

**Management of apple
pests:
codling moth,
leafrollers,
lacanobia,
and
stink bugs**

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Development and degree model to predict the phenology of *Lacnobia subjuncta*

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Tree Fruit Research
and
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Life Stages of the *Lacanobia* Fruitworm

Eggs



Larvae



Pupa



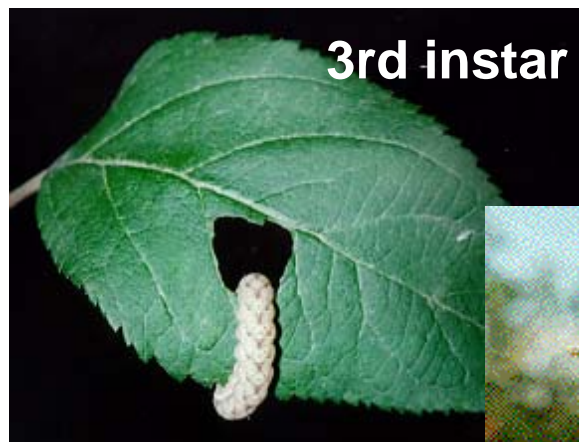
Lacanobia

Leafroller

Adult

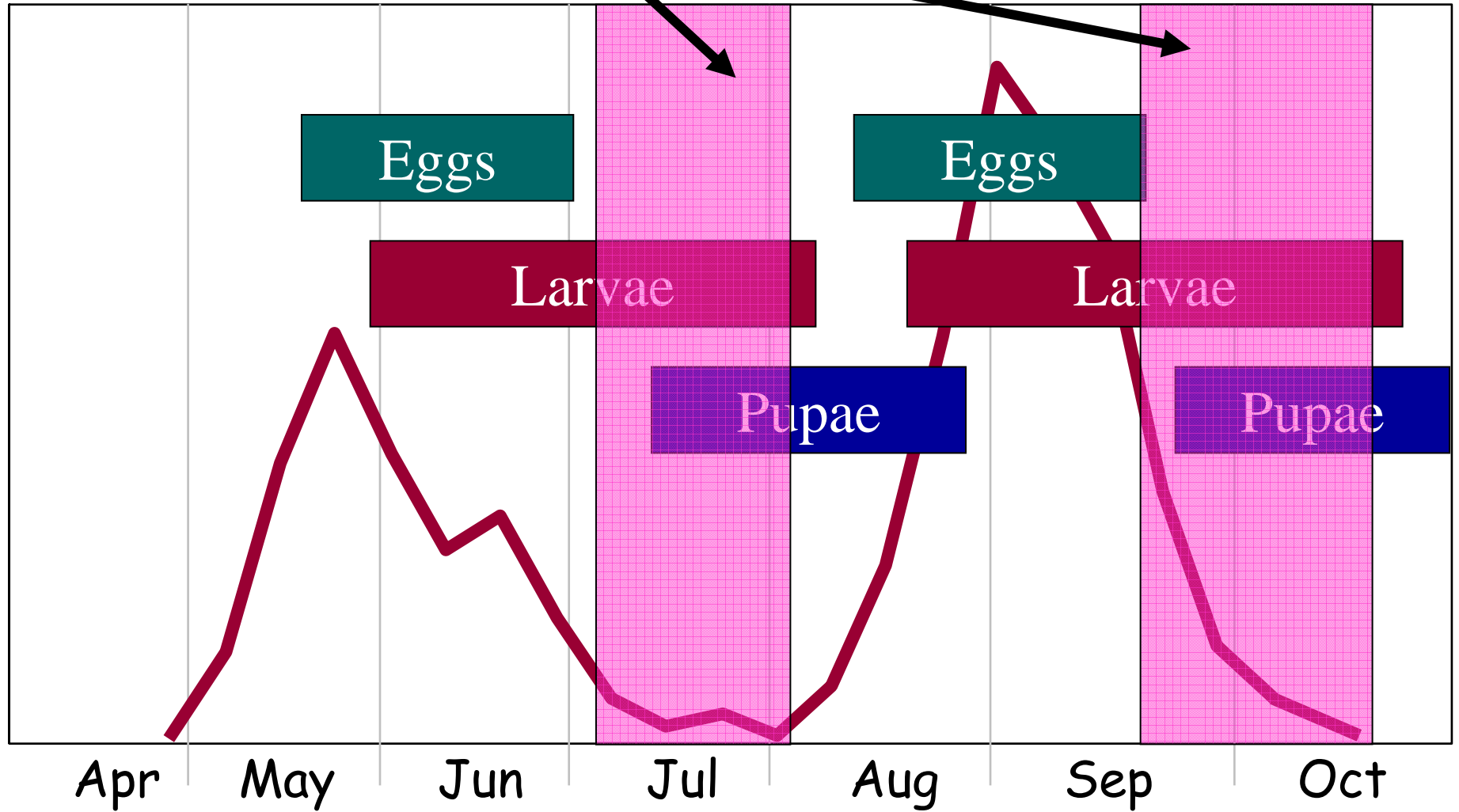


Damage caused by the *Lacanobia* Fruitworm



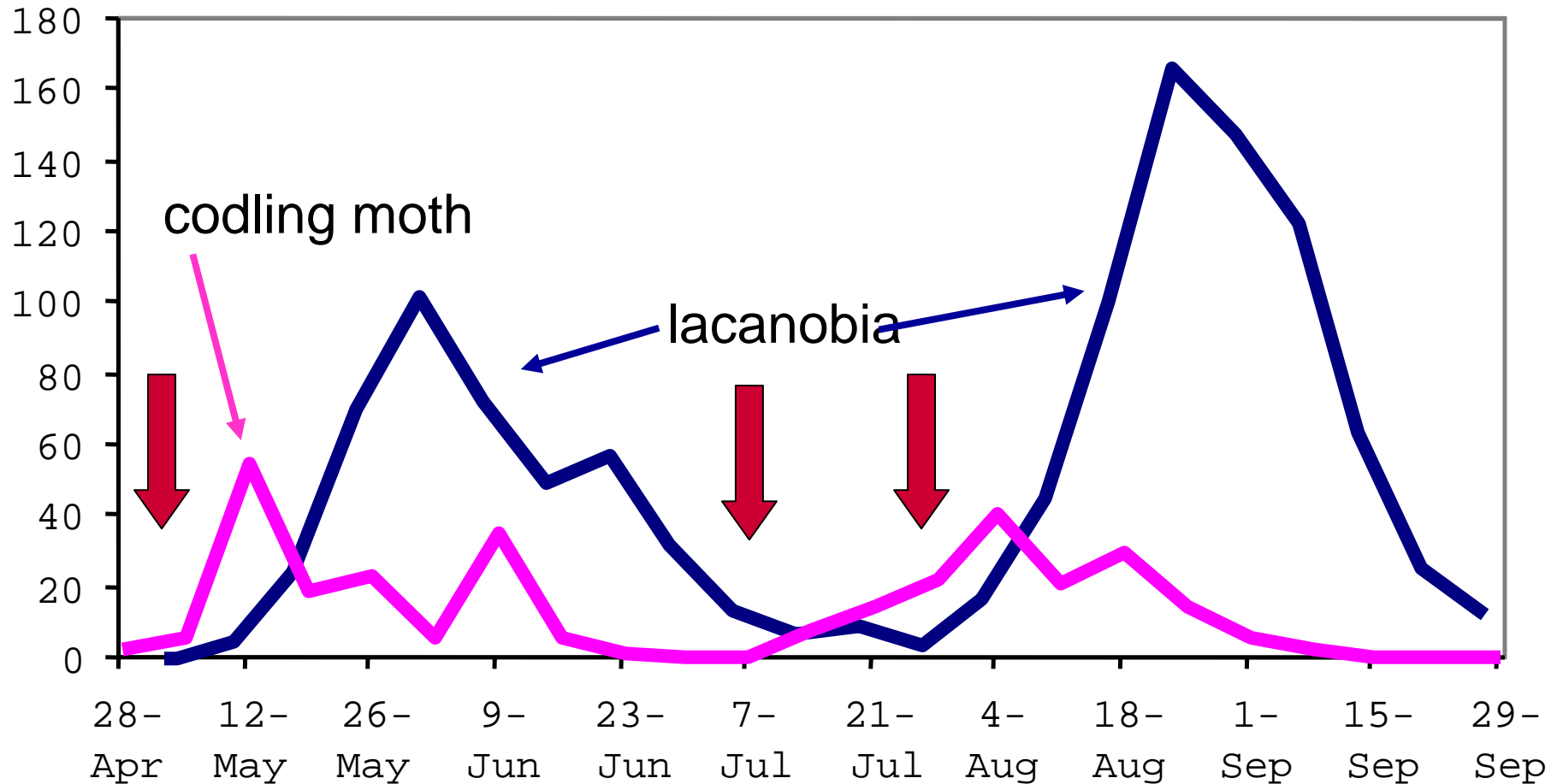


Generalized Life History of *Lacania* Fruitworm

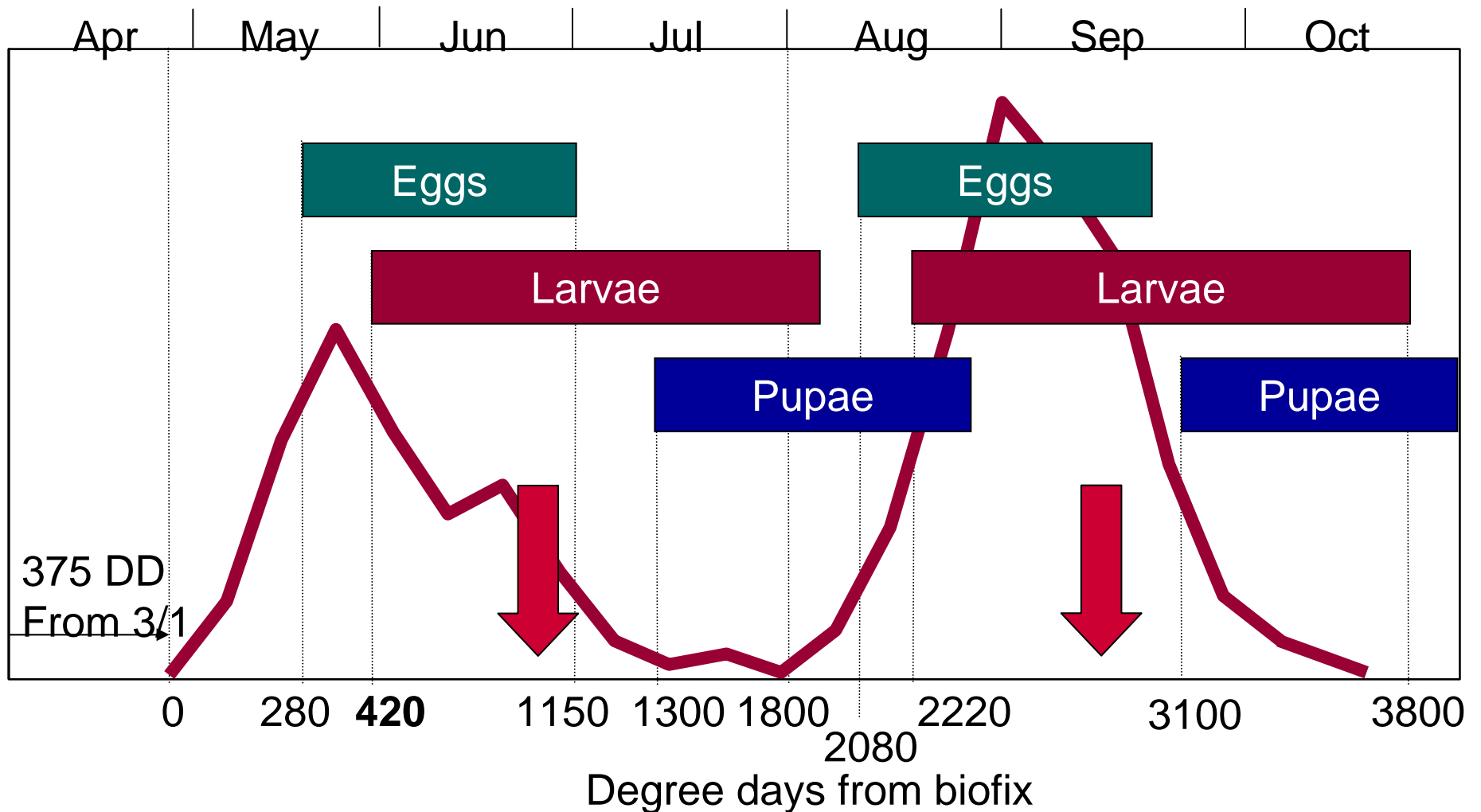


Comparative activity of codling moth and Lacnobia fruitworm

Moths/trap



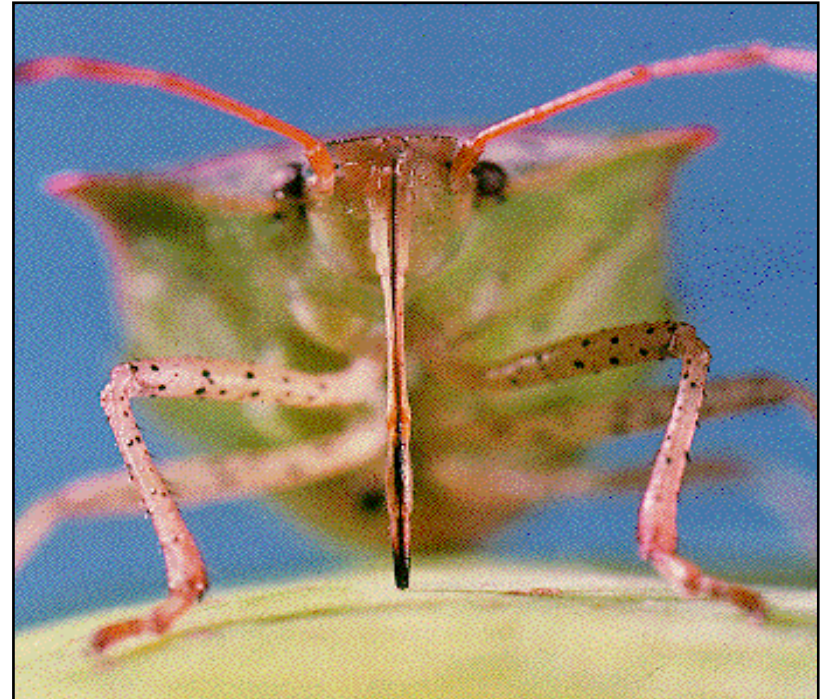
Lacania Fruitworm Degree day development



Control options for lacanobia fruitworm

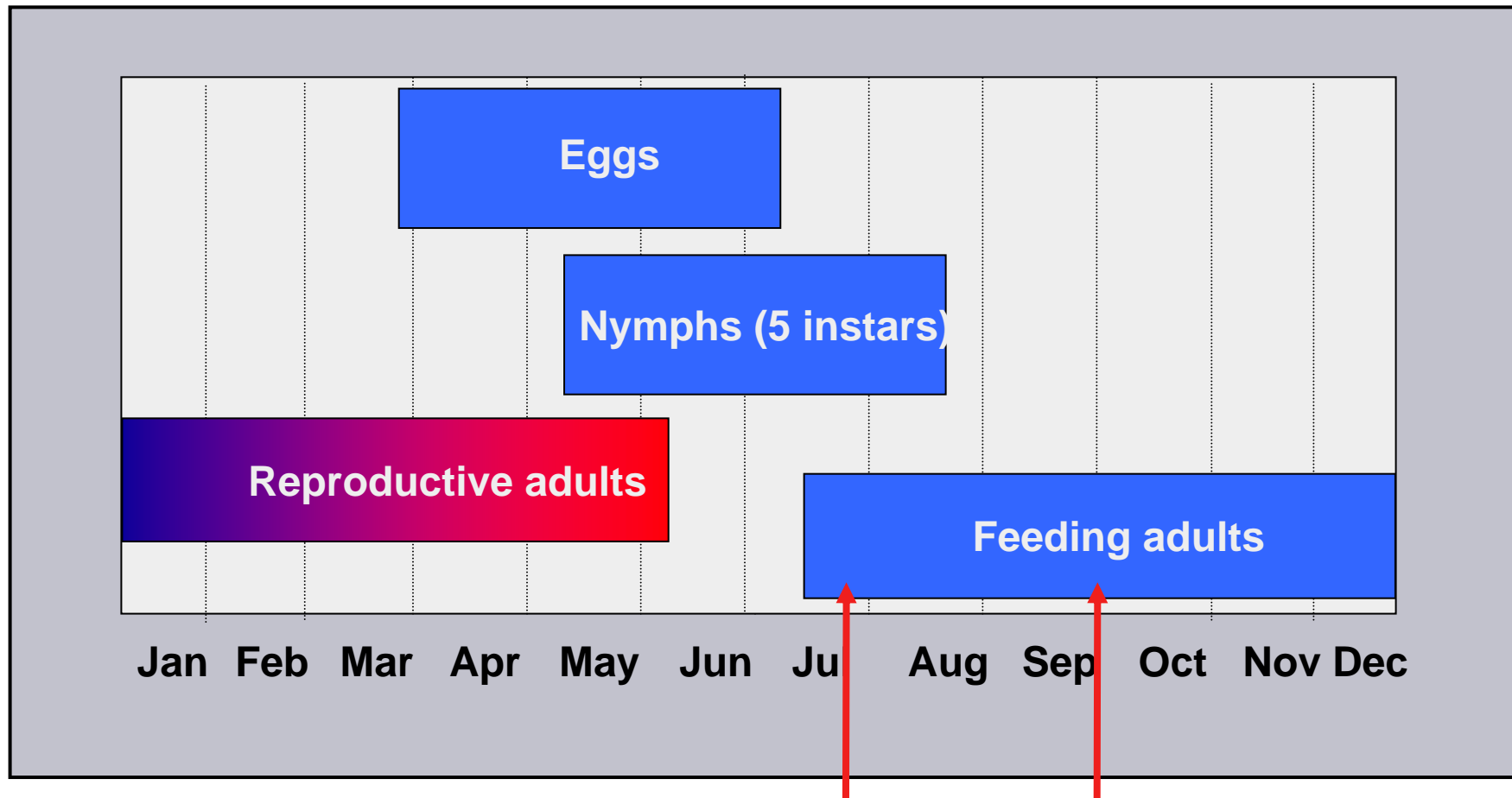
Insecticide	Control and target stage
Thiodan	Excellent - all stages
Avaunt	Excellent - all stages
Proclaim	Excellent - young larvae
Success	Good - young larvae
Surround	Good - young larvae
Ecozin	Good - young larvae
Intrepid	Good - young larvae
Cryolite	Fair - young larvae
Bts	Poor

The Biology and Management of Stink Bugs in Orchards



Stink Bug Species

Seasonal phenology in Washington state



Damage occurs in late summer

Stink Bug Species

Conspere Stink Bug



Chlorochroa ligata



Acrosternum hilare
Green soldier bug



Thyanta pallidovirens
Red-shouldered stink bug



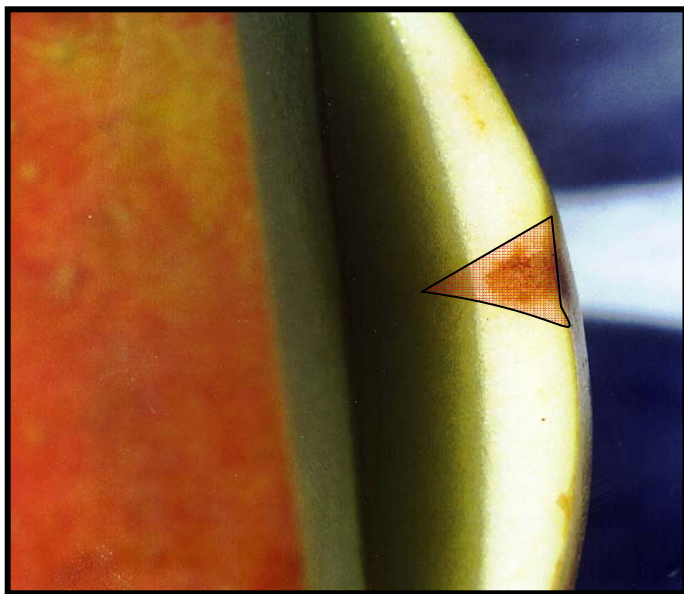
This species often observed in orchards but is a predator not a pest



Stink bug vs. bitter pit

Stink bug

- stink bug damage usually higher on fruit
- usually conical or rectangular
- ranges very light tan to dark brown in color



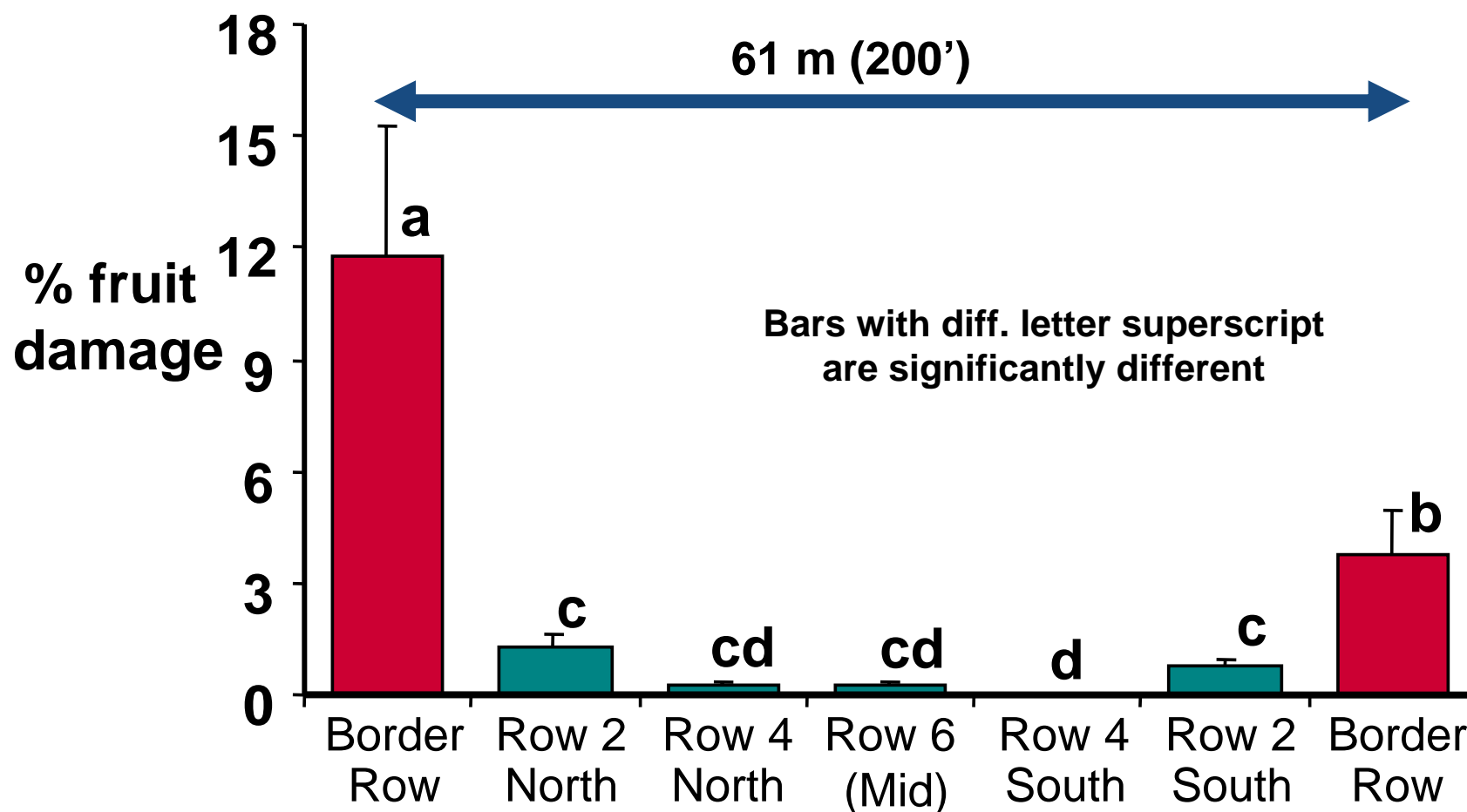
Bitter pit

- damage distributed on sides and near calyx
- spherical damage
- dark brown to black in color



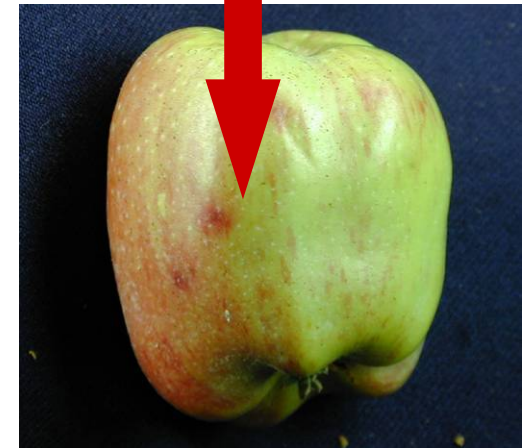
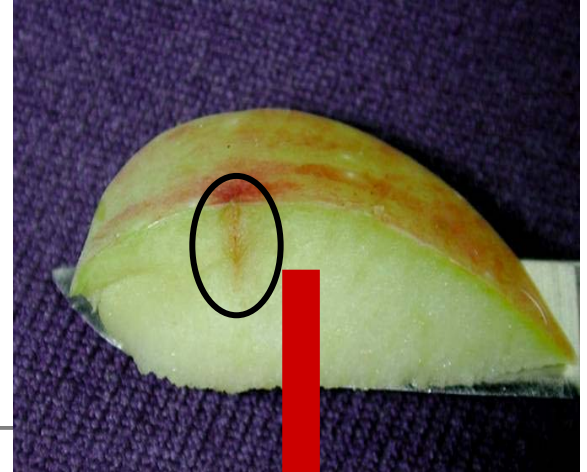
Damage distribution

Fruit injury generally associated with orchard edges bordering native habitats

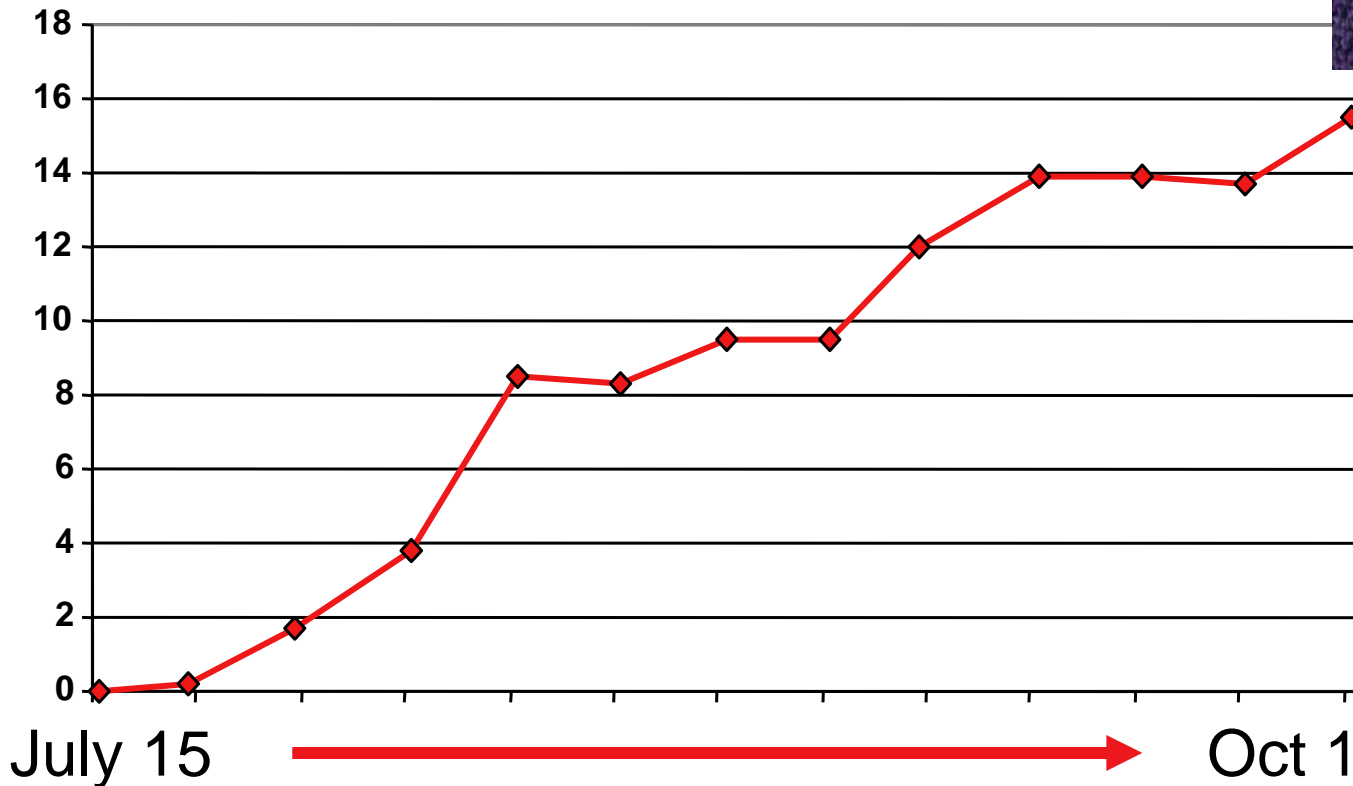


Stink Bug Damage in Orchards

Stink bug damage begins in mid-summer by new adults and accumulates throughout the harvest period.

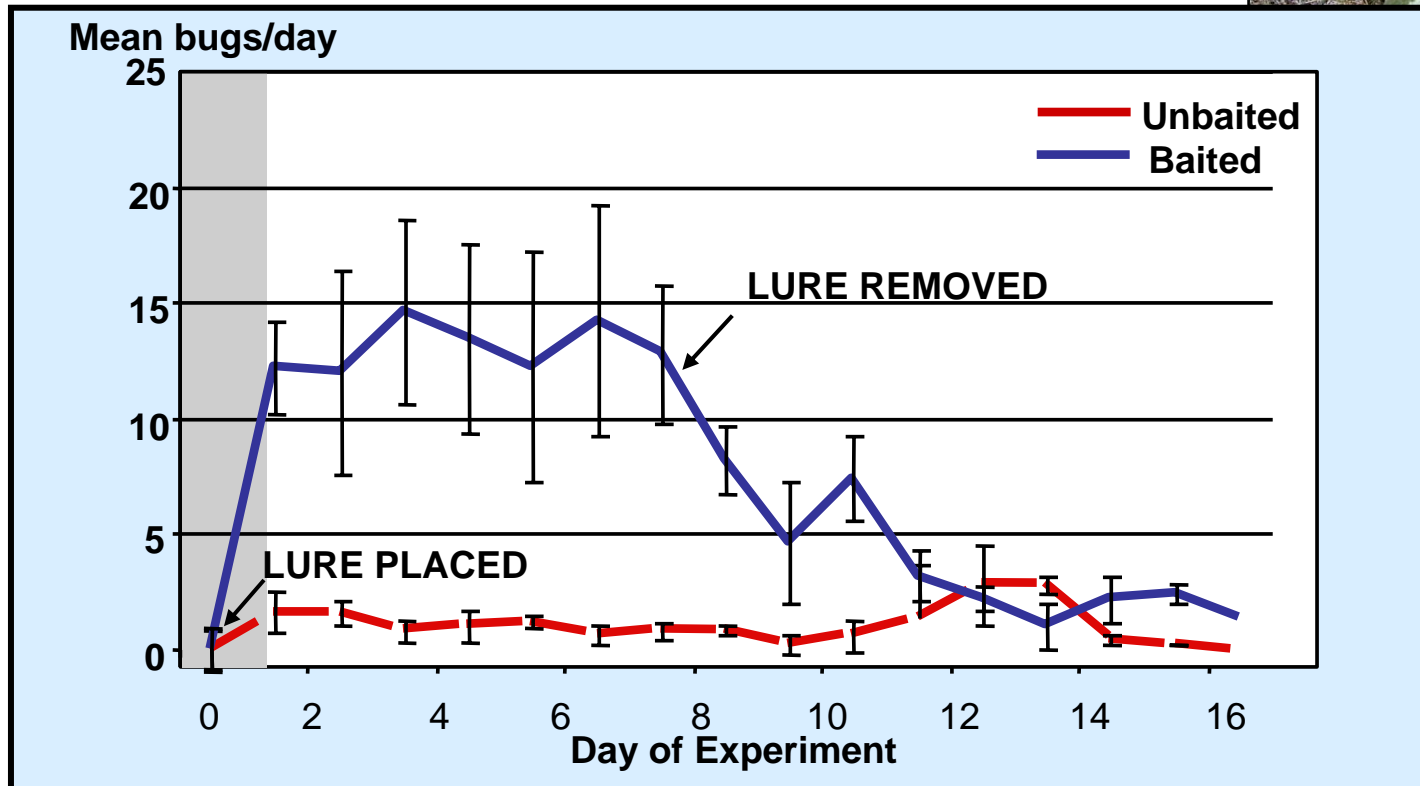
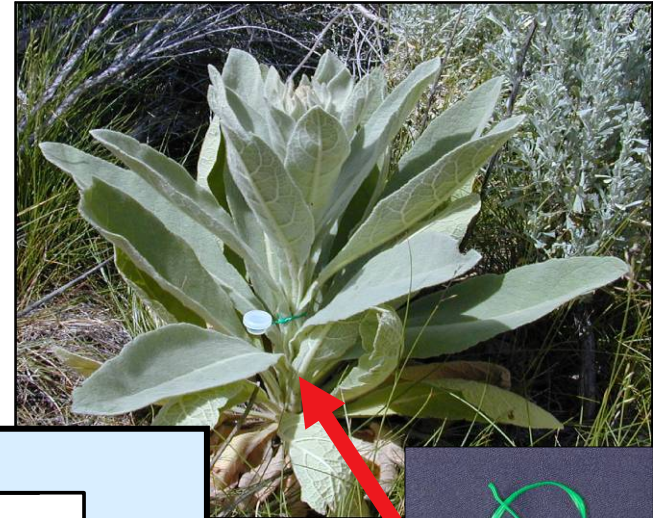


Accumulated % fruit damage



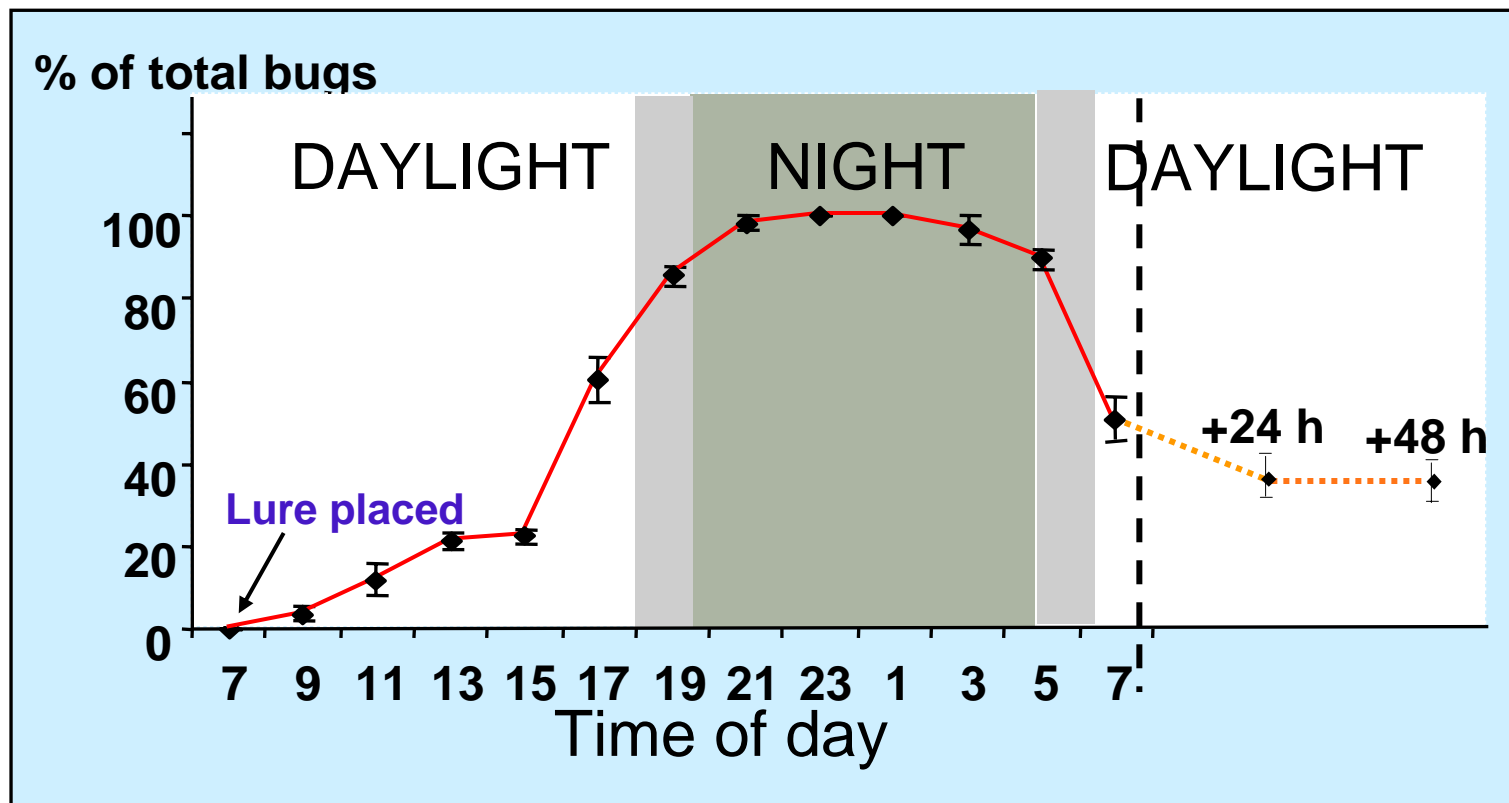
Stink bug monitoring

Stink bugs form aggregations within 24 h and these are maintained until the phormone lure is removed and then aggregations decline over 73 h.



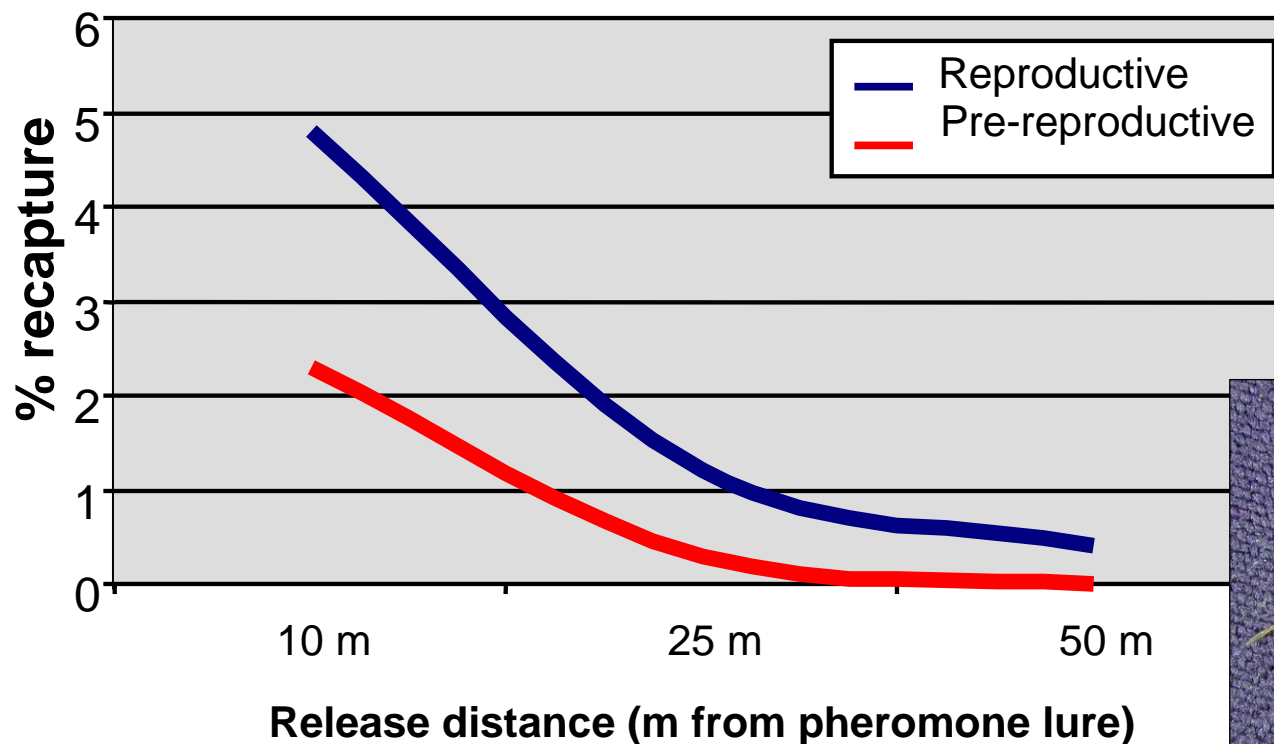
Stink Bug Behavior

We find that stink bugs form aggregation starting in late afternoon with the peak aggregations being at night. Aggregations remain on the host plant the following day but only about 50% of those at night.



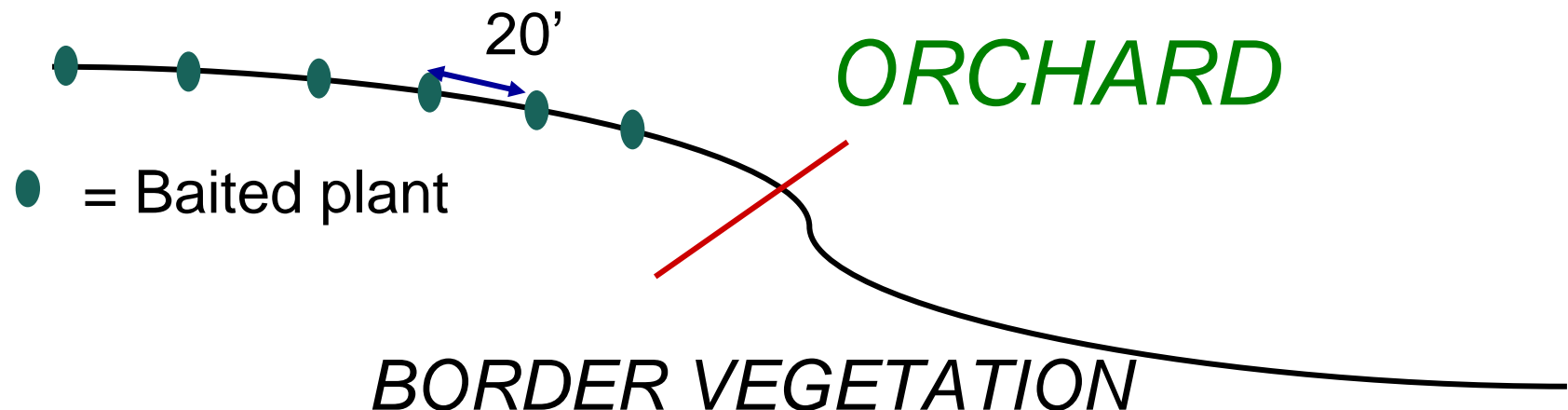
Stink Bug Monitoring

We have found that the aggregation pheromone has a short range of attraction, about 25 meters. Will not draw bugs from long range but will aggregate those in the area to the source.

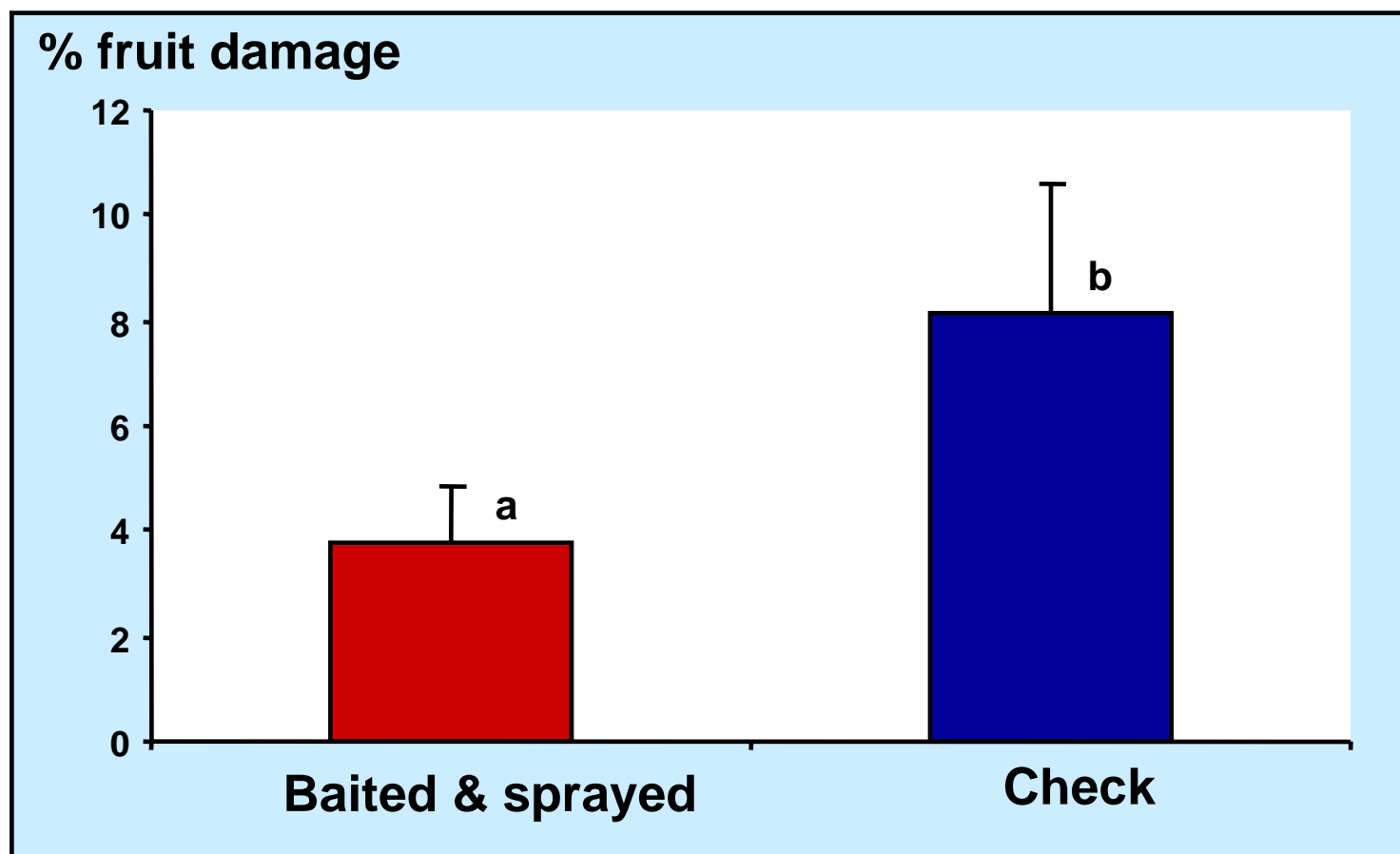


Attract-and-kill: Methods

- Lures placed on mullein plants at 20' intervals along orchard borders
- Alternate baited/sprayed blocks with unbaited/unsprayed blocks (400' sections)

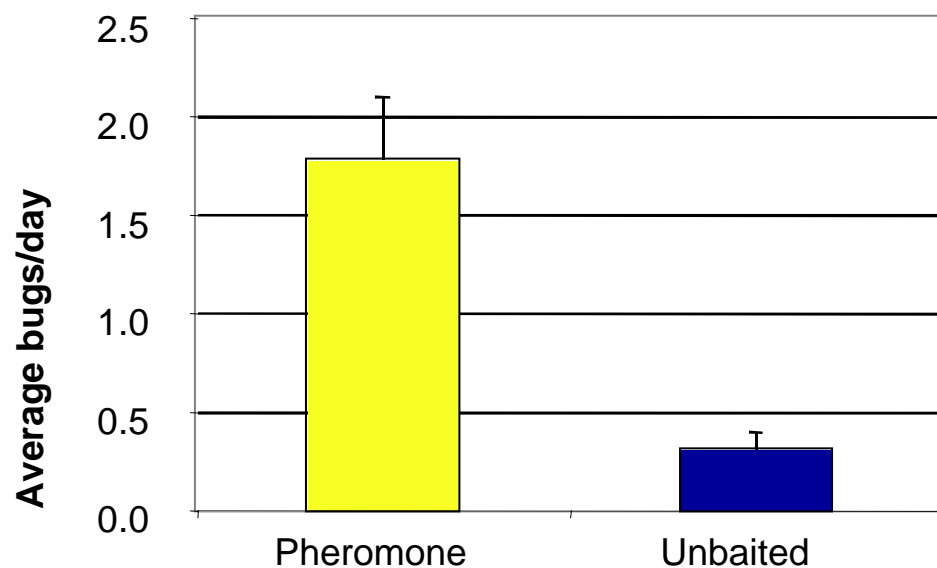


Harvest Damage: Results



Monitoring

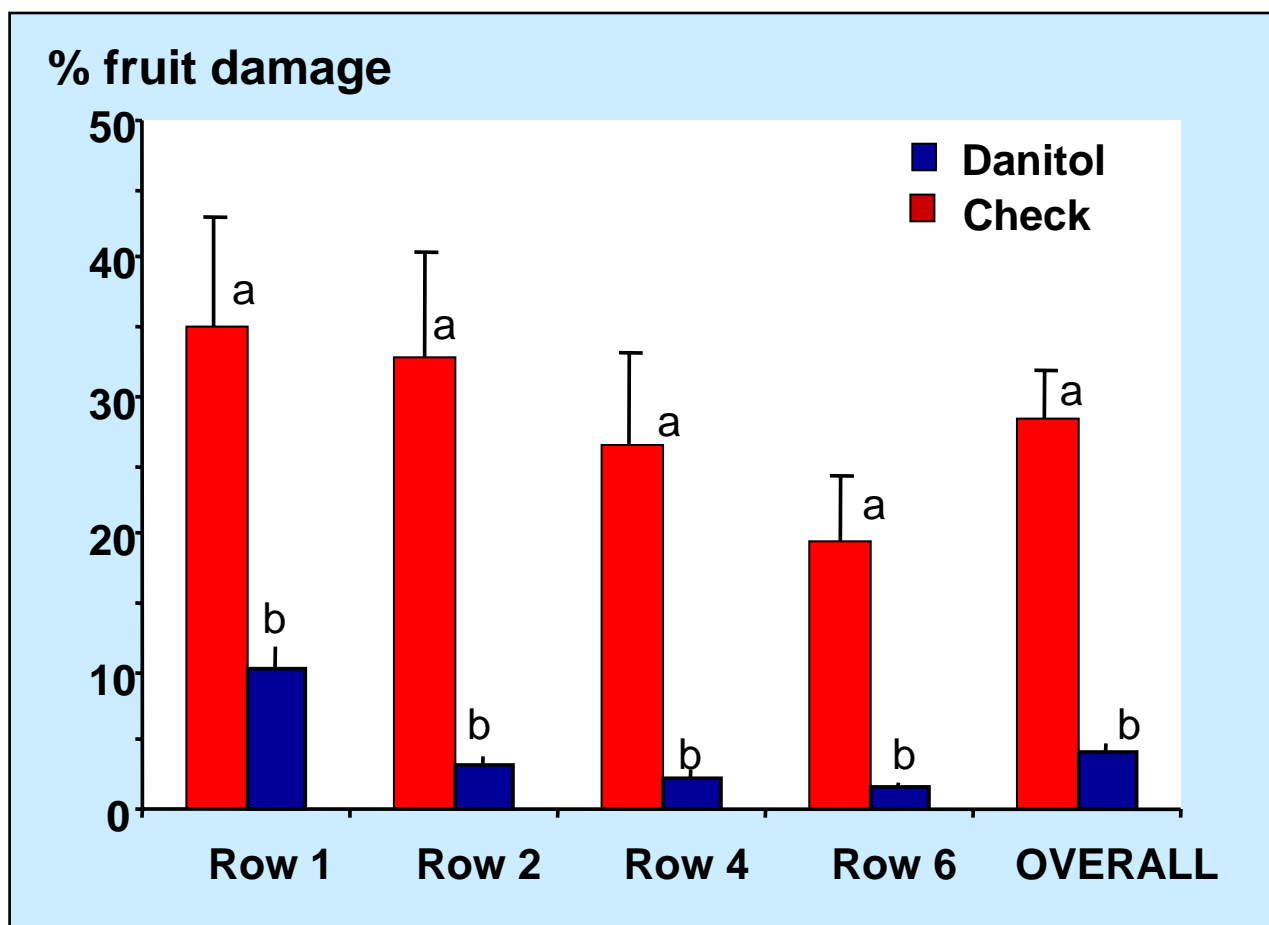
Yellow pyramid traps baited with pheromone captured adult stink bugs (2003 research)



Shorter trap as good a taller ones

Stink bug control

Significant damage reduction with single spray:



80%
reduction
in
damage

Summary

- Most information is for Consperse stink bug
- Other species might have different behavior and not respond to aggregation pheromone
- Most injury along orchard borders adjacent to native habitats
- Monitor with aggregation pheromone and cone traps
- Attract and Kill reduces border populations and reduces fruit injury
- No “soft” insecticides as controls - need to use contact insecticides --> pyrethroids
- Border treatments can reduce negative impacts on biological control agents.

Questions on *Lacnobia* Fruitworm or Stink Bugs