

Table 1. Ecological/Systems Management of Insect Pests at Phil Foster Ranches	
Strategies	Implementation at Phil Foster Ranches
I. Landscape-level design for insect pest suppression	
Embed farm in patchy landscape including remnant natural habitat areas	Very little remnant habitat remains in this region. PFR is surrounded by weedy margins and vegetable farms.
Integrate plant diversity into farm design	Diverse crops and cover crops grown in spatial and temporal rotations. Hedgerows planted along major farm roadways.
II. Soil building for insect pest suppression	
Add organic soil amendments	Cover crops (approximately 30% of cropped acreage); farm-made compost (8-10 wet t/acre/yr).
Reduce tillage	
Optimize quantity and quality of soil organic matter (SOM)	Diverse organic residues added regularly throughout the growing season. Organic residues vary in composition (e.g. C:N) and decomposition rate.
Increase below-ground plant diversity	Diverse crops and cover crops. Goal: grow roots year-round.
Optimize soil potassium levels	Potassium levels maintained at or above sufficiency.
Match nitrogen supply with crop need	NO ₃ -N levels usually within optimal range.
Optimize soil calcium levels and cation balance	Calcium contents maintained at or above sufficiency. Ca:Mg ratio maintained at appropriate level.
III. Habitat-building for conservation biological control of insect pests	

Create diverse below-ground habitat	Diverse crops and cover crops. Goal: grow roots year-round. (See Rotation Rules in the Disease Management System)
Create diverse above-ground habitat in field margins	Hedgerows. Lightly managed farm borders containing several species of mainly non-native weeds, shrubs and trees. Fairly diverse, but not generally considered habitat that supports biological control organisms.
Create diverse above-ground in-field habitat	Diverse crops, in-field insectaries, and cover crops.
Provide winter cover and refuge for beneficial organisms	Hedgerows and cover crops provide year-round habitat and/or cover.
Plant pest-specific insectary plants in crops	Dhani-ya cilantro, white dill, alyssum, bunching dill
IV. Monitoring and identification of beneficial and pest insects	
Scout crops for pests and beneficials	Scouting for insect and disease pests and beneficials every 2-3 days.
Identify pests and beneficials	Cooperative Extension-assisted identification/diagnosis.
Keep records	Scouting reports generated and archived every scouting day.
Use monitoring data to inform management decisions	Farm-developed thresholds developed for pests with effective supplemental input options. Inputs applied when pest reaches threshold, based on monitoring of pests and beneficials. Scouting data also used to evaluate efficacy of management strategies.
V. Supplemental inputs	
Use selective insecticides (soft on beneficials)	Selective (not broad spectrum) insecticides used whenever possible.

Minimize the use of insecticides

Insecticide use discontinued when ineffective and increased when pests are not controlled by other methods.

¹Strategy listed in the NRCS Soil Quality Initiative