

Arthropod Management in California Blueberries

David Haviland and Stephanie Rill
UC Cooperative Extension, Kern Co.
Blueberry Field Day
20 May 2009





Citrus thrips



White grubs



Flower thrips



Flatheaded borer



Pacific Flatheaded Borer

- Adults emerge April-July
- Lay eggs on bark
 - Usually weak or sunburned areas
- Feed within wood
- One generation per year
- Management = pruning it out after harvest



Flower thrips



- Migrate from foothills and pastures when host plants dry down
- Attracted to flowers
- Can be found in very high numbers in blueberries
- Can cause halo spot from oviposition
 - Damage is rare
 - Not very noticeable unless actively searching



Citrus thrips vs. Flower thrips



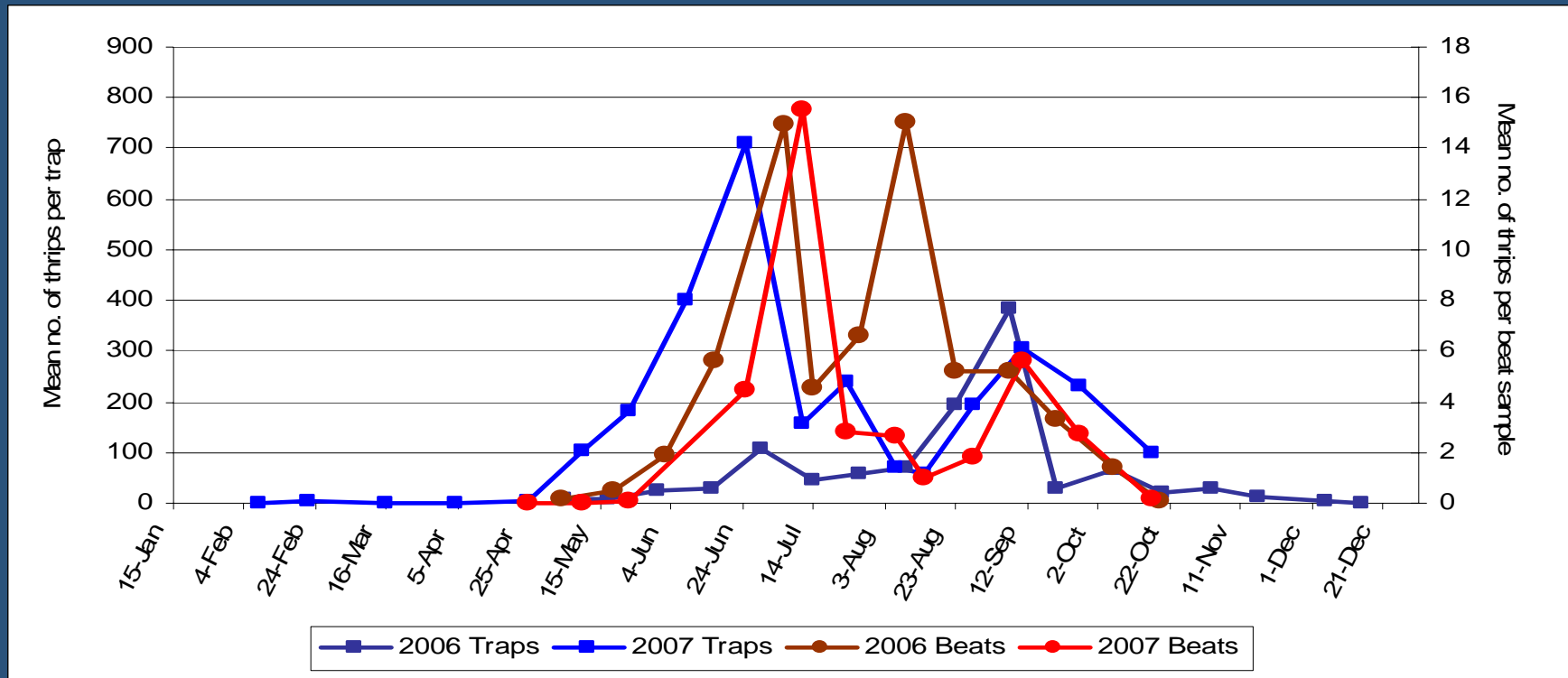
Yellow, have waists, on new flush, very active, present all summer

Yellow/black, long and slender, on flowers, sluggish, present at bloom

Citrus thrips



- Overwinter as eggs in leaves, found in canopy starting in June (3rd generation)
- Not usually an issue until after harvest
- Populations fluctuate June through October





Damage to blueberries

- During harvest they are found on the suckers and not near the fruit (1st & 2nd generation)
- Feed on new flush all summer
 - Shoot stunting
 - Leaf deformation
 - Shortened internodes
 - Stem scarring
 - Varies by variety



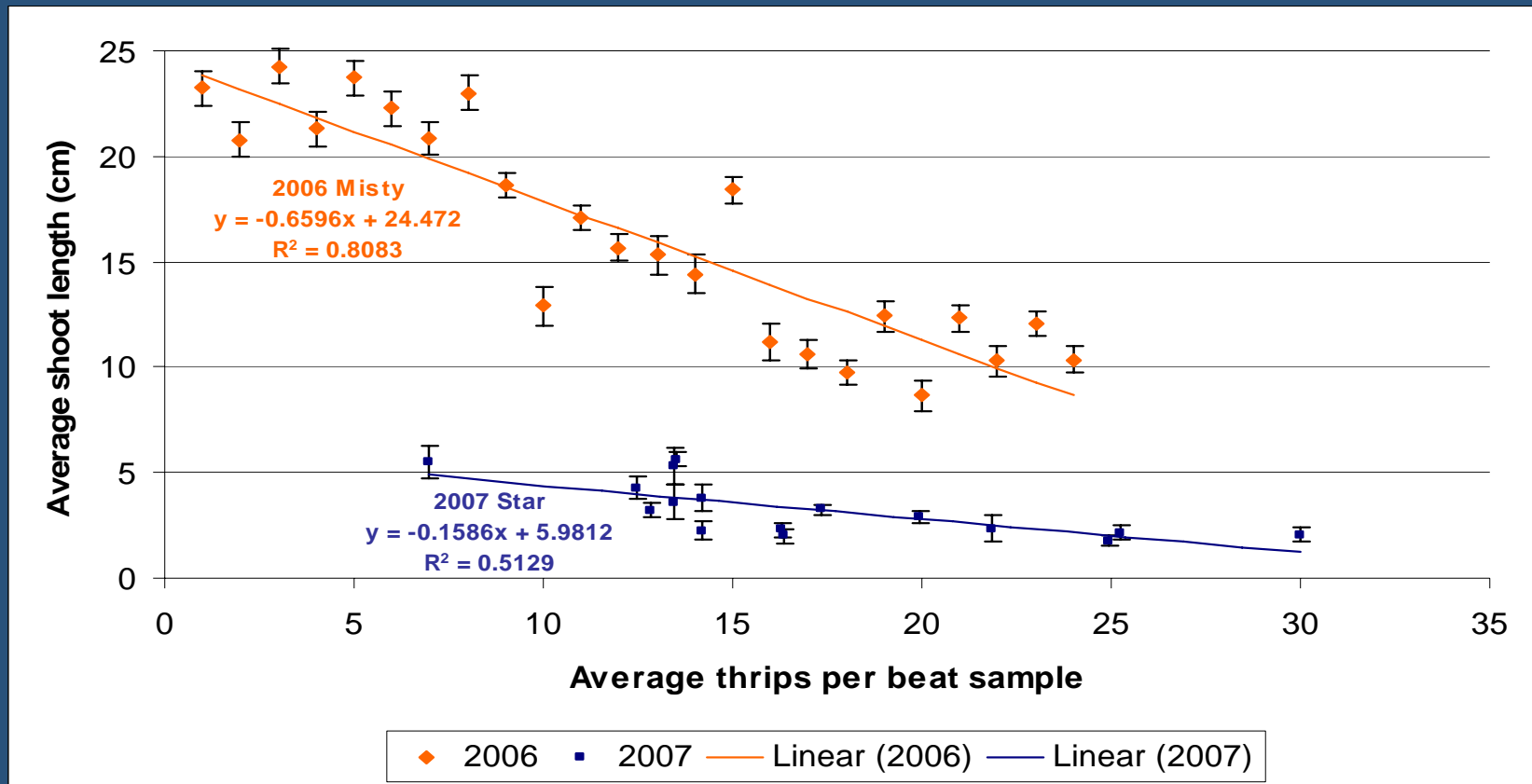
Damage to blueberries





Thrips and New Growth

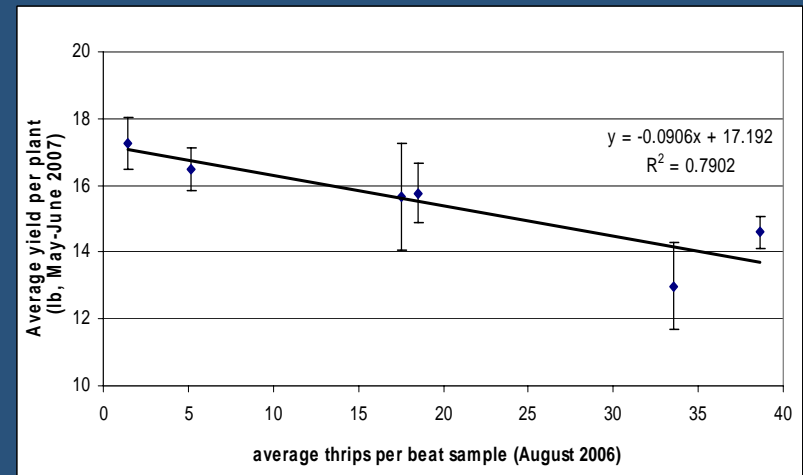
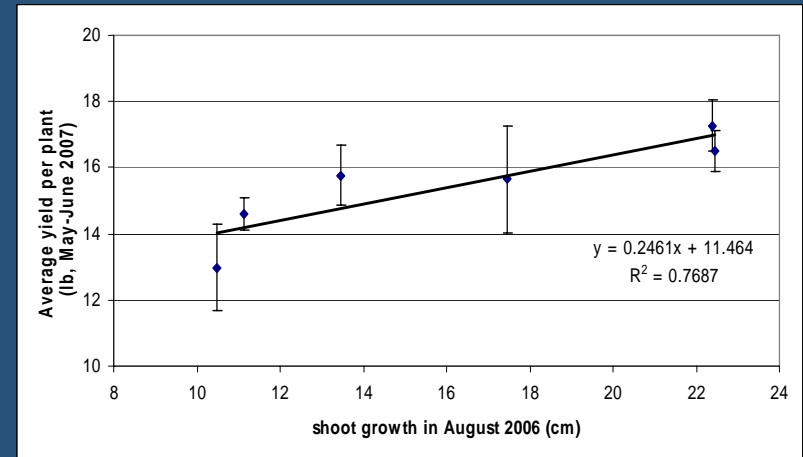
- Increased thrips = decreased new green flush growth



Yield Studies Summary



- Impact
 - Reduced growth (2 yrs)
 - Reduced number of berries (1 yr)
 - Reduced yield per plant (1 yr)
- No impact
 - Size of berries
 - Quality of berries
 - Shift in harvest date

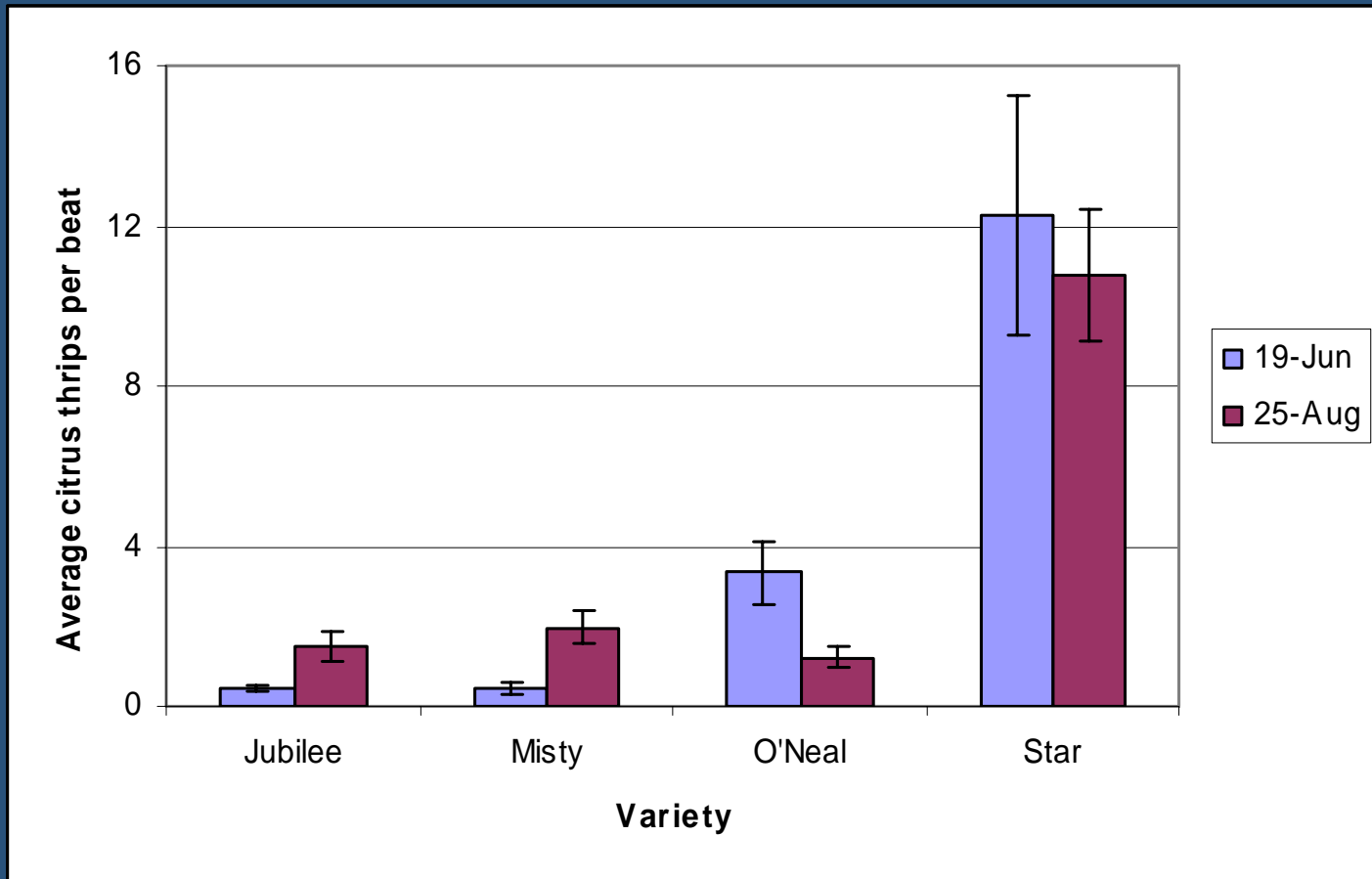


Control methods

- Cultural controls
 - Avoid more susceptible varieties
 - Overhead irrigation
 - High pressure water
- Biological controls
 - Predators and parasites unavailable or unaffactive
 - *Beauveria* shown to have limited results
- Chemical controls
 - Rotation of insecticide sprays

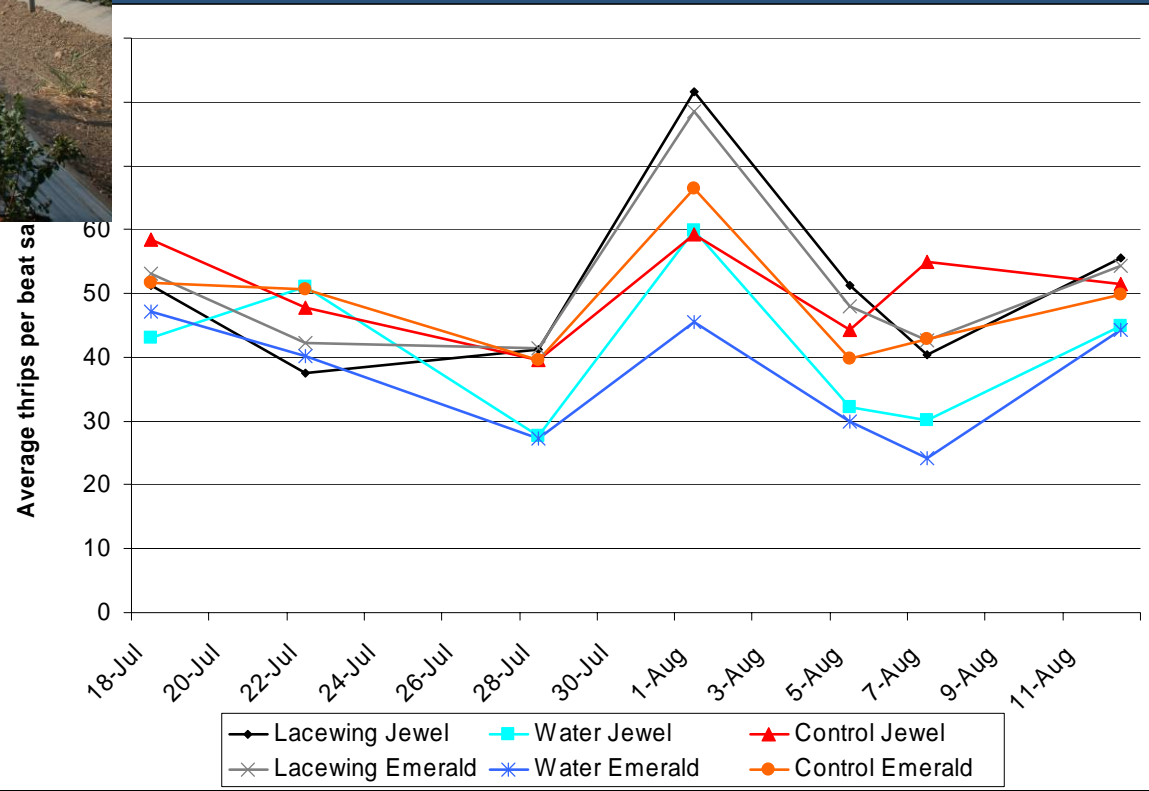


Cultural controls- avoid Star



Mechanism of selectivity not known.

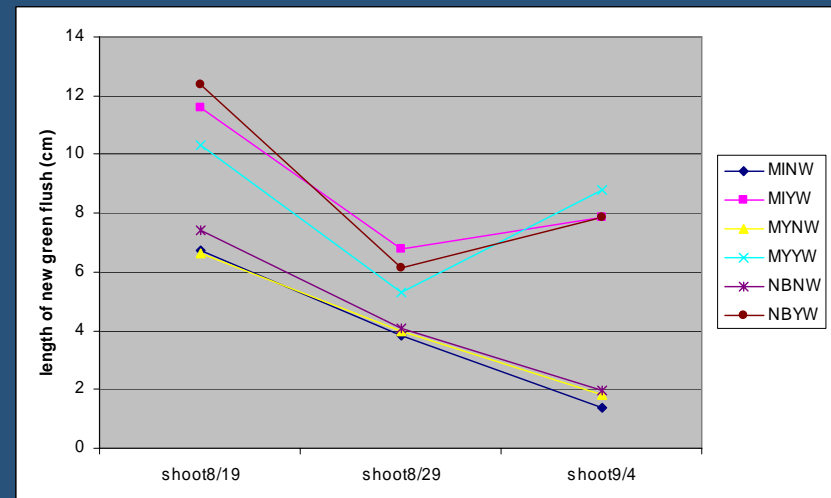
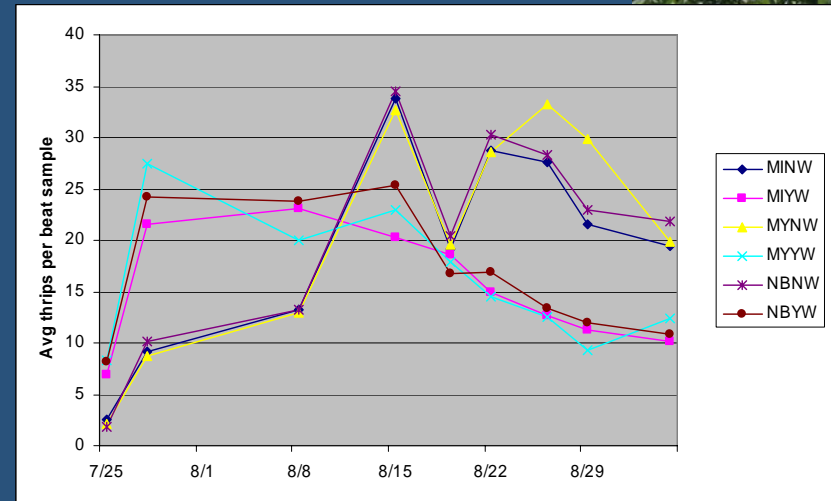
Lacewing & High Pressure Water 2008 (2 trt/week for 5 weeks @ 75GPA)



Beauveria and sprinklers



- Evaluated
 - Overhead irrigation
 - Thrips don't like water
 - Beauveria
 - Mycotrol
 - Millet seed dispersal
- Results
 - Major benefit of sprinklers
 - Not likely due to affect on thrips
 - Beauveria didn't do much





Treatment Thresholds

- Do not have to worry until harvest is over
- Monitor, treat about 20 thrips per beat sample
 - When damage is visible on the plants



Insecticide Studies 2006-2008



- Products that work
 - Success/Delegate/Entrust (organic) –spinosad
- Products that work moderately
 - Assail, Danitol (if not used repeatedly)
- Products that might work
 - Lannate/Diazinon –the first time
- Products that do not work
 - Oils, soaps, pyrethrin/pyrethroids such as Evergreen, Pyganic, Neem-Oils

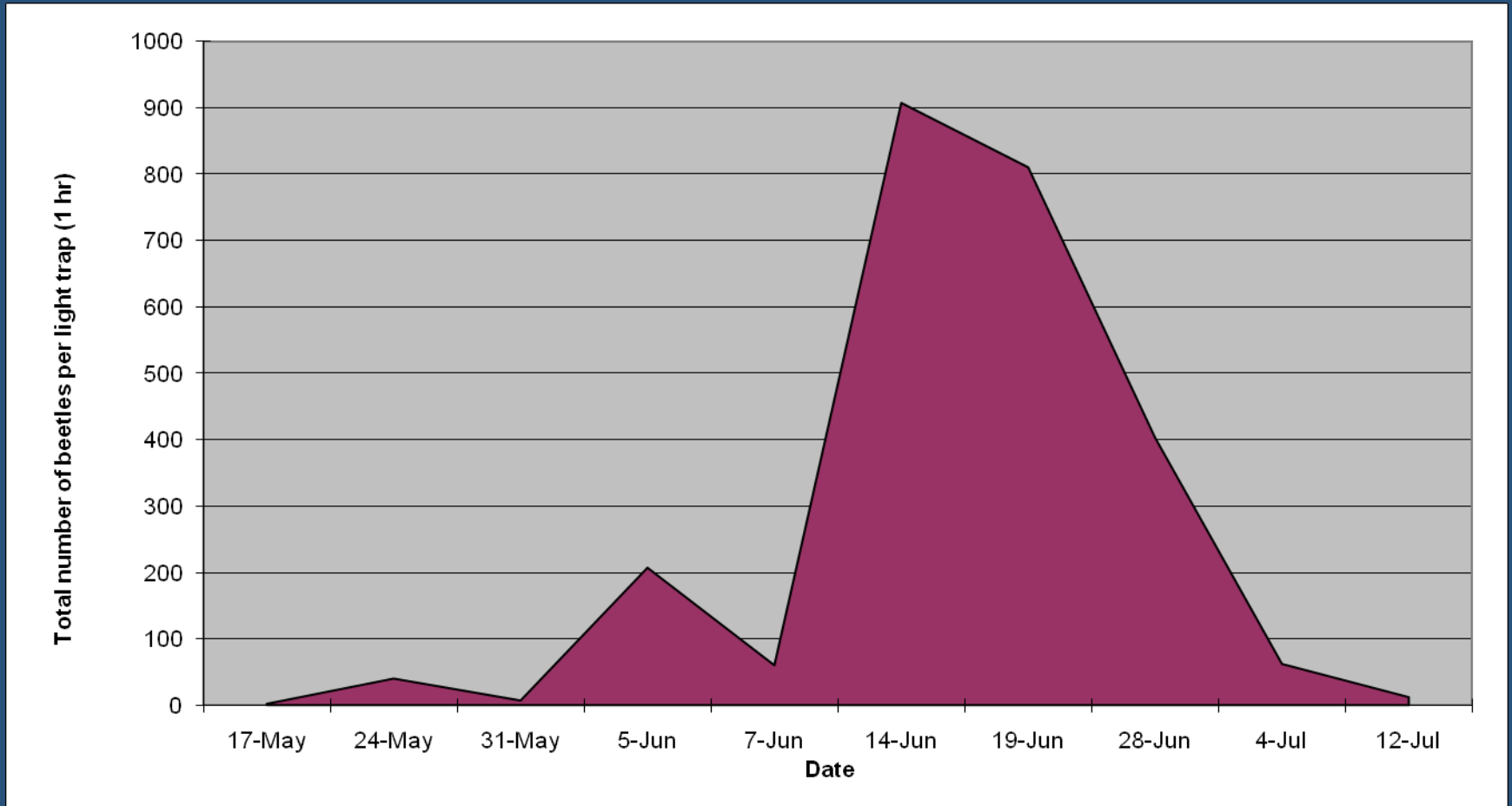


White Grubs (Chafers)

- May beetle, scarab, chafer, white grub, June bug, etc.
- C-shaped grub
- Brown adult
- Native to California
- Highly polyphagous on broadleaves
- Pest of turf, sweet potatoes, and blueberries



Beetles captured in light trap





Estimates of life cycle

(based on info on masked chafer in lawns and Japanese beetle on east coast)

- One generation per year
- Adults in June
- Eggs- mid to late June
- Grubs-
 - hatch in July
 - most are likely fully grown 3rd instar by the fall
 - Overwinter
- Pupae- mid May to mid June
- Adults in June





Why a pest of blueberries?

- To a grub, a blueberry field probably looks and feels like a lawn
 - Lots of organic material (soil amendments)
 - Thick thatch layer (mulches)
 - Fine, shallow roots
 - Consistent moisture
- In fact, grubs often show up in the blueberry field before the plants
 - Can stunt and kill young plants
- Populations build over time



Management in turf

- Insecticides
 - Imidacloprid (Admire)
 - Timing likely best in ~early July when grubs are small
 - Not likely effective in blueberries due to soil binding
- Biological Control
 - Nematodes
 - *Heterorhabditis bacteriophora*
 - A hunter/searcher
 - Commercially available, applied through the drip line
 - Organic
 - Other pathogens such as milky spore
 - Not available in California

Nematode trial

(exploratory quick and dirty)

- Applied April 1, 2009
 - Commercial rate
 - Commercial blueberry field
- Koppert Biological Systems, Inc.
 - Chrissie Davis, cooperator
- Sentinel grubs evaluated 5 weeks later
 - 25% of the grubs missing
 - 25% sick
 - 6% confirmed by nematodes





Prognosis?



- Nematodes have promise
- Can be delivered through drip system
- Can seek out and infect grubs
- But...
 - Optimal timing unknown
 - Rates needed unknown
 - Effects on mortality unknown
 - Effects on fecundity unknown
 - Secondary infection unknown
 - Affects on feeding unknown
 - Damage prevention unknown

