

Insect dynamics in hedgerows

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University of California
Agriculture and Natural Resources

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*Making a Difference
for California*

Hedgerow research sites, Yolo County, 1992-2011

Crops:

Processing tomatoes

Alfalfa

Wheat

Seed crops (sunflower)

Almonds

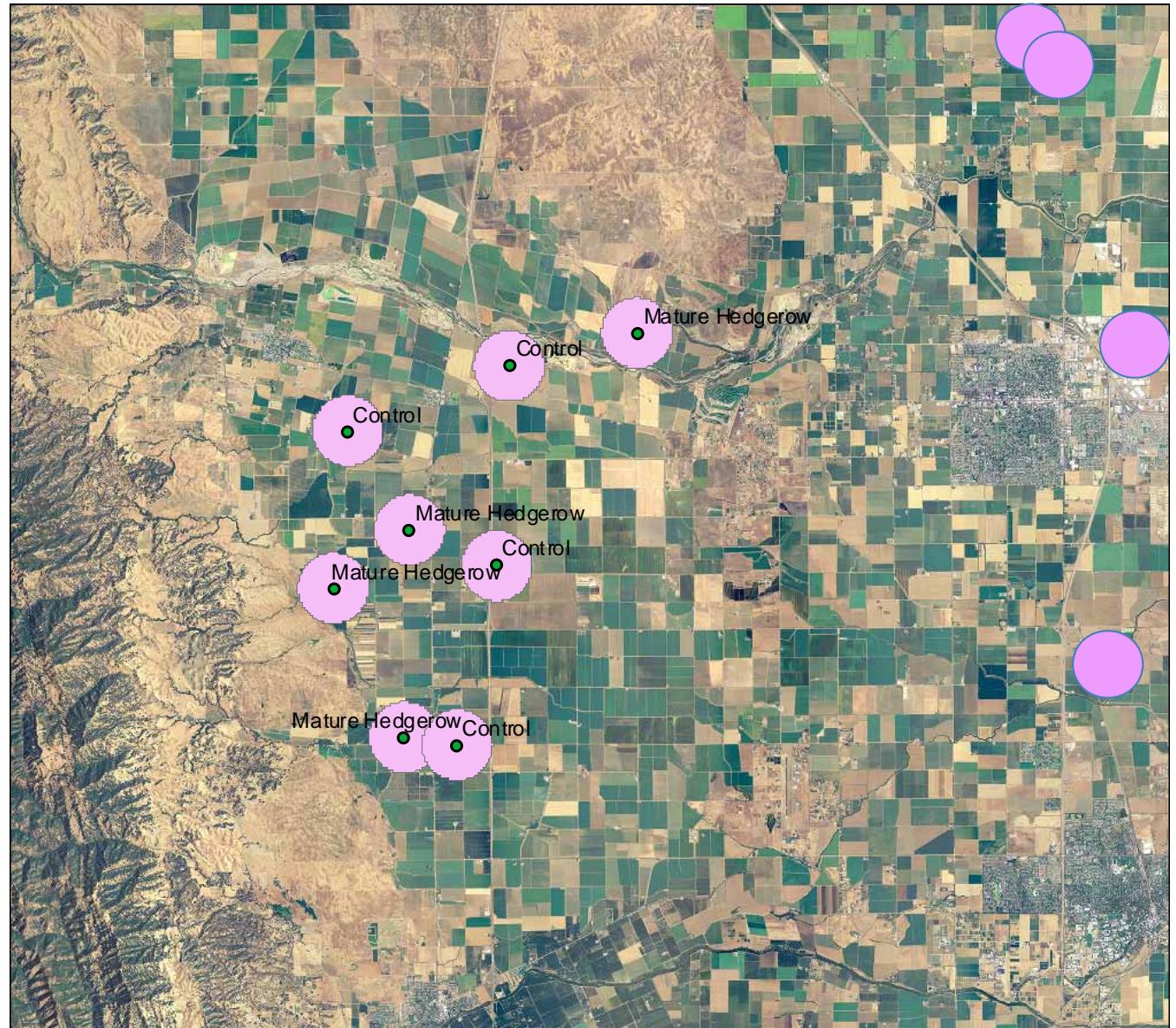
Collaborators

UC Davis

UC Berkeley

Yolo RCD

Hedgerow farms





Hedgerows: Rows of trees, shrubs, grasses, forbs that surround farm fields. In existence for thousands of years. Relic of cleared lands, natural dispersal, or direct plantings.

Hedgerow Benefits

- ☁ **Enhance biodiversity**
- ☁ **Weed suppression**
- ☁ **Filter traps (air and water quality protection)**
- ☁ **Erosion control**
- ☁ **Windbreaks**
- ☁ **Beneficial insect and pollinator habitat**







Many beneficial insects need nectar and pollen to survive and reproduce.

Green lacewings

Adults



larva



Syrphid flies: Water 50 eggs; Pollen: 500 eggs



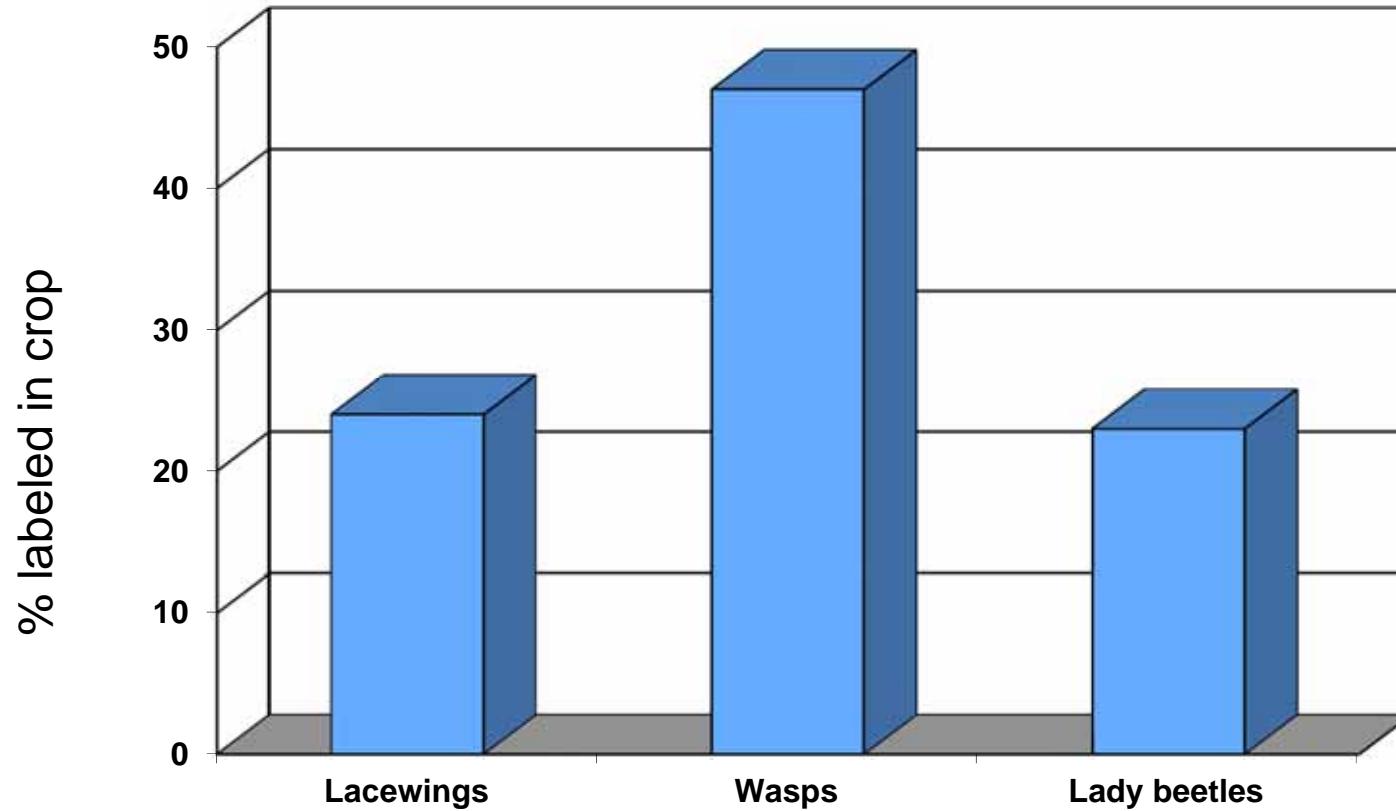
Wasps: longevity
Water: 2 days
Nectar: 9 days







% Rubidium marked beneficial insects in crops adjacent to hedgerows.

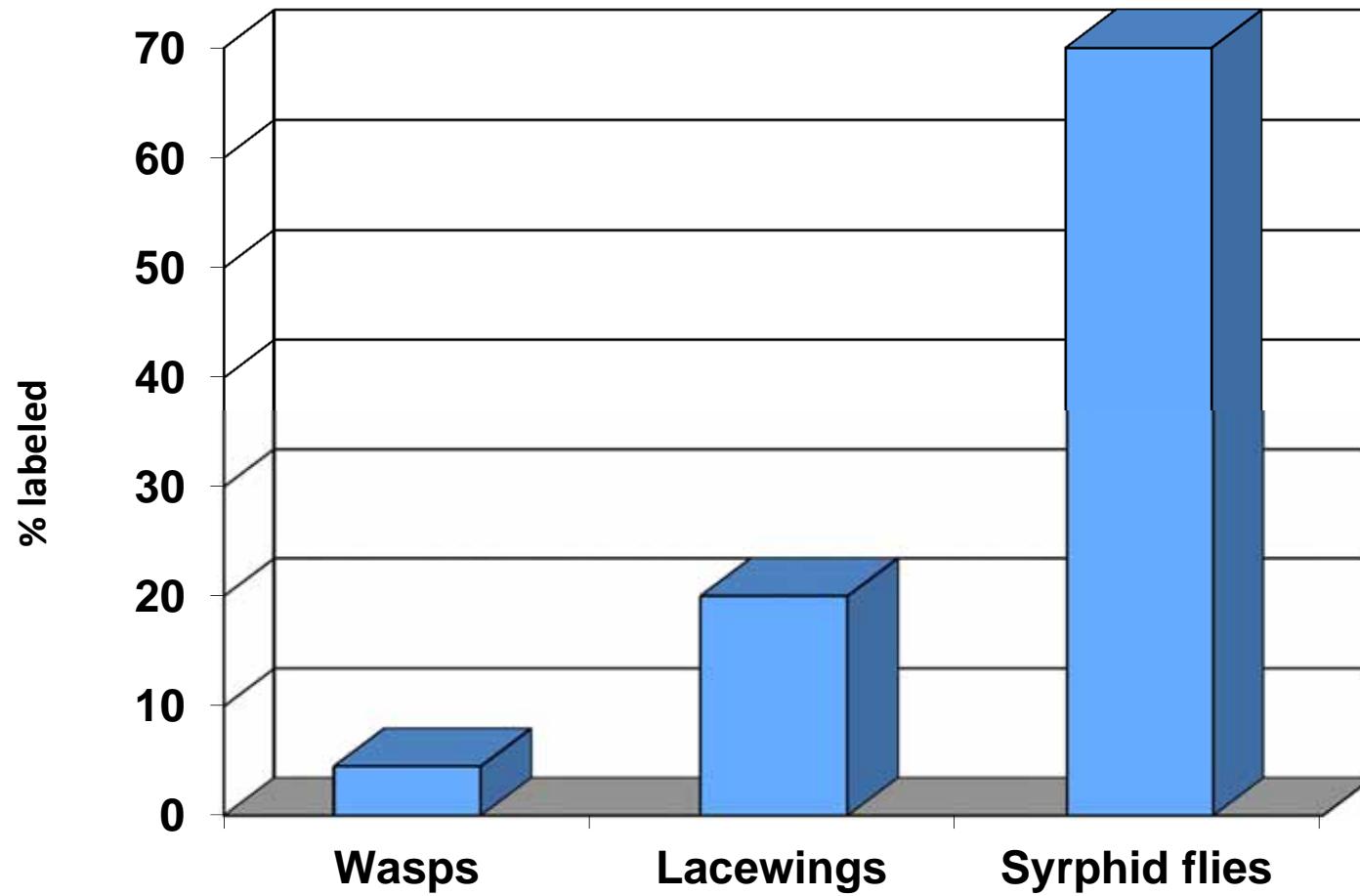


Lacewings 20-450 ft; parasitic wasps, lady beetles 250 ft.

Long RF et al. 1998. Journal of California Agriculture.



Percent Rubidium marked beneficial insects in trees 100 ft from insectary cover crop





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Grape leafhopper



Grape leafhopper egg parasitized by Anagrus



Anagrus parasitoid



Anagrus overwinters outside vineyards



Up to 34% of *Anagrus* in grape vineyards came from prune hedgerows in rubidium marking studies.





Native California shrubs and grasses



Buckwheat



Coffeeberry



Coyotebrush



Elderberry



Toyon



Ceanothus



Purple needlegrass
Creeping wildrye

Beneficial Insects

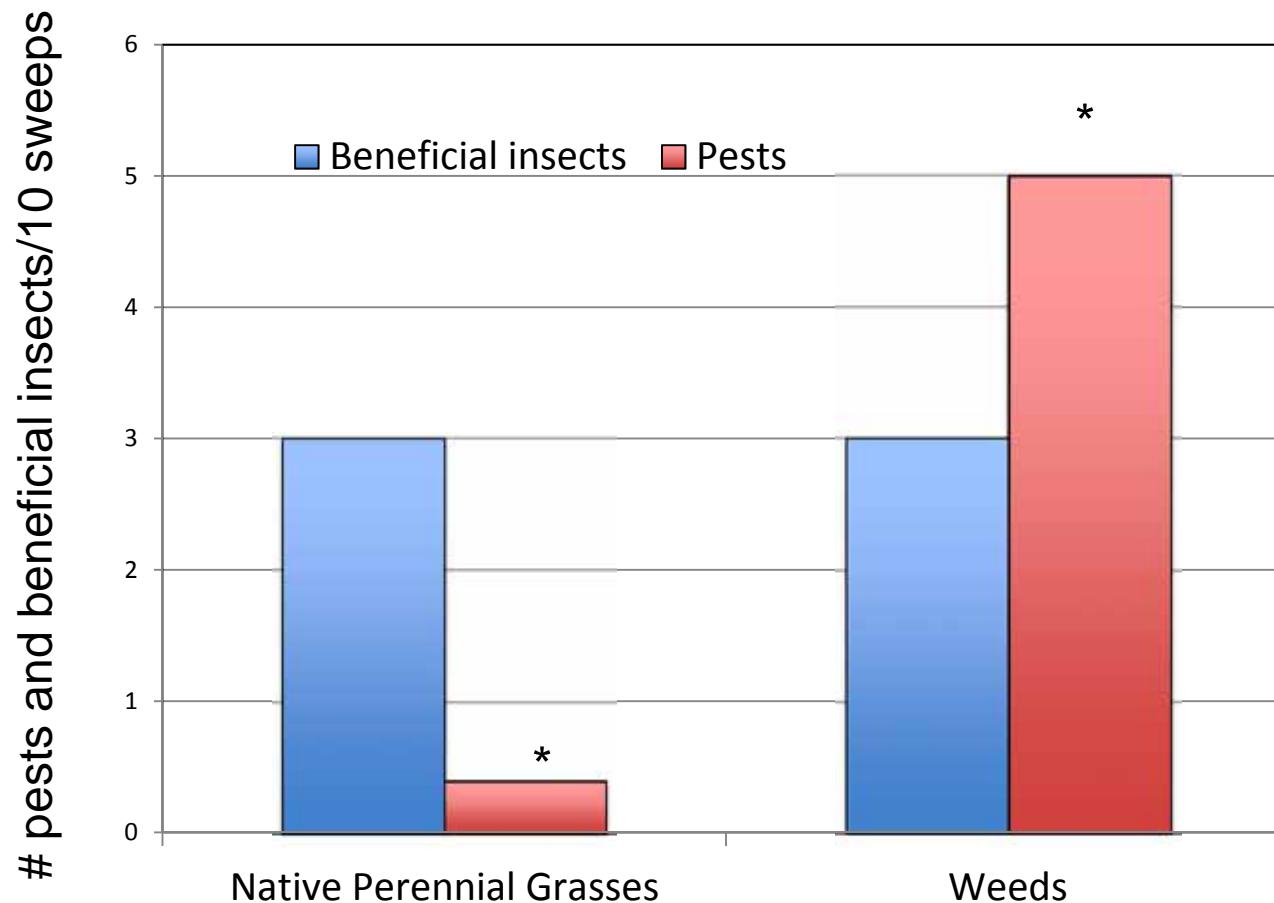


Pest Insects

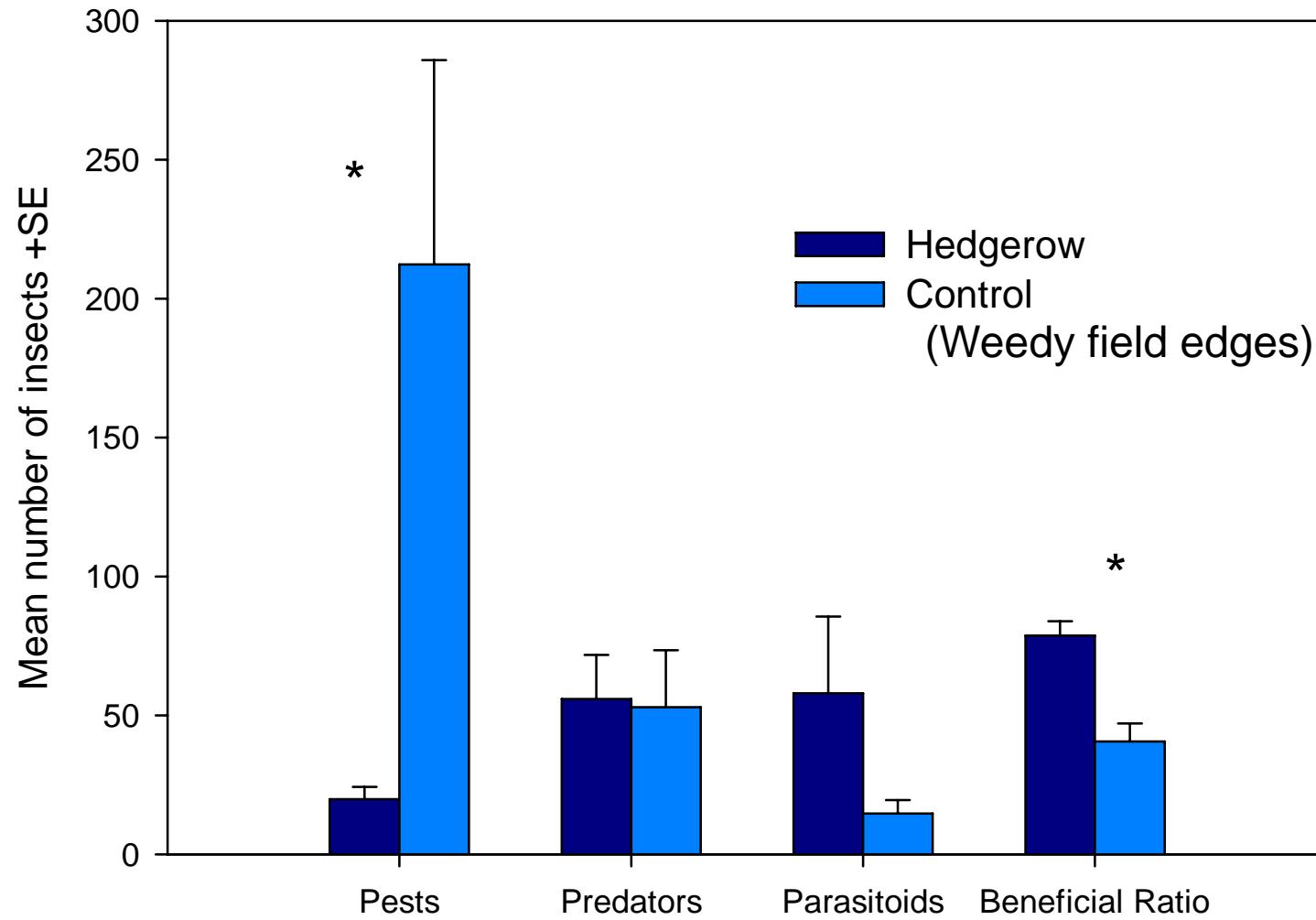




Beneficial and pest insects per 10 sweeps in weeds vs. native perennial grasses, Yolo Co., CA 1999-2000.



Average number of pest and beneficial insects per sample site





Overwintering Data

Very few pests overwintering in hedgerows (~1% of samples had stinkbugs). Lady beetle aggregations in deergrass.

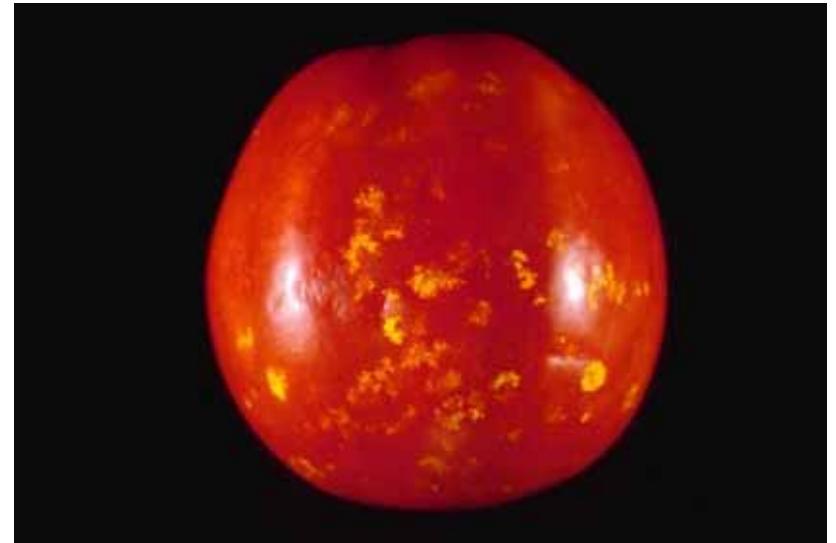


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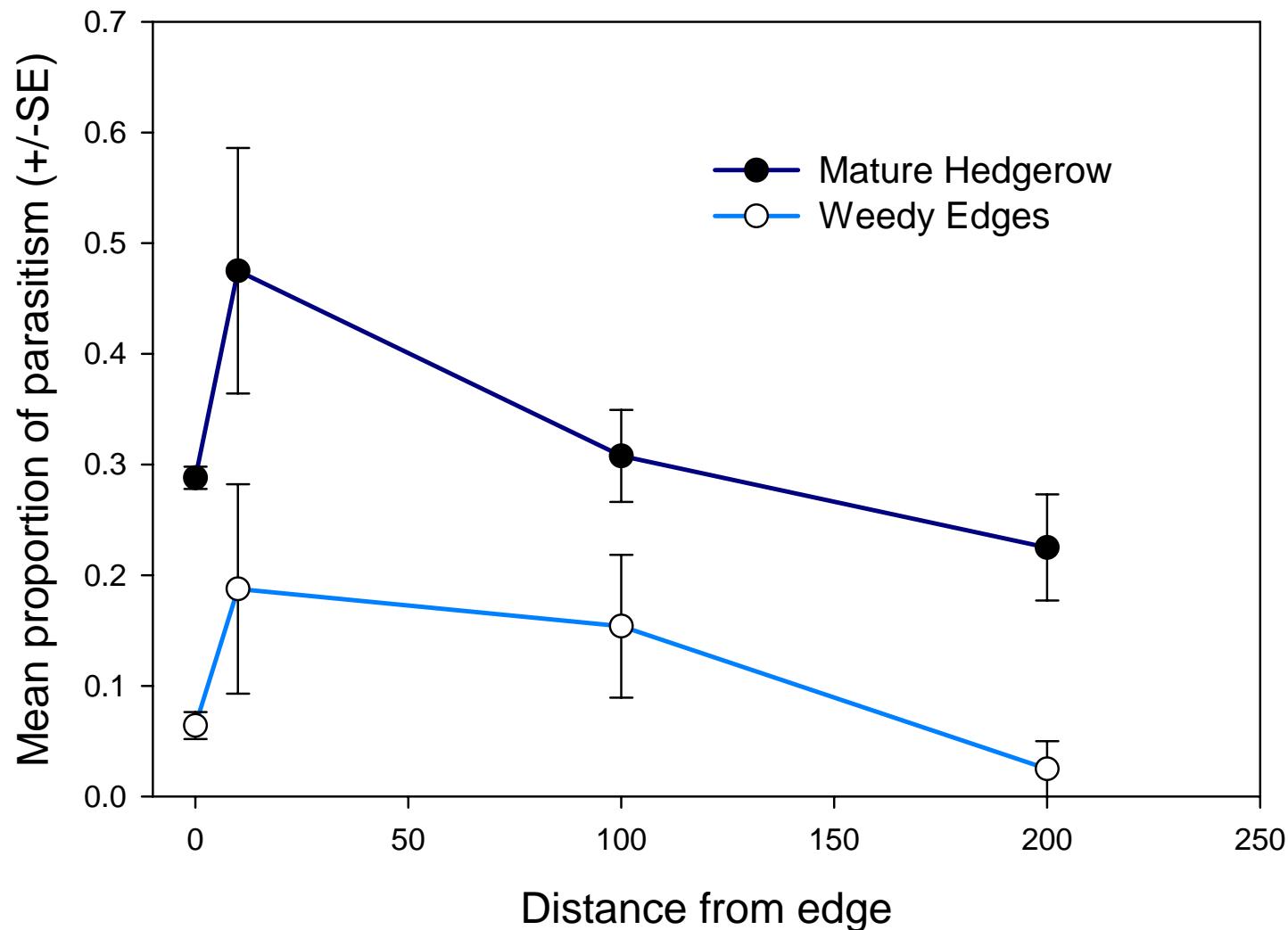


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Impact of hedgerows on pest management: 20% higher parasitism in fields that have hedgerows compared to fields with weedy edges.



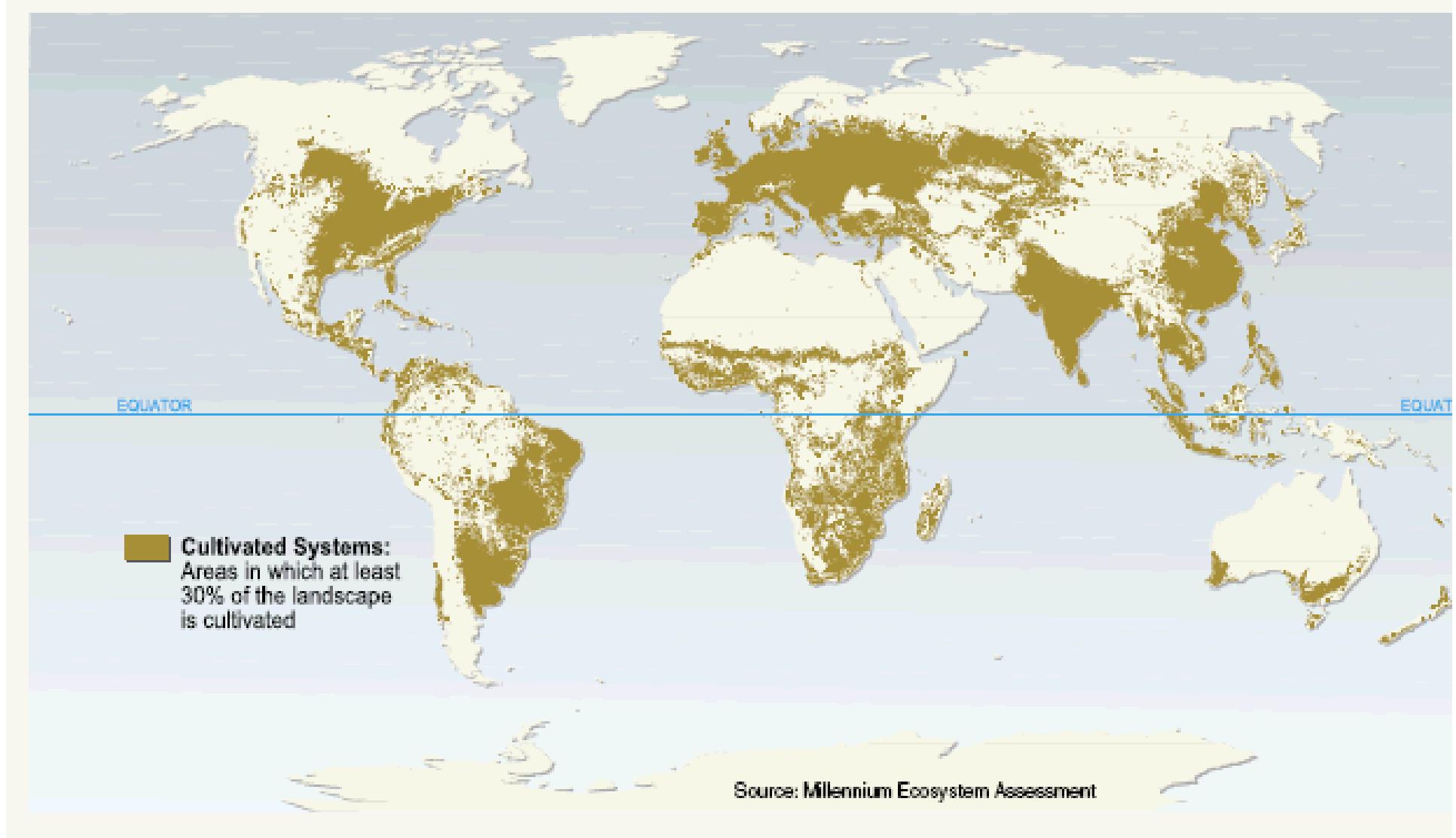
Mean proportion of stinkbug egg parasitism between distances from the field edge by treatment, Yolo County, CA 2009.

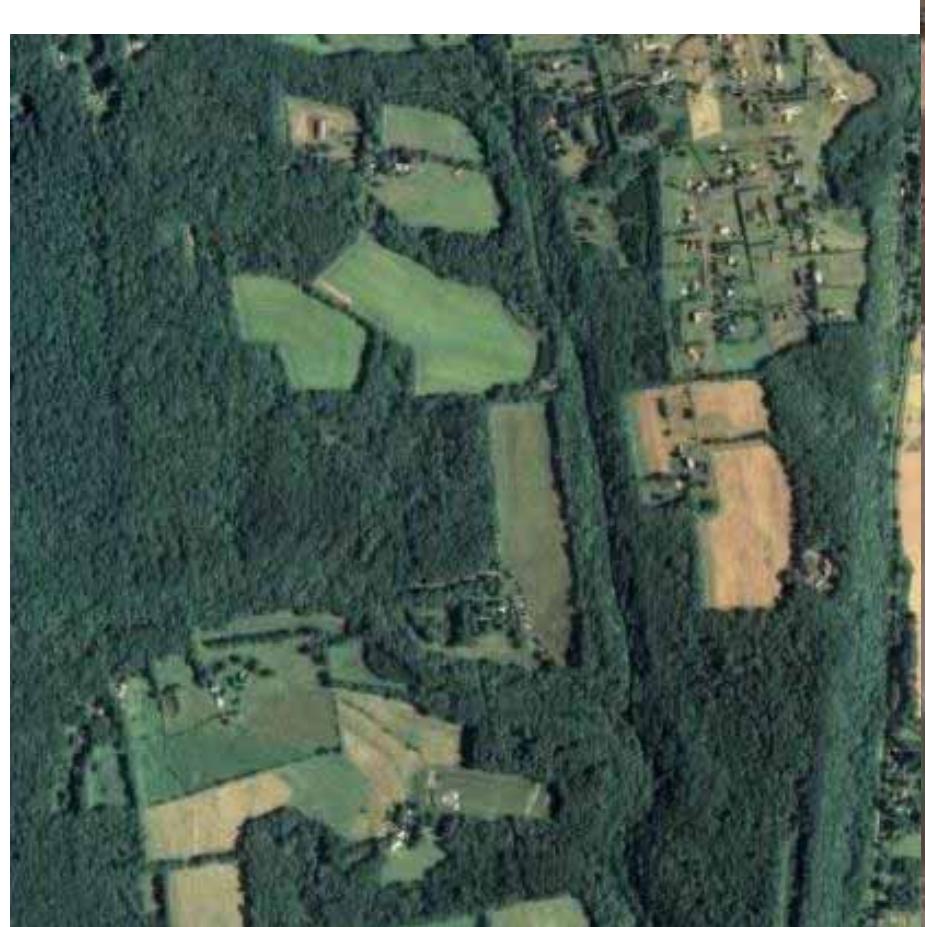


Currently working on models to show economic benefits of hedgerows and ecosystem services they provide in terms of both pollination and pest control.



Figure 1. EXTENT OF CULTIVATED SYSTEMS, 2000. Cultivated systems cover 24% of the terrestrial surface.

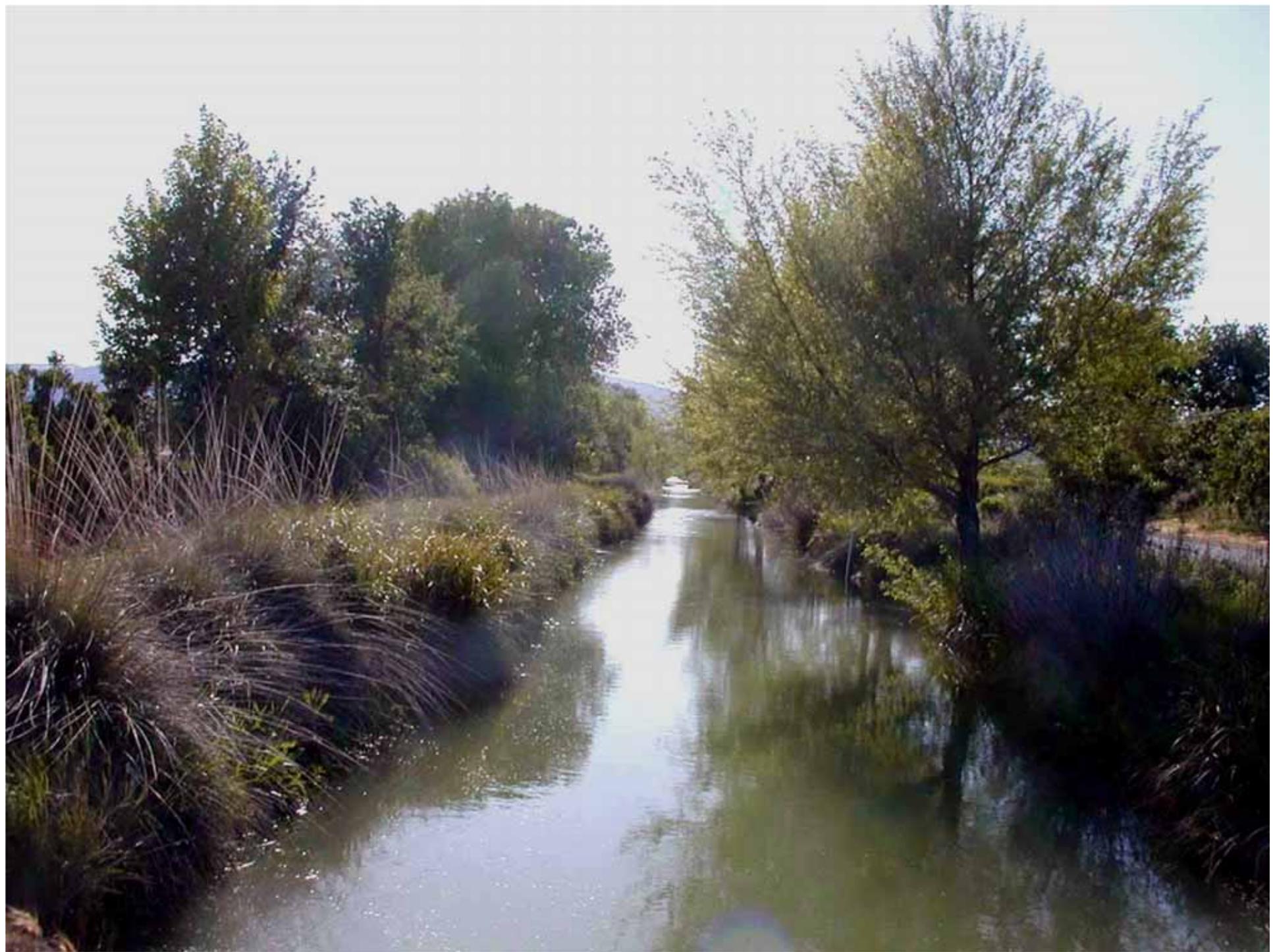




In 74% of cases studied, landscapes with high proportions of non-crop habitat had enhanced natural enemy populations in crop fields .



















Establishing hedgerows on farm in California, ANR 8390, 2010.



A WORKSHOP ON:

INSECTARY HEDGEROWS

Hedgerows for pollinators and beneficial insects

Thursday, September 8, 2011

7:45am-Noon

Espero, California

TOPICS WILL INCLUDE:

- Incorporating hedgerows into a farming operation
- Funding incentives for hedgerow installation
- Benefits of native pollinators on crop production
- Attracting beneficial insects to farm edges
- Selecting plants to maximize insectary habitat
- Incorporating forbs into hedgerows
- Achieving a successful installation

To register and for directions, please contact Sheila Pratt at
pratt@yolorcd.org or (530) 662-2037 ext. 117



WORKSHOP AGENDA

7:45-8:00am	Arrival and Sign-In
8:00-8:05am	Welcome: Yolo County Resource Conservation District (RCD)
8:05-8:20am	Farming with Hedgerows: John Stephens of Oakdale Ranch
8:20-8:30am	Cost-Share Opportunities and Technical Support: Natural Resource Conservation Service (NRCS)
8:30-9:00am	Beneficial Insects in Hedgerows: Rachael Long of UC Cooperative Extension
9:00-9:30am	Hedgerows for Native Bees: Contributions to Crop Pollination: Jessa Guisse of Xerces Society
9:30-10:15am	(Break) Walking Tour of a Mature Hedgerow
10:15-10:45am	Site Preparation, Installation, and Maintenance: Jeanette Wrysinski and Heather Crowell of Yolo RCD
10:45-11:15am	Shrubs and Trees for Insectary Hedgerows: Taylor Lewis of Cornflower Farms
11:15-11:45pm	Wildflowers for Pollinators: John Anderson of Hedgerow Farms
11:45-12:00	Installing and Maintaining Forb Strips: Jessa Guisse
12:00-12:30pm	(Optional) Informal Discussion and Networking





High abundance of vinca (periwinkle) in riparian areas correlated with high Pierce's incidence. Himalayan blackberry is also an important host for Pierce's disease that's vectored by sharpshooters.



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