



Student Farming Enterprise

2019 Handbook



Authors: Joseph Bernstein, Ellis Cordaro, Al Driscoll, Nick Farlazzo, Alex Libenson, Tom Mirabile, Morgan Reppert, Evans Slepian, Rhianna Zadravec

Edited by: Amanda Brown & Jason Dragon





Student Farming Enterprise

History of the Project

2019 marked the 13th growing season of the UMass Student Farming Enterprise (SFE) program. The SFE began in the fall of 2007 with two students growing kale and broccoli through an independent study. In spring 2008, it was established as a year-long class - spring and fall semesters, with a summer farming component. The program was developed and originally taught by UMass Extension Vegetable Specialists Ruth Hazzard and Amanda Brown, and is now taught and directed by Brown. Additionally, Neal Woodard, Zack Zenk, and Keith Lilly of the UMass Crop and Research and Education Center provide a wealth of knowledge and support for the farm's summer operations. In the spring of 2019 the team enthusiastically welcomed Jason Dragon to serve the official role of farm manager for the Student Farm. In addition to his horticultural knowledge and technical skills Jason has brought laughter and new leadership to the program. Welcome Jason! Startup funds for this program were received from many generous supporters, both on and off-campus. All income from vegetable sales cover production and operating expenses including farm inputs and student labor.

2019 Highlights

This season the students enrolled in the Student Farming Enterprise program accomplished the second highest sales on record for the program with the smallest crew since 2011. The farm offered both full and half shares this season to the campus community. CSA membership reached 104 members, 67 full and 37 half. A new cooler was installed in the barn and \$7500 worth of equipment was purchased through a grant provided by the Sustainability, Innovation & Engagement Fund. This season the farm joined forces with the Food For All program to create the Student Farm Food Access initiative under which all donation and food justice programming of the farm will now live with the help of Sarah Berquist. Total acreage in production was just under 10 acres of vegetables and a quarter acre of apples. Over 3 tons of produce was donated to The Food Bank of Western MA and Not Bread Alone. The farm continued to look at the benefits of animal rotation in fallow fields this season raising and slaughtering 100 birds on the farm using the Mobile Poultry Processing Unit under the direction of Ag Learning Center animal coordinator Nikki Burton. Through collaboration with Stockbridge School instructors Nikki Burton and Lisa DiPiano's Silvopasture project, students raised 9 sheep on the farm as well. All meat produced on the farm was sold to the campus community and UMass Dining Services. Overall this season was FUN and successful. Perfect growing weather and a very hard working crew who loved growing food for their community.

The Handbook

2019 also marks the ninth edition of the Student Farm Handbook, which builds upon the work of each successive year's student farmers to plan, grow and evaluate their vegetable crops. This handbook represents the culmination of planning and analysis from the 2019 season and serves as a testament to the year's successes and shortcomings. This handbook is a guide for incoming students of the 2020 season and will continue the ongoing record of experiences and practices that may be built upon by future farmers.



Our Mission Statement

As UMass student farmers, we commit to providing our campus community with nutritious, organically grown, local produce. We cultivate student empowerment through hands-on agricultural production and by educating our peers about the importance of creating a healthier food system.

Thank You to Our 2019 Sponsors!



UMASS
DINING
UMassAmherst

 STOCKBRIDGE | UMASS
SCHOOL of AGRICULTURE AMHERST

 **MDAR**
MASSACHUSETTS DEPARTMENT
OF AGRICULTURAL RESOURCES

 **Sustainable**
UMASS

THE COLLEGE OF
NATURAL
SCIENCES



 The Center for
Agriculture,
Food and the
Environment

Table of Contents

Student Farming Enterprise 2019 Handbook

2019 Articles & Events Featuring the Student Farm

<i>Historic rebuilt 19th century horse barn officially reopened at UMass ribbon cutting ceremony</i>	1
<i>UMass student farmers market features produce, art, clothing and more</i>	5
<i>Massachusetts farm bureau federation hall dedicated as home for agricultural learning center</i>	7
Season Analysis Chapters	9
Land History –Rhianna Zadrevac	10
2019 Financial Statement – Alex Libenson	13
Marketing –Morgan Reppert	17
CSA and Farmers Mkt – Rhianna Zadrevac	23
Wholesale –Evans Slepian	42
Greenhouse –Joseph Bernstein	54
Farm Efficiency –Nick Ferlazzo	59
Summer Production – Tom Mirabile	67
Integrated Pest Management – Ellis Cordaro	74
Livestock Project –Kyle Zegel	81
Food Access Initiative –Al Driscoll	93



Final Crop Analyses & Authors

Arugula	Tom Mirabile	115
Beets	Nick Ferlazzo	119
Bok Choy	Joseph Bernstein	123
Broccoli/Cauliflower	Alex Libenson	128
Brussel Sprouts	Joseph Bernstein	136
Cabbage	Nick Ferlazzo	140
Carrots	Al Driscoll	145
Celeriac	Morgan Reppert	152
Dry Beans	Ellis Cordaro	157
Eggplant	Alex Libenson	162
Fennel	Evans Slepian	168
Flowers	Rhianna Zadravec	174
Herbs	Rhianna Zadravec	180
Kale	Tom Mirabile	185
Leeks	Ellis Cordaro	192
Lettuce	Joseph Bernstein	197
Onions	Ellis Cordaro	202
Parsnips	Al Driscoll	207
Peppers	Nick Ferlazzo	212
Popcorn	Ellis Cordaro	217
Potato	Joseph Bernstein	221
Pumpkins	Morgan Reppert	226
Radish	Morgan Reppert	232
Rutabaga	Rhianna Zadravec	237
Salad Mix	Al Driscoll	242
Scallions	Tom Mirabile	247
Shallots	Evans Slepian	252
Spinach	Nick Ferlazzo	258
Sweet Potato	Al Driscoll	263
Swiss chard	Alex Libenson	269
Tomato	Evans Slepian	274
Winter Squash	Tom Mirabile	282

References

Equipment Used on the Student Farm	290
Advice from the 2018 Farm Crew	298
2019 Field Maps	303
CSA Flyer 2019	314

HISTORIC REBUILT 19TH CENTURY HORSE BARN OFFICIALLY REOPENED AT UMASS RIBBON CUTTING CEREMONY

September 2019- UMass Daily Collegian.

The Massachusetts Farm Bureau Federation Hall, a historic rebuilt 19th century horse barn, was officially reopened as the centerpiece of the University of Massachusetts' Agricultural Learning Center in a ribbon cutting ceremony featuring UMass student farmers, Chancellor Kumble Subbaswamy and several

prominent speakers in the University's agricultural community.

The Queen Anne style structure, first built in 1894, was systematically dismantled from its former location on Grinnell Way, just west of South College near the core of campus in 2017 and relocated to its current location on at the ALC, off of North Pleasant Street.

"It's really a short distance from Grinnell Way to [the ALC], but it's been a long journey because this was one of the first projects that I got involved in when I became chancellor," said Subbaswamy, the chancellor of the University since 2012.

"In my line of work, I'm fortunate to be involved in a lot of exciting projects and this is definitely one of them," Subbaswamy said. "This beautifully restored piece of campus history, now providing an experiential classroom for our students, seems to effortlessly connect our past to our future."

Many speakers at the ribbon cutting, including the Chancellor, UMass Trustee Mary Burns and Tricia Serio, the dean of the College of Natural Sciences, harkened back to the historical connection between UMass' roots as an agricultural college, established in 1863, under the Morrill Land Grant Act and the new life of the historic horse barn as the home base for the farming students of today and the future.

"[T]his work has never been more relevant as our global society increases its focus on areas such as food supplies, sustainable agricultural production and climate change," Subbaswamy



added. “The University is proud to prepare the next generation of leaders and experts, who will play a key role in discovering future solutions.”

The speakers took the podium under a white tent beside the replicated 1894 barn before the ceremonial ribbon cut took place in front of the barn, officially inaugurating its new mission. Attendees at the event were greeted by a folk band featuring fiddlers and flautists as well as a horse-drawn carriage, courtesy of Muddy Brook Farm in Amherst, a homage to the original purpose of the barn.

Wes Autio, the director of the Stockbridge School of Agriculture, detailed the structure’s long



journey to its current role as the Massachusetts Farm Bureau Federation Hall.

“The horse barn began its life as a home for the Percheron work [horses] of the University at the time of Mass Aggie and it got an influx of additional horses in the 1940s when

the U.S. Cavalry disbanded,” Autio explained.

“The barn itself was in full use until about 1991, the horses were then moved to the newly purchased Hadley Farm, which is out on North Maple Street in Hadley, just west of the [McGuirk Alumni] Stadium and then it began to deteriorate a bit,” he continued.

“The other barns that were on campus started to disappear. The livestock barns went when the Mullins Center was built, the dairy barn went when the Rec[reation] Center was built and it ended up that that horse barn was the last barn on campus as dilapidated was it was, it was the last barn on campus,” Autio said.

Before its reconstruction and relocation the barn was last used over a decade ago by the UMass Police mounted patrol until its eventual shuttered vacancy, according to UMass.

The building’s restoration effort results from the vision of key individuals at UMass such as Stephen Herbert, Tom Hastings and Steve Goodwin among them, who were the driving forces

behind saving and repurposing the horse barn, according to Mark Amato, the president of the Massachusetts Farm Bureau Federation.

These individuals presented the idea of moving the barn to its current site to two of Amato's predecessors, former MFBF Presidents Dr. Richard Bonanno and Ed Davidian. A deal was brokered where if the Massachusetts Farm Bureau could raise the sum of \$500,000, the visionaries would advocate for the rest of the money to see it come to life, Amato explained. "While in the end it was not feasible to move the entire building, the structure before us contains some pieces of the original barn including several stalls and some of the structural materials that support the building," said Amato.

"The rest is a true replica of the original 1894 barn," Amato added. "For example, the paint color was chosen from an analysis of paint chips from the old barn, the 'eyebrow' windows, the roof lines, cupolas and off-center passageway were recreated from old photographs."

The 75-acre ALC, located on the former Wysocki Farm, had humble beginnings for its certified organic vegetable farm, which started in the summer of 2013 according to Amanda Brown, a lecturer in Stockbridge and the director of the ALC. "That season our modest production plan for this site only included direct seeding 600 row feet of pumpkins," Brown explained.

However, the site has since flourished over the last six years thanks to the devoted and tight-knit student farmers who are projected to wash and pack 50 tons of student-grown organic produce in the Massachusetts Farm Bureau Federation Hall this fall, bringing in a gross income of \$100,000 according to Brown.

This harvest then reaches consumers in 10 wholesale markets on and off campus including an over 100-member Community Supported Agriculture program, Earthfoods Café, UMass Dining, four Big Y Supermarkets and the autumnal UMass Student Farmers Market, held weekly on the east Campus Pond Lawn. Serio explained student farmers are also conscious of issues surrounding food waste and food insecurity and work to combat these problems.

"The Student Farm Food Access Initiative is a student-run organization that now recovers and redistributes excess food, already grown at UMass and in the local community and partners with local relief organizations to provide this food to those in need," she said.

"[O]ur student farmers have donated over 20,000 pounds of produce to local hunger relief agencies in the past two seasons," Brown added.

"On any given day you will find our students working closely with members of our faculty, honoring the learn-by-doing model of Levi Stockbridge," Brown added. "In the fields behind me, we plant trees and forage for native pollinators, we trellis tomatoes, we raise chickens and sheep, we plant grape vines and extract honey among a million other things."

Senior sustainable food and farming major Thomas Mirabile is one of this season's nine-member UMass student farmers who currently harvest crops three to four times a week.

When asked what it's like working on the farm, especially now with the repurposed horse barn as its centerpiece, Mirabile explained, "It's amazing, we harvest right out here early in the mornings at like 6:30 and it's great to just have produce come straight to the barn where we can wash it and pack it and store it immediately. It's so helpful to have a place close to campus that I can walk or ride my bike to."

"During the dark early morning hours on the farm you'll find the barn buzzing with activity, the radio blaring and the smell of coffee in the air as we work to wash and pack vegetables for that day's order," Mirabile's instructor Brown said.

"In the summer, the shade of the barn is a cool welcome treat for our staff meeting or a quick lunch. The sunlight on the barn at dusk is stunning as we clean up and close the large sliding doors, knowing that the cycle will begin again the next morning."



UMASS STUDENT FARMERS MARKET FEATURES PRODUCE, ART, CLOTHING AND MORE

September, 2019 – UMass Daily Collegian Irina Costache

'What we're trying to do is create alternative economies that are more human scale'

The University of Massachusetts Student Farmers Market opened up for the second time this season, this time coinciding with the day's "Walk Out for Climate" on Friday.



The market, held on the campus pond lawn (near the Integrative Learning Center), is a collaborative project between UMass Permaculture and the UMass Student Farm that has been put on since 2013 and runs from September through November. Occasionally there are markets put on in the spring.

According to Dan Bensonoff, the sustainability coordinator of Campus Gardens and organizer for the market, the market sees about 500 people attend each Friday. About 100 of the attendees come in to pick up produce through the Community Supported Agriculture subscription, he said. Usually, the market features 10 to 20 student vendors — any student can sign up to be a vendor. The goods sold range "from students who sell their own

personal art or crafts, to people who have their own beehives and bring their honey to people that want to recruit people or tell people about something that's happening politically or an event that they're organizing," said Bensonoff.

He added, "It's really more than just like the things that we're offering. It's about creating this movement of people who are creating alternatives to mass consumption and exploitative capitalism. That's kind of the broader theme of what we're trying to do is create alternative economies that are more human scale and allow people to really offer what they're passionate about."

Each week, the UMass Student Farm has a booth selling fresh fruit, vegetables and flower bouquets that were grown and harvested by UMass students, many of whom are majoring in sustainable food and farming.

"It's a lot of people you can count on, they have your back ... It's also about working together during the summer because we all make decisions as one group... so you have to learn how to manage that," said Thomas Mirabile, a sustainable food and farming major.

Though most booths only accept cash, there is an opportunity for students to pay with a card by buying tokens at the information table.

Emmalie Keenan, a graduate student studying German and Scandinavian studies, sells her embroidery at the market.

"I never imagined I would be selling art, and it's just been a great outlet ... More people are doing embroidery because they've met me here and seen my stuff, so that's really fun," she said. "The vibe here is awesome.... it's just a lot of happy, fun people who want you to eat farm fresh food."

Another artist, studio arts major Hannah Exum, sells stickers and posters that focus on "feminism and the idea of promoting female self-worth and the female identity."

"It's a really nice way to just feel integrated in your community ... it's not really as much about the selling as it is about getting to talk to talk to and get to see all different faces on campus. It's really nice outreach," Exum added.

Attendees can also expect to find racks of pre-owned clothing at the market by Rack City, a student-run thrift shop on campus. The clothes are donations from other students and usually range in price from one to five dollars.

"We're always looking for more donations," said Clara Silverstein, a junior political science major. "But all the money we make goes to the Sustainability Innovation and Engagement fund... which is called the SIE. Basically, students and faculty can apply and get funding for projects on campus."

Bensonoff also spoke about the positive environment for vendors who get to showcase their work and receive feedback, saying "my hope [for vendors] is to talk about and showcase

whatever it is that they're offering and maybe also financially support themselves, but more importantly, kind of get that entrepreneurial experience, and be able to feel good about what they're making ... I think it's really an affirmation for them."

The day's farmers market also fell at the same time as the climate strike, just steps away on the campus pond lawn.

"I think it makes sense to have those two together. Because to me... one of the best things that we can really do if we're going to actually try to tackle the climate issue, we have to try to tackle consumerism... I think what we're offering is an alternative way that people can engage in, with the goods that they want and support, artisans and makers without going to a big box store and getting those things," said Bensonoff.

MASSACHUSETTS FARM BUREAU FEDERATION HALL DEDICATED AS HOME FOR AGRICULTURAL LEARNING CENTER

September 2019 –College of Natural Science Newsletter

The former University of Massachusetts Amherst campus horse barn, now part of the Stockbridge School of Agriculture's Agricultural Learning Center, was officially unveiled to the public with a ribbon cutting and opening celebration September 25th. Stockbridge School Director Wes Autio acted as emcee of the event, recapping the barn's history and introducing speakers including Chancellor Kumble R. Subbaswamy, UMass Trustee Mary L. Burns, Massachusetts Farm Bureau Federation President Mark Amato, Agricultural Learning Center and Student Farm Director Amanda Brown, and current student Morgan Reppert.

Built in 1894 and unused for years, the Queen Anne style horse barn was carefully dismantled, moved to its new foundation, and reconstructed with additional materials to provide a central facility enabling Agricultural Learning Center activities. To retain the original exterior appearance, windows and doors were replicated to original measurements, and details such as eyebrow windows were recreated. The project was made possible thanks to a generous



donation from Dr. Richard Bonanno and the Massachusetts Farm Bureau Federation. Autio also recognized the efforts of the UMass Amherst Design and Construction management team and Preserve UMass for their roles in bringing the project to fruition. Chancellor Kumble R. Subbaswamy recognized these contributions in his remarks at the event, noting that, "Through their efforts, this new facility offers the university expanded opportunities to build on our historic strength in agriculture. In the same tradition of Levi Stockbridge, whose research pioneered ways for improving crop production, our faculty and students are advancing agriculture science through learning, research and engagement." In its new life as Massachusetts Farm Bureau Federation Hall, the barn supports student agricultural activities and houses industry-standard equipment for washing and packing the approximately 75,000 pounds of vegetables produced by student farmers each year. Director Amanda Brown says, "The barn has given us a home."

The Agricultural Learning Center as a whole provides a hands-on, living classroom for students to learn about farming and the horticultural, nursery and landscape industries. Created in 2013 on 75 acres of land immediately north of campus on the former site of the Dakin and Wysocki family farms, the center quickly grew to host initiatives from agronomic field crop sites, an organic vineyard, carbon farming experiments, fruit crops, an apiary and pollinator gardens, and the Utility Arboretum, to the UMass Student Farm Enterprise.

To the assembled crowd, College of Natural Sciences Dean Tricia Serio said, "We are so pleased to add this facility as an essential component in our ability to serve Massachusetts agriculture and to fulfill the College of Natural Sciences' mission. Having one of the oldest buildings on campus reborn and rehabinited by the next generation of farmers provides a visible reminder of our continued commitment our land-grant foundation and our long history of successful agricultural partnership with those beyond the borders of our campus. Massachusetts Farm Bureau Federation Hall now becomes part of our ecosystem of innovation and discovery, furthering our ability to implement revolutionary scientific solutions to the grand challenges facing our society." Remarks were followed by a formal ribbon-cutting ceremony and a reception within the barn, where students were on hand to show attendees some of the barn's new functions and talk about their experiences with the Agricultural Learning Center.





Season Analysis Chapters

- 1. Land History** –Rhianna Zadrevac
- 2. 2019 Financial Statement** – Alex Libenson
- 3. Marketing** –Morgan Reppert
- 4. CSA and Farmers Mkt** – Rhianna Zadrevac
- 5. Wholesale** –Evans Slepian
- 6. Greenhouse** –Joseph Bernstein
- 7. Farm Efficiency** –Nick Ferlazzo
- 8. Summer Production** – Tom Mirabile
- 9. Integrated Pest Management** – Ellis Cordaro
- 10. Livestock Project** –Kyle Zegel
- 11. Food Access Initiative** –Al Driscoll

Land History of South Deerfield

The UMass Student Farm acknowledges our fields in both Amherst and South Deerfield as traditional homelands of the Pocumtuc, Nipmuc, and Wabanaki Confederacy. Our presence on this land is due to settler colonialism and the erasure of these local indigenous communities. In South Deerfield, the Student Farm practices sustainable agriculture on fertile lands that abut the Connecticut River. When we learn about the fields in South Deerfield, we see scientific proof that our soil is rich. The Hadley silt loam which resides in these fields holds stories of generations of farming communities that have produced food for centuries; we are grateful to continue this at the Student Farm.

UMass Amherst and the lands on which we farm are located on a broad, flat floodplain that was once occupied by Glacial Lake Hitchcock between 10,000 and 12,000 years ago. Glacial Lake Hitchcock stretched for two-hundred miles from the Connecticut River Valley all the way to Vermont. What we now know as the Pocumtuck Range contained the glacial water to the east and the “Rocky Hill Dam” in present-day Rocky Hill, Connecticut contained the water to the south. Eventually, the dam broke apart and allowed Glacial Lake Hitchcock to drain out, leaving the exposed land and fertile soil we see today.¹

The land in South Deerfield has been occupied by indigenous peoples for twelve-thousand years; and for the past eight-thousand years was farmed, fished and hunted. The Connecticut River Valley, primarily occupied by Algonkian peoples, include the Agawam, Cowass, Pocumtuc, Nonotuck, Quaboag, Quinnipiac, Woronoco, and Sokoki nations, as well as nations from the Hudson River Valley. The valley where our field in South Deerfield is located is known as the “great meadows” and historically is labelled as “some of the best farmlands in the whole valley”.²

The Pocumtuc grew a variety of crops on the land in Deerfield. The main crop grown was maize, a hardy, staple item in their diets. The cultivation of maize in the area can be dated all the

¹ Little, Richard. *Deerfield River Valley Mysteries: How the Glacier Age and Other Geologic Events Shaped the Deerfield River Watershed*. Deerfield Academy, 2011.

² Brooks, Lisa. *The Common Pot*. Minneapolis, University of Minnesota Press, 2008.

way back to 1200 C.E.! Over thousands of years, the Pocumtuc became experts in maize horticulture, planting their fields in the open meadows of Deerfield. The way in which the Pocumtuc cultivated the land has been described as “low impact land use”.³ The land was seen as “animate, communal territory, supporting both human and non-human inhabitants in reciprocal social and spiritual relationships”.⁴ In addition to maize, the Pocumtuc also grew beans and squash. Along with many other nations, the Pocumtuc utilized the sophisticated system of the Three Sisters to grow these crops. The Three Sisters is a way of growing corn, beans, and squash together in a symbiotic relationship. The corn grows tall and is harvested first, allowing the beans to wind up around the stem of the corn while also fixing nitrogen in the soil which allows the squash to grow beneath and flourish. These annual plantings also helped to stabilize the riverbanks, and allowed for the regrowth of native plants, creating habitats for animals.⁵

We want to educate future Student Famers of the rich history embedded in the land. We bring gratitude and respect into our time on the Student Farm, acknowledging the land stewards who came before us. We invite future student farmers to become engaged with this history and understand how the Student Farm got where it is today.

³ “Founding New Communities.” *Deerfield*, PVMA, 2004,
1704.deerfield.history.museum/scenes/nsscenes/founding.do?title=foundDeerfield.

⁴ Bruchac, M. (2011). Revisiting Pocumtuck History in Deerfield: George Sheldon’s Vanishing Indian Act. *Historical Journal of Massachusetts*, 39(1-2), 30-77. Retrieved

⁵ Brooks, Lisa. *The Common Pot*. Minneapolis, University of Minnesota Press, 2008.

Bibliography

- Brooks, Lisa. *The Common Pot*. Minneapolis, University of Minnesota Press, 2008.
- Bruchac, M. (2004). Native Land Use and Settlements in the Northeastern Woodlands. Raid on Deerfield: The Many Stories of 1704, Retrieved From
http://repository.upenn.edu/anthro_papers/107
- Bruchac, M. (2011). Revisiting Pocumtuck History in Deerfield: George Sheldon's Vanishing Indian Act. Historical Journal of Massachusetts, 39(1-2), 30-77. Retrieved from http://repository.upenn.edu/anthro_papers/106
- "Founding New Communities." *Deerfield*, PVMA, 2004,
1704.deerfield.history.museum/scenes/nsscenes/founding.do?title=foundDeerfield.
- Little, Richard. *Deerfield River Valley Mysteries: How the Glacier Age and Other Geologic Events Shaped the Deerfield River Watershed*. Deerfield Academy, 2011.

2019 Financial Statement

Preface

Thoughtful planning and management of finances on the UMass Student Farm is not only vital to ensure the continuity of the program, but is a unique opportunity to explore the side of farm ownership that is not covered in most classes. Although this may not be the most exciting part about working on the Student Farm, its importance should not be overlooked. The financial viability of the farm depends on the decisions and practices of each crew. This is your chance to leave the farm better off than before in a very tangible way. You can do it!

Chart 1. 2019 Revenue and Cost Overview

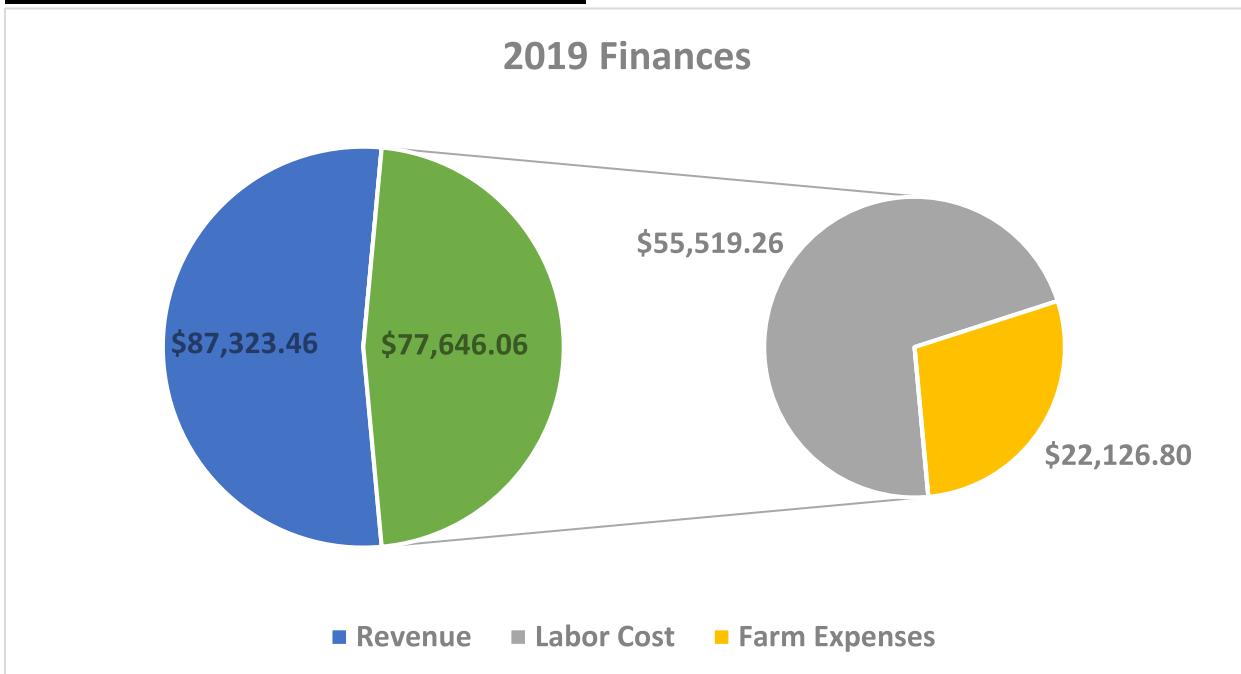


Chart 2. 2019 Revenue Breakdown

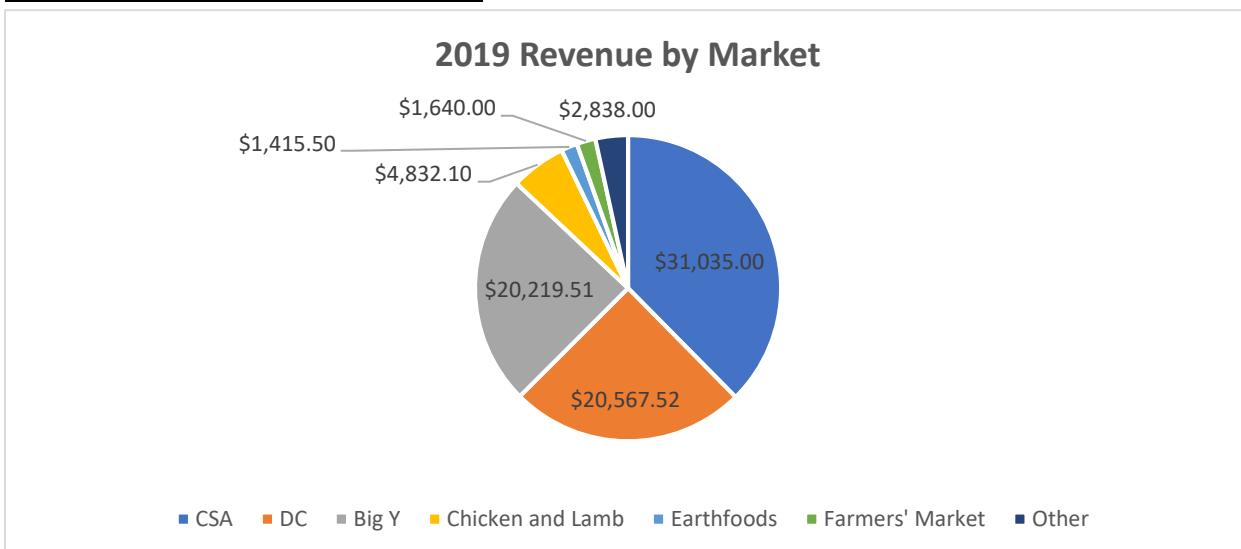


Chart 3. 2019 Cost Overview

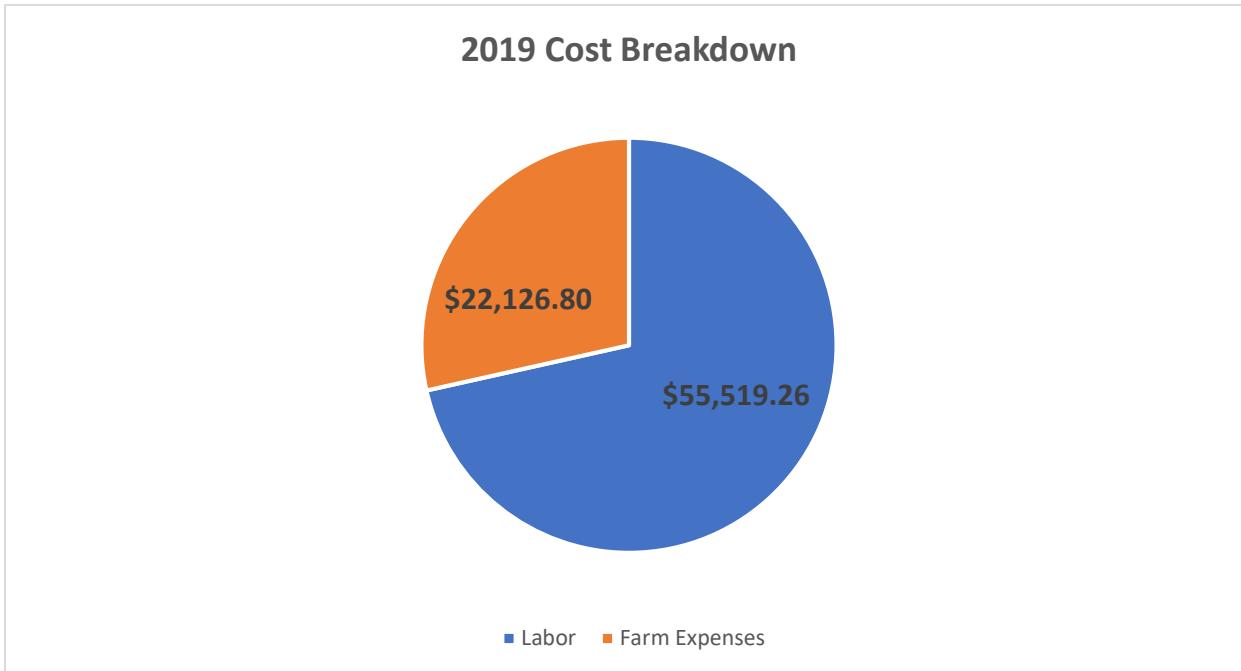
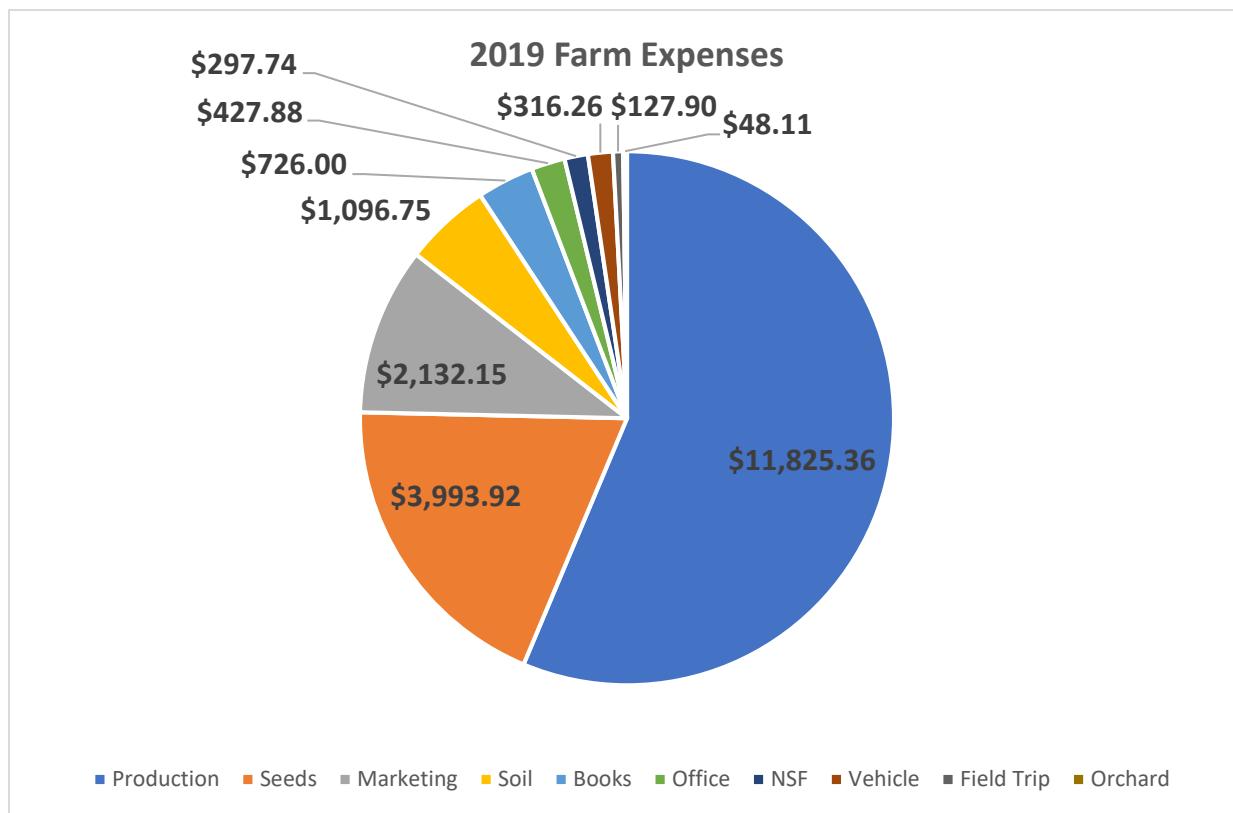


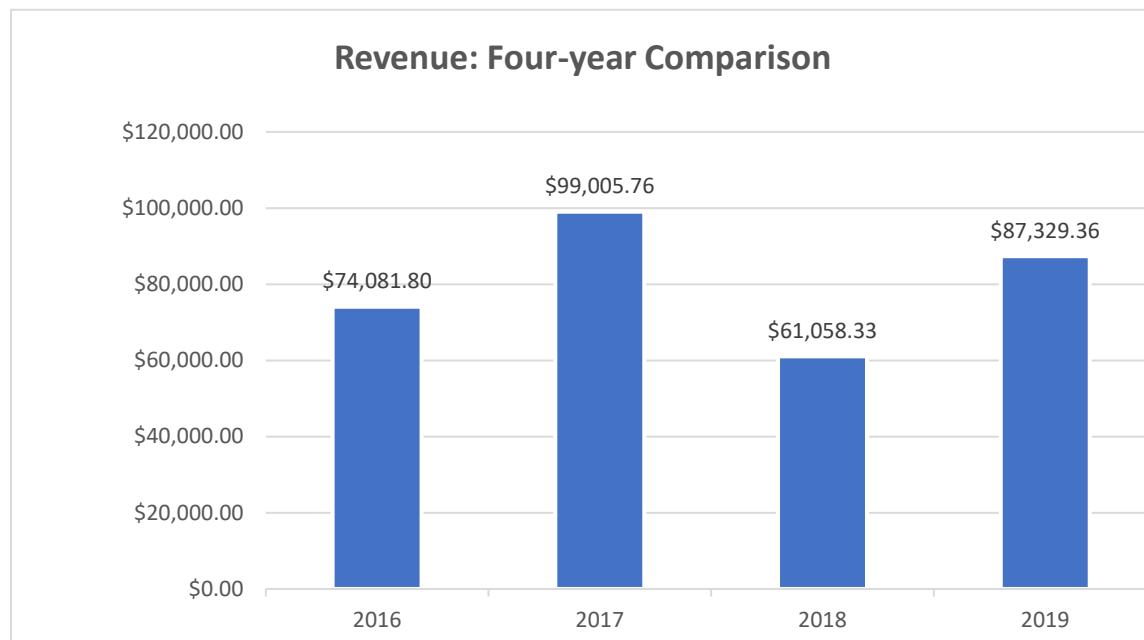
Chart 4. 2019 Expense Breakdown



Trends

A number of important considerations must be taken into account when planning your spending in the spring. Among these are two important questions: why are certain seasons more profitable than others? What percentage of revenue should be spent on labor? It is also important to consider how much of total profit should be spent on labor versus the various farm expenses and classroom expenses.

Chart 5. Student Farm 4 Year Revenue History



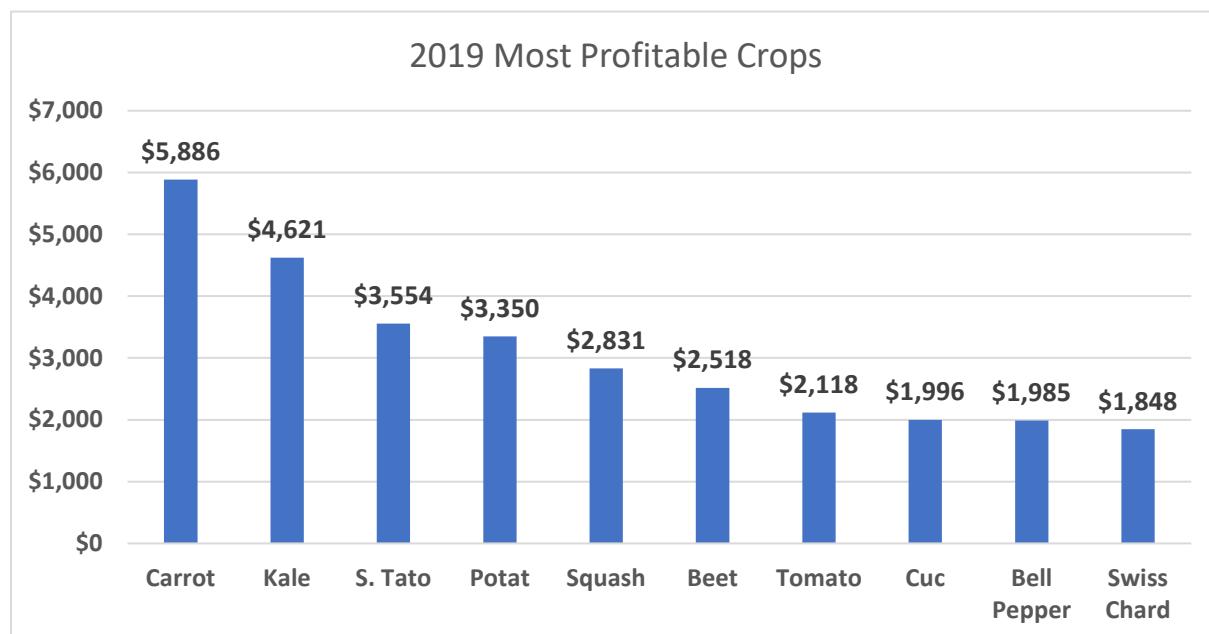
Future Labor Cost Scenarios

When planning labor costs in the spring there are a few general calculations that allow for more accurate estimations. As an example, 10 students working the entire 16-week summer at \$13/hour and 40 hours/week will amount to \$83,200.00 in labor cost. Each incremental farmer added to the crew or taken off the crew would alter the total labor cost by \$8,320.00. This is the general framework for calculating labor cost, which will inevitably change. The number of farmers, number of hours per week, estimated vacation time, and pay rate will all affect the final numbers. In the end, the wants, needs, and judgement of the crew will determine the final labor cost. This past spring, the 2019 crew estimated that 9 students would work 37 hours/week for 15 weeks, which would amount to \$68,522.46. The actual labor cost ended up being only \$55,519.26, which suggests that it might be more accurate to assume that farmers will take more than one week of vacation time due to injury or other unforeseen circumstances. As a general rule, however, it probably makes sense to assume everyone will work the time they commit to, rather than planning for these unforeseen circumstances since expenses could end up higher than expected if everyone does end up working every week they plan to work. Labor cost was 55.7% of total cost in 2016, 61.5% of total cost in 2017, 47.1% in 2018, and 71.5% in 2019. On average, labor on the Student Farm amounts to 58.6% of total cost. It is likely that the target percentage going forward should sit right around this average number, but the final amount will depend on the wants and needs of the crew. Higher relative labor cost does not necessarily mean lower profit, as the 2019 crew demonstrated.

Most Profitable Crops

Our most profitable crops this year were staple crops available throughout the majority of the growing season. This is an important factor to consider when planning in the spring. Crops that are consistently available and demanded by various markets will always make a substantial amount of money. In first place, with a total wholesale income of \$5,886 is carrots. In second place is Kale with a total income of \$4621 followed by Sweet Potato at \$2,405.00.

Chart 6. 2019 Most Profitable Crops



There are also a few intangibles that must be considered when planning for production in the spring, especially since it is more challenging to calculate value of produce that is included in the CSA. The labor requirements of a crop, percentage of total CSA pickup weight, and value of a particular crop adds to the CSA are all important considerations. It is vital to strike a balance between these qualities to create a CSA that is economically productive and well received. For example, carrots and beets make up a substantial percentage of the total weight of the CSA, but carrots are more widely liked by members, which potentially makes them a more valuable crop than beets. Herbs and other leafy greens make up a much smaller percentage of weight but are loved by many CSA members.

General Suggestions for Student Record-Keepers

Consistently keeping accurate records throughout the season is quite a challenge. It is important to allocate roles well, find a system that works, and create a system of accountability. As the summer comes to a close and academic classes begin, it is easy to overlook the record-keeping responsibilities that might have been more of a priority over the summer. Take the time you need, lean on your team for help, and stick with it!

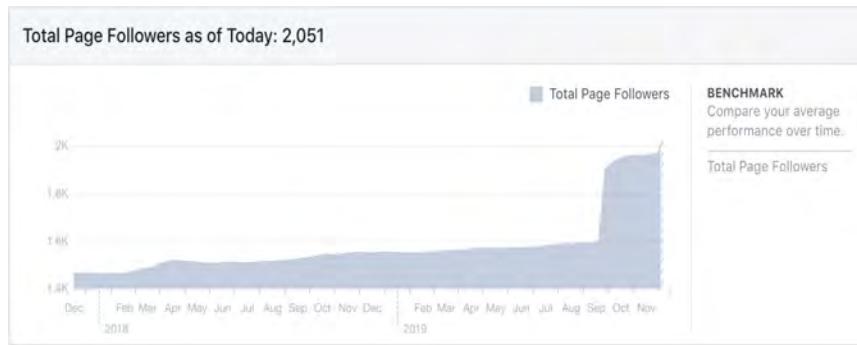
The Morgan Report: Social Media, Marketing, and Public Relations

If you're reading this, you've made the decision to join the UMass Student Farm. Congratulations, it's undeniably one of the most special and rewarding programs at the University of Massachusetts. Although you and others around you may easily know how amazing this program is, it's your job to help spread information and awareness of this program so that it can continue to live on. This is just one of the many reasons why the consistent usage of social media, marketing, and public relations are incredibly incremental to the farm's success. This past year I placed a lot of stress on making sure the community around us knew who we were, what we did, and why we were doing it. In doing so, I believe that we were able to reach a larger audience and better connect with our CSA members, students, and faculty.

My Experience

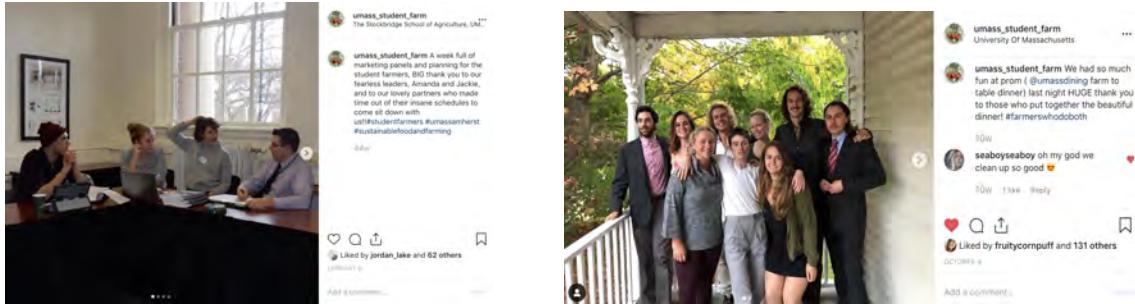
About ten months ago, I remember sitting around the tables in the CNS greenhouse on our first class block. This was the first time all of the 2019 crew was in one room, no one was really speaking casually yet nor was there our usual banter. The topic of social media came up and I awkwardly volunteered to take point on it. I was worried about what my new peers might think that I was *that* person, little did I know with the help of the crew that we would put the student farm back on the social media map.

Facebook Followers from December of 2017 till now



Have you ever tried taking photos or videos of people you don't know that well? I have and it can be for the lack of better words, challenging. However, being able to have a record of essentially what happened this past year was invaluable. I began by making Instagram stories just based on what we were doing day to day in class. I remember my first few posts were not organic and what I thought might be semi-professional. If you take the time to go back through the archives, you can see the quite dramatic shift in the tone of the stories as well as the posts. I often hear myself on repeat saying to the crew, I was able to share our experience with our followers so well because they made it easy. By easy, they were enthusiastic and made me feel comfortable when filming them, taking photos, or making silly boomerangs. It was fun, and we were having fun which translated over into our content.

Spring 2019 vs. Fall 2019



It wasn't until the summer where we really able to document the progress of the crops and our relationship started to bloom. If you're reading this and worried that you don't know your crew members all that well, just give it some time. The people around you are going to be some of your best friends and biggest fans. I began the season by making sure to capture everything from lunchtime, hoeing, weeding for hours on end to what variety was going in the ground that day. There were many days where my phone was covered in dirt or maybe that I forgot to take a photo. But for the most part, I could look back for reference at any point and figure what we did that day in the summer.

I began to make short videos, one about favorite vegetables and the second a video to our CSA members. I remember making a CSA bloopers video after the initial post and that did worlds better, just to reinforce the concept to have fun. The last video I made was a [week in the life of the UMass Student Farm](#), this video's reach was over 1,000+. It may seem daunting at first, but a lot of the film software is very easy to use and YouTube is flooded with how to tutorials. This video aside from it being fun to make it really validated how hard everyone was working. Whether it was a video or a photo, having the memory of those incredibly challenging days is priceless.

As the fall rolled around we had established a significantly larger and active following. This made it easier when making announcements or CSA updates. People were now viewing our stories and commenting on our photos in a way that they didn't before. The recognition that I received was overwhelmingly positive, people were in tune because our content reflected the camaraderie that was shared on the crew. Of course there were times that I was told to put my phone away or maybe it wasn't a great time to film, but this comes with time. You'll get into a flow where you *find the balance of being present while still capturing these awesome moments*.

Although, I was essentially the point person for managing the social media outlets, there were times that I wasn't around to document everything. The crew was really good about compensating with making sure to story or post when I wasn't there also everyone's story had their own flair. Remember to ask for help, don't be a hero.

As the year rolled on, I made a point of allowing myself to get in front of the camera too. Reminding myself that I wasn't just a cameraman or some social assistant helped me stay present and involved. Some of my favorite moments are filled with belly aching laughter on CSA

Fridays, and now I am lucky enough to be able to go back and look at those. The highlights on the Instagram tell a story. And if I might just say, my story too.

The 4-1-1

The Student Farm is currently active on [Instagram](#) and [Facebook](#), however it is incredibly important moving forward into the next year that you reinstate the LinkedIn page and create a Twitter. I know it may sound like a lot at first hand but this stuff is crucial to keep the Student Farm alive. It's not a chore, it's basically an art project. Aside from just creating content for the Student Farm's social media outlets, it's tandem to make sure to reply to inquiries in the form of emails, comments, direct messages, and or posts. Sometimes the requests and messages can get redundant, but replying with a friendly face and message can really help retain positive word of mouth about the Student Farm. Believe it or not, many people actually don't know who we are or essentially what we do, and that's why using social media as a tool to show people is so critical! I've picked a quote below that I think falls in line with the Student Farm philosophy, it's not all about establishing the brand but building relationships so that the Student Farm can continue to live on for years to come.

"Social media is not a media. The key is to listen, engage, and build relationships."

-David Alston

FAQs

1. Does my photo have to be high quality?
 - a. Not necessarily, but phone cameras do have quality cameras these days and mobile applications that are free can really help improve the quality of the photo. For example Lightroom and Snapseed are easy and free to use.
2. How do I engage?
 - a. A very easy way to engage with your followers and incredibly important for the longevity of the farm is to ensure that you're actively resharing, mentioning, reposting people who tag the Student Farm. Obviously, use your discretion when resharing posts because whatever you reshare is reflective of the ENTIRE program. The Student Farm hasn't taken a stance on certain political issues like certain student businesses do so if that's something you want to reshare, talk to Amanda or Jason first.
3. Do we need to pay money to sponsor our posts?
 - a. This will come up on your Facebook and occasionally on your Instagram. I am here to sway you away from this for a few reasons. A farm, especially a student farm is a VERY easy business to market. One it's ran by full-time students, you! That in itself is unusual and quite a large feat, make sure you tell your audience what you do and why you do it. The second half is simply how beautiful our land and space is. It's incredibly photogenic.

4. What applications do I use?

- a. I used a few throughout my time. None were necessary to do the job but made things helpful or made things look more dynamic. The story highlights I used Phonto. For certain graphics for advertising events and CSA share advertisement try your hand at canva. It's very navigable and you can make some nice stuff. Once again, you can do anything just google it or watch a YouTube how to video!

5. Who runs the account?

- a. This is a decision you as a crew will have to navigate. I personally wanted to take point and that worked out well for the crew. However, people still helped out and provided support when needed. If you decide to not give it to simply one person, it's important that you make sure it doesn't become a diffusion of responsibility. Take ownership over it but don't be territorial, find that middle ground.

Do's and Don'ts

Do:

- Post frequently, set a goal for yourself. I would aim to post 3x a week, if you're ever worried about shortage of content there are loads of photos on the drive and on multiple Flickr accounts
- Story! Make sure you story, even if you're sitting around the table at Wysocki, going on a field trip, typing your crop plans, potluck, seriously anything! Document it!
- Make Facebook groups for every event. This is something we should have spent more time and dedication. It would have been very helpful for the Farmers' Markets to have consistent event pages so we could have better marketed them.
- Make sure that your accounts are linked, so you can cross post. It may take a little bit to figure out but it creates less work for you in the long run. An Instagram post and Facebook post simultaneously at once will save you time!
- Watch and read your stats on the applications. Check in to see how certain posts and stories are doing. It's not crucial but it is important, it can help you better gear how to reach the communities around you.

Don'ts:

- Having a theme or a certain filter isn't completely necessary, the photos itself usually have enough color and or spice that the photo itself looks good without over filtering it.
- Avoid using any controversial or harmful language, I've said this before you on the social media accounts represent both Stockbridge and the Student Farm, be cognizant.
- Collaborations can be great, but be careful there are some weird requests or spam accounts that want to work with you, be weary.
- Don't worry about being too professional, organic and raw content does really well for our audiences.

Content Ideas

There were many things I would have loved to have had the chance to start but due to time constraints I never got around to it. A few ideas that I think would fare really well if you execute them are creating a Newsletter. This Newsletter could be really anything you want it to be, you can do them every two months in the Spring and maybe once a month in the Summer. It gives the UMass community, Amherst community, other farms, CSA members, and whoever a chance to get to learn a little bit more about the Student Farm. It also can reach people who aren't on social media to engage with us. You're going to be doing so much and creating so much content it's a great place to share with people.

Another idea is to create farmer profiles for each crew member. We did this for two student farmers last year because I dropped the ball, but doing a series of about me posts lets people "know their farmer". I called the series Meet Your Student Farmer Wednesdays, but you can really do it however you want! Aside from student profiles, doing Friends of the Farm profiles can be really great as well. Below I've included an example of a Student Farm Profile (left) vs. a Staff Profile (right) both did really well engagement wise



CSA Marketing

You'll soon come to find that marketing the CSA will consume most of class discussion. I remember feeling relatively stressed out that we didn't have a fluid plan to best market the CSA and that we weren't going to sell shares and that the Student Farm was going to die. Clearly, that didn't happen. The 2019 crew focused around a lot of flyering, tabeling, mini table tents for the dining commons that didn't pan out well and a few social media posts. What would be really helpful is to consider the following ideas and suggestions! Also I will be around, I'm only a junior, I am happy to help you!

1. Start rolling out advertisements or notices as soon as you can, don't wait till the month before, this can be done in a multitude of ways. You can share photos of CSA members from the Fall or even contact them for testimonies and share those in a post.
2. Don't rely on print advertising, it can be costly and a lot of times it can get thrown out by staff on campus in the buildings you put them in. Focus on mass emails, social media posts, and contacting certain faculty to help share.
3. People want to know what a share looks like! Don't use the photo from years ago, look through the archives on instagram and our highlights, many members shared photos of their shares laid out. Use those!
4. Reach out to graduate students groups, they make a pretty large portion of our members and they get full shares. Also, some of them make more money!
5. Honors College students who live in apartments! They're on campus so close proximity to the markets and they have kitchens. Target them.
6. We have so much content! Look at these flickr pages, lots of good stock content. USE THEM. [UMass Dining](#) / Daily Collegian

Outreach and Public Relations

In the Fall semester, there is going to be an influx of responsibilities! Aside from all your class responsibilities, you're going to have events you attend as a crew. They may seem boring and annoying because you're already so busy. But for the most part it can be fun because you get a free meal and a chance to tell more people about the program. I'd recommend making a master calendar before school starts so you have a good visual about when these events come up. Aside from those events, make designated volunteer hours. We did this once this past fall but it was a little bit of a flop as only two people came, but we didn't communicate it all too well or work that hard to advertise other than a few stories and a Facebook event. *Create designated volunteer hours for each week! This will allow anyone to get involved and this is crucial, it will help you in the long run.* In addition to that have a *CSA members volunteer day*, in our survey this is something they really wanted! **UNRELATED: START A FLOWER CSA!!!**

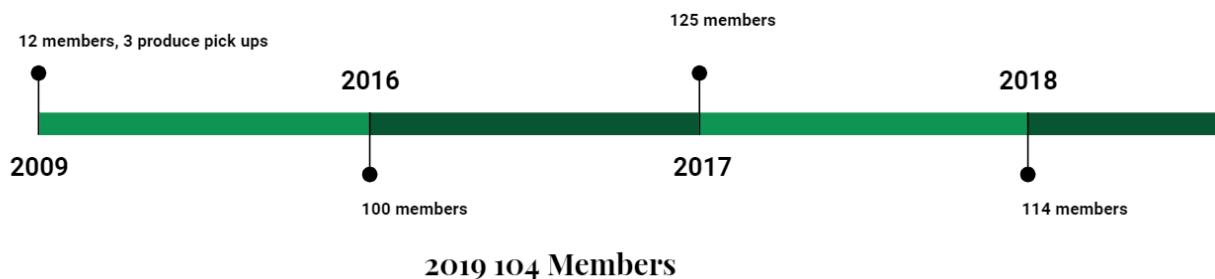
CSA and Farmers' Market

The CSA

CSA stands for Community Supported Agriculture. This model is designed so that farmers get a financial advantage earlier in the season so they can fund their operations, pay their employees, and produce their food. CSA programs generally run in consecutive weeks over the course of a growing season (in our case, the semester). The CSA model involves weekly pickups of a certain poundage of produce, depending on what is seasonally available on the farm at that time. The CSA model is direct to consumer and allows for relationships to build between farmers and consumers. CSA members are not just buying produce they see that looks nice on the shelf—they are investing in our farm, our mission, and goals, and relying on us to provide them with the most beautiful produce we possibly can.

Our CSA program is a huge part of our program, as it is our main source of income for summer employment and other expenses. In the past few years, the CSA program has exploded and evolved with the tastes of the new crew.

Below is a chart of our CSA progression over the years:



Since the beginning of the CSA program, we specifically have only marketed to people within the UMass campus community. It is important for us to not compete with other local farms in the area, as we have many failure cushions and tax exemptions due to our status as a State University farm. There is also plenty of interest within the UMass community as students and faculty are eager to learn about local and sustainable agriculture.

Our CSA program runs approximately from the second week in September to the second or third week in November. This year, our CSA ran from September 13, 2019 until November 15, 2019. CSA pickups always occur on Fridays from 12:00-4:00PM. In past years, the CSA pickups happened on the Goodell Lawn at the Student Farmers' Market. However, due to the Student Union construction, the Student Farmers' Market happened on the East Pond Lawn of the Campus Pond. This new location offered many benefits, as well as posed many challenges for us this season. I will touch more upon this later.

Pricing

Our crew made two huge decisions regarding our CSA program this year. First, we voted to increase the prices of our CSA shares by \$10 for both student and faculty full shares. With increasing minimum wages, operating and fixed costs, and a very low starting balance we decided that it was time for a change. CSA shares went from:

Student Full \$350 -- \$360

Faculty Full \$380 -- \$390

We do offer an Early Bird Special which allows CSA members to sign up for a share before May 1st and receive \$25 off their share! This year about 50% of members signed up before May 1st and received the Early Bird Special.

We also offer a special called Friend of the Farm. This is where CSA members who can afford to do so pay \$500 total for their full share. The extra funds go directly into our program to fund our fixed and operating costs, summer employment, equipment, and much more. We only had two people purchase a Friend of the Farm share. Target faculty to purchase not only CSA shares (because they are more expensive) but also marketing to have them support the farm and buy a Friend of the Farm share.

The second big decision we made was to offer both half shares and full shares to students and faculty. Our thought process behind this was based off past CSA surveys which held common themes that the CSA was too much food and/or was too expensive. We thought that half shares would be a great solution to this! The goal we had in mind was to sell an ambitious total of 150 shares. This would include 100 full shares and 50 half shares (equaling out to 25 full shares). In total, we would receive payment for 125 full CSA shares. In total, we sold 104 shares, which broke down into 37 half shares and 67 full shares (95 full shares). By offering both full and half shares, we **lost** money this year! 😞 In 2017 there were 124 members and the Student Farm made \$42,730. In 2018 there were 114 members and the Student Farm made \$29,515. This year we had 104 members and made \$31,035. If all our members had been full share members (75% student and 25% faculty), we would have made a total of \$38,220.

Spring Marketing

The Spring semester is a crucial time to begin selling CSA shares. This year, we began selling our shares on March 7, 2019. Selling shares during the Spring semester is important as thoughts of school and/or CSA shares drift away from peoples' focus during the summertime. However, during the summertime it is great continuing to advertise via Facebook and Instagram that there are still CSA shares available. Our main motive in the Spring for marketing was using Social Media platforms to reach out to the campus community (see Morgan's Chapter). On our CSA sign up form, we ask people how they had heard about the farm. Besides returning members, most



people hear about our CSA program through word of mouth or flyers. Flyers are SO important! We made a few different ones and posted them all around campus. We also made small table tents which we put on tables in the dining halls for two weeks at a time. We don't know if this was super useful in marketing our shares, and it also cost a lot of money to put table tents up in the dining commons.

Another aspect to Spring marketing is tabling. Tabling involves setting up a table in a heavily trafficked area, such as the Campus Center, Student Union/Bartlett Hall, or the Dining Halls. When we tabled, we brought our flyers for CSA shares, posters about the farm and CSA program, STICKERS (!), and veggie costumes.

We had people sign up for different time slots to go to a location and table for about two hours. To table on campus, you usually must contact a representative from that location to get a table set up for you. When tabling, we can encourage people to sign up on their own phone or computer, but we cannot have people sign up on our own devices because of some security reasons. Tabling can be fun but also painful. We often found ourselves running up to people in our vegetable costumes asking them if they liked vegetables. Was this the best way to increase engagement? Who knows! In the Spring we also have three Spring Markets. Here is a great time to also market for our CSA shares! We also created a Facebook event called "Storm Goodell" where we invited people to join us on the Goodell Lawn to buy a CSA share and maybe scream something like, "I JUST BOUGHT A CSA SHARE!!".



Fall

This year, we continued selling our CSA shares right up until the first pick up day (September 13th). Other than the actual CSA pickup on Fridays, there are a few other very important aspects to the CSA in the fall.

CSA Email

The CSA email exists to provide our members with important information about pickup location and time, what will be offered in their share, a fun recipe to try, and anything else that might be useful for members to know about. Here is an example of a CSA email.

Hi there CSA members!

Happy Fall and welcome to another week of tasty vegetables and beautiful weather! A frost warning this week had us holding our breath for a moment; but it seems as though the warmer weather is going to stick around for a little while longer. We have some amazing new crops coming to you this week and hope you are as excited as we are!

A few announcements from the Student Farm:

We are having an OPEN VOLUNTEER DAY! Come help us get our sweet potatoes out of the ground!

When: Thursday October 8th from 9:00am-1:00pm

Location: 89-91 River Road, South Deerfield

Free food and fun!

Can't stay the whole time? Can only come for an hour? Totally fine! Come when you can for however long you can.

Need a ride? Message us!

What if I am splitting a share with people whom I no longer live with?

Whomever you are splitting your share with, the ENTIRE CSA share must be picked up ALL AT ONCE. We cannot allow for separate groups to come and pick up separate parcels of the same share. The share must be picked up all at once and then divided on your own with those splitting the share.

Why are we doing this?

We base how much we harvest off of the total poundage of the total number of CSA shares we have sold this season. We do not have the capacity to weigh out separate parcels for shared CSA shares. This is why split shares must all be picked up at once.

We appreciate your cooperation with this :)

What you'll see this week:

Parsley

Beets

Carrots

Potatoes

Garlic

Spinach

Peppers (Lunch Box, Jalapenos, Bell Peppers)

Eggplant

Tomatoes

Sweet Potatoes

Here are some reminders about pickup:

Remember to bring the bags that you got at the first pick up!

Location: East Campus Pond Lawn (across from Morrill, next to the ILC)

Time: 12-4 every Friday beginning this week September 13th through November 15th

Distribution: Full share subscribers will receive two green reusable bags at the first pick up. Half share members will receive tan colored bag. Please remember to bring your bag/s every week.

Payments: If you owe a balance, please be prepared to pay the balance in full (cash or check) by the first market (this Friday September 13th). If you are unsure if you owe a balance, please feel free to email us!

Communication: We will be sending out weekly emails on Wednesday mornings with information about what we will be offering in the share and some yummy recipes featuring the weeks vegetables. Please let us know if there are additional email addresses you would like us to add. You can also follow us on [Facebook](#) and [Instagram](#).

What happens if you are unable to pickup? If you find yourself unable to pickup your share on a market day, send a friend! They need to give your name at check in and come with the given CSA bags. Unfortunately, if you forget to pick up or miss the 12-4 time slot, we cannot arrange for an alternative pickup time.

Recipe of the Week:

Warm Spinach and White Bean Dip

Ingredients:

5 ounces baby spinach (3 cups)

- 1 cup part-skim ricotta cheese
- 1 can (15 ounces) cannellini beans, drained and rinsed
- 1 tablespoon finely chopped fresh chives
- 1 1/2 tsp lemon zest
- 1 1/4 tsp coarse salt
- Freshly ground pepper

DIRECTIONS

1. Preheat oven to 350 degrees.
2. Make the dip: Wash spinach, leaving some water clinging to the leaves. Transfer to a large saucepan. Cover, and steam spinach over medium heat, stirring once, until wilted, 4 to 6 minutes. Remove spinach using a slotted spoon, and let cool. Squeeze out excess liquid using a kitchen towel; coarsely chop.
3. Pulse ricotta and cannellini beans in a food processor until smooth. Transfer mixture to a medium bowl.
4. Add chives, lemon zest, and salt. Season with pepper. Stir in spinach.
5. Transfer to a 1-quart baking dish. Bake about 30 minutes until heated through. Season with pepper and enjoy!

See you Friday!!

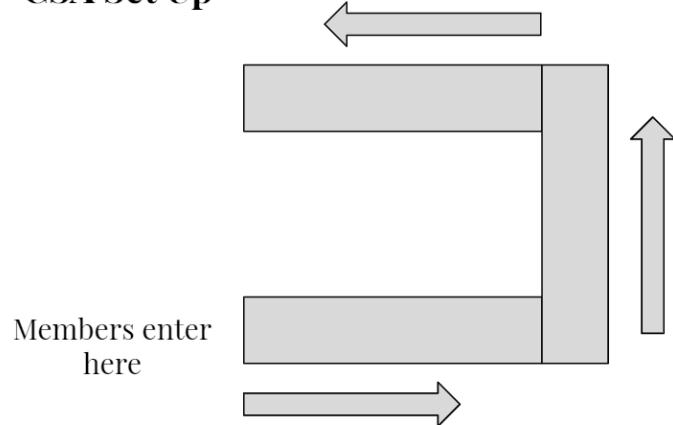
2019 Student Farm Crew

(Al, Amanda, Jason, Joseph, Rhianna, Alex, Evans, Nick, Lee, Morgan, Tom, Ellis)

Distribution

We distribute our CSA every Friday from 12:00-4:00PM. Each week we have hundreds of pounds of produce that we are distributing, and finding the correct system to do so in an organized way is hard! The set up we chose for distribution when we had the most produce is below:

CSA Set Up



Members follow along the outer U-shape, which allows us to refill produce bins from inside the U-shape while members choose from the outside. This set up works great at the Farmer's Market! However we do infrequently have CSA pick ups at the barn. The set up for the barn looks as follows:



**Members
enter here**

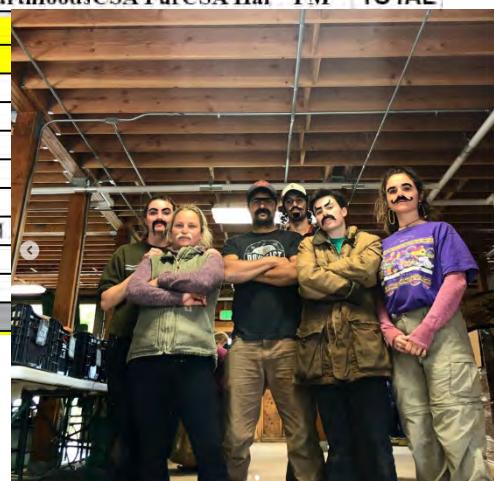


We found that this set up worked well as we could put our refill bins under the tables and swiftly refill the produce bins on top when they ran low. The barn is an amazing space to have our CSA pick up. Members can drive right up with their cars and they also get to see part of what our process looks like! We usually only utilize the barn space when the Farmers' Market gets cancelled, even though it saves us a bunch of time and energy.

Produce and Harvest Amounts

This season we did the majority of our CSA harvest on Friday mornings before the CSA pickup. Having both half shares and full shares made it more challenging to determine harvest amount for each CSA pickup. Looking back to what we planned in the Spring was helpful to know what we had planned to harvest and give out for each share pickup. However, this was not always exact as some crops were available earlier and some later than expected. Below is a harvest list example:

	Big Y Amherst	Big Y S. Hadley	Big Y Northampton	Sylvan	Earthfoods	CSA Ful	CSA Hal	FM	TOTAL
FROM ALC									
Bok Choy	25	25	25						
Cut Flowers									
Eggplant	1	1	1						
Fennel	10	10	10						
Kale	25	25	25						
Peppers	2	2	2						
Swiss Chard	15	15	15						
Tomatoes									
Total									



Each week, we planned out that full shares would receive between 25 to 30 pounds of produce each week. Half shares would receive between 12 to 15 pounds. Most times, half and full shares received the same kinds of produce, but different amounts. There were a few occasions where full shares would receive an item (ex. Cauliflower), which half shares would not. Because we had 37 half shares and 67 full shares, we would put the number value that each

person would receive in their share. Then we would calculate the total amount we would need to harvest for all of the CSA shares combined.

Example: Eggplant

Full share: 3 per share x 67 shares = 201 eggplants

Half share: 2 per share x 37 shares = 74 eggplants

Total to harvest for CSA = 275 eggplants

Signage

The CSA pick up is in need of some new signage! Currently, we use some small slate signs to label our CSA bins, but we often did not have enough signs for each produce bin. We thought about just having a white board which we wrote out what each share should take, but thought it might not be clear enough. Having signs on each bin is useful, but we are in need of more of the same ones we have, or just make new ones.



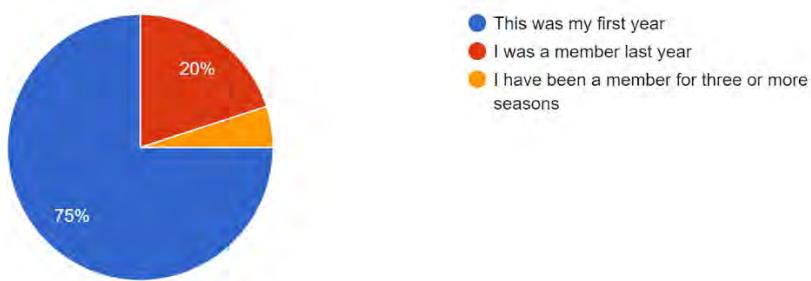
We also found people (not members) wandering over to the CSA share pick up, taking vegetables and walking away. Having more signage that says “CSA MEMBERS ONLY” scattered across the market tent is important. Signs can also redirect people to the Farm Stand, where they can purchase produce by the pound.

CSA Survey & Results

This year, only 40 out of 104 members participated in our survey. It did provide us with a lot of useful and interesting feedback on how our CSA program was received by our members this year. The CSA survey is a great way to receive feedback on how we can better our program for our members. The CSA survey results can be found in the Google Drive under 2019—CSA—Fall Members—2019 CSA Survey.

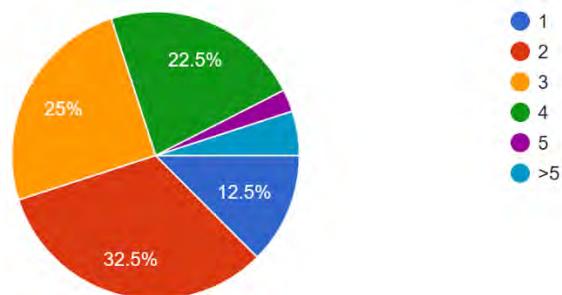
How long have you been a member of the Student Farm CSA?

40 responses



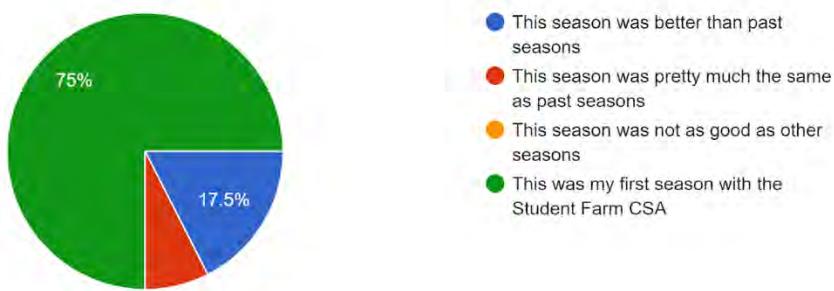
How many people did the share feed on average each week?

40 responses



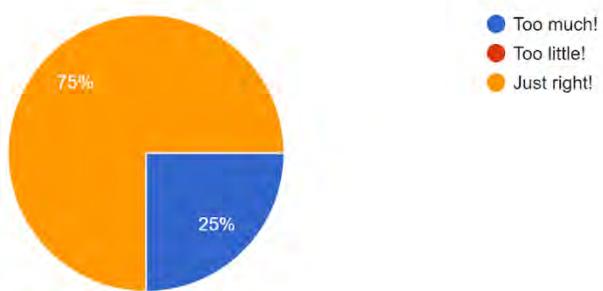
If you have been a member before, how did this season's CSA compare to past seasons?

40 responses



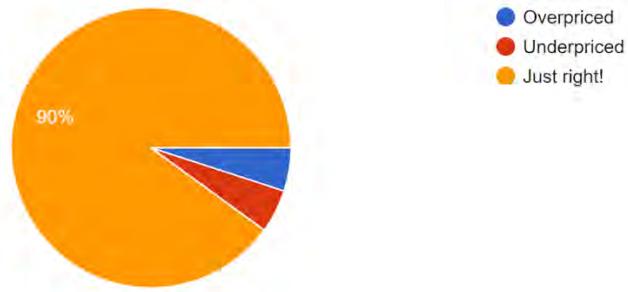
What did you think about the amount of produce you received?

40 responses



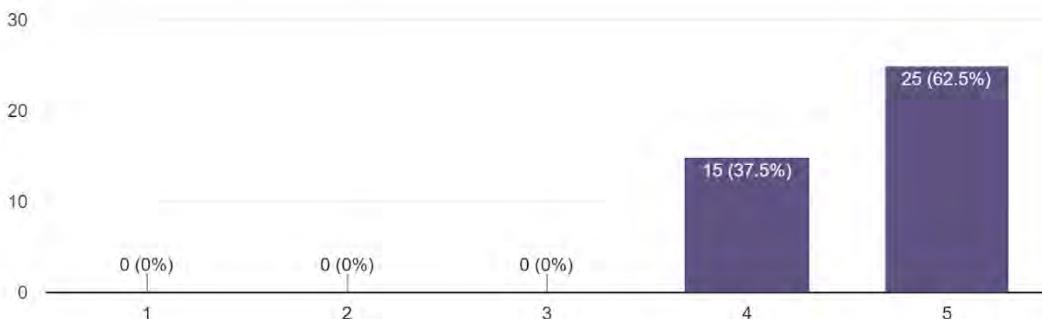
How do you feel about the value of the share?

40 responses



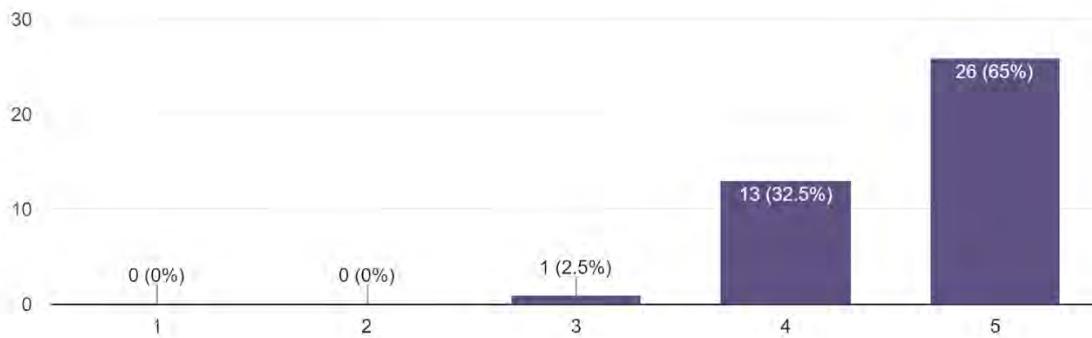
How was your overall experience?

40 responses



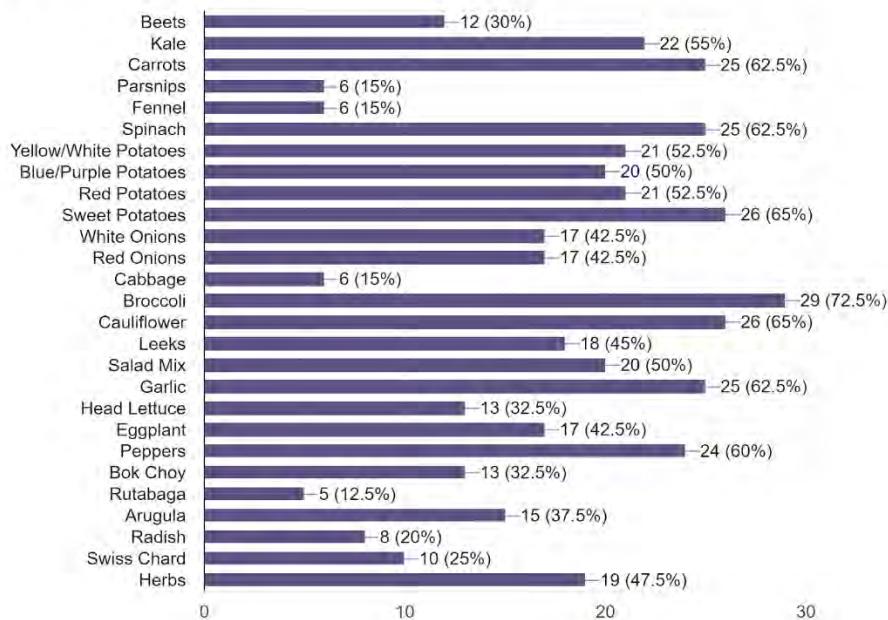
How was the overall quality of the produce?

40 responses



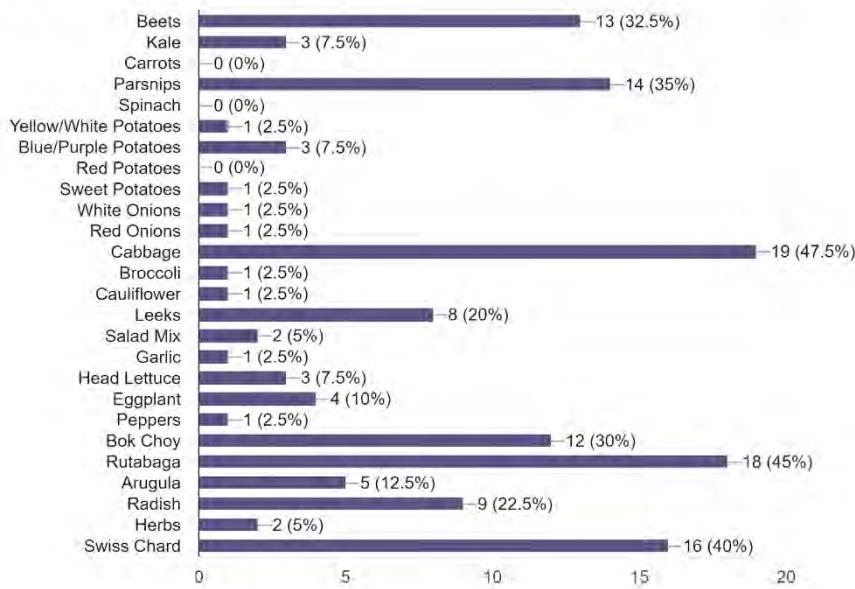
Please check off your favorite produce:

40 responses



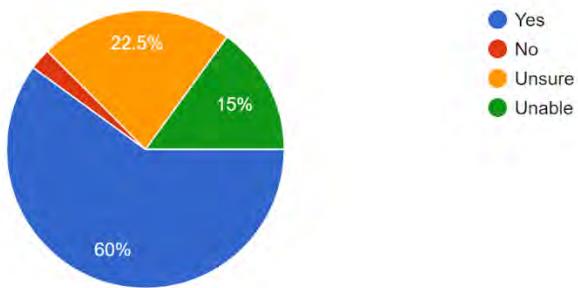
Please check off your least favorite produce:

40 responses



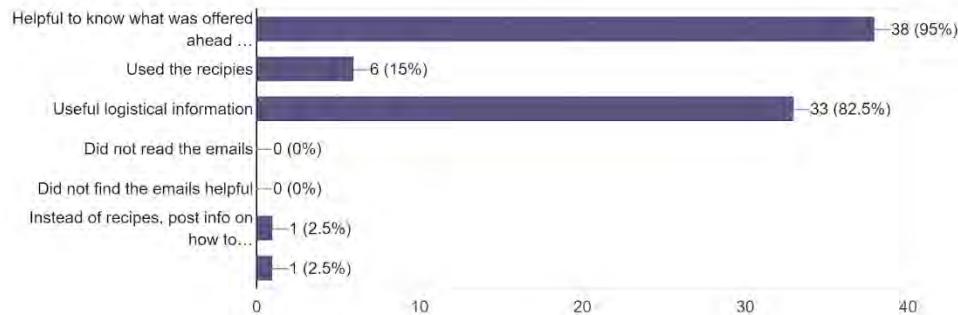
Do you plan on being a member next year?

40 responses



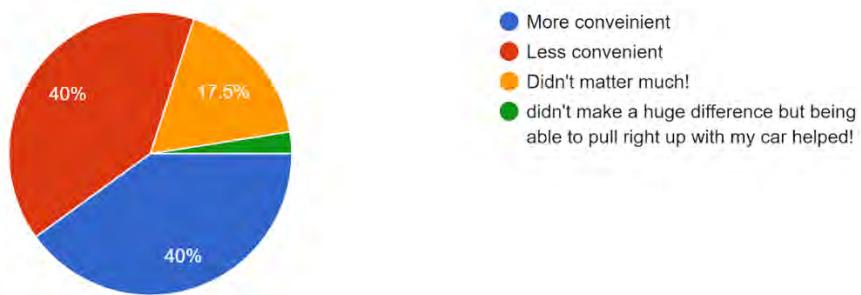
How helpful was the weekly email? (Mark all that apply)

40 responses



On weeks that we had Barn Pickups, was it...

40 responses



Additional Comments:

Well, we really missed the squash, but understand it had been killed by a disease. Every year is different, of course, but this year was strange because there was so much at the start of the season, and by the last few pick-ups, it was all roots. When I say I don't particularly need a huge amount of bok choy and cabbage each week, it's not that we don't like them, but that we can't really figure out how to preserve them for future use. Freeze? Pickling is not what we are into.

the only recommendations I have is that sometimes there was an abundance of vegetables that were sort of specific to use, like pak choi and cabbage and fennel and parsnips, and not enough of things that are a little more everyday, like shallots, arugula, and onions. but also i always felt we had an abundance of delicious food! i really love being able to eat produce grown and harvested by fellow students and friends!!! thank you all so much for being the source of many delicious and nourishing meals, bringing home a bounty every friday was the highlight of my house's week and we are so grateful for all the student farmers' work <3

Thank you so much!m; I was absolutely amazed by my first farm share experience with the Student Farm!

More designated volunteer days to encourage members to help and see the farm.

Thanks for a great CSA! I would recommend using the barn as a pickup location every week because finding a spot to park on campus during the farmer's market is difficult, especially to pickup two heavy bags of produce.

On the above, least favorite, my most least favorite wasn't listed: Fennel But I always found someone who LOVED it and so I made someones day every week that you offered it.

fennel wasn't listed on the least favorite list, but that was one of my least favorites, along with arugula

I will say please work extensively to make it available in the fall and spring

If there is any way to adjust the hours slightly (to maybe a bit past 5), it would be helpful!

The barn pickups were tough for me for two reasons: I'm staff instead of faculty or student, and I don't drive. Getting out there in the middle of the day was tough with a rigid work schedule.

This was such a fantastic experience! I looked forward to my CSA every single week. On top of the food being amazing, I loved the people I got to interact with - everyone is always so friendly! Keep up the great work!!!

I really enjoyed the fresh produce every week. I leaned that the crops early on that the crops had to be eaten pretty quickly due to them not having them chemicals like grocery stores do which is a GOOD thing! Great job all!

would prefer more flexibility in what i take so i don't have 2 cauliflowers freezing in the back of my fridge

Given that the range of items available is limited, you should offer half-shares. It's not the same thing to be compensated by huge amounts of a single root, for example, this year it was sweet potatoes, as to receive a broader range of items. I don't know, really, how you would do that in your situation, but that is the main reason I think half shares would be good. Basically, the share is really expensive for what ends up being large quantities of sweet potatoes and beets.

Also, you need to give more tips on how to preserve these vegetables. Of course, yours are organic and very fresh, but these items are very readily available all around town for reasonable prices. Rather than recipes, you should be posting weekly info on how to preserve sweet potatoes, cabbage, bok choy, kale, and so on. How can they be kept for use into the winter?

Blown away by the gorgeousness of all the produce. Love seeing the smiling student farmers! Thank you so much for feeding the soil along with the humans.

Barn pickups are really hard for those without cars. Trying to find an inside space on campus or extending pickup hours when it is at the barn could be helpful!

Thank y'all so much for your hard work! We loved being members :)

Favorite Produce of 2019: Broccoli, Cauliflower, Carrots, Sweet Potatoes, Spinach

Least Favorite Produce of 2019: Cabbage, Rutabaga, Swiss Chard

Recommendations

Because we offered both full and half shares this year, we lost a significant amount of money and gained extra work and some confusion. On paper, the half share CSA seems like a great idea, but when executed it fell short of its potential. I think we offered too many half shares and should have only offered 20 shares so the financial loss would not have been as great.

Going to the Farmers' Market is fun, although it does add extra work for the student farmers. We finally have a beautiful barn space and when we had CSA pick ups at the barn, the day was much easier on us. An idea could be to have CSA pick ups on campus at the Farmers' Market until mid- October, and then the rest of the pick ups could be at the barn. Farmers' Market attendance is drastically smaller during these late months anyways.

Wherever y'all choose to take the CSA program will be exciting and unique. Enjoy the process and getting to know your members! Members love seeing what we are up to on our social media page, and some became very engaged volunteers. Everyone appreciates the commitment and enthusiasm the Student Farmers show. Enjoy the season!

Farmers' Market

Location

The Farmers' Market provides a space where students and/or student organizations can come together to share their work in an outdoor space. Not only do we distribute our CSA shares at the market, but we also set up a farm stand for anyone to purchase produce from. This year we had to change the location of the Farmers' Market due to the construction on the Student Union. This year the market took place on the East Pond Lawn of the Campus Pond. Although the old location on the Goodell Lawn was classic and easily accessible, the new location offered more foot traffic and was pretty much as accessible as the Goodell Lawn had been. Where the market will be next year is up in the air! Depending upon construction, UMass event scheduling, and a few other factors the location of the 2020 Farmers' Market might be up in the air!



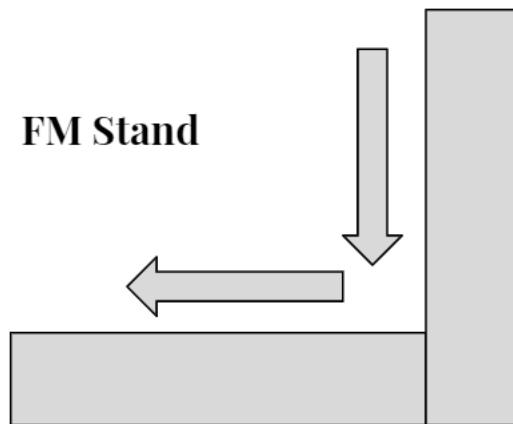
Preparing for Market

The Friday morning crank to harvest, wash, pack, and load the truck for both our wholesale markets and the CSA/Farmers' Market is thrilling. Running on a short nights sleep, Cushman Market, and songs in the washroom get us through the long day. We often would push through to get everything harvested, washed, and packed between 7:00-10:00 AM. Depending on the day, we would break for 30 minutes to an hour to refuel, before leaving for the market in a packed big white truck.

Harvest Amounts

Having exact harvest amounts to bring to the Farmers' Market is challenging. The system we created would be to just bring a little bit extra of the crops which we wanted to sell. You can see in the Harvest List above in the CSA section that we put an "x" on which crops we would bring extra of.

The Farmers Market set up for 2019:



Pricing & Record Keeping

KEEP RECORDS!!! Every year this is the same advice, and every year it is hard to keep clear and accurate Farmers' Market records of what we brought and what we sold. We started by writing in a binder exactly what we sold, by price and amount. We found total sales from each market but did not keep accurate records of exactly what sold. Maybe you bring a computer each week and directly put the records into the Google Drive? You will come up with a system that works for you and hopefully you find more success in record keeping than we did!

Our pricing system definitely varied from week to week. Having a set pricing system of all the crops, how they are sold (by bunch, pound, etc.), and how much they cost per unit is key. Creating this pricing system, laminating it and hanging it up so both student farmers and customers know is important. Again, cultivating relationships with our customers is crucial and makes this program so awesome!

Communication

Communicating with each other about roles at the Farmers' Market is important. Who is signing in CSA members? Who is refilling produce bins? Who is in charge of the Farm Stand? These roles are all super important aspects to allow the Farmers' Market to function smoothly. This year we had one person, Al, who was in direct contact with Dan Bensonoff from Permaculture about the market. Al met with Dan to discuss market themes, vendor applications, and how to set up. I would recommend doing this next year, to ensure there is proper communication between the Student Farm and Permaculture.

Finances

This year, we made a total of \$1,640 from the Farmers' Market and \$478 in credit card coins, totaling \$2,118. Again, these are just totals and we do not know exactly how each crop did because of a lack of record keeping at the market. The market does really well at the start of the

season, and slowly begins to slow down dramatically. Attendance dwindle as well as sales towards the end of the season.

The Farmers' Market accepts cash, check, and credit cards through coins. If someone wants to operate the credit card machine, there is a mandatory (short) training to go through. We all attended the training in late August so we all knew how to operate the machine. Essentially, people use their credit cards to purchase coins (units of 1, 5, and 10) which they can then use at market booths. It was useful to understand how the credit card machine worked so we could step in when need be.

It might be a good idea to only offer Farmers' Markets for half of the season, and then do a few Holiday Markets later on. Having fewer markets might concentrate attendance and make them more enticing for customers as there are fewer for them to attend. Just ideas!

Themes

This year, we planned out themes for the Farmers' Markets and did not follow through on a single one. This could be a product of our smaller crew size, but also interest in pursuing market themes was not strong. If market themes interest you, contact Dan and work together to co-create some fun and interesting market themes! Below are the themes we came up with but did not do:

2019 Farmer's Market Schedule

September 13th: Welcome Back Market

September 20th: Community Activism Market

October 4th: Food Access Market

October 11th: Fermentation Market

October 18th: De- Stress Market

October 25th: Halloween Market

November 1: Student Business Market

November 8th: Foodie Demo Market

November 15th: Clothing Repair Fair Market

Conclusion

The Farmers' Market is a fun time to interact with the campus community. People love seeing our produce, listening to music, and seeing all of the student vendors. Attendance and profit does begin to drop as the season goes on, so deciding whether or not the Student Farm continues to go to the market later in the season is your call. Enjoy the market, make connections with other vendors, bring snacks and overall be so proud of the food you bring to the campus community!



Wholesale Markets

Wholesale: The Overview

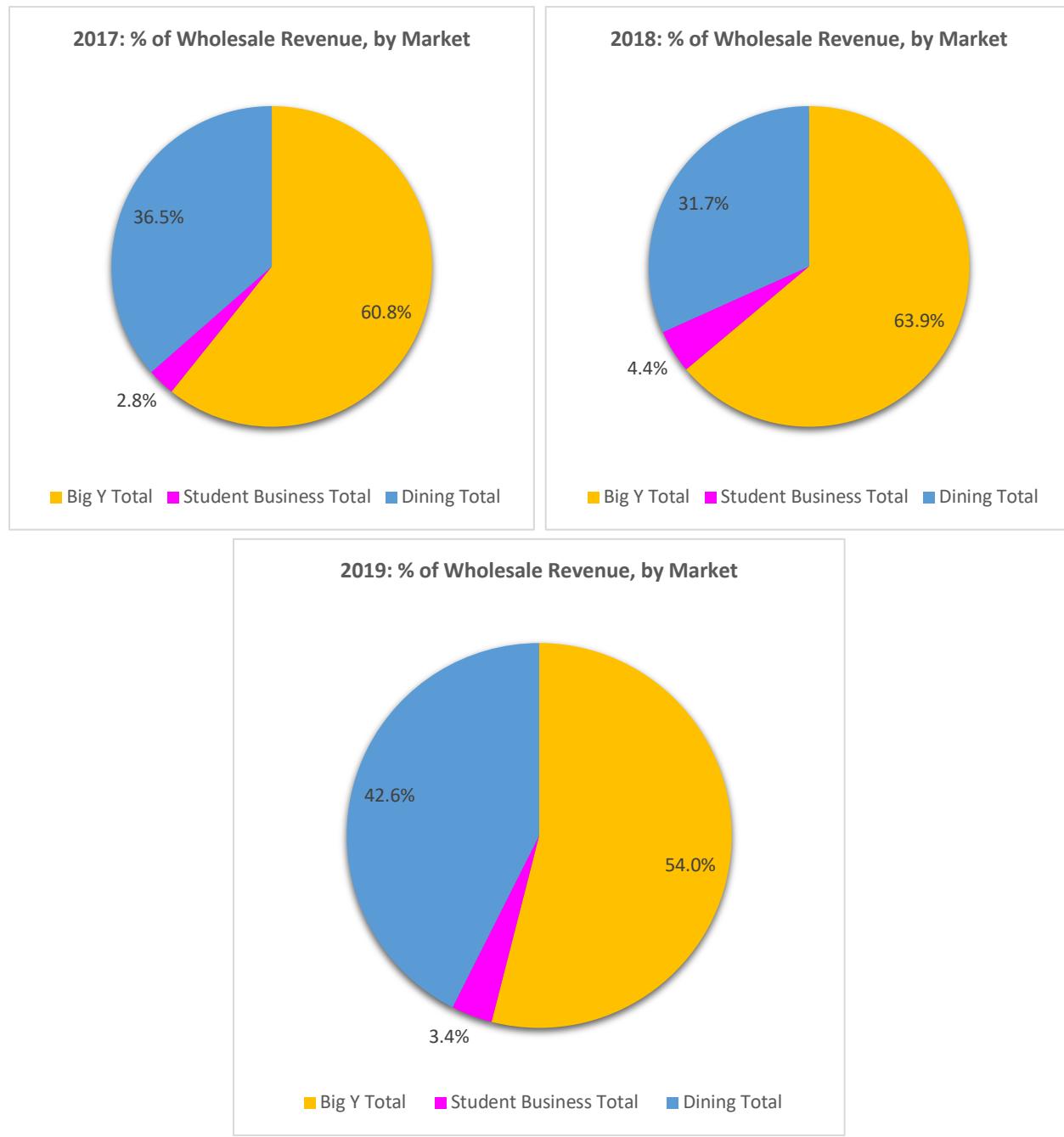
In addition to our CSA, we sell to three additional wholesale markets: Big Y, UMass Dining/Auxiliary (Dining), and Student Businesses. Wholesale makes up the majority of revenues for the Student Farm, and selling to these markets gives farmers exposure to the work required to maintain positive relationships with wholesale buyers. It is a radically different experience than direct to consumer marketing, requiring an overlapping but differing skillset. Each wholesale market is unique and necessitates slightly different procedures. In this chapter I will go over the history and relationship we have with each market, as well as provide a breakdown of our season's wholesale finances, overall and market by market.

Overall, this was a great year for wholesaling. We maintained our relationship with Big Y, grew our relationship with Dining, and rekindled our commitment to Student Business. Wholesale markets accounted for 55.7% of our total revenue this year, or \$47,195.76. This is a massive increase from the 2018 season, where wholesale accounted for 47.2% of revenue, or \$29,566.48. Some of this increase is due to the fact that we had a far more favorable growing season in 2019, gifting us with an abundance of product we could wholesale (when product is scarce, CSA is prioritized.) The table below details all wholesale totals, 2017-2019, and their relationship to total and wholesale revenue. Cells representing the same measurements have been color coded for ease of comparison.

	Total Revenue:	\$84,702.86	% Revenue	% Wholesale
2019				
	Big Y Total	\$25,479.24	30.1%	54.0%
	Student Business Total	\$1,627.00	1.9%	3.4%
	Dining Total	\$20,089.52	23.7%	42.6%
	Wholesale Total	\$47,195.76	55.7%	
2018	Total Revenue:	\$62,663.96		
			% Revenue	% Wholesale
	Big Y Total	\$18,892.32	30.1%	63.9%
	Student Business Total	\$1,293.25	2.1%	4.4%
	Dining Total	\$9,380.91	15.0%	31.7%
	Wholesale Total	\$29,566.48	47.2%	
2017	Total Revenue:	\$99,005.76		
			% Revenue	% Wholesale
	Big Y Total	\$31,414.14	31.7%	60.8%
	Student Business Total	\$1,441.50	1.5%	2.8%
	Dining Total	\$18,853.40	19.0%	36.5%
	Wholesale Total	\$51,709.04	52.2%	

Comparison of total and wholesale revenues, 2017-2019.

Through the past three years, our wholesale markets have been through some ups and downs. Big Y remains steady at around 30% of our total revenue, but drastically decreased from around 60% of wholesale revenue in 2017 and 2018 to only 54% of wholesale revenue in 2019. Student Business hovers at around 2% of our total revenue, but the dollar amount sold has increased each year since 2017. The largest change has been with Dining, shooting up from closer to 30% of wholesale revenues in 2017/18 to 42.6% in 2019. This is most clearly visualized in the pie charts below, where 2017 and 2018 look nearly identical, while 2019 is markedly different.



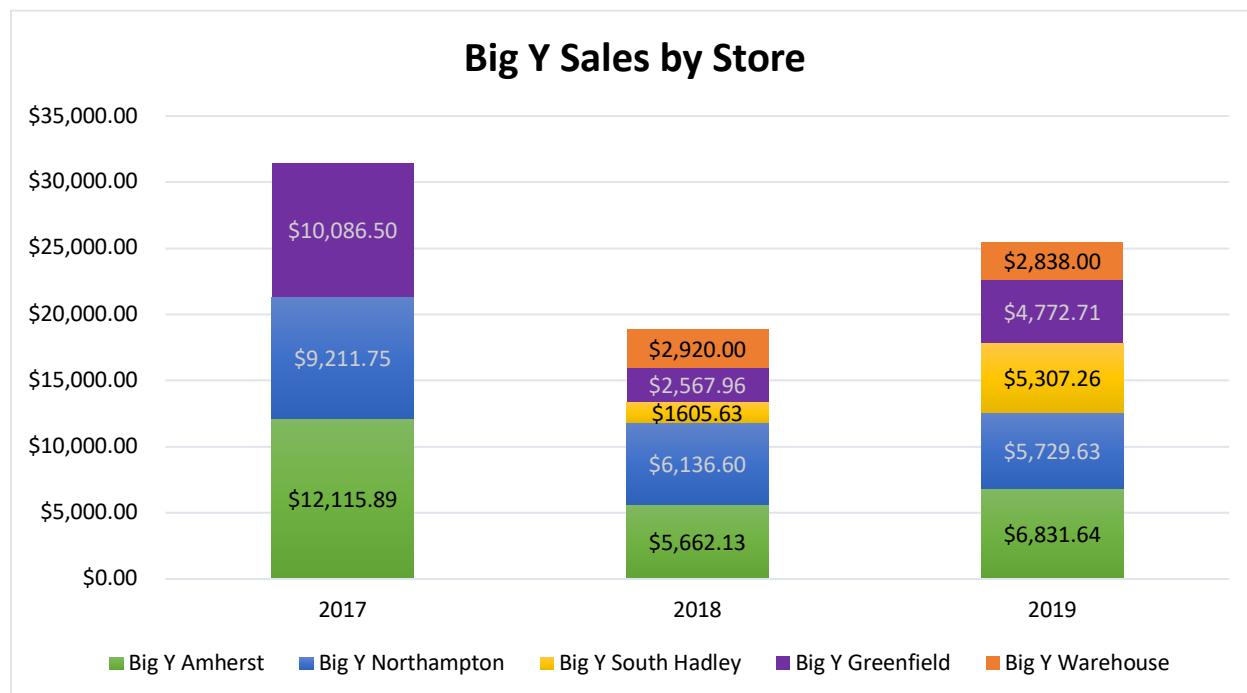
Breakdown of wholesale revenues by market, 2017-2019

Aside from simply having the necessary product in our field to sell, I believe the primary reason for such a fantastic wholesale performance this year was the dedication of the crew. This year all of us pushed hard in our respective market groups to ensure communication remained as open and transparent as possible in every step from planning to delivery. Thanks to the diplomatic work of our crew we were able to show growth in our wholesale markets despite entering our seventh season of wholesaling to the same buyers.

Big Y: Overview

Big Y is a regional, premium supermarket chain, with 70 stores operating in Massachusetts and Connecticut; it is also our largest wholesale market. We sell to four stores: Amherst, Northampton, Greenfield, and South Hadley. We also make the occasional bulk delivery to their distribution warehouse in Springfield. We have a long running, consistent relationship with Big Y. However, nothing is a given, and Big Y should not be taken for granted—this market needs as much love and attention as Dining or Student Business (which are traditionally more challenging.)

Finances



Sales in dollars to Big Y, 2017-2019

This year, we experienced no growth overall in our sales to Big Y by percent of total revenue. However, we were able to increase our sales to individual stores, most notably to South Hadley. We only began selling to the South Hadley store in 2018, and the crew was dubious about continuing sales in following years. The extra driving distance did not seem worth the minimal returns. However, in 2019 we more than tripled our South Hadley sales, from \$1605.63

to \$5,307.26. Our Greenfield sales also bounced back from a rough year, increasing from \$2,567.96 to \$4,772.71, almost doubling. Greenfield and South Hadley are the farthest from us geographically, thus require the greatest effort for delivery, and for growing our relationship with those stores. Northampton and Amherst sales were maintained from last year, despite overall sales increasing. This is worrying, especially for the Amherst store. The Amherst store is where our relationship with Big Y began; they are the most enthusiastic when interacting with us and always showcase our produce. Looking back to 2017, we know they have the capacity to take a lot more than what we are selling them, and we need to capitalize on that.

The most obvious takeaway from previous years is the difference in the volume sold to Big Y overall from 2017 to 2019. The 2018 growing season was extremely difficult, and I believe that accounts for the majority of the drop in sales from 2017 to 2018. However the 2019 growing season was comparable to 2017, yet there is no accompanying bounce back in Big Y sales. While Dining sales were up in 2019, CSA enrollment was down, so even the different allocation of product does not adequately explain why 2019 sales are so much lower than 2017. Purely speculating, I believe we may have lost confidence from the stores with our reduced sales in 2018. I encourage the 2020 crew to push hard in their offerings to Big Y, planning for and following through on selling more.

Procedures

There are two Big Y deliveries a week. Ordering is done via email on Tuesday for Friday delivery and Friday for Tuesday delivery. Produce is packed in lock lids; empty bins are picked up at the next delivery. On Tuesday, we go to Greenfield, and on Friday we go to Amherst, Northampton, and South Hadley. While it would be lovely to do two deliveries each day instead of one and three, this is what the individual stores have asked of us. For Friday deliveries, the most efficient method is to pack the van with the final destination first (closest to the seats), then the second destination second, and the first destination in the back, closest to the double doors. The best order for driving is Amherst, then Northampton, then South Hadley. Friday deliveries can take anywhere from two to three-and-a-half hours depending on how smartly the van was packed, if one or two farmers go on delivery, and what order we drive to the stores. Over the summer this is less of an issue because (for the most part) there is an abundance of time, but during the fall it can be a real hindrance to getting ready for the Farmers' Market and CSA pickup. I encourage the 2020 crew to see if they can sweet talk one of the Friday stores into a Tuesday delivery schedule. Warehouse deliveries happen infrequently, on an as-the-need-arises basis; usually we have to borrow one of the big trucks from South Deerfield.

Given that Big Y targets a higher end market, (I would place them informally somewhere above Stop & Shop but beneath Wholefoods), they have strict standards for the quality, aesthetics, and size of produce they will buy from us. The expectations are even stricter for warehouse sales. For the stores we sell to, they have gotten to know us personally and seem to value the "picked from the farm today/yesterday" nature of our produce; when selling bulk to the warehouse, our produce could be sent to any of the 70 stores, meaning there is no wiggle room in

meeting their companywide standards. For example, at the end of the season we had a few thousand pounds of sweet potatoes left. They were massive, delicious potatoes, but they were not up to snuff aesthetically. This meant we ended up donating them instead of bulk selling to the warehouse. (N.B. Donations are not a bad thing! Those sweet potatoes still ended up feeding people instead of being composted. It is just something to keep in the back of your mind when harvesting, sorting, or dealing with a glut of product.)

Aside from having to redirect the flow of our excess produce, these standards can create strife and confusion in the field. The minimum requirements for size and beauty are not always clearly communicated to everyone in the crew, or people have their own ideas about what is appealing produce. Usually as farmers, our ideas of what counts as attractive produce are not quite aligned with Big Y's vision. This can be mitigated by having sorting workshops during the first harvest of each crop, with refreshers as needed. It takes more time upfront to educate everyone at once, but when everyone is on the same page about harvesting standards (for each market, not just Big Y) the process moves notably faster. More sorting in the field means less sorting in the wash station, which over the course of a season translates to substantial recaptured time.

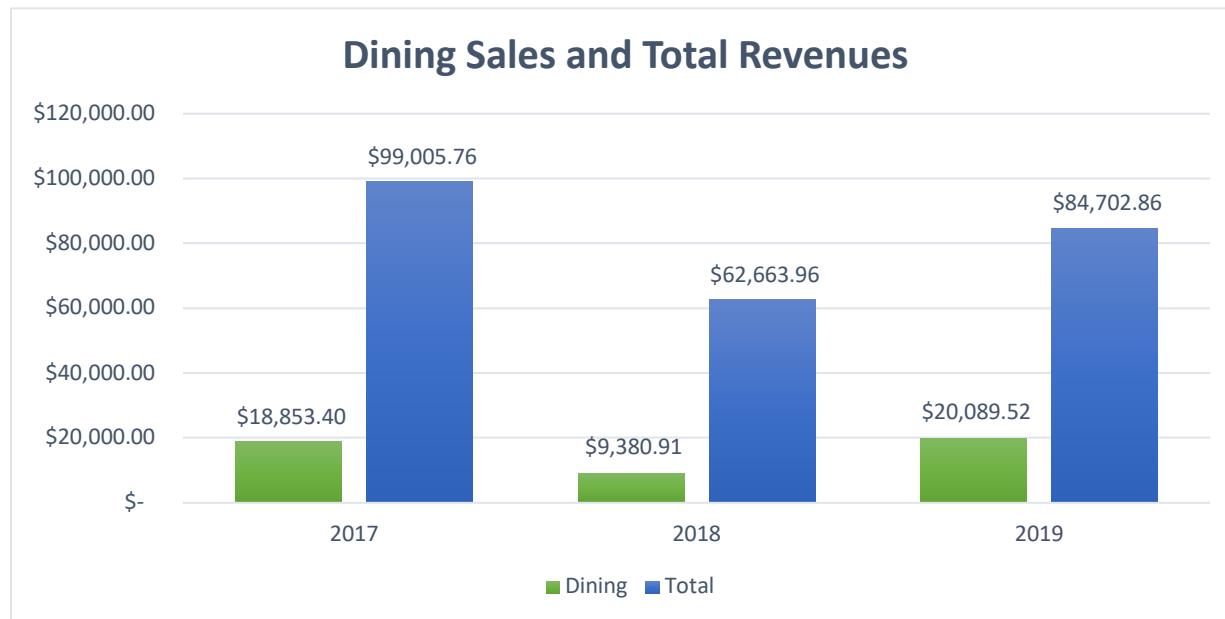
Another caveat of selling to Big Y is that they will only take certain types of crops from us. This means we have to be direct during spring marketing meetings. Ask the representatives at the marketing panel what they feel most confident buying and selling from us. While we have the data of what we sold to them and how much of it, we are not in the stores watching the speed or order at which our crops are bought by the final customer. It has been established that more "out-there" crops like rutabaga will not appeal to them, but they also desire aesthetically traditional varieties of the crops that do. This should be honored during crop planning. If we want to grow our sales to Big Y, a potential avenue is identifying which of our crops is most popular and moves the fastest. Effectively communicating with the buyers to find out what they would be willing to buy more of and doubling down production on those crops should allow us to strengthen our presence in the stores, without overextending our efforts in the field.

Additionally, Big Y will only buy certified organic produce. Currently the Haygrove is our only uncertified field (it is in the middle of the three year conversion process for certification—it should be eligible for certified organic production starting in 2021.) This means that a vast majority of our crops are certified and eligible for sale to Big Y. However, this fall our tomato crop largely failed, meaning we were left only with Haygrove tomatoes. This is fine for the CSA and Dining, but obviously not Big Y. Tomatoes are an extremely high value crop, and Big Y will absolutely buy tomatoes from us (evidenced by summer sales of organic NSF greenhouse tomatoes.) Only having Haygrove tomatoes meant we lost out on a pretty large revenue stream. All of these caveats are of the utmost importance to keep in mind in the spring during crop planning and communication with the Big Y buyers.

Dining: Overview

UMass Dining is the largest college dining program in the country, serving 45,000 meals daily. The incredible volume they move combined with their proximity makes them our ideal wholesale market. Dining is not directly a part of UMass itself, but instead falls under the purview of UMass Auxiliary Enterprises, along with UMass Catering, University Club & Restaurant (UClub), Hotel UMass, and more. In previous years we have sold to Catering and the UClub with separate records, but this year we recorded all invoices to Auxiliary (whether Dining or Catering) under Dining. For ease of comparison and reference, I have aggregated previous years' Auxiliary data into one sum as "Dining."

Finances

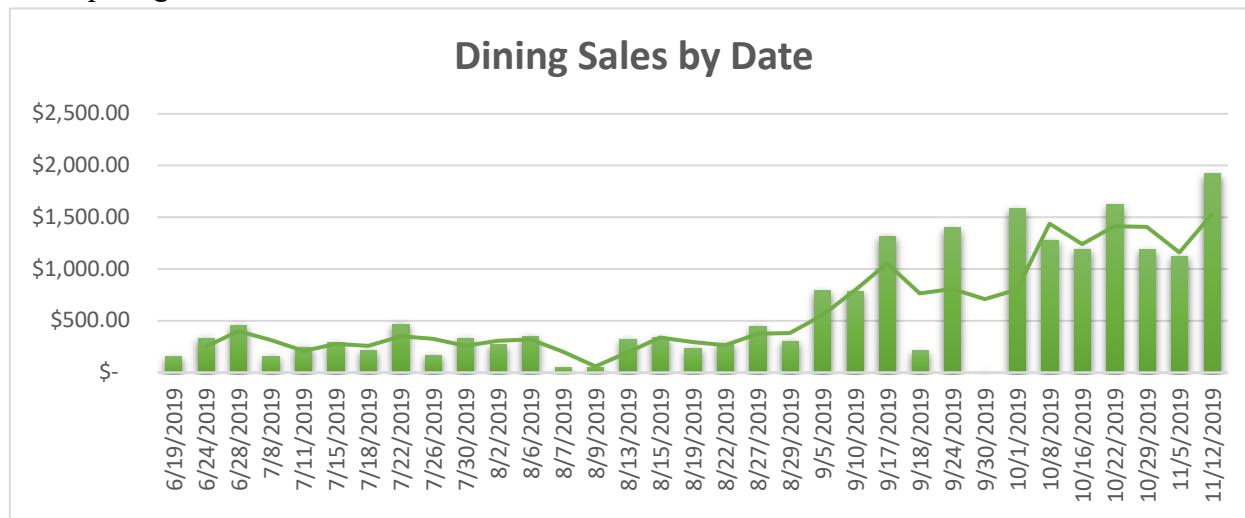


Comparison of Dining sales to total revenues, 2017-2019

2019 was an incredibly successful year for Dining sales. At the behest of many previous crews, this year we established a weekly standing order for all four Dining Commons (DCs). This made a standout difference, pushing Dining sales to new heights. Sales suffered in 2018 for the same reason they suffered for Big Y: the product simply was not there. However, unlike with Big Y, Dining sales saw growth with the more favorable growing conditions of 2019. Despite the decrease in total revenue from 2017 to 2019, Dining revenues increased. I am confident the standing order is the primary driver behind this.

However, it was not always smooth sailing with Dining. In the spring marketing panel this year, as in many previous years, Dining representatives said they would buy whatever we offered during the summer; however, Dining sales were minimal during the summer, despite our bountiful offerings. It was not until the start of the semester when the standing order began that we saw regular sales to Dining. This is largely due to the fact that it is a *college* dining program. They are only serving 45,000 meals daily when school is in session; they just do not have the

same level of demand in the summer. It does not help us that our offerings, however significant to us, are small potatoes in comparison to the contracts they hold with food aggregators. Comparing the value of summer invoices to fall, the difference is harsh.



Dining sales by invoice totals, June to November 2019

One of the main reasons for the difference between what is discussed in the spring and what actually happens is the fact that Dining is a part of the massive institution of Auxiliary. There are so many people involved in the purchasing process. When we talk directly with the Chefs, they would love to have our produce over something sourced from thousands of miles away, but they are not necessarily making the final call. Since summer sales are always pitiful in comparison to fall, I do not think the 2020 crew should plan summer production for Dining, and instead focus on growing the standing order. We easily have the bed space to grow more staple crops for the standing order if we do not bother with Dining summer production. This year was the first attempt at a standing order and it was a smashing success. Despite our historically rocky relationship with Dining, I believe the continued development of the weekly standing order positions them as our most promising opportunity for growth out of all the wholesale markets.

Procedures

Deliveries of the standing order happened every Tuesday. The standing order consisted of potatoes, sweet potatoes, carrots, onions, and kale (for Hampshire only.) For the most part, the standing order was delivered as planned, but in the case of a holiday schedule or additional produce we thought they might want, an email confirmation was sent. Additional produce would often be added, based on seasonal availability. Produce was packed in wax bushel boxes. Since all the DCs are within a few mile radius on campus, the order of packing and delivery matters considerably less compared to the order of Big Y deliveries. Typically we packed and delivered in Fudgie. Deliveries made to the DCs went directly to their loading docks, and any incidental Catering orders went to the Campus Center loading dock.

A lovely benefit of working with Dining is that they have a looser standard than Big Y for their produce, meaning we are able to sell multiple grades of produce. Since Dining is preparing the produce for consumption and it does not reach the end consumer whole, the aesthetic standards for sorting are far freer. However, this does not mean we can sell them just anything. Produce must be relatively uniform and of good size and shape (they use a multitude of cutting/slicing apparatuses instead of prepping by hand.) There is still a standard, it is just not as strict as Big Y. Dining will also buy non-organic produce from us (from the Haygrove), meaning we can utilize all of our available bed space with confidence knowing we have a buyer.

When working with Dining, we interact with an almost unfathomable amount of people. Over the summer, we got to meet many of them during a farm visit, Chefs, buyers, and marketers alike. Of all of them, I believe the most influential people in our relationship with Dining are Chef Bob, Chef Tony, Alexander Ong, Marlene Navarro, and Kathy Wicks.

Chef Bob and Chef Tony are the Executive Chefs of Residential and Retail Dining, respectively. Their voices are key in promoting the incorporation of our produce, as they are primarily involved in what food is actually served through Dining. In a similar vein, Alex Ong is the Director of Culinary Excellence for Dining; he is the big picture man in this story. If you want to know what direction Dining is moving in, he is the man to ask because he is the man who decides. He came into this position only a year ago, meaning this is the first season we have had the pleasure of working with him. He has been perhaps our biggest advocate in the world of Dining; I firmly believe he is one of the key components to our success in Dining sales this year.

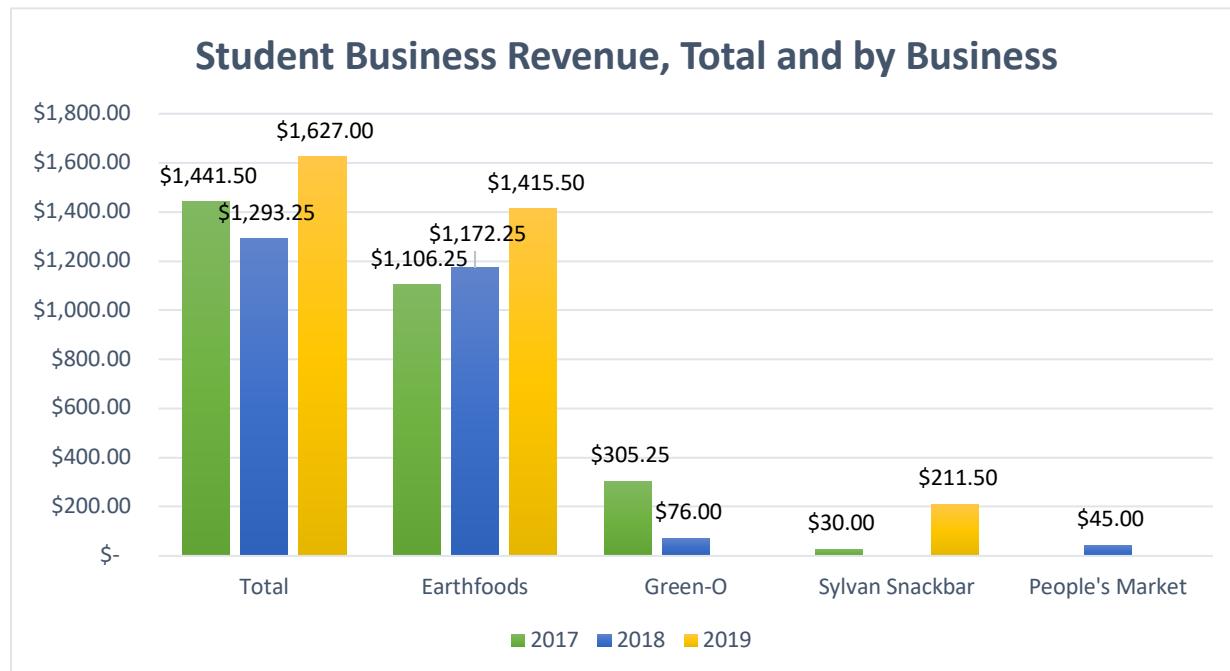
Marlene Navarro is the Director of Marketing and Communications. Our very own marketing magician Morgan Reppert took it upon herself to develop a relationship with Marlene, making sure to collaborate on social media and establish a relationship of publicly promoting each other. Kathy Wicks is the Director of Sustainability, overseeing all sustainability initiatives Dining/Auxiliary undertakes. Through this role she has also been a key advocate for getting our produce in the DCs, especially within the context of the [Real Food Challenge](#). Dining's participation in the challenge has been another contributing factor to our increased presence in the DCs.

Aside from these critical players, we also communicated regularly with Chris Howland, Laurinda Johnston, Kevin Paul, and Laura Snyder, all of whom work in buying/acquisition. The contact information of all named parties can be found on either the Dining website or through UMass People Finder.

Student Business: Overview

Back in 2007, the Student Farm was started by an Earthfoods co-manager and another student for the purpose of growing kale and broccoli organically and locally for Earthfoods' daily menu. At the time, the "Student Farm" was a quarter-acre block of land being managed through independent study hours; today, thirteen seasons later, we have grown to manage 25 acres through enrollment in a yearlong program, and we cater to a multitude of markets. Despite the changes on our end, the Student Business market still represents the "Why" behind what we do: students growing food for students.

Finances



Breakdown of Student Business sales, total and by business, 2017-2019

In spite of our regular challenges, this year was a three year high for Student Business sales at \$1,627. I think this bodes well for continuing our relationship! In general, the trend has been that the bulk of sales are to Earthfoods, with small, incidental sales to the other food-based Student Businesses. This is a trend that should be embraced. Since it feels to some like extra effort to work with Student Businesses, I think our efforts are best focused on only selling to Earthfoods. There has been consistent growth in Earthfoods sales three years running, and I believe that trend can continue. Nailing down our process with them and establishing protocol within their organization that does not change when the produce buyer changes will be our gateway to stabilization of sales and continued growth.

I must add though, Sylvan had incredible commitment to working with us, and was also the only other Student Business to see growth in the past three years, increasing from \$30 in 2017 to \$211.50 in 2019. Despite their small orders, they put in most of the effort by picking up

instead of us having to arrange delivery. If we are going to work with any of the businesses besides Earthfoods, Sylvan is the best option in terms of returns on our efforts. Our relationship with Greeno can be reevaluated next year and potentially rekindled, but in my personal opinion that ship has sailed. Greeno is experiencing tough times recently with infrastructural issues, and I do not feel it is prudent for us to extend our efforts, evidenced by the drastic downturn in sales from \$305.25 in 2017, to \$76.00 in 2018, to none in 2019. People's Market can hardly be considered.

I believe a large part of the success of the Student Business market this year was due to insights into the current climate of Student Business. Knowing that times were hard, we made a concerted effort to make working with us easy for Student Business produce buyers. However, insight does not always ensure sales; the 2018 crew had an Earthfoods and a People's co-manager, and sales were not significantly increased from 2017. I think our success had more to do with the tenacity of the Student Business market group and insistence that communication remain regular and open. I highly recommend the 2020 crew decide for themselves if Student Business is worth it and come up with a point person (or two), co-manager or not, who will dedicate themselves to seeing through this market through.

Procedures

Throughout the years, Student Farm has made efforts to sell to as many of the Student Businesses as we can. Of the seven co-ops, five are food based, and four include vegetables on their menus/in their offerings: Earthfoods, People's Market (People's), Greeno Sub Shop (Greeno), and Sylvan Snack Bar (Sylvan). We have had the most success selling to Earthfoods, both because of our intertwined history and because they move the highest volume of vegetable-based entrees. Earthfoods has a variable menu of vegan and vegetarian lunches, with a menu planning committee meeting weekly to set next week's menus. If communication with the Earthfoods buyer is consistent (and they communicate with their menu planners) it presents a great opportunity for collaboration, in that we can let them know what will be available next week to plan their menu around. This was not something we were able to accomplish this year because of the level of communication required, but it is a goal to strive for.

This semester we made twice weekly deliveries to Earthfoods on Tuesdays and Fridays. Ordering was done on Mondays and Wednesdays via text with Rob Johnston, their produce buyer (N.B. Rob is graduating in the spring and there will be a new produce buyer next fall—keep communication open to establish a relationship with that co-manager early!) Deliveries were made to the Hampden loading dock/kitchen, where Earthfoods co-managers prepare their daily offerings. Produce was packed mostly in lock lids, which were picked up at the next delivery, but if we were ever short on bins, wax bushel boxes sufficed.

Greeno and Sylvan come in second place by vegetable volume, with fixed menus. They usually only want things from us like tomatoes, peppers, lettuce, spinach, and onions, which can be challenging given our growing season and climate. We were blessed with a long, warm season this year, so we were able to supply Sylvan with tomatoes and peppers through the end of

September, which will not always be the case. Greeno struggled at the beginning of the semester, opening quite late at the beginning of October, so we chose not to sell to them at all as we no longer had in season what they wanted. To add to the challenge, Greeno recently downsized their menu considerably, making it even harder to find a place for Student Farm produce in their kitchen.

This semester we arranged with Sylvan produce buyer Jess Slattery to order via email, with ordering occurring by Wednesday for pickup Friday. Produce was packed in wax bushel boxes. A Sylvan co-manager or two would come to the Friday Farmer's Market to pick up their order and invoices. Since the invoices for Sylvan were incredibly small, we stopped creating individual invoices after the third pickup, opting instead to send them a cumulative invoice at the end of the semester; this worked out fine. This also sparked a discussion about how small an order can be, and whether we should set a minimum. We loosely decided that a \$50 minimum per order would suffice, but then never enforced that in order to continue selling to Sylvan and strengthening the Student Farm/Student Business relationship. The conclusion was basically that wholesaling to Student Businesses is about more than money.

People's Market (where I have been lucky enough to be a co-manager for the past five semesters!) can hardly be considered when discussing wholesale. By way of vegetables, they only offer spinach and arugula for customers to put on their bagel sandwiches. Speaking as a co-manager, I can say with relative confidence that People's will not be expanding their vegetable offerings within the next season, but this could change once they move back into the new Student Union. We have sold greens to People's in the past, but most of the times we do it is of such a small quantity we do not charge them for it; they cannot be viewed as a potential source of income.

The most challenging part of working with Student Business is communication and consistency. Similar to Student Farm, all Student Businesses experience relatively high rates of turnover as people graduate or study abroad. The produce buyer can change semester to semester, and often when we are communicating in the spring about fall sales we are talking to a co-manager who will have cycled out of the produce buyer role by fall. Adding to the chaos, the Student Union is undergoing massive renovations until at least fall 2020, meaning the four Student Union businesses have been relocated to swing spaces in Bartlett Hall. This has had a massive impact on the financial stability of these businesses, especially Earthfoods. Their foot traffic has decreased dramatically, limiting the amount of meals they can move and thus, the amount of produce they are able to buy from us. However, I believe it is worthwhile to hold out through this tumultuous time in the Student Business world. I cannot see the future, but I am confident once the new Student Union is open, Earthfoods' business will rise again.

Time and time again it has been proven that there is abundant mutual will to work together, but the ephemeral nature of Student Business makes growth in this market, let alone consistent sales, challenging. Multiple times throughout this season we asked ourselves whether it was worth it to keep selling to Student Business, and every time the answer came back affirmative. Despite the extra effort needed to make this market happen, despite the minuscule

contributions to our total revenue, Student Business lies at the heart of Student Farm. In a literal sense, we would not be around to have this conversation without Earthfoods and the creativity and drive of co-managers.

Conclusion

Wholesaling is an integral part of the Student Farm experience. The diversity in the markets we sell to creates an equal diversity of challenges for each year's crew to overcome. I am proud of what we have accomplished in 2019 in strengthening our relationships and growing sales. However, we obviously were not perfect, and I hope the 2020 crew can build on what we have learned and continue driving forward wholesale growth for the Student Farm. My final recommendations are focusing efforts on rekindling our relationship with Big Y, continuing to develop the standing order with Dining, and not giving up on Student Business.

Greenhouse

Greenhouses are an incredible piece of technology which allows farms like the UMASS Student Farm and many others greatly extend the capabilities of its growing season. These spaces are key to being able to have fully developed plant starts once the ground is ready for plowing. Learning how to operate and work efficiently within a greenhouse is a necessary skill for any vegetable farmers in the northeast. This is where you as a crew will first get your hands dirty and begin the daunting but necessary work needed to run a farm. From a snow covered iglo looking hut to a thriving baby plant eden, the greenhouses exemplifies the extreme degree of changes that will occur to you and your crew. Tens of thousands of seeds will be carefully placed into soil and miraculously give back to us fruits and vegetables which will support and run this farm! Its pure magic I tell you! Enjoy the awesome journey of learning which seeds stick to your fingers, what seeds are fast to plant and how special calendula looks.



The Space

The greenhouses which we use are located right next to the Bowditch Greenhouses. They consist of a head house and four greenhouses, two of which are used for research. The two houses we use are the leftmost or north two. This is a shared organic and non-organic space. This means that there is delineation and separate tools, brushes, benches and watering cans, which needs to be honored to keep our organic certification. The Greenhouse managers are Chris and Dave. They are a wealth of information and knowledge who both enjoy a short chat, for it can get lonely working by oneself! Disease and pests are a real concern in the greenhouses especially when doing research which happen across the hall! Help minimize the chance of disease by keeping things off the ground and clean, there is a high level of foot traffic and who knows what people got on their feet! Its best to leave this space off better than we found it. Thoroughly sweep off benches and then the floor, with proper brushes! Pick up any plant material, they don't like it if we leave thinned or dead plants on the ground in head house and definitely not in the greenhouse.



Chris
Prep work

Dave



Usually your first seeding will be for the spring farmers market where you sell starts. Here you will start to look at all the complicated math you did and then try and figure out how to grow these plants! It can be complex at first but once you develop your systems it will be a walk in the park. This year we had 48 cell trays and 128 cell trays. Not the most fun numbers to deal with but it's what we have. The larger 48s need a support tray

because they are designed to break into 6 cell packs which can happen unintentionally when full of wet soil and plants. Other than water and Vermont Compost Soil, we apply a fish fertilizer to our starts. If you can get away with fertilizing them outside of the greenhouse like when hardening the plant off, then do it, the greenhouse won't smell like a rotting fish market then. Otherwise if you have to fish in the greenhouse learn to love it and just think about how happy those plants are to be getting more nutrients. Almost forgot vermiculite! This stuff is used with very shallow seed depth things like flowers to keep the soil moisture in. If you ever need more they have buckets full of it in the Bowditch greenhouses hallways where the new building is attached to the old greenhouse.



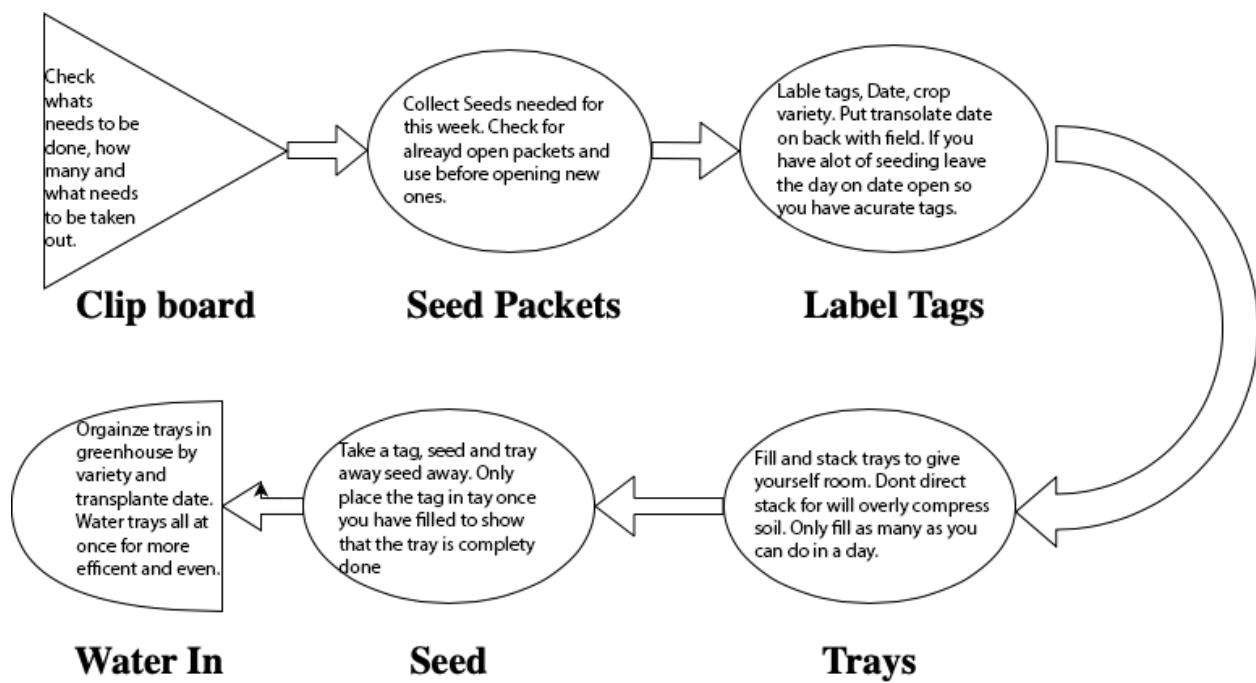
Seeding

Seeding is the main thing you do at the greenhouse, there's a little dancing, a lot of laughing and maybe if you're lucky eating but mostly seeding. Not all seeding is equal, how you seed can drastically affect how plants germinate, grow, develop and ultimately mature. Successful seeding can help insure a successful season, but if seeding is done poorly it's hard to go up from there.

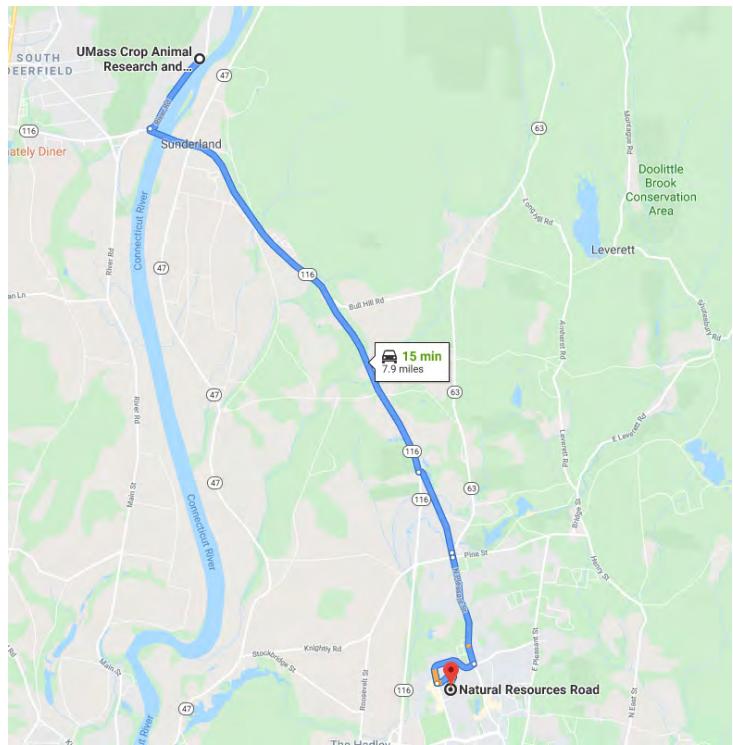
Consistency is key when planting, you want evenly filled cells, evenly pressed holes, centered seedlings and an even cover of topsoil. Breaking steps down into tasks can greatly increase how consistently things are done. The basic system that we developed this year goes kind of like this. Check your clipboard for unfinished seedlings from the prior week and for what lays ahead in the week. Once you know what your planting find the seed packets and count tags for the number of trays you will be planting. If you're with a couple people have some start filling the trays with soil, while one trustworthy individual create all the tags for that week, maybe two if it is a big week of planting. Starting at the non-

pointy end write the, date, variety, crop. Include transplant date on the back of the tag with what field that seedlings are destined to be planted in.

Cover and place tag in the tray. We found that we only placed a tag in a seeded and covered tray and this will help to reduce the chance of confusion on which trays have been seeded and which are still empty. Also when you water in your flats wait till you leave so you can evenly and quickly water all your flats.



The Logistics



summer chaos prevailed the box became a random pile of seeds that would have to be torn apart to find your desired seed. What made this worse for the 2019 crew was that we had a seed order mishap and didn't order all the seeds we needed! This combined with the complete lack of organization at the start of the summer made it very hard to tell if we simply couldn't find the seed packet we were looking for or it just never got delivered. DON'T DO THIS! Seeds should be categorized alphabetically either by species name or genus like brassica and solanaceous. If you're really feeling tenacious you can even check numbers of seed against the number of supposed flats to ensure we have enough of everything. We used rubber bands to group seed types with a note on the font of each group telling you what was in each. This did work but it might be easier to rubber band kale together separate from brussel sprouts just have them both categorized under "B" for brassica.

If you're going to not finish a seeding write down explicit notes on how many were completed of which variety on which day. I always thought I would remember but after a long weekend it somehow always seemed that I wished I had taken better notes. DO NOT just use a blank piece of paper to record seed records. Print out some lined paper so things stay organized. It's important for the records, which kind of fell apart this year... to have a record of who seeded what when! Basic information of who was there and what was seeded. Because there is a revolving door it hard to know where exactly one group left off and another group of seeders should start, help make this space stay organized as a basic habit amongst your crew, you will be thankful you did in the fall! Things like thinning and fishing should also be recorded!

One challenge about seeding in the summer is that it only is one of the many demanding and important tasks that will be calling out to be completed. It is necessary to learn how to multitask and also be able to remember important information throughout the day. Here is a photo of the drive from the greenhouse to Deerfield, it takes 15 minutes. Forgetting to bring flats of seedlings or even soil for filling trays is a huge loss in time. Try to minimize this by writing things down and having a checklist. This year it was agreed that a shut down list would help farmers in future years. The List could go like ("Hey are you forgetting or low on?" *SOIL *SEEDS * FISH EMULSION * TRAYS *TAGS *REMINDERS OF UNFINISHED SEEDING?) This sign put next to the door by the clipboard might help diminishes these oops moments.

When it comes to seed organization the greenhouse needs it. In the beginning we had just a large plastic box filled with all our seed. As the

Transporting

The last step of greenhouse work that occurs is the process of transporting and transplanting. The plants in the greenhouse need to be monitored so we can know when they can be planted. Although it is best learned in person, a simple way is to gently pull on the stem close to the soil and if the plant pops out and roots seem to developing into a web or ball they are ready. Once seedlings are ready for planting, they must be transported and get acclimated outside for a few days before putting directly into the soil. This process is called hardening off and helps prepare the plants for their new environment. If plants are not properly introduced shock could occur and possibly stunt the growth of the seedlings which is bad bad not good!!!

If we could do it again

Oh boy how strange it is to look back and think about what we could do differently. There are so many things that come to mind plus it's hard to try to remember them all. Nonetheless there are a couple of things which I think would really help streamline the greenhouse and minimize mistakes. First get a measuring cup! I over fertilized on a sunny day and almost killed all our pepper, tomatoes and eggplants. While relying on the scientific method of 1 glug, 2 glug per watering can, I think a small measuring cup would help get the new greenhouse manager accustomed with the ratio needed to properly fish. Another thing that might be cool to have would be a tray dibbler. This would allow a person to quickly and easily set the seeding depth of a tray and create all the holes needed to begin seeding. Johnny's sells a cell plug popper which is basically the same thing just turned upside down. It would be easy to make too! The last thing which I would recommend is convincing Jason if he hasn't already, to build a second tier for the back of Fudgie or the van. This is less something ya'll can do but when summer rolls around you have to transport a lot of plants! Being able to double your load would drastically reduce the amount of time spent driving back and forth from Deerfield.

The Tray

I feel like in some ways 2020 crew we let y'all down when it comes to reusing trays. We fought tooth and nail about how to reduce waste and help be more environmentally conscious. It's not really fair to ask farmers to spend more time than they are already spending to try and help the earth but when it comes to the disposable plastic we use and dispose of a lot of it. The main problem is that these trays just aren't made to be reused. Maybe one or two seasons but they start to get brittle and break down. We saved a lot and tried to wash them the best we could but it is hard to get all the nooks and crannies with just a large brush. Even worse when one cell collapses and you stack another tray on top, it collapses that cell too! If the Flats are stacked dirty they really don't like being pulled apart and sometimes just break apart. Try and see how it is to plant and remove starts from a used tray, maybe I'm just being pessimistic.

In the long run the best thing that could be done for the Student Farm crew would be to try and transition towards soil blocks. This would involve huge changes and an entire overhaul of the greenhouse layout, but they are hands down a significantly better alternative. They use no plastic, are better for the plants and require only a one time investment for the block presses. The downside is making the blocks. It is a little bit more complicated than just filling plastic trays with soil. Also when it comes to transporting the seedlings, if we were to us soil blocks we would have to make special trays to carry the starts. If you were interested in this approach maybe try to compare a bed of soil block tomatoes vs plastic tray tomatoes!

Farm Efficiency

Hello 2020 crew! This chapter is about efficiency on the student farm... woohoo!

Efficiency is a ratio of inputs to outputs within a system, if there is a low quantity of input to output then a system is efficient. I want to say before we get into this chapter any more, that this way of analyzing a system (and yourself as a part of that system) is based in a commodity motivated paradigm, and although that is something that many of us may have issues with, it is also a part of the reality of how this farm is able to exist. It is not something I will be focusing on in this chapter, but if any of the 2020 crew is inspired by finding efficiencies, I would encourage looking into practices that can be incorporated into the farm that boost efficiency and are ecologically beneficial. This chapter will cover some basics on time management, coming prepared, and what to expect; but I wanted to particularly focus on a few Standard Operating Procedures (S.O.P's), movement efficiencies, and team structure and communication. So let's get to it!

WHAT TO EXPECT

There are some basic items that will help you be comfortable and prepared for the various tasks that need to be done, here's a list!

Most of these items are for self-care, and it is very important that you feel comfortable while you are working because you will be working fast. Later on in the chapter I will talk about the importance of the last four items on the list and how they increase personal and overall efficiency

-
- SMALL BACKPACK
 - WATER BOTTLE
 - FOOD—LUNCH & SNACKS
 - HAT
 - RAIN GEAR—COAT & PANTS
 - EXTRA CLOTHES FOR
 - WARMTH/COOLING OFF/ BEING DRY
 - WATCH
 - PHONE
 - PERSONAL KNIFE
 - NOTEBOOK & PENCIL

on the farm. For now, let's quickly go over what to expect from your days on the farm and a couple, and simple, preventative measures that can be taken to avoid wasting time.

During the summer your work days will start at 7am, and that means you should be ready to be walking out into the field at 7, so if

you want time to show up/ put your things down/use the bathroom or whatever it is, show up earlier.

The beginning of the day is crucial because it may be the only time the whole crew is together until lunch or the end of the day and there may be changes to the plan. Everyone has a different normal, and that's fine, if 7am is early for you make sure you wake up with plenty of time to spare, better to show up earlier than on time. The physical work load ramps up all of sudden, and it is a stress on everyone's body, and everyone has different bodies and comfort levels, the best thing to do to be prepared for this is to have some of awareness of your physical self and take care of that self in ways that will allow you to keep going. Essentially, stay fed/hydrated, get rest the night before, make a practice of stretching, and don't push yourself too much. Having your personal items in order and your body taken care of means that you will be able to bring your whole self to the work you all will be doing; it shows a respect for yourself and the crew you work with. I can only say this from a point of hypocrisy though, I'm somewhat notorious for leaving my items anywhere and everywhere, and that's because I didn't bring a backpack with me. If I had I wouldn't have had to waste my or others' time looking for items. Ok, that's the basics, come prepared, show up on time, and get ready to work! Let's go over some of those S.O.P's I mentioned earlier.

S.O.P's

Every work environment has a set of standardized procedures set in place to accomplish the tasks at hand in the most efficient way, and these procedures are expected to be followed by everyone who works within that environment. On the Student Farm, you will all have the opportunity to develop some of your own S.O.P's, and there will be some that are already in place. This is where the watch comes in! I find it very useful to wear a watch on the farm, it is more accessible than my phone for checking the time for one, but I use it the most in developing average amounts of time various tasks should take. A good example from this past season was when Morgan, Tom, and myself were hoeing the onion beds. It had taken us about 40 minutes to complete one 500' bed, we had been talking and moving slowly and we all could feel it. But we did not know how long it should have taken us, so we decided to focus on the task at hand and keep an eye on the time for the next bed of onions to get an idea of how long it should take. We hoed the next bed in 15 minutes. After that we had a reference point for hoeing 500' onion beds, and this can

be applied to every task on the farm, but is most useful for the tasks that need to be done more often. I want to present some quick information about *labor efficiency* and *labor productivity*.

Labor efficiency describes how fast workers accomplish tasks based on a standard time and assumed quality (i.e. it is assumed that what is being produced is of acceptable quality). *Labor productivity* measures workers' output, the quantity of items produced. These are simple formulas that can be used to measure both of these metrics.

Labor Efficiency (as a %) = Standard labor time/Actual labor time*100

Labor Productivity = Output/Labor hours

These are useful metrics and perspectives to have with you while you are working on the farm.

An important part of developing standardized procedures is communication, if you find a way to do something that you think is more efficient, share it with the group and see what people have to say, it's not a "standard" operating procedure until everyone agrees on what to do. Many of the tasks that you will be tackling can be done in different ways, and sometimes it can be difficult to know what the "best" or most efficient way is. So I wanted to provide a few written out S.O.P's for just a few of the basic tasks you will need to accomplish often if not daily.

Prepping and Cleaning Vehicles

- Usually everyone goes to pack the van and trucks with harvest bins together
- Know how approximately how many bins you will need
- Load the bins in vertical stacks, not lying on their side
- Our vehicles are longer than wide, maximize the use of space when packing in bins
- Should take no more than 5 min. once at the barn to load the bins into vehicles
- At the end of every day vehicles should be cleared of trash and tools
- At the end of every week vehicles should be washed, dash boards, doors and steering wheels wiped down, and all vehicles should be swept out

Bunching

- Hold stems in non-dominant hand
- Use dominant hand to wrap stems where stem meets greens or root bunch
- Useful to keep bands in front pocket like sweatshirt pouch (nail bags work well) some like to have bands on non-dominant wrist
- A bunch of Kale (in general) can be harvested off of one plant in one motion
- We experimented with cutting and piling loose Swiss Chard with a separate team bunching
- Remember to clean the plants as you go (take off the yellow/dead leaves towards the base of the plant)

Bunching is one of those skills that can take time to get really good at, even though it can seem so simple. My recommendation is to attempt to strike a balance between taking your time to learn the movements and going as fast as you can. You will most likely be doing a fair amount of bunching, it is a good skill to develop.

Lettuce/Cabbage Harvest: Cutters and Packers

I would like to suggest field packing heads of lettuce/cabbage into wax bushel boxes for orders that require them to be packed as such. I think the wash process would be fairly quick, either by dunking the boxes into the dunk tanks or opening up the boxes and spraying down the produce inside.

- Bring appropriate number of bins/boxes and lettuce knives (bright orange handle)
- Once in field divide crew evenly between cutters and packers
- Cutters move ahead of packers
 - Cut the lettuce/cabbage heads straight on where the base of the head meets the stem
 - Be sure to make a clean cut, do not leave angled cuts with a lot of stem showing, the cut should be flat and producing a milky liquid

- If there are yellow/dead leaves on the outer layer of the head, cut a little higher just above where the leaves are attached to the stem
- Turn over the head so that the “butt” end (where you cut) if facing the sky, this is so the packers can easily see what’s been cut
- If you get to the end of the bed, continue onto the next bed to be cut or fall in packing
- Packers follow behind cutters
 - If using wax boxes, have someone making them while others pack
 - Pack heads of lettuce/cabbage along the length of the bin/box with the butts facing towards the center
 - Pack the next layer still along the length of the bin/box, but with the butts facing away from the center, repeat this alternating pattern until the box is full
 - Periodically take packed bins/boxes to the harvest vehicles and pack them in
 - If you are harvesting from a long bed it is best to move the harvest vehicle to the other side of the field once you are halfway through so that packers do not have to walk farther distances

I chose those tasks to write out procedures for because they were some of the tasks we really dialed in this season, I also want to share this general list of best practices when moving through the field to increase your efficiency.

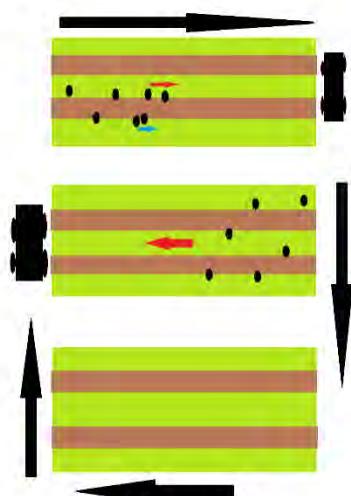
1. Move in one direction as much as possible.
2. Bring as more than enough bins if there is space, otherwise be precise
3. Decide on roles in the field: cutters, packers, bunchers etc.
4. Do one task at a time, **things go faster when like tasks are grouped together**
5. Minimize your transitions in body position
6. Be aware of how much talking is affecting your efficiency/productivity
7. Look ahead of you, plan as much as you can for small timesavers like consolidating bins and leapfrogging in good form
8. **Don’t leave empty handed!** There is usually something to take back to the truck

One more thing... this is also where the knife comes in!! A personal utility knife is a must have item on the farm, you will be cutting strings, opening bags, and who knows what else, a pocket knife is always handy to have.

Harvest Planning

I want to specifically talk about harvest planning because it is a task that can become inefficient if you're not paying attention. This past season we did not have very well defined roles in the field and in the washroom and we never named a harvest leader or washroom leader officially. I think this is a good thing to do, and I think it could be beneficial if the roles of harvest/washroom leader rotated so that everyone has the opportunity to experience managing a crew of people as you move through a field.

With these roles the harvest and washroom leaders of the day would meet a little before 7am and see what orders needed to be filled. From there they can consult the maps you all will have made and decide on what the best way to move through the field is. The harvest leader can make the harvest more efficient by planning for as little doubling back as possible, considering the benefits of working as team versus splitting up into separate teams, all of this will depend on the context of the day, Jason and Amanda are great to ask about this. This is where the notebook comes in!! I have found it very useful to carry a notebook, preferably a rain proof (cheap ones sold at Lowe's!) to write down the harvest goals, task lists, and draw maps of how I want to move through the field. If you get into the habit of using a notebook it can be an invaluable tool, I also used mine to take harvest notes on my crops throughout the season which was helpful to come back to in the fall when writing crop analyses. Below I have attempted to illustrate how you might consider moving through the field in a cutter/packer scenario with two beds to harvest.



In this scenario, cutters are dropped off at the left end of the topmost bed. The truck is pulled around to the end of each bed for packers as cutters progress.

Team Structure and Communication

All of you carries an important role, and without one of you, the system (everyone else) will experience new stresses. That is not to say that everything will fall apart if you miss some days because you are sick or something like that, but it is important that every person continues to perform the actions that they have agreed to be responsible for, and a part of that is communication... this is where the phone comes in!! I don't feel like it needs to be said at length, but the point needs to be emphasized **KEEP YOUR PHONE ON**

YOU/CLOSE BY. You will most likely be using groupme, text, and calling to communicate, and because the student farm operates out of two locations, everyone needs to be near their phone.

Keeping your phone on your person is basic, what is really important to practice is consistent, clear communication. Farms can have a reputation of being dramatic places, they are also known for being places where groups of people become close friends, they are also places where people go to work, whatever the emotional experience, everyone should be able to exist comfortably within a working environment in order to get the job done. Our crew decided to have weekly check-ins as a group to talk about how we were feeling emotionally and physically. That worked fairly well for us, but it is important to create a system that works for the group via consensus. I once worked at a camp that had its staff use *The Four Agreements* by Don Miguel Ruiz as guidelines for communication and behavior and I thought that overall the increase in communication led to an increase in efficiency, so I will share them here.

- ❖ Be impeccable with your word
- ❖ Don't take anything personally
- ❖ Don't make assumptions
- ❖ Always do your best

The last thing I want to say about communication intersects with a tension that some may feel while working on the farm. Although we are a co-operative farm, Amanda and Jason must have the final say in terms of on-farm practices. It can cause unintentional damage and lost time if someone decides to change the plan or do something to a crop on their own without first communicating with the Amanda, Jason, and the crew. We have all come to this place to learn from Amanda and Jason, and they are probably some of the best managers and teachers that you will ever have, they have the longest perspective and the most experience on this farm, their knowledge deserves our respect.

On a farm it seems that there is an almost infinite number of places to look to increase efficiency, I hope the few pieces of advice and steps to get tasks done are helpful for the season! Best of luck to you all, don't forget your watch, phone, knife, and notebook!

Summer Production

Welcome

Congratulations! You're sticking around the Pioneer Valley for the Summer to manage the UMass Student Farm. The stress of papers and finals has ended and your Summer farming journey is about to begin! This chapter will provide a financial analysis of the crops grown in the Summer of 2019, Group Norms, Expenses, Revenue, Markets, Summer Manager Roles, Benefits of Summer Production, and Recommendations for your season and beyond. The real hands on work begins in May. Finally, your crew gets the opportunity to learn outside of the classroom, make important decisions together, and build trust as a team while creating lasting friendships.

Summer Crops:

Beets (Red Ace)

Beets were one of our most productive summer crops. At \$2.83 Revenue per bed foot, it ranked third on most profitable. Summer beets were sent to Big Y consistently. I remember an abundant fourth of July harvest when we bunched our first beets! Make sure your beets size up and select green healthy looking tops for Big Y harvests.

Carrots (Bolero)

Our carrots grew well and we did not have many issues during the summer. Crawling across 500 foot beds in C, to pinch out weeds as young carrots grow, builds mental toughness and lets people share their deepest thoughts. The first harvest was during the third week of July. Similar to beets, healthy looking green tops and symmetrical bunches are desirable traits which customers shopping at Big Y look for. It was beneficial to have one person fork up carrots, others place into piles, and a third group bunch. Consider finding a tractor implement which can effectively lift up carrots without damaging them and covers the whole bed width.

Broccoli (Belstar)

No luck this year with the summer broccoli. We missed spraying it, and it was infested with imported cabbage worm. None was sold. See Ellis' IPM chapter.

Cucumbers (Excelsior and Marketmore)

Cukes exploded with fast and productive growth similar to the Summer Squash and Zucchini. We eventually changed our harvest plan from two to three cucurbit harvests per week. However, we may have been able to sell and donate more produce if this change had occurred earlier. The cucurbits got huge if they were not harvested frequently enough. Cucumbers were grown in SD B/C, NSF Greenhouse, and a not yet certified organic Haygrove for UMass Dining.

Lettuce (Crispino and Coastal Star)

We grew two varieties of lettuce, iceberg and romaine. The lettuce was covered with reemay after transplanting on May 17th. This protected from cold nights and pest damage. Make sure to fully weed the beds before covering with reemay in order to give lettuce a fighting chance. A massive amount of Romaine heads were harvested on June 27th. Over 180 were taken out of the field that day. Iceberg (Crispino) was harvested for the first time on July 4th! Lettuce proved to be the most profitable crop in terms of revenue per bed foot. We almost grew another succession where the Winter squash had failed but chose instead to make sure that Fall crops were well managed.

Kale (Winterbor)

Kale was a frequent and reliable crop sold to Big Y. It was the first crop that we harvested after garlic scapes. After removing the remay, we began harvesting Kale June 24th and into early August.

Peppers (Olympus)

Peppers should definitely be grown again in the summer. They were first harvested in July and transitioned well with our Fall planned Peppers. Often times, we had enough peppers to offer to both Big Y and Dining but be mindful about rot spots and sizing. Great mid harvest snack in the dog days of August.

Summer Squash (Multipik)

Another cucurbit which grew with vigor and produced a lot of fruit. Many hands during these harvests will improve the harvest time, but be mindful about missing squash. If left in the field, it will grow fast and not be marketable to Big Y.

Swiss Chard (Bright Lights)

Swiss Chard took time to harvest even when we had lots of crew members. Creating bunches is more about healthy looking leaves and less about a perfect color scheme. Make sure everyone is taught early on about bunching chard and kale. See Nick's chapter on efficiency.

Tomatoes (Big Beef and New Girl)

Tomatoes were the second most profitable crop in terms of Revenue per bed foot. The tomatoes in the NSF and Haygrove were successful however, debate about management was a key theme at different points during the summer. Our crew checked out Brookfield Farm, whose greenhouse tomatoes seemed to be growing without much human alteration. Pruning tomatoes is something that you can find in Evans' Fall Crop Analysis along with info about diseases and pests.

Zucchini (Midnight Lighting)

Zucchini was the least profitable summer crop. It is important to note that it was productive in terms of growth. However, we missed some key harvest times and the zucchini was no longer Big Y quality. In fact, often times, it became so large that donation was not even an option. Eventually, the three day a week harvest of cucurbits was too much and our crew needed to start prioritizing Fall crop management. We only harvested cucurbits three more times after August 1st.

Garlic Scapes

Three 300 foot beds of garlic were planted in Fall of 2018. Garlic scapes were sold to the Dining Commons (Berkshire) in June. They became items on our very first invoice. In total, we sold 60 pounds of garlic scapes and they provided a nice cash incentive for harvest at \$8.00/lb.

Vegetable	Price/Unit	Revenue/Unit	Units Sold	Units
Beets	\$1.50/lb	\$1,416.50	813.00	Pounds
Carrots	\$1.50/lb	\$1,146.00	764.00	Pounds
Broccoli	\$2.00/lb	0	0	Pounds
Kale	\$1.75/lb	\$1,285.38	734.50	Pounds
Cucumbers	\$1.00/lb	\$1,996.00	998.00	Pounds
Lettuce	\$2.00/lb	\$1,196.00	598.00	Pounds
Peppers	\$1.75/lb	\$1,517.25	867.00	Pounds
Tomatoes	\$2.00/lb	\$1,600.00	800.00	Pounds
Swiss Chard	\$1.75/lb	\$1,319.50	754.00	Pounds
Summer Squash	\$1.75/lb	\$851.25	556.00	Pounds
Zucchini	\$1.75/lb	\$439.75	283.00	Pounds
Garlic Scapes	\$8.00/lb	\$480.00	60.00	Pounds

Group Norms

Our first week proved to be slow, with very few urgent tasks demanding attention. Early on, we constructed a list of Group Norms which differed from Spring classroom expectations. These norms included:

- Be on time and communicate if you're going to be late
- Ask for help if you need it
- Use your best words, be kind!
- Don't take it personally
- Be Present, Step Up – Step Back
- People have different skills
- Verbal Appreciation
- Take care of yourself
- Let's keep it 100
- Make a Human Pyramid

Our work environment became a place where students were able to share their ideas and opinions about farm challenges, future planning, and life in a respectful and productive discussion. As a team member, your crewmates are counting on your best effort, attitude, and involvement. Teamwork and beneficial communication make any kind of business productive. Take the time to develop your own Group Norms. Reflect on what you expect from others and make sure to live by those values as you engage in team decisions. One difficulty of Summer Production is the fact that students are all co-managers who make choices together. The number of voices and diverse backgrounds will be easier to manage if Group Norms are established and respected.

Expenses

Seeds	\$527.49
Seeding Trays (152)	\$152.00
Black Plastic (3,680 feet)	\$124.2
Vermont Compost (10 bags)	\$313.41
Irrigation Supplies	\$698.00
Fish Emulsion fertilizer 5 gallons	\$38.90
Bolts for G cultivation	\$24.04
Grease gun	\$29.99
Wax Bushel Boxes	\$201.56

Estimated Summer Expenses(Exclude Labor): **\$2,109.59**

Revenue

Vegetable	# Bed Feet	Revenue	Revenue/Bed Ft
Beets	500	\$1,416.50	\$2.83
Carrots	500	\$1,146.00	\$2.29
Kale	500	\$1,285.38	\$2.57
Cucumbers	760	\$1,996.00	\$2.63
Lettuce	376	\$1,196.00	\$3.18
Peppers	700	\$1,517.25	\$2.17
Tomatoes	520	\$1,600.00	\$3.08
Swiss Chard	500	\$1,319.50	\$2.64
Summer Squash	500	\$851.25	\$1.70
Zucchini	500	\$439.75	\$0.88

Total Summer Revenue: **\$19,674.93**

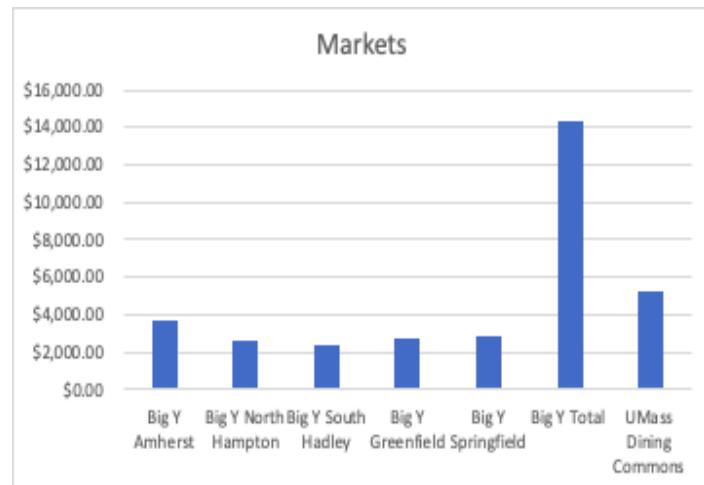
Total Summer Profit(Exclude Labor): **17,565.34**

Markets

Big Y Amherst	\$3,741.39
Big Y North Hampton	\$2,670.63
Big Y South Hadley	\$2,340.26
Big Y Greenfield	\$2,787.26
Big Y Springfield	\$2,838.00
UMass Dining Commons	\$5,297.39

Relationship with Big Y:

We were featured in a Big Y supports local ad. On May 17th, a rainy morning, filmmakers hired by Big Y came to the farm and filmed some of our work activities. Later in the summer, Big Y purchasers Kevin Barry and Sean Stolarik visited the ALC. Deliveries were made on Tuesdays in Greenfield and Fridays in Amherst, NOHO, and South Hadley. Two people would typically take the van or Fudgie and drive first thing in the morning. Big Y purchased significantly more produce in the summer and Dining. They are almost always willing to take whatever is offered provided that it is high quality. It might be more efficient to sell large amounts to the warehouse in Springfield. We only went there twice in the summer compared to weekly visits to the other Big Y locations. It would save drive time and less emails would need to be sent. You should talk with Big Y early in the Spring to figure out if this is possible.



Relationship with UMass Dining:

Communication + Expectations- Do your best to connect with someone involved with UMass Dining. The focal point may be different depending on the season. The difficulty with selling to UMass is that there are many people to create relationships with and not all of them have the time to talk constantly with the student farm. Some key names include Chef Alex, Chef Tony, Chef Bob, Sustainable Kathy, Tyler Tedesco, Ken Toong, and Chris Howland. Check out Evans' chapter about Wholesale Markets.

Summer Manager Roles

In order to maximize efficiency and better utilize the unusually large summer crew size, specific Summer Manager roles were assigned. These roles included:

Record Keeper was responsible for maintaining the day to day log of what was seeded, weeded, planted, or harvested. They were responsible for keeping track of other smaller maintenance related tasks. It is important to note how many people are working, how long it takes, and any other special considerations like running out of transplants.

To view an example of the 2019 work log on Google Drive, follow the folders: 2019-RecordKeeping-RecordKeeping2019-WorkLog

CSA Manager was in charge of sending out CSA updates to confirmed members as well as seek out more potential customers. This position was also in charge of making sure people had paid for their share. Later on, this job becomes more about planning how a successful farm share will operate. See Rhianna's chapter.

Greenhouse Coordinator took ownership of the greenhouse binder. They helped keep track of when transplants should be hardened off and brought to the farm. This position needs to work closely with the Maps and Planning Leader in order to make sure crops are put in the ground at the right time.

Maps and Planning Manager was in charge of managing the fields and making sure transplants and direct seeded crops were planted on time. This position involves taking responsibilities for numerous Fall crops. This person needs to be an effective communicator who can relay information and instruction to the crew clearly.

Harvest Manager was in charge of managing the wash station, keeping harvest records, and relaying tasks on harvest days. This is a very important position but was performed by different people throughout the summer. Our crew was comprised of lots of leaders and I think this resulted in finding a permanent harvest manager difficult. Future crews should consider, a wash room manager, or a rotating harvest manager so that everyone gets the experience. However, this was debated amongst our crew and could lead to more complicated harvests if the leader is constantly changing. Discuss with your peers and see what may work best.

Food Access Initiative Managers (2 students) were in charge of managing donations, reaching out to the Food Bank and Not Bread Alone. Go check out Al's Chapter.

Integrated Pest Management Manager met frequently with Sue from UMass extension to scout bugs and disease in the field. Did you know there is a whole chapter in this handbook about IPM?!? Read up.

Wildcard was necessary due to the size of our crew and the wild amount of work we got ourselves into. There is always something on the TO DO list, and having a Wildcard is handy when others people's hands are tied.

Benefits of Summer Production

ALC Ownership and Responsibility:

The Agricultural Learning Center is now part of your responsibility. This location is close to campus and overtime has gained more recognition among students and faculty. Be proud of your land, and be mindful of your actions here. It is a public area with runners, bikers, dog walkers, and wild animals. Although our summer production crops were grown in South Deerfield, we spent a fair amount of time, around 1-2 days a week working here.

Animal Chores:

Student Farmers will sign up on a rotating chore schedule to help Nikki Burton and the Animal Husbandry program. Chores included helping move the lamb shelter, watering, and general check ins. Chicken chores become more important in August and young chicks are weaker and must get special attention.

Publicity, Social Media, and Promotional Time for CSA:

The summer served as a great time to broadcast our work and adventures to the world via Instagram and Facebook. See Morgan's chapter on publicity.

Relationships with Hampshire College Farm and Book and Plow Farm:

Throughout the summer we attended two Student Farms in the valley and hosted them at the ALC and in SD. This was a time to share interests, sustainability issues, and future ambitions. I appreciated the freedom to host the students and talk with them one on one. In the past years, trade between Hampshire Farm and UMass Student Farm has aided both in the case of crop failures. I think it would be wise to continue these connections and potentially market or host a community event together.

Recommendations

Under the Handbook Folder on the Google Drive, there is a document titled Student Farm Enterprise Summer Work Manual. It discusses some of the manager roles as well as tips and tricks for working on the Student Farm during the summer. In the Spring, students are assigned different crops to plan for. More assignments in the Fall will cover what happens to your crops. Consistent and informative record keeping throughout the summer will significantly help you on Fall assignments and make them more accurate. Remember that your fellow students, Jason, and Amanda all have your back. This is a learning farm and if you're not getting enough out of the program speak up. That being said, prepare to give it your all, as dedication and effort during the summer will be well rewarded in the Fall.

Integrated Pest Management

IPM Overview:

Pest management is one of the most crucial elements to running a successful vegetable farm. There are a variety of products and practices available to ensure effective pest management. At the student farm, we choose to practice integrated pest management (IPM). IPM aims to use specific thresholds to determine when there is an economic risk for a crop, and spraying pesticides to mitigate the problem. The intention is to spray just at the right moment to kill the maximum amount of pests, at their most vulnerable stage of life, to spray only when needed, not wasting time or spray.

Each season, one member of the student farm crew is chosen to fulfill the role of the IPM manager. The IPM manager works with Sue, our UMass Extension pest and disease specialist, to scout for pests and determine when to spray. The IPM manager meets with Sue once every other week for about an hour to scout the fields where there are suspected to be pests. We take random samples throughout the field and compile the data, comparing it with UMass Extension-determined thresholds to decide when it is appropriate to spray. Sue then recommends a spray schedule; what to spray and when. If we determine it is necessary to spray a crop, we show the scouting report along with recommendations to Amanda and Jason who then spray the crops.

Pests on the Farm:

Through the season, there are a lot of pests to look out for, and almost every crop has bugs that want to eat it...

Thrips:

Starting at the beginning of the season, we look for thrips on the onions. Once the plants have grown a bit, you can look for thrips at the crown where the leaves come out of the onion bulb. They are small, white or brown bugs that are almost invisible. You can only really spot them when they move. You can notice their damage as silvery streaks on plants which can be so damaging that they cause the leaves and neck to rot. Although they most commonly affect onions, they can live on any allium, so also check leeks and shallots. Although there were some thrips on the onions, it never really got bad, so we never sprayed them. You could spray azadirachtin and pyganic if too many thrips come.



Striped Cucumber Beetle:

Once the cucurbits begin to grow, you can start to see striped cucumber beetle. These beetles are small with yellow and black stripes and appear flying around cucurbits, commonly cucumber, summer squash and winter squash. Cuke beetles cause problems because they feed on the plants and can give the plant a bacteria that makes the plant wilt. Before planting, it is good to cover the transplants in Surround®, which is clay that you coat the plants in so the cuke beetles are not attracted to the plants right away. Once you determine the pest is worth spraying, plants can be sprayed with pyganic which will kill cuke beetles.

**Flea Beetles:**

Flea beetles eat every brassica. You can find them in arugula, kale, broccoli, cabbage and any other brassica. They are small black beetles that leave a lot of holes in leaves. To have a marketable product, you need to spray your brassicas for flea beetles. You can spray Pyganic, Dipel and Entrust to kill flea beetles and it will normally take repeated sprays throughout the season to manage them.

**Colorado Potato Beetle:**

Colorado potato beetles eat the leaves of potatoes and eggplants. As adults, they are large yellow and black striped beetles. They emerge from the sides of the field and will quickly infest the potatoes. When the adults lay eggs, the larvae emerge and quickly eat leaves. It is important to spray the potato beetles when they are at the larvae stage. Spray Pyganic and Entrust, which the young beetles will eat and then die. Multiple applications are often necessary to manage Colorado potato beetle.



Leafhopper:

Leaf hoppers are long green bugs that look almost like a cricket. They cause hopper burn on a variety of crops. This season, we sprayed leafhopper on potatoes and the dry beans. Azadaractin and pyganic were sprayed on the potatoes and dry beans.

**Cabbage Worm:**

If you ever see white moths in a brassica field, you are seeing the mature form of the imported cabbage worm. It is important to spray your brassicas even when there are few cabbage worms, as they sneakily infest a planting in no time. They are small green caterpillars who will eat your plants and grow then make cocoons on the plants (they also poop on them). This year, we lost an entire field of broccoli to cabbage worms because we did not spray them quick enough. You can spray BT for cabbage worms.

**Hornworm:**

The hornworm is a beautiful creature and it is always a special moment when someone sees their first one. They are big fat green worms with fake eyes on the sides and a horn. They eat tomatoes and poop all over them. You will see them all the time when you start picking tomatoes. We do not generally spray for them. It is good to remove them when you see them and carry them away from the field. We liked to have a hornworm bucket present in the greenhouse when we worked on the tomatoes. You can also look out for white eggs on the hornworm. This is a wasp that lays its eggs on the worm and when the eggs hatch it kills the worm. When you see a hornworm with eggs on it you can leave it and it will make more wasps to kill the hornworms.



Squash Bug:

There was a really big infestation of squash bugs in the winter squash. Squash bugs look like stink bugs and they suck the leaves of squash plants. They do not really damage the plants very badly. We did not spray for them.

**Mexican Bean Beetle:**

The Mexican bean beetle is a yellow and black spotted beetle that looks like a ladybug. They eat the beans leaves and leave them with just their veins. This year we did not have a real problem with the bean beetle but you could spray Pyganic or Azadaractin.

**Fungal Problems:****Angular Leaf Spot:**

This year we lost our entire butternut field to angular leaf spot. Angular leaf spot is a fungal disease which makes the entire plant wilt and die. We tried to spray the plants, but the squashes were not able to be stored. We are not sure if the plague was seed born, since we planted some three year old seed, or something else, but DO NOT PLANT WINTER SQUASH IN A.



Late Blight:

Late blight is a fungal disease that mostly affects tomatoes. You will notice it in August and September as black bullseyes beginning to form on the leaves. This disease comes with the weather and will affect the entire region, so it is good to keep in touch with surrounding farms, especially in the south, to see if late blight is coming your way. When late blight takes over, you can expect to lose your entire crop. To prevent late blight, we spray emulsified copper onto the tomato plants, this acts as an organic fungicide.

Apples at the ALC:

At the ALC, we have a small planting of apples. Apples are a difficult crop to grow and require a lot of sprays in order to get a marketable crop. Growing them organically is even more difficult since most of the sprays used conventionally are not certified organic. For the ALC apples, Jason and Amanda sprayed Stylet for mites and scale, Surround and Azera for plum cucurlia and another application of Surround and Azera for plum lucurlia.



The apples did not turn out very good for anything besides cider. They had working and pitting problems, suggestive of calcium and boron deficiency. I would recommend doing foliar sprays of calcium and boron in order to get more saleable fruits for next year.

Equipment:

Backpack sprayer: mostly used for applying Surround but can be used for small applications of anything
Tractor Sprayer: 55 Gal. 3 point PTO driven sprayer. Was used in all field applications of pesticides

Spray Records:**South Deerfield:**

UMass Student Farm SD Spray Records 2019

Date	Time	Crop and target pest	Location	Active Ingredient / Brand or Product Name	EPA Registration Number	# of Units/ Acres	Total Amount	Applicator Info	REI	Expiration (Mo/Da/Time)
Friday, May 17, 2019	10:00:00 AM	Kale	Block C	Sorround/ Kaolin Clay	61842-18	.08 Acres	5 Cups	Amanda Brown	4 Hours	5/17/19 2:00 PM
Monday, May 27, 2019	8:00:00 AM	Winter Squash, protected SCB	Block A	Sorround/ Kaolin Clay	61842-18	1	15 Cups	Amanda Brown	4 Hours	5/27/19 11:00 AM
Wednesday, June 26, 2019	6:00:00 PM	Winter Squash Striped Cucumber Beetle	Block A	Pyganic	1021-1772	1.5	18 oz	Amanda Brown	12 Hours	6/26/19 18:00
Wednesday, June 26, 2019	6:00:00 PM	cucumber, Squash and Zucchini Striped Cucumber Beetle	Block C	Pyganic	1021-1772	1.5	18 oz	Amanda Brown	12 Hours	6/26/19 18:00
Monday, July 01, 2019	9:00:00 AM	Colorado Potato Beetle -Potato	Block A	Pyganic	1021-1772	1.5	18 oz	Amanda Brown	12 Hours	7/1/19 21:00
Monday, July 01, 2019	9:00:00 AM	Colorado Potato Beetle -Potato	Block A	Entrust	62719-282	1.5	10 oz	Amanda Brown	4 Hours	7/1/19 21:00
Thursday, July 04, 2019	9:00:00 AM	Colorado Potato Beetle -Potato	Block A	Pyganic	1021-1772	1.5	18 oz	Amanda Brown	12 Hours	7/4/19 21:00
Thursday, July 04, 2019	9:00:00 AM	Stripped Cucumber Beetle - Cucumber	Block C	Pyganic	1021-1772	1.5	18 oz	Amanda Brown	12 Hours	7/4/19 21:00
Thursday, July 04, 2019	9:00:00 AM	Stripped Cucumber Beetle - Cucumber	Block C	Azadactin	2217-836	0.11	16 oz	Amanda Brown	12 Hours	7/4/19 21:00
Thursday, July 04, 2019	9:00:00 AM	Leaf Hopper - Beans	Block B	Pyganic	1021-1772	0.11	18 oz	Amanda Brown	12 Hours	7/4/19 21:00
Thursday, July 04, 2019	9:00:00 AM	Leaf Hopper - Beans	Block B	Azadactin	2217-836	0.11	16 oz	Amanda Brown	12 Hours	7/4/19 21:00
Thursday, July 04, 2019	9:00:00 AM	Leaf Hopper - Potato	Block A	Pyganic	1021-1772	0.11	18 oz	Amanda Brown	12 Hours	7/4/19 21:00
Thursday, July 04, 2019	9:00:00 AM	Leaf Hopper - Potato	Block A	Azadactin	2217-836	0.11	16 oz	Amanda Brown	12 Hours	7/4/19 21:00

ALC:

Date and time	Crop and target pest	Location	Active Ingredient / Brand or Product Name	EPA Registration Number	# of Units/ Acres	Total Amount	Applicator Info	Duration (Hours)	Expiration (Mo/Da/Time)
4/1/19 9:00 AM	Mites and Sale	Apple Orchard	Stylet	65546-1	1/2 Acre	1500 ML	Amanda Brown	4 Hours	4/11/19 2:00 PM
5/30/19 9:00 AM	Plum Cucurlia	Apple Orchard	Surround	61842-18	1/2 Acre	25 Cups	Amanda Brown	4 Hours	5/30/19 4:00 PM
5/31/19 10:00 AM	Plum Cucurlia	Apple Orchard	Azera	1021-1872	3 Trees	2 oz	Amanda Brown	12 hours	5/31 10:00 PM
6/4/19 8:00 AM	Weed	Apple Orchard	20% Vinegar	N/A	1/2 Acre	1 Gallon	Hoveizeh Karimi	1 hour	6/4/2019 10:00 AM
6/7/19 10:00 AM	Plum Lucurilia	Apple Orchard	Sorround	61842-18	1/2 Acre	25 Cups	Jason Dragon + Amanda Brown	4 hours	6/7/2019 2:00 PM
6/7/19 12:30 PM	Plum Lucurilia	Apple orchard	Azera	1021-1872	3 Trees	1 oz	Amanda Brown	12 hours	6/8/2019 12:30 PM
6/19/19 8:00 AM	Weed	Apple Orchard	20% Vinegar	N/A	1/2 Acre	1 Gallon	Hoveizeh Karimi	1 Hour	6/19/19 10:00 AM
7/10/2019 9:00AM	OBLR	Apples	Dipel DF	73049-39	1/2 Acre	1/2 lb	Amanda Brown	4 hours	7/10/2019 1PM
7/26/2019 10:00AM	Flea Beetles	Brassicas	Pyganic	1021-1772	1/2 Acre	9 oz	Amanda Brown	12 hours	7/26/2019
7/30/19 10:00	Flea Beetles	Brassicas	Dipel DF	73049-39	1/2 Acre	1/2 lb	Amanda Brown	4 hours	7/30/19 14:00
7/30/19 10:00	Flea Beetles	Brassicas	Entrust	62719-282	1/2 Acre	30 oz	Amanda Brown	4 hours	7/30/19 14:00

Recommendations for 2020 IPM Manager:

I think the way the IPM is set up currently works very well. The meetings with Sue are a perfect way to get acquainted with the different pests we deal with.

- 1) I recommend giving all of the information you gain from Sue to the rest of the crew, so they can learn about pests and know what to look for while they are working. I think there could be many ways to teach the crew about the pests. One of the best ways for me was pointing things out and explaining them as we found them in the field, that way people could see the pest and experience them.
- 2) Another activity we tried was a “bug safari” where we took everyone and did a scout. It was nice because we could get all of our samples very quickly and everyone got to learn all of the bugs. I recommend doing more bug safaris. I think the three or four bug safaris throughout the season, people would be able to get sufficient experience.

- 3) I also tried to keep a list of pests and when they were out, along with info about identifying them and where to look for. I only updated this twice but people seemed to like it. If you can make a habit of having a running list of pests on the wall of the breakroom, it will help people learn about the pests
- 4) Taking the time to learn how to set up the sprayer and mix the pesticides so you know how that works.
- 5) Get your pesticide applicators license before working on the farm, so you can get the full experience of using pesticides.

UMass Student Farm Livestock Project



The current landscape of livestock agriculture and meat production in the United States is a landscape of corporate consolidation and gross mistreatment of animals. Currently, only four corporations control about 80% percent of the meat supply, vertically integrating the supply chain and controlling production, processing, packaging and distribution¹. Livestock farmers are squeezed into incredibly low wholesale prices by retailers and processors, so more and more farmers are responding by using direct-market approaches such as farmers markets, CSAs, and selling directly to restaurants and local stores.

There are also ethical implications to the current livestock system in the U.S., where the vast majority of our meat comes from Concentrated Animal Feeding Operations (CAFOs), which are high-density, indoor livestock operations in which large numbers of animals are raised for meat, milk, and/or eggs. These operations are characterized by high disease pressure, reliance on antibiotics, 100% grain feeding, and high levels of animal stress. According to data compiled from USDA and EPA censuses, only four companies are responsible for raising 81% of cattle, 73% of sheep, 50% of chickens, and 60% of hogs consumed in America. That number skyrockets to 99.9% for both laying hens and broilers when all other CAFOs are considered². These statistics are frightening to small livestock farmers, as an increasing number of small farms (especially dairies) foreclose operations every year due to unreasonably competitive prices from industrial, taxpayer subsidized meat.

As more light is shed on the realities of the meat industry in the modern, industrial world, more people are demanding change and looking for meat from healthy animals raised sustainably and ethically by local farmers. People want to divest from industrial agriculture and invest in a system of agriculture that values animal welfare, ecological stewardship, and workers' rights. A systems shift of this scale and significance will be a long, challenging process, but it is a process many believe can happen. With this knowledge in mind, the UMass Student Farm Livestock Project seeks to create an opportunity for students at UMass Amherst to interact with sustainable livestock production through experiential learning.

The UMass Student Farm Livestock Project began in 2015 with raising broiler chickens in mobile tractors on dormant vegetable plots. The main goals of this project are to integrate livestock into vegetable production in order to reduce the cost of purchased chicken manure, to increase fertility and build soil organic matter, to diversify farm income, and to act as an educational opportunity for students interested in sustainable livestock production.

Sheep were raised on the student farm in 2018. In this pilot year, six dorset lambs were purchased from the Hadley Farm and raised on hay fields, a dormant vegetable plot (Plot 7), and finally a young chestnut silvopasture in partnership with the UMass Carbon Farming Initiative. During this year, systems and infrastructure were set up including housing (10'x10' corral shelter by ShelterLogic w/ hog panel front door), fencing (electronet w/ solar-powered energizer), waterers (simple plastic buckets), and mineral feeders. This year also established how sheep

¹ From *The New Livestock Farmer* by Rebecca Thistlethwaite and Jim Dunlop

² Overcash, Elizabeth. *Overview of CAFOs & Animal Welfare Issues*. Michigan State University College of Law, Animal Legal & Historical Center. 2011

would be moved from paddock to paddock; by closing sheep into their shelter while fences are moved or by creating an alleyway of fences to a new, farther away paddock when the shelter must be moved as well. In 2018, the main source of labor was Nikki Burton (Project Manager) and Sierra Torres (Student Assistant Manager). Sierra Torres was working part-time with the livestock project and part-time with the student farm vegetable production program. This proved problematic as a student in this position will tend to feel isolated when their time is divided, and time boundaries between vegetable and livestock work may become blurry and tough to manage.

This year some changes and expansions were made to the project. The numbers changed from six lambs to nine lambs, still dorsets from Hadley Farm. Management of housing, fencing, and moving stayed roughly the same though there were changes in record keeping, marketing, and in labor which will be discussed in this report. This year Nikki Burton and myself, Kyle Zegel (Student Assistant Manager), were the main source of labor. This was more successful than last year because I was not also working with the Student Farm vegetable production. I was hired part-time to this position and had defined time spent at the Student Farm and a defined time spent at my other farm job

The poultry side of the project demonstrated mixed success this year. We raised 110 broilers, although we had significant losses that will be discussed later. Despite these losses, we still made a significant profit. All of our birds were processed on farm on the Mobile Poultry Processing Unit and sold to students, faculty, local community members, and UMass Dining. The Small Farm Husbandry: Pigs & Poultry class made a new chicken tractor that was somewhat successful. Overall, the chickens this year provided students with valuable educational experiences, were a source of healthy, local poultry for many individuals, gave a dormant vegetable plot some extra fertility, and provided the Student Farm with one source of income.

Chicken Finances

Overall, we made a profit even when including the cost of labor, which was calculated as 1 hour of work per day valued at \$12 per hour for the 80 days of the chickens' lives. The average weight of our birds was 4.91 lbs, which is great! We had a few small birds in the 3-4 lb range and some very large birds in the 6-7 lb range. We decided upon \$6/lb for the public price this year and \$4.25/lb as a discounted price for anybody who has put in work with these chickens (i.e., students from the Pigs and Poultry class and student farmers). A year-to-year comparison of per pound prices since the start of the program is provided below.

Pricing: Year to Year

Year	Farmers/Discount	Public/Retail	Dining/Wholesale
2015	N/A	N/A	\$4 dining
2016	\$4.50/lb	\$4.50/lb	N/A
2017	\$4/lb	\$4.25/lb summer \$4.50/lb fall	N/A
2018	\$3.50/lb	\$5/lb	N/A
2019	\$4.25/lb	\$6/lb	\$4.50/lb

Most birds were sold to students in the class, student farmers, and local community members who heard about our birds through the order form sent out through Facebook and on UMass email listservs. We also made a bulk delivery of 30 chickens to UMass Dining for a special event. It is not reflected on the following finances sheet, but three birds were donated to supporters of the program and one bird was used for the Pigs & Poultry class final potluck.

Chicken Finances 2019		
Expenses		Sales
Freedom Ranger Chicks	\$77.50	\$1,865.51
Kosher King Chicks	\$84.00	
FR + KK Chick Shipping	\$40.00	Profit (w/o labor)
Cornish Cross Chicks (w/ Shipping)	\$47	\$1,159.03
Accidental CC Order	\$47	
Poulin Grain (600 lbs - 12 bags)	\$183	Profit (w/ labor)
Clover Hill Farm Grain (1,000 lbs)	\$210	\$199.03
Connectors for Charger	\$17.98	
		Total Poundage
<i>Total</i>	\$706.48	407.86
Labor		
\$12/hr - 1 hr/day - 80 days	\$960	

Sheep Finances

Overall, 2019 was a very successful season and we made a healthy profit on lamb sales. Lamb meat was sold primarily to current students, student farmers, recent alum, faculty, and a few members of the surrounding community. These sales were made through an online order form that was sent out through UMass email listservs and posted on the Sustainable Food & Farming Facebook page. We sold out of meat within two weeks of our first post of the order form! Six of our nine lambs were reserved for these public sales. There were two options given to public customers; buying small to medium quantities of various cuts (under 15 lbs) at retail prices or buying one of our three tiers of lamb boxes. The difference in our retail prices from 2018 vs. 2019 and the prices and content of our three tiers of lamb boxes is provided below.

Retail Prices: 2018 vs. 2019

Cut	2018	2019
Ground	\$12	\$10
Stew	\$13	\$12
Shank	\$11	\$9
Leg (Bone-in)	\$14	\$12
Leg (Boneless)	\$17	\$15
Roast (Bone-in)	\$10	\$10
Roast (Boneless)	\$12	\$12
Chops (rib, loin, shoulder)	\$17	\$15
Rack	\$17	\$15
Organs	\$5	\$5
Bones	\$4	\$4

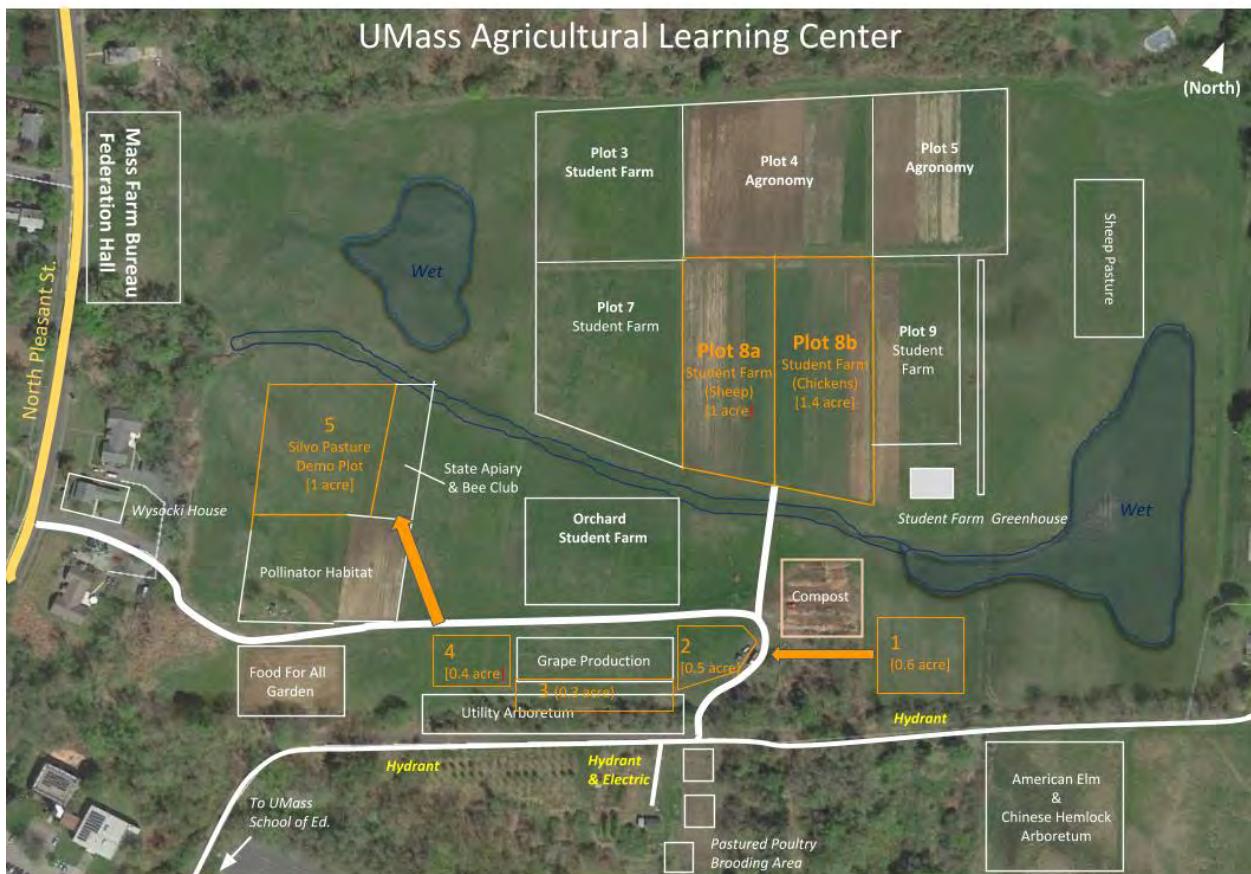
What's in a Box?

Small Box	15 lbs @ \$13/lb = \$195
	1 rack
	1 bone-in roast
	3 lbs stew
	4 lbs ground
	2.5 lbs chops (6-8 packages of 2)
Medium Box	20 lbs @ \$12/lb = \$240
	1 rack
	1 bone-in roast
	4 lbs stew
	6 lbs ground
	4.5 lbs chops (9-13 packages of 2)
Large Box	25 lbs @ \$11/lb = \$275
	2 racks
	1 bone-in roast
	5 lbs stew
	8 lbs ground
	5 lbs chops (10-15 packages of 2)

Our other customer base for the lamb meat was UMass Dining, to whom we sold three of our nine lambs. We sold these three lambs to Dining at \$350/lamb which included four legs, three whole saddles, about 25 lbs of ground, and a large number of bones.

As depicted in the following expenses sheet, we added estimated labor in order to give more perspective for how lucrative this project actually was this season and the efficiency/productivity work at this scale and with this infrastructure. Six and one half hours per week was an estimate based off of taking 30 minutes per day to do morning and evening chores and to move the sheep three times per week, taking into account moving the shelter every few weeks or so. If the sheep were moved every day or every other day, then that labor estimate would be higher.

<u>Sheep Finances 2019</u>							
<u>Sheep Expenses</u>		<u>Inventory</u>			<u>Sheep Income</u>		
Cost of Livestock	\$1,410.60	Cut	Packages	Weight (lbs)	Sales		
Processing Fees	\$868.32	Cut	Packages	Weight (lbs)	\$3,567.17		
Fence Connectors	\$17.98	Leg (Bone-In)	4	26.04			
		Leg (Boneless)	2	11.45			
<i>Total</i>	\$2,296.90	Loin Chops	24	13.35	Total Poundage		
		Rib Chops	6	2.65	375.49 lbs		
<u>Profit (w/o labor)</u>		Shoulder Chops	15	15.97			
\$1,270.27		Stew	13	13.57			
		Ground	61	62.25			
Labor		Roast (Boneless)	2	4.09			
\$12/hr - 6.5 hrs/wk - 19 wks		Roast (Bone-In)	6	28.46			
\$1,482		Shank	8	13.04			
		Rack of Lamb	7	14.07			
Profit (w/ labor)		Denver Style Rack	4	3.92			
-\$211.73		Organs	27	12.56			
		Bones	1	6.8			
				228.22 lbs			
		Dining Order					
		3 Whole Lambs					
		Saddle	3	30.72			
		Leg (boneless)	4	27.34			
		Ground	24	24.72			
		Bones	4	64.49			
				147.27 lbs			

Grazing Patterns

Above is the grazing pattern for the sheep for the entirety of the season as it was planned in the early Spring. Note that there is no arrow pointing to Plot 8A which was in a cover crop of oats and peas and planned to be grazed. Plot 8A was not actually grazed by the sheep, due to a few reasons. The first is because the cover crop was of poor quality towards the end of the grazing season, when it was planned to be in the grazing rotation. The cover crop was in good quality in early to mid-summer though, so good timing would be key for making sure the sheep graze an annual cover crop in future seasons. Next year we should either plan to graze the vegetable fields earlier in the rotation or plant the cover crop later in the season if the vegetable field is later in the rotation. Oats and peas are better forage in spring and fall as they do not grow well and decline in quality in the summer heat.

The second reason Plot 8A was not grazed is because it is far away from all of the other paddocks in the rotation and would have required substantial fencing to move the sheep that far, though it would likely have been possible from Paddock 2.

The final reason that Plot 8A was not grazed is because it was not necessary as we had more than enough pasture to graze for these nine lambs. We wanted to reach the silvopasture sooner than later so that we could start grazing that area when the grass was at a lush, healthy, not overgrown stage. Fortunately, we were successful. In order to not be worried about so much

overgrown pasture next year, we could troubleshoot in a few ways. One would be to expand the numbers of lambs so that pasture area is grazed more quickly. The second is to practice mowing pasture that is later in the grazing rotation early in the season. This way when we start to get to the later paddocks, we will not need to deal with tall, seedy forage, but will instead be dealing with a healthy height of regrowth after mowing.

Another point to make is that Paddocks 1, 2, 3, and 4 are all hay fields so the plant species are different than in the silvopasture and in the cover cropped vegetable fields. These paddocks as well as the silvopasture were overgrown early in the season and in paddocks 2-4, we were grazing the sheep in grass taller than the heights of their backs. Paddock 1 was a more manageable height because it was grazed earliest in the season, though it was still tall. The silvopasture also grew very quickly early in the season, but it was mowed in late spring so by the time the sheep got down to it in July it was the perfect height. All of these pastures were likely overgrown so early in the season because these fields were not hayed, mowed or grazed late in the season so they went into the winter with a lot of biomass and root reserves. This combined with the local climate made the grass grow very, very quickly. These factors are set up to create the same conditions next year too as these paddocks are going into the winter with a lot of biomass. The primary conclusions from this information, are that we could start grazing earlier in the season (depending on weather and conditions, this takes observation) and that early season mowing is important for paddocks that are later in the rotation.

Thoughts for the Future

Expanding Quantity

In my opinion, this project has a lot of potential to create more income, sell more meat, and provide more educational opportunity. To accomplish this, we would have to increase numbers. When thinking about increasing numbers, there are a few factors to consider. Firstly, we would need to consider labor and the ability of whoever is working on the project with Nikki to be able to handle, move, and care for increased numbers of sheep and chickens. We also have to think about the capacity of our infrastructure and the capacity of the land. When reflecting on this season, I can believe that 15-20 lambs could handle the size of the shelter, the size of paddocks we can provide with two or three fences, and the amount of pasture we have available at the ALC. This year we always had more than enough pasture; when we were grazing in the silvopasture we found that by the time we had returned the first paddock, the grass had 45 days to regrow which is longer than the suggested maximum regrowth interval. Regrowth varies depending on climatic conditions and post-grazing residual, but it is suggested that during spring and fall 21 days is ideal and during the hot summer months when grass growth is slower, a maximum of 40 days may be needed. Based on this information and my observations of how much extra pasture was available at any given time in the season, I think we could definitely increase from nine lambs to between 15-20 lambs. Increasing the number of lambs would also

increase our stock density and would make it so paddocks would be more evenly grazed, more pressure would be put on weed species, and we would have to move fencing more frequently.

I believe that we could expand the number or broilers in this project as well and, coupled with good chick sourcing, could find ourselves making larger profits. While profit is not the point of this project, it is important to note that increased profit will enable this project to be self-sustaining. Also, students interested in production want to see models of raising pastured broilers that are minimum input for a good profit and scale. Another reason for expanding numbers is that the more chickens we have, the larger an area of the cover cropped field we can graze, ideally the whole field. This expansion benefits the farm with more income, more fertility, and more opportunities for students to manage a larger amount of chickens. It is not necessary for us to quadruple the production, but in future years it would be feasible for us to produce 150-200 chickens. Overall, I believe that the project should expand!

There are several limitations to expanding broiler numbers here at the ALC. One is the amount of space we have for them in chicken tractors. We would have to have some larger tractors or more tractors. Another option is the model of a semi-portable day range shelter which is in the process of being made for next year where chickens can free range within fencing during the day and then return to the shelter at night. These shelters can have less space per bird than the chicken tractors because the chickens are allowed to free-range during the day. There are several potential advantages and disadvantages to this model. Advantages include more birds per square foot in the shelter, more foraging ability, sturdier shelter, easier feed and water logistics, and not having to move the shelter once or twice per day. Disadvantages include less even manure spreading, difficulties getting birds inside at night, and susceptibility to daytime predation from hawks and courageous dogs and coyotes willing to barrel through the electric fence. This model also has great potential to for multispecies grazing; we could follow the chickens behind the sheep when the sheep graze in the vegetable plot.

Another limitation to expanding broiler numbers is at processing. It is reasonable for a small group of students and Nikki to process 50 birds per day with the MPPU. If 200 birds were grown, there would need to be four slaughter dates, which would be a burden on Nikki and the students. Another thought is that if slaughtering a larger number of chickens seems like too much for students, then sending a batch of chickens to be slaughtered at Valley View Farm in Templeton may be a possibility. Lastly, freezer space is another limitation to us expanding our numbers.

When thinking about expanding numbers, the idea of raising a separate batch in the summer comes to mind. This happened in 2015 and feedback from Nikki and student farmers of that season is that it may have been too much to do with the summer vegetable farm work, but it is something for next years farmers to consider. If there is a student working part-time with Nikki and taking a lot of the workload of chores off from student farmers, and if a summer batch of chickens is maybe sent to Valley View Farm in Templeton rather than processed with the MPPU, then expanding numbers could be reasonable.

Another important consideration when thinking about increasing numbers of both broilers and sheep is that we would need to increase meat storage space by buying one or two more freezers. We would also need to consider setting a date immediately after receiving the lamb meat from the slaughterhouse to deliver a large quantity of meat to dining and/or have people pick up their orders. It would be tough to schedule people to pick up their orders the day of receiving meat because we do not know exactly when we will receive the lamb meat, but making a bulk delivery to dining immediately after receiving the meat is easier. We made our delivery to dining this year immediately after receiving the meat, which is a great opportunity to have a market that flexible to our time. We were very grateful for that! For broilers, scheduling for people to pick up their chicken the day after slaughter is more likely, but still may be difficult to work around peoples' schedules.

Expanding Markets

Selling to dining this year was very successful and very helpful. We were able to sell three whole lambs to dining (cut into saddle, legs, ground and bones) immediately upon returning from the slaughterhouse which saved us a lot of freezer space. We also sold 30 chickens to dining for a special event which helped us to liquidate and make room in the freezers. We also made a quick return from selling such large orders to dining which is very helpful. Dining purchases this large quantity of lamb from us for their "Diet for a Cooler Planet" event which is in early October. I would recommend continuing this relationship, selling three or four whole lambs to dining next year if the numbers stay at 10 lambs, but we need to be cautious about our slaughter date in comparison with the event date. The slaughter date needs to be at least a few weeks before the event date for us to ensure that we can get the frozen meat to them in time for them thaw, process, and cook it for the event. To make sure this is accomplished, we can recommend for dining to push back the date for the event which would also allow us to sell them chickens for the event instead of selling the chickens for a later event not focused on sustainable agriculture.

As for public lamb sales, I think pushing the lamb boxes would be helpful in getting rid of more meat more quickly while giving the customers a better price per pound. That being said, retail prices on the smaller sales are more profitable!

Pigs

An exciting expansion planned for the future is to start raising small batches of market hogs in woodlots at the ALC. Adding pigs into the student farm production will allow educational opportunity for students about sustainable hog production, add another income stream for the farm, allow cull vegetables to be better utilized as supplemental pig food, allow marginal lands to be better utilized, and provide some local, sustainably raised pork to the campus community.

In Conclusion

Overall the sheep and chickens this season were a financial and educational success! We made a substantial profit with both animals and tried out some new marketing strategies (bulk sales to dining, lamb boxes, lower retail prices for sheep). We expanded sheep numbers from six to nine, kept good records and notes (weight gains, grazing charts, etc.), and did not have any escapes or major problems. Students in the Pigs & Poultry class made a new tractor and successfully slaughtered 89 birds over two days. We had significant losses with the Kosher Kings, but the losses were not overwhelming and provided students with a unique, real world learning opportunity.

Personally, I learned deeply valuable information for my career and am very grateful to have had this opportunity to work so closely with Nikki and these animals. This experience will help me a great deal in my personal livestock farming ventures in the near future. I am very excited to see this livestock project expand and grow, incorporate more animals, educate more young farmers, and to see the chestnut silvopasture mature. Thank you UMass Student Farm!

Student Farm Food Access Initiative

Lil intro

As a farm our job is to grow food for our local community. We are able to reach a large demographic of our community by selling our produce through our wholesale markets, the farmers market, and CSA shares. These markets are wonderful and help us turn a profit so we can continue funding the Student Farm for future generations. However, those markets are not accessible to all members of our community. Having healthy and nutritious food is a basic human need and right but the access to fresh organic produce is often blocked by financial restrictions. In order to best grow and provide for all members within our community it is necessary for us to have one additional market: donations.

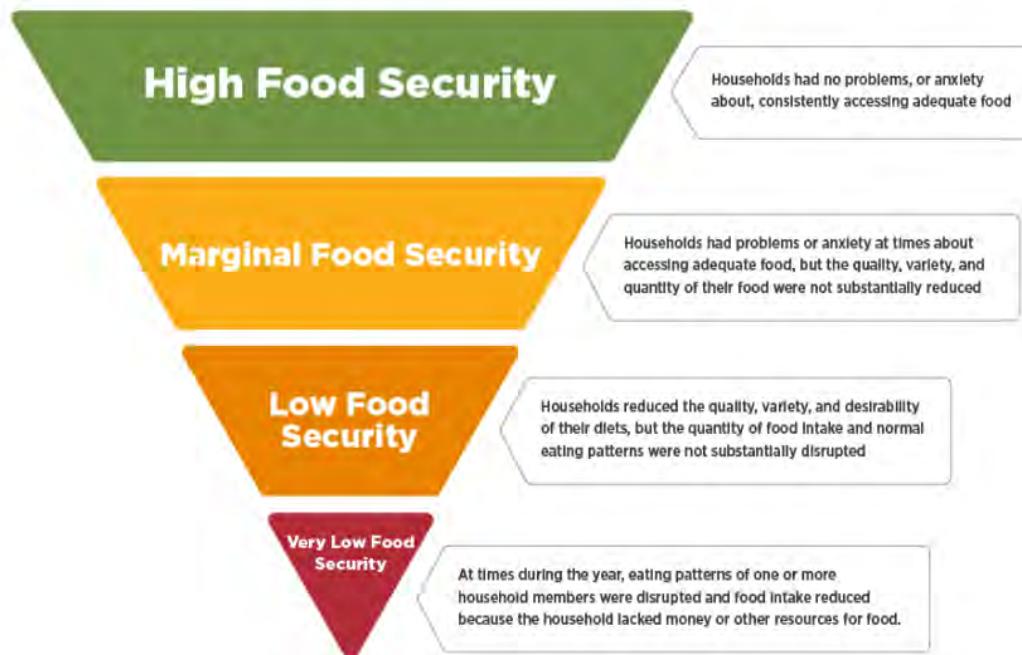
Food insecurity

The USDA defines food insecurity as a lack of consistent access to enough food for an active, healthy life. While hunger and food insecurity are closely related, they are two different concepts. Hunger refers to a personal, physical sensation of discomfort, while food insecurity refers to the lack of available financial resources for food at a household level. Many people do not have the resources to meet their basic needs such as housing and medical bills, which increase one's risk of food insecurity. "Though food insecurity is closely related to poverty, not all people living below the poverty line experience food insecurity and people living above the poverty line can experience food insecurity" (feedingamerica.org). Food insecurity is a complex problem that cannot be easily dissected and requires both short term aid and long term solutions.

A Conceptual Framework: Cycle of Food Insecurity & Chronic Disease



Adapted: Seligman HK, Schillinger D. N Engl J Med. 2010;363:6-9.



Source: Adapted from the USDA Economic Research Service.

Food Insecurity in MA

“Map the Meal Gap 2019” estimated how many people are food insecure in counties and congressional districts across the country by analyzing data from the U.S. Census Bureau, United States Department of Agriculture, and the Bureau of Labor Statistics. According to data **12.5%** of the nation’s population are food insecure. The percentage of Massachusetts residents who are food insecure totalled at **9%**.

Food Insecurity within Western Mass:

Hampden County: **10%**

Berkshire County: **9.7%**

Hampshire County: **9.6%**

Franklin County: **8.8%**

Across all counties of western Massachusetts, **14.2%** of children are food insecure compared to **11.7%** of children overall in the state.

Food Insecurity at UMass

While UMass Dining has won the Princeton Reviews #1 Dining reward 3 years in a row, the cost of the meal plans has increased each year. In a 2018 survey, **24%** of undergraduates and **36%** of graduate students reported worrying that their meal plan would run out before they had money to buy more. **23%** of undergrads and **26%** of graduate students reported skipping a meal because they didn't have enough money to buy food.

Food Sovereignty

“Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agricultural systems. It puts the aspirations and needs of those who produce, distribute, and consume food at the heart of food systems and policies rather than the demands of markets and corporations” -Declaration of Nyéléni, the first global forum on food sovereignty, Mali, 2007.

While food security addresses the issue of food insecurity and hunger through use of the current food systems in place, food sovereignty challenges those current structures and works to build alternative options through a bottom-up, grass-roots approach.

How Can We Make a Difference?

The Student Farm Food Access Initiative can help create a positive change in our community by providing short-term hunger relief; while simultaneously striving to rework current food systems to create long-term solutions. For the UMass Student Farm, short-term hunger relief means providing fresh produce to local food banks and soup kitchens. Creating long-term solutions is something that will take time. One solid way to work towards solutions is through conversations and collaborations with fellow food justice conscious groups (such as the UMass Food Security Committee), as well as people who hold positions of power and influence (such as Kathy Wicks of UMass Dining). Within this chapter I will elaborate on how SFFAI can work on both short-term and long-term solutions in the 2020 season, striving to work along the spectrum of food security and sovereignty.

History of SFFAI

Food For All

Food For All began in 2014 as a production based educational program. Supported by the Stockbridge School of Agriculture, students and faculty grew produce and flowers on $\frac{3}{4}$ an acre of land to donate to local community partners Not Bread Alone and the Amherst Survival Center. One of the most beneficial aspects of having a plot of land dedicated to Food For All was the ability to grow food tailored to the needs of the local organizations. Food For All offered a 1 credit practicum in which students learned about food sovereignty through a combination of classroom time, service-learning, and hands on field work. The students of the class along with the professor, Sarah Berquist, were in charge of harvesting the produce and facilitating donations

during fall semesters. However, in the summer the task of growing and maintaining the Food For All plot was typically divided between two part-time students. After the 2017 season of the Food For Practicum, it was determined that there was not enough labor to upkeep the $\frac{3}{4}$ an acre. A shift was in need for the program.

Food For All and the Student Farm

In 2018, Food For All combined forces with the Student Farm. Kayleigh Boucher, a student farmer, worked as the Program Manager and a connecting point between the Student Farm and Food for All. A major difference between the 2018 season and the years preceding it was that the focus was on redistributing the excess produce grown on the Student Farm rather than growing food specifically for donation. The Food For All plot was still used to grow flowers and herbs for use by both groups; however, incorporating Food For All into the Student Farm added acres of farmland to recover excess produce from. The integration of Food For All into the Student Farm reduced the amount of work, time, and money needed to donate a similar amount of produce to our community partners. Together, Food For All and the 2018 crew accomplished: donating 10,000 lbs of produce to community partners, providing 27 grant funded CSA shares, 6 students enrolled in the Food For All practicum, gleaning and flower events, and a Food For All themed farmers market.

Student Farm Food Access Initiative

After the success of Food For All during the 2018 season, it was decided to permanently integrate the program into the Student Farm. Bridging together two UMass educational programs, one with a focus on food sovereignty and the other on production farming is an amazing step forward! This year we made the change official with the creation of our new title: **Student Farm Food Access Initiative!** This name change was a decision we took our time with and ultimately thought would be the clearest way to communicate who we are now. Additionally, the name change will benefit us in the future as we apply to grants and conferences (more detail on that in the **Grants** section).

Roles and Responsibilities

Responsibilities

SFFAI's main objective is to improve local food access and strive to build food sovereignty within our community. As a group you will all have some responsibility in working towards those goals. As I said, it is our job as farmers to grow food for the community and this is a major part of SFFAI. It is necessary to be present in the fields and put in the hours of physical labor required to grow produce that you will be proud to give to people. To improve local food access the next responsibility is to coordinate donations with our community partners. This will include:

- Sorting through excess produce in the fields and wash station and determining what is donation quality
- Packing and labeling the produce with what it is, the weight, date, and that it is donation
- Emailing or calling our community partners letting them know what we have to offer
- Scheduling a time during which you will make the deliveries
- Making deliveries and recording in the records what, when, how much, and where the produce was delivered
- Additionally, organizing other food recovery efforts such as gleaning events and food drives

Last but not least, it is SFFAI's goal to build food sovereignty in our community. The avenue we have gone through to work towards that goal has been focusing on community engagement. Thus, a third responsibility of those in SFFAI is to connect with fellow members of the community through collaboration, volunteering, educational outreach, and organization. This will include:

- Communicating and listening to our community partners
- Connecting with other groups who have a similar food justice mission such as Gardening the Community in Springfield
- Organizing educational events such as a Food Sovereignty Farmer's Market and hosting workshops and tours for schools and other community members
- Meeting and collaborating with people in leadership roles at UMass such as Kathy Wicks: Director of Sustainability for UMass Dining, Charity O'Connor: Student Support Coordinator, and Dan Bensinoff: UMass Permaculture Initiative and Farmer's Market
- Organizing group volunteer days at Not Bread Alone and Amherst Survival Center
- Write informative blog posts on what SFFAI is up to
- There's really no limit to the efforts that can be put towards creating a more sovereign community food system; so get creative and follow any other ideas you may have along with those mentioned

1 Manager vs 2 Co-managers

The 2018 crew had Kayleigh Boucher as their sole Food For All (soon to be SFFAI) Program Manager. That meant that she took on the majority of the responsibilities with the support of our faculty advisor Sarah Berquist. Due to the stress this position caused her at times, Kayleigh recommended that the 2019 crew select two crew members to act as co-managers

During the 2019 season, Nick Ferlazzo and I took on the positions of co-managers. Initially, we divided the responsibilities in half by having one person in charge of numbers, records, and donations and the other in charge of community engagement work. Nick and I each selected the role we were most interested in during the end of the spring semester. As summer began our roles often morphed into one. This worked at times and became complicated at others. Without following our previously established roles there were times where accountability was lost. For instance, we both took on the task of record keeping rather than just one of us; so at times we both assumed the other had already filled out the records leading to neither of us completing them. Small miscommunications like that may seem easy to fix but when the farm is in full swing it can be difficult to manage all the small but important intricacies. At the same time, having two people serve as the SFFAI manager lessened the work load by a lot. This allowed us to be more present and involved with the farm and crew as a whole, which I found to be invaluable.



Faculty Support

Sarah Berquist has been a large part of SFFAI from the beginning as both the professor of the Food For All practicum and the faculty advisor of SFFAI. She serves as a guide and educator to students throughout the season. SFFAI student managers should plan to meet with Sarah once a week to seek out support and update her on what work has been done. Sarah has well established relationships with our community partners and members of the Stockbridge School and UMass community. As we are an educational program there is a constant turnover of student leaders. Having Sarah as a more permanent team member on SFFAI is helpful for the program's continuation and longevity.

Recommendation for 2020 roles

My recommendation for the 2020 crew would be to have one main Program Manager for SSFAI with an Associate Manager alongside them. By establishing someone as the main point person you can mitigate the problems with accountability our season faced. The person in the position of Program Manager will have to be able to commit their time to coordinating donations and community engagement events. The Associate Manager can help the Program Manager with these tasks and attend all the same SFFAI meetings and events but will not have the same time commitment expectations. Of course each crew is different and these suggested roles may not work for your crew. The most important part is that at least one person on the crew is able to commit to the role of SFFAI Program Manager.

Additionally, I recommend that mid-way through the spring semester a food sovereignty based lecture should be held by Sarah. The lecture can be an introduction to the concepts and terminology used when discussing food insecurity. While the objective and focus of this class is production based, I think a supplemental lecture or assignment would benefit the farm. This will also give the crew an opportunity to start thinking about their interest in donations and food sovereignty as it relates to the farm. Those who it sparks interest with can connect with Sarah afterward to discuss becoming the SFFAI Program Manager. I have spoken with both Amanda and Sarah about this and they are supportive and willing to do. It is not in the curriculum on paper so I suggest reminding Amanda of this idea if it is something you would value.

Community Partners

Our community partners are local organizations who work to provide healthy and nutritious food to those who are food insecure through free community meals, groceries, and produce distribution. This past season we primarily worked with Not Bread Alone and The Food Bank of Western Mass, as well as The Pioneer Valley Workers Center new Worker Coop Farm. In past seasons the primary community partners have been Not Bread Alone and The Amherst Survival Center. Below are the details of the partners we worked with during the 2019 season but there is a guide on the drive within the Community Partners folder that details other organizations we can give to such as Amherst Survival, Craigs Door, and the First Baptist Church Food Pantry.

Not Bread Alone

Program Description:

“Not Bread Alone welcomes everyone to help prepare and enjoy fresh, nutritious, and family-style meals using local ingredients whenever possible. Our free meals program fosters a caring environment that relies on strong volunteer and community involvement. All who come are welcomed, accepted and appreciated for what they can offer.” They provide free homemade, hot meals three times a week and have counselors on site to help guests resolve issues such as housing, food stamp applications, health insurance, and employment.

Contact Information:

Bob Stover- RStover@chd.org, (413) 992-7304

Address: 165 Main St Amherst, MA

Weekly Meals:

Wednesdays at 4pm

Saturday and Sunday at 12pm

Grocery Distributions Saturday at 12:45pm

Availability for Delivery:

Wednesday around 12pm

Friday between 4-5pm

Saturday before 10am (for meal donations) and before 12:30 pm (for grocery/produce distribution).

Please note that these times can change year to year and are dependent on when Bob is available. There may also be times when timing doesn't align for Bob and you will have to contact someone within the church to come unlock the doors.

When to contact:

It is best to email Bob 1-2 days prior to delivery with what it is available.

For Wednesday Delivery: Email on Monday

For Friday Delivery: Email on Thursday as soon as you are done harvesting

Volunteer Shifts:

Wednesdays: 4-7pm (serving and clean up) *they need the most help Wednesdays

Saturdays and Sundays: 9-12pm (cooking) and 12-3pm (serving and clean up)

Quantity of Donations:

Not Bread Alone has limited storage space for produce so it is typical that they will take 5-10lbs of each vegetable we offer them. Our goal with NBA was always more variety and less bulk.

The Food Bank of Western Mass**Program Description**

“Since 1982, The Food Bank of Western Massachusetts has been feeding our neighbors in need and leading the community to end hunger. We distribute food to our member agencies in Berkshire, Franklin, Hampden and Hampshire counties. These independent pantries, meal sites and shelters are on the front lines of emergency food assistance in our region, playing a crucial role helping individuals, families, seniors and children”.

Contact Information

Brandie Taggart: brandiet@foodbankwma.org 413-247-9738 ext.106

Address: 97 N Hatfield Rd, Hatfield, MA

Availability for Delivery

Monday-Friday 9am-5pm (the people at the loading dock take lunch around 12-1)

When to Contact

The Food Bank doesn't require too much notice ahead of time in most cases. If you are bringing an especially large delivery it is best to give them a call to let them know how much you have.

Quantity of Donations

The Food Bank has a large facility and can take large amounts of produce at a time. It is best to give them the large, bulk excess produce and give smaller donations to NBA.

Pioneer Valley Workers Center: Worker Coop Farm**Program Description**

“The Pioneer Valley Workers' Center builds power with low-wage and immigrant workers throughout Western Massachusetts. Together, we organize to build community and win real change in the lives of working people”. Their vision is to build institutions that represent the interests of working people. The development of a worker run farm to grow food to feed the community is one way they are making that vision a reality.

Contact Information

Neftali Duran: 413-695-0431

Address: 27 Middle St, Hadley, MA

Availability for Delivery We communicated with Neftali via text to set up delivery times on a case by case basis.

When to Contact

It is always best to give at least 24 hour's notice for organizational purposes. The exception to that rule would be if it is a Friday and excess starts will die if not put in the ground and watered in prior to the weekend.

Quantity of Donations

We donate our excess starts rather than produce to the Worker Coop Farm. We typically donated about 3-6 trays of excess starts. As a farm we plan for some excess seeds so it is not rare to have excess starts at the beginning of the summer. If we had more than the farm wanted than Nick would distribute them to some families in the area to grow in their home gardens.

UMASS Community Members and Groups

Along with our community partners in Amherst and the surrounding towns, we have a number of important connections at UMass. Through our connections with these UMass community members we are able to take steps towards creating long term solutions. The work we do with them is less straight-forward than delivering donations to our community partners. Below are the descriptions, contact information, what we've done with each individual/group, and recommendations on how to move forward with them.

Student Food Pantry

Program Description

The mission of the Student Food Pantry is to reduce food insecurity in the UMass Amherst community by providing free, nonperishable items to those in need. They are open to all five days a week (Mon-Thurs, 4-7pm and Friday, 10-2pm) and offer graduate student additional hours on Fridays from 4-7pm. The operation is a collaboration between Alpha Phi Omega, the Student Government Association, and the Graduate Student Senate. The pantry is donation-driven, volunteer-run, and anonymous.

Contact Information

The GSS (Grad Student Senate) Food Security Committee is composed of graduate students working to address food insecurity on the UMass Amherst campus. Therefore, there is a quick turnover rate for who is running the pantry. The co-chairs of the committee are listed below; however, there may be new people in their positions so check on the link below for updates.

<https://www.umass.edu/gss/news/student-food-pantry-now-open>

Debadatta Chakraborty: debadattacha@umass.edu

Rebecca Steinberg: rsteinberg@umass.edu

What Happened in 2019

At the end of the fall semester the co-chairs of the food pantry met with me, Nick, Sarah, and Kayleigh to discuss how we could best support and collaborate with them. The Student Farm had just been awarded grant money through SIEF that was designated to be used on equipment (more on this in the Grants section). During this discussion we gauged their interest adding a cooler to the pantry, funded with the SIEF money. A cooler would allow them to offer produce in addition to dry food and hygiene supplies. Unfortunately, they explained to us the regulations in place that would make it difficult to do so. One of the main issues that prevented us from donating to them was that only graduate students are allowed key access to the pantry; meaning neither Nick nor I could do deliveries during the summer. Additionally, there are regulations surrounding perishable food in pantries that would require a student to document the temperature of the food twice a day. Lastly, they lost their location in the Student Union because of the construction and their new location in Bartlett is a very small space. Due to these barriers we collectively decided that a cooler was not a viable option this year.

How to Move Forward

While the regulations in place may be discouraging, there is still room for growth and collaboration between SFFAI and the Student Pantry. With the Student Union still under construction it is unclear what new rooms will be available upon its completion. It would be ideal if UMass could prioritize giving the Student Food Pantry a space large enough to fit shelves of dry goods and a cooler for perishables. In order to orchestrate a change like this at UMass it is best to seek out the support of those who have influence over these decisions. Luckily we have developed relationships with Kathy Wicks and Charity O'Connor, who both have the potential to help advocate for this cause (individual info below). Additionally, SFFAI can support the Student Pantry and student body by posting information on their location and hours on our instagram and facebook.

Kathy Wicks

(aka Sustainable Kathy)

Position Title

Director of Sustainability at UMass Dining, Auxiliary Enterprises

Contact information

kwicks@umass.edu

What Happened in 2019

In mid June Nick, Sarah, and I met with Kathy and Rachel, a graduate student working with her. We learned about current efforts UMass dining is making to help alleviate food insecurity on our campus. One small but useful point of access for those in need of food on campus is the new No

Student Goes Hungry plan. No Student Goes Hungry is a supplemental meal swipe program for students experiencing severe food insecurity. When a student is in desperate need of food, they will be able to log onto Spire, click a link, and three day's worth of meal swipes will automatically load onto their UCard for use in the dining commons. Additionally, dining is introducing more affordable meal plan options for both undergrad and graduate students.

In August, Kathy and Rachel organized a team of people with experience in farm and food systems, culinary arts, and communication to help them write a grant proposal for the Kendall Foundation. Nick, Sarah, Amanda and I attended several of the meetings to offer our perspectives on the project. Initially, the grant proposal began as a vague, open-ended project based around the idea of capturing more food and feeding more people. Over the course of the Summer and Fall Kathy and Rachel were able to utilize the advice from group brainstorming sessions and put together the official grant proposal. The project is titled Whole Harvest and the description submitted read:

“Whole Harvest will establish an industry standard for farming and culinary professionals to reduce on farm waste, maximize efficiencies to utilize 2nd and 3rd tier produce, and create products for dining programs and food security initiatives on college campuses. The innovations of this project include: training integrated into professional development and curriculum, infrastructure enhancements that will enable the harvest of seconds to be processed into value added products for dining programs and food pantries, models for farmers to sell more of their 2nd and 3rd tier produce that will be purchased by HEI dining services, and a network that can respond to and utilize crop surplus.”

Unfortunately, we did not receive the prize from the Kendall Foundation; however a good deal of content is within that grant proposal that can be recycled into other proposals.

How to Move Forward

Despite not winning the Kendall Foundation prize, Kathy has continued to pursue alternative funding options for the Whole Harvest Project. The grant proposal is being revised currently for resubmission for the Rockefeller Grant. If helping create systems for gleaning between farms and schools interests you, I recommend you look into helping Kathy develop grant proposals.

Kathy has our back and is a good resource for the Student Farm to gain support from dining. It is important to stay connected with her and maintain this relationship. I suggest meeting with her once during the Spring and Summer to discuss food security in the dining halls as well as options to help improve the Student Food Pantry.

Charity O'Connor**Position Title**

Student Support Coordinator

Contact Information

charityoconn@umass.edu

What Happened in 2019

Charity was hired at UMass this Summer as the full time Student Support Coordinator. Her role on campus is dedicated to helping students who are experiencing homelessness and financial insecurity. 50% of her job is working in case management directly with students and the other 50% is outreach and programming capacity. We discussed how to bring more access points for food onto campus with Charity. One idea we thought of was coordinating with the Western Mass Food Bank to set up a Mobile Food Bank for our campus. We also discussed the idea of forming a Food Access Coalition at UMass, utilizing Charity as the connection to the Chancellor.

How to Move Forward

I recommend meeting with Charity to elaborate on the ideas we established this Summer. They are large projects that may take more than a year to arrange but it's important to keep the conversations going and not give up. Organizing a meeting with Charity, Kathy, and the Student Food Pantry could be a productive start to the 2020 season.

Daniel Bensonoff

(Aka Perma Dan)

Position Title

Sustainability Coordinator of Campus Gardens, Auxiliary Enterprises, Umass Dining

What Happened in 2019

Dan is the coordinator of both the permaculture garden and the farmer's market on campus. This season Dan helped SFFAI begin the process of applying to become a SNAP retailer at the farmer's market. Supplemental Nutrition Assistance Program, aka SNAP, formerly known as Food Stamps, is a federal nutrition program that provides a monthly supplement for purchasing food to those who go through the application process and are eligible. Becoming a SNAP retailer would allow the UMass Student Farm and UMass Permaculture to accept SNAP benefits as a form of payment for produce and other non value-added goods such as herbs and teas.

Additionally, in Massachusetts there is an option to become a Healthy Incentives Program, aka HIP, authorized farm and/or vendor. In this program, those receiving SNAP benefits can receive

an additional dollar for each dollar spent on fresh fruits or vegetables from a HIP authorized farm or vendor.

The application process proved to be impossible for me to do on my own, as it required the social security number of the person wishing to become a SNAP retailer. As Dan is in charge of the farmer's market he offered to use his information on the application. We applied using the UMass permaculture email on this webpage:

<http://www.fns.usda.gov/snap/retailers/applicationprocess.htm>. However, while applying we discovered that there are some regulations for SNAP retailers that might prevent us from becoming one. Unfortunately, Fall became too hectic to look further into SNAP so the process is on pause currently.

How to Move Forward

If you are interested in making the UMass farmer's market a SNAP retailer I recommend you contact Dan to gain access to his email along with the USDA account password. Another support option for navigating this process is Mia Kortebain from CISA. You can contact her by phone number: 413-665-7100 or email: Mia@buylocalfood.org

Volunteering and Community Engagement

Our crew put a focus on spending time volunteering together this Summer, both during and outside of work hours. Bob often needs more help during the Summer since most of the student volunteers are gone. Many of us enjoyed going to Not Bread Alone to do clean up in the kitchen or serve food to people out front (shout out to Lee who went nearly every week!). Bob creates a warm, welcoming environment for everyone at Not Bread Alone making it a space for community engagement across socio-economic lines. Each volunteer is welcomed to have a meal at the end of their shift and many of the frequent diners also help cook the meals and clean the kitchen. There's always fun music playing in the kitchen, since Bob is a ~cough cough~ award winning DJ. On some Saturday pick-ups students brought bouquets of our flowers to hand out while volunteering. Overall it is a great experience that allows the student farmers to not only witness the full journey of their produce, from the ground to the plate, but also allows them to form new relationships within their community.



Not Bread Alone has a garden in front of their building. However, Bob is so busy organizing weekly meals and donations that there is little time left for him to maintain the garden. This Summer we decided to volunteer as a group at the end of our work day to weed the garden and pull out any plants that were overgrown. Lee organized the event and used the SFFAI budget with the help of Sarah to purchase wood chips for mulching the garden. We also used lambs wool as a mulch and insulator around some of the plants. Betsy, a woman with Not Bread Alone, came to help us with weeding and showed us where the house key and other supplies are kept. It was a great bonding experience for the crew and an introduction to Not Bread Alone for those who hadn't volunteered yet. As the season went on, we set aside extra flower starts to be planted in the NBA garden. I recommend the 2020 crew use a small portion of the excess starts to donate to the garden early in the season. This way Bob and Betsy can have access to more fresh produce right in front of their building. An exciting group trip we made was to Gardening the Community in Springfield, MA. They are a food justice, youth oriented, urban agriculture non-profit. Here is a section from Nick's blog post on the experience:



“Ruth Hazzard, long-time supporter and former co-founder of the UMass Student Farm helped initiate the connection and workday. We met with Ibrahim Ali, the co-director of programs and marketing, to spend a day working on the sites GTC has and listen to what programs are offered. GTC grows vegetables and fruits with middle and high school students to sell to their CSA called “GTC Eats!”, their Walnut St. community farm store, and to deliver to farmers markets and individuals via bike! We were able to take a look at their new youth-run farm stand and their sites for growing on Walnut St. and Hancock St. Much of the program’s success comes from how well it has been received by the youth in the area, and much of the day to day work is done by youth in the community including running the farm stand and managing the crops. Youth even participate on the board and some receive a stipend for their work and education about the food system and sustainable urban agriculture and living. GTC aims to address some of the lack of access to healthy foods in Springfield through educating and empowering youth within their community to grow and distribute their food. We had a great time spending the day weeding beds and talking with some of the employees and local community members that were on site. Volunteer days are on Saturdays from ~9am to 1pm, meeting at 200 Walnut St. in Springfield. Learn more at <http://www.gardeningthecommunity.org/volunteer.html>!”

To read the full blog post check out our website <https://food4allamherst.com/>

Recommendations for Volunteering and Community Engagement

-Volunteer as a group at Not Bread Alone and Gardening the Community early in the Summer when there is more time. Going as a group enforces that everyone volunteers at least once and gives those who want to continue to volunteer an idea of what to expect. It is also impactful to come as a group and make a difference whether it be in cleaning a kitchen twice as fast or weeding twice as many beds.

-Use a small portion of the excess starts to donate to the garden early in the season. This way Bob and Betsy can have access to more fresh produce right in front of their building. Flowers, herbs, and tomatoes are all specific requests from Bob but you can always contact him about other excess starts.

-We intended on having a Food Access themed farmer's market but our final markets were canceled due to weather. Kayleigh, Sarah, and the Food for All practicum put one on during the 2018 season and it functioned as a way to collect donations from CSA members as well as a way to educate the UMass community on food security. Bring this back if you have the capacity to do so!

-Other community engagement opportunities include: hosting gleaning events with other farms and students who are interested in getting their hands dirty, handing out flowers at Not Bread Alone and Amherst Survival Center, and hosting educational workshops such as a cooking class with gleaned produce.

-Get creative and do what excites you!

Donations

Donating produce during the **summer** is essentially the same process we use for any of our other markets:

Harvest, Wash, Pack, Store, Deliver, Record.

Harvest

During the summer harvests we aimed to always have one person collecting donation quality produce alongside those harvesting for Big Y and dining. This was beneficial because it allowed us to clear the plants of produce that was weighing it down or taking energy from other fruits on the plant. It also simplified our organization and sorting in the wash station. At times we struggled to know the difference between seconds that should be donated vs composted. I recommend Sarah, Amanda, or Jason give a quick overview on what is donation quality for each crop. Kayleigh has a document in the drive under "Donations" that has a written guide to donation quality as well. Link below.

https://drive.google.com/drive/u/1/folders/1WI5JXQF0f2a_LQYNds5JVJNa8eEUK6pW

Wash

The wash station is a second opportunity to sort out donation from 1st quality and compost from donation. We wash all donations the same as they would be washed for the other markets.

Pack

If one type of produce has a bulk amount of donation (over 30lbs)it should be packed into locktop bins, as it will likely go to the Food Bank.

The produce that has smaller amounts of donation available should be packed into wax bushel boxes, as it will likely go to Not Bread Alone which is tight for space. Sarah can buy bushel boxes for donations if you ask her.

Store

Unlike other markets, the donations are rarely sent on delivery immediately following getting washed and packed. This means it is extra important to properly label the produce as “donation” with the date it was harvested on. Additionally, it is important to keep the cooler organized to excess produce doesn’t get left in the back to be forgotten and turn into compost quality. Nick was in charge of cycling the bins in the back of the cooler forward each time we put new bins in. This was so helpful and I highly recommend establishing that system from day one.

Deliver

Contact the organizations you wish to deliver to ahead of time and determine what you are delivering where. For deliveries to the food bank the van is usually necessary, whereas Not Bread Alone deliveries can fit in Baby Truck. More information on the delivery side of donation is provided under the Community Partners section of this chapter.

Record

Just as all the other markets, it is important to keep records of our donations. However, the records for donations must be kept separate from the rest of the harvest records because they can cause problems during the food safety walkthrough. The records may be kept in the same method as the rest of the produce so long as it is in a different folder. Below is an example of our donation records from the summer.

Date Harvested	Crop	Field	Harvest Goals	TOTAL Amount Harvested	MARKET
6/27	Scapes	A	excess	60 lbs	NBA
	Romaine	C	excess	30 heads	NBA
	OG Kale	C	excess	20 lbs	NBA
7/8	Summer Squash	SD C	N/A	161 lbs	Food Bank
	Summer Squash	SD C	N/A	30 lbs	1st Quality
	Cucumbers	HG	N/A	243 lbs	Food Bank
	Romaine	SD C	excess	171 lbs	Food Bank
	Iceberg	SD C	excess	19 lbs/ 16 heads	Food Bank
	Zucchini	SD C	excess	102 lbs	Food Bank
7/11	Beets	SD C	excess	12 lbs	Food Bank
	Cucumbers	SD C	excess	265lbs	Food Bank
	Zucchini	SD C	excess	38.5lbs	Food Bank
	Summer Squash	SD C	excess	129 lbs	Food Bank
	Green Kale	SD C	excess	8 lbs	Food Bank
	Swiss Chard	SD C	excess	19 lbs	Food Bank
7/11	Iceberg	SD C	excess	13 heads	Food Bank
	Cucumbers	SD C	excess	20 lbs	NBA
	Summer Squash	SD C	excess	20 lbs	NBA
	Zucchini	SD C	excess	20 lbs	NBA
7/15	Cucumbers	SD C	excess	804 lbs	Food Bank
	Zucchini	SD C	excess	370 lbs	Food Bank
	Summer Squash	SD C	excess	246 lbs	Food Bank

Fall Donations

During the Fall the systems above are not in place for donations. Our fall donations come from the excess produce at the end of the farmer's market and CSA pick up on Fridays. This fall we struggled with maintaining a steady flow of donations. This was for a number of reasons: a smaller fall crew than past years, no Food for All practicum, and lack of SFFAI leadership available to organize donations at the end of many Fridays.

Recommendations for Fall Donations in 2020

- Seek out a steady volunteer base through classes that require a service learning credit or project. Contact the professors over the summer about connecting with their class during the fall.
- If there are two Program Managers of SFFAI, establish one who can commit to taking the last shift of the farmers market (2-4) to organize, lead volunteers, and deliver to Not Bread Alone.
- If you know any grad students interested in facilitating the Food for All practicum let Sarah know
- Have a meeting with the SFFAI Program Manager(s), Sarah, and Amanda to discuss what your realistic goals are for the fall and what you feel the capacity of the farm will be.
- Let your community partners know ahead of time that donations may slow down as the school year starts. Communicate with them the whole way through.

Grants

Grants and scholarships are an important resource for our farm, including SFFAI. Having more money allows the farm to put forth projects students and faculty members are passionate about. Grant money can also help sustain the program and provide us with necessary machinery for farming. Now that we have absorbed the Food for All ideals and practices into the Student Farm we are able to apply to a larger variety of grants. Many grants will categorize themselves under themes such as: education, food and farming, sustainability, food access, and community building. With the combination of the UMass Student Farm program teaching about sustainable food production and SFFAI incorporating food access and community building, we are able to apply to an array of funding opportunities.

SIEF Grant

(Sustainability Innovation and Engagement Fund) is a UMass Fund established in 2013 that is open to all students, faculty, student groups, and classes. We received money from SIEF in 2018 and 2019 so I recommend you apply again but keep in mind they don't want to keep funding the same projects.

Apply here:

<https://www.umass.edu/sustainability/campus-living-student-activities/idea-funding/sustainability-innovation-engagement-fund-sief>

In 2018 SIEF funded 26 CSA shares for UMass community members who were interested in receiving a share but did not have the means to. This was an amazing project put forward by Kayleigh Boucher that created 10 weeks of access to fresh produce for 80 individuals who identified as food insecure.

In 2019 our crew wanted to continue the fully funded CSA shares so we applied to SIEF hoping for round two. While we did receive grant money from them, they designated it be used for equipment rather than funding more CSA shares. While it was disappointing, a valuable lesson was learned through the experience: organizations do not want to fund something that is not going to sustain itself in the future. We cannot rely on the same grant to fund more shares so new grants and alternative methods will have to be used if the Student Farm wishes to bring back the fully funded shares. For more information check out the folder on the drive titles F4A Shares linked below

<https://drive.google.com/drive/u/1/folders/1hNiTRQgUMxlt292Z7WtwIJyPAsbIwSmY>

Women for UMass Amherst Grant

Women for UMass Amherst (WFUM) is a network of alumni that promotes the advancement of campus programs that provide access, support, and opportunity for UMass Amherst students, with preference to those projects that positively impact UMass Amherst women and their respective communities.

Apply here

<https://www.umass.edu/wfum/>

Northeast Sustainable Agriculture Research and Education

Farmer Grants are for commercial producers who have an innovative idea they want to test using a field trial, on-farm demonstration, marketing initiative, or other technique. A technical advisor--often an extension agent, crop consultant, or other service professional--must also be involved. Projects should seek results other farmers can use, and all projects must have the potential to add to our knowledge about effective sustainable practices.

Proposal deadlines are in early winter with awards announced the following spring.

Apply here

<https://www.northeaststsare.org/Grants/Get-a-Grant/Farmer-Grant>

Conferences

Attending and presenting at conferences is a great way to connect with other student farms in the country. It's both an educational opportunity for students and an outreach opportunity for the program as a whole. I recommend the 2020 crew to apply to present or attend conferences during the fall semester.

New England Campus Farmer Summit

This year we applied to present at the New England Campus Farmer Summit on our incorporation of SFFAI into the Student Farm. We were accepted and will be presenting at the event on Saturday February 22, 2020 at Stonehill College!

The New England Campus Farmer Summit is a biennial one day event held in February that gathers the campus farm community in the northeast. The event aims to empower the campus farmer community with tools, resources, and connections to improve the longevity, integration, and impact of campus farms. Additionally celebrate the accomplishments and potential of campus farm programs to build a just, equitable, and sustainable food system in our region. The summit is co-hosted by Farm to Institution New England, Stonehill College, and the New England Farm & Sea to Campus Network. It gathers students, farmers and instructors involved with campus farms and food systems, as well as campus farm partners and stakeholders such as school administrators, dining service staff, local for-profit farms, and organizations and agencies that are working to nourish healthy food systems.

More info below.

<https://www.farmtoinstitution.org/campusfarmersummit>

Soul Fire Farm

“Soul Fire Farm is committed to ending racism and injustice in the food system. We are a survival and thrival training ground where people impacted by oppression can reclaim our ancestral right to belong to land and to have agency in the food system. We are a multiracial, people-of-color-led team of activist-farmers drawing upon the wisdom of our ancestors to uproot oppression. Our programs include sustainable farming and leadership training for people of color, strategic development support for grassroots activists of all backgrounds, a subsidized farm food distribution program for people living under food apartheid, food justice training for youth, and public education and organizing on equity in the food system”

(<http://www.soulfirefarm.org/>).

Soul Fire Farm hosts many educational workshops on food sovereignty for farmers. The closest location they will be holding a workshop this winter is at Clark University, Worcester, MA on **March 26, 2020**. It would be an important learning experience for those who are able to attend. For those of you who are interested in learning more about Soul Fire Farm and their work but cannot attend, below is the link to guide put together by them titled “Sowing the Seeds of Food Justice.”

<https://cdn.sare.org/wp-content/uploads/20180307095610/Sowing-the-Seeds-of-Food-Justice-SARE-Manual-2018.2.7.pdf>

Crop Analyses



- | | | |
|-------------------|--------------|----------------------|
| 1) Arugula | 12) Flowers | 23) Radish |
| 2) Beets | 13) Herbs | 24) Rutabaga/ Turnip |
| 3) Bok Choy | 14) Kale | 25) Salad Mix |
| 4) Broccoli/Cauli | 15) Leek | 26) Scallions |
| 5) Brussel Sprout | 16) Lettuce | 27) Shallots |
| 6) Cabbage | 17) Onions | 28) Spinach |
| 7) Carrots | 18) Parsnips | 29) Sweet potato |
| 8) Celeriac | 19) Peppers | 30) Swiss Chard |
| 9) Dry Bean | 20) Popcorn | 31) Tomatoes |
| 10) Eggplant | 21) Potato | 32) Winter Squash |
| 11) Fennel | 22) Pumpkin | |

ARUGULA

Eruca vesicaria ssp. Sativa

Final Crop Analysis

Estimated Harvest goals:

Market	Crop/Variety	Weeks Needed	Lbs. Requested each week	Total Pounds Requested per Market
CSA	Arugula	4	0.75	525
CSA	Braising Mix	3	1	525
Farmer's Market	Arugula	5	5	25
FM	Braising Mix	3	5	15
Big Y (A)	Braising Mix	4	20	80
Big Y (N)	Arugula	6	20	120
Efoods	Arugula	2	25	50
People's	Arugula	5	1	5
			Harvest Total:	Arugula: 725 Braising Mix: 620

Cultivars/varieties and seeds:

Seed Source	Suggested Variety	Cost	Pelleted or coated seed? Y/N	Organic? Y/N	Notes
High Mowing	Esmee	½ lb \$19.35	N	Y	*much more seed than needed
Johnny's	Tatsoi	1 oz, \$6.60	N	Y	
Johnny's	Red Giant	1 oz, \$8.10	N	Y	
Johnny's	Stir Fry Mix	1 oz - \$8.04	N	N	

Reasons for selecting these cultivars:

Esmee: Surrey variety (from 2016, 2017) was sold out and esmee has similar qualities. Great leaf shape and spicy flavor. Did very well last year.

Lee chose tatsoi for the braising mix because we have grown it the past 2 years and it is hearty, especially in cold weather, has a long growing period, and delicious!

Red Giant – has spicy flavor and has been good in the past

*STIR FRY MIX: (NOT ORGANIC) has tatsoi and red mustard greens already in it so it might make more sense just to buy this BUT it is not OG: it was grown in 2017 and did well.

Did the variety description meet your expectations? Why or why not?

Yes, the bed in SD C seems to be thriving. Easy to seed and grow.

Would you recommend these varieties again?

Note, we did not plant braising mix. Although it was planned in the Spring, it never made it into the ground. During the Fall CSA, we had leafy greens like arugula, salad mix, and lettuce heads different weeks. Some CSA members requested even more greens, so consider growing a braising mix in 2020.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Astro seems like it would be a pretty easy grow. It is heat tolerant and could be seeded earlier in the season.

Wasabi – Unique, would be fun to grow a small amount of this as an experiment. Maybe the Stir Fry cooks at Hamp or Frank would be interested.

How and when the crop was seeded/transplanted

Arugula was seeded by the F24 Roller with the hang and a 6 seed roller during the week of August 19th.

Direct seeding

Planting #	Seed date	Seeder Used	Settings Used	Notes on germination
Esmee	8/19	F24 Roller with the Jang	6 seed roller	

Farmer Notes:

Later in the season, weed management in South Deerfield was more difficult. Arugula had to compete with weed growth.

Planting Information

Expected yield/ft: .25 lbs

Direct seed or transplant: DS

In-Row Spacing: ½ inch Spacing

Between Row Spacing: 8.5 inches. It was seeded in six rows with the F24 Roller with the Jang clean seeder.

Number of Rows Per Bed: 1000

Bed Feet planted: 6000

Field Planted In: SD C

Number of succession plantings: 2 August 19th and September 2nd

Broadcast Fertility: 1,000/A chicken manure 5/13/19

Additional Fertility: None

Cultural practices:

We did not weed the arugula as intensely as other summer crops. It was direct seeded and the I

and J toolbar cultivated weeds in between the beds of Block C. The I and J cannot be used with 6 row seeder, weeding in between these rows is not possible.

Notes on Irrigation:

None

Diseases observed:

None thus far

Potential Disease Threats: Bacterial Leaf Spot- Small water spots, could also be brown. The leaves may yellow. This is the result of cold temps and can spread from seeds or water. You should remove infected plants and harvest what is ready to bring to markets.

Downy Mildew- A fungal disease with symptoms included as random brown spots on the leaves or mold underneath. These can spread as spores travel through the air. Poor air circulation and moisture may result in more fungal growth.

White Rust- Determine if a plant has white rust if there are white blisters on the undersize of leaves. Good management practices include crop rotation and plough plants into the soil after season.

Potential Insects:

Flea beetles- Will chew random holes on the leaf causing damage. This can result in stunted leaf growth or wilted plants. Flea beetles are many different colors from black to brown to blueish. They have large rear legs used for jumping to safety. Direct seeded crops are less tolerate against flea beetles because they are not as developed when the beetles can start munching.

Slugs- Prefer to eat old decaying materials. If the arugula is wet and moist and not being harvested, slug buildup may occur. Hand picking is most effective. Slugs can be trapped with cups of beer, milk or yeast dissolved in sugar water.

Do you think the production practices needed for this crop was worth the yield that we received?

Yes, these crops were direct seeded and did not require a lot of weeding or cultivation work. Harvest is quite quick with a knife or scissors. No real spacing issues, good green to offer later in season. People can get experience using the six row seeder.

Harvest & Storage

When was the crop ready for harvest? How did you know?

Arugula was harvested either Thursday or Friday morning before CSA pickups on October 11th and 25th . It can be harvested as baby greens and continue to grow. Harvest before it gets longer than 8 inches.

How was it harvested? [Give us the details, tools used, people needed to get it done, problems in the field] Arugula was harvested with harvest knives with as little as two people and as many as the whole crew. No real problems, it was harvested directly into lock tops for the CSA.

How was it washed at the wash station? See below

List different post-harvest practices for each market (if any) none

List different shipping practices for each market (if any) We only provided the CSA with arugula and it was brought in lock tops.

What different or improved harvest and shipping recommendations can you make? Harvest directly into bins, day before or morning of market.

Storage and post-harvest handling

Curing: We did not cure.

Washing before storage: 3 bay sink and the greens dryer.

Storage Requirements: 32 to 40 degrees at 95% relative humidity.

How this crop should be processed for long term storage: Unwashed in lock top bins!

Where your crop was stored this fall 2019? ALC Barn cooler

How well did this crop fair in storage and how did it enter storage? Arugula stored well in lock top bins. We took enough and used it up within a week to either CSA or for Student Farmers.

Were there any problems in storage? Nothing major.

What different or improved storage recommendations can you make? N/A harvest what you need, leave the rest in the field.

Gross Income

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
10/11	5	bags	1 Bag	4-5 lock tops	1 bag for ½ share too
10/25	7	bags	1 Bag	5 lock tops	1 bag for ½ share too

Total Gross Income Received From Your Crop: All to CSA

Review and Recommendations

What was different between what was done and what was planned?

Arugula was a successful addition to the CSA. We had a fair amount for consistent weeks. We did not grow enough for other markets.

What worked really well and should be continued?

Low time spent harvesting arugula.

What changes would you recommend for next year?

Consider growing more for other markets or expanding the amount offered to CSA.

Should we grow this crop again? Why or why not?

Yes, arugula was successful and did not require a lot of our time compared to other crops. You should definitely grow again.

BEETS

Beta Vulgaris

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	2,100	
FM	100	
Big Y A	300	
Big Y NH	300	
Big Y G	90	
Big Y SH	200	
Earthfoods	40	
Catering	100	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Chioga Guardsmark	Johnny's	25,000	64.50	
Red Ace	Johnny's	50,000	67.00	
Touchstone Gold	Johnny's	25,000	145.00	

Reasons for selecting these cultivars:

These varieties were chosen for their diversity. Red Ace is a standard red beet so it will be recognizable to all customers. The Chioga Guardsmark is a candy stripe beet (a pink beet with white candy stripes when cut into) and the Touchstone Gold is a yellow/gold beet, both look good at the market and our Big Y markets appreciate the variety.

Did the variety description meet your expectations? Why or why not?

The beets did well! Despite one of our beds of beets being left with weeds in it for a little too long, which stunted their growth, all of the beets came in on time and have been looking good! There is wire worm damage (and there almost always will be some) but I do not think that we have looked into or taken any action towards mitigating that damage.

Would you recommend these varieties again?

I would recommend these varieties again, or at least a mix of varieties that brings diversity to markets for an otherwise well-known crop.

Make suggestions for two other varieties you think would be interesting to try in 2020.

I would recommend either the Boro or Merlin varieties sold by Johnny's as a replacement for Red Ace. Boro because it apparently grows stronger stems and we have had a little trouble with floppy stems after storage, and the Merlin because it produces more sugar in the beet so the taste would most likely be better.

Planting Information

Expected yield/ft: 0.7lbs.

Direct seed or transplant: DS

In-Row Spacing: 1"

Between Row Spacing: 15"

Number of Rows Per Bed: 3

Bed Feet planted: 2,500'

Field Planted In: B and C-Late Season

Number of succession plantings: 3

Broadcast Fertility: 1,000/A chicken manure 5/23/19 in C 1,000/A chicken manure 5/13/19 in B

Additional Fertility: None

Cultural practices: The beets were direct seeded and weeded with scuffle hoes until they reached maturity.

Notes on Irrigation: This crop was not irrigated.

Diseases observed: I believe we may have seen Leaf Spot on the beets which is a fungal disease that presents as (the same as spinach) white spots surrounded by reddish circles.

Potential Disease Threats: Downy Mildew is also a high potential disease threat of beets.

Insect Pests observed: There were some holes in the leaves which may have been from flea beetles which were in Field C due to nearby brassicas.

Potential Insects: Aside from flea beetles, Aphids and Blister beetles can also negatively effect beet crops. Aphids and Blister beetles will eat the leaves.

Do you think the production practices needed for this crop was worth the yield that we received?

I think that we did the right thing in hoeing the beets as often as we did when they were young, before they had developed enough of a canopy to shade out the weeds. I do not think that any extra cultural practices need to be done given that we have plenty of beets this season.

Harvest & Storage

We harvested our fall beets for the first time on 9/10. Beets are ready to harvest when they're first set of leaves have died and the "shoulders" of the beets are sticking out of the ground, you judge the size of the beet fairly well by looking at the shoulders, the longer they are in there the bigger they will get.

How was it harvested?

We harvested beets in two different ways. For Big Y orders we pull 4 medium sized beets (3 big ones, 5 smaller ones) and bunch them by their stems close to where the stems meet the beets. For beets that we send to student businesses, dining, and farmer's market/CSA 2-3 people pulled beets from the bed and made piles as they went. Another group of 2-3 twisted the tops off of the beets and filled green harvest bins 2/3 of the way full. As more bins get filled, 2 people break off from twisting tops off and pour 2 harvest bins into the large white bags. The bags are then packed out of the field.

How was it washed at the wash station?

Bunches of beets are dunked in the large dunk tank and then shaken to get the water off. Bulk beets (without the tops) are put through the root washer.

List different post-harvest practices for each market (if any)]

Beets are washed for Big Y, student businesses, dining, and donations. Beets are not washed for the farmer's market/CSA. Be sure to check for small slimy dead leaves/stems.

List different shipping practices for each market (if any)

Beet bunches are delivered to Big Y in lock-top bins. For the other markets we deliver to, bulk beets are put into wax bushel boxes. For the CSA and farmer's market, beets are kept in the black crates and put on display in the wooden and wire handle baskets.

What different or improved harvest and shipping recommendations can you make?

I think that the system we used this season worked well.

Storage and post-harvest handling

Curing: No

Washing before storage: No

Storage Requirements: 32-40°, 95%RH, 2-5 months

How should this crop be processed for long term storage: For long term storage beets should remain unwashed and in the large white bags, preferably at or close to 32°.

Where your crop was stored this fall 2019?

ALC-cooler.

How well did this crop fair in storage and how did it enter storage?

Our beets kept well in the cooler, especially when they remained in the bags. Sometimes we kept beets in the black crates, which works well if they are going to be gone within a week or two.

But beets that had been exposed to the air for longer than that got a little soft.

Were there any problems in storage?

We did not have any major problems with the beets in storage this season.

What different or improved storage recommendations can you make?

I would recommend putting a date on each bag that comes out of the field, just in case there are older beets in the cooler when the next succession comes in so that they will get used first.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/13	1	Lbs.		342	
9/20	2	Lbs.		446	
9/27	3	Lbs.		349	
10/4	4	Lbs.		342	
10/11	5	Lbs.		275	
10/18	6	Lbs.		409	
10/25	7	Lbs.		150	
11/1	8	Lbs.		342	
11/8	9	Lbs.		275	

Other Markets

Market	Price/unit	Total Units sold	Total amount of sales
Big Y Amherst	\$1.75/lb.	410lbs.	\$716.63
Big Y Northampton	\$1.75/lb.	422lbs.	\$737.63
Big Y South Hadley	\$1.75/lb.	363lbs.	\$634.38
Big Y Greenfield	\$1.75/lb.	479lbs.	\$838.25
Dining Commons	\$1.75/lb.	75lbs.	\$112.50

Total Gross Income Received From Your Crop:

Wholesale Total: \$2,405.00

Review and Recommendations

What worked really well and should be continued?

Selling beets in bulk is always going to be best for the pricepoint. Beets were a great crop to have for the CSA shares and they sell well as bunches to Big Y.

What changes would you recommend for next year?

I would reconsider growing a golden beet variety.

Should we grow this crop again? Why or why not?

Yes. Beets are a staple at the CSA and Big Y will buy them from us in bunches which means we don't have to spend time topping them in the field.

Farmer Notes:

What words of advice can you give to the next generation of Student Farmers? How has it been juggling farming and full time student life? How can these farmers continue to build upon the legacy you have left them?

BOK CHOY
Brassica rapa subsp. Chinensis
Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	700lbs	
Dinning	700	
Student Business	20lbs*EF	
Big Y A	80lbs	
Big Y N	105lbs	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Black Summer	Johnny's	1000	\$6.96	Org
Joi Choy	Johnny's	1000	\$5.35	Org
Asian Delight	Johnny's	5000	\$18.45	Org

Reasons for selecting these cultivars:

These cultivars were selected for size, appearance and pest resistance. These crops grew well and sized up, one problem is that growing large Bok Choy is not always that marketable. Not sure if Dinning will take large or small but Asian delight was chosen for its ability to be grown as mini choy!

Did the variety description meet your expectations? Why or why not?

For the most part! Although nothing beats knowing a plant variety like having grown it before. Ask Amanda and Jason, people are not crazy about the choy but I think it's a fine crop that can make money if managed well against pests and proper harvest timing.

Would you recommend these varieties again?

Yes! If so harvest Asian delight early, not late better as a mini. Joi Choy did great and gave huge heads. Black summer was nice but it might make more sense to plant a red variety just to break up all the green leaf bok choy.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Try Mini variety's if you can keep the pest off them it might be more marketable! Avoid Win win I know it got hit really hard by flea beetles!

Farmer Notes:

It felt like there was a lot of leftovers in the field, it might be because some successions we planted late or we just got sick of bok choy but if we do grow this amount next year try to figure out why there is seemingly a lot of bok choy left in the fields.

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Black Summer	7/8	128	3	
Joi Choi	7/8	128	3	
Black Summer	7/22	128	3	
Joi Choi	7/22	128	3	
Asian Delight	8/5	128	11	This crop had shorter gestation period thus the late seeding even though it was planted with the 7/22 bok choy.

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1	8/5	150	2	Bed Furrowed and hand planted	
1	8/5	150	2	Bed Furrowed and hand planted	
2	8/19	150	2	Bed Furrowed and hand planted	
2	8/19	150	2	Bed Furrowed and hand planted	
2	8/19	600	2	Bed Furrowed and hand planted	

Farmer Notes:

This Crop gave me some serious problems while doing spring crop planning. Asian delight was a must faster to germinate variety(possibly a mini variety) which caused me to have strange planting times. Also the Black Summer and Joi Choi came out beautifully just far too big! These plants were planted in field (and did well with minimum pest damage. Most damage came from harvesting these monsters heads. If I could do it again I would plant later and have the heads be much smaller. People at all the markets were surprised at the size of the produce. They seemed overwhelmed with such a large bok choy. Grow littles guys and harvest on time. If you were to use the same varieties and dates for Bok choy, remember that Asain delight does not size up as large as the other two varies so it should be harvested earlier before it gets tough and holy.

Planting Information

Expected yield/ft: .75 lbs

Direct seed or transplant: TP

In-Row Spacing: 12"

Between Row Spacing: 18"

Number of Rows Per Bed: 2

Bed Feet planted: 1200

Field Planted In: 2400

Number of succession plantings: 3

Broadcast Fertility: 1,000/A chicken manure 6/17/19, 500/A Potassium Sulfate 6/17/19

Additional Fertility: None

Cultural practices: Bok Choy was cultivated with the INJ on the Green bean. It was also hand weeded. Overall this plant did well against weeds. It is rather a fragile crop so hoes and tractors occasionally damaged some heads.

Notes on Irrigation: Happy plants without artificial watering. No drip or plastic needed :)

Diseases observed: No severe diseases. Some leaves had brown rotting stripes but can be just pulled off.

Potential Disease Threats: Some diseases that have occurred are downy mildew and Alternaria. Neither appeared at levels that were damaging for production.

Insect Pests observed: Flea beetle

Damage caused: Small little holes in leaves, looks like pin pricks or slightly larger.

How was it scouted or observed: scouted

Damage caused: Cabbage worm

How was it scouted or observed: Large holes near the edges of the leaves leaving little crescents at the leaf edge.

Action(s) taken: On 8/12 pyganic was applied at 18oz per acre. Dipel was additionally applied at 4 cups per acre all done on the green bean with the PTO sprayer.

Potential Insects: What should farmers of the future expect to see? Report more than one pest if applicable. Look for anything eating the leaves or roots. Flea beetle and cabbage worm can cause havoc but if plants look unhealthy but leaves are not eaten, look for club root, its a balling of the root that forms galls reduces the success of crop.

Do you think the production practices needed for this crop was worth the yield that we received?

I'd recommend growing more small varieties. Most shareholders seemed surprised at the size of Blacksummer and Joi Choi varieties. This crop grew well and vigorously and lasted after the first frost.

Farmer Notes: Grow this stuff, learn the recipes and enjoy it. Despite the lack of enthusiasm about this crop it can make money and it seems to like the climate here.

Harvest & Storage

When was the crop ready for harvest? How did you know?

When heads open up and are full is a good way to tell when to harvest.

How was it harvested?

Best harvested like any head. Get your harvest number, have your cutters cut desired number of heads, one or two extra and then pack out. Best done with a large sharp knife. You should be able to cut free the head with one quick swift motion. Cutting too low means you have to spend extra time cleaning and trimming. Too high and you cause the head to be smaller than necessary. Find that happy point and stick with it.

How was it washed at the wash station?

Depending on how consistent your harvest crew was, you might just need a dunk in water bath, other times you need a dunk, cut and peel.

List different post-harvest practices for each market (if any) All markets received wash Bok Choy

List different shipping practices for each market (if any) Mostly lock tops for Bok Choy.

What different or improved harvest and shipping recommendations can you make?

The best way other than calling bok choy fragile is that it is brittle. The stocks break and bruise easily so careful harvesting and washing is necessary. If we ever hope to entertain the idea of wholesale to Big Y we really need to develop a practice that is quick clean and minimizing chances of damage.

Storage and post-harvest handling

Curing: N/A

How well did this crop fair in storage and how did it enter storage?

NOPE

Farmer Notes: It doesn't store very well so best if harvested and delivered close to each other.

Gross Income

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/13	1	Succession	N/a	1 Whole Succession	
9/27	3	heads	2	171	
10/11	5	heads	2	208	
10/25	7	heads	1	104	
11/8	9	heads	1	104	

Other Markets

Market	Price/unit	Total Units sold	Total amount of sales
Big Y A	\$1.75	172	\$258
Big Y N	\$1.75	174	\$261
Big Y S	\$1.75	162	\$243
Big Y G	\$1.75	52	\$78
DC	\$1.75	144	\$216

Total Gross Income Received From Your Crop: \$ 1,056

BROCCOLI AND CAULIFLOWER

Brassica oleracea
Final Crop Analysis

Estimated harvest goals Broccoli

Market	Total Yield Goal [lbs]	Notes
CSA	875	Based off of 175 shares.
Farmer's market	50	
Big Y Amherst	125	
DC	140	
Earthfoods	75	Planned for late October / November, may not be available by then.
Sylvan Snack Bar	15	They did not follow through on September 13 th , have not confirmed other orders.
Catering	125	

Estimated harvest goals Cauliflower

Market		Total Yield Goal [lbs]	Notes
CSA		525	Based off of 175 shares.
Farmer's market		40	Not available for at least the first two markets.
Big Y Amherst		125	
Big Y Northampton		125	
DC		100	
Catering		100	Not available for September 13 th .

Cultivars/varieties and seeds: Broccoli

Cultivar	Source	Amount	Cost	Org or Untreated?
Gypsy	Johnny's	1,000 seeds	\$8.24	Not Organic
Belstar	Johnny's	1,000 seeds	\$22.06	Organic
Arcadia	Johnny's	1,000 seeds	\$7.62	Not Organic
Marathon	Johnny's	1,000 seeds	\$8.24	Not Organic

Cultivars/varieties and seeds: Cauliflower

Cultivar	Source	Amount	Cost	Org or Untreated?
Skywalker	Johnny's	2,000 seeds	\$105.78	Organic

Reasons for selecting these cultivars:

“Nancy from Hampshire Farm suggested all 4 varieties of broccoli so I figured we would do a row of each variety. We need about 750 seeds for each variety so I had to go with the 1,000 seed packet for each. For the cauliflower, the seed was significantly more expensive than last year’s order (they got non-organic) but we decided to get it anyway cause all organic cauliflower seed was just as expensive. We couldn’t opt for a cheaper conventional seed because ‘too expensive’ can’t be argued for organic certification. I had to order 2 1,000 seed packs because we needed 1,320 seeds and it was easier than ordering 500 seeds + 1,000 seeds (and relatively the same cost.)” –Lee McLoughlin

Did the variety description meet your expectations? Why or why not?

Yes. The broccoli looks better than it has in years on the student farm. Great success. As for the cauliflower, we have not achieved a yield yet as of September 23rd, but I am not sure if this is a result of the variety or other factors like when it was planted.

Would you recommend these varieties again?

Yes. They looked freaking beautiful! Some alterations to planting dates and both should work out great.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Emerald Crown, De Cicco – We initially planned to grow these varieties but decided against it because of recommendations from Nancy at the Hampshire College farm. They may have worked out well. Worth considering in the future.

How and when the crop was seeded/transplanted**Greenhouse seeding**

Variety Broc	Seed date	Tray size	Number of trays	Notes on germination
Gypsy	6/10/19	128	6	
Belstar	6/10/19	128	6	
Marathon	6/24/19	128	6	
Arcadia	6/24/19	128	6	

Variety Cauli	Seed date	Tray size	Number of trays	Notes on germination
Skywalker	6/3/19	128	5	
Skywalker	6/17/19	128	5	

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1 Broc	7/8/19	1,100	2	Hand plant	Beautiful!
2 Broc	7/22/19	1,100	2	Hand plant	Amazing!
Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1 Cauli	7/1/19	550	2	Hand plant	
2 Cauli	7/15/19	550	2	Hand plant	

Farmer Notes:

Cauliflower was likely seeded about two weeks too late. About half of heads did not mature fully and some others had mold.

Planting Information

Expected yield/ft: 2-3 lb/ft

Direct seed or transplant: transplant

In-Row Spacing: 16" (broc), 18" (cauli)

Between Row Spacing: 12"

Number of Rows Per Bed: 2

Bed Feet planted: 1,100 (broc), 550 (cauli)

Field Planted In: ALC 7

Number of succession plantings: 2 (broc), 2 (cauli)

Broadcast Fertility: 6/17/19 Composted Chicken Manure 5-4-3 1000 lbs/acre Potassium Sulfate 500 lbs/Acre

Additional Fertility: 9/5/19 Blood Meal 100 lbs/A

Cultural practices

Harvested by hand with knives.

Sprayed on 7/26/19 for flea beetles with Pyganic at a rate of 9oz per ¼ acre.

Sprayed on 7/30/19 with Dipel Entrust at a rate of 1/2lb 30oz per ½ acre.

Sprayed on 8/12/19 for flea beetles with Pyganic and Dipel at a rate of 18oz 4 cups per acre.

Notes on Irrigation:

Irrigated with drip

Diseases observed broccoli: No diseases observed.

Diseases observed cauliflower: Small black spots of mold on some (approximately 1/10th) of the heads. These heads were left in the field, not to be harvested.

Potential Disease Threats:

Black rot - Brown necrotic patches on leaves, lesions on leaves.

Blackleg - Dark lesions in base of stem, can extend to roots.

Bacterial head rot - Wet, darkened spots on head with many unopened or dark florets.

Downy mildew - Yellow or orange necrosis on leaves, angular lesions on leaves, necrosis becomes "downy" looking as with more spore growth.

Alternaria - Yellow, dark brown or black circular necrotic spots on leaves or stems, centers of lesions can fall out, can cause leaf drop.

Insect Pests observed broccoli:

Diamondback Moths:

Damage caused: Poop, holes in leaves.

How was it scouted or observed: Throughout the growing season, Ellis, Sue and Amanda scouted for insects. At the time of harvest we found poop but not a substantial amount, especially when compared to cauliflower.

Action(s) taken: Sprayed with pesticides (details above). Washed post-harvest.

Cabbage Looper:

Damage caused: Ragged holes in leaves.

How was it scouted or observed: Throughout the growing season, Ellis, Sue and Amanda scouted for insects.

Action(s) taken: Sprayed with pesticides (details above). Washed post-harvest.

Imported Cabbageworm:

Damage caused: Feed and reside on bottoms of leaves. Ragged holes in leaves. Some poop.

How was it scouted or observed: Throughout the growing season, Ellis, Sue and Amanda scouted for insects.

Action(s) taken: Sprayed with pesticides (details above). Washed post-harvest.

Insect Pests observed cauliflower: About half of heads had caterpillars that pooped all over the heads but did not harm the crop itself.

Diamondback Moths:

Damage caused: Poop, holes in leaves.

How was it scouted or observed: Throughout the growing season, Ellis, Sue and Amanda scouted for insects. At the time of harvest we found lots of poop. Poo-poo is green and can be found under leaves close to head. Gross.

Action(s) taken: Sprayed with pesticides (details above). Thorough washing post-harvest.

Cabbage Looper:

Damage caused: Ragged holes in leaves.

How was it scouted or observed: Throughout the growing season, Ellis, Sue and Amanda scouted for insects.

Action(s) taken: Sprayed with pesticides (details above). Thorough washing post-harvest.

Imported Cabbageworm:

Damage caused: Poop, holes in leaves.

How was it scouted or observed: Throughout the growing season, Ellis, Sue and Amanda scouted for insects.

Action(s) taken: Sprayed with pesticides (details above). Thorough washing post-harvest.

Potential Insects:

Flea beetle, Aphids

Do you think the production practices needed for this crop was worth the yield that we received?

I think that Broccoli was well worth it. It looked beautiful and we had large harvests throughout the fall. Could reduce in-row spacing to 14" for next year. Cauliflower was much less desirable than broccoli. Yield was significantly lower and is objectively less tasty. If it was planted at the right time it could be worth it. A nice companion crop to broccoli for a CSA in my opinion.

Harvest & Storage

When was the crop ready for harvest? How did you know?

Broccoli was harvested 9/13 until early November. We harvested cauliflower from 10/18 to 11/8. Head and floret size were the biggest indicators as to when to harvest both of these crops. On average, the heads reached a size of about 7 inches across at the time of harvest. We knew they were ready when florets were the size of a small ball bearing and were not quite so tight. After this point, the flowers would bloom and make the plant significantly less desirable to eat. Once one or two plants bloomed, we would hurry to harvest the entire planting.

How was it harvested?

We harvested into green bins with the large orange harvest knives provided by the farm. We cut them so that there was about six inches of stem. We would clean leaves with knives or by hand in the field if we had the time. Earlier in the season, we were more selective and only took the heads that were perfect just because there was so much. Later in the season, we would harvest everything we could when all the heads began to reach their ideal size. We usually had two or three people on the job for a CSA harvest. The biggest danger is when we tried to harvest really quickly because it is so easy to cut yourself on the knives. Keep knives sharp and make sure you are aware of where your hands are.

How was it washed at the wash station?

We gave these crops a quick spray with a hose or dunked them in a dunk tank. The cauliflower required much more washing than the broccoli because it was covered with caterpillar poop. After it was washed it was packed in lock lids and transported to the different markets as soon as possible.

List different shipping practices for each market

Broccoli and cauliflower were packed in blue lock lids for the CSA.

What different or improved harvest and shipping recommendations can you make?

Don't stack beyond the max capacity of the green bins as the heads will be crushed when bins are stacked.

Storage and post-harvest handling:

Curing: N/A

Washing before storage: Hose or dunk tank

Storage Requirements: Stored in a cooler at 32 degrees for no longer than 3 to 4 days.

How should this crop be processed for long term storage: N/A. It should be harvested and distributed as quickly as possible.

Where your crop was stored this fall? It was stored in lock lids in the cooler.

How well did this crop fair in storage and how did it enter storage? Washed and packed loose in lock lids. Florets of broccoli would become discolored and gross after only a few short days. Cauliflower could be stored for longer without becoming discolored.

Were there any problems in storage? Broccoli would rot quickly. Any caterpillars on cauliflower could hide in leaves and continue to wreak havoc, pooping all over the place.

What different or improved storage recommendations can you make? Try to harvest and distribute day-of.

Farmer Notes: Ugh broccoli is so good!!! Don't let any of it go to waste!

Actual Yields and Sales (Broccoli): CSA

Date	Week #	Unit	Amount Per share	Total brought to CSA	Notes
9/13	1	# of heads	?	all that's ready	This was the only week that broccoli was on the harvest list. We definitely offered it more than once though...

Actual Yields and Sales (Cauliflower): CSA

Date	Week #	Unit	Amount Per share	Total brought to CSA	Note s
10/18	6	# of heads	1 full, 1 half	104	
10/25	7	# of heads	?	all that's ready	
11/8	9	# of heads	1 full, 0 half	67	

Other Markets (Broccoli \Only)– report total amount sold to each market over the season

Market	Price/unit (\$/lb)	Total Units sold (lb)	Total amount of sales (\$)
Big Y A	2	46	92
Big Y N	2	47	94
Big Y SH	2	49	98
DC	2	20	40
EarthFoods	2	20	40

Total Gross Income Received From Your Crop: \$364

Review and Recommendations

Most everything went according to the plan that we made in the spring for broccoli. The same was true for cauliflower. The only real difference was that we harvested far less than what we expected for all markets other than the CSA. For example, we planned to harvest over 1,000 pounds of broccoli and only harvested 182 pounds. Cauliflower came much later in the season than we planned.

What worked really well and should be continued?

Broccoli (in the fall at least) came out great. We could potentially decrease spacing in the rows but other than that it was a great success. Huge hit in the CSA.

What changes would you recommend for next year?

Scout for insects more frequently, decrease in-row spacing, and plant cauliflower earlier in the season.

Should we grow this crop again? Why or why not?

Yes! Even though it was not the biggest money-maker, broccoli quite possibly the most beautiful and well-liked item in our CSA. Cauliflower was a hit too.

Farmer Notes

What words of advice can you give to the next generation of Student Farmers? How has it been juggling farming and full-time student life? How can these farmers continue to build upon the legacy you have left them?

It is really challenging sometimes because it is easy to forget you are in school when you are working on the student farm. Everything else about school feels like a burden sometimes. Sadly, you can't just go home, cook a lovely dinner, and drink a beer like you might hope. You have to go home and do 150 pages of readings on German culture in the late 1800s. Don't give up! It is an amazing accomplishment to be able to balance academic classes, farm work, and homework while also managing to feed yourself, stay healthy, and have a social life. Keep on keepin' on! You are doing great!

BRUSSEL SPROUTS

Brassica oleracea

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	525	
Dinning	0	
Big Y A	40	
Big Y N	30	
Big Y G	20	
Big Y SH	0	
Catering	70	
Farm Market	50	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Hestia F1 3271	Johnny's	500	\$16.49	
Rubine	Johnny's	250	\$6.15	

Reasons for selecting these cultivars:

I believe that Rubine was picked because it has a purple hue to it that makes it more interesting than the typical green. The Hestia is your classic green sprout, it is cheap seed and a hybrid.

Did the variety description meet your expectations? Why or why not?

Not a complete failure. Got a small harvest, but no purple sprouts :(

Would you recommend these varieties again?

Not sure? We had a lot of pest damage and hard to tell what was due to variety and what was due to pest.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

A variety that works, I think with these type of crops picking one and getting a successful harvest it key! I'd say if you were to try something new, go for the OG dagan and Hiesta, try comparing the hybrid and organic seed? Which does better with pest, heat and yield.

Farmer Notes: Dear farmers of the future, if you are going to place similar like crops apart, don't forget about your lonely Brussel sprouts they need spraying too!

How and when the crop was seeded/transplanted:

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Hestia	6/3	128	6	
Rubine	6/3	128	2	

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
Hestia	7/1	600	2	holes with water wheel and hand plant	Some stunted/Flea damage
Rubine	7/1	400	2	holes with water wheel and hand plant	Some stunted/Flea Damage

Farmer Notes:

Crop was heavily attacked by pests. Planting earlier might help reduce the level of pest pressure.

Planting Information:

Expected yield/ft: .75 LBS

Direct seed or transplant: TP

In-Row Spacing: 18"

Between Row Spacing: 18"

Number of Rows Per Bed: 2

Bed Feet planted: 1000

Field Planted In: C

Number of succession plantings: 1

Broadcast Fertility: 4/23/19 Composted Chicken Manure 5-4-3 1000 lbs/acre

Additional Fertility: no

Cultural practices: These plants were put under a lot of stress when they were young. They were on black plastic which reduced the amount of time they needed to be tended, this though caused us to forget about them at the start of the season and flea beetles got a little out of control. After spraying we managed to get everything under control. The stocks must be topped right around the time when onions are being bagged in order for sprouts to size up.

Notes on Irrigation: At one point in the summer we lost maybe one third of our newly transplanted babies due to hot sun and dry soil. We had these boys on drip but because of the two rows per bed the drip didn't quite hit all the plants. Sometimes we did move the drip manually from side to side on very hot days.

Diseases observed: No significant diseases were observed.

Potential Disease Threats: Downy mildew and Alternaria leaf spot are common, sometimes blackrot may affect the seedlings.

Insect Pests observed: Flea beetle

Damage caused: Small pin holes in leaves

How was it scouted or observed: Crop walk through.

Action(s) taken: Spray

Potential Insects: Aphids have posed a huge problem with Brussel sprouts in the past. Common cabbage worm which loves all brassicas is another pest to keep an eye out. Look for those pretty diamondback moths, they look nice but lay eggs everywhere!

Do you think the production practices needed for this crop was worth the yield that we received? It is hard to say for this crop. For it is not grown every year and its success is still yet to be measured this fall. It does though offer our CSA members a unique and special crop to cook and eat with their family. As long as maintenance and upkeep are not exceptionally high I think this plant makes a great addition to our CSA.

Harvest & Storage:

When was the crop ready for harvest? How did you know?

When heads have seized up properly, firm and tight. Sight and touch.

How was it harvested?

Brussel sprouts are harvested in a series of steps. First the leaves must be stripped, this can be done in a quick down up motion. Breaking most on the leaves press down and getting any leftovers on the pull up motion. Once the stocks have been stripped stocks need to be cut. Large pruners are need to get through the hardy stocks. Once cut pack out!

How was it washed at the wash station?

Sprouts were not washed.

List different post-harvest practices for each market (if any)

List different shipping practices for each market (if any)

We just had a large bin full of sprouts which our CSA members picked out of.

What different or improved harvest and shipping recommendations can you make? Not much to mess up or change.

Farmer Notes: Best eaten roasted in a cast iron pan! Harvest when the crop is dry, they will last longer if they can be put away dry. We loaded them into a bulk bin right from the field so no way to transfer them to the fridge. Plus we didn't have enough to need to store.

Gross Income:

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
11/8	9	Stocks	2	1 full bulk bin	
11/15	10	Stocks	First come first serve	1 bulk bin	

Total Gross Income Received From Your Crop: \$0

Review and Recommendations:

What was different between what was done and what was planned?

Pests, sometimes you just lose a crop.

What worked really well and should be continued?

For harvest we had a really great strategy where we all strip leaves, followed by a few people cutting stems and then drive the tractor down the row with a pallet to just throw the sprouts into!

What changes would you recommend for next year? Watch for pests.

Should we grow this crop again? Why or why not?

Yes they are a great crop, hard because it's a onetime harvest so if something goes wrong might lose the whole crop but people love them in their shares.

Farmer Notes:

Mistakes happen and sometimes they offer the greatest learning opportunities. I think three major mishaps happened which led to a smaller bounty than desired. First the sprouts were planted in blistering July heat. Those first two weeks in July had an average of 96 degrees Fahrenheit, those babies didn't stand a chance. This was compounded by the fact that they were planted on plastic in two rows with only one line of drip tape. The plants needed lots of water that point in their life and because our plastic layer can only put one line down the plants got stressed. If they wilted and touched the black plastic they were instantly fried due to the unbearable heat caused by black plastic. The second issue we ran into was quality of variety. It's hard to say due to all the factors but the purple variety of Brussel sprouts. Fared far worse than the green variety. It's hard to say but it might be worth trying again and make sure the seedlings don't get stressed as bad. Who knows maybe the purple variety fares far better than green later in the season when it colder. The last factor that really seemed to affect our crop was flea beetle. I believe that the Brussel sprouts were missed during a round of spraying, this allowed the pests to thrive and for maximum damage to occur. I think it was an out of sight out of mind type of deal. During the chaos of summer things broke down a little. When a crop doesn't have a harvest date till fall and it's not a huge priority in summer things fall apart. Also Brussel sprouts belonged to a farmer who didn't work in the summer. This meant that wasn't someone's baby to look after and care for.

CABBAGE

Brassica oleracea var. capitata

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
Csa	1,400	
FM	100	
Big Y Amherst	250	
Big Y Northampton	340	
Big Y Greenfield	140	
Big Y South Hadley	300	
DC	225	
Earthfoods	50	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Farao	Johnny's	800	30.40	Org
Integro	Johnny's	800	25.67	Org
Bilko	Johnny's	400	9.73	Org

Reasons for selecting these cultivars:

Farao is a standard green cabbage and Integro is a standard red cabbage that will withstand slightly cooler weather than Farao. I chose Bilko because it is a Chinese cabbage with different shape and taste.

Did the variety description meet your expectations? Why or why not?

I have not seen the Bilko produce heads yet. Farao has exceeded my expectations, heads of Farao are averaging 6" in diameter in the field! There is some damage on the Farao from flea beetles and the intercropping of rye in the first succession has caused retention of moisture in the bed and rotting on some cabbage heads. Integro is the best looking of the cultivars with very little damage and slightly smaller heads than farao.

Would you recommend these varieties again?

I would recommend Integro again. I think that the Farao may be too large for the farmer's market or CSA share, though good for wholesale markets. I have yet to see how Bilko does.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

I would suggest trying Tiara and Famosa in 2020. I think Tiara would be good for the CSA and Farmers Market because they produce much smaller heads (a miniature variety) which would mean higher density plantings and happy CSA members, I think a smaller cabbage is more marketable. I suggest Famosa because it is a savoyed cabbage which we did not grow in the 2019

season.

How and when the crop was seeded/transplanted:

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Farao	7/2 7/17	128	2	
Integro	7/2	128	2	
Bilko	8/12	128	1	

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1 (farao&integro)	7/2	700	2	TP	
2 (farao)	7/17	350	2	TP	
3 (Bilko)	8/12	300	2	TP	

Farmer Notes: Amanda asked me to specifically point out that the seeding/planting dates for the cabbage worked quite well.

Planting Information:

Expected yield/ft: 2lbs.

Direct seed or transplant: TP

In-Row Spacing: 10"

Between Row Spacing: 12"

Number of Rows Per Bed: 2

Bed Feet planted: ~825

Field Planted In: ALC-7

Number of succession plantings: 2

Broadcast Fertility: 6/17/19 Composted Chicken Manure 5-4-3 1000 lbs/acre Potassium Sulfate 500 lbs/Acre

Additional Fertility: 9/5/19 Blood Meal 100 lbs/A

Cultural practices:

Cabbage is a cole crop, and as such it does not need much in terms of protection (i.e. remay cover). We did however decide to seed winter rye into the cabbage rows this season, which did prevent weed growth, but also may have led to some rotting in the Farao cabbage (because they grow on the ground surface and the grass retains moisture).

Notes on Irrigation: This crop was not irrigated. All of the brassicas were sprayed with Pyganic on the 26th of July, and with Entrust and Dipel DF on the 30th to prevent flea beetle damage.

Diseases observed:

Flea beetle damage definitely occurred in the Farao variety, as well as the previously mentioned rot. On average I would estimate the first 2 outer layers of leaves were damaged with flea beetle bites. With the Bilko cabbage, there was a lot of caterpillar feces, which takes extra leaf peeling and washing. The Integro variety however, has remained fairly pest free (besides minor flea beetle damage), and I think this may be because it grows about 6-12" off of the ground.

Potential Disease Threats: Damping off and leaf/head rot tend to be the most common diseases to effect cabbage.

Insect Pests observed:

Flea Beetles

Damage caused: Leaf damage from feeding

How was it scouted or observed: Observed in the field on the crop

Action(s) taken: 3 types of pesticides applied one timed each

Potential Insects:

As with all brassicas, flea beetles are the major threat. Remay covering can help prevent large populations if crops are covered early, organic pesticides also accomplish this goal.

Do you think the production practices needed for this crop was worth the yield that we received?

Overall the cabbage did well this season. If anything we could have done a better job with our spacing because we hand-planted the transplants, and there were some unnecessary gaps in the rows.

Harvest & Storage:

When was the crop ready for harvest? How did you know?

We harvested this crop for the first time on 9/20/2019 out of ALC-7. We first harvested the variety Farao, which produced the largest heads with an average of 6" in diameter. A week later we harvested the variety Integro, which averaged a head diameter of 4". When a cabbage is ready to harvest, it will be about the size that the variety pack told you it will be (1-3lbs/head) and the outer leaves will usually be a paler color, larger than the under layer of leaves, and they will usually be pealing back over themselves a little at the top of the head of cabbage.

How was it harvested?

I think that cabbage is best harvested with 4 people, 2 cutters and 2 packers, who move down the 2 rows for each bed. Cabbage is cut with lettuce knives (neon orange handle) and the cut should make a perpendicular plane in relation to the cabbage head (in others words make a straight cut at the bottom, and the cut is important to our markets so it is important to get it down quickly). After being cut the cabbage should be flipped with the "clean butt" facing up for the packers to grab, pack, and move out of the field.

On the last harvest of cabbage Jason drove the tractor down the beds with the forklift attached carrying one of the large bins we use to harvest squash and we just cut and placed the cabbage directly into that bin.

How was it washed at the wash station?

Cabbage was dunked if it was being washed for a wholesale market but for the CSA, we do not wash cabbage.

List different post-harvest practices for each market (if any)

We do not wash cabbage for the CSA, but we dunk it in a tub of water for Big Y. It can also be necessary to make sure the cuts on the cabbage butts are clean if the cabbage is being sent to any other market besides the CSA or Farmer's Market.

List different shipping practices for each market (if any) For Big Y and storage at the Farmer's Market/CSA pickup we stored cabbage heads in lock-top bins (with the exception of the last few CSA pickups where we left the last succession of cabbage in the bin Jason had carried through the field with the tractor). For any dining, student business, or donation delivery we packed cabbage into wax 1 1/9-bushel boxes.

What different or improved harvest and shipping recommendations can you make?

I think that if cabbage is going to be harvested for a market in which we would be sending heads in wax bushel boxes then it should be packed into the wax boxes in the field and the boxes can be dunked into the large tubs at the wash station.

Storage and post-harvest handling:

Curing: N/A

Washing before storage: No

Storage Requirements: 34-39° at 80-95% RH for 2 weeks to 2 months

How should this crop be processed for long term storage: For long term storage the outer leaves should be kept on, the cabbage remains unwashed, and bags or open bins are best so that moisture doesn't get trapped within the container.

Where your crop was stored this fall?

ALC cooler.

How well did this crop fair in storage and how did it enter storage?

Cabbage was stored mostly in lock-top bins, though during the last 2 weeks of CSA pickup the cabbage was kept in the squash harvest bins in the ALC barn.

Were there any problems in storage?

The cabbage stored well, there was flea beetle damage on the outer leaves, particularly with the Farao variety.

What different or improved storage recommendations can you make?

We moved the cabbage out of the cooler quickly enough that it did not need to be kept at a cooler temperature, but I think that if cabbage were to be kept for a longer period of time that the temperature in the cooler should be closer to 34-36° on average where it was usually closer to 40°.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/27	3	Lbs.		104	
10/11	5	Lbs.		104	
10/18	6	Lbs.		104	
10/25	7	Lbs.		104	
11/1	8	Lbs.		104	
11/8	9	Lbs.		104	

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Big Y Amherst	\$1/lb.	87	\$87
Big Y Northampton	\$1/lb.	96	\$96
Big Y South Hadley	\$1/lb.	80	\$80
Big Y Greenfield	\$1/lb.	122	\$122

Total Gross Income Received From Your Crop: Wholesale Total: \$305

Review and Recommendations:

What was different between what was done and what was planned?

The cabbage came in at the time that we wanted it to and we had what we needed for our markets. We had what we planned for.

What worked really well and should be continued?

Cabbage does not make us a lot of money, but it is a staple food for the CSA and I think it is a good vegetable to include in the shares.

What changes would you recommend for next year?

Cabbage doesn't make us a lot of money, I would recommend raising the price to \$1.25/lb. and attempting to sell in bulk if possible, maybe to the warehouse in Springfield. If there isn't a good bulk market out there then I would suggest only selling special varieties like nappa cabbage to our markets outside of the CSA.

Should we grow this crop again? Why or why not?

Yes. I think cabbage is expected at the CSA and it does offer a good amount of food for a lower price. Cabbage also has some longevity in the cooler which increases its value.

CARROTS

Daucus carota

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
Big Y	1348 lbs	
CSA	2100 lbs	
Farmers Market	210 lbs	
Dining	1450 lbs	
Student Businesses	595 lbs	This is being generous

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Bolero	Johnny's	100,000	\$224	untreated
Purple Haze	Johnny's	25,000	\$58.75	untreated
Rainbow	Johnny's	25,000	\$58.75	untreated

Reasons for selecting these cultivars:

Bolero has been a constant on the farm so far. It is known to have a good flavor, store well, and has a very “classic carrot” look to it.

I thought it would be cool to add Purple Haze to have a darker color within our carrots. This specific purple carrot was also marked as an AAS winner.

Rainbow would also add to the diversity of color in our carrots. I was deciding between rainbow and Malbec since they had both been grown in past years. I chose rainbow over Malbec because it was listed as being more flavorful.

Did the variety description meet your expectations? Why or why not?

The bolero carrots have come out looking and tasting great. However, some of the bolero we've harvested have been on the smaller side with different shapes and entanglements that made them not Big Y quality. The purple haze were overall good as well and had less issues with funky shapes but their taste was not as sweet as the bolero. The rainbow carrots were not super good. Many of them were overly hairy and grew to be cracked down the middle or at the tops.

Would you recommend these varieties again?

I would definitely recommend bolero carrots to next year's crew.

I recommend keeping the purple haze or a different purple/red variety of carrots to keep things interesting. I do not recommend the rainbow carrots.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Sugarsnax 54 from Johnny's Seeds have long, slender roots that are high in beta-carotene. They are listed as being sweet, tender, and smooth.

Gold nugget also from Johnny's Seeds appears to be a very bright, almost neon yellow carrot. It is listed as having a uniform shape and being flavorful.

Farmer Notes: Not my own notes, but Amanda says that the farm has never grown the gold nugget variety so that could be a fun experiment!

Direct seeding

Planting #	Seed date	Seeder Used	Settings Used	Notes on germination
1	5/15	Jang seeder	A roller with the setting X12	Our germination rate was good overall
2	6/20			
3	7/15			

Farmer Notes: During the second two seed dates, 6/20 and 7/15, we planted 3 beds each. Only one bed was planted on the first seed date 5/15. Some of the greens on our carrots started to bolt in August which was bizarre. It is likely that they were planted too early which caused some of the carrots to grow faster than others and go to seed earlier than they should have.

Planting Information:

Expected yield/ft: 1lb/foot

Direct seed or transplant: Direct seed

In-Row Spacing: X12 setting seeds at 2-5"

Between Row Spacing: 12-15"

Number of Rows Per Bed: 3

Bed Feet planted: 9 beds, 2700 feet

Field Planted In: A

Number of succession plantings: 3

Broadcast Fertility: 4/16/19 Composted Chicken Manure 5-4-3 1000 lbs/acre

Additional Fertility: No

Cultural practices:

We used the Jang seeder with a roller with the setting X12. 2 successions 6/18 and 7/16

No row cover

No black plastic

We frequently crawled the carrots

We thinned them as we crawled them about 2-3 times but we were not all consistent about thinning unfortunately.

Once the carrots were big enough we were able to use the basket weeder implement on the tractor that got between the three rows of carrots so we only had to hand weed directly around the plants.

Notes on Irrigation:

No drip tape was placed on the carrots and they fared well.

Diseases observed:

It appeared that our rainbow carrots had root knot nematode.

The roots were often either extra thick, hairier, or stubbier than other carrots. I also think some of our carrots may have gotten cavity spots on them but it may have just been wireworm damage.

Potential Disease Threats:

Alternaria leaf blight: Symptoms first appear on the upper leaf surface as small, circular, tan spots with white centers. These spots enlarge, turn light brown and form a slight depression.

Black root rot: Caused by the fungus *Thielaviopsis basicola* is a very persistent and damaging disease for growers of bedding plants, herbaceous perennials and some woody species — including poinsettias.

Cavity spot: Cavity spots are small elliptical lesions (usually less than 10mm across) often surrounded by a yellow halo. Infection can take place anywhere along the carrot root and lesions start as pinhead-size spots.

Insect Pests observed:

wireworm

Damage caused: holes and bite marks/ actual worms inside the carrot

How was it scouted or observed: not scouted

Action(s) taken: discarded the affected carrots

Potential Insects: What should farmers of the future expect to see? Report more than one pest if applicable.

Wireworm: Wireworms can also tunnel into parts of the roots or stems of young plants causing stunted growth and wilted leaves.

Cutworm: They primarily feed on roots and foliage of young plants, and will even cut off the plant from underneath the soil. In most cases, entire plants will be destroyed; they do a lot of damage in no time at all.

Do you think the production practices needed for this crop was worth the yield that we received?

While it felt like we were endlessly crawling the carrots at times it was well worth it. Carrots are a staple item to all of our markets and crawling was our best group bonding time.

Farmer Notes: *We should have been more consistent with our thinning of the carrots because we ended up with some patches of beautiful carrots that were evenly spaced and others that were so clumped together they took on shapes we could not sell.*

Harvest & Storage:

When was the crop ready for harvest? How did you know?

We had carrots as a summer production crop as well so we had many successions of them being harvested throughout the season. The fall carrots were harvested in early September. You can check to see if they are ready to harvest by pulling up a few and checking to see if they are the diameter and length you're aiming for. We aimed for about 6 inches in length and the diameter changed depending on the variety.

How was it harvested?

-Carrot harvests were typically done with all hands on deck so we could quickly knock out an order or a few rows to store for future orders. However, you can get by doing a small order with 2-3 people harvesting.

-The carrots were harvested either using a fork to loosen up the soil followed by people pulling the carrots out by hand or using a tractor implement called the undercutter to lift a whole row out at once.

-Depending on the market we would either bunch the carrots with rubber bands while keeping the tops on or pull the tops off and bag up the loose carrots.

CSA, Dining, and Student business were all harvested as loose carrots.

Big Y and Farmers Market were typically bunched.

Additionally when we had the capacity to do so we would have a separate bag of “uglies” to donate to Bob at Not Bread Alone or the Food Bank.

How was it washed at the wash station?

The root washer.

List different post-harvest practices for each market (if any)

Carrots were washed for all markets.

List different shipping practices for each market (if any)

CSA/Farmers Market: Lock lids

Student Business: Bushel box

Big Y: Lock lids

Dining: Bushel box

What different or improved harvest and shipping recommendations can you make?

None that I can think of.

Storage and post-harvest handling:

Curing: Not needed

Washing before storage: We washed some before storing them and others sat in bags in the cooler before getting washed and packed. Both methods work relatively the same it's just a matter of when you have time to wash.

Storage Requirements:

32-38 degrees, RH of 98%, and duration depends on the variety so it's recommended to check for rot every few weeks (we typically sold ours before that point though).

How should this crop be processed for long term storage:

Either unwashed or topped in white bags inside the cooler or washed and topped in black totes in the cooler.

Where your crop was stored this fall 2019?

The cooler in the barn.

How well did this crop fair in storage and how did it enter storage?

The carrots that entered storage pre-washed did better than the ones we stored in bags with dirt on them. The ones in bags weren't as easy to clean after being stored but they all held up well in terms of staying crisp and fresh tasting.

Were there any problems in storage?

No issues of rot, pest damage, color issues, or condensation.

What different or improved storage recommendations can you make?

Labeling the date the carrots were harvested on the bags and when they were washed on the black totes. It was hard to tell at times which carrots we should prioritize selling first.

Farmer Notes: *I thought the most efficient method of harvesting the carrots was when we would use the undercutter first and follow behind filling green bins and then transferring them into white bags. It is best to not fill the green bins up past the halfway point in order to keep the weight low so it's easier to lift and dump them into the bags.*

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/13	1	bunches	2 and 1	75 bunches	
9/20	2	each	5 and 3	446	
9/27	3	bunches	6 and 4	75 bunches	
10/4	4	each	6 and 3	513	
10/11	5	each	5 and 3	446	
10/25	7	Locktops	unknown	6 locktops	
11/1	8	each	6 and 3	513	
11/8	9	each	5 and 3	446	
11/15	10	-	Take what you want	All left	

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Dining	\$1.50/lb	1930 lbs	\$2,895
Big Y Amherst	\$1.50/lb	124 lbs	\$186
Big Y Northampton	\$1.50/lb	137 lbs	\$205.5
Big Y South Hadley	\$1.50/lb	129 lbs	\$193.5
Big Y Greenfield	\$1.50/lb	246 lbs	\$369
Earth Foods	\$1.50/lb	100lbs	\$150

Total Gross Income Received From Your Crop: \$3,999

Review and Recommendations

What was different between what was done and what was planned?

The dates we direct seeded the carrots changed from the original plan so that the earliest carrots going in the ground were on 5/15 (however my assumption is we harvested these for summer production) and the last seeding was on 7/15. In my original plan the first seeding was on 6/24 and the last on 7/29. Both the plan and the execution were done in three successions though. Other than that we stuck to the plan.

What worked really well and should be continued?

The bolero variety was the best looking and tasting so it should definitely be part of next years carrot varieties. I think growing a large amount of carrots was smart as all of our markets were interested in them. I would recommend growing more of the bolero in comparison to the other varieties as they were much more consistent and marketable to Big Y and dining.

What changes would you recommend for next year?

Set aside chunks of time where you are not just weeding the carrots but thinning them. We didn't always have a clear idea of when to thin vs weed. This resulted in parts of some beds being over populated with carrots when we were harvesting them; which caused some to become entangled with each other which is cute but also not bunchable.

Should we grow this crop again? Why or why not?

Yes, carrots are a must! We sell them to all of our markets and they were a staple item in the CSA shares. Since we sell them to every market it makes up for the tedious crawling during the summer months. I think any crop bringing in close to \$4,000 is a keeper. Plus they taste great!

Farmer Notes: *I think what made this program such an amazing experience for our crew was the amount that we invested ourselves into the farm and each other. It's natural to just view it as another class during the spring as you are doing a lot of tedious planning and not too much outdoor farming but that will change as summer rolls around. The farm becomes everyone's mutual baby which is exciting and also difficult. It can be hard at times to have a group of people all feel passionate about the same project, especially as opinions can clash and decisions can become harder to make. My suggestion would be to always maintain clear communication with each other and not be afraid to have open dialogues about tough decisions. Having a group meeting where everyone has the chance to voice their opinions and feelings goes a long way. In terms of juggling the farm with other classes and life in the fall, I would say take solace in that you are all in it together. Lean on each other for support when you need to and don't be afraid to let the crew, Amanda, and Jason know if you're struggling. That being said, show up, put in the most effort you can, and have fun because the year goes by WILDLY fast and you'll miss it when it's over. I think our crew built a great sense of community this season and I have faith that the 2020 crew will be able to do the same. Grow produce, lasting relationships, skills, and resilience yippiii!*

CELERIAC

Apium Graveolens var. rapaceum

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	1400lbs	2 to each member 4 x so each member will receive 8 in total at four different markets totaling to 1400lbs
Big Y	100lbs	BIG Y N- 100lbs / will they actually take this?
Dining	N/A	None
Earth foods	75lbs	I don't think we will have enough quite honestly, so this will probably fall through
Farmers market	20lbs in total	Although that is what is accounted for, I think the best bet would just be placing a wood basket with a few occasionally, like 2 -3 markets

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Mars	Johnny's	5000 seeds	50.70	Organic

Reasons for selecting these cultivars:

The reason I selected Mars was because it had fared well in the past for the student farmers. The root ball always seemed to be better with disease and other uncontrollable factors rather than the traditional stalk celery.

Did the variety description meet your expectations? Why or why not?

Yes, it did what it said it will. Didn't require much attention, it was transplanted pretty early on and grew very slowly.

Would you recommend these varieties again?

Yes, Mars did what he said he would. Account for all the time to grow to its maturity because at some glances it will literally look like it's the same as it was when you transplanted it.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

1. Brilliant – larger and known to be solid / flavorful
2. Tango – why not try a more traditional looking celery stalk instead of the root ball, the traditional shape of the celeriac we grow can sway people just because it's different

Farmer Notes: Personally, this is sort of just an extra crop or a filler crop at the markets. I'd like to see it go bye bye and more focus / money be placed on a more popular crop. I've never heard anyone be truthfully thrilled about the taste or viewed this as a hot commodity.

How and when the crop was seeded/transplanted:

Seeded into 128s, originally was supposed to be two successions. However, it was only transplanted once and consisted of 4 128s.

Greenhouse seeding:

Variety	Seed date	Tray size	Number of trays	Notes on germination
Mars	4/11	128s	4	The numbers on the spread sheet do not reflect how many were actually seeded

Field Planting Info:

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1(only one succession)	5/28 according to Activities Log	4/5 of bed 250ft	2 rows	transplanting	Relatively slow, looked like it didn't grow for three months

Farmer Notes: Celeriac is low maintenance, easy to plant. Make sure to leave ample time because it has a large maturity window, four months to be exact.

Planting Information:

Expected yield/ft: 1lb per foot

Direct seed or transplant: transplant

In-Row Spacing: 6 to 12 inches

Between Row Spacing: 18 to 24 inches

Number of Rows Per Bed: 2

Bed Feet planted: 250ft / Less than half of the dry beans

Field Planted In: B

Number of succession plantings: 1

Broadcast Fertility: 5/13/19 Composted Chicken Manure 1000 lbs/acre

Additional Fertility: No

Cultural practices:

No mechanical weeding was used for the Celeriac. Hoed and hand crawled about in total 5 times, once or twice walking through and hand pulling weeds closest to root. When we were crawling the beans right next to the Celeriac some of us would break off and weed the portion of Celeriac.

Notes on Irrigation: About how often what this crop irrigated, how? Anything else you are seeing in the records worth mentioning

No irrigation in B, Celeriac does better in cooler and moist climates, we elected to not use drip tape as it was not a necessity. However since it's a long season crop and grows better with a lot and uniform supply of water, it should be revisited to use drip tape or to plant in a field that's known to be on the moist side. This website has strong reading material on irrigating

Diseases observed:

The celeriac developed a rot from the inside, it was brown and white mush when cut into. It's possible that it was Basal Stalk Rot, this can have to do with soil compaction and cultivating late in the season.

Potential Disease Threats: What should farmers of the future expect to see?

Leaf Blight or Septoria apicola also known as late blight can be common on the greens of the celeriac root. This can be bypassed by using disease-free seeds and using wider spacing. Another to consider is Pink Rot which is derived from contaminated soil. Make sure to test the soil before planting as many of the diseases can be due to that.

Insect Pests observed: No pest observed, but maggot like damage caused.

Potential Insects:

Potential insects that are common are Cabbage Looper and Imported cabbageworm.

Cabbage Looper doesn't pick up until late July or August, moths are gray-brown and can be treated with bucket type pheromone traps. Damage looks like large holes in foliage. Imported Cabbage worm is offspring of a cabbage butterfly, it has white wings and is visible during the daytime. Its damage includes feeding holes and leaves wet green or brown deposits, first appearing in May. Another to watch out for is Leafminers. Although there are many species, they appear clear-winged flies with yellow and black markings. There are biological controls to restrain them.

Do you think the production practices needed for this crop was worth the yield that we received?

Yes, because weeding I think allowed it in the beginning to grow strongly, also considering the size of the bed feet was on the small side it was easy to run through and weed. If it hadn't gotten sick, Celeriac is usually a relatively "easy" crop and produces a strong yield.

Farmer Notes: *The celeriac rotted and died and did not make it to our CSA members and it was absolutely tragic, a nightmare! I believe this is due to the fact that we planted celeriac in B, when you don't rotate celeriac it makes it much more likely to contract Basal Stalk Rot.*

Harvest & Storage:

When was the crop ready for harvest? How did you know?

I thought the Celeriac was ready for harvest and quite excited, however I was wrong! It was one day in class in early September, Jason brought in a Celeriac root and it was rotting on the inside. To determine if the celeriac is ready the right way to go about it is when the base of the root reaches about 4 inches in diameter. It can hold well in the field, also the window to harvest is about 100 days after transplant.

How was it harvested?

Although in 2019, it was never harvested. The proper way to harvest Celeriac would be to cut the stems and then either with a small garden sized fork lift and or pull. A similar process to our other root crops. The greens can be used in recipes so try to keep those and pull off any gross ones like you would with bunched beets.

How was it washed at the wash station?

It never made it to the wash station BUT if it was going to it would go through our lovely brush washer, another way to go about it is lay them out on the black flats and spray them down.

List different post-harvest practices for each market (if any)

Celeriac post-harvest practices standard for solely CSA.

List different shipping practices for each market (if any)

Going to the CSA so they would be in lock tops and topped in storage so the greens did not rot. The greens also won't last as long post harvest as the "tubers". If you consider shipping to wholesale it would stay in locktops and for Dining, bushel boxes.

What different or improved harvest and shipping recommendations can you make?

Since Celeriac can last fine in the field, only harvest what you need at the time so that you won't have a backup in the probably very crowded cooler.

Storage and post-harvest handling:

Curing: Doesn't need to be cured.

Washing before storage: Washed in brush or root washer.,

Storage Requirements: Can be stored 3 to 6 months kept at 32 F - 34 F and 95% relative humidity.

How should this crop be processed for long term storage:

Celeriac can last 3 to 6 months in the above storage requirements. It would have been stored in the cooler following the CSA markets in lock tops and their greens topped. It is also an option to leave unwashed celeriac in lock tops before giving them out.

How well did this crop fair in storage and how did it enter storage?

Celeriac typically does well in storage if at the right conditions.

Were there any problems in storage?

In the past no as the period they were in the cooler was limited, no student farm celeriac attempted to store for 3 to 6 months.

What different or improved storage recommendations can you make?

Keep an eye on the humidity and temperature.

Farmer Notes: Celeriac can actually withhold the first frost and become "tastier" or more flavorful, so I would consider planting far later than I did, remember it takes four months to mature. Like leeks, celeriac can hold well in the field, so harvest what you need.

Actual Yields and Sales: None

CSA: Never

Other Markets – No other markets / none sold at Farmers Market

Review and Recommendations:

What was different between what was done and what was planned?

For the seeding and transplanting, everything was pretty much on par. Since the crop itself was an early transplant and seeding, it went in pretty seamlessly. However since it doesn't require much power to transplant or attention, it kind of got forgotten about when things on the farm really started to pick up. It wasn't until the second week of September that I realized after Jason told us that the Celeriac had all gone to rot.

What worked really well and should be continued?

We paid attention to it for the most part and it still got weeded. The field was well groomed and it looked good for the most part. We hit the proper dates when it was supposed to go in and what not.

What changes would you recommend for next year?

Everytime we would check in on the celeriac, we would be like, "hmm it looks like it has not grown since we put in". It was at the point, we should have actively done something to understand why that was happening. Since it takes four months to grow, I wasn't too concerned but now in retrospect I wish I had done a much better job at looking at the root ball to ensure it was making timely growth as well as not rotting and dying. This goes in hand with record keeping and doing your diligence on your crop.

Should we grow this crop again? Why or why not?

Yes, definitely. I would NOT plant in B. Celeriac has been planted in B the past years making it more susceptible to basal stalk rot .Celeriac fields need to be rotated. Consider what crops it would do well next to. It's a good crop to mix up the routine crops that you can plant later in the season and use as some spice to the later CSA markets that can get kind of boring. Plant later, check in with your crop, and follow through!

Farmer Notes: *There's a lot of things that come to mind when I think of advice for the next generation of Student Farmers. This program challenges you in many ways that your other classes have not. Waking up in the morning, going to your regular academic classes in your farm clothes and then back to the farm is tough! I remember I would quickly shower and put on jeans and a nice shirt then go back to the farm and change (This happened once). Throw that out the window. My favorite moments are running back to classes covered in dirt with my co-student farmer's / best friends. The moments of stress and worry, lean on the people around you. The camaraderie and love will carry you through the harder times. Getting up at 6:30am to farm on a beautiful piece of land? There are worse things in life.*

DRY BEANS

Leguminosae, Phaseolus, vulgaris

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	1400	
FM	40	
Earth Foods	20	
DC	50	

Cultivars/varieties and seeds:

Seed Source	Suggested Variety	Cost	Pelleted or coated seed? Y/N	Organic? Y/N	Notes
High Mowing	Jacobs cattle	\$2.95/oz.	N	Y	
Johnnys	Kenearly Yellow Eye	\$4.35/pk	N	Y	
High Mowing	Pinto	\$2.95/pk	N	Y	

Reasons for selecting these cultivars:

Mostly appearance and native varieties that can withstand the excess moisture of New England climate

Did the variety description meet your expectations? Why or why not?

Yes all of the varieties yielded good beans. The Kenearly was the most productive/ most planted. Jacob's cattle produced largest and most beautiful beans but less in quantity.

Would you recommend these varieties again?

Yes to all

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Calypso because it looks cool

Black turtle because it's very recognizable black bean

Farmer Notes: I recommend that future farmers plan to plant enough beans to save seeds for the following year. It would be easy to do and will save a lot of money because bean seed can be expensive. I also recommend keeping the varieties separate in their beds, for simplicity when harvesting.

How and when the crop was seeded/transplanted: Crop is seeded by hand in tractor made furrows then covered with hoes. Was planted in mid-May (May 13)

Direct Seeding:

Planting #	Seeding date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
Jacobs Cattle	5/13	2000	4	Hand	
Kenearly Yellow Eye	5/13	2000	4	Hand	
Pinto	5/13	2000	4	Hand	

Farmer Notes: Could have planted more densely, some plants did not survive, germination rate was around 70-80%. This left a lot of open space where weed grew which made us weed out the field many times. We also tried filling in holes by moving baby plants that germinated close together for a better stand in the field.

Planting Information:

Expected yield/ft: 1 lb

Direct seed or transplant: DS

In-Row Spacing: 6"

Between Row Spacing: 1'

Number of Rows Per Bed: 4

Bed Feet planted: 2000

Field Planted In: B

Number of succession plantings: 1

Broadcast Fertility: 5 /13/19 Composted Chicken Manure 1000 lbs/acre

Additional Fertility: no

Cultural practices:

Planted in 4 rows. Hand weeded and hoed many times. Were sprayed for leafhopper (see IPM section)

Notes on Irrigation: None

Diseases observed: None

Potential Disease Threats: Pod Rot, leaf spot, rust, root rot, mold

Insect Pests observed:

Mexican bean beetle, leaf hopper

Damage caused: Hopper burn

How was it scouted or observed: randomly spotted

Action(s) taken: Spray pyganic and Azadaractin

Potential Insects: Leaf hopper, bean beetle, aphids

Do you think the production practices needed for this crop was worth the yield that we received? We had to weed way too much. The cost to produce the beans was not made up for with sales since it was only distributed to the CSA. That being said, I think it is possible to plant at a high enough density that you only need to weed once or twice.

Farmer notes: Seeds should be planted at higher density to shade out weeds quicker. It is very important that when the beans are weeded, every worker is doing a thorough job because any unthorough work will turn into a mess with a few weeks left alone.

Harvest & Storage:**When was the crop ready for harvest? How did you know?**

Dry beans ready in August when the entire plant is mostly dry, at least pods thoroughly dry

How was it harvested?

Entire plant cut by hand with a knife, machete or clippers, then put on white whale then put back on the ground and covered in plastic then fed into combine by hand while stationary. The plants were not entirely dry by the time they got to the combine and some had gotten wet from being under the tarp. Took a team of about 7 people two hours or so with Zack there for combine operation.

List different post-harvest practices for each market (if any)

All stored in burlap bags

List different shipping practices for each market (if any)

Beans were distributed to CSA in 1 lb bags

What different or improved harvest and shipping recommendations can you make?

We planted the field so that the combine could drive through. Make sure you grow beds that are spaces so the combine can drive through. Grow a thick stand, plant seeds 2 inches apart and thin if you need to, get a full stand, so that the harvesting can happen all at once with the combine. When you harvest it, time it so that they only get handled once. Make sure the plants are dry and there is no rain in the forecast for a long stretch. If you cannot drive the combine through the field, drive it onto the field, where the husks can shoot back onto the field. We handled the beans way to many times and made a lot of panicky decisions so be calm about the beans and try to harvest them right.

Storage and post-harvest handling:

Curing: Dried in burlap sacks

Storage Requirements: Dry and even temp (in break room worked well)

How this crop should be processed for long term storage:

Shelled and dried in sacks.

Where your crop was stored this fall?

Break room at SD

How well did this crop fair in storage and how did it enter storage?

Sacks in break room. Some beans swelled and went bad but most were fine

Were there any problems in storage? [Any rotting, pest damage, color issues, condensation]

Some individual beans went bad

What different or improved storage recommendations can you make?

Just make sure they are dry when you bag them, I recommend making big drying tables and spread the beans on them right after harvest.

Farmer Notes: The beans were my favorite crop to grow. They are beautiful and it empowering to know how to produce beans. Learn from what we have done this year because we made many mistakes, but they can be avoided. The beans have been grown on this land for thousands of years and the beans love this land, so plant them! People love beans.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
11/1	9	1 lb bag	1	104	
11/8	10	1 lb bag	1	104	

Total Gross Income Received From Your Crop: Does not apply since they were only given out to the CSA

Review and Recommendations**What was different between what was done and what was planned?**

We planned to be able to give 2lb bags to the CSA but only ended up giving away 1lb bags. We also planned to sell 10 lbs for 4 weeks at the farmers market but did not. We also planned to give some to dining but did not accomplish that either.

What worked really well and should be continued?

We only gave them to the CSA twice which seems like a lot of work for not a lot of payoff.

What changes would you recommend for next year?

I recommend growing the same size field and selling fill-your-own bags at the farmers market and seeing if Big Y would buy bags. I think high end retail markets would like the dry beans since they look so nice. If we displayed them in jars so people could see them, I think people would buy them and pay a high price.

We talked to the chefs at the beginning of the season about selling a standing order to them but we were not able to grow enough. I recommend either going for that and doing the math to see if the profit will be worth the space and work. It is also okay to just focus on selling them to Big Y and pushing them at the farmers market.

Should we grow this crop again? Why or why not?

I think dry beans should be grown again if you can find a market that really wants them beside the CSA such as Big Y, Dining or farmers market, making it more profitable since they were somewhat challenging to grow. They would be very easy to distribute for retail or wholesale.

Farmer Notes: *The Dry Beans were a test for everyone involved. They required using the combine under the supervision of machine master Zack and took a lot of weeding. However through ambition we were able to grow a crop that is uncommon to grow in Massachusetts and they came out very good. It is important if these are grown again to increase the planting density and aim to control weeds quickly, leaving few bare spots. Then if the weeding is done well, the plants will dry better and can be harvested directly into the combine, not moved onto the truck and stored in the field under plastic while it rained, causing some plants to get soggy and sprout. Make sure that the hard work you is productive and profitable so you are not wasting time that could be used growing something more desirable or easy to grow*

EGGPLANT
Solanum melongena
Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs]	Notes
CSA	2,100	Based off 175 shares.
Farmer's market	20	Achieved this goal as of 9/20
Big Y A	150	
Big Y N	175	
Big Y G	30	
DC	300	
Efoods	140	Did not order on september 13 th
Catering	75	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Diamond	High Mowing	1,500 seeds	\$22.50	Organic
Ping Tung Long	High Mowing	1,500 seeds	\$22.70	Organic

Reasons for selecting these cultivars:

“Johnny’s did not have organic orient express or nadia that we grew last year and did really well so I chose Traviata because it is high yielding, very uniform, and has a good classic bell shape. I chose the ping tung long because we grew it in 2015 and it seemed to do well.” – Lee McLoughlin. Lee ended up choosing Diamond in the end because Traviata was sold out.

Did the variety description meet your expectations? Why or why not?

Yes. We have been able to harvest more Diamond eggplant than we planned and all are looking beautiful. Two minor frost events in early September have not harmed the crop. We have not obtained a significant yield from the Ping Tung Long but I am not sure if this is because of the variety or because of the planting / transplanting date.

Would you recommend these varieties again?

Yes. Definitely Diamond – large yield and high-quality fruits. Ping Tung Long could be great too (looks beautiful) if the planting dates were altered.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Orient Express, Nadia – The 2018 crew grew these varieties and highly recommended both of them. They were not available this spring but are definitely worth considering in the future.

How and when the crop was seeded/transplanted:

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Ping Tung Long	6/3/19	128	3	
Diamond	6/3/19	128	3	
Ping Tung Long	6/10/19	128	5	
Diamond	6/10/19	128	5	
Ping Tung Long	6/17/19	128	3	
Diamond	6/17/19	128	3	

Field Planting Info:

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1	7/9/19	550	2	Hand plant	Good.
2	7/15/19	1,100	2	Hand plant	Good.
3	7/22/19	550	2	Hand plant	Good

Farmer Notes: Late succession of eggplant was planted too late. Ping Tung Long was significantly less fruitful than Diamond but looked beautiful.

Planting Information

Expected yield/ft: 1 lb/ft

Direct seed or transplant: transplant

In-Row Spacing: 12"

Between Row Spacing: 18"

Number of Rows Per Bed: 2

Bed Feet planted: 1,100

Field Planted In: ALC 7

Number of succession plantings: 3

Broadcast Fertility: Composted Chicken Manure 5-4-31 000 lbs/acre

Potassium Sulfate 500 lbs/Acre

Additional Fertility: Fish Emulsion was applied through the tractor mounted sprayer in early September

Cultural practices:

Black plastic was used.

Harvested with pruners, knife, or by hand.

Sprayed in 7/30/19 with Dipel Entrust at a rate of ½ lb 30oz per ½ acre.

Notes on Irrigation: Eggplant was irrigated with drip.

Diseases observed:

Phomopsis Fruit Rot

Damage caused: Round or oval brown spots on fruit with tiny black dots within, present near ground level where fruit touches wet ground. Not a big problem at all.

How was it scouted or observed: Seen at the time of harvest.

Action(s) taken: Fruit was clipped and tossed aside.

Potential Disease Threats:

Blossom-end rot - Sunken lesions on the blossom (lower) end of the fruit.

Cercospora leaf spot - Small brown spots on the leaves.

Early blight - Brown spots surrounded by a yellow ring increases in size over time.

Powdery mildew - Powdery white spots on stems and leaves eventually causes yellowing and death of leaves.

Insect Pests observed:

Colorado Potato Beetle

Damage caused: Some damage to the leaves.

How was it scouted or observed: Throughout the season, Ellis, Sue and Amanda scouted for insects.

Action(s) taken: Sprayed with pesticide (details above).

Flea Beetle

Damage caused: Tiny holes in some of the leaves.

How was it scouted or observed: Throughout the season, Ellis, Sue and Amanda scouted for insects.

Action(s) taken: Sprayed with pesticide (details above).

Potential Insects:

Aphids - Tiny little bugs usually reside on the underside of leaves, produce sticky honeydew, black mold can grow on honeydew.

Cutworms - Small grayish caterpillars that feed on stems in the night and hide in the soil during the day, can chew through stems completely until plants fall over.

Do you think the production practices needed for this crop was worth the yield that we received?

This crop was a hit and was pretty straightforward to grow. We had tons of eggplant, especially Diamond, and it was easy to harvest large amounts in minimal time. I think CSA members were getting a little tired of it by the end though. Ping Tung Long was beautiful and a joy to eat but did not produce enough amount of fruit to make it worthwhile.

Farmer Notes: Keep scouting often for any sign of pests or diseases!

Harvest & Storage:

When was the crop ready for harvest? How did you know?

Eggplant was harvested for about the first half of the fall. It is ready for harvest when the fruits are large in size (around 8 inches or larger) but have not yet developed a tough, woody or brown skin. The maximum yield and highest quality fruit can be obtained by harvesting just before the eggplants reached this stage. Before the first big frost, we harvested as much as we could, regardless of the size of the fruit.

How was it harvested?

We systematically moved down the rows, selecting the largest fruits and discarding the ones that had become woody or had defects, rot, etc. It was very quick to harvest with knives, hand pruners, or by pulling the fruits off by hand and throwing them on the ground in a harvest row. It was harvested into green bins. Sometimes we would harvest all the fruits and leave them in the dirt, collecting them all at the end, while other times we would drag or carry the harvest bins along with us. I think both are pretty fast but it is easier to estimate how much you have harvested when you fill the bin as you go.

How was it washed at the wash station?

It was washed in the brush washer in the barn.

List different post-harvest practices for each market (if any)

N/A

List different shipping practices for each market (if any)

Packed in wax boxes for DC and catering and lock tops for Big Y and CSA.

What different or improved harvest and shipping recommendations can you make?

Remember which rows you harvested and where you left off so that you don't waste time or re-run over the same area that you already harvested.

Storage and post-harvest handling:

Curing: N/A

Washing before storage: Brush washer

Storage Requirements: Store unwashed in cooler for a number of days or outside of cooler for 1-2 days.

How should this crop be processed for long term storage: N/A

Where your crop was stored this fall? In lock lids in the cooler.

How well did this crop fair in storage and how did it enter storage?

It did pretty well in storage but we did not end up having to store much of it. It is best to move it out on the day of harvest.

Were there any problems in storage?

Washed eggplant would rot in storage if constantly in contact with water for too much time. Also, our cooler is not the right temperature for Eggplant storage.

What different or improved storage recommendations can you make?

Try not to harvest too much. Harvest, wash, pack, and ship day-of if possible.

Farmer Notes: CSA members did not know what to do with all the eggplant. Give them a reasonable amount but not too much. Try not to leave a ton on the plants later in the season or else you will have to scramble to harvest it all before a frost and there will be so much that you won't know what to do with it

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/13	1	# of fruits	2 full, 1 half	171	
9/20	2	# of fruits	2 full, 1 half	174	
10/4	4	# of fruits	3 full, 2 half	271	
10/11	5	# of fruits	2 full, 2 half	204	

Other Markets – report total amount sold to each market over the season

Market	Price/unit (\$/lb)	Total Units sold (lb)	Total amount of sales (\$)
Big Y A	1.75	93	162.75
Big Y N	1.75	48	84.00
Big Y SH	1.75	69	120.75
Big Y G	1.75	51	89.25
DC	1.75	270	472.50

Total Gross Income Received From Your Crop: \$929.25

Review and Recommendations

What was different between what was done and what was planned?

It is hard to say for sure, but I would estimate that we harvested under half of what we planned for in the spring. We also did not sell much to catering and did not sell any eggplant to the student businesses. All of the rest was pretty much executed according to the plan.

What worked really well and should be continued?

The Diamond variety of eggplant was a great success. Huge yields and we did not even harvest all of it before the first frost.

What changes would you recommend for next year?

Plan for eggplant to mature earlier in the season and plan for less of it. People in the CSA were tired of it (because they do not appreciate the joyous sauce that is baba ghanouj).

Should we grow this crop again? Why or why not?

Yes. Eggplant made a fair amount of money and is very quick to harvest. The demand is there, maybe just not to the degree that we predicted. Nonetheless, it is a worthwhile addition to the array of lovely foods we offer.

FENNEL

Foeniculum vulgare

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	1400	
Farmer's Market	10	Fennel doesn't sell well in the farmers market. If we had it at the CSA we might throw a bulb on the market table to offer, but to my knowledge we probably only sold 2-3 bulbs this way.
Big Y A	20	
Big Y NH	60	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Preludio	Johnny's	1000	\$18.83	org
Finale	High Mowing	.25oz (~1750)	\$17.30	org

Reasons for selecting these cultivars:

Preludio had been grown before with great success in multiple years. It does well for us. Finale had never been grown before, but was purported to have excellent bolt resistance.

Did the variety description meet your expectations? Why or why not?

Preludio is a gorgeous fennel. The bulbs are large and smooth and the flavor is iconic. They also hold unbelievably well in the field; we were harvesting fennel until nearly the bitter end. Unfortunately, High Mowing never sent us the Finale seed, so we had to last minute order more Preludio from Johnny's. I did not get the chance to find out how Finale would perform.

Would you recommend these varieties again?

Absolutely. Preludio is an epic fennel variety, and I would love to know how Finale grows (assuming we could actually obtain the seed in the future!)

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Finale- since we didn't actually get to grow it.

Idillio- it was one of my runner ups in choice. It's supposed to be similar to preludio but with added cold tolerance. Fennel seems like it's going to be one of our crops that we're harvesting late into the season, so added cold tolerance for second succession wouldn't be a bad idea.

Farmer Notes: Future farmer, people get real down on fennel and I don't know why. It is so delicious, really hearty, easy for us to grow, and lasts a long while in the ground. If fennel is grown again there should be lots of recipes given out with it, or at least a stronger market need for it identified. Most people don't like the taste of licorice or anise, which is how raw fennel tastes, so they never get around to trying deeply roasted or charred fennel. The maillard reaction does something special to this bulb, transforming it into this unbelievably sweet, vegetal, toothsome but tender accompaniment to any meal. I think giving customers that kind of information might help, especially for the CSA (less so Big Y). I love fennel, but it seems like most people don't.

How and when the crop was seeded/transplanted:

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Preludio	6/3 and 6/7	128	12	High mowing never delivered our Finale seed, so we only ended up doing Johnny's Preludio.
Preludio	6/20	128	12	

Field Planting Info:

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
Preludio	7/11	500	2	Trenches dug with toolbar, hand transplanted	These did so well. Some of them are absolute monsters
Preludio	week of 7/29	500	2	Trenches dug with toolbar, hand transplanted	These puppies are so beautiful

Farmer Notes:

I wish more people liked fennel because it grows so easily. It is so low maintenance and blows up into these incredible bulbs. What a dream crop! I really wish we could've compared the Preludio and Finale, though.

Planting Information:

Expected yield/ft: 1 pound

Direct seed or transplant: TP

In-Row Spacing: 1'

Between Row Spacing: 18"

Number of Rows Per Bed: 36"

Bed Feet planted: ~1000 (ALC-9 was shortened this year because of flooding and rocks at the far end)

Field Planted In: ALC-9

Number of succession plantings: 2

Broadcast Fertility: Composted Chicken Manure 5-4-3 1000 lbs/acre Potassium Sulfate 500 lbs/Acre

Additional Fertility: No

Cultural practices:

Fennel was grown bareground without irrigation. It was hoed whenever we hoed 9, (not super frequently), but was regularly kept clean with the I+J toolbar. When we planted the first succession of fennel it was incredibly hot and dry, and honestly, I thought we would lose it. Miraculously (and I still don't understand how) we barely lost any plants and it bounced back beautifully to grow into some thick bulbs. Even more incredibly, this dusty dry start did not seem to weaken the fennel/make it more susceptible to pests or diseases.

Notes on Irrigation:

Fennel was not irrigated (and did just fine!)

Diseases observed: None! They are so bodacious and healthy.

Potential Disease Threats:

Fennel has never been a diseased crop at student farm, but two potential disease threats for fennel are powdery mildew and cercospora leaf blight. Powdery mildew (*Erysyphe heraclei*) appears as powdery growth on the leaves and stalks, which can cause yellowing. Cercospora leaf blight (*Cercosporidium punctum*) shows up as small necrotic flecks, which can develop a yellow border and grow into larger brown lesions.

Insect Pests observed: None. Fennel is such a dream.

Potential Insects:

As with disease, fennel has never had insect pest issues at the Student Farm. However, the biggest potential threat is cutworm. We have not had cutworm issues with any crops at the ALC (to my knowledge) so there should not be any eggs kicking around to cause problems next season. Cutworms are the small, grayish/brown caterpillars of several species of night-flying moths. Eggs are laid on low-to-the-ground on plants or residues; they hatch and the larvae begin feeding on plant matter. Their feeding method creates lateral cuts around a stem or other part of a plant, killing off the part above the cut. Adults can lay hundreds of eggs and larvae can overwinter on residues.

Do you think the production practices needed for this crop was worth the yield that we received? Heck yes! Almost every single fennel is FAT and we barely did anything to raise them up. Keeping them weed free was easy with the I+J, and that really was the most important part.

Farmer Notes:

Maybe try to plant them on a wetter day next year. Aside from that, fennel is probably the easiest crop to manage for what the payoff is; if only people liked it! It was a struggle to plan for fennel with regards to pests, as there was nothing on fennel in the UMass VMG or veg program website. I consulted the 2017 and 2016 handbooks, but according to them (and now me!) fennel is basically a dream crop. 2017 fennel was not elaborated on in detail, but 2016 despite observing no problems gave common problems to be aware of. I also used Penn State's PlantVillage website's Fennel page, which was very informative.

Harvest & Storage:

When was the crop ready for harvest? How did you know? The fennel was ready for harvest when the bulbs were about the size of a fist or larger. They stand out prominently from the soil so it is easy to assess how they are sizing up.

How was it harvested? Fennel was harvested using the large, angled harvesting knives. The bulb is tilted over to expose the root and cut at the base. The tops of the fennel were cut at angles relatively tight to the bulb, leaving only the delicate, herbaceous center fronds.

How was it washed at the wash station? After being cut, the outer layers were peeled (more necessary later in the season, there are more gross layers) and the root re-cut if necessary to make it look nice. It was then sprayed off on both sides to remove surface dirt.

List different post-harvest practices for each market (if any) Fennel was washed the same for all markets.

List different shipping practices for each market (if any) Fennel was sent in locklids to Big Y and to CSA distribution. There was one catering event/order where fennel was delivered in bushel boxes for ease, but locklids work fine with fennel.

What different or improved harvest and shipping recommendations can you make? I think our methods for fennel are efficient and effective!

Storage and post-harvest handling:**Curing:** N/A**Washing before storage:** Yes; first the outer layers were peeled off and then the fennel was sprayed down.**Storage Requirements:** Fennel can be stored at 32F 90-95% RH for maximum one month, but quality degrades after a week. We had great success leaving it in the cooler; quality did not degrade until day 4-5 postharvest.**How should this crop be processed for long term storage:** N/A**Where your crop was stored this fall?** In the ALC cooler, short term only.**How well did this crop fair in storage and how did it enter storage?** Fennel stored well in the cooler for slightly less than a week postharvest, washed and in locklids.**Were there any problems in storage?** Quality degrades very quickly after the 5 day mark.**What different or improved storage recommendations can you make?** Do not plan on storing fennel long term, only ever harvest what you need for a given day's order as it lasts in the field much longer.***Farmer Notes:***

Fennel was extremely easy to harvest and deal with postharvest. Both by luck of the weather and choice of variety, we did not deal with any bolting this year, and had great success leaving the fennel in the field and only harvesting what we needed (maybe a little extra).

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/27	3	each	2 full, 1 half	201	Approx 250lb*
10/4	4	each	4 full, 2 half	338	Approx 423lb*
10/11	5	each	1 full, 1 half	104	Approx 130lb*
10/18	6	each	1 full, 1 half	104	Approx 130lb*
11/1	8	each	1 full, 1 half	104	Approx 130lb*

*fennel are usually 1-1.5lb/bulb; using an average of 1.25 for poundage as most of our bulbs were big boys

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Big Y Amherst	\$1.75/lb	38	\$66.50
Big Y Northampton	\$1.75/lb	36	\$63.00
Big Y South Hadley	\$1.75/lb	39	\$68.25
Big Y Greenfield	\$1.75/lb	38	\$66.50
Dining	\$1.75/lb	10	\$17.50

Total Gross Income Received From Your Crop:

\$213.50 of fennel was sold. Approximately \$1,860.25 worth of fennel was brought to CSA distributions. All told, we moved an approximate total value of \$2,073.75 worth of fennel.

Review and Recommendations

What was different between what was done and what was planned?

The only major difference between what I planned and what happened was in the varieties, since we never received the Finale seed.

What worked really well and should be continued?

I think growing only a small amount of fennel worked really well. You get a massive yield from relatively little bedspace, and it isn't the most popular crop, so it is easy to strike a good balance. We had some pretty incredible poundage come out of not that much field (4 short beds in 9). Growing fennel bareground without irrigation, and keeping it clean primarily with the I+J was extremely effective. It is not a hard conclusion to make that the reason our fennel were so big and hearty, despite their rough start, was because they were kept so weed free.

What changes would you recommend for next year?

Experiment with new varieties! Preludio is a tested classic, but I think it's time to change it up and see what else will work well for SFE. Since fennel is in such low demand, it is a great crop to experiment with, since it matters less if it fails.

Should we grow this crop again? Why or why not?

I think yes. Fennel is not in the highest demand but it grows up beautifully with minimal effort and can supply a lot of needed poundage in the CSA. I personally love fennel and think with the right approach, a future crew could get some love for and excitement about it going.

Farmer Notes: Future farmer, I hope you choose to look past fennel's bad reputation and give it a fair chance. I really want to drive home how good it is once its been cooked at a high heat and browned. It totally transforms. That is the fennel I want you to show the world. You just have to grow the fennel to do it.

FLOWERS

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	2100	Based off of 175 shares
Farmer's Market	100	Sold extremely well at first market. Should up price to \$8/ bouquet
Big Y Am	30	I think we thought sunflower stems?
Big Y NH	120	"
Earthfoods	80	Bouquets for all Student Businesses
Greeno	75	"
People's Market	180	"

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Calendula, Flashback Mix	Johnny's	850 seeds	\$11.47	Org
Florenza	Johnny's	1,000	\$20.38	"
Benary's Giant Mix	Johnny's	500	\$18.30	"
Alaska Mix	Johnny's	200	\$5.84	"
Red Spike	Johnny's	10,150	\$8.60	
Pampas Plume	Johnny's	4,518	\$9.68	org
Gloriosa Double Daisy	Johnny's	500	\$16.90	"
Tower Custom Mix	Johnny's	1,750	\$12.70	"
Durango outback Mix	Johnny's	500	\$8.45	"

Reasons for selecting these cultivars:

I initially knew that I wanted to grow sunflowers, amaranth, and a good drying flower variety (celosia). I looked through seed catalogs to see which other flowers would look the prettiest. I also looked back at previous years advice on which flowers customers liked best and which ones grew well at the Student Farm. I was super intimidated to choose which flower varieties to grow because there are just so many to choose from. The truth is though you really can't go wrong with picking flower varieties as they are all beautiful!

Did the variety description meet your expectations? Why or why not?

All of the variety descriptions that I read were similar to the result. The only thing is that the Daisies and Asters grew faster than we expected.

Would you recommend these varieties again?

Yes! They have all been beautiful in the bouquets and the customers seem to love them.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

I think it would be cool to try and grow Eucalyptus! I wanted to grow it this year but it didn't work out for a lot of reasons and then we just totally forgot to even order it. Eucalyptus would need to be seeded around February and would need lots of greenhouse time, so maybe finding a way to put it in the NSF Greenhouse (in large pots maybe?) and then moving them outside as it

gets warmer. Last crew tried to grow sunballs but it didn't work out. I didn't choose to grow them but I saw them in many bouquets over the summer and they are so cute!! 2017 said that they seeded them in cells that were too big so they didn't germinate.

Farmer Notes: *Keep an eye on the flowers as they grow! Deadheading will help to make the plants continue to produce flowers as the season moves on. Also, talk with Jason about getting different seeding flats for the flowers. We wanted to get flats with columns to seed into, and then transplant into larger cells as the seeds germinate.*

How and when the crop was seeded/transplanted:

Greenhouse seeding

I think all flowers may have had better germination if we had better trays to plant into. Maybe try flats just with rows and transplant to bigger cells after germination?

Variety	Seed date	Tray size	Number of trays	Notes on germination
Aster (Tower Custom Mix)	4/8/2019	128	4	Decent germination; def planted way too soon; died before fall
Rudbeckia (Gloriosa Double Daisy)	4/8/2019	128	4	
Zinnia (Benary's Giant Mix)	6/17/2019	128	5	Good germ rates; taking time to separate doubles when young and put in cells without any is worth it
Amaranth (Red Spike)	7/15/2019	128	8	"
Nasturtium (Alaska Mix)	7/15/2019	128	2	
Marigolds (Durango Outback Mix)	7/15/2019	128	4	
Calendula (Flashback Mix)	7/15/2019	128	8	
Sunflower (Florenza)	7/22/2019	128	8	
Celosia	5/27/2019	128	5	

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1. Aster	6/10/2019	300	3	TP	
1. Rudbeckia	6/10/2019	300	3	TP	
1. Celosia	7/15/2019	1800	2	TP	We planted SO much celosia (3 BEDS)
1. Zinnia	7/15/2019	450	3	TP	1.5 beds
1. Sunflowers	7/15/2019	200	2	TP	Amanda brought in a few tray of sunflowers from home. We planted 1 bed
1. Sunflower	8/5/2019	300	3	TP	Planted a little late, only got a few stems for fall
1. Amaranth	8/5/2019	300	3	TP	"
1. Nasturtium	8/5/2019	300	3	TP	
1. Marigold	8/5/2019	300	3	TP	Planted a little late, did well but were pretty small
1. Calendula	8/5/2019	300	3	TP	Planted a little late

Farmer Notes:

Overall the flowers did really well this year! Deadheading made the daisies late for a while, and mad our bouquets beautiful. Asters need to go in later as they were planted a little early and sunflowers, amaranth, marigolds, and calendula could be planted a week or two earlier to have for the first few markets.

Planting Information

Expected yield/ft: 0.50 lbs

Direct seed or transplant: TP

In-Row Spacing: 12"

Between Row Spacing: 12"

Number of Rows Per Bed: 2 rows per bed (we had extra starts and add an extra third row for amaranth)

Bed Feet planted: 1400' total

Field Planted In: FFA

Number of succession plantings: 1 for each variety of crop

Broadcast Fertility: 6/17/19 Composted Chicken Manure 5-4-3 1000 lbs/acre Potassium Sulfate 500 lbs/Acre

Additional Fertility: No

Cultural practices:

Deadheading was done in the early fall, only on daisies, celosia, and zinnias. If we started dead-heading earlier (August) we would have produced more flowers.

Scuffle hoeing and crawling was done to minimize weed growth.

We also fished using fish fertilizer on the starts while they were in the greenhouse.

Notes on Irrigation: no irrigation needed

Diseases observed:

There was a stray basil plant in the bed with sunflowers, celosia, and zinnias that got downy mildew. The downy mildew began to spread into some of the zinnias nearby so we chopped it down and did not notice any further spreading of the downy mildew. The main diseases seen were just rot from neglect/not harvesting them. The daisies also saw some leaf spot on their petals (black dots).

Potential Disease Threats: Powdery Mildew is a threat to the celosia, zinnias, and asters; although we thankfully did not observe it this year.

Insect Pests observed: none, just lots of beautiful bees!

Potential Insects:

Leaf miner: This pest can dig into the leaves of plants, causing them to have white streaks on them. This is important for flowers because then they will not look good and it is harder to sell them !

Aphids: feed on stems, leaves, and buds. The damage caused by aphids increases the potential risk of fungal infections.

Do you think the production practices needed for this crop was worth the yield that we received? YES! Flower bouquets at the farmer's market are a hit! This season, we profited a lot from our flower bouquets. The first market, flowers brought in \$105 ! (based off of income records). It would be cool to hire someone onto the student farm in the summer/fall time to specifically work with the flowers so that they get all the care and attention they need!

Harvest & Storage:

When was the crop ready for harvest? How did you know?

Flowers were ready for harvest when the heads are open and beautiful.

How was it harvested?

We used hand clippers to cut the long stems, strip the leaves off, and placed into 5 gallon buckets. The flowers then immediately got placed into buckets with water to prevent wilting.

How was it washed at the wash station?

No wash!

List different post-harvest practices for each market (if any)

CSA and Farmer's markets were our only markets for flowers this season. We brought as many buckets of flowers as we could, and then made gorgeous bouquets at the market.

List different shipping practices for each market (if any)

What different or improved harvest and shipping recommendations can you make?

More 5 gallon buckets, set aside time to harvest flowers!!!! They make a lot of money at the farmer's markets and people love them! We often forgot about them and last minute rushed to pick them.

Storage and post-harvest handling

Curing: n/a

Washing before storage: no way

Storage Requirements: just in the barn out of the sun, or in the cooler in buckets. Putting the flowers directly into buckets with water is super important

How should this crop be processed for long term storage: we stored some flowers in the cooler for a day or so. We did not dry or try to store flowers for longer this season.

Where your crop was stored this fall? Cooler or not at all

How well did this crop fair in storage and how did it enter storage? Did not try to store for long. Longer times will cause flowers to wilt.

Were there any problems in storage? No, other than wilting due to leaving them out in the sun too long (and leaving a bucket of daisies in the back of my car over the weekend).

What different or improved storage recommendations can you make?

Being more on top of harvesting flowers for drying. We had sooooooooooooo much celosia and calendula and would have been cool to dry some

Farmer Notes: Harvesting lone stems is super important! Also setting aside the needed time to harvest your beautiful flowers. Setting a set length and having everyone who is harvesting flowers use that length is also crucial. Sometimes the stems were cut too short

Actual Yields and Sales:

Market	Price/unit	Total Units sold	Total amount of sales
Farmers' Market	\$8/bouquet	14 on first market (n/a on rest of days)	\$105 on first market

**we started charging \$7.50 per bouquet, then moved to \$8, and ended up doing a sliding scale of \$7-\$10 per bouquet. The sliding scale worked out well because the bouquets sometimes differed in sizes each market week.

Total Gross Income Received From Your Crop:

\$105 on first market but need to see FM records binder as records are not in the drive

Review and Recommendations:

What was different between what was done and what was planned?

We planned to have flowers for the CSA, some student businesses including Peoples Market, Greeno, and Earthfoods, as well as Big Y Amherst and Northampton. We only sold flowers at the Farmers' Market, and we also donated flowers to Not Bread Alone. We also did not have a set price for the flower bouquets. They differed in sizes each week and we eventually made a sliding scale of \$7-\$10 for the bouquets, which worked out well.

What worked really well and should be continued?

People loved the flowers at the market!!! They were a big hit and made us a lot of money. Catering asked for some flower bouquets later in the fall, and it would have been lucrative to have sold some bouquets to them.

What changes would you recommend for next year?

Don't put energy into planning to sell flowers to the Student Businesses. Flowers for CSA members, donation, and maybe Catering is enough. We were not able to track the amount of flower bouquets we actually sold at the markets because we did not have a good enough system set up. We know that flowers made up a huge portion of our sales because everytime we made bouquets, we would sell out!

Should we grow this crop again? Why or why not?

Yes! Flowers are a great addition. I would recommend creating time to deadhead and harvest flowers for market is crucial, as we often forgot and rushed to at the last minute.

Farmer Notes: *Maybe having two people be the flower people and their specific duties be harvest and deadhead when needed so that flowers are not forgotten about. I feel as though many of my crop recommendations involve creating more time to tend to certain crops, like flowers. It was really hard to find time to tend to these other crops. My biggest piece of advice would be to put your 100% into the farm, but remember to leave the farm on the field. Don't bring worries home with you and let it affect the rest of the day, have fun with it!*

HERBS

Basil (Ocimum basilicum)
Parsley (Petroselinum crispum)
Cilantro (Coriandrum sativum)

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	131.5	Based off of 175 shares
Farmer's market	15	
Big Y A	15	
Big Y N	15	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Genovese	Johnny's	17,900	\$8.41	Y
Eleonora	Johnny's	7,700	\$11.34	"
Santo	Johnny's	2,200	\$4.86	"
Caribe	High mowing	4,400	\$12.05	"
Giant of italy	Johnny's	15,300	\$7.83	"

Reasons for selecting these cultivars:

I selected these varieties based off of suggestions from the past. For example, Johnny's website said that the Eleonora basil would be downy mildew resistant so I chose it because that has been a problem in past years. As for Parsley and Cilantro, I made the variety choices based on past years information.

Did the variety description meet your expectations? Why or why not?

So far, I am disappointed that the basil died, although it was expected. Years in the past have said that basil was not worth trying to grow because of downy mildew, and i have come to agree with them. As for cilantro and parsley, cilantro seems to be doing well and I have not seen the parsley yet.

Would you recommend these varieties again?

Yes, but i would not recommend starting basil late in the summer and focusing on using drip irrigation. If you are going to grow basil, I would maybe start it a lot earlier and try selling to summer markets (Big Y or Dining), and then have basil solely for the first CSA and Farmer's Market.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

I would not recommend growing basil in 2020. As for other herbs, trying out perennial herbs in the Food For All plot would be cool! Things like rosemary, sage, chives, thyme, mint, and oregano would be spectacular.

Farmer Notes: Culinary herbs are delicious but sometimes not worth the money and time spent into them. Trying to grow herbs (especially basil) would mean putting in focus and effort into the crop. It can be done, but with lots of love and care!!

How and when the crop was seeded/transplanted:

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Genovese basil	7/15/2019	128	3	Good, separating doubles into cells without seedlings is good
Eleonora basil	7/15/2019	128	3	
Giant of Italy Parsley	6/10/2019	128	3	Poor germination
Santo Cilantro	7/15/2019	128	3	
Caribe Cilantro	7/15/2019	128	3	

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1. Basil genovese	8/26/2019	360	2	TP	All died ☹ downy mildew
1. basil eleonora	8/26/2019	360	2	TP	Dead!
1. Cilantro Santo	8/12/2019	600'	4	TP	Good!
1. Cilantro	10/8/2019	200'	2	TP	
1. Giant of Italy Parsley	8/12/2019	450	2	TP	"

Farmer Notes: Planting basil in august is probably not worth it due to downy mildew risk. The varieties I chose were even supposed to be resistant to downy mildew ☹

Planting Information:

Expected yield/ft: 0.25 lbs/ft

Direct seed or transplant: all TP

In-Row Spacing: 6"

Between Row Spacing: 6"

Number of Rows Per Bed: 2 Basil, 3 Parsley and Cilantro

Bed Feet planted: Basil- 180', Parsley- 225'. Cilantro-150' (ALC 9-1st planting) and 100' (NSF GH-2nd planting)

Field Planted In: Basil- NSF GH, Parsley and Cilantro (1)- ALC 9, Cilantro (2)- NSF GH

Number of succession plantings: 1 for basil and parsley, 2 for cilantro

Broadcast Fertility: See fertility records

Additional Fertility: No

Cultural practices:

All the herbs were planted directly into the ground without row cover or black plastic. The cilantro (thanks, Renee!) and parsley were weeded.

Notes on Irrigation: Basil was in the NSF GH and was irrigated with drip when needed before it got Downy Mildew. Cilantro is in the NSF GH now and on drip irrigation.

Diseases observed:

Downy Mildew; black spots under basil leaves. We pulled it all out and did not sell any of it. Is transmitted by spores and causes the leaves to turn a yellowish color and begins to spread across the entire plant. Downy mildew can also cause black and gray fuzzy spots on the underside of the leaves.

Potential Disease Threats:

Fusarium wilt: causes the entire plant to wilt and die. We did not see this this year thankfully!

Insect Pests observed: None

Potential Insects:

Grasshoppers; will eat large holes in basil plants

Aphids; problematic pest that lays eggs on leaves and eats the leaves as well.

Do you think the production practices needed for this crop was worth the yield that we received? We did not put much time into our herbs this year. However, I do not think that they are worth the time and money. Unless we want basil to be only for summer production, I do not think it is worth it for the fall due to threats of Downy Mildew. The cost of seeds for herbs is high for the small yield we got (one CSA harvest). They are fun though and customers love fresh herbs!

Farmer Notes: *Basil would be awesome for summer production! Herbs in general would also be great for a pick your own herb field. Also focusing more on perennial, culinary herbs would be less labor intensive and cost less.*

Harvest & Storage:

When was the crop ready for harvest? How did you know?

Basil died before we could harvest any of it :(if your basil survives, you will know it is ready to harvest when there are a lot of large leaves on the plant and it is bushy.

We harvested cilantro when it was green and about 6-8 inches tall. A lot of our cilantro bolted before we harvested it, causing it to have hard woody stems and a different flavor.

We harvested parsley when it was also 6-8 inches tall.

How was it harvested?

You want to harvest basil, parsley, and cilantro with scissors or hand clippers. Cut the plants about 1-2 inches above the ground. We mowed down a row of cilantro and parsley for the CSA and placed the cut herbs directly into lock tops. When we harvested it, we were not expecting to get a second cutting out of either of the herbs.

How was it washed at the wash station? We did not wash the herbs this year as we cut them perfectly above the roots and they did not get dirty.

List different post-harvest practices for each market (if any) The herbs only went to the CSA and the Farmer's Market. We bunched herbs for the Farmer's Market and left the CSA herbs loose for people to put in bags.

List different shipping practices for each market (if any) lock tops for CSA and Farmer's Market

What different or improved harvest and shipping recommendations can you make?

I do not recommend just pulling the entire plant out as a harvest method. Carries a lot of dirt and does not look good.

Storage and post-harvest handling

Curing: n/a

Washing before storage: no

Storage Requirements: do not store. You can put them in lock tops in the cooler for a few days if need be

How should this crop be processed for long term storage: do not long term store, but store between 32-42 degrees and an RH >95% to keep quality for short term storage

Where your crop was stored this fall? n/a

How well did this crop fair in storage and how did it enter storage? We did not try to store any herbs. If need be, they can probably last no more than 3 to 4 days.

Were there any problems in storage?

No but wilting is imminent.

What different or improved storage recommendations can you make?

If you have to store herbs I would recommend in the cooler, in locktops. Trying plastic bags with ventilation holes might be worth it if you need to store herbs for a few days. I also wonder if they would store longer if we stored them like flowers, in buckets with water? It also might be worth it to see how other farms (ex. Queens Greens) in the area store their herbs.

Farmer Notes: *I am still unsure if annual herbs are worth growing. It would be cool to do perennial herbs like thyme, oregano, and mint for wholesale markets only (or just dining).*

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
10/11	5	bags	1 tongful each	3 lock tops	Parsley and cilantro

** I am pretty sure that we brought herbs to another CSA pick up week, but it was not recorded in the harvest lists.

Total Gross Income Received From Your Crop: CSA Only**Review and Recommendations:****What was different between what was done and what was planned?**

We had big goals for herbs (basil, parsley, and cilantro). We thought we could sell some to dining and would offer it multiple weeks in the CSA share. Unfortunately, we only offered herbs a few weeks in the share. Members expressed interest in having more herbs at pickups.

What worked really well and should be continued?

To harvest, we just cut the herbs a few inches from the ground and put them directly into lock tops. This worked out well and we did not wash the herbs.

What changes would you recommend for next year?

Plan to harvest and weed herbs more regularly because the members love them. They are worth it if you put the effort into growing and tending to them.

Should we grow this crop again? Why or why not?

Hmmmmm...I am seriously unsure if herbs are worth it. Past years talked about how it is not worth it to try and grow herbs and we decided to move forward anyways. I understand their sentiments now, as herbs are delicate and require care and they are often forgot about. However, members LOVE the herbs! I think yes, growing them again is a good idea.

KALE
Brassica oleracea
Final Crop Analysis

Estimated Harvest goals:

Market	Crop/Variety	Weeks Needed	Lbs. Requested each week	Total Pounds Requested per Market
CSA	Darkibor Toscano Amara KX1	10	2, 2.5, 2, 2.5, 2, 2.5, 2, 2.5, 2, 2.5	3937.5
Farmer's Market	Darkibor Toscano Amara KX1	10	30	300
Big Y	Darkibor Toscano Amara KX1	A, NH, SH: 10 weeks Greenfield: 9/13 30lb 9/27 30lb 10/11 20lb 10/25 10lb 11/8 10lb	Amherst 30 NoHo 25 SH 20	A 300 NoHo 250 SH 200 G: 100
Dining Commons	Darkibor Toscano Amara KX1	10	50	500
Student Business	Darkibor Toscano Amara KX1	Earthfoods 10 Catering 10	10	900

Harvest Total: 6,487.5 lbs

Cultivars/varieties and seeds:

Seed Source	Suggested Variety	Cost	Pelleted or coated seed? Y/N	Organic? Y/N	Notes
Turtletree	Ruffles	1,000 seeds, \$6.35	N	Y	
Johnny's	Toscano	\$12.10/oz	N	Y	
Johnny's	KX1	\$7.50/oz	N	Y	

Reasons for selecting these cultivars:

Mix of KX1 and Toscano will add a colorful and unique addition to our CSA. Lacinato- Toscano known as dinosaur kale, is tolerant of hot and cold weather and is recommended for baby leaf. This was requested by Earth Foods and is very easy to sell to the Dining Commons. Ruffles can be sold bunched to Big Y wholesale. It is dark green, curly, and attractive for the CSA. Despite my original plan, the final selected varieties for Kale were Ruffles, Toscano, and KX1. We chose three varieties instead of four. Ruffles, our curly and abundant kale, was chosen because it could sell to all of our markets. We chose KX1 and Toscano in order to explore varieties that do not take as long to grow as well as types which could be brought in order to diversify the CSA.

Did the variety description meet your expectations? Why or why not?

Yes we have an abundance of Kale. It is going to every market! It is going to sustain us for many weeks to come.

Would you recommend these varieties again?

Yes, I would recommend ruffles. The crew can decide what other kinds of unique kale to grow. I do not recommend growing KX1. It was an experiment for us and we never ended up harvesting much for the CSA. No KX1 was sent to other markets. I think growing a Dinosaur kale variety is important like Toscano.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Redbor – similar to ruffles and Winterbor. Solid yield in late season. It is purple!

Red Russian – This would add some diversity to Farmers Market and may be received well by customers who want to cook and make salads. 2020 should look into DC cooks and if they would prefer this variety.

How and when the crop was seeded/transplanted:**Greenhouse seeding**

Variety	Seed date	Tray size	Number of trays	Notes on germination
Ruffles	5/30	128	22	
Toscano	5/30	128	6	
KX1	5/30	128	3	
Ruffles	6/21	128	22	
Toscano	7/3	128	6	
KX1	7/3	128	3	

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
Ruffles #1	7/1	1925	2	Tractor furrow and hand plant	
Toscano #1	7/1	550	2	Tractor furrow and hand plant	Early insect damage but recovered after spray
KX1 #1	7/1	275	2	Tractor furrow and hand plant	Early insect damage but recovered after spray
Ruffles #2	7/15	1925	2	Tractor furrow and hand plant	
Toscano #2	7/15	550	2	Tractor furrow and hand plant	
KX1 #2	7/15	275	2	Tractor furrow and hand plant	

Farmer Notes: Kale is thriving and bountiful. We have an enormous amount! I think it will serve us well late into the season.

Planting Information:

Expected yield/ft: 1 pound per foot of row

Direct seed or transplant: TP

In-Row Spacing: 12"

Between Row Spacing: 2.5 ft

Number of Rows per Bed: 2

Bed Feet planted: 2750ft

Row Feet Planted: 5500 ft

Number of succession plantings: 2 July 7th and July 17th!

Broadcast Fertility: 6/17/19 Composted Chicken Manure 5-4-3 1000 lbs/acre

Potassium Sulfate 500 lbs/Acre.

Additional Fertility: 9/5/2019 Blood Meal 100 lbs/acre

Cultural practices:

Kale was planted in a simple method. A tractor with a furrow attachment was driven through ALC-7 to create a furrow. Farmers followed in teams of droppers and planters. These method was used frequently over the summer and works well. We did not cover the Kale but brassicas in ALC 7 were sprayed on 7/26 with PyGanic (9oz per $\frac{1}{2}$ acre) to combat flea beetles. Later again, they were spread with the organic fertilizers Dipel DF(rate of 1/2lb per $\frac{1}{2}$ acre) and Entrust (30oz/ $\frac{1}{2}$ acre) on July 30th. We decided to skip black plastic and drip irrigation in these beds and instead focus more on rotational weed management. We used scuffle hoes in and around these rows of kale. Harvest included bunching and loose kale and is quite easy.

Notes on Irrigation:

We used drip tape in the ALC and used it in frequently come late August. There was no black plastic at the ALC. In the first week after planting, the ALC was extremely dry. We had to water by hand with watering cans and also used the water wheel transplanter to splash the kale and other crops in ALC 7. Later on in the season, the ALC was not dry and Kale rebounded from the initial lack of water.

Diseases observed:

Beetle damage prior to spraying. Lots of munching going on when the transplants were young. I was worried that the kale was not going to develop fully because of this however, the ruffles variety appears robust and successful.

Potential Disease Threats: What should farmers of the future expect to see?

Alternaria Leaf Spot. Small black spots which can turn to brown. These lesions will be of different shapes and crack in the center. Leaves will fall off and it can spread to the stem.

Downy Mildew. DM appears as small yellow spots on the upper surface of leaves. Spots spread and can become brown. The Fungus *Pseudoperonospora cubensis* survives in a wetter environment.

Black Rot. Symptoms include V shaped lesions on the edge of leaves, black leaf stems, and brown spots. It thrives in warm and humid climates. Pests and water will spread this disease so it is important to keep our plants clean and sanitary. Controlling weeds will also prevent bacteria build up.

Insect Pests observed:

Flea Beetle: Random loose holes in the leaves of the plants. Slower growth and loss of plants if the leaves are not able to recover. Spray PyGanic.

Diamondback Moths: We had loads of these.

These pests are discovered by their wing tips which point up and are decorated with some small diamond like shapes. Moths overwinter in warm climates. They fly in and lay eggs on plant. They have the ability to migrate far distances. Adults work at dusk and through the night. New adults come up on plants in the morning and will mate on their first day. Females lay eggs for 10 days and can produce as many as 250. The eggs are flat ovals, laid in clusters in the cavities of leaves. They hatch 4 to 8 days later. The larva are distinguishable by pron legs at their tail ending in a V shape. They munch on the underside of the leaf. Trap crops such as white mustard and rape can be implemented to attract the moths. Overtime, these moths acquired a strong pesticide

resistance. Rain and water can kill young larva. We should use cover crops and build a trap with female pheromones.

Imported cabbageworm: see Ellis' IPM chapter.

Potential Insects:

Aphids

Aphids have plumb bodies and thin legs. Their backs contain chronicles which are small backward tubes that face up. These pests suck plant juice sugar with a sharp piercing mouth. It is absorbed into the blood and a substance known as honeydew is released. This causes curling of leaves and sooty mold. Winded females lay eggs in the woods for several cycles by asexual reproduction. They finally move on to plants and lay wingless females. After males visit the plants, eggs will overwinter and hatch in the spring. We can use lady bugs and wasp parasites to help control aphids.

Flea Beetles

Small, 1/16 to 1/8 inch. Black, brown, bronze, gray, some have stripes. Their back legs are black and powerful, allowing them to jump far if scared. Their life cycle is similar to that of aphids. They feed on the roots of new seedlings. Transplants have a much higher tolerance to flea beetles. The beetles dig shallow pits and holes in the leaves which disrupts the photosynthesis process. We need to proactively monitor in the spring. The threshold count for a plant is 5. *Microctonus vittatae* is a wasp which kills the beetles.

Do you think the production practices needed for this crop was worth the yield that we received?

Yes, Kale continues to produce very well. It will need to be sprayed well cultivated but should thrive well at the ALC or SD.

Harvest & Storage:

When was the crop ready for harvest? How did you know?

Kale was ready once the leaves sized up to about 6 inches and larger. It is dark green and crunchy to taste raw. Kale was ready for harvest during the entire CSA season.

How was it harvested? Kale can take ages to harvest or be super quick. It depends on how many people join in on the fun and how efficient they want to be. Quick harvests of kale included loose leaves being sent to Earthfoods and Hampshire Dining Commons as well as the CSA. It was ripped right off in a down then up movement with both hands, then placed into a bushel box or lock top depending on market. When bunching kale for Big Y, it is important to make similar sized bunches. Even if they are all a little over or under one pound, they should just resemble each other. Bunching kale took longer later in the season as we stripped both successions of the best quality and had to search a little more. They proved to be some aphids and eggs on the underneath side of the leaves.

How was it washed at the wash station? Dunked in the three bay sink. As the season progressed and during some wet harvest, we did not wash any kale!

List different post-harvest practices for each market (if any) Loose leaf was not washed, it was put straight into bushel boxes for dining/student business. Loose leaf for CSA was put directly into lock top boxes. We created one pound bunches for Big Y then either put directly into lock tops or brought back to wash station at barn (in harvest bins) to quickly dunk in three bay sink.

List different shipping practices for each market (if any) Wax bushel boxes for Earthfoods and Hampshire Dining Commons. Lock tops for CSA and Big Y.

What different or improved harvest and shipping recommendations can you make?
If the kale is wet and seems clean, skip the wash and save time. Harvest directly into a shipping bin that applies to the market.

Storage and post-harvest handling:

Curing: None

Washing before storage: None

Storage Requirements: 32 to 40 degrees at 95% relative humidity.

How should this crop be processed for long term storage: Do not wash if storing longer, however, kale was never stored for more than a week. Wash and store if it needs to be removed from the field to excessive heat.

Where your crop was stored this fall 2019? Cooler in barn at ALC.

How well did this crop fair in storage and how did it enter storage? Loose and bunched, will store for a week or so. Harvest as needed.

Were there any problems in storage? Eventually the kale got a little rubbery towards the end of the season in the field.

What different or improved storage recommendations can you make? Harvest kale as needed. Take lots of bodies as sometimes bunching can take a while and it's nice to work in a group. Be really mindful about how many yellow organic bunching bands are left in people's pockets, on wrists, in hair, and on the ground!

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/13	1	Pounds	1	160.5	.5 lbs to ½ share
9/20	2	Leafs	10	1160	10 to ½ share
9/27	3	Pounds	1	169	1 lbs to ½ share
10/11	5	Leafs	10	1160	10 to ½ share
10/18	6	Leafs	10	1160	10 to ½ share
10/25	7	Bins	Lots	6 bins	Take as you want!
11/1	8	pounds	2	264	1 lbs to ½ share
11/8	9	Pounds	1	197	1 lbs to ½ share
11/15	10	Leafs	Lots	No records	Take all you can!

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Big Y A	\$1.75/lb	303	\$530.25
Big Y NH	\$1.75/lb	311	\$544.25
Big Y SH	\$1.75/lb	321	\$561.25
Big Y GF	\$1.75/lb	197	\$344.75
Hamp DC	\$1.75/lb	662	\$1,158.5

Total Gross Income Received From Your Crop: \$3,139

Review and Recommendations:

What was different between what was done and what was planned?

We followed the plan closely.

What worked really well and should be continued?

Kale was sold as a standing order to Hampshire DC and this proven effective. We had ample kale to offer to CSA and plenty left. We consistently offered 15-25 bunches to the Big Y most weeks.

What changes would you recommend for next year?

Consider spending more time sending emails and planning for wholesale markets in the fall. We stopped selling to Greenfield because of forgotten emails and a lack of time. Big Y sales can prove profitable in the fall if the crew takes the time to regularly send emails and plan harvests.

Should we grow this crop again? Why or why not?

Yes, definitely grow kale again. It is productive for most of the season and should last all fall for the CSA. Big Y and the DCs will both purchase kale throughout the fall.

LEEKS

Allium ampeloprasum

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	1312	
Farmers Market	30	
DC	100 lbs	
Earthfoods	75	
Big Y	400	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
King Richard	Johnny's	4750 seed	\$6.81	O
Lexton	Johnny's	1000 seeds	\$62.98	O

Reasons for selecting these cultivars: King Richard inexpensive OP leek with fastest days to maturity. Lexton much more beautiful and long lasting leek, ideal for late season harvesting.

Did the variety description meet your expectations? Why or why not?

Yes. They grew well, good stand, and were fat leeks. Lexton grows the biggest and most beautiful but kind richard is also good, considering it is the least expensive.

Would you recommend these varieties again?

Yes

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

I would suggest megaton to try for 2020 since it was grown before and did well. It is a longer season leek and will do well paired with king richard. I would grow just King Richard and Lexton though since they did so well

Farmer Notes: Leeks did great. There was no real problem with pests. Lexton is a beautiful leek, probably worth the extra seed costs. King Richard is also good since it is cheap and grows well, not quite as beautiful as lexton.

How and when the crop was seeded/transplanted:

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Lexton	3/21	128	16	
King Richard	3/21	128	37	

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
	5/27	2400	2	Tractor furrow and hand plant	

Farmer Notes: Leeks, along with onions are one of the first crops sown in the greenhouse. It is important to give them a good start so you get a good stand in the field.

Planting Information

Expected yield/ft: 0.75 lbs

Direct seed or transplant: TP

In-Row Spacing: 6"

Between Row Spacing: 18"

Number of Rows Per Bed: 2

Bed Feet planted: 1200 ft

Field Planted In: A

Number of succession plantings: 1

Fertility: 4/16/19 Composted Chicken Manure 5-4-3 1000 lbs/acre

Cultural practices:

Hand planted. Hilling with CUB, Hoeing, Hand weeding

Notes on Irrigation: none

Diseases observed: Soft/pink stalk and rot from inside (it happens)

Potential Disease Threats: Botrytis, purple blotch, white rot

Insect Pests observed:**Thrips**

Damage caused: white streaking on leaves

How was it scouted or observed: Random samples throughout field

Action(s) taken: None

Potential Insects: Thrips, Onion maggot

Do you think the production practices needed for this crop was worth the yield that we received? Yes. leeks are an easy crop to grow since they are hardy and can be mechanically cultivated for the most part. The few times we did hand weed them was worth the work.

Farmer Notes: *Leeks came out great and did not require much more than some hillling and weeding. Hilling with the CUB was somewhat difficult given the spacing we chose. They needed to be slightly further apart to deal with the width of the Cub. Once the hillling shoes were set up correctly, hillling went fairly well, but many leeks were run over by the tractor.*

Harvest & Storage:**When was the crop ready for harvest? How did you know?**

The leeks were ready from August until November. You can choose when the leeks are large enough to be harvested

How was it harvested?

Harvested by pulling them out of the ground, then cutting the roots and peeling outer layers and trimming down leaves.

How was it washed at the wash station?

Leeks were put on plastic pallets and sprayed with hose so dirt in root came out. Then, they were dunked in water.

List different post-harvest practices for each market (if any) [example: potatoes washed for wholesale and unwashed for CSA]

Leeks were always washed the same way. Sometimes they were bunched for big y but not for CSA or farmers market

List different shipping practices for each market (if any) [example: wax boxes for DC, blue lock lids for CSA]

Wax boxes for dining. Lock lids or wax boxes for Big Y and farmers market

What different or improved harvest and shipping recommendations can you make?

Make sure you have sharp knives

Storage and post-harvest handling:

Washing before storage: Yes. Sprayed and dunked in water

Storage Requirements: Put inside cooler will last long time

How should this crop be processed for long term storage: Cut, trimmed and washed and put in cooler

Where your crop was stored this fall?

Cooler in barn

How well did this crop fair in storage and how did it enter storage?

Lasts around a month in lock lids. Did fine we sold all of them before we lost any

Were there any problems in storage?

They can get a little softer

What different or improved storage recommendations can you make?

Farmer Notes: Keeping leeks out of the sun when they are first harvested helps them last longer in storage. It is also important to empty the water when you switch to washing a non allium crop after washing leeks since they can make other crops smell like alliums. At the end of the season with big orders of leeks, it is fine to get them out of the field and let them sit in the barn for a little while and work at cleaning them over a couple of sessions.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/20	2	individual	2 half 4 full	355	
10/4	4	individual	3	315	
10/11	5	individual	3 full, 2 half	325	
10/18	6	Individual	3 full, 2 half	325	
11/1	8	Individual	3 full, 2 half	325	

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Big Y	\$1.75	1239	\$2166.63
CSA		5 week	\$477

Total Gross Income Received From Your Crop: \$2500

Review and Recommendations

What was different between what was done and what was planned?

There was less planned for than what was needed and what was sold. Stores ordered more than what we planned to give them. The CSA was fairly accurately planned for but we could have still planted more

What worked really well and should be continued?

We should continue making leeks a staple crop, it sold very well in all the markets and was fairly heavily relied upon

What changes would you recommend for next year?

I would recommend planting the same amount of leeks and possibly. I would consider planting some more if the crew is able to pick and sell them.

Should we grow this crop again? Why or why not?

Always grow leeks. It made a lot of money and gave us a long harvest season with only 1 succession planted. They are easy to grow and dependable. People around here love them.

Farmer Notes: *I think that there is room for improvement in the way we cultivate the leeks. If we had the right spacing for the Cub tractor, and the hillling shoes well adjusted, it would be easy to mechanically cultivate the leeks, making them one of the easiest crops on the farm to grow. Hill the leeks three times over the season and they will reward you.*

LETTUCE
Lactuca sativa
Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	2100	
Dinning	100	
Student Business	45*EF 60*GO 60*SN	
Big Y A	100	
Big Y N	50	
Big Y G	20	
Farm Market	20	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Muir	Johnny's	1000	\$19.40	Org
Red cross	Johnny's	1000	\$10.24	Org
Coastal Star	Johnny's	1000	10.91	Org

Reasons for selecting these cultivars:

Picked these varieties to satisfy the needs of a red, green and romaine. Coastal start is nice large romaine with heat tolerance. Some say that butterhead cultivars don't transport well and are a pain to harvest and wash, but they do taste good, so they are not all butter heads!

Did the variety description meet your expectations?

Yes

Would you recommend these varieties again?

Yes! Romaine was a huge success, if you can sell more in the summer, same with iceberg. Butter heads are nice and leafy green are good too. I really would like to see Muir gown again it was so gorgeous and happy up in 9 it was just planted too late so we didn't get to harvest all the successions.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

We grew iceberg for summer production and I loved it! Its nice to harvest and great for eating. We grew the crispino variety and it did well. Sadly we didn't have extra seeds for fall planning so we stuck with just the three listed above. I bet people would buy a fall iceberg (Crispino was excellent) if it grows okay when the temperatures get colder.

Farmer Notes: After having lettuce this year I have a theory which you might try and implement. More small successions in summer then as summer ends plant fewer large successions. In the summer sometimes we couldn't harvest all the lettuce heads before they bolted. Harvest half a row and the next few days the rest could bolt. There is where successions would help reduce the chance of losing yield due to bolting. The difference of a week planting in the summer can mean bolting and not. Then as the days get shorter and colder plant large rows of lettuce. Then when the heads are full, the darker cooler days will help keep the heads from bolting and with a little remay you can keep your heads from freezing and have lettuce far into the fall!

How and when the crop was seeded/transplanted:

Greenhouse seeding:

Variety	Seed date	Tray size	Number of trays	Notes on germination
Coastal Star	7/22	128	3	
Red Cross	7/22	128	3	
Muir	7/22	128	3	
Coastal Star	7/29	128	3	
Red Cross	7/29	128	3	
Muir	7/29	128	3	
Coastal Star	8/5	128	3	
Red Cross	8/5	128	3	
Muir	8/5	128	3	

Field Planting Info:

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
Coastal Star	8/12	100	3~4	Hand planted in Tractor Furrow for all	
Red Cross	8/12	100	3~4		
Muir	8/12	100	3~4		
Coastal Star	8/19	100	3~4		
Red Cross	8/19	100	3~4		
Muir	8/19	100	3~4		
Coastal Star	8/26	100	3~4		
Red Cross	8/26	100	3~4		
Muir	8/26	100	3~4		

Farmer Notes: (PLANT EARLIER) We fudged the in bed spacing and did three or four staggered bed plantings. This may affect the speed at which these heads grew but also may have just been the cold weather. We also needed remay for the cold weather would have killed our crops.

Planting Information:

Expected yield/ft: 2.5lbs

Direct seed or transplant: TP

In-Row Spacing: 10"

Between Row Spacing: 10"

Number of Rows Per Bed: 4

Bed Feet planted: 900ft

Field Planted In: 9

Number of succession plantings: 3

Broadcast Fertility: 6/17/19 Composted Chicken Manure 5-4-3 1000 lbs/acre

OMRI Potassium Sulfate 500 lbs/Acre

Additional Fertility: none

Cultural practices:

For lettuce we ended up with enough starts that we decided to plant 4 rows per bed instead of 3. This meant we had to furrow the beds by hand with a shovel. For weeding hoes and hands can be used but with the busy fall lettuce weeding was not a top priority. The lettuce did need remay to protect it from the cold weather and this must if late season heads are desired.

Notes on Irrigation: None. Happy without!

Diseases observed: No significant diseases observed.

Potential Disease Threats:

Downy Mildew and lettuce mosaic virus are two common diseases that can occur but thankfully these were avoided. Look out for white looking mold fibers for downy mildew, where mosaic will make the leaves yellow unevenly.

Insect Pests observed: None

Potential Insects: What should farmers of the future expect to see? Report more than one pest if applicable. Aphids, leaf miners and cutworms are all pests that can damage lettuce heads. Encouraging natural predators and crop rotation seem to have kept these pests at bay. A good thing to learn to identify leaf miner. It can start in the greenhouse and can simply be picked out. It will appear as little squiggly tan lines on the leaves, just remove the infected leaf and hope for the best.

Do you think the production practices needed for this crop was worth the yield that we received?

We planted lettuce in 4 rows per bed which is almost too close. If spaced evenly it can work, however if when creating the furrows by hand and you aren't exact, the spacing can be too tight. Either making sure the spacing is dead on or just plant 3 rows.

Harvest & Storage:

When was the crop ready for harvest? How did you know?

Lettuce is a little tricky to learn when it's ready. A good trick is to gently squeeze the head and if it is firm that a good indicator of maturity.

How was it harvested?

Give us the details, tools used, people needed to get it done, problems in the field] My recommendation is to get your harvest number, walk down the bed cutting and then once you hit your number pack out. Lettuce harvest should always begin with a sharp large knife. Time spent sawing through a soft lettuce head with a tiny pocket knife is time wasted. Jason will show you the best method, but if you gently part the leaves between the far outside leaves and then slice you will free the head and leave the dirty leaves attached to the ground.

How was it washed at the wash station?

A good little dip and dunk makes the lettuce all ready for distribution and eating.

List different post-harvest practices for each market (if any)

All lettuce was treated the same

List different shipping practices for each market (if any)

Usually we packed lock lids with lettuce. Occasionally on a small delivery a wax bushel snuck in.

What different or improved harvest and shipping recommendations can you make?

Learn to tuck and roll, yes kind of like gymnastics but with lettuce. Especially the romaine, the heads fit but only with a nifty squire and roll and pack. Count and remember your pack numbers and learn which way gets you the most heads but also don't over pack. Lettuce is a VERY fragile crop.

Storage and post-harvest handling:

Curing: N/A

Washing before storage: triple bay sink or dunk tank

Storage Requirements: 34 degrees and 95% RH

How should this crop be processed for long term storage:

Where your crop was stored this fall? Cooler in barn

Actual Yields and Sales:CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
10/18	5	Heads	2	174	
10/25	6	Heads	2	169	
11/1	7	Heads	2	174	
11/8	8	Heads	2	174	

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Wholesale	\$12/case	24	\$288
DC	\$2/lbs	25	\$50
Sylvan snack bar	\$2/lbs	10	\$20

Total Gross Income Received From Your Crop: \$368 :(planted too late

Review and Recommendations:

What was different between what was done and what was planned?

Two things greatly affected our season for lettuce. The first was heat. During our summer production we lost 2 maybe 3 whole rows of head lettuce due to a hot weekend. It was a perfect storm, Amanda and Jason were both on vacation and a select few were forced to make a hard call. That bolting of so much head lettuce cut our summer production short. Then the second major mistake was my planning of planting our fall lettuce was far too late. We did not get CSA head lettuce in the fall till over the second CSA in October. We didn't have much to offer DC or Big Y and what could have been a profitable fell a little short.

What worked really well and should be continued?

Summer romaine and iceberg were very successful. Green, red and romaine in the fall were happy but they should have been started earlier.

What changes would you recommend for next year?

I think succession are great, If I could recommend it would be more successions. If we didn't have a 500 foot bed divided into just two successions but maybe 4, heat mishaps may affect one planting but rarely will you lose a whole bed. Amanda and Jason plan summer production but maybe talk about trying multiple successions in one bed so the crew can get a feel for what it is like to work and weed such a diverse bed. Look at my seed dates and they might need to be started earlier if you don't want to have such a gap between summer production and fall.

Should we grow this crop again? Why or why not?

YES! This crop is amazing, delicious and makes buck if you don't let it all bolt!

Farmer Notes: Farming is hard work! Remember on a co-op farm doing less work means more work for someone else. Putting in the work always pays off. If it means staying till 6pm on a Friday so you don't lose two full beds of lettuce you might just want to delay your evening plans. In the moment you might feel indecisive but looking back you are gambling months of work for a few hours. Start seeding end of June, through July NOT end July beginning of August. We had three succession in the fall and only one of the three was really ready to harvest by the time they fully stopped growing.

ONION

Allium Cepa

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	6125 lbs	
Farmers Market	84 lbs	
DC	1000 lbs	Great market, standing order earned us a solid amount of income
Earthfoods	775 lbs	
Greeno	175 lbs	
Sylvan	100 lbs	
Big Y	627 lbs	
Catering	400 lbs	
Sweets	75 lbs	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Red Wing	Johnny's	6000	\$42.40	O
Cortland	Johnny's	6000	\$32.71	O

Reasons for selecting these cultivars:

Red wing for red and cortland for yellow. These onions are common for northeast farmers where the season is not ideal length for onion cultivation. Red wing recommended for northern growers and cortland good for long storage.

Did the variety description meet your expectations? Why or why not?

Yes, both cortland and redwing grew well, nice bulb formation, good onion for north east, fast growing onions. Both have stored nicely.

Would you recommend these varieties again?

Absolutely, they have been grown in the past and continue to do well

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

I would not recommend growing other onions, these two varieties seem perfect for now. Other varieties were tried last year and did not perform well. Why change what grows good?

Farmer Notes: Onions came out great! We were blessed to have minimal thrip pressure. We kept up with weeding very well. We cured them in Hay grove which worked okay. Some onions did not size up, maybe due to lack of fertility or stunting due to lack of water in specific areas early on in the season. I would recommend having a better plan for curing. 2020 crew should make onion racks so curing happens evenly and there is less rot, we lost a lot of onions to rot from them being on the ground and working was difficult with the ground covered in onions.

How and when the crop was seeded/transplanted:

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Cortland	3/4	128	17	First planting of the season, good opportunity for people to learn to seed in trays.
Redwing	3/4	128	17	

Field Planting Info:

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
Cortland	5/1	1800	2	holes with water wheel and hand plant	Some stunted
Redwing	5/1	1800	2	holes with water wheel and hand plant	Some stunted

Farmer Notes: Onions are the first thing to be seeded in the greenhouse in March. It is important that they are done in time since our growing season here is short. Plan with the entire group to work on the onion seeding. It is a good opportunity at the beginning of the year to get everyone learning how to farm right away.

Planting Information:

Expected yield/ft: 3 lbs

Direct seed or transplant: TP

In-Row Spacing: 1'

Between Row Spacing: 2'

Number of Rows Per Bed: 2

Bed Feet planted: 1800 ft

Field Planted In: A

Number of succession plantings: 1

Fertility: 4/16/19 Composted Chicken Manure 5-4-3 1000 lbs/acre

Cultural practices:

Planted by hand in black plastic with drip tape (two rows of holes made by waterwheel). Hand weeded holes. Toolbar weeded when young, hoeing bed edges. Straw mulch eventually between rows

Notes on Irrigation: Yes, as needed, was not crucial

Diseases observed: None

Potential Disease Threats: Purple blotch, root and bulb rot, pink root, neck rot, botrytis

Insect Pests observed:

Thrips

Damage caused: minimal silver streaks

How was it scouted or observed: Random samples taken across field.

Action(s) taken: None

Potential Insects: Thrips, maggots

Do you think the production practices needed for this crop was worth the yield that we received?

I think the plastic made it easy to weed but could have caused some onions to be stunted when it was dry, could have been irrigated though. We did spend a lot of energy weeding holes and paths and also putting hay down in paths. It was definitely worth it either way.

Farmer Notes: *Black plastic maybe not necessary for the size of the field we grow. Even with plastic, the onions were still thoroughly weeded by hand. I think for the size field it is, it would be worth trying to grow them without black plastic. I would also investigate mulching the entire field first with straw and planting into that. Since the student farm is a great place to try new things, I recommend trying both and comparing how it goes.*

Harvest & Storage:

When was the crop ready for harvest? How did you know?

Onions were ready late August to early September, we knew because the tops began to die.

How was it harvested?

Onions were harvested by hand and into crates.

List different post-harvest practices for each market (if any)

Stored and sold in 25 pound onion bags

List different shipping practices for each market (if any)

What different or improved harvest and shipping recommendations can you make?

Bags work great

Storage and post-harvest handling:

Curing: Cured on tables/on ground in the haygrove, cured for about a month and then were stored in mesh onion bags in the cooler

Washing before storage: no

Storage Requirements: Stored at room temp or in cooler for extended storage

How should this crop be processed for long term storage: must be cured for storage, if not cured, trimmed tops and roots can be sold fresh using cooler for storage

Where your crop was stored this fall2016? Cooler at SD and shelves in barn

How well did this crop fair in storage and how did it enter storage? They did great bagged in the barn and also in crates. They also did well in the cooler at the barn.

Were there any problems in storage? None

What different or improved storage recommendations can you make?

Make shelves for hay grove curing so there is enough space and they will dry better than on the ground and make it easier for farmers to work

Farmer Notes: Onions did great, we cured them pretty well and had a huge harvest. We made makeshift pallet tables in the haygrove which worked well. It would be a huge upgrade to have some wire mesh, multistory drying racks already made. This would be a good project for the early spring.

Actual Yields and Sales: CSA:

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/13	1	Individual Onions	4	6 bags (416)	
9/20	2	Individual Onions	4 full, 2 half	348	
9/27	3	Individual Onions	3 full, 2 half	245	
10/11	5	Individual Onions	3 full, 2 half	275	
10/18	6	Individual Onions	3 full, 2 half	275	
10/25	7	Individual Onions	3 full, 2 half	6 bags	
11/1	8	Individual Onions	3 full, 2 half	280	

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Big Y	\$1/lb	85 lbs	\$85
CSA		7 weeks	\$250
Farmers Market			
Dining + Student Business	\$1/lb	2575 lbs	\$2575

Total Gross Income Received From Your Crop: \$2910

Review and Recommendations:

What was different between what was done and what was planned?

The plan worked out very well. It was consistent with what we were able to sell.

What worked really well and should be continued?

The standing order with the dining halls was always delivered and generated most of our income for onions

What changes would you recommend for next year?

I would grow the same amount and keep the standing order with the dining halls. I think maybe more could be grown and sold for Big Y since we did not sell so much to them

Should we grow this crop again? Why or why not?

Yes we absolutely should, everyone loves onions. They store super long. They sold very well and the standing order was easy to fulfill.

Farmer Notes: *We grew a lot of onions. We had enough to sell, but a lot of onions got wasted since we did not adequate cure some and they got lost behind in the hoop house. It would be good if possible to preserve the harvest so it can be sold. That being said, I think we grew the perfect amount of onions, any more and we might now have gotten to process them for storage. The standing order with the dining halls was essential in selling the onions, I recommend continuing that and even adding more to the order if possible. I also recommend selling the onions for \$1.25 or \$1.50/lb (\$1/lb seems cheap for local organic onions)*

PARSNIPS

Pastinaca sativa of Apiaceae

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
Big Y	232 lbs	
CSA	700 lbs	
Farmers Market	50 lbs	
Student Business	100 lbs	
Dining	200 lbs	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Lancer	High Mowing	12427 seeds (2oz, 1/8 oz, 1/32 oz)	\$78.05	Organic

Reasons for selecting these cultivars:

The Lancer variety from High Mowing Organic Seeds looked like our best option for price, in terms of the actual cost of the seeds and also because High Mowing is one of the three main companies we buy from, so we should save on shipping. Further, this variety proved really successful in previous years on the farm -Carly

The lancer variety also shows resistance to canker, a fungal pathogen which causes black lesions on the root.

Did the variety description meet your expectations? Why or why not?

No, because a fair amount of our parsnips ended up with lesions and cracks. Although we could have spent more time on them this summer so it's hard to say what was the variety and what was our practices.

Would you recommend these varieties again?

No I would not recommend the lancer variety.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Javelin Pelleted from Johnny's are conventional seed with NOP-compliant pelleting. They are slim, smooth, tapered roots with a shallow crown. Johnny's describes them as a consistent performer; also with a strong field resistance to canker, making it ideal for overwintering. Halblange Weisse Organic seeds from Adaptive Seeds. This variety is german for "half-long white". It is a shorter variety that holds most of its mass at the top and tapers off quickly at the bottom. This shape makes it an easier root to harvest.

How and when the crop was seeded/transplanted:

Direct seeding:

Planting #	Seed date	Seeder Used	Settings Used	Notes on germination
1	6/17	Planet junior	Hole 8	Poor germination rate

Farmer Notes: We seeded the parsnips later than we planned for but the timing worked out well. It is likely that the poor germination rate was from a seeder error.

Planting Information:

Expected yield/ft: 23 bags harvested, need to go weigh some to get the average etc

Direct seed or transplant: Direct seed

In-Row Spacing: seeder set at 8. My guess is 2-5" but I could not find the exact info.

Between Row Spacing: 12-18"

Number of Rows Per Bed: 3

Bed Feet planted: 1000

Field Planted In: C

Number of succession plantings: 1 on 6/3

Broadcast Fertility: 4/23/19 Composted Chicken Manure 5-4-3 1000 lbs/acre

Additional Fertility: no

Cultural practices:

We seeded parsnips with Planet Junior seeder and used a hole 8. Jason hates this seeder. Boo Planet Junior seeder boo. No plastic. No drip tape. We crawled the parsnips 2-3 times. I recommend using a butter knife or gloves as well as washing your hands afterwards to avoid getting parsnip burn. Ideally don't deal with parsnips when it is bright outside as sunlight is what starts the reaction. We used the undercutter bar. We harvested the parsnips on our volunteer day along with the sweet potatoes. We all wore gloves and pulled the parsnips directly out of the ground. We snapped the greens off and stored them in large white bags.

Notes on Irrigation:

No drip tape was used on the parsnips. I don't think a lack of water was an issue for them.

Diseases observed:

I think our parsnips had root knot nematode. Many of them were short and stubby with lots of hairy root ends hanging down. Not a great look unfortunately.

Potential Disease Threats: What should farmers of the future expect to see?

Leaf spot: Leaf spots are round blemishes found on the leaves of many species of plants, mostly caused by parasitic fungi or bacteria.

Root rot: Root rot is a disease that attacks the roots of plants growing in wet soil.

Powdery mildew: As this mildew spreads, leaves begin to yellow and wilt, and eventually, the entire branch dies. Advanced symptoms of an infection also include distorted leaves, premature leaf drop, blemishes on fruit, and buds that won't open.

Bacteria blight: Initial symptoms of bacterial blight may include dark brown necrotic (dead) leaf spots with yellow halos. If leaf spots develop before leaves are fully expanded, leaf curling and twisting may result.

Insect Pests observed:

Wireworm

Damage caused: Holes, bite marks, worms inside parsnips

How was it scouted or observed: not scouted

Action(s) taken: discarded affected parsnips

Potential Insects:

Wireworm: Wireworms can also tunnel into parts of the roots or stems of young plants causing stunted growth and wilted leaves.

Cutworm: They primarily feed on roots and foliage of young plants, and will even cut off the plant from underneath the soil. In most cases, entire plants will be destroyed; they do a lot of damage in no time at all.

Do you think the production practices needed for this crop was worth the yield that we received?

This year's parsnips did not turn out looking great unfortunately. There was a lot of size and shape variation that was a little too extreme. I don't think the farm should stop growing them but I do think a different variety should be tried and more time can be spent thinning and weeding the crop.

Farmer Notes: We did not have a good germination rate on our parsnips. There were large stretches where no plants grew. This could potentially be from weeding them when they were so young that it was easy to slip up and kill the babies. This was also the final crop we used the Planet Jr seeder on which likely impacted the germination rate as well.

Harvest & Storage:

When was the crop ready for harvest? How did you know?

We harvested the parsnips on October 10th.

How was it harvested?

We went through and harvested all of the parsnips in one day. I think we had about 8 people go through. Four people pulling the parsnips and laying them on the ground and four people following behind and sorting through them, topping them, and placing them into white bags for storage.

How was it washed at the wash station?

The root washer

List different post-harvest practices for each market (if any)

We washed all the parsnips because they were initially pretty grimy.

List different shipping practices for each market (if any)

CSA/farmers market: locklids

Dining/student business: bushel box

What different or improved harvest and shipping recommendations can you make?

I think we harvested them at the right time as well as the right weather. It was a cloudy day so the fear of getting parsnip burn went down a bit (the rash is activated by sunlight/heat). No different shipping recommendations.

Storage and post-harvest handling:

Curing: No

Washing before storage: Yes and no

Storage Requirements: 32-40 degrees, 95% RH, a couple weeks to a month duration

How should this crop be processed for long term storage: store unwashed in 32 degrees 95% RH

Where your crop was stored this fall?

In the barn cooler

How well did this crop fair in storage and how did it enter storage?

The parsnips didn't look too hot to begin with so coming out of storage I wouldn't say they were anything fancy. But I think they fared well in storage and held up okay. Some of the parsnips were stored in black totes after being washed and others were stored in white bags unwashed.

Were there any problems in storage?

No

What different or improved storage recommendations can you make?

None

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
10/18	6	each	4 and 4	416	
11/1	8	each	5 and 5	520	
11/8	9	each	3 and 2	275	
11/15	10	-	Take what you want	All	

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Dining	\$2/lb	20 lbs	\$40
Big Y Northampton	\$2/lb	50 lbs	\$100
Big Y South Hadley	\$2/lb	50 lbs	\$100

Total Gross Income Received From Your Crop: \$240

Review and Recommendations:

What was different between what was done and what was planned?

In the plan we intended on planting the parsnips on 5/13 but in reality we planted them on 6/17.

What worked really well and should be continued?

Doing one massive harvest of the parsnips (and sweet potatoes) was amazing. It was nice to know they were all out of the ground and in the barn during harvest days. Having the ability to have the whole crew in one location rather than sending some people to South Deerfield to harvest roots made communication and timing during class harvest blocks better.

What changes would you recommend for next year?

I suggest choosing a different variety of parsnips as ours turned out pretty gnarly in terms of shape (short, stout, and many small hairy roots).

Parsnips were one of the crops that we ended up neglecting so try to pay more attention to weeding them throughout the summer and don't let parsnip burn scare you away.

Should we grow this crop again? Why or why not?

Yes (although my own personal opinions make me want to say no), parsnips are a classic New England vegetable that people anticipate being in the CSA. We made a small profit off of them which could be increased if the 2020 seasons look closer to Big Y and dining quality.

PEPPERS

Capsicum annuum, Solanaceae

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	1,750	
Farmer's Market	30	
Big Y A	80	
Big Y NH	80	
Big Y G	40	
DC	150	
Earthfoods	75	
Greeno	60	
Sylvan	40	
Catering	120	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Olympus	Johnny's	1,000	89	Org
Lunchbox	Johnny's	1,000	18.30	Org
Early Jalapeno	Johnny's	1,000	74.75	Org

Reasons for selecting these cultivars:

Olympus grows large green bell peppers which is a standard item for us and looks good at the market, but does especially well with our wholesale markets. I thought Lunchbox would be a fun variety to grow because the peppers it produces are small, colorful, and quite sweet, we would also be able to make more profit off of these peppers as they are somewhat of a specialty item, I chose the Early Jalapeno for similar reasons, except it is spicy and not too colorful.

Did the variety description meet your expectations? Why or why not?

Olympus and Early Jalapeno did very well this season. There was some blossom end rot on the peppers in both the field and in the haygrove but other than that both varieties were healthy and produced good peppers. The Lunchbox have taken a lot longer to mature in the field, yesterday was the first of October and I saw the first ripe peppers on the plants, I had been hoping (more importantly planning) for them to mature by early September.

Would you recommend these varieties again?

Now that I have tasted a ripe lunchbox, they're delicious, I would recommend seeding and planting that variety a couple weeks earlier than we did this season. I would recommend any big green bell pepper variety, Olympus has done well for us and stayed disease free thus far. We have had some pile-up with the Early Jalapenos and not selling as much as we had planned for, so this may not be a good variety for next year.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

I think that attempting to grow and sell another small sweet variety could prove worth its while. The variety Cornitos sold by Johnny's grows sweet peppers which are slightly larger than the Lunchbox variety. It could also be interesting to grow a different color bell pepper like the yellow bell Eros or Sweet Sunrise varieties also sold by Johnny's

Farmer Notes: *It is important to harvest peppers on a regular basis once they have reached maturity and you are harvesting them. This season we went too long before harvesting peppers and some went past their ripe point and became rotten. This can introduce more rot and bacteria into the bed, so best to air on the side of overharvesting (at least for green peppers) and store them given you have the space and time.*

How and when the crop was seeded/transplanted:

Expected yield/ft: 1lb.

Direct seed or transplant: TP

In-Row Spacing: 8"

Between Row Spacing: 1'

Number of Rows Per Bed: 2

Bed Feet planted: 2,450'

Field Planted In: ALC-7

Number of succession plantings: 2

Broadcast Fertility: 6/17/19 Composted Chicken Manure 5-4-3 1000 lbs/acre OMRI Potassium Sulfate 500 lbs/Acre

Additional Fertility: fish emulsion through sprayer in early September

Cultural practices:

With our peppers in the field we planted them in black plastic and had them on drip tape irrigation lines. The haygrove peppers were also in black plastic and had drip tape but were also held up by a perimeter of string attached to staggered stakes along the bed.

Notes on Irrigation: During the summer the peppers in the haygrove were watered once a day for a minimum of half an hour, the field peppers were watered on particularly hot days in the summer.

Diseases observed:

Blossom end rot was the most pervasive disease that effected this crop.

Potential Disease Threats:

Bacterial Spot and Cucumber Mosaic Virus are also potential threats to pepper crops.

Insect Pests observed:

We did not observe any insects on these crops

Potential Insects:

Peppers tend to have less issues with insects but Green Peach Aphids and Black Cutworms are listed as some of the most prominent insect pests for peppers in the Vegetable Management Guide for 2018-2019.

Do you think the production practices needed for this crop was worth the yield that we received?

The Peppers did very well this year except for the lunchbox variety which matured late due to us planting it too late, so I suppose that would be the cultural practice to change if you were to grow lunchbox peppers again. But as far as the care of peppers, weeding them while they are young (as with all crops) will ensure their healthy growth, peppers will outcompete the weeds once the adult leaves have come out though.

Harvest & Storage:**When was the crop ready for harvest? How did you know?**

Our fall peppers were planted in ALC-7 and were harvested on 9/13. The Olympus peppers were ready before the jalapenos by a couple weeks in that field and the lunchbox were planted too late to get a full harvest out of though some lunchbox peppers did mature in time to get to the farmer's market, but only 1 green bin's worth. The Olympus peppers are a large green variety and are matured when the fruits have gotten to be about 4-6" long and the plant is about 3-4' high. The jalapenos are ready when the tips of the peppers begin to turn purple or brown and lateral tan "scar marks" appear.

How was it harvested?

Peppers were harvested by hand either with hand clippers or a knife, cutting the stem of the pepper, or by twisting the pepper to break the stem. Sometimes we harvested into buckets which I found easier to carry through the field, other times we used the green bins.

How was it washed at the wash station?

Peppers were run through the brush washer.

List different post-harvest practices for each market (if any)

Peppers were washed for every market.

List different shipping practices for each market (if any)

Peppers are sent in wax bushel boxes for student businesses, dining, donations, and sometimes Big Y if there was a small amount. If there was a large enough amount peppers could go to Big Y in lock-top containers.

What different or improved harvest and shipping recommendations can you make?

Because peppers are mostly packed into wax bushel boxes, I think it would save time to pack them into wax boxes in the field while harvesting and give those boxes a double dunk in the tanks at the washroom.

Storage and post-harvest handling:

Curing: N/A

Washing before storage: yes, brush washer

Storage Requirements: 47-55°, 90-95% RH, 14-20 days

How should this crop be processed for long term storage: Peppers are not kept for long term storage.

Where your crop was stored this fall?

The ALC cooler

How well did this crop fair in storage and how did it enter storage?

The peppers did really well in storage this season. We kept them in lock-top bins after washing and some lasted almost a month before needing to go to compost (though not many made it that long before going to market).

Were there any problems in storage?

We did not experience any major problems with storage, but there was some slight softening in peppers, especially those on the bottom of bins, that had been stored for close to 3 weeks. It is important to pour out any excess water that may be in the bins after putting washed peppers into them to avoid slime mold and rot.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/13	1	Lbs.	4 whole 2 half	342	
9/20	2	Lbs.	5 whole 3 half	446	
9/27	3	Lbs.	3 whole 2 half	238	
10/4	4	Lbs..	5 whole 3 half	446	
10/11	5	Lbs.	4 whole 2 half	342	

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Big Y Amherst	\$1.75/lb.	248lbs.	\$433.13
Big Y Northampton	\$1.75/lb.	156lbs.	\$272.13
Big Y South Hadley	\$1.75/lb.	191lbs.	\$333.38
Big Y Greenfield	\$1.75/lb.	127lbs.	\$222.25
Dining Commons	\$1.75/lb.	551lbs.	\$963.38
Earthfoods	\$1.75/lb.	20lbs.	\$35
People's Market	\$1.75/lb.	34lbs.	\$59.50

Total Gross Income Received From Your Crop: \$1985.38

Review and Recommendations:

What was different between what was done and what was planned?

We had planned on having peppers slightly earlier than we did so we missed probably a week's worth of pepper business. We had also planned on having lunchbox peppers to sell but that variety took much longer to mature and did not come in very well, I think if they had matured as planned we would have made a noticeable though not too much larger profit on peppers this year

What worked really well and should be continued?

We grew peppers in field C, AIC-7, and in the haygrove this season, which meant that we had organic and non-organic peppers. This was good for us because peppers are marketable and sell at a decent price.

What changes would you recommend for next year?

First off would be to put the peppers in the ground earlier. There may be more profitable crops that could go into the haygrove next season, but the peppers we grew there sold well, especially in the summer season.

Should we grow this crop again? Why or why not?

Yes. Peppers bring in a good amount of income for their density and our markets want them.

POPCORN
Zea mays everta
Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	700lbs	
FM	30lbs	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Glass Gem	Johnnys	2400 seeds	\$42.09	Org and untreated
Robust	Left over			

Reasons for selecting these cultivars:

Appearance for glass gem, it is also an heirloom variety coming from original Cherokee corn.
 Robust seed was saved from previous year and performed very well. (we thought hybrid seed did not reproduce but it did great!)

Did the variety description meet your expectations? Why or why not?

Yes. Looks great. Robust had much higher yields than glass gem

Would you recommend these varieties again?

Yes for both.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

I would suggest saving the glass gem and robust for replanting next year. I would also recommend experimenting with cross pollination to get some new hybrids

Farmer Notes: I suggest that future farmers plan production so that there is enough seed to save. The glass gem is open pollinated so that could be a good option for saving seed.

How and when the crop was seeded/transplanted:

Field Planting Info:

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1	6/3	1000	2	Hand	Great stand!
2	6/21	1000	2	Hand	

Farmer Notes: Hand planting at high density worked great. Make furrows with a tractor, drop seed by hand and cover with a hoe. We only bought glass gem, but also had left over Robust seed, so we planted that also in two successions. We picked the entire field as one succession so that did not matter. We ended up with 5 beds total. Weeding was a breeze, everything was shaded out.

Planting Information:

Expected yield/ft: 1lb

Direct seed or transplant: DS

In-Row Spacing: 6"

Between Row Spacing: 2.5

Number of Rows Per Bed: 2

Bed Feet planted: 1250

Field Planted In: B

Number of succession plantings: 2

Broadcast Fertility: none

Additional Fertility: Composted Chicken Manure 5-4-3 spread by hand before planting

Cultural practices:

Tractor furrows made, two rows per bed. Hand seeded and covered with hoes. Hand weeded and hoed. Clover ground cover planted when plants reach full height

Notes on Irrigation: None, not needed

Diseases observed: Moisture when picked, turned into mold in storage

Potential Disease Threats: Corn smut, Corn rust, Mold, Stalk rot, Eye spot, Gray Leaf Spot

Insect Pests observed: None

Potential Insects: corn borer, spider mites, leaf hopper, popcorn tends to be very robust and does not attract pests in general.

Do you think the production practices needed for this crop was worth the yield that we received? Suckers on Glass gem may be related to decreased cob size. Clover looks great. Robust came out great. The popcorn is very low maintenance, but at the same time, it does not generate a lot of income since it is given to the CSA. That being said, it is a valuable crop for the CSA. I think it is worth it and a pleasure to grow. I also think it is important for students to learn how to grow corn since it is a staple crop.

Farmer Notes: Glass gem is beautiful but not as productive as robust. It would be worth planting a mix of these two again, with Glass Gem for show and Robust for how big its yield is. It would be worth cross pollinating them further so each year it can improve, gaining visual colors from Glass Gem and size of Robust. For production practices, I think we really nailed it. Weeds were not a problem and we established a really nice cover crop under the corn. To seed the cover crop, we first rototilled between rows, so the soil would be soft and well prepared for the clover seed. Then roll the seeds in with grass roller.

Harvest & Storage:

When was the crop ready for harvest? How did you know?

Crop was ready in October, When silks were dry and even more so when the husks were dry

How was it harvested?

Harvested by hand into mesh bags

List different post-harvest practices for each market (if any)

Could be sold as entire cob or could be sold as bags of just grain

List different shipping practices for each market (if any)

Moved using black crates directly to CSA

What different or improved harvest and shipping recommendations can you make?

Harvest earlier and do not store in bags for more than a day or two, dry immediately on drying racks or hung up.

Storage and post-harvest handling:

Curing: Curing was done on a drying rack made by jason very quickly and out of panic and was not super successful but some of the harvested that was shucked right away was saved. Cobs are dried with husks (ideally) and then shucked when dry and stored in black crates in dry area.

Storage Requirements: Dry space where humidity can pass through container

How should this crop be processed for long term storage: Crop is dried in husks the shucked where it can dry entirely. Indefinite storage when dried correctly. As cobs or bags of gain if you need to save space.

Where your crop was stored this fall? Stored in barn in crates

How well did this crop fair in storage and how did it enter storage? Most was lost when stored waiting to be shucked with husks on. What was stored successfully has done well besides a little mold but hopefully will dry thoroughly for popping

Were there any problems in storage?

We left them in mesh bags for too long, which trapped moisture and caused mold to fester, which lead to the loss of most of the crop.

What different or improved storage recommendations can you make?

Storage is fine, processing needs to happen right away. As soon as it is out of the field, either hang cobs to dry or have a drying rack ready for them, so they can dry completely.

Farmer Notes: The popcorn was beautiful but most of it was lost because it grew mold before we shucked them since they were stored for a few weeks with their husks on in mesh bags, where the mold proliferated. Next time, do it right away and make it a priority, shuck them within a few days and have them drying in the open on a drying rack for a month at least.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
10/18	7	Cobs	4 cobs full, 2 cobs half	342	
10/25	8	Cobs	4 cobs full, 2 cobs half	342	
11/1	9	Cobs	4 cobs full, 2 cobs half	342	

Total Gross Income Received From Your Crop: NA

Review and Recommendations:

What was different between what was done and what was planned?

We gave out approximately what we planned to give out for the CSA

We also planned to sell 30 lbs at the farmers market but did not

What worked really well and should be continued?

Giving them to the CSA worked well and people really respond well to the type of popcorn we grew

What changes would you recommend for next year?

I would recommend selling it at the farmers market and perhaps asking Big Y if they would buy it. This way, we can make money from another crop that stands out in retail markets

Should we grow this crop again? Why or why not?

We should absolutely grow popcorn again, it is so easy to grow and is a beautiful plant. People love it and it stores indefinitely and could even be sold to make money in the spring.

Farmer Notes: Cook them in butter and they are really good. The popcorn was an example of the conflict that can present itself farming within UMass with other work from school being the priority. The popcorn got left sitting on the stalk too long and then was left in the bags too long and we lost a lot of the crop that way. It is a tough situation and makes everyone sad but it is important to remember that we tried our best but sometimes things fall through when there is so much to be done.

POTATO

Solanum tuberosum

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	3850lbs	
Dinning	3500	
Student Business	350lbs*EF 300lbs*GO	
Big Y A	500lbs	
Big Y N	500lbs	
Big Y G	90lbs	
Big Y SH	500lbs	
Catering	750lbs	
Farm Market	79lbs	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Yukon Gold	Chappelle's	200lbs	\$110	Org
Adirondack Blue	Chappelle's	200lbs	\$144	Org
Red chieftain	Chappelle's	200lbs	\$168	Org
Kennebec	Chappelle's	200lbs	\$184	Org

Reasons for selecting these cultivars:

These varieties where chosen to satisfy our market needs. It's safe to grow one gold, one red and a color variety. I think Dinning special requested Adirondack blue and of my favorite, I think Red Chieftain got the best flavor!

Did the variety description meet your expectations? Why or why not?

Yes, the Adirondack blue was stunning is person!

Would you recommend these varieties again?

Yes! The blues were beautiful and not heavily affected by disease or pest. The gold and chieftain were okay and the Kennebec seemed to have trouble not rotting in storage.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

If your feeling up for something maybe fingerling potatoes? Not sure how the harvesting machine would do with them but maybe worth a shot? Also we ended up just giving mixed bags to the dining commons so maybe nice little bags of roasting mixed potatoes would work?

Farmer Notes: Take notes on which plants sprout first, which plants flower first and how notice how different the plants look depending on variety! The Adirondack Blue were so purple it hurt, not just the spud but the plant and even the flower pistol! Notice and enjoy the beauty of life and creation!

How and when the crop was seeded/transplanted:

Direct seeding

Planting #	Seed date	Seeder Used	Settings Used	Notes on germination
Adirondack Blue	5/1	Potato Planter		
Red Chieftain	5/1	Potato Planter		
Yukon Gold	5/1	Potato Planter		
Kennebec	5/1	Potato Planter		

Farmer Notes: I believe we ended up planting an extra row for each variety. Kennebec variety did not store very well, worm damaged got worse. Also the Gold and Kennebenc seemed to lose their skin when we washed them.

Planting Information:

Expected yield/ft: 4 Lbs

Direct seed or transplant: DS

In-Row Spacing: 8-10"

Between Row Spacing: N/A

Number of Rows Per Bed: 1

Bed Feet planted: 3000

Field Planted In: A

Number of succession plantings: 1

Broadcast Fertility: 4/16/19 Composted Chicken Manure 5-4-3 1000 lbs/acre

Additional Fertility: None

Cultural practices:

To plant the Potatoes we used a tractor mounted PTO driven potato seeder. This was a huge time saver and really helped get all our seed into the ground. It was a fun activity and really required full effort to not miss any holes in the rotating carousel. The potatoes also needed to be hilled at least twice over the course of the season. This helps the plants not fall over and gives the potatoes more room to grow also it keeps the potatoes covered so they do not green and sprout. Weeding was a delicate process that ranged from hand weeding, wire weeding and outright just pulling anything that was close to flowering and wasn't a potato!

Notes on Irrigation: About how often what this crop irrigated, how? Anything else you are seeing in the records worth mentioning
Potatoes did fine without artificially irrigation.

Diseases observed: No substantial diseases were observed

Potential Disease Threats:

Common scab, Fusarium Dry Rot, and early blight are all diseases which can occur and cause severe damage. The best method of defence against these problems is healthy soil and healthy seed potatoes. Other than actually digging up the tubers and checking for disease, the quality of the foliage will give some signs of how the tubers are doing. CPB will be obvious when you see it, they eat all the leaves and just leave the large stems.

Insect Pests observed:

Colorado potato beetle

Damage caused: Eaten foliage

How was it scouted or observed: Crop walk through

Action(s) taken: On July first Pyganic and Entrust were sprayed at 18oz per 1.5 acre. On July 4th Pyganic was sprayed additionally also at 18oz per acre.

Leaf hopper

Damage caused: Eaten foliage

How was it scouted or observed: Crop walk through

Action(s) taken: On July 4 Azadaractin was sprayed at 16oz per .1 acre and again Pyganic

Potential Insects:

Other than the CPB and leaf hopper, wireworm caused some damage around harvest time. Although there isn't a lot of ways to manage this pest it is something that should be noted when harvesting potatoes.

Do you think the production practices needed for this crop was worth the yield that we received?

This year our yellow and golden varieties, kennebec and yukon gold seemed to lose a lot of their skin when we put them through the root washer. Kennebec also didn't store particularly well. It seemed that our red had the most insect damage.

Farmer Notes: *Keep an eye out for potato fruits! It's cool to think that potatoes originally were propagated by seeds, they look like little tight tomatoes. I don't know much about seed saving for potatoes, but there must be some cool history and or possibilities there. Potato breeding must be quite the lucrative business especially as plant diversity dwindles I think we had a yield of 2.1 lbs per foot. That's assuming that a white harvest bag had 50lbs of potatoes in it. We recorded that we filled 126 bags (34 kennebec, 31 Red chief, 32 adirondack blue, 29 yukon) 126X50=6300lbs/3000bed feet=(2.1lbs/bed foot)*

Harvest & Storage:

When was the crop ready for harvest? How did you know?

Potatoes were ready at the end of the summer, other than digging up a potato and seeing if the skin has hardened watching the leaves wilt and yellow is a great sign to start paying attention.

How was it harvested?

First Jason used the rototiller raised up to mow all the above ground matter. Once the foliage was removed we used the potato digger to uncover the spuds. The more the merrier when it comes to harvesting 14 beds of potatoes. We filled two green bins 75% (up to the draft mark) then poured two, three quarter greens into one bag, trying to hit around 50LBs bags.

How was it washed at the wash station?

Potatoes lasted longer unwashed. Not all varieties fared the same. Keeping them dirty in white bags until we needed them, putting them through the root washer and sending out was our practice.

List different post-harvest practices for each market (if any)

We washed them all for all markets.

List different shipping practices for each market (if any)

Usually black totes were the best way to transport the potatoes, coming right from the root washer, they did better in open air than a lock top.

What different or improved harvest and shipping recommendations can you make?

We had the system down well this year. If I can recommend anything it would be label or color the bags or something. Differentiate between varieties, it saves time so you don't have to open every bag.

Storage and post-harvest handling:

Curing: Happens in ground

Washing before storage: NO

Storage Requirements: cool dark space.

How should this crop be processed for long term storage: Any rot needs to be removed before storage.

Where your crop was stored this fall? Deerfield cooler

How well did this crop fair in storage and how did it enter storage?

Overall storage went well. One thing that became apparent was that the Kennebec variety was a lot more prone to rot and thus we had to move out the fastest before they got to bad in storage.

Were there any problems in storage?

Light damage from wire worm and other things would cause nasty rot.

What different or improved storage recommendations can you make?

Nothing much, other than coloring bags so we could tell the difference between varieties.

Farmer Notes: Help develop a system for cleaning and reusing the white harvest bags. We saved a lot of them not sure we if plan on using all them but something to consider. Is there chance of disease if we don't clean them? If so how do we mitigate the risk. Also try and record how many lbs come from each individual bed, so an accurate yield per foot can be established. Compare yield bed vs bed, we only have yield for the entire year for 2019.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/13	1	lbs	4	416	
9/20	2	lbs	4	384	
9/27	3	lbs	4	453	
10/11	5	lbs	5	8 Bags	
10/18	6	lbs	5	8 Bags	
10/25	7	lbs	5	6 Bags	
11/1	8	lbs	4	386	
11/8	9	lbs	5	446	

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
DC	\$1/lbs	2530	\$2530
Earthfoods	\$1/lbs	88	\$88

Total Gross Income Received From Your Crop: \$2,618

Review and Recommendations:

What was different between what was done and what was planned?

I think that the biggest difference between what we did and planned was number of rows. We originally planned 10 rows and ended up planting 14 one more of each variety. Other than planting Red Chieftain rather than Red Pontiac all went according to plan. This crop is straightforward and should be to continue as a part of this farm.

What worked really well and should be continued?

It was instrumental to have a standing order with Dining. They are flexible on variety and quality. This needs to happen in order to move the volume we did this year.

Harvesting with the potato digger and then dumping into white bags was very successful. Not overfilling green bins and dumping two into a white bag helped keep their weight roughly at 50lbs.

What changes would you recommend for next year?

One change I might suggest is finding a way to get an agreement with Big Y to buy our potatoes. This would be the next step in increasing our sales for potatoes. Also might find way to get a trailer or truck in the field so we don't have to carry out hundreds of bags and show a way to demarcate between varieties once in bags.

Should we grow this crop again? Why or why not?

Yes! Its successful fun delicious and most importantly can make money.

Farmer Notes: Put in the work, stay late, laugh hard and grow some veggies that help fill our community's bellies. DC came in clutch and made us a boatload of money! Think about expanding to Big Y or ramping up our DC standing order?

PUMPKINS
Cucurbita Pepo
Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
Farmers market	160lbs	75lbs at one market, and 85 lbs at the halloween market
Csa	416 lbs at two pick-ups / total 832 pumpkins	4 lbs per csa member at two markets = 832 lbs
Big y	175lbs total	Big y a -135 big y- 40
Sb	70lbs total	E foods- 45lbs slyvan -25
Dining	N/a	None were designated to dining

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Long Island Cheese	Johnny's	368	5.11	Org
New England Pie	Johnny's	250	6.40	Org
Jill Be Little	Johnny's	500	12.80	Org

Reasons for selecting these cultivars:

I selected these varieties for a few reasons. One of them being I liked the variety of sizes and the purpose of the actual crop. The New England Pie would be the perfect pie pumpkin that could be used for cooking, whereas the other two are more gourd like or meant for decoration.

Did the variety description meet your expectations? Why or why not?

For the most part yes, they have seemed to size up well and at a bit earlier than the 52-day mark. They have yet to be harvested as of 10/1 and are getting ready to rot on the vine, so I am really truly hoping that they do not die. I am so far content with how they've come to be, the Jill Be Littles are not exactly that little. But you know what they say about pancakes, the first never turns out exactly the way you want it.

Would you recommend these varieties again?

I would, because I think they are pretty consistent but still fun and spicy. I would actually recommend maybe doing a fourth one if there is a good deal or a special variety that would excite the CSA members! This all may change though after the Pumpkins get sent out to their markets and then I will have more concrete feedback.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Blaze F1 Seed Johnny's

Moonshine / Polar Bear F1 Johnny's

- a. Both choices are atheistic reasons and look visually appealing, they also have good reviews

Farmer Notes: Pumpkins are important don't let anyone tell you otherwise.

How and when the crop was seeded/transplanted:

Direct seeding:

Planting #	Seed date	Seeder Used	Settings Used	Notes on germination
1	6/12	Hands	N/A	Kind of spotty, had to go back in and plant more seeds

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1	6/12	250 ft	1	DS by hand	Hungry critters eating pumpkin seeds!

Farmer Notes: Creatures living around the area look a good snack, that good snack might just be your pumpkin seeds, keep an eye on the germination because you might need to go back in and replace the eaten seeds. The maturity period with good weather can decrease so consider delaying the planting date, especially because the time they get harvested is very busy and may cause them to sit for longer. Plant more, remember the margin of loss, I wish I had planted more pumpkins and in turn got more children.

Planting Information:

Expected yield/ft: 3 lbs.

Direct seed or transplant: direct seed

In-Row Spacing: 12 inches

Between Row Spacing: 6'

Number of Rows Per Bed: 1

Bed Feet planted: 750 ft total

Field Planted In: B

Number of succession plantings: Should have been one seeding, came in after to refill seeds that got eaten by some creatures

Cultural practices:

No particular practices used, no hilling or plastic used. Directing seeded by hand, seeds were larger making it easier to estimate spacing and depth. Added security doing it by hand, aware of how many were going in as well confirming they were getting properly buried

Notes on Irrigation: Pumpkins had no irrigation was set up in B, pumpkins were fine. May be something to consider for the following year because Pumpkins are 80% to 90% water and most of our other cucurbit plants did have drip tape.

Diseases observed:

Bacteria growth post-harvest in storage, resembles a sort of wet gum consistency. Different types of rot, as I mentioned in my CPA 2 due to expedited growth the pumpkins reach maturity faster than we had expected which cost us losing a percentage of good pumpkins to rot. Although never diagnosed it's possible that it was bacterial fruit spot which is super common among fall squashes, can be fixed with an early copper spray!

Potential Disease Threats: What should farmers of the future expect to see?

One potential disease threat is mildew or powdery mildew, it is super common among cucurbits and comes in waves throughout the season. Blight and rot are also diseases that prey on cucurbits, remember to they always inform you when these are expected to set foot in western Massachusetts

Insect Pests observed: No pest observed, but animal damage reported.

Vertebrate Pests. Although the animal was not actually seen its most common for deer, mice, rabbits, moles, squirrels, and or groundhogs were the culprits.

Damage caused: Seeds eaten or chewed threw.

How was it scouted or observed: Checked in after direct hand seeding the pumpkin seeds were chewed into or just simply gone, causing a setback in the germination.

Action(s) taken: Replanted by hand and paid closer attention.

Potential Insects:

There are many insects that the future farmers can expect to see. One being the Squash Vine Borer, these bugs are day-flying moths with orange markings. Pumpkins are more susceptible to them because of their thicker stems. Treating them timely is important, this can be done by treating the base of stems to target hatching larvae. Another insect to watch out for are Aphids, Green Peach and Melon specifically. They vary in attraction to pumpkins, so spot treatment can be more viable however be weary of how the treatments can affect the bees. Another potential insect to be aware of is cucumber beetle, striped and spotted. The beetles can cause feeding damage as well as cause bacterial wilt from beetle feeding. Pumpkins have a higher threshold because of their early growth and lower susceptibility to wilt but still be weary of them. Consider perimeter trap cropping or spraying the perimeter.

Do you think the production practices needed for this crop was worth the yield that we received?

Yes, I think we should have planted more because they didn't end up being that high maintenance quite honestly and our harvest only took a team of about three people and less than an hour. We crawled / hoed maybe maximum three to four times, when we did do this we did focus on hand pulling the small weeds close to the root of the plant, being cognizant of that I really believe allowed the pumpkin plants to come to their full glory!

Farmer Notes: Grow more pumpkins than I did and plant more varieties. Make sure to weed when they are young, it as a really good payoff. And don't plant them next to another cucurbit plant!

Harvest & Storage:

When was the crop ready for harvest? How did you know?

On October 8th, the pumpkins were visibly ready and resembled their respective varieties so we decided it was time for them to come out of the field. They had actually been ready for a solid amount of time but as you will come to find that when fall comes around things get incredibly busy and they should have been harvested earlier.

How was it harvested?

Three student farmers entered the pumpkin patch also known as Field B with clippers and or scissors in hand to cut the vines of the pumpkins. Behind them followed Jason with the forklift and the giant bin, the Student Farmers placed the precious pumpkins in the bin, and placed the Jill Be Little pumpkins (your typical small baby mini pumpkin) in the green bins. It took about an hour or so, with only four people in total for people power!

How was it washed at the wash station?

The pumpkins then made their way to the Barn where they were not cleaned as it did not seem that they needed it. The little dirt on them shows their story and when it goes home with a CSA member they can elect to decide what they want to do with it. At some points if the pumpkin was super dirty we used a spare cloth to wipe it down.

List different post-harvest practices for each market (if any)

Non-applicable as our pumpkins go solely to our CSA members and a few Farmer's Market buyers!

List different shipping practices for each market (if any)

The precious pumpkins stayed in the large bin and green bins for the duration of their lives.

What different or improved harvest and shipping recommendations can you make?

I think the harvest could have been done significantly earlier and we would have saved a lot more pumpkins quite honestly. The process went quite smoothly for the most part, but something to consider is that the pumpkins didn't go out for another week and a half as they were harvested on a Tuesday and went out the following market not the coming one that Friday.

Storage and post-harvest handling:

Curing: We did not cure the pumpkins but if you were to do it can help store them for much longer.

Washing before storage: no washing

Storage Requirements: In a cool, dry, well-ventilated storage area. Ideal temperatures are between 55° and 60° F with relative humidity of 50 – 70%

How should this crop be processed for long term storage: Where your crop was stored this fall?

In the barn in a large bin and green bin, not inside the cooler.

How well did this crop fair in storage and how did it enter storage?

It did well reasonably, pumpkins are pretty easy go lucky. They stayed in the barn for approximately 3 to 4 weeks. Avoid rain and them going on the ground were two big things and the babies were not exposed to that, so they did okay!

Were there any problems in storage?

Well. The Long Island Cheese started to emit some weird juices, but I think that had to due to the stress under stacking them improperly so just making that we are careful when placing them on each other.

What different or improved storage recommendations can you make?

Harvest timelier so that the pumpkins don't have to hang out too long and rot in the field. Pumpkins are also tough think about how many farms have picked pumpkin patches, but usually in less wet areas. Carry pumpkin as a baby don't grab it by its stem unless you want to murder a pumpkin.

Farmer Notes: I would say overall post-harvest and storage / harvest went well considering how busy things were and that we got to it and got a pretty significant yield. Figure out timing better, don't do exactly what I did it can definitely be more accurate, I wish I knew that they would mature faster and that if your crew is invested and loves to weed, you can PLANT WAY MORE PUMPKINS.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bundles, bags	Amount Per share	Total brought to CSA	Notes
10/18	6	Pumpkin	Full - 1 Half -1	The full large bin	Some people elected to take smaller ones over larger sized People asked questions about what to do with the pumpkins, would have been good if we / I did more research on Long Island Cheese cooking
10/25	7	Pumpkin	Full-1 Half-1	3 green bins	only Jill be Littles left

Other Markets – No other markets / none sold at Farmers Market

Review and Recommendations:

What was different between what was done and what was planned?

I think for the most part the pumpkins closely aligned with the planning from the Spring Semester. The markets did significantly change, they ended being a sole CSA crop and none got sold to Student Business, Dining, Wholesale markets, and even at the Farmers' market. I also believe that the pumpkins were a relatively low work intensive crop and could have been expanded in the initial seed order, we aired on the side of caution because the 2018 crew had a challenging time.

What worked really well and should be continued?

Having everyone invested on the crew made the pumpkins do well. Hand seeding the pumpkin seeds went really, the spacing seemed to work out well! Weed the pumpkins when they are babies, not just hoe but actually hand weed closest to the root of the plant. Plastic is NOT needed nor is irrigation, I believe what also helped is the magic in the South Deerfield soil.

What changes would you recommend for next year?

Account for the seeds being eaten by the animals! Before the seeds germinate the pesky squirrels will eat them, so I would account for that margin of error. Also it's important to keep an eye on them especially right after seeding to make sure they actually germinate.

Should we grow this crop again? Why or why not?

Plant more, pumpkins are the dominant crop, and don't let anyone tell you otherwise but the Pumpkins matter. They are a morale crop and gives the CSA members something other than food. We were modest because we had heard the experience that the 2018 crew had with pumpkins.

***Farmer Notes:** There's a lot of things that come to mind when I think of advice for the next generation of Student Farmers. This program challenges you in many ways that your other classes have not. Waking up in the morning, going to your regular academic classes in your farm clothes and then back to the farm is tough! I remember I would quickly shower and put on jeans and a nice shirt then go back to the farm and change (This happened once). Throw that out the window. My favorite moments are running back to classes covered in dirt with my co-student farmer's / best friends. The moments of stress and worry, lean on the people around you. The camaraderie and love will carry you through the harder times. Getting up at 6:30am to farm on a beautiful piece of land? There are worse things in life.*

RADISHES / SALAD TURNIPS

Raphanus raphanistrum sativus

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	1664 radishes	4 radishes per CSA member at 4 pickups $104 \times 4 \times 4 = 1664$
FM	28lbs in total	Dispersed 3-5 lbs at each market which makes no sense, so approximately a basket at 2-4 markets seem more fitting
BIG Y's	135 lbs in total	BIG Y A - 60 BIG Y N -45 BIG Y GF 30 lbs
Student Biz/ Dining	None	I feel like this may change if we have a surplus or need something to do with them

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Crunchy King	Johnny's	5000	21.40	Org
Sora	Johnny's	5000	11.30	Org
Pink Beauty	Johnny's	12675	12.30	Org
KN Bravo	Johnny's	2287	13.52	Org
Hakurei	Johnny's	11353	23.20	Org

Reasons for selecting these cultivars:

I selected these for a few reasons, a lot of them were from the past student farmer's as well as some sway from a few of the UMass Dining Chefs. Also, Jackie recommended a few and I didn't totally feel strongly about them. I did however make sure to have the generic "red" radish but also keep it spicy with some new and fresh ones. People love purple.

Did the variety description meet your expectations? Why or why not?

As of the first week of October, the radishes and salad turnips that have come in to their size. We keep forgetting to harvest and offer them, but we will fix that soon. They look good visually and are spicy to the taste. As of 10/1 the variety descriptions online do meet my expectations, but they will be easier to tell when they come to their full fruition.

Would you recommend these varieties again?

Yes, they have been hashed and fleshed out by past student farmers and seem to continue to be a primarily reliant crop and don't require too much work as they are direct seeded.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Make sure to understand the poundage / the yield better than I did because a lot of my notes don't totally make sense. By this I mean how much yield per foot, have a strong idea of what this means. I also would wish I understood the purpose of radishes / salad turnips better, so I could better gear which markets we send them to. Luckily, nothing is set in stone and we can still offer to dining even though that was initially planned. We shall see how this turns out. Two new varieties I will recommend trying are the Green Luobo because it's green and fun, also meant to be fermented and the Shunkyo Semi Long because the shape is different and long.

Farmer Notes: Make sure to ask questions and do your research, this crop can be deceptively confusing.

How and when the crop was seeded/transplanted:

Direct seeded on July 31st direct seeded using the JANG JP, the Roller code used was 13/64 and M-6 / M-12 at a Hole Depth of 2 mm.

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1	8/31	550ft	3	DS with the Jang	Didn't really receive that much attention, suffered a lot of pest and maggot damage

Direct seeding:

Planting #	Seed date	Seeder Used	Settings Used	Notes on germination
1	8/31	JANG JP	Hole depth 2mm Roller Code 13/64	Took easily

Farmer Notes: Varieties included Crunchy King, Sora, Pink Beauty, KN Bravo, and Hakurei. It was planted in row that had lettuce and cucumbers before it, also since it was a new seeder we made sure to follow it check that the seeds were getting properly buried, extra seeds are good for the case of trial and error.

Planting Information:

Expected yield/ft: 1lb per foot

Direct seed or transplant: DS

In-Row Spacing: 1 inch

Between Row Spacing: 6 inches

Number of Rows Per Bed: 3

Bed Feet planted: Length of B

Field Planted In: approximately 550 feet

Number of succession plantings: N/A 1 (five varieties in one row)

Broadcast Fertility: 5/13 Composted Chicken Manure 1000 lbs/acre

Additional Fertility: None

Cultural practices:

After the seeds germinate, the crew crawled once or twice after that it was relatively hands off. “Table” Radishes only take about four weeks so it’s great that they got in by the end of July considering how busy things were whereas daikon radishes will take about two months to reach their size. If there was more time it would have been great if we could have done another quick crawl and thinned them out.

Notes on Irrigation: No irrigation used in B, radishes typically don’t need a uniform water system as the South Deerfield fields are relatively moist and soft ground.

Diseases observed:

I believe that there was a little alternaria leaf spot because of the damage on the foliage. This can be easily prevented by buying or selecting disease free seeds or treated seeds, look for the hybrids. This can also be caused by certain debris left in the soil, like cruciferous weeds. Crop rotation is important.

Potential Disease Threats: What should farmers of the future expect to see?

Something to look out for is downy mildew, this is such a common disease and can affect the crop at the most important stage right when it’s germinating. This can be managed by early in the day irrigation and good air circulation, damp conditions allow this disease to do well. Another generic threat to look out for is seed decay, make sure to pick a treated seed.

Insect Pests observed:

Cabbage root maggots and flea beetles

Damage caused: cosmetic really, but small and large holes in the crop, inside flesh did not seem to be affected

How was it scouted or observed: Post-harvest, damage is noticeable.

Action(s) taken: Sorted for quality, at this point not much to do. The threshold for “ugly” vegetables for the CSA is greater than say for Big Y and Dining. Ugly vegetables are in and acceptable to an extent.

Potential Insects: In the future the farmer should look out for cabbage root maggot, cutworm black, cutworm variegated, flea beetle crucifer.

Do you think the production practices needed for this crop was worth the yield that we received?

I think putting over row cover even without hoops would be helpful and create a layer from the pests and hopefully a barrier between any other potential threats. This could be to protect from small critters like mice, squirrels, deer, and whatnot. Most of the damage was cosmetic and although this was predominantly a CSA crop in 2019, it's worth considering the cost benefit / opportunity cost of better preserving them so that you can sell more of them to your wholesale markets.

Harvest & Storage:

When was the crop ready for harvest? How did you know?

The table radishes were ready about four weeks after seeding, The diameter reached the size bigger than a ping pong ball and the daikon were ready about 2 months after the initial seeding and those resembled the size of a small sweet potato.

How was it harvested?

Picked and or picked and topped. This year we didn't bunch them with the foliage because of damage so they were not bunched like they usually are, but given out "loose" as seen in the photo at the beginning of the crop analysis.

How was it washed at the wash station?

Straight to the root washer! One black crate in and pushed through with our awesome broom.

List different post-harvest practices for each market (if any)

Same for all.

List different shipping practices for each market (if any)

Same for all, difference when going for catering is it goes in a wax bushels rather than a typical lock lid for the CSA.

What different or improved harvest and shipping recommendations can you make?

If their topped there are no greens to really go bad, so they can last longer in storage

Storage and post-harvest handling:

Curing: Not necessary.

Washing before storage: Yes! in the root washer, unless they are going to be in cooler awhile before they are handed to CSA members because then get them dirty

Storage Requirements: Table radishes topped can be stored 3-4 weeks at 32 F and 95% relative humidity in breathable packaging, i.e. the black crates. The daikon radishes can be topped and stored in similar conditions although they can last 3-4 months which is significantly longer.

How should this crop be processed for long term storage: Where your crop was stored this fall?

Brand new cooler baby! Long term storage isn't great, but I bet you could push it a wee bit more than 2 weeks, especially if they are topped, instead of a black crate I would recommend putting them in the white bags to prevent air bacteria

How well did this crop fair in storage and how did it enter storage?

Well for the most part, seemed like we had an excess more so of the turnips than the radishes

Were there any problems in storage?

No! They didn't last really all that well past two weeks so try to move them on the faster side.

What different or improved storage recommendations can you make?

Try to be more in loop about harvest because it happens very quickly especially with us not being on the farm as often. Account for what's coming out of the field and going in the cooler / what you can move to the CSA members vs wholesale.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/20	2	radish count	Full 5 Half -3	4 black trays	estimate
10/11	6	radish count	Full - 6 Half - 6	5 black trays	Inside Barn market,
10/18	7	salad turnips	Full-1 Half-1	4 black trays	People didn't seem to know what they were

Other Markets – UMass Catering

9/18	Catering	\$1.00 per lb	10 lbs	\$10.00
10/22	Catering	\$1.00 per lb	10lbs	\$10.00

Review and Recommendations:**What was different between what was done and what was planned?**

I had originally picked 5 varieties in total, but the radishes ended up all looking the same and the Daikon, purple salad turnip was the only one that really was different from the others and variation in size.

What worked really well and should be continued?

They were a good as I like to call taste breaker crop, it's not so much of a staple crop but one that they can add to their greens or something for a little bit of spice. Both salad turnips and radishes can be fermented!

What changes would you recommend for next year?

I would personally choose less varieties, and focus on growing two specialty radishes and salad turnips.

Should we grow this crop again? Why or why not?

Yes solid crop, but I think we can downsize how many varieties we grow!

RUTABAGA AND STORAGE TURNIP

Brassica napobrassica
Brassica rapa

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	875	
Farmer's market	20	
Big Y A	80	
Big Y N	160	
Earthfoods	60	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Helenor	Johnny's	5,000 (2 packets)	\$71.70	Org
Purple top white globe	Johnny's	69,163	\$7.53	"

Reasons for selecting these cultivars:

Both crops are frost sensitive and do well in the Northeast. Both varieties have been grown on the Student Farm in the past and proven to be high yielding and easy to manage.

Did the variety description meet your expectations? Why or why not?

Yes! Both varieties have produced delicious crops. I am so proud of my storage turnips and rutabagas.

Would you recommend these varieties again?

Yes! Although both these crops intimidate customers, i think with proper marketing, both can excite our customers.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

For the future, I would recommend trying out the Gilfeather Rutabaga seed. We have not strayed away from the Helenor variety in the past few years, and mixing it up and incorporating in a New England Heirloom would be interesting! It would also be cool to try the Laurentian Rutabaga seed. Again, diverging from what we have done in the past to see how these new varieties do in the field is a great idea.

Farmer Notes: Rutabaga RULES!!!! These crops do really well with little work being put in

How and when the crop was seeded/transplanted**Direct seeding**

Planting #	Seed date	Seeder Used	Settings Used	Notes on germination
Rutabag	6/17/2019	Planet Junior	Hole 1	Good, thinning done
Storage Turnip	7/22/2019	Planet Junior	Hole 1	

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
Rutabaga	6/17/2019	1500	3	DS	Great!
Storage Turnip	7/22/2019	3000	3	DS	Great!

Farmer Notes: Thinning and weeding do great things for these crops! Weeding helps crops not have to compete for nutrients, sunlight, and water with the weeds. Thinning helps to remove the weaker plants at a young age so that the larger and stronger ones can grow the best

Planting Information:**Expected yield/ft:** 1 lb**Direct seed or transplant:** DS**In-Row Spacing:** 1-2"**Between Row Spacing:** 12"**Number of Rows Per Bed:** 2**Bed Feet planted:** 2 beds 250' (rutabaga) 1 bed 500' (storage turnip)**Field Planted In:** SD B**Number of succession plantings:** just 1 for each crop**Broadcast Fertility:** 5/13/19 Composted Chicken Manure 1000 lbs/acre**Additional Fertility:** None**Cultural practices:** Weeding and thinning of Rutabaga and Storage Turnips. The seeding plants the seeds close together, and as the plants get older thinning in-row spacing to 1-2" is crucial for maximum growth potential!**Notes on Irrigation:** irrigated by earth's sweet rain drops (no drip irrigation). The crops seemed to do well with this.

Diseases observed:

I remember now-- it was early to mid- September; the Storage Turnips looked stunning- large round roots with bright green leaves swaying in the cool breeze. The excitement of the CSA harvests and our hot crops slowing down made us push the images of our sweet storage turnips to the side. Before we knew it, wire worms had infiltrated the storage turnip row, mining their ways through our precious roots. We were too blind to see this happening, until it was too late. Our entire bed of storage turnips, now full of holes, lay rotting in the fields, waiting for the metal spikes of Jason's mower to pound them into the earth. Only to be consumed by more wire worms.

Potential Disease Threats: Leaf spot and downy mildew can also affect the leaves of storage turnips and rutabaga. If the leaves are not green and healthy, the root will not properly develop.

Insect Pests observed:

Wire worm

Damage caused: holes and scars

How was it scouted or observed: we did not harvest the turnips in enough time and the wire worms attacked without us knowing. We found them too late, full of holes and scars.

Action(s) taken: Jason mowed them in as they were too damage

Cabbage maggots

Damage caused: eggs laid around root base, tunnel and make holes in rotted spots

How was it scouted or observed: Jason and Amanda said they were full of maggots

Action(s) taken: mowed them in

Potential Insects: Flea beetles eating the greens in the early season. I remember seeing some but nothing standing out to me.

Wire worm, rot, maggots; we saw all of these this year sadly :(

Do you think the production practices needed for this crop was worth the yield that we received? Yes, I think that if we gave more care to the Storage Turnips they would have been a great crop to have for out markets. The few we did harvest were beautiful!

Farmer Notes: Ruatabaga is a great root vegetable, no matter what. It requires very little effort in cultural practices for the high yield you get. I wonder if our shelf life of these crops would be different if we covered them in wax like the grocery stores have? Does this actually make a difference, and if so what would this look like for our processing systems?

Harvest & Storage:

When was the crop ready for harvest? How did you know?

We were not super worried about harvesting either storage turnip or rutabaga, and then they got wire worms and maggots. We harvested the rutabaga and some storage turnips when they were about the size of a softball and the greens were tall and bushy. If the crop looks ready, i would recommend harvesting it and putting it in storage, as it will store for a while and not rot or get buggy in the fields.

How was it harvested? I think Jason did a lot of the harvesting of these crops, but it can be done by hand. I recommend having either hand pruners or a knife to cut off the taproot as it can be long and the crop looks much better with the root cut off. You also need to twist the leaves off. Both of these steps can be done in the field to reduce processing needing to be done in the wash station.

How was it washed at the wash station? Root washer <3

List different post-harvest practices for each market (if any)

Making sure the Rutabaga and Storage Turnips going to Big Y or Dining are uniform in size is super important.

List different shipping practices for each market (if any) lock tops for CSA, Farmer's Market, and Big Y. Bushel boxes for dining.

What different or improved harvest and shipping recommendations can you make?
Harvest and process in the fields.

Storage and post-harvest handling:

Curing: none

Washing before storage: no. store both roots dry and unwashed in white bags and wash before sending to markets

Storage Requirements: will store for up to 4 months in the cooler. 32F 90-95% humidity

How should this crop be processed for long term storage: greens and roots cut in the fields and then stored dry

Where your crop was stored this fall? All of our roots were stored in the cooler in South Deerfield and we brought them over to the barn to be washed before each market needed.

How well did this crop fair in storage and how did it enter storage?

It did fine in storage. Sorting for rot and ugly crops when washing is important.

Were there any problems in storage?

No

What different or improved storage recommendations can you make?

Harvest when the crop looks good and do not let it sit in the field. We did and lost pretty much all of our storage turnips. They will last when stored dry in the cooler better than in the field.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bundles, bags	Amount Per share	Total brought to CSA	Notes
10/18	6	Single root	2 per share	208	Storage turnip
10/25	7	Single root	1 each ? maybe 2	6 white bags	Rutabaga (no note on how much per share, just total amount brought)
11/8	9	Single root	2 full 1 half	171	rutabaga
11/15	10	Single root	As much as wanted	leftover	Rutabaga; put out all we had left for members

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Catering (ST)	\$1.00/lb	25 lbs	\$25
Big Y Amherst ®	\$1.00/lb	25 lbs	\$25
Big Y Noho ®	"	25lbs	\$25
Big Y SH ®	"	25lbs	\$25
Big Y GF ®	"	25lbs	\$25
Catering ®	"	30 lbs	\$30

® is Rutabaga ST is storage Turnip

Total Gross Income Received From Your Crop:

Rutabaga: \$125, Storage Turnip: \$25

Review and Recommendations:

What was different between what was done and what was planned?

We had many plans to sell these crops but they both began to rot in the field because we left them for too long. They looked beautiful so we waited to harvest and waited too long and they began to rot.

What worked really well and should be continued?

These crops did not require much care, just thinning and weeding. Catering seemed to like them, but I am unsure how we can compete at Big Y with the wax covered rutabagas and storage turnips? Might not totally be worth our time as we only did one delivery to them.

What changes would you recommend for next year?

Maybe just grow Rutabaga or Storage Turnips and not both.

Should we grow this crop again? Why or why not?

Yes but I would choose one. Neither are favorites among CSA members or our other markets. Channeling our energy into more production of broccoli, greens, herbs or other crops members prefer.

Farmer Notes: *I think the main thing that made our year so successful in so many ways, was that we all committed and felt connected to both the farm and each other. We wanted to show up for each other and give our all for the farm so it could be the best it could be. The hours are long and during the semester it can feel challenging, but we were always there to lift each other up and keep the positive energy flowing!*

SALAD MIX

Scientific name and family vary

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
Big Y	60 lbs	
CSA	612.5 lbs	
Farmers Market	29 lbs	
Student Business	8 lbs	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Allstar Gourmet	Johnny's	32450 seeds (1.5 oz plus packet of 1000 seeds)	\$31.39	No

Reasons for selecting these cultivars:

Allstar Gourmet is Johnny's most popular salad mix. The mix includes green oakleaf, red oakleaf, green romaine, red romaine, lollo rossa, and red leaf lettuces. This mixture provides a variety of colors, shapes, and textures which looks beautiful and creates an interesting texture.

Did the variety description meet your expectations? Why or why not?

Yes, the mix looks and tastes great!

Would you recommend these varieties again?

Yes, although the mixture of lettuce varieties is subject to change.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Encore Lettuce Mix is an all organic seed mix. It is almost identical to the Allstar mix but the seeds are all organic. This does make it a more expensive seed to buy but past crews have recommended it.

Five Star Greenhouse Lettuce Mix is a blend of downy mildew resistant varieties. This mix is designed to be grown for fall/winter production which could be a way to extend our production into November.

How and when the crop was seeded/transplanted:

The salad mix was seeded with a direct seeder on a tractor on 3 different dates in mid-late August.

Direct seeding:

Planting #	Seed date	Seeder Used	Settings Used	Notes on germination
1	8/12	Jang seeder	Setting F24	Good germination rate for all three seedings
2	8/19			
3	8/26			

Farmer Notes: We had issues with this seeding. We ran out of seed early into the first seeding because the seeder we used was dumping the seed too fast. We ordered more seed and were able to plant more later on.

Planting Information:

Expected yield/ft: Six rows in a bed yields about 1 pound per linear foot.

Direct seed or transplant: Direct seed

In-Row Spacing: F-24 seeds at 0.5-2.5"

Between Row Spacing: 6"

Number of Rows Per Bed: 6

Bed Feet planted: 500 feet

Field Planted In: Late season C

Number of succession plantings: 3 successions: 8/12, 8/19, 8/26

Broadcast Fertility: 4/23/19 Composted Chicken Manure 5-4-3 1000 lbs/acre

Additional Fertility: No

Cultural practices:

No black plastic

No row cover

We used the Jang seeder with the F24 rollers to direct seed salad mix. It is a 6 row seeder.

We hand weeded the salad mix two or three times but it got very weedy which made harvesting take longer due to sorting out the weeds as we cut.

We harvest it directly into large locktop bins and use harvest knives to slice the salad at the base of the plants in handfuls.

Notes on Irrigation: We did not put drip tape on the salad mix.

Diseases observed: none

Potential Disease Threats:

Downy mildew: On the foliage, small yellow spots develop on the upper sides of the leaf while white to bluish-white fluffy growth forms on the underside of the leaf.

Leaf spot: Leaf spots are round blemishes found on the leaves of many species of plants, mostly caused by parasitic fungi or bacteria.

Bottom rot: Rust colored rot spots at the base of the leaves

Insect Pests observed: none

Potential Insects:

Aphids: Small sap sucking insect that can cause yellowing, mottled leaves, stunted growth, curled leaves, browning, and low yields

Flea beetles: A small jumping beetle that causes damage by feeding on leaves and stems

Grasshoppers: Similar to flea beetle damage, grasshoppers leave ragged bite marks from eating leaves and stems.

Do you think the production practices needed for this crop was worth the yield that we received?

Salad mix was a relatively low maintenance crop and I think it has turned out with a good flavor and texture combo. Despite the weeds being annoying the crop had no diseases or noticeable pests. I personally love having it in the CSA shares.

***Farmer Notes:** I mentioned this in an earlier crop analysis but we ran out of seed during our first planting and had to buy more during the summer. Take into consideration the number of beds you'll be planting in a row when purchasing seed (as well as how much the seeder dispenses per foot). This way you can avoid coming up short like we did this year.*

Also! Don't lose the orange harvest knives that were bought this year! They work so much better than a regular pocket knife for harvesting salad mix.

Harvest & Storage:

When was the crop ready for harvest? How did you know?

We harvested the salad mix in late September through October. The salad mix was ready once the beds looked relatively full and all the leaves had grown to be about 4-5" tall.

How was it harvested?

We used the orange harvest knives to cut the salad mix and place it directly into lock tops.

Having 2-4 people on this task was best for a speedy job although is doable by just one person.

We had some problems with sorting out weeds from the salad mix. This is best avoided by keeping up with weeding it earlier in the season; however, things get hectic so it may just be necessary to slow down while harvesting and pick out the weeds from each handful you cut.

How was it washed at the wash station?

Salad mix got triple washed in the 3 bay sink and dried using the greens dryer (a massive salad spinner...very fun).

List different post-harvest practices for each market (if any)

We washed our salad mix regardless of market.

List different shipping practices for each market (if any)

CSA/Farmers market: Lock lids

Student business: Plastic bag (last minute decision)

What different or improved harvest and shipping recommendations can you make?

Figuring out what might work better for student business deliveries (plastic bags may be the best option though).

Storage and post-harvest handling

Curing: No

Washing before storage: Best to avoid washing and storing for too many days because the bottom of the bin will get slimy and ruin some of the salad. Ideally that won't be an issue if the salad mix has been thoroughly dried before getting stored.

Storage Requirements:

Below 41 degrees, 95-100% RH, 1-2 weeks duration

How should this crop be processed for long term storage:

Should not be in long term storage

Where your crop was stored this fall 2019?

In the cooler in the barn when there was excess.

How well did this crop fair in storage and how did it enter storage?

Washed in lock lids. Salad mix did not fair well in storage for more than a week tops.

Were there any problems in storage?

Rotting and condensation ruined the leaves at the bottom of the lock lid which led to the rest of the mix having a gross smell.

What different or improved storage recommendations can you make?

Harvest only as much as you need and if there's extra see about donating it with in the following few days.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/20	2	Lbs or plastic bags ??	1 and 0.5	87	
10/11	5	Plastic bags	1 and 1	104	

Total Gross Income Received From Your Crop: only CSA

Review and Recommendations:

What was different between what was done and what was planned?

The amount of seed we needed for a bed ended up being more than we planned for so we made a midsummer order. Unclear if the need for more seed was due to a problem with the original plan or if it was because the seeder implement we used dropped too many at once.

What worked really well and should be continued?

The All-star variety turned out really good so I recommend growing it again.

What changes would you recommend for next year?

I wonder if we could offer our salad mix to another market in addition to the CSA and farmers market. Since dining increased how much they bought from us a large amount this season we could continue that trend and offer them even more the 2020 season.

Should we grow this crop again? Why or why not?

Yes, it is a nice addition to our CSA and the members enjoy it. While we didn't receive an income from it this season I think that can be changed in the future.

SCALLIONS

Allium fistulosum

Final Crop Analysis

Estimated Harvest goals:

Market	Crop/Variety	Weeks Needed	Lbs. Requested each week	Total Pounds Requested per Market
CSA	Paradise Deep Purple	20-Sep .5 4-Oct .5 18-Oct 1 1-Nov 1 15-Nov .5	.5 .5 1 1 .5	612.5
Farmer's Market	Paradise Deep Purple	13-Sep 20-Sep 27-Sep 4-Oct 11-Oct	7 5 5 5 5	27
Big Y	Paradise Deep Purple	Amherst: 20-Sep 27-Sep 4-Oct 11-Oct NH 4-Oct to 1-Nov	Amherst 10 NH 20	Amherst 40 NH 100

Cultivars/varieties and seeds:

Seed Source	Suggested Variety	Cost	Pelleted or coated seed? Y/N	Organic? Y/N	Notes
Johnny's	Deep Purple	\$23.35/ pack	N	Y	
Johnny's	Parade	\$13.15/ pack	N	Y	

Reasons for selecting these cultivars:

Parade: Classic bunching onion, easy harvest and cleaning.

Deep purple: For CSA members.

Did the variety description meet your expectations? Why or why not?

Yes, most definitely. The first harvest of scallions which we brought to the Farmers Market looked great. Still waiting to see the Deep purple, will update.

Would you recommend these varieties again?

Yes, if the Twenty Twenty crew decides to grow scallions, they should consider repeating these varieties.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Evergreen Hardy White – Johnny's claims them to be incredibly winter harder. They could supply the CSA and Farmers Market towards the end of the season.

White Spear – This variety can tolerate heat if the crew wants scallions early in the year.

Farmer Notes: Scallions proved simple and easy to grow. Some hoeing and weed maintenance at the ALC should result in beautiful scallions. Consider hilling them for more developed bulbs.

How and when the crop was seeded/transplanted:

Scallions were seeded in 128 flats and transplanted into a furrow created by a tractor. We then hand planted the seedlings.

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Parade	6/25	128	6	
Deep Purple	6/25	128	6	
Parade	7/22	128	6	
Deep Purple	7/22	128	6	

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
Parade #1	7/22	900	2	Tractor furrow and hand plant	
Deep Purple #1	7/22	900	2	Tractor furrow and hand plant	
Parade #2	8/19	900	2	Tractor furrow and hand plant	
Deep Purple #2	8/19	900	2	Tractor furrow and hand plant	

Farmer Notes: Scallions looked great in the first succession planted in ALC 7. Unfortunately, the second succession planted in ALC 9 was overtaken by weeds and we lost it. The scallions got too big in October and we stopped bringing them to the CSA.

Planting Information:

Expected yield/ft: 100 lbs a row of 100ft... so 1 lb per foot of row.

Direct seed or transplant: TP

In-Row Spacing: 6"

Between Row Spacing: 2.5 ft

Number of Rows Per Bed: 2

Bed Feet planted: 1800ft

Row Feet Planted: 3600ft

Number of succession plantings: 2

Broadcast Fertility: 6/17/19 Composted Chicken Manure 5-4-3 1000 lbs/acre

Potassium Sulfate 500 lbs/Acre

Additional Fertility: None

Cultural practices:

The scallions were planted similarly to other plants in the ALC. We used a tractor to create a furrow row and farmers followed in teams, dropping and planting the scallions transplants. We did not use drip irrigation or black plastic. The scallions were not hilled but this could have encouraged better growth. They are too big now but we did have some successful harvest over the course of the Fall. We used scuffle hoes to combat weeds around the plants. The second succession was overtaken by weeds and we did not harvest from the bed in ALC 9.

Notes on Irrigation: Rain from the sky

Diseases observed: None

Potential Disease Threats: What should farmers of the future expect to see?

Downey Mildew DM appears as small yellow spots on the upper surface of leaves. Spots spread and can become brown. The Fungus *Pseudoperonospora cubensis* survives in a wetter environment.

Insect Pests observed: None

Potential Insects:

Thrips

Thrips are similar to aphids in their method of sucking out sugar juice from the plants using a sharp piercing mouth. This leads to bacteria buildup from the thrip honeydoo residue. Females reproduce both sexually and asexually. They lay eggs in soft plant tissue. We can use similar yellow sticky tape to gage the infestation number of thrips. A constant surveillance of this tape is important.

Nematodes

Nematodes enter through the roots and cause yellow wilt leaves. They can stunt growth. Plants should be ripped up and disposed of. Considering that the farm has not grown scallions in recent years our bunching onions may survive well. A strong history of crop rotation will aide them.

Mites

These pests stunt growth and bring a host of bacteria and pathogens. They disrupt bulb rooting. Again, crop rotation is key and our scallions should manage well against pests.

Do you think the production practices needed for this crop was worth the yield that we received?

I think our production practices adequately reflect the yield of this crop. If we had more time and decided to weed the second succession, we would mostly still have scallions for our markets. Right now the second succession is lost and the first succession is too big so we ran out of marketable scallions earlier than I had predicted. Even a quick yet thorough scuffle hoe can significantly help a crop in the Fall as weeds will take longer to grow to a size which inhibits crop development. Spacing could also have been improved as we only planted in two rows by hand. Scallions could definitely have been planted with a smaller between row spacing to maximize space! Or just consider growing less.

Harvest & Storage:

When was the crop ready for harvest? How did you know?

Scallions were harvested starting in late August through October. They were ready when they had a lot of white growth above the roots. Scallions can be harvested at 6 inches but will develop a stronger taste if left to grow for longer.

How was it harvested?

Scallions were pulled up and brought to wash station in green bins. Typically 2-4 people harvested scallions along with another crop at the ALC. They were sprayed off with a hose and brought to Farmers Market in lock top bins.

How was it washed at the wash station? Laid out on a bed frame of upside-down black harvest bins and sprayed with a hose.

List different post-harvest practices for each market (if any) All went to CSA/Farmers Market.

List different shipping practices for each market (if any) Brought to Farmers Market in lock tops.

What different or improved harvest and shipping recommendations can you make?

I think lock tops are the best shipping methods. Harvest wise, scallions are too dirty to harvest directly into these blue and gray lock tops. Consider harvesting with 4 people depending on how many rows are planted. Split up into people who rip up scallions, and those who collect into black harvest bins. Wash at same interval as leeks or crops which can be sprayed down.

Storage and post-harvest handling:

Curing: None

Washing before storage: None

Storage Requirements: 32 to 40 degrees. 95% relative humidity.

How should this crop be processed for long term storage: If kept for a long period should not be washed. But will only last for a week or two maximum. Harvest as needed.

Where your crop was stored this fall 2019? Stored in barn cooler at ALC.

How well did this crop fair in storage and how did it enter storage? Entered storage loose in black or green harvest bins. Typically scallions were harvested the day of for market. Any leftovers were claimed by Student Farmers or composted a week later.

Were there any problems in storage? They will get a little soft and not last more than a week or two.

What different or improved storage recommendations can you make? Just make sure to harvest as needed because scallions will last better in the field (depending on temp and size) compared to the cooler.

Farmer Notes: *Harvest your scallions before they get too big, but do not harvest more than you need. ☺*

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/20	2	1 lb	1-2 bunch?	87.5	1 bunch to ½ share
9/27	3	1 scallion	6	423	3 scallions for ½ share

Total Gross Income Received From Your Crop: All to CSA

Review and Recommendations

What was different between what was done and what was planned?

We only provided scallions to the CSA.

What worked really well and should be continued?

Scallions grew well at the ALC however, you could save space by growing in more rows per bed.

What changes would you recommend for next year?

We had an abundance of scallions for a certain period of time and they were not sold to other markets.

Should we grow this crop again? Why or why not?

Yes, scallions were weeded a few times at the ALC but proved to be low maintenance for their reward. It was a good addition to the CSA to balance with leeks and other onions.

SHALLOTS

Allium cepa var. aggregatum

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	1225	
Farmer's Market	21	
Big Y NH	30	
Big Y A	30	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Conservor	Johnny's	8000	\$165.28	org

Reasons for selecting these cultivars:

There were very few organic shallot seed options. I narrowed it down between conservor, and another variety called camelot, but ultimately went with conservor. Conservor store better and have the classic shallot look, with a teardrop shape and rich purple color.

Did the variety description meet your expectations? Why or why not?

Absolutely. I've said it time and time again, but I am the proudest father of my sexy shallots. We had an amazing yield of fat, bodacious shallots with a kick-you-in-your-face flavor. I cook with them at home almost every day and everyone who's tried them loves them! They were easy to grow, with the same cultural practices as onions, but are a more premium product (same inputs for greater returns). I can only say good things about shallots in general and especially about Conservor.

Would you recommend these varieties again?

100% yes; see above answer.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Unless they've bred newer, sexier varieties since I did my research, I think Conservor is honestly the way to go. Just in case no seed is available, I would recommend looking into Matador or Camelot. (Conservor is really the way, though.)

Farmer Notes: Future farmer, I hope throughout this crop analysis I build a strong enough case to convince you to grow shallots again next year. They're gorgeous, tantalizing, delectable, and every other positive adjective one could use to describe fancy onions. For the first year growing shallots at SFE, I think we had a smashing success and should grow even more next year to target more markets. They really are just more flavorful, more expensive onions, but they are not fussy to grow. I love shallots. I love my sexy shallots.

How and when the crop was seeded/transplanted:

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Conservor	3/25	128	16	good. tops can/should be trimmed like onions; makes transplant easier

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
Conservor	5/1	1500	2	poked holes with transplanter then transplanted by hand	these babies did beautifully. some stunted but most were gorgeous.

Farmer Notes: I cannot express how much I love shallots. Eating them, growing them, convincing student farmers of the future to grow them.

Planting Information:

Expected yield/ft: .8

Direct seed or transplant: TP

In-Row Spacing: 1"

Between Row Spacing: 18"

Number of Rows Per Bed: 2

Bed Feet planted: ~750

Field Planted In: A

Number of succession plantings: 1

Broadcast Fertility:

Additional Fertility: No

Cultural practices:

Shallots were grown on silver plastic with dripline, like the onions. About halfway through the season, after hoeing between the beds many times, we laid down straw mulch to suppress weeds. Saying this was moderately successful would be generous. Instead, the beds were un-hoeable and the weeds free to grow tall. Infrequently/as needed, we would go through the beds and hand weed the holes.

Notes on Irrigation:

I think the shallots actually were only irrigated exactly once, during the most intensely hot day of the summer. These puppies don't need that much; the plastic does a pretty good job of trapping moisture.

Diseases observed: Blessed be, none.**Potential Disease Threats:**

Potential diseases for shallots are the same as onions; common ones to watch out for are botrytis leaf blight, botrytis neck rot, and downy mildew. Botrytis leaf blight (*Botrytis squamosa*) shows up as a long, oval, whitish/yellow leaf spots, oriented vertically. Infection occurs in the oldest leaves first. Severe infection leads to widespread necrosis and dieback of the leaves, and can result in reduced yield. Botrytis neck rot (*Botrytis allii*) infects in the field but only appears prominently after harvest. Once placed to cure, the bacteria break down the leaves, moving into the scales, turning the entire bulb into a rotten, soft mass. Downy mildew (*Pernospora destructor*) appears as relatively large, yellow to brownish blotches on the leaves. The splotches can appear fuzzy from the growth of the fruiting bodies and sporangia of *Pernospora*. It can cause leaf death but does not usually kill the whole plant; it can result in reduced yields/stunted bulbs.

Insect Pests observed:

Again, thankfully none. Not even thrips. Shallots were the most amazing, peaceful, easy to take care of babies.

Potential Insects:

The biggest potential threat is onion thrips. Thrips are tiny tiny things, hard to see, but can usually be recognized by the damage they cause on the leaves, which appears as thin, silverish lines. If you look into the leaves and pull them apart, sometimes you can see tiny thrips moving around.

Do you think the production practices needed for this crop was worth the yield that we received?

YES. Very few shallots were stunted, if anything some got too big before we harvested them. They were so easy to grow and we got an amazing yield from our ~2.5 beds. Shallots are a delicious premium product that grow at the same expense/input as onions (biggest difference is in seed) and that is incredible.

Farmer Notes: I just love shallots. There was quite the hullabaloo in the spring about cultural practice and the idea that they're a fussy crop, but they're really just sexy onions (as reflected in their updated species name). Growing them like onions is really effective.

Harvest & Storage:

When was the crop ready for harvest? How did you know? The shallots were ready for harvest when most of the leaves had turned brown and fallen over (only ~2 green leaves left.)

How was it harvested? We went through the beds in teams, with a group moving ahead pulling all the shallots and piling them, and a group following behind packing the shallots into green bins to be brought to the Haygrove.

How was it washed at the wash station? Shallots were not washed at the wash station.

List different post-harvest practices for each market (if any) Shallots for all markets were handled the same.

List different shipping practices for each market (if any) All shallots were sold/brought to markets in the 25lb mesh onion bags.

What different or improved harvest and shipping recommendations can you make? I think our methods for shallots work really well. Splitting the harvest team into pullers and packers made it go super fast.

Storage and post-harvest handling:

Curing: Shallots were cured in the haygrove for about two to three weeks before being clipped and bagged. Not all of the shallots were able to be clipped and bagged in one day, hence the spectrum of curing times; this did not seem to adversely affect the shallots. Ideally, shallots are cured for two weeks at temperatures between 75-80F and 70-80% relative humidity, just like onions. I am not sure what the average temperature or RH was in the haygrove during curing, but it seemed to be an ideal location and environment as all the shallots cured beautifully. To cure, the shallots were laid out on makeshift metal mesh tables (wide, flat metal grates laid on top of green bins) which seemed to provide a good amount of airflow.

Washing before storage: After curing, the tops of the shallots were clipped and the very outermost layer of skin removed before being placed in 25lb mesh bags.

Storage Requirements: After curing, the temperature should be lowered to as close to freezing as possible (cooler temp is ideal) with relative humidity between 65-70%. Cooling too slowly, if followed by warm days, will cause condensation. Any rapid increase in temperature can trigger sprouting, so maintaining proper storage conditions is critical.

How should this crop be processed for long term storage: Tops clipped in 25lb onion bags.

Where your crop was stored? After we bagged our shallots we threw them into the SD cooler with the onions, to be taken to the barn as needed. Once we started running out of cooler space, we moved them out from the cooler to the green metal shelves outside the barn cooler. On paper, this was a risky move, as it could have caused sprouting or condensation (thus rot), but by this point in time the barn's temperature was cool enough that I don't think it was too much of a shock to the shallots.

How well did this crop fair in storage and how did it enter storage? Despite moving them around, the shallots did remarkably well. They remained in 25lb mesh bags from start to finish.

Were there any problems in storage? We had no problems with shallots.

What different or improved storage recommendations can you make? To be safe, next year shallots should be put in one storage spot with consistent temperature (as cold as possible) and RH. Just because we had no problems with switching it up does not mean that it wouldn't invite problems in future seasons.

Farmer Notes: Shallots are up in the running for lowest maintenance crop. They are so easy to take care of if cured well, which is also easy to do. The fact that they are a higher value crop makes the low input of effort extra worthwhile.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
10/18	6	each	3 full, 2 half	275/each	Approx 46lb
11/1	8	each	6 full, 3 half	522/each	Approx 87lb
11/8	9	each	6 full, 4 half	576/each	Approx 96lb
11/15	10	all	"Take what you want."	Approx 75lb	At the final CSA distribution, we decided to let people take as much as they wanted of our remaining crops. I believe we had about 3, maybe 3.5 25lb mesh bags of shallots left

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Big Y Amherst	1.75/lb	25	\$43.75
Big Y Greenfield	2.10/lb*	57	\$119.70
Dining	1.75/lb	120	\$210.00
Earthfoods	1.75/lb	100	\$175.00

*price was changed mid-late season to \$2.10 but this was not reflected on new invoices

Total Gross Income Received From Your Crop:

\$548.45 worth of shallots was sold. If the price had been \$2.10 the whole season (as it should have been) it would have been \$634.20. Approximately \$638.40 worth of shallots were brought to the CSA (using \$2.10/lb). Ignoring unaccounted for shallots, that is an approximate total poundage of 606lbs and approximate total value of \$1,272.60.

In addition to these shallots, there are unaccounted for shallots. Last minute, in the first standing order to the DCs, approximately 100lb of shallots were substituted for red onions because red onions were not done curing. The invoices had already been made and ended up getting sent with the order, meaning that poundage was recorded as sold onions. We lost around 33-50% of the value of those 100lbs of shallots (onions are \$1.10/lb, shallots are supposed to be \$2.10/lb but at the time were being sold at \$1.75/lb). I am unsure if there were more times like that. Besides that, many of us took shallots home. Given my obvious, unending love for shallots, throughout the season and at the final distribution I probably took home about 20lbs of shallots myself. I still

have a massive bag of them in my kitchen; I used them to see how many shallots are in the average pound to estimate the poundage and value given to the CSA since we planned for them by the each. I am unsure what the potential value of these shallots would be. I am sure that farmers eat first, always.

Review and Recommendations

What was different between what was done and what was planned?

Laying down the straw between the aisles was a decision of opportunity and not in the plan. I did my spring special topic on mulch and mulching, so I was in support of the idea. However it was not as effective as I would have hoped. Most everything else followed the plan.

What worked really well and should be continued?

I hate using the plastic mulch, but it is unbelievably effective. Hand weeding the shallot holes (and onion holes) was easy and never took that long (we did it maybe once every two/three weeks). The aisles were kept clean by hoeing the bed edges and hitting the middle with the I+J. All this combined to create a weed free ideal for the shallots to develop unhindered.

What changes would you recommend for next year?

I am not ready to give up on some sort of naturally/organically based mulch, but a different material or method should be tested. I think straw could have worked if we spread it more evenly and more thickly. Maybe we needed to hoe more thoroughly before mulching. It would be cool to see future generations experiment with different mulching methods for different beds/aisles. We only grew 2.5 beds and got an okay yield. I think next year the crew should look into spacing (shallots are much smaller than onions and I think could go closer together), and grow at least 3 beds. Our shallots were gorgeous and flavorful and when we offered them, people wanted them. I also highly encourage all farmers to think about and change the price of their crops- our prices are super outdated. I wanted to/changed a lot of them, but did not do a thorough enough job updating the invoice templates (I am also not sure new invoices were always copied from the same template file). There is a lot of potential income with shallots and they are so loved in the CSA.

Should we grow this crop again? Why or why not?

Yes! I hope if I have gotten anything across throughout this crop analysis, it is that shallots are so worthwhile. There is so much potential and they are already so good. I am so honored to have had the opportunity to grow shallots at SFE for the first time. I believe they will become a staple crop for us.

Farmer Notes: Future farmer, if you are reading this now I hope you are as excited to grow shallots as I was. I hope you too get to discover the beauty and joy of fancy onions, and that you too will experience the feeling of being a proud father of your sexy shallots.

SPINACH
Spinacia oleracea

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	1,756	
FM	80	
Big Y A	120	
Big Y N	40	
Earthfoods	50	
Greeno	50	
People's Market	15	We will most likely be delivering more than 15lbs for the season, probably more like 5lbs/week
Sylvan	25	
Catering	200	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Acadia	Johnnys	40,000	\$40.80	Org
Corvair	Johnnys	40,000	\$40.80	Org
Renegade	High Mowing seed	50,000	\$72.50	Org

Reasons for selecting these cultivars:

Acadia is a “classic” spinach variety with sturdy dark green leaves. I chose Corvair because it is a savoyed variety of spinach which provides some diversity in appearance and texture. Renegade is supposed to mature about a week or so more quickly than the other two varieties and tends to grow lighter colored leaves, I wanted to grow more of this so we would have plenty of spinach for the beginning of the fall season when there is higher csa pickup and farmer’s market attendance. A mistake I made in choosing these varieties was mistaking Corvair for a fall variety when it is an early spring variety.

Did the variety description meet your expectations? Why or why not?

The first planting of every variety did fairly poorly when germinating, though renegade did come in better than the others. I’m not completely sure if the variety is to blame though because our second plantings have been coming in nicely despite how many weeds are in the bed.

Would you recommend these varieties again?

It is difficult to make recommendations based on one season, but I would recommend growing renegade again and either choosing to stick with the other varieties to have another season of data for them, or pick something new.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

I would highly recommend hammerhead spinach, a fully savoyed spinach with good resistance towards downy mildew meant to be grown in the spring, fall, or winter (this could grow in the greenhouse or haygrove in the coolest months if there is space!).

Farmer Notes: *With all crops it is important to keep an eye on weeds, but especially short leafy greens need the attention or they will be outcompeted early on.*

How and when the crop was seeded/transplanted:

Direct seeding

Planting #	Seed date	Seeder Used	Settings Used	Notes on germination
1	7/29	Jang	X12	Did not germinate well
1	8/12	Jang	X12	" "
2	8/26	Jang	X12	Germination better than 1 st planting, but still not uniform in beds

Farmer Notes: *We believe that the reason the 1st succession didn't germinate very well is because of the seeder we were using; the second succession came in fairly well. Something that I think was also a factor in poor germination in the 1st succession is that we did not weed the beds at the "white thread stage" of weed growth and so some of the spinach was outcompeted as well. The seeding of spinach on 7/29 was an experimental planting in field b of all three varieties.*

Planting Information

Expected yield/ft: 0.5lbs.

Direct seed or transplant: DS

In-Row Spacing: 0.75"

Between Row Spacing: 6"

Number of Rows Per Bed: 6

Bed Feet planted: 1000

Field Planted In: C-Late Season

Number of succession plantings: 1

Broadcast Fertility: 6/17/19 Composted Chicken Manure 5-4-3 1000 lbs/A

Additional Fertility: None

Cultural practices:

After we direct seeded the spinach we left it in the ground with no covering, fertilization, or cultivation (except for a few weeds pulled by hand)

Notes on Irrigation: This crop was not irrigated

Diseases observed: none

Potential Disease Threats: What should farmers of the future expect to see?

Downy Mildew and Leaf Spot are common diseases that effect spinach crops. Symptoms of these include (respectively) white/gray mildew on the underside of leaves and white spots surrounded by reddish circles.

Insect Pests observed: We did not directly observe any insects on the spinach crops though there were signs of leaf eating by some insect.

Potential Insects: What should farmers of the future expect to see? Report more than one pest if applicable.

Green Peach Aphid and Cabbage Loopers are listed as the most common insect pests by the NEVMG 2018-2019. Aphid damage will appear as small “nubby” embryonic pods on leaves in which the larvae are being born, during and after which there may be leaf damage from eating. Cabbage loopers will also leave leaf damage and feces behind

Do you think the production practices needed for this crop was worth the yield that we received?

We used the incorrect seeder with the first succession of spinach which is why we ended up only having one. I also think it would have helped germination if we had covered the beds with remay after seeding.

Harvest & Storage:

When was the crop ready for harvest? How did you know?

We first harvested spinach for our fall markets on 10/4, which is later than was planned, but our first seeding didn't take and it took a while for the second succession to come in. Spinach is ready to harvest once the leaves have spread out a little from their tight floret.

How was it harvested?

We harvested spinach by hand, making a bunch with one hand and cutting the stems about halfway up with the other hand. If you are harvesting young spinach, harvest the outer leaves to encourage growth. Spinach can usually be harvested 2-3 times. We put the spinach into green harvest bins.

How was it washed at the wash station?

Spinach is washed in the triple wash station, dunked and weeds/yellow leaves picked out, and then placed in the spin dryer for about 45 seconds to a minute.

List different post-harvest practices for each market (if any) Spinach is triple washed for all of our markets.

List different shipping practices for each market (if any)

If we sold to Big Y we would most likely put spinach in 1.5lb plastic bags. We use large plastic bags for deliveries or bushel boxes to dining and student businesses. Spinach is either kept in the small lock-tops, or in the wood and wire handle baskets for the Farmer's Market and CSA during distribution.

What different or improved harvest and shipping recommendations can you make?

If future student farmers wanted to harvest spinach and other small greens more efficiently as well as use a tool that is used on many farms, it would be beneficial to use our Quick Cut Greens Harvester.

Storage and post-harvest handling:

Curing: No

Washing before storage: yes, triple wash and spin dry

Storage Requirements: 32° 95-100%RH 10-14 days

How should this crop be processed for long term storage: Spinach does not store long-term

Where your crop was stored this fall? The barn cooler

How well did this crop fair in storage and how did it enter storage?

The spinach that we did get from the field faired just fine in the cooler. We kept it in lock-top bins if it did not go to market.

Were there any problems in storage?

Some of the spinach on the bottom was a little slimy in some of the bins at times, the remedy for which is most likely taking more time in the spin dryer, it can always go back in!

What different or improved storage recommendations can you make?

The spinach we had went to markets fairly quickly, so we didn't have problems in the bins, I have seen spinach kept in plastic bags with holes in the bag to help with moisture problems, but this can also affect the texture of the leaves.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
10/4	4	Lbs.	1.5 (in bags)	156lbs.	
10/18	6	Lbs.	1.5 (in bags)	156lbs.	

Review and Recommendations

What was different between what was done and what was planned?

The spinach did not go as planned at all. We only sold a small amount of spinach to Big Y Amherst and brought it to the CSA twice, we had planned to have early fall spinach for the wholesale markets and CSA.

What worked really well and should be continued?

When we had spinach, we brought it to the CSA and sold it where we could, because there wasn't that much, it is difficult to say what went well.

What changes would you recommend for next year?

I think spinach should be up for reconsideration as a crop next year, it can be hard to grow and we offer other greens, considering the cost we put into seeding the spinach it was not worth the money made from the final product.

SWEET POTATO

Ipomoea batatas

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
Big Y	1144 lbs	
CSA	2800 lbs	
Farmers Market	76 lbs	
Dining	1300 lbs	
Student Businesses	575 lbs	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Beauregard	Vicks Family Farms	1000 slips	180\$	untreated

Reasons for selecting these cultivars:

Beauregard is a very standard variety of sweet potato and one of the most popular varieties. It has nice orange color and does well in areas that get cool.

I was interested in also trying Japanese yams but the price difference between the Beauregard variety and the Japanese yams was huge. So I decided to keep things simple and stick with just Beauregard to save money.

Did the variety description meet your expectations? Why or why not?

Yes, the sweet potatoes grew great and look great right now. Considering they were often the crop that ended up getting skipped on for weeding I think they did really well. I have yet to taste one so I'm curious about the flavor still.

Would you recommend these varieties again?

Yes, I think Beauregard is a trusty and popular variety and should be included in next years crop.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

I recommend Japanese Yams if someone is able to find someone who sells the slips for cheap/ non-organic slips. This variety is currently gaining popularity (honestly, I think it is because they are the color of the yam emoji).

How and when the crop was seeded/transplanted:

We put down black plastic then had a large group of people to manually punch holes at a foot spacing. We hand planted all the slips in one afternoon on May 31st.

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1	5/31	3000/ 6 beds	1	hand	High survival rate

Farmer Notes: When planting sweet potato slips it is important to dig holes deep enough to cover the majority of the slip (up to the top leaves) in soil. Our crew did this by hand using bulb planters (giant hole-punchers for soil). This caused us to take a whole afternoon to plant the sweet potato slips so I recommend using the water wheel on the tractor instead. It is best to plant them in full sun late enough in the season so the soil is warm. Our sweet potatoes looked pretty wilted the first few weeks they were in the ground but they perked up on their own as time went on, so don't feel panicked if this happens to you.

Planting Information

Expected yield/ft: 3.5 lbs/foot

Direct seed or transplant: direct seed/ planting slips

In-Row Spacing: 12"

Between Row Spacing: 6'

Number of Rows Per Bed: 1

Bed Feet planted: 3000

Field Planted In: C

Number of succession plantings: 1

Broadcast Fertility: 4/23/19 Composted Chicken Manure 5-4-3 1000 lbs/acre

Additional Fertility: No

Cultural practices:

- We used black plastic in all 6 beds.
- Unlike potatoes, no hilling is required for sweet potatoes
- We went through and hand weeded the holes of the sweet potatoes on June 12th, 25th, 26th. As the season went on we had less time to give a detailed hand weeding but would do quicker walk throughs and pull the big weeds.
- We hoed the paths between the rows of the sweet potatoes on June 12th and 25th and about 4 more times in July and August.
- We used the under-cutter bar implement on the tractor to get them out of the ground.
- Once the sweet potatoes were dug and laying in the field, we hosted a volunteer day to get help with getting them all out of the field and packed into bags.

Notes on Irrigation:

The sweet potatoes were set up with drip lines underneath the black plastic. We turned the drip on during the excessively hot and dry times in the summer. Sweet potatoes don't require a lot of water though and can do well in dry soil once established.

Diseases observed:

There were no diseases observed on our sweet potatoes!

Potential Disease Threats:

Over-irrigation can lead to water-logging sweet potatoes which can suffocate the plant roots and lead to diseases such as powdery scab, blackleg, and tuber cracking.

Powdery scab: dark brown, pithy patches that may be raised and warty

Blackleg: inky dark colored and sometimes slimy lesion that develops on the stalk

Tuber cracking: cracks that form in the sweet potato that either stay open or heal creating a fissure

Insect Pests observed:

Wireworm

Damage caused: Holes and scars from holes

How was it scouted or observed: While harvesting we observed some wireworms still inside of the sweet potatoes

Action(s) taken: All we could do was sort out the sweet potatoes that had damage from the wireworms.

Potential Insects: What should farmers of the future expect to see? Report more than one pest if applicable.

Wireworms: larvae of beetles that eat holes and leave scars in root vegetables

Sweet potato flea beetle: beetles cause damage to the growing leaves of the sweet potato

Leaf hopper: leafhoppers also cause damage to the leaves by feeding on them

Do you think the production practices needed for this crop was worth the yield that we received? Yes, we often times left sweet potatoes as our last priority for weeding and they looked alright for the most part. Of course if we left them unattended for too long they would become a slightly stressful weeding situation but never anything unmanageable. They produced a good yield and taste great, are good for storing, and add some weight to the CSA.

Farmer Notes: Try to weed in the holes of the sweet potatoes early on because once they start to grow and vine out it becomes much more difficult to even get in the aisles. I recommend using the transplanter on the tractor to punch holes in the black plastic and drop the slips into place. Remember to weigh how many pounds you end up harvesting because it will be useful for next years crew (we forgot to write it down).

Harvest & Storage

When was the crop ready for harvest? How did you know?

Typically the leaves start to turn yellow when sweet potatoes are ready to be harvested. You can dig a few up to see how they look prior to harvesting all of them. Ours were harvested on October 10th.

How was it harvested?

We used the under-cutter implement on the tractor to dig them all out at once.

We hosted a volunteer day to get some extra hands for collecting the sweet potatoes into white bags. There was about 10 of us total who were able to come. It took us between the morning block @9am till about 2pm to get the job done.

When harvesting heavy bags of roots we would have one person drive a truck along the edge of the field while one person stood in the bed of the truck and collected the bags into the back as people carried them to the edge of the field.

How was it washed at the wash station?

We put some through the brush washer initially but they got kind of scraped up in it.

For the majority of the sweet potatoes we would use white rags to brush the dirt off before packing them.

List different post-harvest practices for each market (if any)

Wholesale: brush washer

Dining: brush washer

CSA/Farmers Market: wiped down

List different shipping practices for each market (if any)

Dining: Wax boxes

Big Y: Wax boxes

CSA/Farmers market: Either keep them in the bags or transfer them into black totes.

What different or improved harvest and shipping recommendations can you make?

A better system for washing the sweet potatoes for wholesale needs to be developed. The brush washer was too rough at times and cleaning them with a rag isn't thorough enough for Big Y and dining. I recommend experimenting with the root washer and the brush washer to see which one works best for sweet potatoes.

Storage and post-harvest handling:

Curing: We cured the sweet potatoes in the haygrove for about a month.

Washing before storage: No

Storage Requirements: 54-61 degrees, 85-90% RH, about 1 month duration

How should this crop be processed for long term storage: Cured and unwashed until an order is placed

Where your crop was stored this fall?

In white bags in the barn

How well did this crop fair in storage and how did it enter storage?

The sweet potatoes did great in storage.

Were there any problems in storage?

No issues with storage

What different or improved storage recommendations can you make?

None

Farmer Notes: I recommend talking to Amanda and Jason about what methods for washing the sweet potatoes they would recommend. We resorted to wiping them down with clothes a few too many times which resulted in sending out orders that weren't as quality as they could have been.

Actual Yields and Sales:CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/27	3	each	3 and 2	275	
10/1	4	each	4 and 2	342	
10/11	5	each	2 and 2	208	
10/25	7	White bags	unknown	6 bags	
11/1	8	each	3 and 2	275	
11/8	9	-	Take what you want	All	We had a surplus of sweet potatoes
11/15	10	-	Take what you want	All	So that last two weeks CSA members could load up

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Dining	\$1.75/lb	1275 lbs	\$2231.25
Big Y Amherst	\$1.75/lb	180 lbs	\$315
Big Y Northampton	\$1.75/lb	173 lbs	\$302.75
Big Y South Hadley	\$1.75	171 lbs	\$299.25
Big Y Greenfield	\$1.75	50 Lbs	\$87.50

Total Gross Income Received From Your Crop: \$3,235.75

Review and Recommendations**What was different between what was done and what was planned?**

I had planned on growing a second variety of sweet potatoes along with the Beauregard. But we were not able to find someone who sold the varieties slips for a price we could afford. However, this change happened early enough in the season for it to be noted in my original crop plan so technically we did follow the plan.

What worked really well and should be continued?

Doing one massive harvest of the sweet potatoes (and parsnips) was amazing. It was nice to know they were all out of the ground and in the barn during harvest days. Having the ability to have the whole crew in one location rather than sending some people to South Deerfield to harvest roots made communication and timing during class harvest blocks better.

What changes would you recommend for next year?

I would try to up the amount of sweet potatoes we sell to dining because they can always use them. We had a large amount of excess at the end of this season and the food bank was unable to take all of it so it is a shame we didn't sell more during the season.

In terms of planting I would recommend planning a day when you can use the transplanter on the tractor to punch holes in the plastic and drop slips. We got the job done doing it without a tractor but it would have been more time efficient to use one.

Should we grow this crop again? Why or why not?

Yes, sweet potatoes bring in a good amount of money and are a relatively low maintenance crop. They were a big part of every CSA as soon as they were harvested and available.

SWISS CHARD

Beta Vulagis

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs]	Notes
Csa	700	Based off 175 shares.
Farmer's market	25	
Big Y A	150	
Big Y N	180	
Big Y G	10	Ordered more than 10# in reality.
Big Y SH	100	
Dining	350	
Efoods	100	Did not order on Sept. 13 th

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Bright Lights	Johnny's	6,000 seeds	\$29.52	Not organic

Reasons for selecting these cultivars:

“I only chose the Bright Lights variety based on the recommendations from previous years’ farmers. Their advice was to keep it simple, because our markets like rainbow chard and to add several varieties just complicates things unnecessarily for us. I was deciding between one 10,000-seed packet and six 1,000-seed packets, because there’s a difference in unit price of 257 seeds/dollar versus 203 seeds/dollar. However, since we only need 6,000 seeds the 4,000-seed excess is not worth it for the savings. I thought about the fact that this variety is not organic, but since my other two crops are organic and this one was so highly recommended, I stuck with it!”
– Carly Brand

Did the variety description meet your expectations? Why or why not?

Yes. The chard looks beautiful with big leaves and bright colors. Modest leaf damage from pests. We have achieved our desired yield for the first two weeks and it looks like we are on a good track for the rest of the fall.

Would you recommend these varieties again? Yes

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Ruby Red/Rhubarb, Bright Yellow, and Fordhook Giant Chard – these three varieties could be a good alternative to Bright Lights because it would mean that the farmer can create their own rainbow mix. Potentially cheaper than Bright Lights as well.

How and when the crop was seeded/transplanted:

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Bright Lights	6/10/19	128	9	
Bright Lights	6/24/19	128	9	

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
1	7/8/19	600	2	Hand Plant	Good
2	7/22/19	600	2	Hand Plant	Good

Planting Information

Expected yield/ft: 0.5 lb/ft

Direct seed or transplant: transplant

In-Row Spacing: 12"

Between Row Spacing: 18-24"

Number of Rows Per Bed: 2

Bed Feet planted: 600'

Field Planted In: ALC 9

Number of succession plantings: 2

/Broadcast Fertility: 6/17/19 Composted Chicken Manure 5-4-3 1000lbs/acre Potassium Sulfate 500 lbs/Acre

Additional Fertility: None

Cultural practices: None

Notes on Irrigation: No irrigation was used in the field. Did well without drip tape.

Diseases observed:

Alternaria

Damage caused: Yellow and dark brown circular necrotic spots on leaves, centers of some lesions fell out, some leaf drop occurred.

How was it scouted or observed: Observed at the time of harvest.

Action(s) taken: Leaves with holes were cast aside and not bunched for Big Y, but some with minimal damage were deemed acceptable for distribution in the CSA.

Potential Disease Threats:

Bacterial soft rot - Brown lesions on leaves, center of leaves break down.

Damping-off - Dark lesions on seedling stems, can cause death of seedlings.

Beet curly top virus - Slow growth, shortened stems, curled, yellow leaves with swollen veins

Insect Pests observed: Insects were the primary pest observed on the chard but I never actually saw any bugs while harvesting.

Leaf Miner

Damage caused: Holes in over half of leaves.

How was it scouted or observed: Saw the holes but did not see the insects themselves.

Action(s) taken: Leaves with holes were cast aside and not bunched for Big Y, but some with minimal damage were deemed acceptable for distribution in the CSA.

Potential Insects:

Flea beetle - Tiny insects that jump like fleas chew small holes in the leaves.

Rove beetle - Dig planted seeds out of ground, feed on young seedlings and sometimes leaves.

Do you think the production practices needed for this crop was worth the yield that we received?

We obtained a solid yield from the chard but we were all sick of it by the end. Harvesting and bunching was quite a pain and took a lot of time. The longer it sat in the field, the more damaged the leaves became. Probably worth-while but not so fun for Big Y since many leaves had at least some damage.

-

Harvest & Storage:

When was the crop ready for harvest? How did you know?

We harvested chard until mid-late fall. It was ready once the average combined length of the leaves and petioles reached about 2 feet in length. It is ideal to harvest it as early as the leaves reach the right size because bugs eat holes in the leaves the longer the plants sit in the field. Not a huge problem for CSA but a major pain if doing bunches for Big Y.

How was it harvested?

We harvested the chard with knives or simply by breaking leaves off by hand. We used a number of different methods to try to boost efficiency when making bunches for Big Y. In the beginning of the season, we selected individual leaves and cleaned plants so that there were a few young leaves remaining that would grow up so we could get a second harvest. Our system by the end of the season was as follows: a few people would cut entire plants down and make piles of leaves. The rest of the crew would sort and bunch leaves or pack them loose.

How was it washed at the wash station?

We either used the 3-bay sink to dunk the chard or just a single dunk tank. The chard was never very dirty.

List different post-harvest practices for each market (if any)

Sometimes we did not wash chard for the CSA while when we did was it for other markets.

List different shipping practices for each market (if any)

Packed in lock lids for all markets.

What different or improved harvest and shipping recommendations can you make?

I am not sure that it is worthwhile to attempt to get a second harvest off the chard. It never looked as good and was a real pain. Cutting the entire plants is a much more efficient technique.

Storage and post-harvest handling:

Curing: N/A

Washing before storage: Dunk in 3-bay sink or dunk tank

Storage Requirements: Should be washed and stored in a cooler at 32°F for no longer than 5 days.

How should this crop be processed for long term storage: N/A

Where your crop was stored this fall? Lock lids in the cooler.

How well did this crop fair in storage and how did it enter storage?

It did fairly well in storage. I do not think we ever had to store much chard though. We never wanted to harvest more of it than we needed.

Were there any problems in storage? No.

What different or improved storage recommendations can you make? None.

Farmer Notes: The chard is kind of a pain to harvest and people do not really like it very much. Bunching chard takes so much time and so many people. Keep that in mind, future farmers...

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/13	1	lb	1 full, 1/2 half	105.5lb	
10/4	4	leaves	8 full, 5 half	~750 leaves	Harvest lists are not accurate

Other Markets – report total amount sold to each market over the season

Market	Price/unit (\$/lb)	Total Units sold (lb)	Total amount of sales (\$)
Big Y A	1.75	397	694.75
Big Y N	1.75	304	532.00
Big Y SH	1.75	273	477.75
Big Y G	1.75	153	267.75
DC	1.75	202	353.50

Total Gross Income Received From Your Crop: \$2,325.75

Review and Recommendations

What was different between what was done and what was planned?

Things went more or less according to plan for the chard. We harvested almost exactly as much as we planned. We did not end up selling to Earthfoods, however, and were not able to harvest chard until the final market like we planned.

What worked really well and should be continued? Seeding / planting was all great.

What changes would you recommend for next year?

Utilize more efficient harvest strategies. Make sure to have knives and all the right gear. Improve pest management strategies / don't leave in the ground too long because the leaves will become full of holes and unworthy for picky supermarket shoppers. Don't make bunches too big either.

Should we grow this crop again? Why or why not?

Yes. It is kind of a pain sometimes and is not widely enjoyed in the kitchen but it really does make a surprising amount of money.

TOMATO

Solanum lycoperisum

Final Crop Analysis

Estimated Harvest goals:

Market	Total Yield Goal [lbs/units]	Notes
CSA	2625	We mostly only ended up bringing summer production tomatoes to the CSA because mine ripened extremely late. We did get to bring two weeks of mixed Esterina and Clementine tomatoes for people to take from.
Farmer's Market	30	We sold mostly summer production tomatoes, with two weeks offering mixed pints of my two cherry varieties.
Big Y N	90	We did not have the opportunity to sell Big Y tomatoes in the fall, as all we had were non-organic summer production tomatoes from the haygrove to offer them.
Big Y A	75	"
Big Y SH	80	"
Auxiliary	75	We did not sell any to auxiliary/catering.
Earthfoods	75	
Greeno	45	

Cultivars/varieties and seeds:

Cultivar	Source	Amount	Cost	Org or Untreated?
Defiant	Johnny's	500	\$108.34	org
Granadero	Johnny's	500	\$86.43	org
Clementine	Johnny's	130	\$20.03	org
Esterina	Johnny's	140	\$23.84	org

Reasons for selecting these cultivars:

I selected a mix of cultivars to cover as many bases as I could between type of tomato (slicer-defiant, sauce/paste-granadero, cherry/colorful tomatoes-esterina and clementine), while also selecting for disease resistance when possible (e.g. defiant).

Did the variety description meet your expectations? Why or why not?

So far, all varieties have met their descriptions. The clementines are beautiful, big, orange cherry tomatoes with a sweet-tart flavor. The esterina are a brilliant yellow, smaller than the clementines, with the sweetest flavor, reminiscent of a sun gold. The esterina were my favorite. The defiant tomatoes were absolutely disease resistant; they required the least spraying. However, defiant tomatoes have absolutely no flavor. All of the aromatic qualities have been bred out of them in favor of disease resistance, making the eating experience... less than desirable. It tastes like acidic mush; like a wintertime supermarket tomato. It is unpleasant to say the least. The granadero unfortunately never ripened, so I cannot speak to their flavor, but the fruits were firm and fleshy like a good saucer should be, and the plants themselves were insanely productive.

Would you recommend these varieties again?

I would definitely recommend clementine and esterina; cherry tomatoes are slightly easier to harvest than grape tomatoes and really fulfill the CSA member desire for colorful, fresh, flavorful tomatoes. I would recommend defiant never be grown again. I cannot say either way on granadero; it might be worth future experimentation, but it might turn out to be terrible.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Big beef: this is the most epic tomato! We grew it in the haygrove (not certified organic) and they were beautiful and sexy and meaty and delicious.

Brandywine/Cherokee Purple/Black krim/literally any heirloom slicer: just grow an heirloom to try it. Choose an accompanying disease resistant variety so that if the crop fails there is something to fall back on. This year ended up being great growing conditions and I didn't plan for any ~risky~ but flavorful tomatoes, which I regret.

Farmer Notes: Future farmer, less is more with tomatoes. I spent so much time focusing on checking off all the boxes of different types of tomatoes, and a lot less time delving as deeply as I should have into the specific varieties I picked. It wasn't until after all the varieties were chosen and seeds were ordered that I realized more disease resistance=less flavor for tomatoes. I would really recommend just picking a boss tomato variety and a resistant variety, hoping for the best and knowing that if the delicious tomato fails you have the resistant variety as a backup (even if it's not as great). If you must go crazy (as I did), limit yourself to four varieties, and see how many you can use to hit two (or three) birds with one stone.

How and when the crop was seeded/transplanted

It was transplanted using the transplanter and water wheel on 7/9 and 7/11.

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Defiant	6/3	128	2	just fine
Granadero	6/3	128	2	"
Clementine	6/3	128	1	"
Defiant	6/10	128	2	"
Granadero	6/10	128	2	"
Esterina	6/10	128	1	"

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
Defiant	7/9	~350	1	transplanter	did fine
Defiant	7/11	~350	1	transplanter	did fine
Granadero	7/9	~275	1	transplanter	never ripened
Granadero	7/11	~138	1	transplanter	never ripened
Clementine	7/9	~138	1	transplanter	ripened first
Esterina	7/11	~138	1	transplanter	ripened second

Farmer Notes: The seed order was enough to fill all the bedspace dedicated to tomatoes, but I messed up my math breaking it down by variety, so we got weird splits of beds between varieties. We planted tomatoes WAY too late. They barely got to ripen before the first frost and a lot of our effort was fruitless. Our main tomato product this year were our summer production tomatoes from the Haygrove. Our tomatoes should be put in the ground in mid-June, **the latest**. If they start coming in before school starts, we have plenty of summer markets in August interested in tomatoes. It'll give them a chance to really get going before the weather kills them off. I planned two successions of tomatoes but they weren't seeded that far apart and ended up being ready to transplant at the same time, effectively making it only one succession. It is tempting to make multiple successions of tomatoes, but since the fruits come in so regularly and abundantly only one succession is necessary.

Planting Information

Expected yield/ft: 2lb/ft

Direct seed or transplant: TP

In-Row Spacing: 24"

Between Row Spacing: NA

Number of Rows Per Bed: 1

Bed Feet planted: 1375

Field Planted In: ALC-7

Number of succession plantings: 1

Broadcast Fertility: Composted Chicken Manure 5-4-3 1000 lbs/acre

OMRI Potassium Sulfate 500 lbs/Acre

Additional Fertility: No

Cultural practices:

Tomatoes were grown on black plastic with drip tape. Wooden stakes were placed every 2-3 plants for trellising. Tomatoes were trellised using a Florida Weave technique. We suckered/pruned the tomatoes once, about a week or two after transplanting, before we trellised for the first time. After we began running lines through them we stopped suckering and pruning.

Notes on Irrigation:

This crop was irrigated using the dripline only on the hottest days of the summer; it was not necessary to irrigate it regularly. It was not a rainy season, but it was just wet enough to keep things generally happy.

Diseases observed: Luckily (and rarely) no disease was observed on the tomatoes this year. Copper was sprayed regularly, disease resistant varieties were selected, and above all else prevailing weather conditions were unfavorable to common tomato pathogens.

Potential Disease Threats:

Tomatoes can be wimpy, sickly babies, and are hosts to a wide range of diseases. Diseases to watch out for include: early blight, late blight, alternaria leaf spot, fusarium wilt, powdery mildew, blossom end rot, and more. The biggest, most common threats on SFE are probably late blight, powdery mildew, and blossom end rot.

Late blight (*Phytophthora infestans*) appears as large, yellow to dark brown to black lesions on stems and leaves. According to Amanda, it “looks like someone drew with a sharpie all over the plant.” Late blight is the most serious threat to tomatoes and other solanaceous crops, and any incidence of it must be reported immediately, with any infected plant material removed from the field and disposed of.

Powdery mildew (*Oidium neolyopersici*) appears as light greenish/yellow lesions on the leaves. They start small and eventually converge, leading to full coverage of the leaf by lesions. In favorable conditions, powdery growth will appear on the undersides of the leaves. Complete defoliation is possible.

Blossom end rot is a physiological disorder caused by insufficient Calcium. It appears as waterlogged, brown lesions or rot on the bottom of the fruits.

Insect Pests observed:

There was a brief incidence of hornworms (mostly in the summer production tomatoes, but the smallest handful were observed in the field tomatoes), but lucky for us they had been colonized by parasitizing wasps, who took care of the problem for us.

Hornworms:

Damage caused: They nibble off foliage, stems, and will even munch green tomatoes.

How was it scouted or observed: They’re literally fat green worms, so while they blend in a little with the plant, it’s pretty easy to see them (especially where there’s damage) while you’re working in the tomatoes, trellising and whatnot.

Action(s) taken: This year, none. You can feed them to the chickens, or keep them like pets in Wysocki to see if they sprout parasitizing wasp babies. If it gets truly terrible (which it never has in previous years) there are abundant organic pesticides available for use, all of which can be found in the Vegetable Management Guide from UMass Extension.

Potential Insects:

Typical pests for tomatoes that student farmers have seen before are hornworms and flea beetles. Hornworms are described above. Flea beetles are incredibly small (1.5-3mm adults) beetles. They chew holes in the leaves; a severe infestation on young plants can cause the loss of full plants or entire stands. The beetles can overwinter on neighboring weeds, in plant residues, or in the soil if present the previous season.

Do you think the production practices needed for this crop was worth the yield that we received?

I think we did good this year with tomatoes, trellising pretty regularly and using new wood stakes. I desperately urge whoever has tomatoes next year to put your foot down and demand coated, 8' metal T-posts. We don't need every post to be metal, but a few sprinkled in among the wooden stakes would make a big difference in the collective load bearing capability of our trellising system. The new wooden stakes were a definite step up from the old, weakened ones, but they were still somewhat short and definitely hard to deal with (and were only tenuously supporting the weight of the tomatoes). I think a metal T-post in place of every third to fifth wooden stake would be the ticket, and would also be a fantastic compromise economically (coated T-posts are very expensive.)

Farmer Notes: *The fact that the tomatoes were planted so late they never really ripened sort of negates any benefit of our cultural practice. The fact that only the cherry varieties tasted good really negates our efforts. It was sad for me to have put in so much effort for so little reward, so I would like again to drive home the idea that tomatoes must be planted in June. I don't know how past years had any success planting in July. Tomatoes are easily my favorite fruit/vegetable/whichever you consider them, and they deserve better than what I gave them.*

Harvest & Storage

When was the crop ready for harvest? How did you know?

Tomatoes were ready for harvest when they were fully ripe. The ripeness was distinguished by the intensity of the color and of course, taste testing. Unfortunately, the majority of the fall tomatoes never ripened, so the following information is mostly about summer tomatoes- however these practices are applicable to future fall tomatoes that do ripen on time! When tomatoes were harvested (twice a week in summer, once a week in the fall) we would also pick any tomatoes that were half ripe as well, to sort and ripen in tomato boxes on the green shelves in the barn.

How was it harvested?

Tomatoes were harvested by hand into green bins. When harvesting for Big Y it is ideally done in clusters of 4+, but for dining or CSA loose tomatoes (with the calyxes removed to avoid stabbing the others) were acceptable.

How was it washed at the wash station?

Tomatoes were not washed.

List different post-harvest practices for each market (if any)

Ripe tomatoes were packaged immediately for sale, while half ripe tomatoes were boxed up and marked as such so they could be sorted the next time we filled an order.

List different shipping practices for each market (if any)

Tomatoes were packed in tomato boxes (or bushel boxes if we ran out) for Big Y and Dining, and lock lids for CSA. We sold tomatoes to Sylvan Snack Bar in bushel boxes.

What different or improved harvest and shipping recommendations can you make?

I would recommend being religious about the system of picking anything half ripe to ripe, as usually they ripen so fast on the vine by the next harvest the half-ripes are no good/overripe.

Storage and post-harvest handling

Curing: N/A

Washing before storage: No

Storage Requirements: Tomatoes can be stored for 5-10 days, (the greener they are when picked, the longer they can store as they ripen), ideally between 65-70F (cooler if closer to 10 days) and 90-95% RH. Flavor and aroma quality will decrease with longer storage. Tomatoes should be brought to room temperature before consumption and should **never** be refrigerated.

How should this crop be processed for long term storage: Unwashed, calyxes removed, in tomato boxes.

Where your crop was stored? The crop was either sold immediately or stored (short term, no more than a few days) in tomato boxes on the green shelves outside the cooler in the barn.

How well did this crop fair in storage and how did it enter storage? Tomatoes were only stored until the next harvest/wash/pack/delivery day, where the stored half-ripes would be sorted again for what was sellable and what had to be composted.

Were there any problems in storage? Some tomatoes had to be discarded after storage.

What different or improved storage recommendations can you make? It's important to be on top of tomato harvest and sorting, so that we can sell as much ripe product as possible. Half-ripe tomatoes ripen within a few days and should not be forgotten about. Once tomatoes start coming in off the vine they come in like gangbusters and we can/should sell as much of it as possible.

Farmer Notes: Tomatoes are finicky little fruits. The most important thing is to not refrigerate them; otherwise, just do your best to keep up with the glut of ripe tomatoes and remember to sort any half-ripes that have been boxed up to ripen on the next harvest day. The only fall tomatoes we ended up moving were the esterina and clementine, which were picked Friday mornings and brought to CSA distribution. They were never stored. Nearly all the information above is about summer tomatoes but I think it is the same system that should be employed for fall tomatoes of the future.

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/13	1	“all”	unknown	“all”	Haygrove tomatoes
9/20	2	each	5 full, 3 half	454	Haygrove tomatoes; approximately 454lbs
9/27	3	each	3 full, 3 half	312	Haygrove tomatoes; approximately 312lbs
10/4	4	each	10 full, 10 half	~1000 (definitely didn't bring this many, I am pretty sure we ran out towards the end or changed half shares to 5)	Mixed esterina and clementine. This was the only week of distribution we got to bring fall tomatoes before a hard frost. The rest never ripened.

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Dining	2.00/lb*	234**	\$468.00
Sylvan Snack Bar	2.00/lb*	25**	\$50.00

*Price is \$2.00/lb because these were the non-organic haygrove tomatoes. Certified organic tomatoes are sold at \$2.75/lb

**Only summer production haygrove tomatoes were sold in the fall. Fall tomatoes largely failed.

Total Gross Income Received From Your Crop:

\$0.00 was earned from fall tomatoes. \$518.00 was earned from summer production tomatoes sold in the fall. This is a bitter lesson on planting tomatoes in June. Little of the fall tomatoes were brought to the CSA and I do not have an approximate poundage, so I cannot estimate the value of tomatoes brought to the CSA.

Review and Recommendations

What was different between what was done and what was planned?

Almost everything went according to plan. We planted super close to the planned planting date, despite my bad math dividing up the beds between varieties we planted a balanced mix of them, and we stayed on top of trellising. We did not end up suckering or pruning as frequently as I had planned, but honestly it was not necessary; I had a bad plan.

What worked really well and should be continued?

Trellising with the Florida Weave and fresh wooden stakes every 3ish plants was surprisingly effective, though I doubt they would have held even a few pounds more of plant material. Pruning only once before setting down the first line was also a good call. Growing them on black plastic sucks for the plastic waste but I think it is super essential for keeping them mostly weed free, since once the stakes are in we cannot get the I+J toolbar through and the aisles must be hoed entirely. Given the time of the season this happens at is a crazy busy time, any extra weed suppression we can get without active labor is a must.

What changes would you recommend for next year?

Please, please grow more flavorful varieties. Pick one disease resistant variety to fall back on, a real in-case-of-emergency variety, and then choose the best tomatoes you can. People love tomatoes, heck, I love tomatoes, and I just cannot stand the thought of a disappointment next year like we had this year, what with the lack of ripening and the poor flavor of the only slicer we grew. Also, do you damndest to get Amanda and Jason to invest in at least some coated, 8' metal T-posts. We can start accumulating them year by year and slowly increase the density of them within our trellising system. It is expensive but so worth the money!

Should we grow this crop again? Why or why not?

Yes. Do I even have to elaborate? We're a largely CSA based farm. They're tomatoes. C'mon.

***Farmer Notes:** Future farmer, I hope you can do tomatoes right. I did not, but I learned more about growing tomatoes in the process than I ever could have imagined. We have struggled with fall tomatoes every year and I really wanted to make this one the year we did not. Despite shockingly low disease pressure, regular trellising, and other blessed alignments of cultural practice and circumstance, I still doomed us from the start by overthinking variety selection. Try not to get caught up in the small details and focus instead on the big picture of delivering fresh, tasty, local tomatoes to your community. Tomatoes can be the most epic fruit we grow; they can also be extremely offensive to the senses. Depends on the tomato. I hope what I have written here will steer you right and 2020 will be the beginning of a long reign of delicious SFE tomatoes.*

WINTER SQUASH

Cucurbita moschata & pepo

Final Crop Analysis

Estimated Harvest goals:

Market	Crop/Variety	Weeks Needed	Lbs. Requested each week	Total Pounds Requested per Market
CSA	Waltham Butternut Acorn Honey Bear Spaghetti Squash	27-Sep 4-Oct 11-Oct 25-Oct 1-Nov 8-Nov 15-Nov	5 5 5 5 5 5 5	6,125
Farmer's Market	Waltham Butternut Acorn Honey Bear Spaghetti Squash	20-Sep 27-Sept 4-Oct 11-Oct 1-Nov 8-Nov 15-Nov	15 10 15 10 15 20 20	100
Big Y	Amherst North Hampton Greenfield South Hadley	27-Sep to 15-Nov 27-Sep 11-Oct 25-Oct 8-Nov 10	100 80 150 150 150 100 50	800 800 550 500
Earthfoods Greenos	Waltham Butternut Acorn Honey Bear Spaghetti Squash	EF 13-Sep 27-Sep 11-Oct 25-Oct 8-Nov 15-Nov G 13-Sep 27-Sep 11-Oct 25-Oct 8-Nov	50 50 50 50 50 75 25 25 25 25 25	EF 325 G 125

Cultivars/varieties and seeds:

Seed Source	Suggested Variety	Cost	Pelleted or coated seed? Y/N	Organic ? Y/N	Notes
Johnny's	Acorn Honeybear	\$10.24/oz	N	N	
Johnny's	Waltham Butternut	\$46.44/lb	N	Y	
Johnny's	Spaghetti	\$5.68/oz	N	N	

Reasons for selecting these cultivars:

I was interested in winter squash which is resistant to powdery mildew.

Butternut is a staple crop and last year the butternut variety was popular for the CSA. Big Y and Earthfoods are also interested in it. Acorn Squash - Honey bear is a single serving fruit when sliced in half and will provide CSA members a unique option. Spaghetti Squash - It was successful in Big Y sales and works great for the CSA. This larger version is more productive and has a higher demand compared to the angel hair variety.

Did the variety description meet your expectations? Why or why not?

The variety which I picked lived up to healthy looking plants and abundant fruit. However, we ended up using some Waltham Butternut seeds purchased from the Hadley Garden Center. This direct seeded squash became unhealthy and infected with powdery mildew. Additionally, the fruit was infected with black rot, fusarium fruit rot, and bacterial soft rot. It did not store well. More on this later.

Would you recommend these varieties again?

Despite these challenges, I recommend all three varieties. Be mindful of the type of seeds which you use. Do not grow cucurbits in South Deerfield A.

Make suggestions for two other varieties you think would be interesting to try in 2020. List your reasons.

Delicata JS- Stands out and looks different. Stripes and green streaks.

North Georgia Candy Roaster- Looks crazy, can store up to 5 months after harvest. Its tubular shaped and can appear an orange tinge with green stripes. This rare variety could spice up the CSA and provide a unique flare for Farmers Markets. Johnny claims that it tastes amazing. There are many recipes online.

How and when the crop was seeded/transplanted

Greenhouse seeding

Variety	Seed date	Tray size	Number of trays	Notes on germination
Butternut	5/8	48	21	
Spaghetti	5/8	48	16	
Honey Bear	5/15	48	5	

Field Planting Info

Planting #	Plant date	Number of row feet planted	Rows per bed	Planting method	Notes on survival in field
Butternut	5/29	1800	1	Plastic and water wheel transplanter	Mildew, squash bugs
Spaghetti	5/29	1200	1	Plastic and water wheel transplanter	
Honey Bear	5/29	600	1	Plastic and water wheel transplanter	

Farmer Notes: Original numbers were wrong, we did not have enough transplants. Two beds of Waltham Butternut were purchased at Hadley Garden Center. Seed was direct seeded into ground and became infected. This direct seeded squash became unhealthy and infected with powdery mildew. Additionally, the fruit was infected with black rot, fusarium fruit rot, and bacterial soft rot. Also, our original seeding numbers were incorrectly planned. We did not have enough transplant and this is why more were purchased at Hadley Garden center.

Planting Information:

Expected yield/ft: This was the expected harvest yield for Waltham Butternut: Weight range is 4-5lbs, 4-5 fruit per plant, 16-25 lbs/plant. 1 plant per 8". However, we ended up harvesting nothing 😞.

2 - 3.12 lbs per foot of row.

Acorn honey bear: 1-1.25lbs, 3-4 fruit per plant, 3-5 lbs plant. Compact vine length, 1 plant per 4". .75 lbs - 1.25 lbs per foot of row.

Spaghetti: 3-4 lbs, 4-5 avg fruit per plant, 12-20 fruit per plant. 1 plant per 8". foot of row. 1.5 lbs - 2.5 lbs per foot of row.

Direct seed or transplant: TP and DS

In-Row Spacing: 12

Between Row Spacing: 5 ft

Number of Rows Per Bed: 1

Bed Feet planted: 3600ft

Row Feet Planted: 3600 ft

Number of succession plantings: 1

Field Planted in: SD A

Broadcast Fertility: 4/16/19 Composted Chicken Manure 5-4-3 1000 lbs/A

Additional Fertility:

Cultural practices:

Black plastic was laid in early May. The squash transplants were planted with the water wheel transplanter. Two people dropped transplants into moist holes created from dibbles. This occurred on May 27th. We ran out of transplants, additional Butternut seed was purchased from the Hadley Garden Center. We did not use reemay over the few beds and this may have proved to weaken the plants disease resistant. The squash was later covered in reemay to protect from the cold nights of Spring and early pest damage from insects such as the striped cucumber beetle. Prior to applying reemay, we were diligent to hoe in between the rows and hand weed all unwanted weeds in the poked holes around the squash plants before covering with reemay. At one point, Ellis, Rhianna, Al and myself crawled into the reemay to check on the status of the transplants and weed some more. This may have been a waste of time but it was a toasty, warm and humid adventure. I still remembered taking the reemay off for the first time and seeing a huge amount of weed growth. I imagine that we would have lost the some squash (even earlier in the season) if we hadn't been weeded so meticulously prior to using reemay. After removing the reemay, the next step was to weekly monitor the weeds in between rows and keep the holes clean for the squash to continue to develop. We used scuffle hoes and occasionally the I and J toolbar would be driven through attached to the Green Bean to cultivate between the beds. Spaghetti squash was harvested with big hand pruners, rubbed with a cloth and placed into waxed bushel boxes. The acorn squash was harvested with pruners. We used a tractor carrying a large bin to quickly harvest the squash. However, numerous Honeybear was sticky and mushy. We had to compost a fair amount. Consider storing the squash with less pressure in a cool dry area, space in the barn? Butternut was harvested with pruners and left to cure in the field. However, it did not store well due to many diseases explained below.

Notes on Pesticide Application:

The squash was sprayed twice to protect against the striped cucumber beetle. The first was on May 27th, the same day as transplanting at a rate of "15 cups an acre" (Pesticide Application Records 2019). Sorrund/Kaolin Clay was applied. Later on June 26th, Pyganic was applied to the squash to help reduce the effects of striped cucumber beetles.

Notes on Irrigation:

The squash was irrigated through drip tape which was laid down at the same time as black plastic. It was turned on more often in the middle of the summer when we had stretches of long hot weeks. Drip tape was not left on overnight. Field A did not get particularly dry and the squash did not suffer extreme heat damage.

Diseases observed:

Powdery mildew- PM is a white powdery growth on the surface of leaves and stems. Fruit size is stunted and the fungi known as *Erysiphe cichoracearum* attacks in a wide range of temp 50-90 degrees and humid conditions. It strongly affects late planted squash.

Black rot- The spaghetti squash had a common case. This type of rot is caused by the same fungus which causes gummy stem blight.

Fusarium fruit rot- This pathogen can survive in the soil for 2-3 years and can be carried on or in the seed. I suspect that the Butternut from Hadley Garden center may have been infected.

Butternut had an odd pimple like symptoms which oozed a sap often times appearing like a foam. The diagnostic lab report from UMass extension guessed that the rot was a symptom of

some type of wounding of the fruit which allowed both the fusarium and bacteria to penetrate the skin.

Bacterial soft rot- This bacteria is spread from cultivation and insects. Healthy tissue is invaded through wounds created from squash bugs and other damages. Bacteria can also be splashed up from rain water or irrigation. Infection often occurs after a heavy wet week. UMass extension does not have any effective treatments for control of bacterial soft rot. One should remove as much infected plant material as possible. We ended up ripping up two beds of squash to prevent further spreading back in August when the squash was looking poor. Plants should be given enough room to grow, drip irrigation is more effective than overhead at limiting the spread of disease.

Potential Disease Threats: What should farmers of the future expect to see?

Please refrain from planting any cucurbits in block A for three years. The diseases which infected the squash will remain in the soil and can infect other types of cucurbits such as pumpkins, cucumbers, summer squash, and zukes.

Insect Pests observed:

Striped Cucumber Beetle

SCB effect different types of cucurbits and we found them flying around the haygrove near cucumbers as well as in block A near the winter squash. The pests are $\frac{1}{4}$ inch long, have a black underside and 3 black and yellow stripes on their wings. These stripes are straight and this helps distinguish them from the potato beetle. Larvae are $\frac{3}{8}$ inch long and look like tiny white worms. After overwintering, the adults emerge when temperatures exceed 55 degrees. They feed on the pollen of plants and move towards the winter squash plants to mate. Often they will emerge from wooded areas and create a concentrated perimeter around the crops. The eggs are laid at the base of the plants in soil and hatch after 1 week. Larvae grow for 2-4 weeks and summer adults will feed on flowers, foliage, and fruit. These beetles feed on cotyledons and vector (transmit) pathogens which can cause bacterial wilt. Their poop clogs the plant vascular tissue.

Squash Bug

Mushy fruit, difficult harvest, spreading of disease. Squash bugs ran rampant during the Butternut harvest. There were so many of them all over the place. Although a small quantity can just live around the squash in harmony, I think the masses may have hurt growth and spread disease. We did not take any real actions as it occurred late in the summer and we were busy with harvests and other projects at the ALC.

Potential Insects:

Squash bugs- often mistaken for stink bugs. These guys can grow to over a $\frac{1}{2}$ inch long. Young squash bugs look like aphids and often move robotically. These bugs will overwinter in dead leaves and vines. It is best to move squash far away from block A, in an attempt to end their life cycle. Squash bugs can inject a toxin into the plant and drink sap. This stab causes a yellow spot and can cause leaves to wilt, inhibiting the flow of nutrients. Squash bugs can therefore encourage the spread of bacterial wilt.

Do you think the production practices needed for this crop was worth the yield that we received?

I think Winter Squash is a great crop for the farm and in recent years has resulted in large amounts of revenue. It is easy to manage and grows well. Although our crew suffered a tough L in the production of Honeybear and Waltham Butternut, it should be grown again. Consider growing over at the ALC or in SD B/C and manage well with pesticide application, row cover, and frequent cultivation. Squash is a staple of the Student Farm, please bring us redemption!

Harvest & Storage

When was the crop ready for harvest? How did you know?

Spaghetti Squash was ready for harvest in mid August. It appeared as a white to yellow color and was quite firm. Acorn squash and Butternut was ready in September. They were firm and no longer had a glossy texture. Acorn is ready when it reaches a dark green color and the Butternut when it is tan. Acorn should be around the size of a softball. The butternut should be around 12" long.

How was it harvested? Butternut was cut off the vine using large pruners and some hand pruners. Butternut was placed in rows on the black plastic to cure for one week. Acorn squash harvest was really fun. We worked in groups and cut all ripe squash off the vine. Then a tractor was driven in the harvest row with a large white bin. Two people tossed the acorn squash to catchers who dropped the squash lightly into the bin. Spaghetti squash was harvested with large pruners and then cleaned off with a rag. It was placed directly into wax bushel boxes.

How was it washed at the wash station?

Winter Squash was not washed, it was cleaned off with cloth and rags.

List different post-harvest practices for each market (if any) Spaghetti Squash was put into wax bushel boxes for wholesale to the Springfield Big Y. Acorn was brought to CSA in lock top bins. Butternut never made it to any official type of market.

List different shipping practices for each market (if any) Wax Bushel boxes for Spaghetti Squash to the Big Y wholesale in Springfield. We used lock tops to bring acorn to the first CSA pickup.

What different or improved harvest, storage and shipping recommendations can you make?

It would be smart to store the acorn and butternut with less weight (do not stack) or in a cleaner bin. The acorn began to rot in the bay across from the SD cooler. There was too much pressure from excessive squash. The Butternut had a huge set of problems regarding pests and disease, however it also was stored in a similar method as acorn squash. Consider storing in a stable temperature, giving the squash as much space from each other as possible.

Storage and post-harvest handling

Curing: Butternut was cured for a week. Right after harvest, we laid them on top of the black plastic in rows. Cure for 7-10 days.

Washing before storage: Cleaned off with cloths

Storage Requirements: 50 degrees, darkness. Relative humidity of 50–70%.

How should this crop be processed for long term storage: Same as above

Where your crop was stored this fall 2019?

Inside by the bay in South Deerfield.

How well did this crop fair in storage and how did it enter storage? See above

Were there any problems in storage? See CA-3. Butternut had an odd pimple like symptoms which oozed a sap often times appearing like a foam. The diagnostic lab report from UMass extension guessed that the rot was a symptom of some type of wounding of the fruit which allowed both the fusarium and bacteria to penetrate the skin.

Farmer Notes: *Store in a single layer, not stacked on other squash.*

Actual Yields and Sales: CSA

Date	Week #	Unit lbs., bunches, bags	Amount Per share	Total brought to CSA	Notes
9/13	1	Lock Top	1	All	Acorn Squash

Other Markets – report total amount sold to each market over the season

Market	Price/unit	Total Units sold	Total amount of sales
Big Y Warehouse	\$1.50	738lbs	\$1,107
Big Y Amherst	\$1.50	56 lbs	\$84.00

Both of these above sales are Spaghetti Squash.

Total Gross Income Received From Your Crop: \$1,191

Review and Recommendations

What was different between what was done and what was planned?

This is pretty self-explanatory. We did not have enough squash to offer to CSA or other markets. The Butternut was unsuccessful, and the spaghetti was sold in summer to the Big Y Warehouse in Springfield.

What worked really well and should be continued?

Large shipments of squash should be brought to the warehouse in Springfield if the CSA season has yet to begin.

What changes would you recommend for next year?

None

Should we grow this crop again? Why or why not?

Yes, winter squash has proven successful in many years prior to this one. We had an unfortunate run, but I recommend that you try your hand at growing winter squash.

Farmer Notes: *I recommend staying for the summer in order to grasp a full understanding of the speed and timing that it takes to harvest large amounts of produce. This will better serve you in the fall while attempting to manage classes, harvests, friends, and other responsibilities. Like any college class, sleep is really important as early morning harvests will usually lead to long class days. Try and find a schedule in the fall which complements the Friday farmers market as well as Tuesday/Thursday Harvests.*

EQUIPMENT USED ON THE STUDENT FARM

We use many different pieces of equipment on the Student Farm, from simple walk-behind seeders to complex tractor-powered machinery, and even self-contained post-harvest equipment. The mechanization of diversified vegetable farming and the use of appropriate technology can often be the difference between a profitable enterprise and one that cannot make ends meet. We strive to gain efficiencies in equipment use wherever possible and practical, while maintaining our complex bottom line of education, economic viability, and environmental stewardship. The following are the main items we use.

TRACTORS:

John Deere 5055D: The 5055D, or “Green Bean”, is a 55 horsepower, two-wheel drive diesel tractor purchased new in 2014 for the exclusive use of the Student Farm and the Agricultural Learning Center. It has a front loader frame (for a bucket or pallet forks) and is our principal tractor for disking, fertilizing, laying plastic, transplanting, and direct seeding.



John Deere 2040: The 2040 is a 40 horsepower, two-wheel drive diesel tractor from the 1970's, and has seen a lot of love around the UMass Research Farm. It is ideal for tasks like disking, fertilizing, and mowing, and is an easy and comfortable tractor to drive. We use it as a substitute for the Green Bean when it is not available or when we need two tractors in operation simultaneously.

Massey Ferguson 2615: This relatively new tractor was acquired during the fall of 2011. It is a 50 horsepower, two-wheel drive diesel tractor, with the same range of applications as the John Deere 2040, is particularly well suited for the undercutter. It has all of the modern safety features of a new tractor, garnering it the affectionate nickname of “**The Safety Tractor**”. Though newer, its transmission is a little more complex than the 2040.



Massey Ferguson 175: The 175 is a two-wheel drive diesel tractor from the 1970's that has 75 horsepower. We primarily use this tractor for plowing, but also use it occasionally for disking, plastic laying, transplanting, or tasks that require more pulling or lifting power than the 5055D, 2040, or 2615 have to offer.

Allis Chalmers G: The G can be a big asset in our fight against weeds. The orange gas tractor is from the 1940's, but is in great condition and runs like a Swiss watch, especially now that the charging system has been converted from 6 volt to 12 volt. The G has a myriad of cultivation tools that can be mounted directly under its frame. Its unique feature is its rear-mounted engine, allowing the operator to look straight down and easily monitor the crops they are cultivating.



International Cub: The Cub is a small gas tractor from the 1960's, with a high amount of clearance underneath the frame for crops to pass through while cultivating. We primarily use the Cub to hill crops like potatoes and leeks, but there are wide varieties of hills and spades that can fit all kinds of applications. It is also useful for sidedressing fertilizer.

TILLAGE IMPLEMENTS:



The **Moldboard Plow** is the first piece of equipment that we use in the soil preparation process. It slices through the dirt and inverts the top 6-8" of soil to bury weeds and incorporate crop residues on the soil surface. While the moldboard plow can have a detrimental effect on soil structure and soil organisms (worms don't much appreciate being cut in half), it is still largely unrivaled in organic vegetable farming, where getting rid of initial weeds and incorporating residues are a high priority. The particular plow that

we use is a Massey Ferguson three-bottom plow, which means that it slices and inverts three furrows of soil per pass of the tractor. The Massey 175 is the tractor of choice for this implement, as it has enough horsepower to get the job done, but we also have access to a John Deere **two-bottom plow** that can fit the JD 5055D if need be.

After plowing (also known as primary tillage), the **Disc Harrow** is the most common form of secondary tillage. A disc harrow breaks up large clods of soil and can incorporate fertilizers in preparation for planting. The two gangs of discs churn the top 4-6" of soil, and an optional board dragged behind the implement smooths the soil surface in preparation for planting.

Discs can also be used as light primary tillage when a plow is too aggressive, such as lightly tilling the soil before seeding a cover crop or killing and incorporating a wide patch of weeds that have gotten out of control. As with any tillage, though, its overuse can damage soil structure and health. We have multiple sets of disc harrows that we utilize, including one at each farm location.



The **Perfecta Harrow** is a simple tine harrow with a rolling basket at the back of the frame. It is by far the most gentle and shallow piece of tillage equipment on the farm and is best used when trying to keep empty beds free from weeds. This process of maintaining empty beds free from weeds is called stale bedding. The perfecta harrow is also another great tool for incorporating soil amendments. smooth drum mounted on an axle that we use to firm up a bare-ground.



AMENDMENT APPLICATION EQUIPMENT



The **Drop Spreader** allows us to apply fertilizers to the field before planting. The tool consists of an eight foot wide hopper that is towed behind the tractor, with small holes in the bottom that allow fertilizer to drop at a controlled rate. By adjusting the size of the holes (via a small dial) and doing some trial runs you can calculate and hone in on the correct setting for applying a certain rate of fertilizer per acre. The drop spreader is towed using a tractor's drawbar, and the one we use requires hydraulic lines from the tractor to operate.

Our **Broadcast Spreader**, newly purchased in 2016, is another means for quickly spreading fertilizer and cover crop seed. Using a spinning disc with paddles, much like a truck sander, it throws material in a wide arc behind the tractor. It is much faster than the drop spreader, but is far less precise in its rate of application. We primarily use this at the Agricultural Learning Center where we do not usually have ready access to a drop spreader or grain drill.



PLANTING PREPARATION EQUIPMENT



The **Tractor-Mounted Rototiller** does an excellent job of pulverizing the soil and “hitting the reset button” on areas of our fields that have gotten out of control with weeds. It also does a great job preparing a bed for direct seeding, especially if we then roll the bed with our bed roller. Of course, as with any rototilling, it does damage soil structure and reduce populations of beneficial organisms (like our beloved worms), so we try to limit its use.

The **Bed Roller** is a simple smooth drum mounted on an axle that we use to firm up a bare-ground seedbed for direct seeding. We have found drastic germination improvements in using the three-row Planet Junior seeder when a bed has first been rototilled and then rolled. The bed roller also improves the success of using the transplanter on bare ground. However, if a bed is rolled too many days ahead of seeding, the germination of weeds may require another rototilling and bed rolling for optimal crop germination and minimal weed pressure.





Our **Plastic Layer** forms raised beds, lays drip tape, and covers the bed in plastic mulch in a single pass. It is three point hitch mounted, and its weight necessitates a tractor with front-mounted counterweights (such as the 2040 or 175) or a front loader frame (such as the 5055D).

SEEDERS / PLANTERS

Our **Clean Seeders** are utilized for a large portion of our direct seeding. They can be adjusted to precise seed spacings by use of interchangeable gears connected by a drive chain, as well as different seed sizes with each of their many seed rollers. When assembled with the correct rollers and gear settings, the clean seeder is very efficient, but can have difficulty with larger or coated seeds (like carrots,) which it is apt to grind and damage. In addition to our one-row clean seeder, in 2016 we purchased a **6-row variant** which allows us to plant dense beds of items like greens and radishes. The 6-row clean seeder also comes with a bracket to attach it to a tractor.



In 2015 we purchased a tractor-mounted **Three-Row Planet Junior** Seeder. While a simpler design than the clean seeder and sometimes fickle to adjust, the Planet Junior does a great job at seeding our Carrots, Beets, Parsnips, and other large-seeded crops. Seed spacings achieved are more of an average number of seeds per foot than a precise spacing, with a simple agitator and a variable sized hole for seeds to fall through. As such, smaller seeds (such as radishes, salad greens, and brassicas) tend to be planted in a clumped and erratic manner when run through the Planet Junior. Being tractor-mounted allows us to plant straight, uniform two or three-row beds, which greatly improves the effectiveness of mechanical cultivation. Between-row spacing is at 12", matching the basket weeder. *In 2019, after further research it was determined that the Planet Junior was not actually a Planet Junior Seeder but a Market Farm cheap substitute and has since been replaced.*

Our **Water Wheel Transplanter** allows us to plant and water-in transplants efficiently. Narrow drum-like transplanter wheels ride the contour of the bed, with adjustable "dibbles" that poke holes in the soil or black plastic and let water saturate the soil from on-board water tanks through adjustable valves. Farmers riding on the transplanter's rear seats manually drop seedlings into the holes created, and more farmers follow along behind the rig to set the seedlings and finish planting them in the soil. The transplanter can plant one or two rows per bed, and options for in-row plant spacing are 5", 10", 14", 19", and 23".





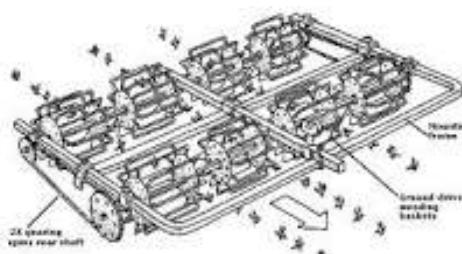
The **Potato Planter** allows efficient planting of one row of potatoes at a time. It digs a deep enough furrow for the spuds, and an operator sitting in back regulates the flow of potato pieces into the machine, which drops them into the furrow and covers them up with small hillling discs. It is a very small tractor-mounted machine, and far simpler than large-scale commercial potato planters, but it is a huge improvement over digging a trench and planting by hand at our scale.

The **Three-Row Jang Seeder** was purchased during the 2019 growing season after a few years of frustration with the Planet Junior Three-Row seeder. The new Jang seeder offers a lot of the simplicity that comes from our single and six-row Jang seeders but with the specific design meant for tractor use on our bed spacing for three-row crops. As we now use the clean seeders for crops staples such as carrots and beets we need to continue to experiment with rollers to make sure we can germinate these crops at a satisfactory rate.



CULTIVATION IMPLEMENTS:

The **Basket Weeder** is the main tool that we have used on the Allis Chalmers G. It consists of two sets of cultivating “baskets” mounted on two axels, with gaps for the crop rows to pass through unharmed (set for 12” between-row spacing). The baskets turn and loosen up the top inch of soil between the rows, uprooting small weeds and kicking them onto the surface where they desiccate. It is extremely effective at weed control when the weeds are still small (white thread stage to 3” tall, or so). We currently have the baskets set up to match the spacing of our three-row Planet Junior seeder for easy cultivation of our carrots, beets, and parsnips.



The **Williams Tool** is a tractor-mounted cultivator that uses many long tines to scratch the soil surface, uprooting tiny weeds that are still in the white thread stage. It is mounted behind the tractor and is intended for what is called *blind cultivation*, where the operator drives over crops without having to look back at the implement. The tines’ action can be set anywhere from aggressive to delicate; they should be set gently enough that they don’t disturb your established

plants but harsh enough to still uproot the very small weeds (in the “white thread” stage). Individual tines can also be raised to keep them out of the way of crop rows (such as potatoes). Our results with using the Williams have been good early in the season, but the success diminishes due to inconsistent use of the tool (and weeds that therefore get too large for it).

Equipment Used on the Student Farm

The **BCS** walk-behind rototiller is instrumental in controlling weeds in between beds. The rotating tines are effective at chopping up and incorporating small to medium sized weeds, and the compact nature of the machine makes it quite maneuverable and able to access areas that other tractor-mounted equipment can't. However, the slow forward speed of the BCS makes rototilling the entire farm a full or even multi-day endeavor, and

the bigger the weeds get, the more often it becomes clogged and ineffective.



The **Multivator** is a tractor-mounted twin rototiller designed to straddle beds and rototill the aisles. We use it primarily between beds of black plastic, as well as large bare-ground plantings like potatoes, and it is very effective when weeds are relatively small. However, once weed size increases, the multivator gets clogged more easily and imprecise tractor driving can lead to damaged crops or ripped plastic. Multivating can only occur when a crop is

small enough to be straddled by a tractor – once the crop gets too tall, it cannot be driven over without getting bent and damaged, and an alternative means to weed control in the aisles is needed. Still, with its limitations, multivating is far faster than using a walk-behind rototiller.

The **I&J Three-Row Cultivator** was purchased during the 2019 growing season. Its primary purpose is to improve cultivation of all crops in 2 rows. Its adjustable tines and shovels allows it to be very customizable and therefore able to be used on a wide variety of tasks including, crop cultivation, plastic cultivation, and with a disc attachment it can also hill the potatoes and the leeks more efficiently than the ones on the Farmall Cub.



HARVESTING EQUIPMENT



The **Potato Digger** has transformed the harvest of our potato crop. The digger scoops under the row of already mowed potatoes and pulls both soil and spuds upwards. The rear ramp of the machine shakes off the soil and drops the potatoes on the surface for easy collecting. Weeds can easily clog the machine, and we have found that diligent mowing of weeds and multivating very close to the row of potatoes decreases the frequency of frustrating hang-ups while digging.

Equipment Used on the Student Farm

Our **Undercutter Bar** (also called the “Woodard Multi-lifter” or “The Thundercutter”) is a new scratch-built piece of equipment fabricated by Neal Woodard at the research farm this in 2016. Built from a single-shank subsoiler, the undercutter has a horizontal slicing blade that runs under root crops to loosen them and the soil around them for easier harvesting. This piece of equipment has revolutionized our harvest of sweet potatoes and carrots, worked well with parsnips, and has the potential for application with potatoes and other root crops. The offset nature of the undercutting blade on this prototype is not ideal for harvesting three-row crops, and sometimes requires driving both directions along a bed to loosen the soil adequately, but it still beats using a pitchfork by a considerable margin. In the future, we hope to acquire or build a wider model using two shanks set far apart and an undercutting blade strung between them. The undercutter by far fits the best on the Massey Ferguson 2615 (“Safety Tractor”).



Our **Quick Cut Greens Harvester** is a wonderful hand-held tool that drastically increases the speed at which we can harvest salad greens and spinach. Powered by a portable drill, the machine has an oscillating cutter blade and a spinning reel that pushes cut greens backwards into a collection pouch. When the pouch is full, the operator dumps it into a harvest bin and continues harvesting. However, the stand of greens needs to be relatively weed free, as the machine will cut and collect anything in its path. This year we had an issue with a spinach harvest that was so inundated with weeds that it

needed to be picked through leaf-by-leaf before going to market.

POST-HARVEST EQUIPMENT

Our **Root Washer** resembles a rotating long slatted barrel set at a slight angle, which sprays root crops with water as they tumble through it. This machine *dramatically* increases the speed at which we can wash carrots, beets, parsnips, potatoes, radish, and turnips, provided that they all are un-bunched and without tops. Celeriac can go through the machine as well, but often takes multiple runs in order to get cleaned adequately. Sweet potatoes have skin that is far too fragile to go through the machine without suffering a great deal of damage.



The **Brush Washer** is very efficient at washing tough-skinned fruiting crops such as Peppers, Zucchini, Summer Squash, Cucumbers, and Eggplant. A series of brush-rollers within the machine keep produce rotating while water is sprayed from above. New produce entering the machine pushes the fruit forward, and those that exit are generally immaculate, shining, and ready for proud display at any of our wholesale markets. With just two people, the brush washer can process numerous bushels of product per hour.

COVER CROPPING EQUIPMENT

At first glance the **Grain Drill** looks quite similar to the Drop Spreader, but the difference lies in the many coulters and tubes underneath that are designed to sow small seeds in the soil at a row spacing of 7.5". We use the grain drill for sowing uniform stands of cover crops such as rye, oats, peas, clover, and vetch. The grain drill is towed behind a tractor, and requires a hydraulic connection to the tractor to raise and lower its coulters.



Farmer Notes: Advice from the 2019 Student Farm Crew

I wish you new student farmers the best of luck and can't wait to hear all about your amazing wacky and fun filled time! You are incredibly fortunate to have Amanda and Jason as teachers, bosses and best of yet, friends for the upcoming season! This experience is really like nothing else I've done! I'm sad to see it go but I'm so happy to see a whole new crew of farmers fill our spots. Don't forget to roll in the dirt, splash in the rivers and laugh till you cry. This is not your typical class or even job, it's an experience within a whole different classification. You will be pushed in ways you never imagined and learn things you never thought you needed to know. Make sure to not let Jason eat too many sweets and help Amanda remember the million and 1 things that are bouncing around in her head. Hard work always pays off and don't think it will go unnoticed! Stay late on Fridays, rest hard on Saturdays and get up early on Mondays you will not regret it! With much love and appreciation may the 2020 crew help to continue to grow amazing food, communities and memories! JB – **Joseph Bernstein**



My advice is to try to work on working fast in the field and being careful to do good quality work. I also recommend coming to the group ready to hear people's ideas and be willing to try new things. I also recommend always having a hat, a long sleeve shirt and jeans in the summertime. Also have a big sharp knife for the field.

- **Ellis Cordaro**

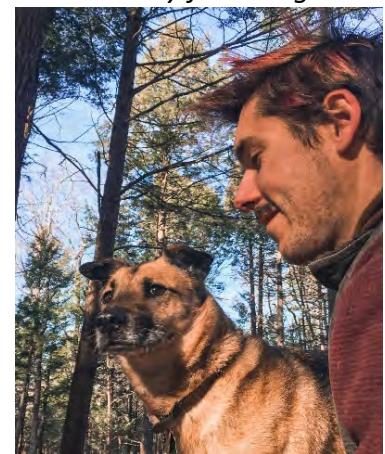
Hiii 2020 crew! First would like to say I'm so jazzed for you guys and incredibly jealous for the year you have ahead! It is truly an experience unlike any other I've had and has taught me more than any other class or job. Be prepared for the year to fly by and remember to take time to slow down and appreciate all that you've accomplished with each other. In the spring don't feel too intimidated if you can't always conceptualize the subjects you are learning about. As someone who had never farmed before, I felt lost at times while completing crop plans and choosing varieties. Amanda, Jason, and your fellow crew members will be so helpful with any questions you have so don't be afraid to ask...no shame in being inexperienced. The spring is a great time to plan any passion projects, events, or goals you want to achieve during the summer and fall. Use your free time to start those projects while you can (if you want... also no shame in wanting to use your free time to do nothing ← not sarcasm). I HIGHLY recommend staying for the summer. Summer is where I learned the most about farming and grew the most personally. It is hard work but so worth it to

*watch the progress of the farm each week and grow closer as a crew. Plus we all got tan and looked great on the first day back to school. My advice for summer farm survival is 1. Buy a water bottle that keeps the cold in 2. Buy those fizzy electrolyte tabs (I'm a fainty person) 3. Try to not only eat food from the Sunderland Corner Store and Cumbies the whole summer (we reallllly struggled with that one...lotsa diarrhea along with a few bouts of food poisoning) 4. Sleep 5. Play truth or dare, f*ck marry kill, and hot seat for bonding purposes. Fall advice: The time given for harvests in the fall is much shorter than during the summer. Prep for this. Try to get your harvesting and washing down to a two hour mark for the weeks leading into September so the change of pace doesn't surprise you. If you feel overwhelmed by your*

workload combined with farmwork give yourself a few weeks to adjust before dropping a class. I found I was able to get used to my schedule but it is best to avoid scheduling a busy fall semester to begin with. Plan fun group activities during the fall! It's your last time together as a crew and goes by the fastest. Potlucks, b-day farmers market celebrations, and elicit times together are sure to boost group morale as a years worth of exhaustion kicks in. I could keep writing but it might turn into a weird journal entry and I think it's best to keep that sorta thing out of a published work. But in conclusion: yaiiii! It's going to be fun, challenging, rewarding, LIFE CHANGING, and the like. Cherish the experience and appreciate the people making it special :) Yall are gonna crush it Luv-Big AL

-Al Driscoll

Hello again 2020 crew! My advice to you is fairly quick and to the point. Be ready for it to get harder to take care of your basic needs, but be sure to do it. A positive mental attitude is going to go a long way, you're here to learn through experience, so take it in and learn from those around. Be willing to get silly and get serious, too much of one or the other doesn't seem to be a good thing. I'm assuming you're all invested in completing this program and care about what is being done, but don't forget to remind yourself of why you're here and why you're doing this work, don't loose sight of the Big Y of it all! If you feel comfortable doing so, open up to someone and make lots of friends, you're fellow crew members are also your support if you let them and support them as well. -Nick Ferlazzo





Ah what an amazing experience lies ahead for you all! A bit of advice: plan for this semester to be challenging. It is easy to forget you are in school when you are working on the Student Farm. Sadly, you can't just go home, cook a lovely dinner, and drink a beer like you might hope. You have to go home and do 150 pages of reading on German culture in the late 1800s. Don't give up though! It is an amazing accomplishment to be able to balance academic classes, farm work, and homework while also managing to feed yourself, stay healthy, and have a social life. Keep on keepin' on! - Alex Libenson

Welcome 2020 Crew! I hope you all are excited for a great year! Keep pushing through the tough times and support each other. My recommendation is to find the right balance each semester. Juggling classes, family, friends, and the farm is something that takes time. Definitely stay for the summer in order to grasp a full understanding of the speed and timing that it takes to harvest large amounts of produce. Like any college class, sleep is really important as early morning harvests will usually lead to long class days. Do your best and keep each other motivated. I'll be around the area next season if you need support! -Tom Mirabile

Have you read The Giving Tree by Shel Silverstein? If you haven't, please stop reading this and go read that book. Okay now that you're back, the Student Farm is essentially a giving tree. It has given me so much and more. I never thought that it would be this incredibly hard to walk away from this program. This is a very special time in your life and there is simply nothing out there like it. The people around you are your biggest supporters and your number one fans. I wish I had learned earlier to lean on my crew and turn to them in times of hardship. I know that sounds dramatic but when things pick up it can be very tough to juggle everything alone. A few more tactical words of advice, get a pair of comfortable shoes, you're going to be wearing them for well over forty hours a week. Second to that, invest in rain gear. It's going to be wet and cold, having a solid raincoat and rain pants will change your life! Don't be an absolute fool and wear sunscreen, I got horrible burns the first week of May, like blisters and everything! Buy a ton and wear sunscreen like it's your job.

Try to get enough sleep, of course there are going to be mornings where you slept awfully or maybe stayed up too late doing other things. Wink wink. It's mornings like those when you show up for your crew and for yourself. Also coffee, drink so much coffee and buy your friends coffee. If you go to Dunkin or a delivery always bring back donuts for everyone else. It builds camaraderie and the love you have for each other. Love is measured by how many donuts you



get Jason to eat. Work your ass off and have fun, there is simply nothing out there like this program. You are so lucky to be part of this, it's a privilege remember that! Challenge yourself and challenge others. If you're looking to grow as a person both physically (you get swole) and mentally, this is the place. Also hang out with each other over the summer, yes you're dirty and tired but go swim or get ice cream. Unlimited time with each other is fleeting. If you're still reading, the one huge thing I want you to take away is to stay for the summer. It will change the entire experience for you and it will be the best summer of your life. I swear. Call me, I'll tell you all about mine! Sincerely, Morgz P.S. If you ever have any questions, call me or email me – **Morgan Reppert**



Future farmers, you have no idea what you're in for, but I promise you it will be one of, if not the best experience of your life. My advice to you is simple: go to bed early, feed yourself well, do not neglect exercising and stretching just because the work is physical, and remember to appreciate every moment— even the ones that sucked will turn rose colored when your season is over. Take full advantage of the beautiful farm family you have been brought into. This work can be grueling; you have to lean on each other and lift each other up to make it to the big payoff. Don't be afraid to question methods or systems. It's called the Student Farm for a reason. This is your farm and your season to learn, mess around, and grow. Above all, STAY FOR THE SUMMER! That is the bulk of the Student Farm experience! I would not have learned half as much as I did about production farming, group dynamics, and especially my own inner self if I had not stayed for the summer. Lastly, just try to soak up all that you can. The season only ever gets shorter; I would give anything to be in your shoes again. Enjoy the ride for me. <3 Evans

–Evans Slepian



This past year has been unforgettable for me. The Student Farm provided me with support, a home, friendships, and experiences I could never replace. Taking the time to connect with each other and making the most of your time together is huge. Let go of stuff that does not matter and share laughter with your crew. This program has been running for over a decade now, and each year it morphs into what the new crew wants it to be. Don't be afraid to challenge the systems in place—there is always room for improvement and this is a great place to try something new. Planning and running a farm while being a full time student can be challenging,

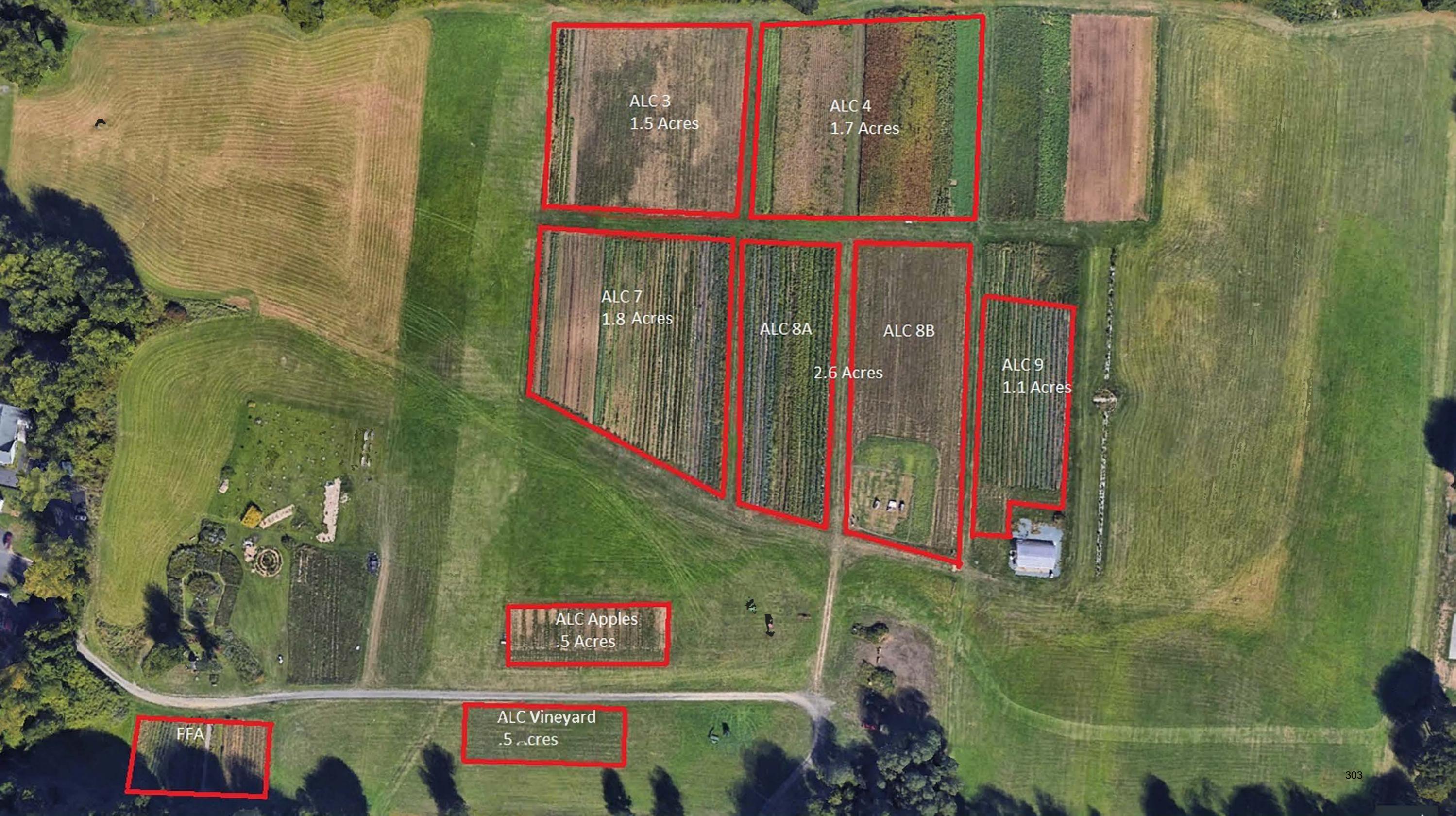
but finding the perfect balance between commitment and self care is huge. Remind yourself that you are invaluable to the farm and your total commitment makes for an awesome year; and also remember to continue doing the things that rejuvenate you throughout the year.

Sometimes the break between harvest and the farmers' market on Fridays was one of the most rejuvenating things. Some final advice I would give for your upcoming year:

- Don't take too many credits in the Fall. Almost every crew says the same thing (I did not listen) but not being swamped by other work or classes on farm days makes for a more enjoyable time on the farm.*
- Take the time to connect with each other! Hang out and do fun things outside of the farm together.*
- Care for each other. Take the time to check in and listen to each other about what is going on in everyone's head. The year can get tough and it was great we were all around to understand and support each other.*
- Stay for the summer if you can! It was an amazing part of the program and really brought us together as a crew and gave us all the complete experience of the Student Farm.*
- Enjoy the food you grow and cook special meals with your friends and the farm crew!! It is a very special opportunity to eat the food from your farm, and not everyone has this option, enjoy it!! Have a great season 2020!! —Rhianna Zadravec*



**Best of Luck
2020
Farm Crew!**



ALC 3
1.5 Acres

ALC 4
1.7 Acres

ALC 7
1.8 Acres

ALC 8A

2.6 Acres

ALC 8B

ALC 9
1.1 Acres

ALC Apples
.5 Acres

ALC Vineyard
.5 Acres

FFA

ALC-9

300' x 120': 0.8 Acres (Twenty 300' x 6' Beds)

Swiss Chard (Bright Lights) TP 7/11		
Swiss Chard (Bright Lights) TP 7/11		
Fennel (Preludio) TP 7/11		
Fennel (Preludio) TP 7/11		
Swiss Chard (Bright Lights) TP 7/11		
Swiss Chard (Bright Lights) TP 7/11	Parsley (Giant of Italy)	
	Fennel (Preludio) TP 7/29	
	Fennel (Preludio) TP 7/29	
	String Beans (Tavera) August	
	Pac Choi (Joi Choi) 8/5	
Pac Choi (Joi Choi) 8/12	Bok Choy (Black Summer) 78/5	
	Pac Choi (Joi Choi) 8/12	
	Bok Choy (Asian Delight) 8/19	
	Nappa Cabbage 8/12	
Scallions (Deep Purple)	Cilantro (Santo)	
Lettuce (Muir) 7/22	Lettuce (Coastal Star) 7/22	Red Cross
Lettuce (Muir) 7/29	Lettuce (Coastal Star) 7/29	Red Cross
Lettuce (Muir) 8/5	Lettuce (Coastal Star) 7/29	Red Cross

Nor'easter Off-Grid Greenhouse

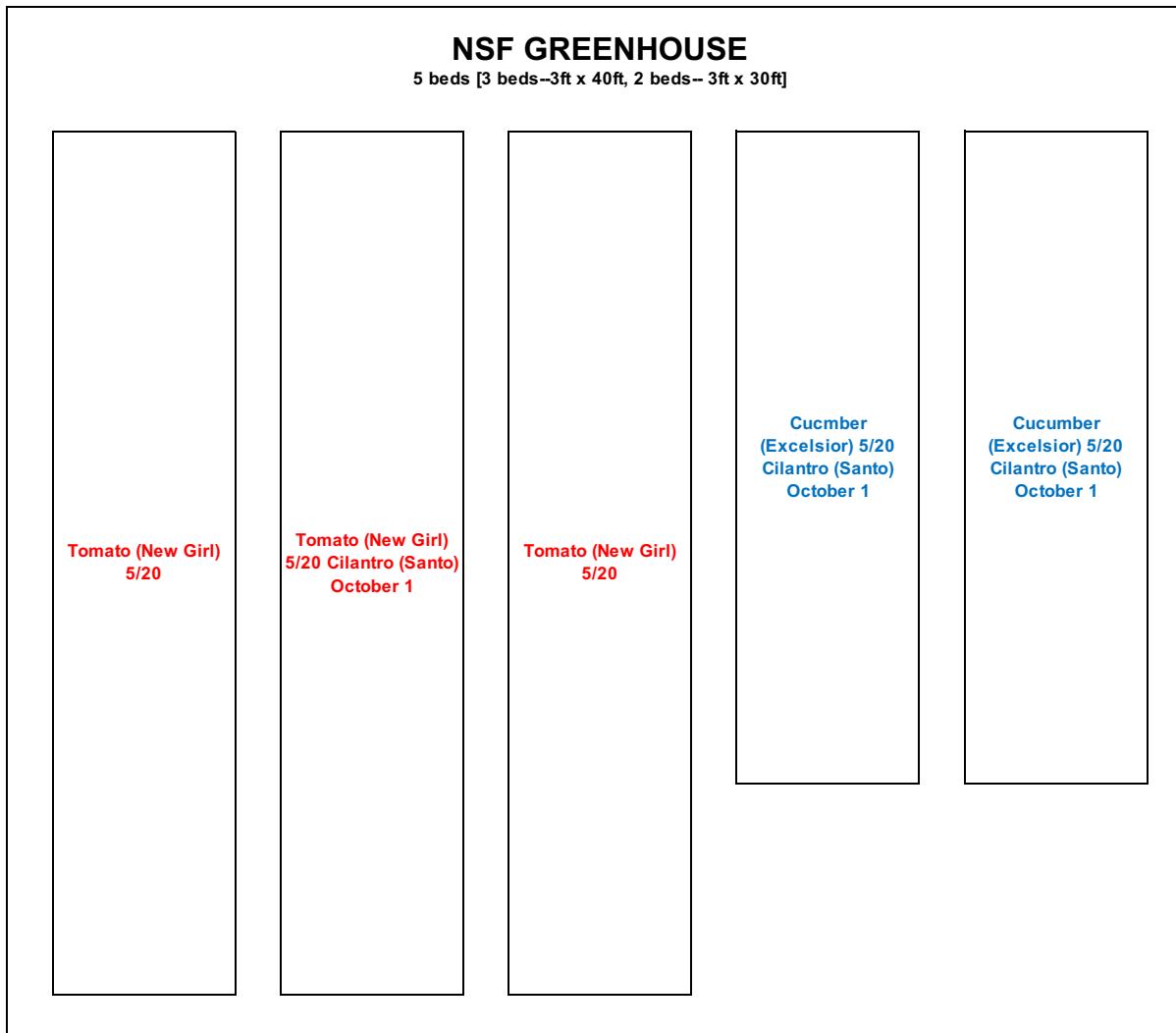
North

Key:
(Cover Crop)
(Plastic)

(Cucurbits Root Crops Brassicas Greens Solenaceous Allium Specialty)

NSF GREENHOUSE

5 beds [3 beds--3ft x 40ft, 2 beds-- 3ft x 30ft]



Key:
(Cover Crop)
(Plastic)

(Cucurbits Root Crops Brassicas Greens Solenaceous Allium Specialty)

ALC 7

(Length ranges from ~350' (top) to ~250' (bottom) x 260': 1.6 Acres (Forty Three (~250'~350') x 6' Beds)

Tomatoes (Defiant) TP 7/9		
Tomatoes (Defiant) TP 7/9	Tom. (Defiant) TP 7/11	Tomatoes (Granadero) TP 7/9
Tomatoes (Granadero) TP 7/11		Tomatoes (Granadero) TP 7/9
Tomatoes (Clementine) TP 7/9		Tomatoes (Esterina) TP 7/11
Tomatoes (Defiant) TP 7/11		
HARVEST ROW (plastic)		
	Peppers (Olympus) TP 712	Peppers (Olympus) TP 712
Peppers (Olympus) TP 712		Peppers (Olympus) TP 7/29
Peppers (Lunchbox) TP 7/12		Peppers (Lunchbox) TP 7/29
	Peppers (Jalepeno) 7/29	Peppers (Olympus) TP 712
	Eggplant (Diamond) TP 7/12	Eggplant (Diamond) TP 7/12
Eggplant (Ping Tung Long) TP 7/29		Eggplant (Ping Tung Long) TP 7/12
HAREVST ROW		
	Kale (Ruffles) TP 7/2	
	Kale (Ruffles) TP 7/2	
	Kale (Ruffles) TP 7/2	
Kale (KX1) TP 7/2		Kale (Ruffles) TP 7/2
	Kale (Toscano) TP 7/2	
	Cauliflower (Skywalker) TP 7/2	
	Cabbage (Integro) TP 7/2	
Cabbage (Faraao) TP 7/2		Cabbage (Integro) TP 7/2
	Broccoli (Belstar) TP 7/11	
	Broccoli (Belstar) TP 7/11	
	Broccoli (Gypsy) TP 7/11	
	Kale (Ruffles) TP 7/17	
	Kale (Ruffles) TP 7/17	
	Kale (Ruffles) TP 7/17	
		Kale (Ruffles) TP 7/17
Cabbage (Faraao) TP 7/17		
	Cauliflower (Skywalker) TP 7/17	
	Cauliflower (Skywalker) TP 7/17	
	Broccoli (Arcadia) TP 7/26	
	Broccoli (Marathon) TP 7/26	
	Scallions	
	Scallions	
	Broccoli (Arcadia) TP 7/26	
	Broccoli (Marathon) TP 7/26	

Key:

(Cover Crop)

(Plastic)

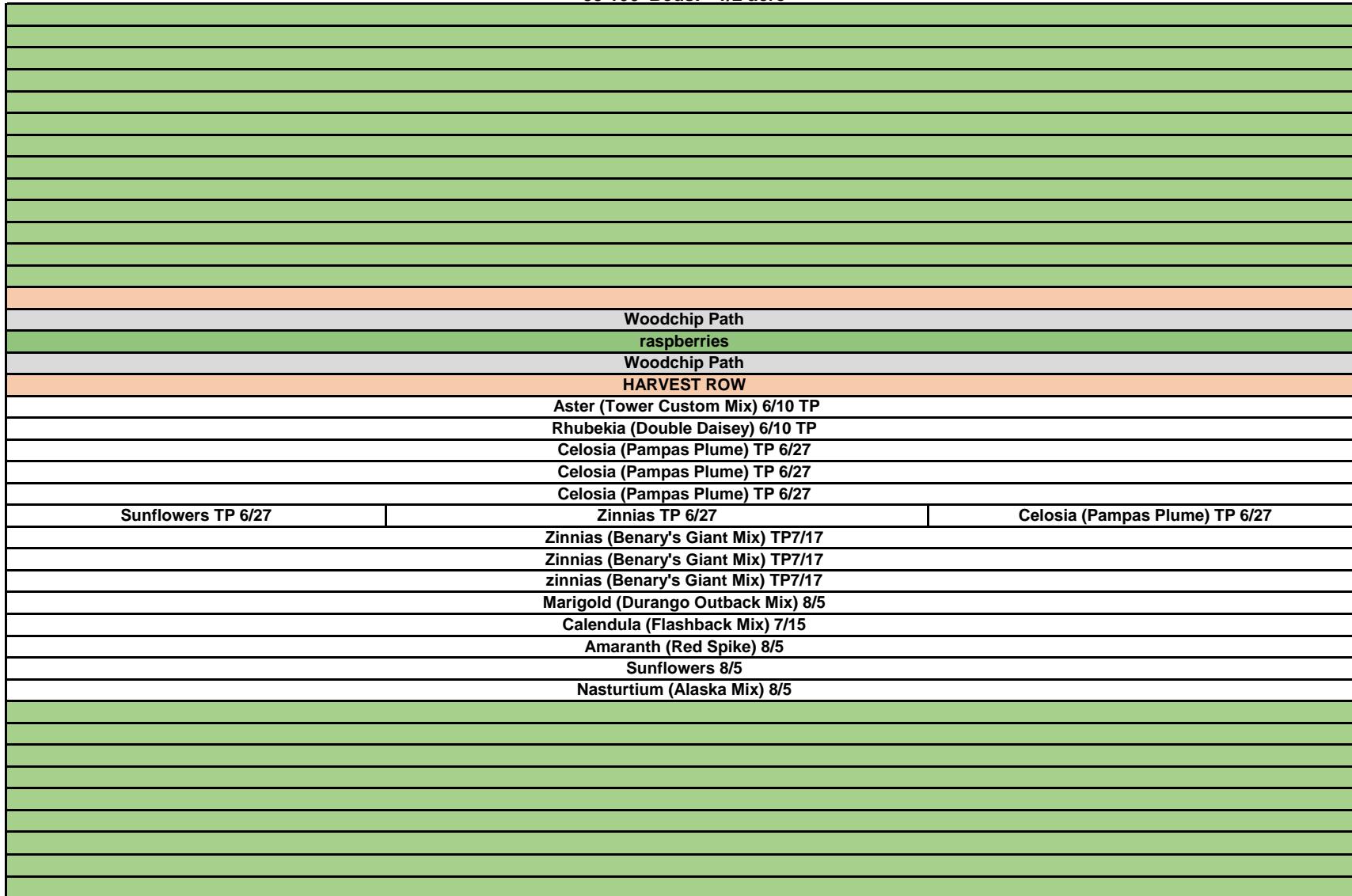
(Cucurbits Root Crops Brassicas

Solenaceous

Allium

Specialty

35 100' Beds: ~1/2 acre



| Key:

(Cover Crop)

(Plastic)

(Cucurbits

Root Crops

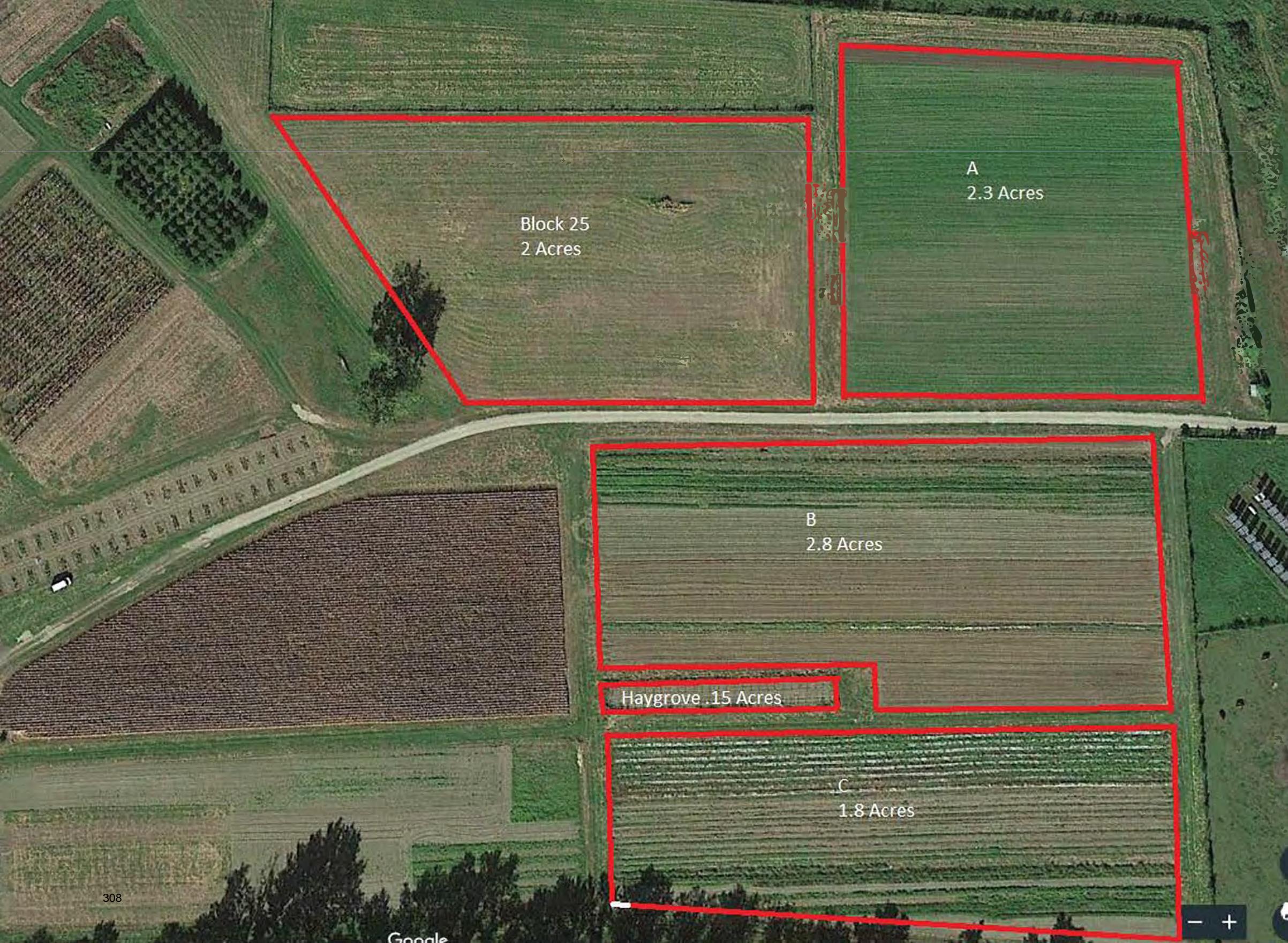
Brassicas

Greens

Solenaceous

Allium

Specialty



Fields A1 & A2	
300ft X 300 ft : 2 Acres : (Fifty 300' x 6' Beds)	
	(North) ↗
	Garlic
	Garlic
	Garlic
	Carrot (rainbow) 7/16 DS
	Carrot (bolero) 7/16 DS
	Carrot (bolero) 7/16 DS
	Carrot (bolero) 7/16 DS
	Carrot (rainbow) 6/18 DS
	Carrot (purple) 6/18 DS
	Carrot (Bolero) 6/18 DS
	Carrot (rainbow) 6/18 DS
	Carrot (rainbow) 6/18 DS
	Leek (King Richard) 5/17
	Leek (Lexton) 5/15
	Leek (Lexton) 5/15
	Leek (King Richard) 5/15
	Leek (King Richard) 5/15
	Potatoes (Red Pontiac) 5/9
	Potatoes (Kennebec) 5/9
	Potatoes Adirondack Blue 5/9
	Potatoes Adirondack Blue 5/9
	Potatoes Adirondack Blue 5/9
	Potatoes Yukon Gold 5/9
	Potatoes Yukon Gold 5/9
	Potatoes Yukon Gold 5/9
Hydrant	Potatoes (Red Pontiac) 5/9
	Potatoes (Red Pontiac) 5/9
	Potatoes (Red Pontiac) 5/9
	Potatoes (Kennebec) 5/9
	Potatoes (Kennebec) 5/9
	Potatoes (Kennebec) 5/9
HARVEST ROAD	
	Squash (honeybear) 6/12 TP
	Squash (honeybear) 5/29 TP
	Squash (Butternut) 5/29 DS - torn out angular leaf spot
	Squash (Butternut) 5/29 DS - torn out 7/3 angular leaf spot
	Squash (Butternut) 5/29 DS - torn out 7/3 angular leaf spot
	Squash (Butternut) 5/29 TP
	Squash (Butternut) 5/29 TP
	Squash (Butternut) 5/29 TP
	Squash (Spaghetti) 5/29 DS
	Squash (Spaghetti) 5/29 TP
	Squash (Spaghetti) 5/29 TP
	Squash (Spaghetti) 5/29 TP
	Shallot (Conservor) 5/1
	Onion (Redwing) 5/1
	Shallot (Conservor) 5/1
	Onion (Redwing) 5/1
	Onion (Redwing) 5/1
	Onion (Cortland) 5/1 Onion (Redwing) 5/1
	Onion (Cortland) 5/1
	Onion (Cortland) 5/1
	Shallot (Conservor) 5/1
	Shallot (Conservor) 5/1

Field B

(North)↗

Working Dimensions: 500' X 204' 2.55 Acres (Actual 500ft X 240ft : 2.75 Acres) : (Thirty Four 500' x 6' Beds, five ~250' x 6' Beds)

Dry Bean (Jacobs Cattle, mixed Quincy Pinto) 5/23 DS

Dry Bean (Kenealy) 5/23 TP

Dry Bean (Kenealy) 5/23 TP

Beets (1 row Touchstone Gold)

Lettuce (Coastal Star) 6/10

Lettuce (Crispino) 6/10 TP

Celeriac (Mars) 5/28 TP

Lettuce (Coastal Star) 6/10 TP

Beets (1 row Touchstone Gold 2 rows Red Ace) DS

Beets (1 row Touchstone Gold 2 rows Red Ace) DS

Turnips (Purple Top White Globe Storage Turnip) DS

Spinach (Corvair) DS 7/29

Spinach (Acadia) DS 7/29

Spinach (Renegade) DS 7/29

Extension Trial

Rutabega (Helenor) DS 6/20

Rutabega (Helenor) DS 6/20

Pumpkin (Pie) DS 6/12

Pumpkin (Jill Be Little) DS 6/12

Pumpkin (Long Island Cheese) DS 6/12

HARVEST ROW

Popcorn () DS 6/21

Popcorn (Glass Gem) DS 6/3

Popcorn (Glass Gem) DS 6/3

Popcorn (Glass Gem) DS 6/3

Frank Mangan's High Tunnel: 30' x 200'

Turn Around

~36 x ~50

Popcorn () DS 6/21

Key:

(Cover Crop)

(Plastic)

(Cucurbits

Root Crops

Brassicas

Greens

Solanaceous

Allium

Specialty

)

Field C ↓

Field C

1.9 Acres: 500ft X150ft (twenty five 500' x 6' Beds) + a 50' X 500' Triangle (Five 6' Beds, decreasing lengths)

(North)↗

Hydran

Sweet Potato (beauregard) 7/1
sweet Potato (beauregard) 7/1

Brussel Sprouts Hestia 7/1

Brussel Sprouts Rubine 7/1

Arugala (8/19, 9/2)
Salad Mix (8/12, 8/19, 8/26)

Peppers

Peppers

Spinach Renegade (8/12)

Spinach Renegade (8/12)

Page 54/54

Beets 7/1 (Red Ace) DS

Beets (Red Ace) DS 7/3

Beets (Chioggia) DS 7/3

Beets (Red Ace) 7/16 DS

Parsnips (Lancer) DS 6/17

Parsnips (Lancer) DS 6/17

Partnerships (Lancer) DS 6/17

—
—

Parsnips (Lancer) DS 6/1

Key:

(Cover Crop)
(Plastic)

(Cucurbits Root Crops Brassicas Greens Solanaceous Allium Specialty)

Leeks(King Richards) 5/28

Leeks(Megaton) 5/28

Field C

(North)↗

1.9 Acres: 500ft X150ft (twenty five 500' x 6' Beds) + a 50' X 500' Triangle (Five 6' Beds, decreasing lengths)

Hydrant	1.9 Acres: 500ft X 150ft (twenty five 500' x 6' Beds) + a 50' X 50' Triangle (Five 6' Beds, decreasing lengths)	
	Sweet Potato (beauregard) 5/31	
	Brussels Sprouts (Rubine) TP 7/4	Brussels Sprouts (Hestia) TP 7/4
	Kale (Winterbor) TP 6/3	Kale (Winterbor) TP 5/19
	Broccoli (Belstar) TP 6/3	Broccoli (Belstar) TP 5/21
	Summer Squash (Multipik) TP 6/10	Summer Squash (Multipik) TP 5/28
	Cukes (Marketmore)	Cucumber (Marketmore) TP 5/28
	Cucumber (Marketmore) TP 6/10	Zucchini (Midnight Lightning) TP 6/3
	Zucchini (Midnight Lightning) TP 6/10	
	Peppers (Olympus) TP 6/12	
Beets (Red)	Beets (Red Ace) DS 5/15	
	Carrots (Bolero) 5/15	
	Lettuce (Crispino) 5/17	Lettuce (Coastal Star) 5/17
	Lettuce (Coastal Star) 6/10	Lettuce (Coastal Star) 5/17
	Lettuce (Crispino) 6/10	
	Swiss Chard (Bright Lights) 6/3	
	Beets (Red Ace) DS 7/3	
	Beets (Chioggia) DS 7/3	
	Beets (Red Ace) 7/16 DS	
	Beets (Touchstone Gold) 7/16 DS	
	Parsnips (Lancer) DS 6/17	
	Parsnips (Lancer) DS 6/17	Parsnips (Lancer) DS 6/17

Key:

(Cover Crop)
(Plastic)

Cucurbits Root Crops Brassicas Greens Solanaceous Allium Specialty

Haygrove High Tunnel

4 200' Beds:

Tomato (Big Beef) 5/21

Tomato (Big Beef) 5/21

Pepper (Olympus) 5/21

Cucumber (Market More) 5/21

Key:

(Cover Crop)

(Plastic)

(Cucurbits

Root Crops

Brassicas

Greens

Solanaceous

Allium

Specialty

) |



UMass Student Farm CSA



25 lbs. of the freshest produce for 10 weeks!

Great to share with housemates, friends, or family!

Student Full \$360/\$210 Student Half
Faculty Full \$390/\$225 Faculty Half



UMass Student Farm



@umass_student_farm

Sign up today: <http://stockbridge.cns.umass.edu/csa-membership>





