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 (*Phytopthera 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 neolycopersici*) 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.*