Small Bugs and Stink Bugs on Pistachios

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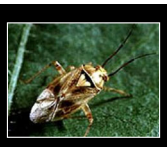
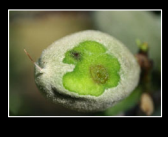
Outline

- Bug Species
  - Small bugs
  - Stink bugs
- Damage
  - Seasonal Biology
  - Economic Injury
- Controls
  - Monitoring
  - Insecticides & timing
  - (bio-controls, trap crops)





Bug Species: Small Bug Pests

Calocoris norvegicus

Phytocoris relativus

Lygus hesperus

Calif. buckeye bug
(Neurocolpus longirostrus)

Photo: web

Bug Species: Large Bug Pests

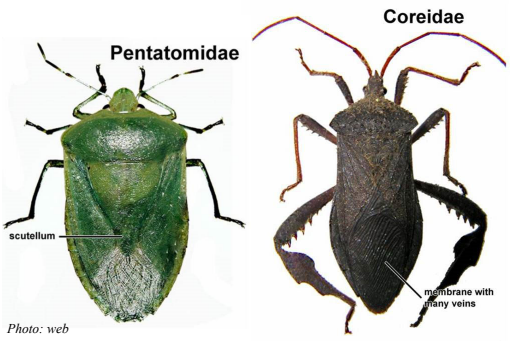


Photo: web

Green Stink Bug
(Chinavia (=Acrosternum) hilaris)

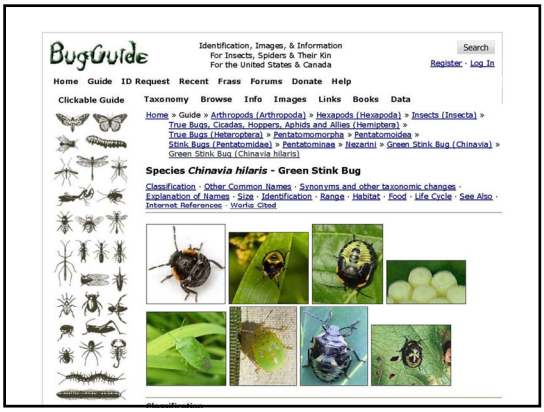
Stink bugs (Pentatomidae)

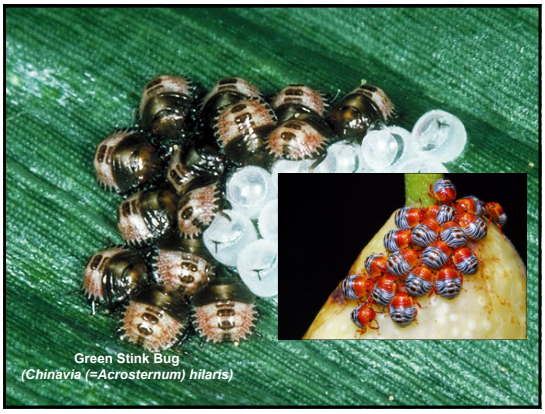
Say's Stink Bug
(Chlorochroa sayi)

Uhler's Stink Bug
(Chlorochroa uhleri)

Stink bugs (Pentatomidae)

Green Stink Bug
(Chinavia (Acrosternum) hilare)





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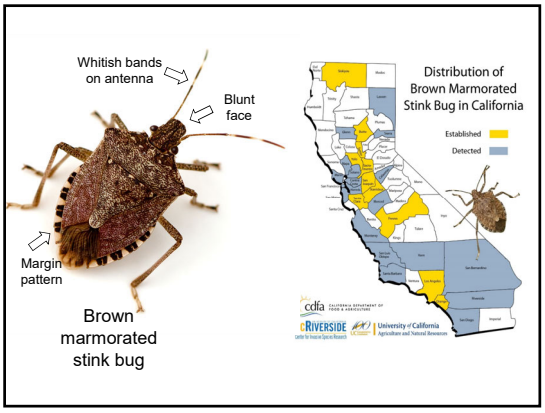
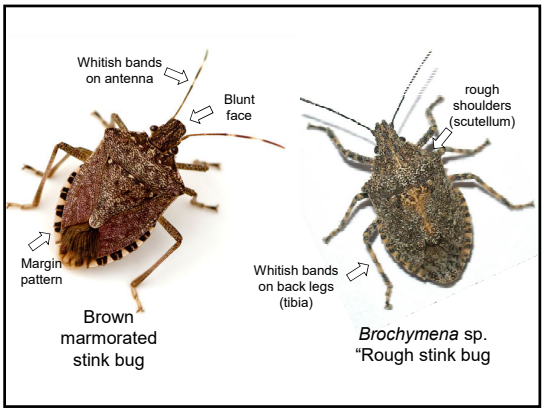

Whitish bands on antenna
Blunt face
Margin pattern
Brown marmorated stink bug
Distribution of Brown Marmorated Stink Bug in California
Established
Detected


Whitish bands on antenna
Blunt face
Margin pattern
Brown marmorated stink bug
rough shoulders (scutellum)
Whitish bands on back legs (tibia)
Brochymena sp.
"Rough stink bug

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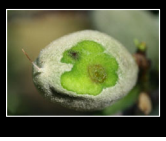
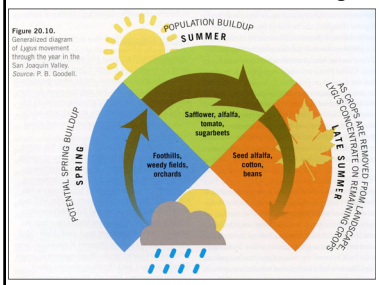


Pistachio Small Bug Pests



Lygus hesperus

For Lygus (and other small bugs) the orchard's proximity to their preferred host plants is important (overwinter as an adult); they can 3-5 generations / yr depending on host plant, but it is the early-season pistachio damage (dropped nuts)

Pistachio Small Bug Pests

Potato mirid
(*Calocoris norvegicus*)

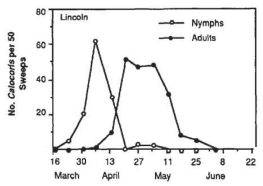


Fig. 1. Seasonal phenology of *C. norvegicus* nymphs and adults in the Lincoln, Roseville, Chico, and Orland pistachio orchards.

from Purcell & Welter 1990 JEE

Again, early-season damage; one generation per year; overwinters as an egg in weedy host plants

Pistachio Small Bug Pests

Phytocoris
(Phytocoris relativus and Phytocoris californicus)

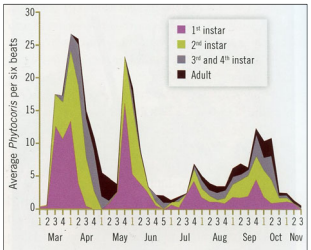
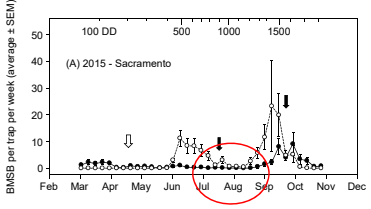


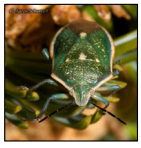
Figure 20.8. *Phytocoris relativus* life cycle from March to November 1992, based on weekly beating of female pistachio trees (Kerman cultivar) receiving no insecticide treatments and averaging counts from six replications. *Source:* R. H. Beede.

Pistachio Small Bug Pests

Phytocoris
(Phytocoris relativus and Phytocoris californicus);
overwinter as egg in young tree branches (e.g., on pistachio);
four generations per year.

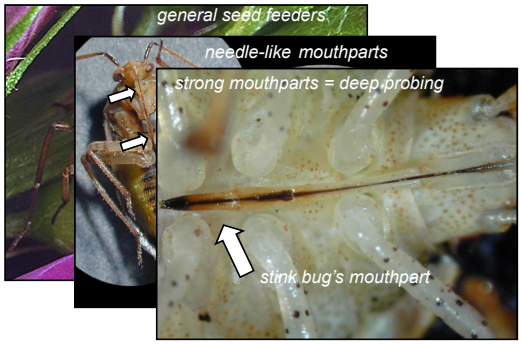
Pistachio Large Bug Pests typically have 2 generations

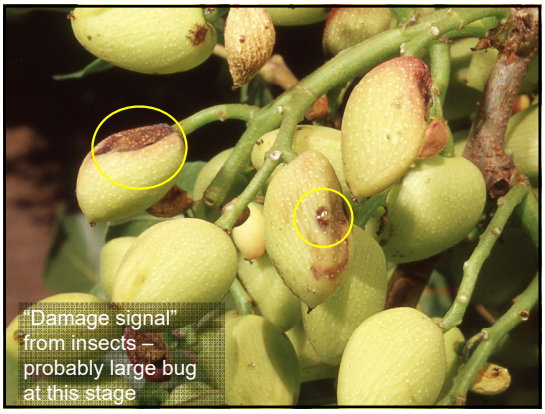




Hemiptera “half-wing” actually two wings with the half-wing covering the second fly-like wing

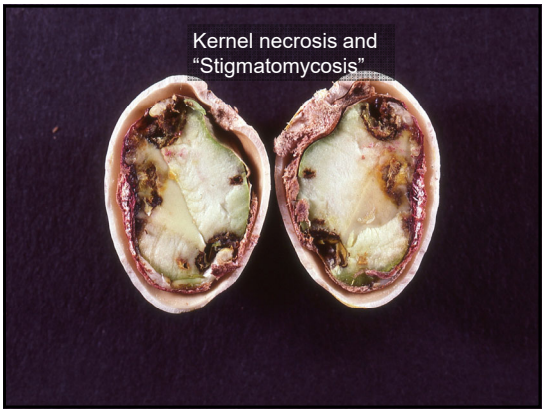
Bug Damage - Mouthparts

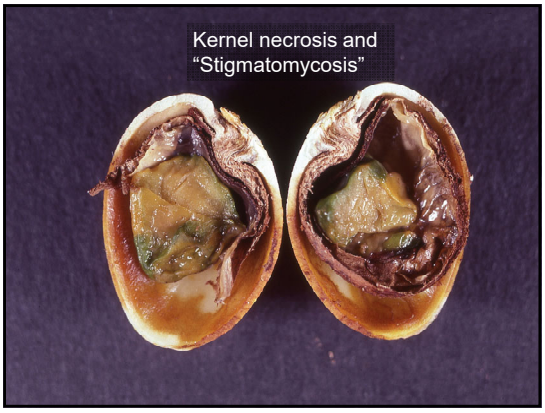



"Damage signal"
from insects –
probably large bug
at this stage


Almond damage
(RE Rice)


Almond damage
(RE Rice)

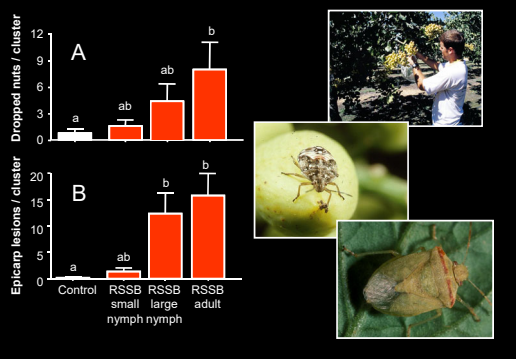




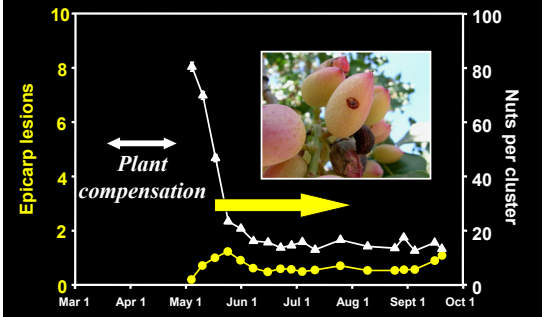
Damage amount & Seasonal development

1) Bug density
2) Bug size
3) Crop load
4) Shell hardness

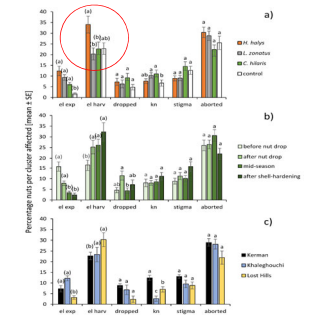

2) Bug size – Pistachio cage study with RSSB



3) Crop load & compensation

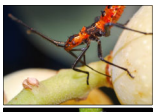


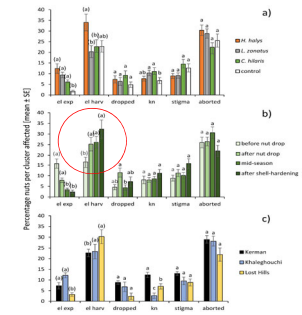
Brown marmorated stink bug



Pistachio damage for (a) different insect treatments, (b) the pistachio phenology and (c) different pistachio varieties: 'el exp' = epicarp lesions recorded immediately after insect exposure, 'el harv' = epicarp lesions recorded during harvest, 'dropped' = dropped nuts, 'kn' = kernel necrosis, 'stigma' = fungal symptoms indicating stigmatomycosis, 'aborted' = aborted nuts.

Brown marmorated stink bug





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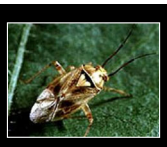
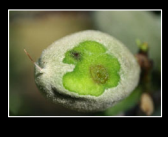
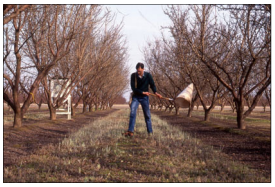


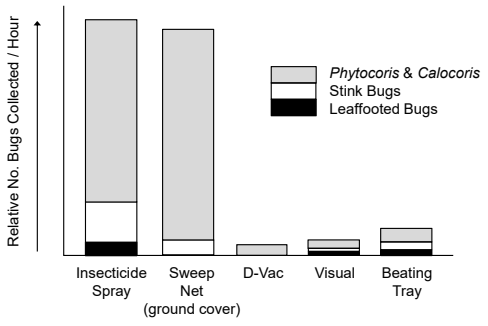


Monitoring for Small & Large Bugs

- Sweep samples for small bugs
- Beat samples for large bugs
  - easy, species in canopy & immediate response
- Monitor damaged nuts
  - indicates bug presence
  - shows "%" crop damage
- Critical sampling period
  - April-June (pistachios)
  - March- May (almonds)



Compared different sampling methods (beating tray, sweep net, D-Vac, visual sampling) to a 'complete' insect collection with Bob Beede spraying the pistachio trees and collecting the insects that dropped onto a plastic sheet



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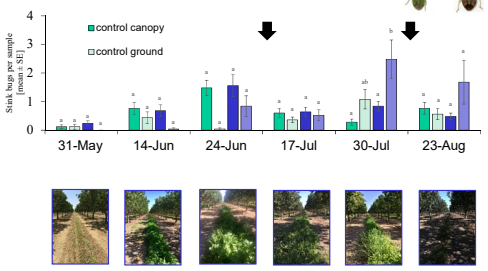
Cover crop trial in 2018 and 2019 with Nichols Farms
(Pistachio Board funded project)

Cover crop
mixed seeds

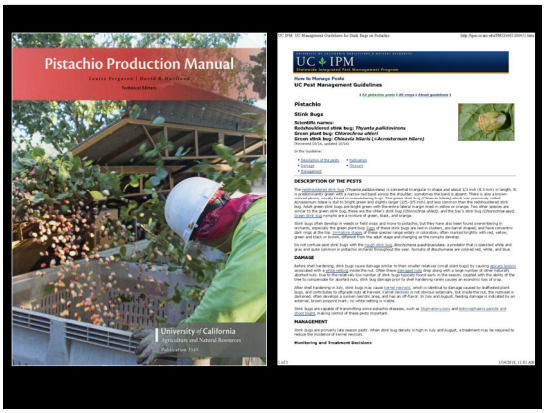
Control
resident weeds

Trend: Towards the end of the season most stink bugs in the cover crop without increase in canopy



Conclusion: Lots of small bugs (early-season) or some large bugs (early, mid-season), insecticides are the most reliable option. But remember (1) crop load compensation, (2) bug size, and (3) mid- to late-season shell-hardening,

Pyrethroids (April-May) are often used for bugs. Materials are broad-spectrum, and may be connected to Gill's mealybug problems & NOW resistance


Pistachio Production Manual
University of California
Agriculture and Natural Resources
Publication 3420
UC IPM
How to Manage Pests
UC Pest Management Guidelines
Pistachio
Stink Bugs
Scientific names:
Green-striped plant stink bug: Thyanta pallidovirens
Green plant bug: Chlorochroa uhleri
Green stink bug: Chlorochroa ligata (=Acrosternum hilare)
DESCRIPTION OF THE PESTS
DAMAGE
MANAGEMENT
Monitoring and Treatment Decisions