

# **Management of Common and Occasional Pests of Pecan**

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Some pecan insects receive more attention than others....because they cause more damage than others.

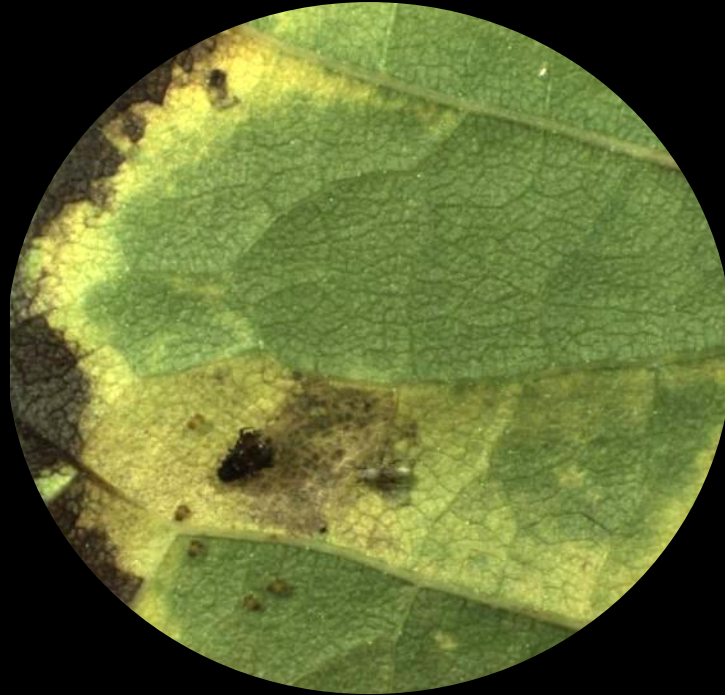


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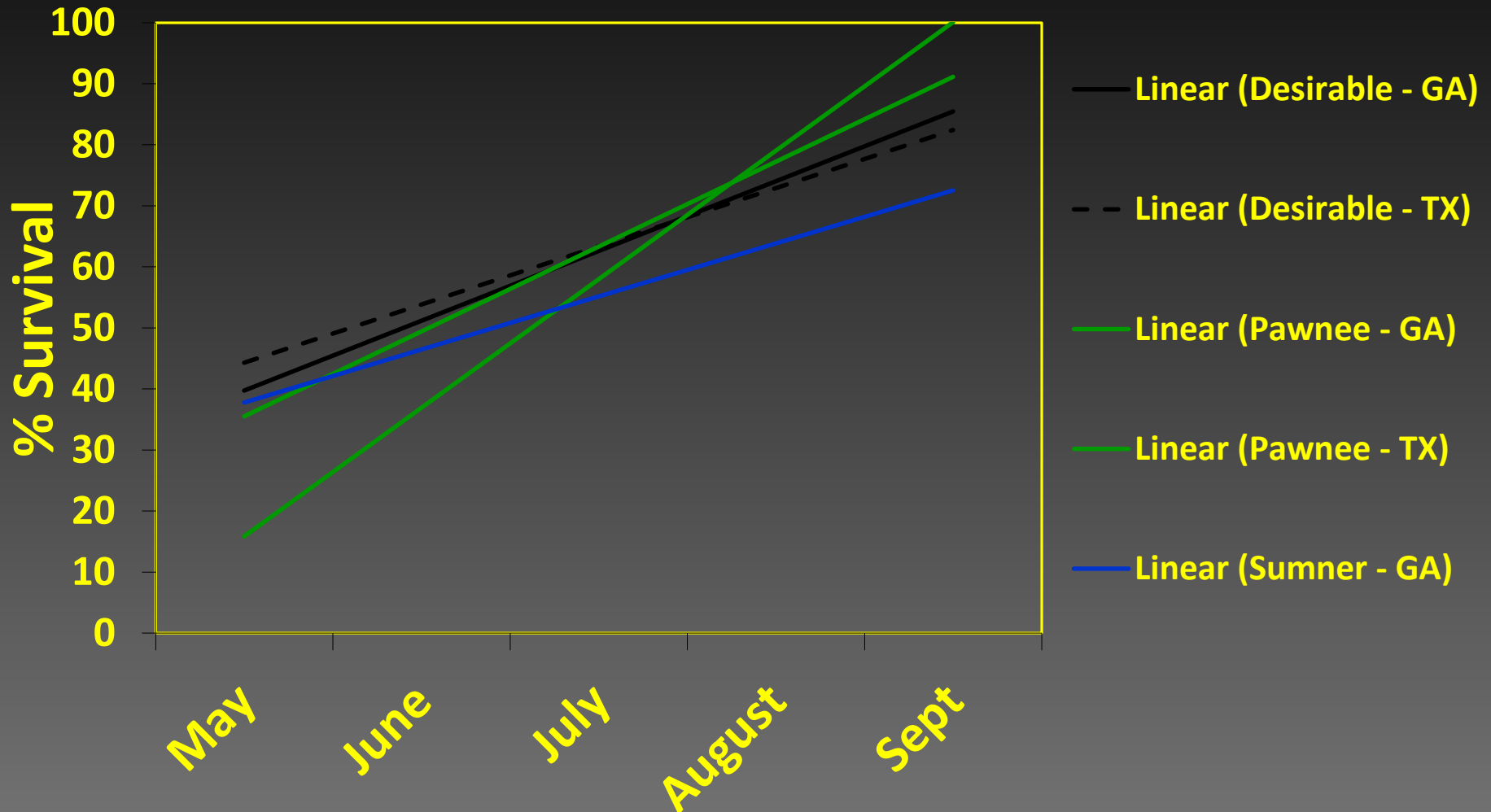
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# Importance of Leaf Chlorosis on Black Pecan Aphid Development and Survival

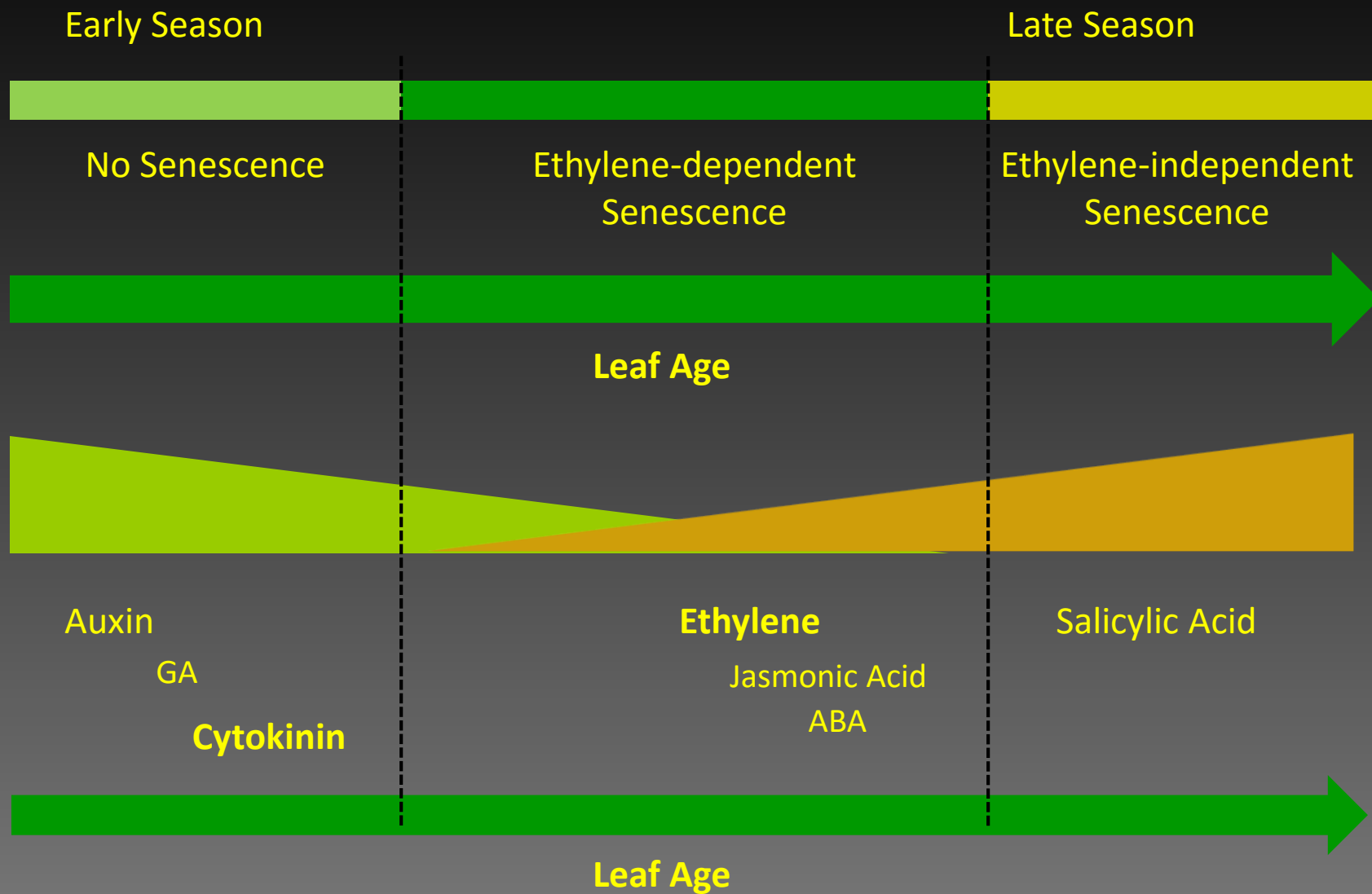


**Black pecan aphid-induced chlorosis: 1<sup>st</sup> instar to Adult**

# % Survival of BPA to the Adult Stage Increases as the Season Progresses....Why??



# Seasonal Life of a Leaf Leading to Senescence



# Seasonal Changes in Nutrient Import/Export by Leaves

On many plant species, many aphid species feed on senescing leaves exploiting nutrients that are being remobilized out of the leaf.

manipulate leaf senescence to its benefit.

*Leaf chlorosis is not a byproduct of BPA feeding, rather it is part of what is needed for the BPA to feed.*

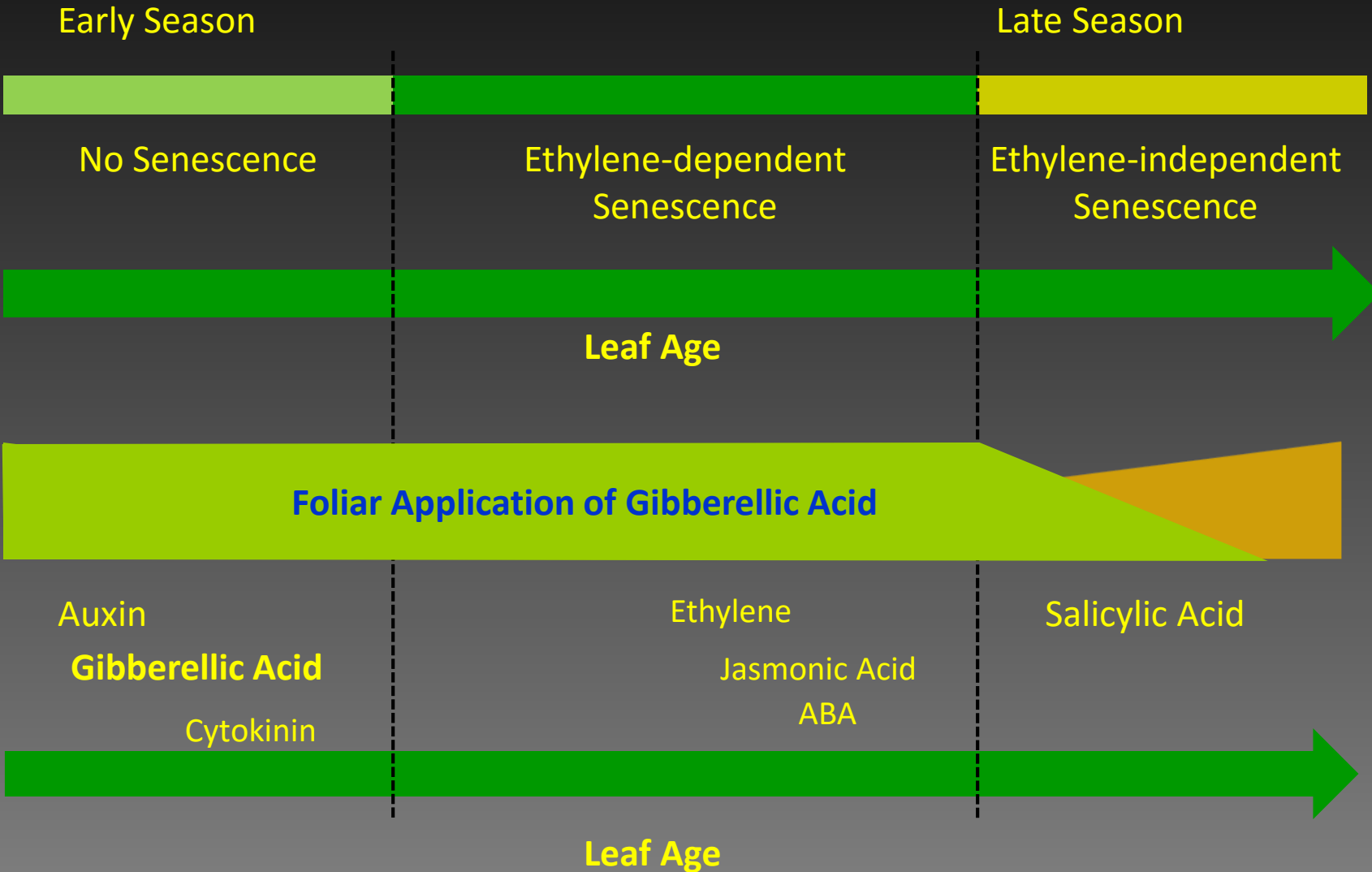
-initiates the breakdown of chlorophyll and feeds on the resulting catabolites.

Senescing Leaves



Nutrient Import  
Nutrient Export & Remobilization

If levels of senescence-delaying hormones remained high for a longer period, would there be a negative impact on the BPA?



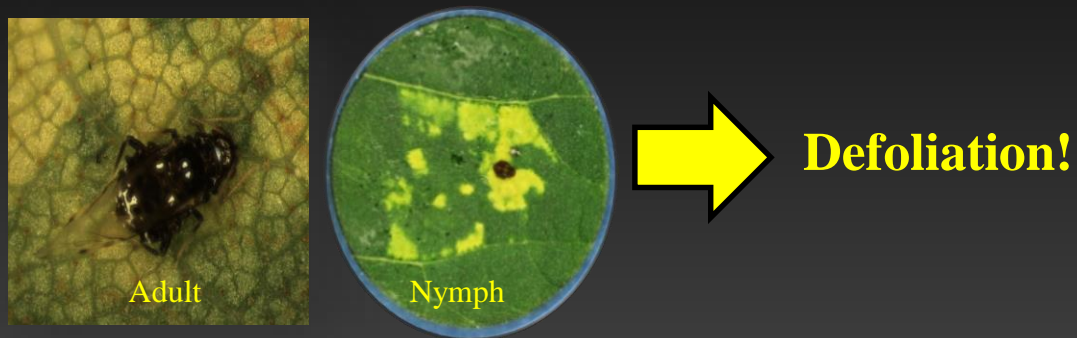
# Gibberellic acid mitigates black pecan aphid feeding damage to pecan foliage

Application of gibberellic acid (GA<sub>3</sub>) to pecan (after mid-July) mitigates BPA-elicited chlorosis.

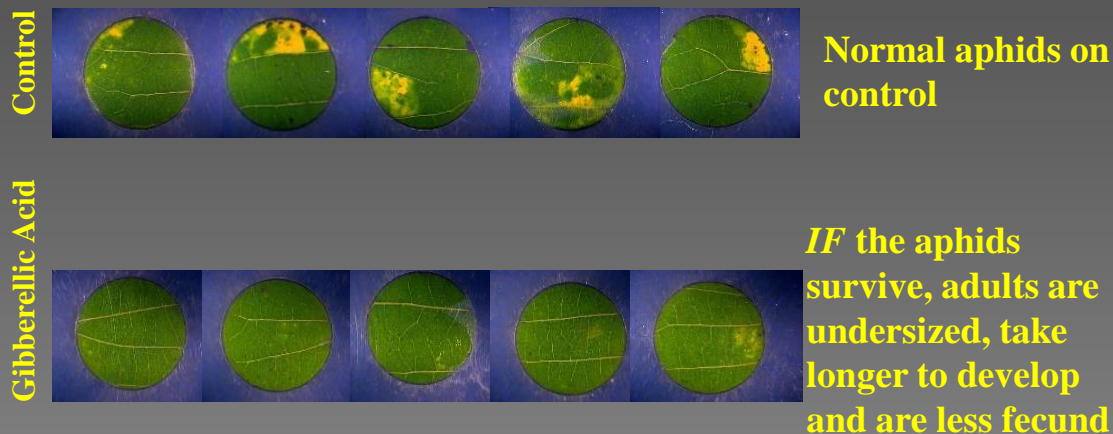
Depending on your situation and the cultivar being treated, gibberellic acid provides a tool that can be used alone or in conjunction with insecticides to manage late-season BPA populations.

Gibberellic acid cannot undo the yellow spots on leaves. BPA control with gibberellic acid must be initiated before significant injury occurs.

## BPA Feeding Elicits Chlorotic Lesions



Representative damage 7 days after BPA nymphs put on excised leaf discs treated earlier with or w/o gibberellic acid.





# Managing the Black Pecan Aphid using Gibberellic Acid (ProGibb LV Plus)

## General Guidelines:

- 1) Do not apply before mid-July.
- 2) Should be applied (5 oz/acre) before black pecan aphid injury begins (but not before mid-July).
  - Cost is about \$1/oz
- 3) Frequency of application should be at most at a 14 day interval.
  - Don't wait for injury before applying. You can't erase the damage.
- 4) Gibberellic acid *is not* an insecticide.
  - Management of other pests at the same time will require a concurrent insecticide.

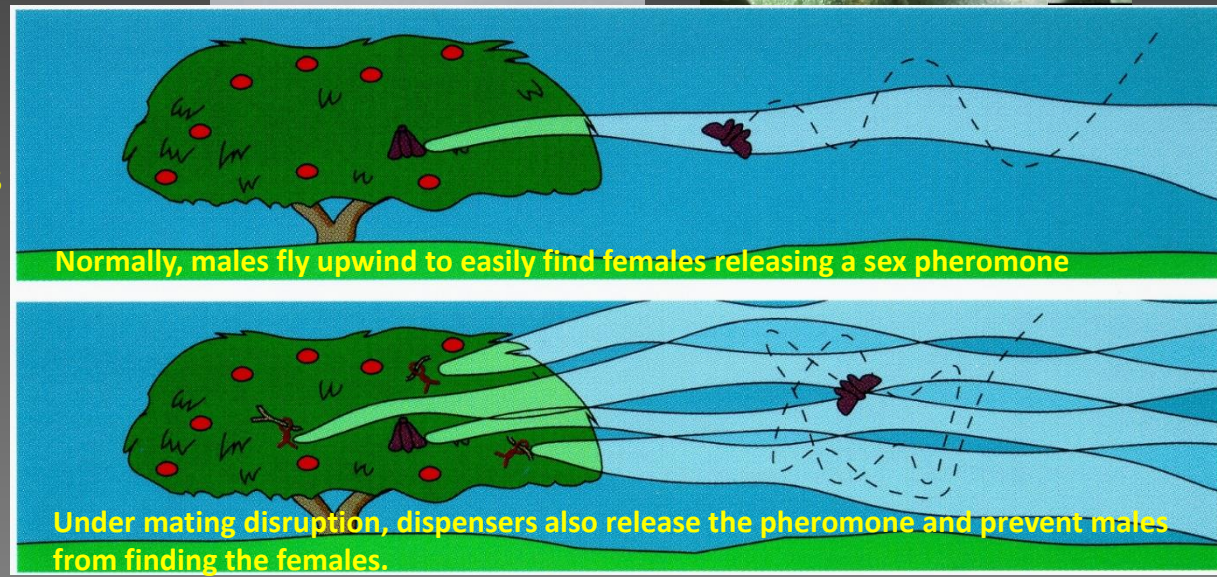


# Mating disruption: A possible control for pecan nut casebearer and hickory shuckworm

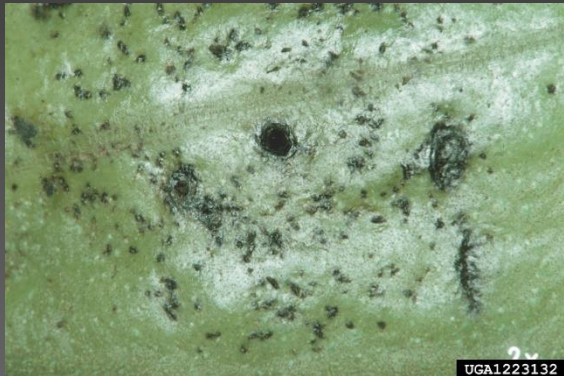
Mating disruption is a pest management technique that prevents males of a species from finding the female, thus the mating process is disrupted.

Generally, a pheromone dispenser is applied to the crop before the pest is active and one application will last long enough to cover the time period when the pest is active. Various types of dispensers can be used for treating an area with pheromone.

Females release a sex pheromone that is carried downwind and attracts males. By applying the synthetically produced sex pheromone over an area, the males cannot pinpoint the location of a female releasing the same pheromone. This prevents egg fertilization and no larvae are produced to damage the crop.



# Pecan Weevil



# Insecticidal Screen

Collaborating with Dr. Angel Acebes-Doria, Univ. of GA

Made by Vestergaard and marketed by AgBio – NOT labelled for pecan. Used for research only.

A polyethylene screen with deltamethrin (0.4%) incorporated.

1-m-wide band around pecan trunk

Weevils crossing the band receive a toxic dose and most are dead or near death after 24 h.

Pecan nuts in the canopy are NOT protected from weevils flying into the canopy.



**Some pecan insects receive less attention than others.....because they: 1) do not do as much damage as often, 2) are not noticed, 3) many other reasons.....**



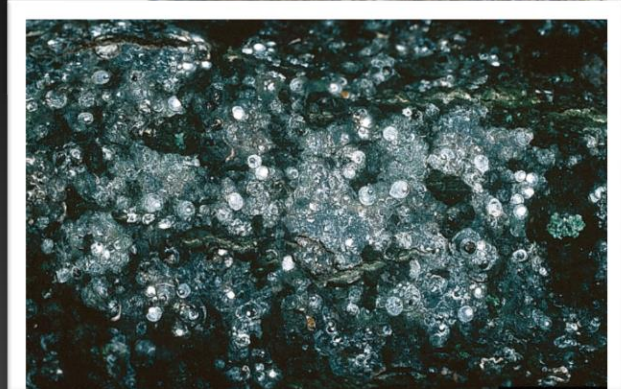
# Scale Insects on Pecan

A large group of minute and highly specialized herbivorous insects

- do not look like insects
- many are inconspicuous on plants
- infestations can be highly damaging

> 20 species of scale insects attack pecan

- Most species found 'occasionally' but some found 'commonly' on pecan
- Obscure scale is usually the most damaging.
- Giant pecan scale is the most striking; common but rarely seen.



# Armored Scale Insects

- Armored scale insects live under a protective 'scale' made from wax secreted by the insect
- The protective scale covering is free from the insect
- Immobile insects - only newly hatched nymphs (crawlers) and adult males are mobile
- Dispersal: crawlers move to new sites on same host plant, birds may carry some, wind may move some

Protective scale covering  
Live insect



mass of scales at different growth stages on ash branch



Photo Credit: John Davison







# Obscure Scale

- Attacks hickory, chestnut and oak species:
  - Chinese chestnut
  - Pecan
  - Hickory
  - Oaks (black, blackjack, chestnut, English, live, pin, post, red, scarlet, Spanish, swamp white, water, white, willow)
  
- Reservoirs for infestations are many!



Photographer: J.A. Davidson

# Obscure Scale

- Known as a pest of pecan for many years

“Pecan trees, on which large branches were completely killed, have been frequently observed, and in a few instances the trees were so badly infested that they were completely incrustated with this scale from top to bottom.”

H.L. Dozier. 1925. The obscure scale attacking pecan trees. The Quarterly Bulletin, State Plant Board of Florida, v. IX, no. 4.

“...a serious pest on both seedling and improved varieties in Texas, Louisiana, Arkansas, Mississippi, and Alabama.”

H. Baker. 1933. The obscure scale on the pecan and its control. USDA Circular No. 295.

# Damage

- Immature scale and adult females use piercing/sucking mouthparts to feed on plant sap (adult males do not feed)
- Infestations typically start on the lower, inner portions of the tree, spreading toward terminals
- Severe infestations can weaken and kill limbs



# Obscure Scale: Biology

- Life cycle on pin oak at Auburn, AL
  - Eggs laid from June through early September (most laid in June and July)
  - Crawlers: mid-June through mid-Sept. (most occurred from mid-June through July)



# Scale Management

- Biological Control
  - predators (certain species of lady beetles, predatory mites)
  - parasites (several species of parasitic wasps)
  - pathogens (pink scale fungus [*Nectria diploa*])



# Scale Management - Oils

- Dormant oil application

- Typically applied to approach runoff using 2% oil with a repeat application 10 - 14 days later.

- **\*\*Death is by suffocation.**

- Thorough coverage is required .
- Typical coverage by airblast for scab or aphids is not enough.
- Scale covering can protect the insect from the treatment.
  - live scale can be covered by one or more layers of dead scale.

# Scale Management - Insecticides

- Chemical Insecticides: Timing sprays against the vulnerable crawler stage can be effective.
  - Various insecticides are effective against the crawlers (e.g., dimethoate, chlorpyrifos, diazinon, malathion, acephate and carbaryl – read the label).
  - Movento is good against San Jose Scale. In apples, peaches, etc. it is applied to expanding foliage using a penetrative, spreading surfactant for maximum systemic activity.
- Insect Growth Regulator
  - pyriproxifen



# Root-feeding Weevils: Overlooked Pests?



M.C. Thomas, Bugwood.org

Two-banded Japanese Weevil

*Callirhopalus bifasciatus* (Roelofs)



Clemson Univ, Bugwood.org

Fuller Rose Beetle

*Naupactus cervinus* Boheman

- Flightless
- Reproduce asexually – No males are known to occur
- Polyphagous



# Adults feed on foliage of many plant species



Russ Ottens, Univ. of Georgia,  
Bugwood.org



General Biology: Adults feed on foliage, near the ground; Eggs are laid on foliage and in bark crevices; Larvae hatch and enter soil through cracks, feed on roots; Pupation occurs in soil

# *Peach Root Injury*

Previously unobserved damage to peach roots.



# A more likely problem for nurseries and low-input pecan orchards

Although foliage damage looks bad, the real problem is with the damage to roots affecting the long-term health of a tree.

Target-specific trunk insecticide applications/insecticidal screen could provide control.

- FRB is active all year, TBJW is active during the summer.



# Acknowledgments

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