INFORMED CONSENT

We are asking you to participate in a research study titled "Organic Farming for Pest-Suppressive Soil Microbes". We will describe this study to you and answer any of your questions. This study is being led by USDA Postdoctoral Fellow Dr. Elias H Bloom, Department of Plant Pathology and Plant-Microbe Biology at Cornell University. The Faculty Supervisor for this study is Dr. Clare Casteel, Department of Plant Pathology and Plant-Microbe Biology at Cornell University.

What the study is about
The purpose of this study is to determine links between organic farming practices and naturally occurring soil microbes that suppress insect pests.

What we will ask you to do
We are asking you to fill out two questionnaires and send up to two (2) soil sample(s) from your farm. The total time commitment for contributing to this research is 90 - 120 minutes over 2 years.

Risks and discomforts
We do not anticipate any risks from participating in this research.

Benefits
You may benefit from participating by learning about the organic farming methods that could reduce pest pressures on your farm, though, we cannot guarantee these benefits.

Compensation for participation
There is no monetary compensation.

Taking part is voluntary
Your participation is purely voluntary. You may refuse to participate before the study begins, discontinue at any time, or skip any questions that may make you feel uncomfortable, with no penalty to yourself, and no effect on your relationship with Cornell University or the USDA.

Follow up studies
In 2022, we will send you your soil microbiome results and ask you to take a follow up questionnaire.

Privacy/Confidentiality/Data Security
Your data will be kept in a locked office and filing cabinet when not in use. A digital copy of your data will be stored on the cloud and/or servers at Cornell University. For digital storage, we will take all steps to protect your confidentiality to the degree permitted by the technology being used. Data kept on the cloud/servers will be password protected.

We will also: (1) de-identify datasets (separate identifiable information from the dataset linked only by a key); (2) maintain a list of all individuals who have access to the data; (3) never save your identifiable data on mobile devices; (4) only save identifiable data to approved encrypted cloud storage; (5) never transmit identifiable data via email; and (6) limited access to data to those authorized persons using an assigned account specific to them.

Your data will only be available to Dr. Elias H Bloom, and their supervisor, Dr. Clare Casteel.

Sharing De-identified Data Collected in this Research
De-identified data from this study will be shared with the research community to advance science. By current standards and known methods, no one will be able to identify you from the information we share. Despite these measures, we cannot guarantee anonymity of your personal data.

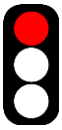
Future use of Identifiable Data or Specimens Collected in this Research
De-identified data may be used for future research without your consent. Data with your identifiable information, however, will not be distributed or used for future studies.

If you have questions
You may contact Dr. Bloom at ehb64@cornell.edu or at 607-255-0066. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) for Human Participants at 607-255-5138 or access their website at http://www.irb.cornell.edu. You may also report your concerns or complaints anonymously through Ethicspoint online at www.hotline.cornell.edu or by calling toll free at 1-866-293-3077. Ethicspoint is an independent organization that serves as a liaison between the University and the person bringing the complaint so that anonymity can be ensured.

Statement of Consent
Participation in the described research procedures is considered your implied consent to participate in the research. Please keep a copy of this form for your records.

Last Updated: September 20, 2021

SURVEY PREAMBLE



Before starting the survey, we need to verify some details. This is to make sure we reached the person intended to complete the survey. This will take 4 minutes.

Q1. Are you a primary operator on your farm? Acting as a primary operator includes handling day-to-day operations and making decisions regarding farming practices for crops.

☐ Yes → Please go to **Q2.**
☐ No

If **NO**, pass this survey on to a primary operator. If you are unable to pass the survey to a primary operator, check the box next to the statement for Q1 on the attached postcard and place the postcard in the mail. Do not complete this survey.

Q2. Is your farm certified organic?

☐ Yes → Please go to **Q3**
☐ No

If **NO**, check the box next to the statement for Q2 on the attached postcard and place the postcard in the mail. Do not complete this survey.

Q3. Do you grow vegetable and/or small fruit crops?

☐ Yes → Please go to **Q4**
☐ No

If **NO**, check the box next to the statement for Q3 on the attached postcard and place the postcard in the mail. Do not complete this survey.

Q4. Are you located in New York state?

☐ Yes → Please go to **Section A**
☐ No

If **NO**, check the box next to the statement for Q4 on the attached postcard and place the postcard in the mail. Do not complete this survey.

SECTION A: SOIL MICROBIOME SAMPLING INSTRUCTIONS

Next you will take your soil sample(s). Start by reviewing the do and don't table below. Then follow the 6 steps to take your soil sample(s). One sample can take 30 minutes to gather!

Do	***Don't***
• Sample from up to two (2) fields* • Sample in the row and between plants in a vegetable and/or small fruit crops field • Sample on a dry day • Avoid unusual areas or crossing soil types • Ship your sample within 1 week of collecting • Store your soil at room temperature	• Don't sample from high tunnels or potting soil • Don't mix soil from different fields • Don't sample from the path or plant roots • Don't sample when fields are wet • Don't let your soil dry out in high temperatures • Don't forget to send us your soil sample - it's FREE!

*We define a field as an area with similar conditions and management. Consider submitting two samples from fields with different management, soil types, or insect pressures.

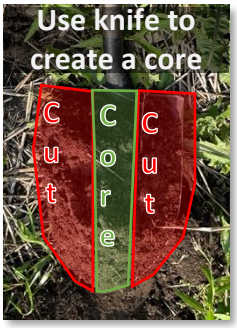
Step 1. Collect your soil sampling supplies

Materials you need:
(1) Shovel or spade (not included)
(2) Bin or bucket (not included)
(3) Trowel or Knife (not included)
(4) Two (2) quart size sample bags (included)

Step 2. Go to the field

At the field:
(5) Pick 10 sub-sampling points
Tip: Avoid points that fall in unusual areas, within high tunnels, or that span across different soil types.

Step 3. Dig at the sub-sampling points



At each sub-sampling point:
(6) Push shovel vertically into soil until your reach 6 inches
(7) Tilt shovel back and lever the soil up
(8) Use the trowel or knife to cut away a soil core
(9) Place core in the bin or bucket
(10) Repeat at each sub-sampling point (see Step 2)

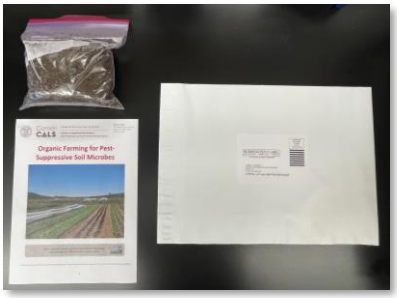
Step 4. After you visit all of the sub-sampling points

Mix the sub-samples together:
(11) Break down clods with your hands
(12) Remove rocks, plastics, and organic matter (e.g., roots, weeds, earthworms, hay, etc.)

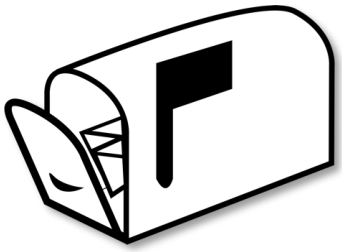
Step 5. Fill the sample bag

Grab handfuls of soil:
(13) Place handfuls into the bag labeled “Sample 1”
(14) Fill the bag to the marked line
(15) Dump your extra soil in the field
(16) For two samples, repeat Steps 1 - 5

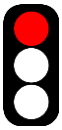
Step 6. Send sample in the mail



To mail your sample:
(17) Place sample(s) and questionnaire in provided envelope
(18) Place the envelope in any USPS mailbox - shipping is FREE



SECTION B. ABOUT THE FIELD YOU SAMPLED



In this section we ask you about the field, or section of the field, where you took the first soil sample. If you have a second sample, you can record data for that field on pages 17-19. This section should take about 20 minutes to complete.

B1. What was the date you took the sample? ⟶ _____ / _____ / _____ (MM/DD/YYYY)

B2. What is the closest physical address for the field? ⟶ _____
_____

B3. About how many acres is this field? ⟶ _____ acres

B4. Which of the following irrigation methods did you use in this field in the last year, if any? *Choose all that apply. Use the other option to list any other irrigation methods you use.*

☐ Drip ☐ Overhead (e.g., sprinkler) ☐ Hand watering ☐ Flood ☐ None ☐ Other: _____

B5. Which of the following best describes your relationship to the field? *Choose one.*

☐ You own the field ☐ You lease the field from the landowner ☐ You do not own or lease the field; you are employed by the owner

B6. Which of the following crops did you grow in this field in the last year? *Choose all that apply. Use the other option to list any other crops you grew.*

☐ Brassica crops (e.g., cabbage, kale, broccoli)
☐ Cucurbit crops (e.g., cucumber, watermelon, squash)
☐ Solanaceous crops (e.g., tomato, potato, pepper)
☐ Sweet corn
☐ Legume crops (e.g., beans, peas)
☐ Lamiaceous crops (e.g., basil, mint, thyme)
☐ Allium crops (e.g., garlic, onions, leeks)
☐ Umbel crops (e.g., carrot, parsley, dill, fennel)
☐ Chenopod crops (e.g., spinach, chard, beet)
☐ Aster crops (e.g., lettuce, endive, salsify)
☐ Rosaceae crops (e.g., raspberry, strawberry)
☐ Ericaceae crops (e.g., blueberry)
☐ Other: _____

B7. About what percent of the field was in crop production this year? ⟶ _____ %

B8. Which of the following cover crops did you grow in this field in the last two years, if any? *Choose all that apply. Use the other option to list any other cover crops that were not listed.*

☐ Legumes (e.g., red clover, hairy vetch, sun hemp)
☐ Brassicas (e.g., forage radish, purple top turnip)
☐ Buckwheat
☐ None
☐ Cool season grasses (e.g., winter rye)
☐ Warm season grasses (e.g., sorghum, millet, sudangrass)
☐ Phacelia
☐ Other: _____

B9. Which of the following livestock have you rotated into this field in the last two years, if any? *Choose all that apply. Use the other option to list any other livestock that were not listed.*

☐ Chickens ☐ Ducks ☐ Cattle ☐ Goats ☐ Sheep ☐ Hogs ☐ None
☐ Other: _____

B10. Which of the following fertilizers have you applied to this field in the last year, if any? *Choose all that apply. Use the other option to list any other fertilizers that you used.*

☐ Alfalfa meal ☐ Bat guano ☐ Feather meal ☐ Fish meal ☐ Bone meal
☐ Blood meal ☐ Cottonseed ☐ Fish emulsion ☐ Soybean meal ☐ Rock phosphate
☐ Kelp meal ☐ Greensand ☐ Langbeinite ☐ Potassium sulfate ☐ Compost
☐ None ☐ Other: _____

B11. Which of the following reduced or no-tillage practices have you used in this field in the last year, if any? *Choose all that apply. Use the other option to list any other reduced tillage methods you used.*

☐ No-till (soil is undisturbed by any tillage equipment between plantings)
☐ Ridge-till (cultivator maintains permanent ridge for planting, wheel traffic in same lanes)
☐ Shallow tillage (tillage limited to the top 1-2 inches of soil)
☐ Zone tillage (narrow strips of tillage, bands where crops are planted)
☐ In-row subsoiling (soil surface residue left undisturbed, but tillage used underneath)
☐ Permanent beds (primary tillage is concentrated in beds, less disturbance in pathways)
☐ None ☐ Other: _____

B12. Which of the following mulches did you use in this field in the last year, if any? *Choose all that apply. Use the other option to list any other mulches that were not listed.*

☐ Hay ☐ Stray ☐ Plastic mulch ☐ Weed barrier fabrics ☐ Biodegradable planting paper ☐ None
☐ Other: _____

B13. Which of the following pre-planting practices did you use in this field in the last two years, if any? *Choose all that apply. Use the other option to list any other pre-planting practices that were not listed.*

☐ Tarping (e.g., silage tarp or other non-transparent plastic) ☐ Solarization (e.g., clear plastic)
☐ None ☐ Other: _____

B14. Which of the following microbial insecticides have you applied <u>to the soil</u> in this field in the past three years, if any? *Choose all that apply. Use the other option to list any other microbial insecticides that you used.*

- ☐ *Beauveria bassiana (*e.g., BoteCHA ES*)*
- ☐ *Chromobacterium substugae* (e.g., Grandevo)
- ☐ *Isaria fumosorosea* (e.g., Preferal, PFR-97)
- ☐ None
- ☐ Other: _____

B15. Which of the following non-microbial pesticides have you applied <u>to the soil</u> in this field for insect and disease management in the past three years, if any? *Choose all that apply. Use the other option to list any other soil pesticides that you used.*

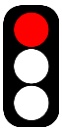
- ☐ Azadiractin (e.g., AzaGuard, Neemix)
- ☐ Iron phosphate *(*e.g., *Bug-N-Sluggo)*
- ☐ Hydrogen dioxide (e.g., OxiDate 2.0)
- ☐ Potassium silicate (e.g., Sil-Matrix LC)
- ☐ Spinosad (e.g., *Bug-N- Sluggo, Seduce*)
- ☐ *Reynoutria sachaliensis* extract (e.g., Regalia)
- ☐ None ☐ Other: _____

B16. State the yield damage (0 - 100%) in this field that you think was caused by insect pests. Indicate 0% if there was no pest damage in this field. ⟶ _____ %

B17. List the insect pests responsible for this damage? Only answer this if you gave a value > 0 % for B16.

_____
_____
_____
_____

SECTION C: ABOUT YOU AND YOUR FARM



Next, we want to know more about you and the farm. We will use this information to understand the demographics of the study participants. This section will take about 10 minutes to complete.

C1. What is your age? _____ years old

C2. Are you a first-generation farmer? *First generation farmers do not have parents that were farmers.*

☐ Yes ☐ No

C3. What is the highest level of school you have completed? *Choose only one.*

☐ Less than 12 years
☐ High school diploma
☐ Some college, no degree
☐ Associate's degree
☐ Bachelor's degree
☐ Graduate degree

C4. Do you have a degree in agriculture or a related field? *Examples of related fields include horticulture.*

☐ Yes ☐ No

C5. Below is a table of information sources about farming practices. Indicate if you have used, are using, would use, or would never use each. *Choose one for each information source.*

	Used in past	Used now	Would use	Never have and never will use
NOFA-NY	☐	☐	☐	☐
Rodale Institute	☐	☐	☐	☐
Young Farmers Coalition	☐	☐	☐	☐
For-profit consultant (e.g., a crop scout)	☐	☐	☐	☐
Electronic newsletter (e.g., Cornell Small Farms Program)	☐	☐	☐	☐
Print magazines (e.g., American Vegetable Grower)	☐	☐	☐	☐
Books	☐	☐	☐	☐
Social media (Twitter, Instagram, etc.)	☐	☐	☐	☐
Optional: Use the other option to add another information source.				
Other: _____	☐	☐	☐	☐

C6. Which of the following describes your role(s) on the farm? *Choose all that apply. Use the other option to list any other roles that you perform.*

☐ Use of heavy equipment
☐ Finances (bookkeeping)
☐ Marketing
☐ Harvesting of produce
☐ Pesticide applications
☐ Personnel management
☐ Planting (seeding, transplanting)
☐ Hand work (weeding, mulching)
☐ Fertility management

Other:_____

C7. Is farming your household's <u>main</u> source of income? *A main source is > 50 % of your income.*

☐ Yes ☐ No

C8. How many total acres is your farm? Both certified and non-certified acres. ⟶ _____ acres

C9. How many acres of certified land is in vegetable/small fruit production? ⟶ _____ acres

C10. How long has your farm been managed organically? ⟶ _____ years

C11. Are all fields that belong to your farm at the same location?

☐ Yes ☐ No

C12. How do you market (sell) your produce? *Choose all that apply*. *Use the other option to list any other ways you market your produce.*

☐ Farm Stand ☐ CSA ☐ Farmers Market ☐ Wholesale ☐ Supermarkets
☐ Other: _____

C13. Which of the following best describes what will likely happen to the certification status of your farm in the next 5 years? *Choose only one.*

☐ Continue with organic certification
☐ Continue with organic certification and add a further certification (e.g., Regenerative organic certification)
☐ Drop organic certification
☐ Other: _____

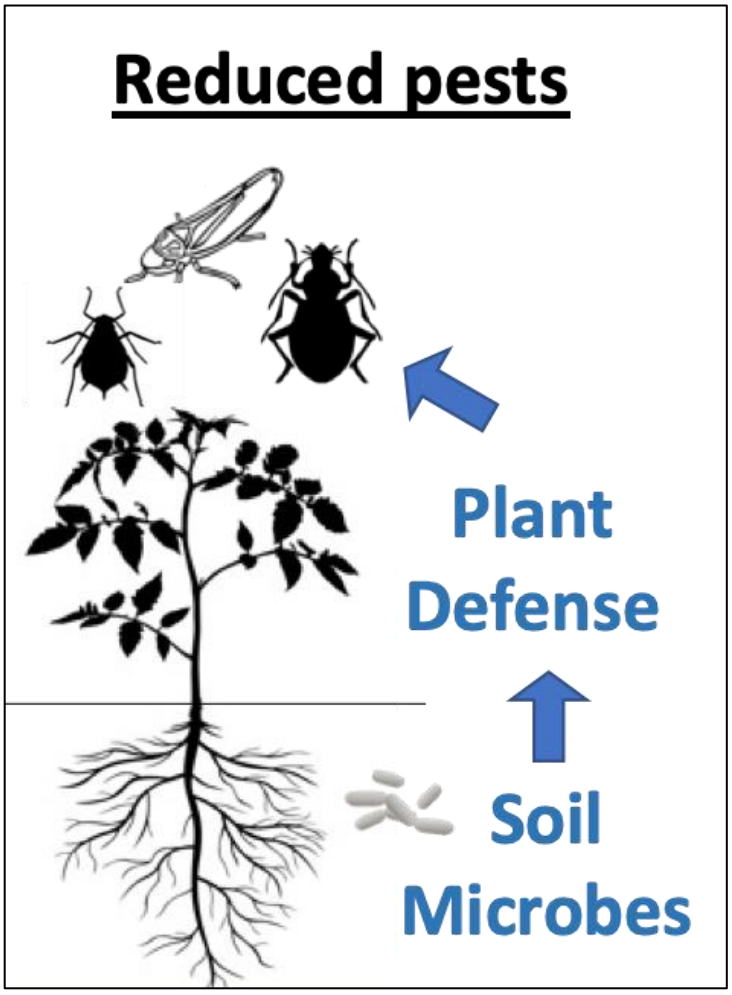
C14. Which of the following best describes what will likely happen to your farm operation in 10 years? *Choose only one.*

☐ I will continue to be the primary farm operator
☐ A relative will be the primary farm operator
☐ Someone else (not related) will be the primary farm operator
☐ The farm will be converted for non-farm use
☐ The farm will be donated to a farmland preservation program or other land trust
☐ The farm will be sold
☐ I'm not sure
☐ Other: _____

SECTION D: YOUR PRECEPTIONS OF SOIL MICROBES

This is the final section. We start by standardizing your knowledge of microbes. Then we evaluate your perceptions and factors influencing your adoption of practices that support the microbiome. This section will take 20 minutes to complete.

Our research shows organic farms promote soil microbes that enhance plant defenses and reduce pest populations. This process is displayed in the arrow diagram below.



SOIL MICROBE AND PLANT DEFENSE FACTS

- Soil microbes can be both fungi and bacteria
- Soil microbes interact with plant roots
- Plants have chemical defenses (hormones) that turn off and on
- Soil microbes can turn on plant chemical defenses
- Plant chemical defenses naturally reduce pest pressures

D1. Indicate how important you believe each of the following factors are for pest-suppressive soil microbes on your farm. *Select one option for each of the following statements.*

	Not at all important	Slightly important	Somewhat important	Very important	Extremely important
Farming practices					
Irrigation	☐	☐	☐	☐	☐
Crop diversity (# of crops grown)	☐	☐	☐	☐	☐
Livestock rotation	☐	☐	☐	☐	☐
Fertilizer inputs (N, P, K)	☐	☐	☐	☐	☐
Compost applications	☐	☐	☐	☐	☐
Reduced or no-tillage	☐	☐	☐	☐	☐
Cover cropping	☐	☐	☐	☐	☐
Mulches (e.g., plastic mulch)	☐	☐	☐	☐	☐
Pre-planting protocols (e.g., tarping)	☐	☐	☐	☐	☐
Microbial insecticides applied to soil (e.g., *Beauveria* spp.)	☐	☐	☐	☐	☐
Other pesticides applied to soil (e.g., Hydrogen dioxide)	☐	☐	☐	☐	☐
Soil properties					
Soil type (e.g., clay, sandy)	☐	☐	☐	☐	☐
Soil organic matter	☐	☐	☐	☐	☐
Farmer and farm characteristics					
Time in organic farming	☐	☐	☐	☐	☐
Formal education in farming (e.g., degree in agriculture)	☐	☐	☐	☐	☐
Amount of certified land in vegetable/fruit production	☐	☐	☐	☐	☐
Factors outside of your farm					
Conventional pesticides applied to soil in bordering lands	☐	☐	☐	☐	☐
Amount of natural areas in bordering lands	☐	☐	☐	☐	☐
Climate factors					
Increases in extreme weather events	☐	☐	☐	☐	☐
Changes in weather patterns (e.g., early and late frosts)	☐	☐	☐	☐	☐
Optional: Use the other option to list any other factors you think influence soil microbes.					
Other: _____	☐	☐	☐	☐	☐

D2. To what extent do you agree with the following statements about pest-suppressive soil microbes on your farm? *Select one option for each of the following statements.*

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Even though I cannot see soil microbes, I believe they enhance pest suppression on my farm by boosting plant defenses.	☐	☐	☐	☐	☐
The most effective way to promote soil microbes that enhance pest suppression is using farming practices that support them.	☐	☐	☐	☐	☐
The most effective way to promote soil microbes that enhance pest suppression is using microbial inoculants (e.g., *Beauveria* sp.).	☐	☐	☐	☐	☐

D3. Indicate what would motivate your decision to adopt a new practice that supports pest-suppressive soil microbes on your farm. *Select one option for each of the following statements.*

	Not at all motivating	Slightly motivating	Somewhat motivating	Very motivating	Extremely motivating
Reduced labor costs of controlling pests	☐	☐	☐	☐	☐
Easy integration with your existing practices	☐	☐	☐	☐	☐
Recommendation made by extension persons	☐	☐	☐	☐	☐
Recommendation made by commercial advisor	☐	☐	☐	☐	☐
Conversation with a neighbor	☐	☐	☐	☐	☐
Workshop at a conference (e.g., NOFA-NY, MOSES)	☐	☐	☐	☐	☐
Requested by a customer	☐	☐	☐	☐	☐
Benefits to the environment (e.g., species conservation)	☐	☐	☐	☐	☐
Increases in marketable yield	☐	☐	☐	☐	☐
Observable reductions in insect pest damage on your farm	☐	☐	☐	☐	☐
A microbe friendly farming labeling scheme for products	☐	☐	☐	☐	☐
Optional: Use the other option to list any other motivating factors.					
Other: _____	☐	☐	☐	☐	☐

D4. To what extent do you agree or disagree with the following statements about this project? *Select one option for each of the following statements.*

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I participated in this project because I want to know more about the soil microbes on my farm.	☐	☐	☐	☐	☐
I intend to use the practices discovered by this project to support soil microbes on my farm.	☐	☐	☐	☐	☐

Thank you for participating in our soil microbiome project!

Please insert this questionnaire and your soil sample(s) into the included mailing envelope and place the package in the mail. The postage is prepaid.

If you have any questions or misplaced any of the materials and need replacements, please contact:

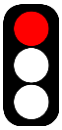
Dr. Elias H Bloom
Email: ehb64@cornell.edu
Phone: 607-255-0066

If you have any additional comments, please write them in the space below.

Acknowledgements: We would like to thank the Dilmun Hill Student Organic Farm for allowing us to test our methods there, and the farmers and Cornell Cooperative Extension personnel that assisted with the development of this questionnaire!

VERSION 4

SECTION E: USE ONLY IF YOU TAKE A SECOND SOIL SAMPLE



If you are submitting a second sample, use this section to record the data for that field. We recommend you sample a field with different management, soil type, or insect pressure than your other sample. This section will take 20 minutes to complete if you choose to submit a second sample.

E1. What was the date you took the sample? ⟶ _____ / _____ / _____ (MM/DD/YYYY)

E2. What is the closest physical address for the field? ⟶ _____
_____

E3. About how many acres is this field? ⟶ _____ acres

E4. Which of the following irrigation methods did you use in this field in the last year, if any? *Choose all that apply. Use the other option to list any other irrigation methods you use.*

☐ Drip ☐ Overhead (e.g., sprinkler) ☐ Hand watering ☐ Flood ☐ None ☐ Other: _____

E5. Which of the following best describes your relationship to the field? *Choose one.*

☐ You own the field ☐ You lease the field from the landowner ☐ You do not own or lease the field; you are employed by the owner

E6. Which of the following crops did you grow in this field in the last year? *Choose all that apply. Use the other option to list any other crops you grew.*

☐ Brassica crops (e.g., cabbage, kale, broccoli)
☐ Cucurbit crops (e.g., cucumber, watermelon, squash)
☐ Solanaceous crops (e.g., tomato, potato, pepper)
☐ Sweet corn
☐ Legume crops (e.g., beans, peas)
☐ Lamiaceous crops (e.g., basil, mint, thyme)
☐ Allium crops (e.g., garlic, onions, leeks)
☐ Umbel crops (e.g., carrot, parsley, dill, fennel)
☐ Chenopod crops (e.g., spinach, chard, beet)
☐ Aster crops (e.g., lettuce, endive, salsify)
☐ Rosaceae crops (e.g., raspberry, strawberry)
☐ Ericaceae crops (e.g., blueberry)
☐ Other: _____

E7. About what percent of the field was in crop production this year? ⟶ _____ %

E8. Which of the following cover crops did you grow in this field in the last two years, if any? *Choose all that apply. Use the other option to list any other cover crops that were not listed.*

☐ Legumes (e.g., red clover, hairy vetch, sun hemp)
☐ Brassicas (e.g., forage radish, purple top turnip)
☐ Buckwheat
☐ None
☐ Cool season grasses (e.g., winter rye)
☐ Warm season grasses (e.g., sorghum, millet, sudangrass)
☐ Phacelia
☐ Other: _____

E9. Which of the following livestock have you rotated into this field in the last two years, if any? *Choose all that apply. Use the other option to list any other livestock that were not listed.*

☐ Chickens ☐ Ducks ☐ Cattle ☐ Goats ☐ Sheep ☐ Hogs ☐ None
☐ Other: _____

E10. Which of the following fertilizers have you applied to this field in the last year, if any? *Choose all that apply. Use the other option to list any other fertilizers that you used.*

☐ Alfalfa meal ☐ Bat guano ☐ Feather meal ☐ Fish meal ☐ Bone meal
☐ Blood meal ☐ Cottonseed ☐ Fish emulsion ☐ Soybean meal ☐ Rock phosphate
☐ Kelp meal ☐ Greensand ☐ Langbeinite ☐ Potassium sulfate ☐ Compost
☐ None ☐ Other: _____

E11. Which of the following reduced or no-tillage practices have you used in this field in the last year, if any? *Choose all that apply. Use the other option to list any other reduced tillage methods you used.*

☐ No-till (soil is undisturbed by any tillage equipment between plantings)
☐ Ridge-till (cultivator maintains permanent ridge for planting, wheel traffic in same lanes)
☐ Shallow tillage (tillage limited to the top 1-2 inches of soil)
☐ Zone tillage (narrow strips of tillage, bands where crops are planted)
☐ In-row subsoiling (soil surface residue left undisturbed, but tillage used underneath)
☐ Permanent beds (primary tillage is concentrated in beds, less disturbance in pathways)
☐ None ☐ Other: _____

E12. Which of the following mulches did you use in this field in the last year, if any? *Choose all that apply. Use the other option to list any other mulches that were not listed.*

☐ Hay ☐ Stray ☐ Plastic mulch ☐ Weed barrier fabrics ☐ Biodegradable planting paper ☐ None
☐ Other: _____

E13. Which of the following pre-planting practices did you use in this field in the last two years, if any? *Choose all that apply. Use the other option to list any other pre-planting practices that were not listed.*

☐ Tarping (e.g., silage tarp or other non-transparent plastic) ☐ Solarization (e.g., clear plastic)
☐ None ☐ Other: _____

E14. Which of the following microbial insecticides have you applied <u>to the soil</u> in this field in the past three years, if any? *Choose all that apply. Use the other option to list any other microbial insecticides that you used.*

- ☐ *Beauveria bassiana (*e.g., BoteCHA ES*)*
- ☐ *Chromobacterium substugae* (e.g., Grandevo)
- ☐ *Isaria fumosorosea* (e.g., Preferal, PFR-97)
- ☐ None
- ☐ Other: _____

E15. Which of the following non-microbial pesticides have you applied <u>to the soil</u> in this field for insect and disease management in the past three years, if any? *Choose all that apply. Use the other option to list any other soil pesticides that you used.*

- ☐ Azadiractin (e.g., AzaGuard, Neemix)
- ☐ Iron phosphate *(*e.g., *Bug-N-Sluggo)*
- ☐ Hydrogen dioxide (e.g., OxiDate 2.0)
- ☐ Potassium silicate (e.g., Sil-Matrix LC)
- ☐ Spinosad (e.g., *Bug-N- Sluggo, Seduce*)
- ☐ *Reynoutria sachaliensis* extract (e.g., Regalia)
- ☐ None ☐ Other: _____

E16. State the yield damage (0 - 100%) in this field that you think was caused by insect pests. Indicate 0% if there was no pest damage in this field. ⟶ _____ %

E17. List the insect pests responsible for this damage? Only answer this if you gave a value > 0 % for E16.

_____
_____
_____
_____