Insect pest management in organic field and vegetable crop production

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Guest Speaker

Rachael Long, University of California Cooperative Extension

In the third session of the Lunchtime Seminar Series for Organic Growers, Rachael Long, the Farm Advisor for Field Crops and Pest Management in Yolo, Solano, and Sacramento Counties, shared some core principles of pest management in organic systems. She then led a discussion of some major groups of insect pests on field and vegetable crops for our area, and how to approach their management.

Provide habitat for beneficial insects

Natural enemies eat insects—that's why they're beneficial. But many need nectar and pollen too, at certain life stages or in times of scarcity. For example, syrphid fly larva are a voracious predator of aphids, but the adults feed on nectar and pollen. Having sources nearby, such as alyssum interplanted in lettuce, will increase the ability of the larvae to control aphid populations. Hedgerows also have been shown to be good places for natural enemies to build up. They may encourage insectivorous birds, as well. However, not all habitat is created equal—avoid plants that are known to host insect or disease pests of the crop you're planting.

The best offense is a good defense

Healthy crops have better defenses against insect pests. Rachael recommends an "integrated crop management" approach.

- **Varietal selection:** If available, select varieties that are resistant to problematic insect pests or the diseases they vector. Use certified seed.
- **Crop rotation:** Crop rotations can break pest cycles and improve soil health.
- **Site selection:** Planting in areas which are prone to stressful conditions like flooding or salt accumulation will lead to more pest-susceptible plants.
- **Soil preparation:** Cultivation, especially when the soil is too wet, can lead to hardpans. Plants on these soils will be shorter, more stressed, and more susceptible to pests. This is especially true of heavy clay soils.
- **Nutrient management & soil fertility**: Soil fertility should be sufficient for crop needs. However, excess nitrogen can attract some insect pests like aphids.
- **Clean equipment:** Soil-borne pests like nematodes can be spread to new fields with dirty equipment. Cleaning equipment between fields can help prevent this.

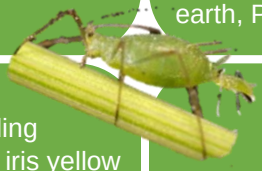
University of California Integrated Pest Management has many resources for pest and beneficial identification on their website at: ipm.ucanr.edu

A full recording of this talk is available at http://ccsmallfarms.ucanr.edu/Events_and_trainings/Organic_Agriculture_Seminar_Series_for_Growers/

Caterpillars
Caterpillars can be a big problem in some years and not in others. They can cause heavy yield losses quickly so monitoring is key--especially under dirt clods (for armyworm and cutworm).

Effective natural enemies include trichogramma, hyposoter, and birds. Products labeled for organic caterpillar control include Xentari, Grandevo, Entrust, and Seduce (spinosad bait).

Aphids
Aphids multiply quickly. Their feeding distorts leaves, they secrete sticky honeydew which can be colonized by sooty mold, and vector diseases like alfalfa mosaic virus. Control will only be effective before populations build up. Avoid excess N and planting near virus reservoirs like alfalfa. Use virus resistant varieties. Aphids are moved and tended by ants, so controlling ants will help. Insecticides include diatomaceous earth, PyGanic, Azera, and Pyganic+Grandevo



Thrips

Thrips vector several diseases, including tomato spotted wilt virus (TSWV) and iris yellow spot virus in onion. They can be recognized by the large amounts of frass they produce. Their natural enemies include minute pirate bugs, collops beetle, and the six-spotted thrip. Entrust and Success are effective insecticides. Control TSWV by planting virus-resistant varieties and controlling the disease's weed hosts (i.e prickly lettuce, cheeseweed, bell beans).

Mites
Mites are most often only a problem when plants are water stressed, so irrigation management will be important for control. Too much dust can interfere with the predatory mites which prey on them, so dust control is also key. Sulfur, soap sprays such as M-Pede, and neem oil are potentially effective. However, the most important factors are water stress and dust control.

Flea beetles
Flea beetles are a destructive pest that defoliate seedlings. They come out of the field edge weeds when they start to dry down. They are good leapers, and hard to control. Measures include disking in the crop residue that they shelter under, or using row covers. Irrigate crops when damage appears on the field edges. Early plantings may be less affected than late plantings. The Surround (kaolin clay) and Celite (diatomaceous earth) can protect seedlings.

Seed corn maggots
Seed corn maggots are mainly a pest in wet years, especially when another crop has left a lot of biomass in the field or when low temperatures slow germination. Total losses can occur under these conditions. Incorporate crop biomass at least two weeks before planting. For chronic problems, monitor adult fly populations by putting out bowls with water and a little soap, and hold off planting until populations have declined

Darkling beetles

Darkling beetles are a pest of seedling vegetables. They likely come to the field looking for water when the weeds dry out. Two natural predators are the carabid beetle and the stink beetle. Plant early, and irrigate crops when damage appears on the field edges

Cucumber beetles

Cucumber beetles are a major pest of melons. These will be the subject of their own talk on 3/16/2021

Stinkbugs
Stinkbugs are sucking insects that do quite a bit of damage. Emerging species in California include the brown marmorated stinkbug and bagrada bug. Stinkbugs have a very wide host range. They overwinter in protected areas and come out of hibernation around March to feed on weeds such as mustard, radish and cheeseweed that are producing pods. Check out the recording for our community forum on bagrada control (on 1/12/21).

Questions? Stories to share? Contact Rachael Long at rflong@ucanr.edu
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