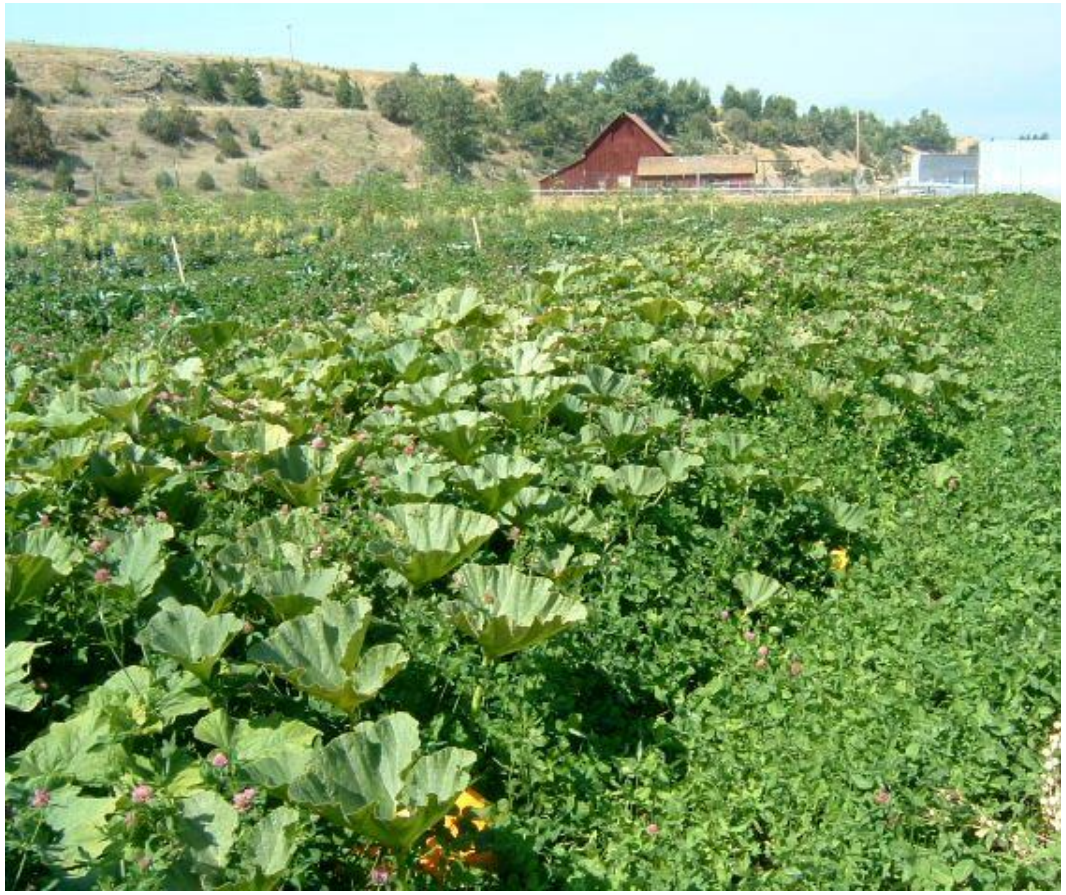
Managing insect pests in organic vegetable crop production

Rachael Long, Farm Advisor Yolo County

Common insect pests on farms

- Caterpillar worms
- Flea beetles
- Aphids
- Thrips
- Seed corn maggot
- Darkling beetles
- Cucumber beetles
- Stinkbugs



Importance of good Agronomic Practices in IPM

7C's: Park Farming Organics leading to healthy soils and healthy plants

- Cover crops
- Conservation tillage
- Crop rotation
- Crop residue
- Controlled traffic
- Compost
- Conserve inputs (N)

Know your pests: Insect identification in larval/immature stages

Caterpillar- pseudo-legs

Maggot, fly larva- no legs

Beetle larva-legs

Plant bugs (Lygus)

Know your beneficial insects

Parasitoid wasps (parasites)

Predators

Collops beetle

Soldier beetle

Habitat and floral resources for natural enemies

Caterpillar pests (worms)

Cabbage looper

Cutworms

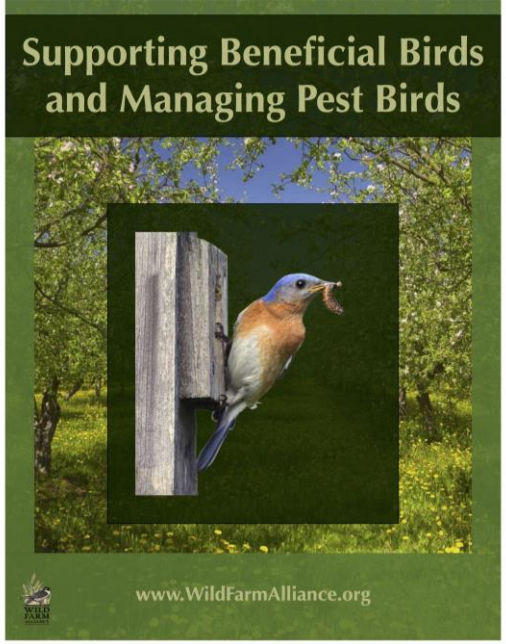
Armyworms (western yellowstriped, beet)

Tomato fruitworm, corn earworm

Management practices

- Natural enemies, trichogramma and hyposoter wasps
- Monitor and treatment thresholds (e.g. UC IPM guidelines tomatoes)
- Insecticides: Microbials: *Bacillus thuringiensis*, Bt (e.g. Xentari). Most cost effective. Seduce (spinosad bait) for cutworms

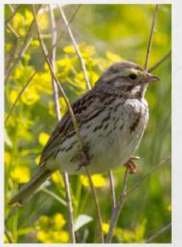
Note: Entrust (spinosad) targeting thrips will also get worms, but not western yellowstriped armyworms



Wild Farm Alliance
Farmer to Farmer Field Day:

ALL THINGS AVIAN

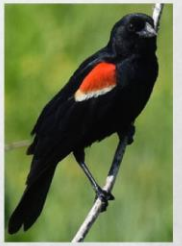
March 19, 2019, 8:30 am - 1:00 pm
Hosted by: Chamberlain Farms, Woodland



Cost: $15, Includes lunch and a copy of WFA's Bird Booklet

This field day will feature:

- ✓ **Jo Ann Baumgartner,** Wild Farm Alliance, shares highlights from their recent publication Supporting Beneficial Birds and Managing Pest Birds;
- ✓ **Duane Chamberlain** discusses the swallows, owls, hawks, egrets and herons that make his farm home part of the year;
- ✓ **Sara Kross,** Columbia University, shares her Barn Owl and alfalfa research, and how to manage pest birds;
- ✓ **Xeronimo Castaneda**, Audubon discussing their birds in alfalfa program;
- ✓ **Rachael Long,** UCCE, shares research project on hedgerows, birds, and pest control in walnuts, and economics of hedgerows;
- ✓ **Corey Shake**, Point Blue & NRCS, discusses research on woody field margins boosting on-farm bird diversity and abundance, and NRCS programs;
- ✓ **Sam Earnshaw,** Hedgerows Unlimited, discusses native plants and benefits of conservation plantings;
- ✓ **Jeanette Wrysinski,** Yolo Resource Conservation District, describes why the Union School Slough was widened and how it is part of a larger restoration project.



Common aphid pests in Vegetable Crops

Green peach aphid (spring, fall)

Vegetables, flowers, fruit, vector viruses

Cabbage aphid

Cole crops, brassicas

Potato aphid (spring, summer)

Vegetables

Bean aphid

Legumes, flowers, ornamentals, bell beans
Vector viruses

Melon (cotton) aphid
Spring, summer

Vegetables, citrus, flowers, ornamentals

Aphid Identification

- Long legs, wings, no wings
- Piercing sucking mouthpart (straw-like stylet)
- Excrete honeydew
- Cornicles: Emit pheromones or defensive secretions
- Sedentary
- Build up large colonies quickly (bare live young)
- Primarily above ground (sometimes in roots)

Damage

- Discoloration (bronzing, yellowing)
- Distorted, curled leaves (toxins)
- Honey dew excretion and sooty mold
- Vector diseases (alfalfa mosaic virus)

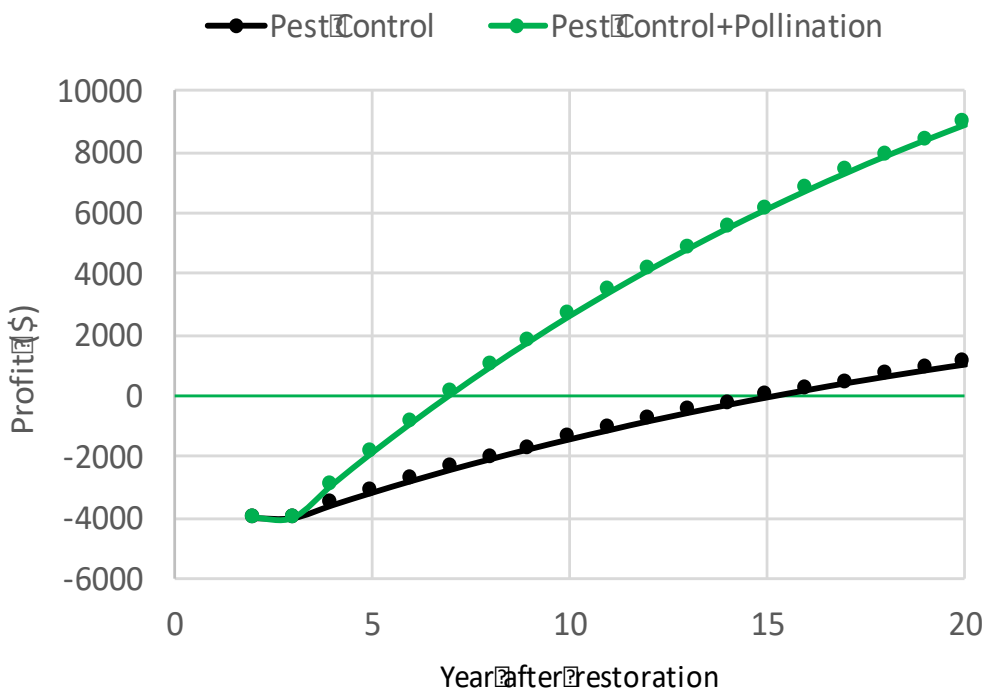
Protect and enhance natural enemies

Aphid Control

- Aphid resistant /tolerant plant varieties (romaine lettuce, tomatoes)
- Watch for excess N and low K in plants
- Avoid/remove virus reservoirs (esp. alfalfa)
- Virus free/resistant planting stock
- Control ants

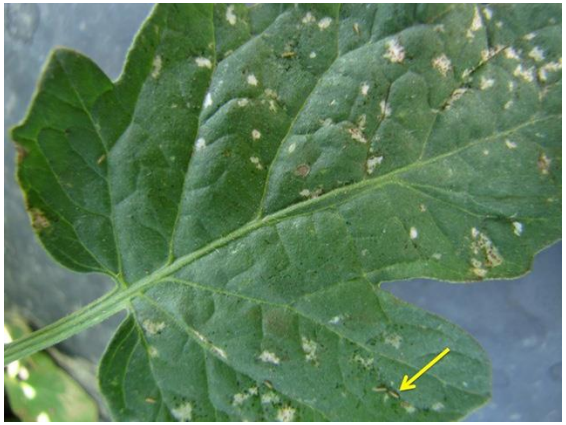
- Monitor & IPM thresholds: e.g. tomatoes, aphids: treat if 50-60% or more infested leaves.
- Insecticides: PyGanic (pyrethroid) or Azera (pyrethroid+azadirachtin) + organic spray adjuvant. Microbials: Mycotrol or PFR-97 (fungi), need humidity (dew); apply late evening.

Pest control and pollination benefits of hedgerows



Thrips (western flower, onion)

- Chewing mouthparts, damage/distort plant tissue
- Scaring
- Vector diseases



Diseases vectored by thrips:

Tomato spotted wilt virus (TSWV), Iris yellow spot virus (IYSV)

- Plant resistant varieties (tomatoes)
- Control TSWV hosts: Prickly lettuce, cheeseweed (Malva), sow thistle, bell beans, spiny buttercup

Thrips Control

- Natural enemies
- Insecticide: Entrust (spinosad)

Six spotted thrips predator

Bean thrips (pest)

Minute pirate bug

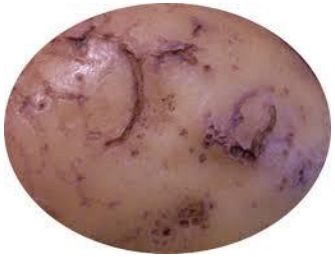
Big-eyed bug

<u>Flea beetles</u> (pale striped, potato, tuber, brassica)

Difficult to manage pests of eggplant and cole crops

Older plants rarely suffer economic damage; by 5th leaf stage resilient.

Defoliate and kill seedling plants



Other hosts include potatoes, tomatoes, peppers

Flea beetle control

- Row covers
- Disk in crop residue where flea beetle adults overwinter.
- Insecticide: Surround (kaolin, clay mineral, feeding deterrent) or Celite (diatomaceous earth), for protection in seedling stage (to 5th leaf).

Pale striped flea beetle

Western striped cucumber beetle

Seed corn maggot

Prefer cooler temperatures (spring and fall during rainy years)

Seed corn maggot control

- Incorporate residues from a previous crop, destroy weed growth.
- Wait several weeks after incorporating a cover crop prior to planting.
- Plant under ideal soil and weather conditions for rapid seed germination.
- In areas where chronic problem, monitor adult flies with yellow-colored bowls with water and a drop of soap; when populations start to decline, plant crop.

Darkling beetles (pest of seedling vegetables)

Control:

- Irrigation
- Seduce (spinsoad bait)

Carabid beetles (predators)

Tule stink beetle Predator

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Green lacewings