Prionus Root Borer in Older Pecan Trees

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Barnum--->>>>Barman

Prionus root borer

Prionus root borer life cycle

Mated females lay eggs in the soil near the roots.

Young larva will tunnel into and feed in the roots

Pupa in the soil before emerging as an adult.

Adults emerge and reproduce

~ 5 years cycle

Prionus root borer behavior

- Adults active during night, attracted to lights
- During the day, adults remain hidden
- Females lay about 300 eggs near tree base
- Larva bores and digs down to the roots and begin feeding
- Larvae can move through the soil from one root to another

Root feeding on pecan trees

Root borers feed on the tap and lateral roots.

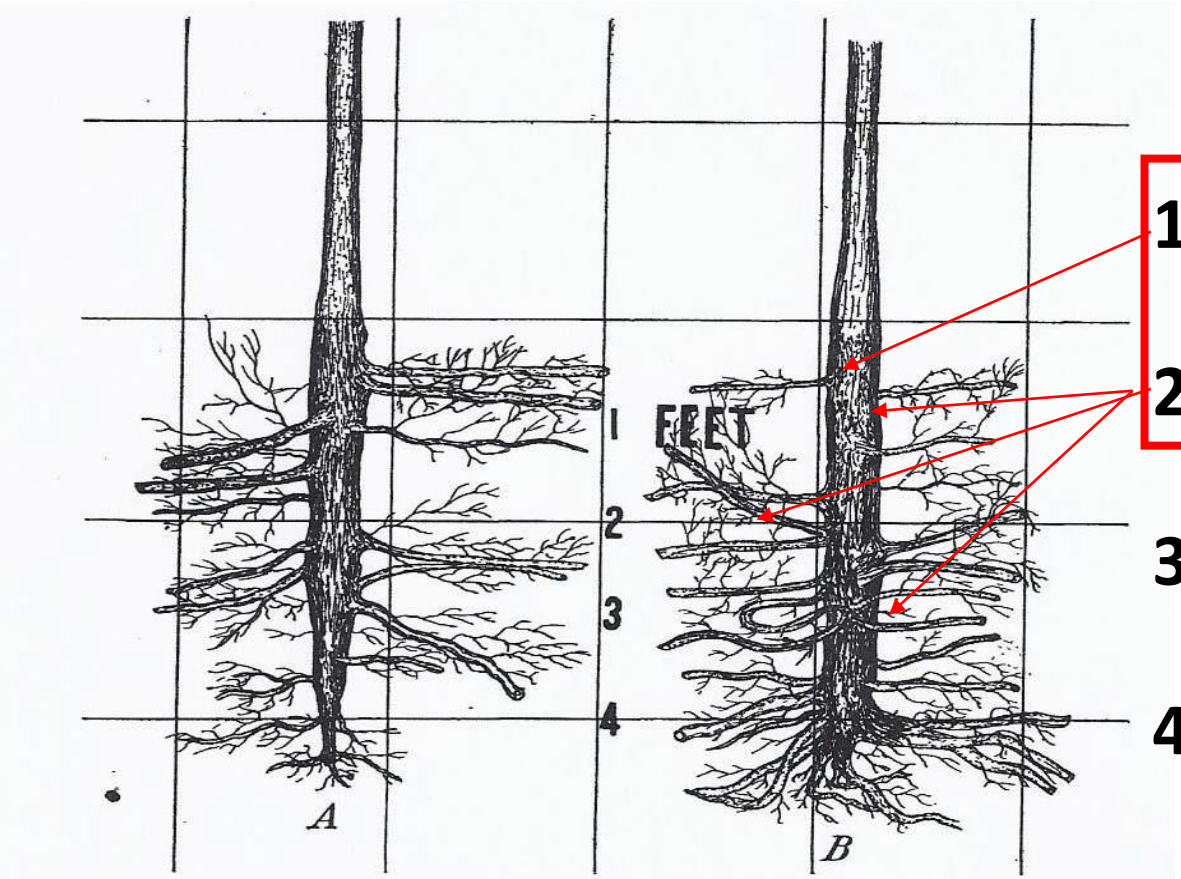
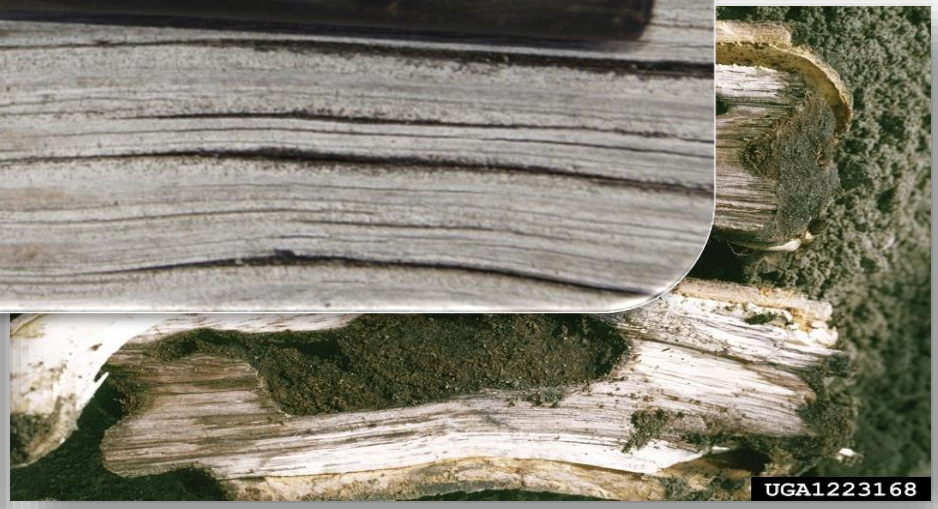


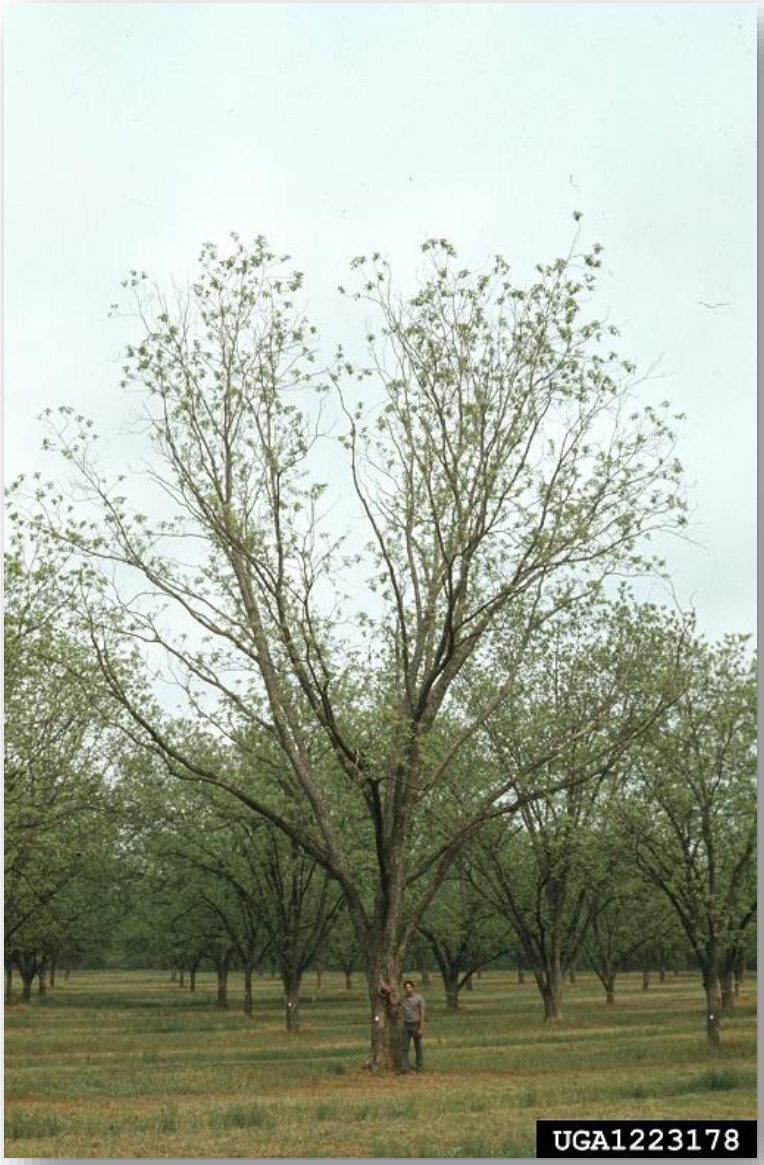
FIGURE 15.—Comparison of the orientation of lateral roots on transplanted and nontransplanted pecan trees. The nontransplanted tree *A* had 11 main laterals, while the transplanted tree *B* had 21.

1. Tap Root
2. Lateral Roots
3. Fibrous Roots
4. Mycorhizzal Roots

Root damage from *prionus* infestation



Symptoms of prionus borer infestation



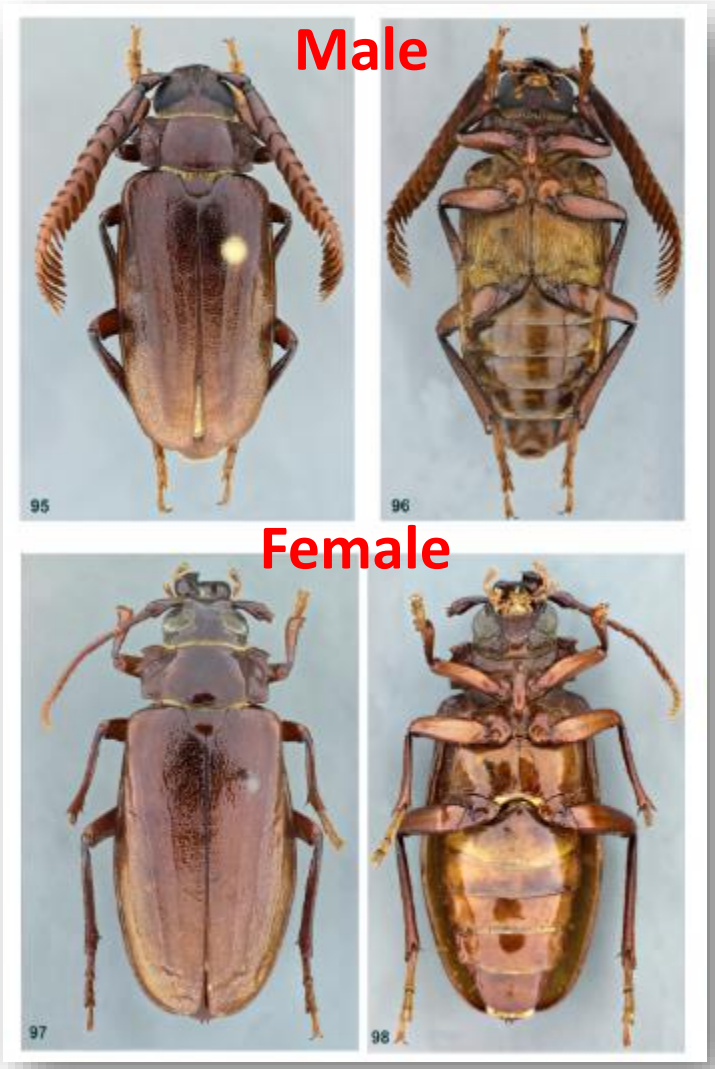
- Older trees in gradual decline
- Limbs look weaker and weaker each year
- Irregular and thinner foliage, lighter in color than that on healthy trees
- Root system can be reduced by 75-90% over several seasons

Symptoms of prionus borer infestation

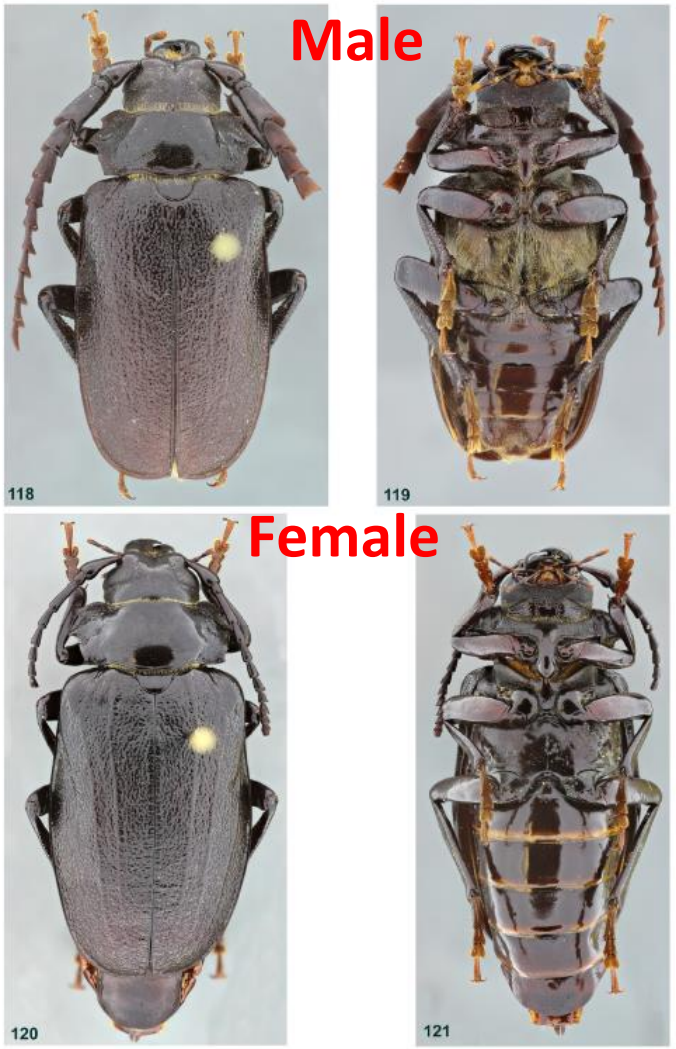
- **Infested trees easily topple over due to compromised root system**
- **Crown galls**

Two species associated with pecans

Tilehorned *Prionus* beetle

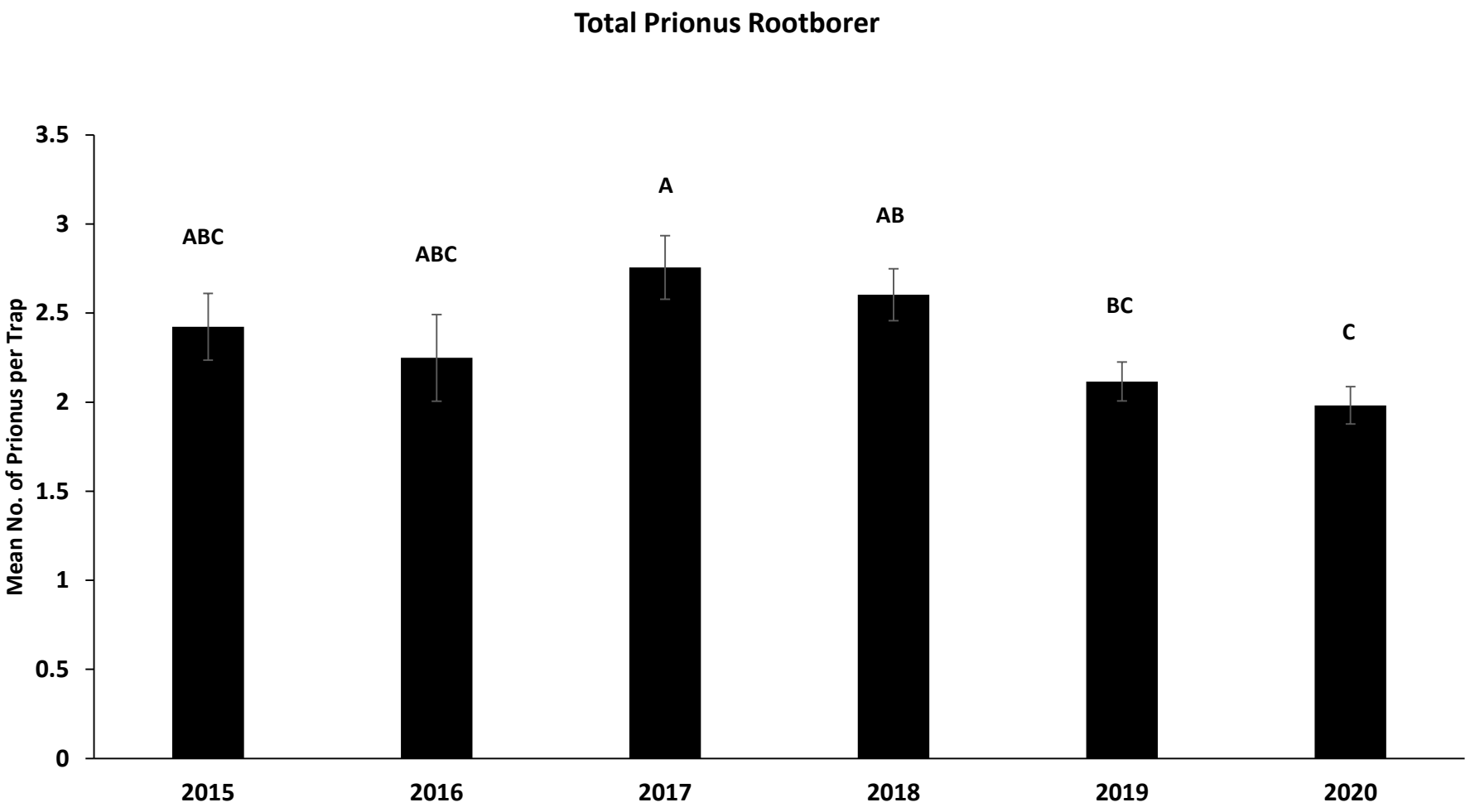


Broadnecked *Prionus* beetle

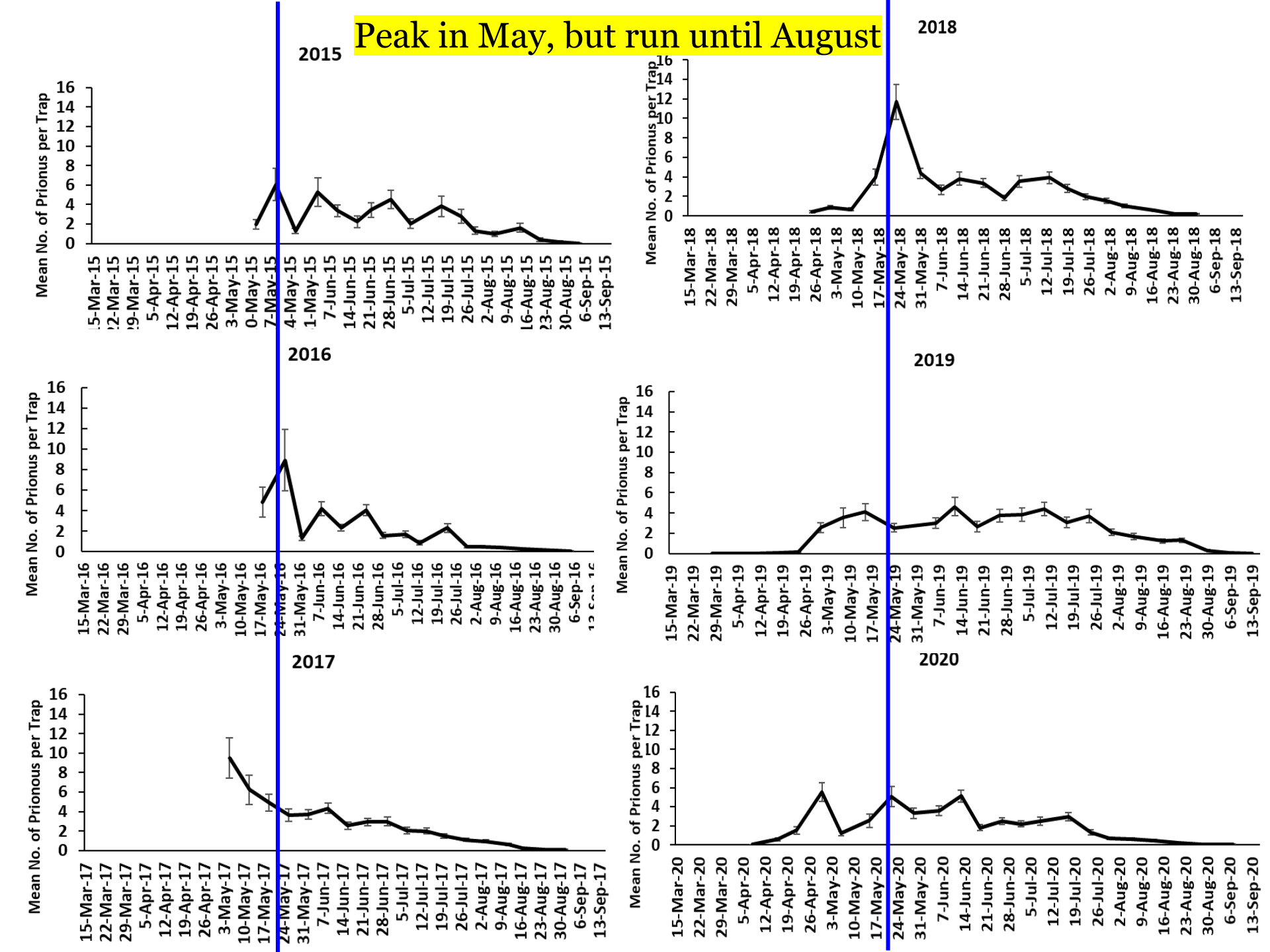


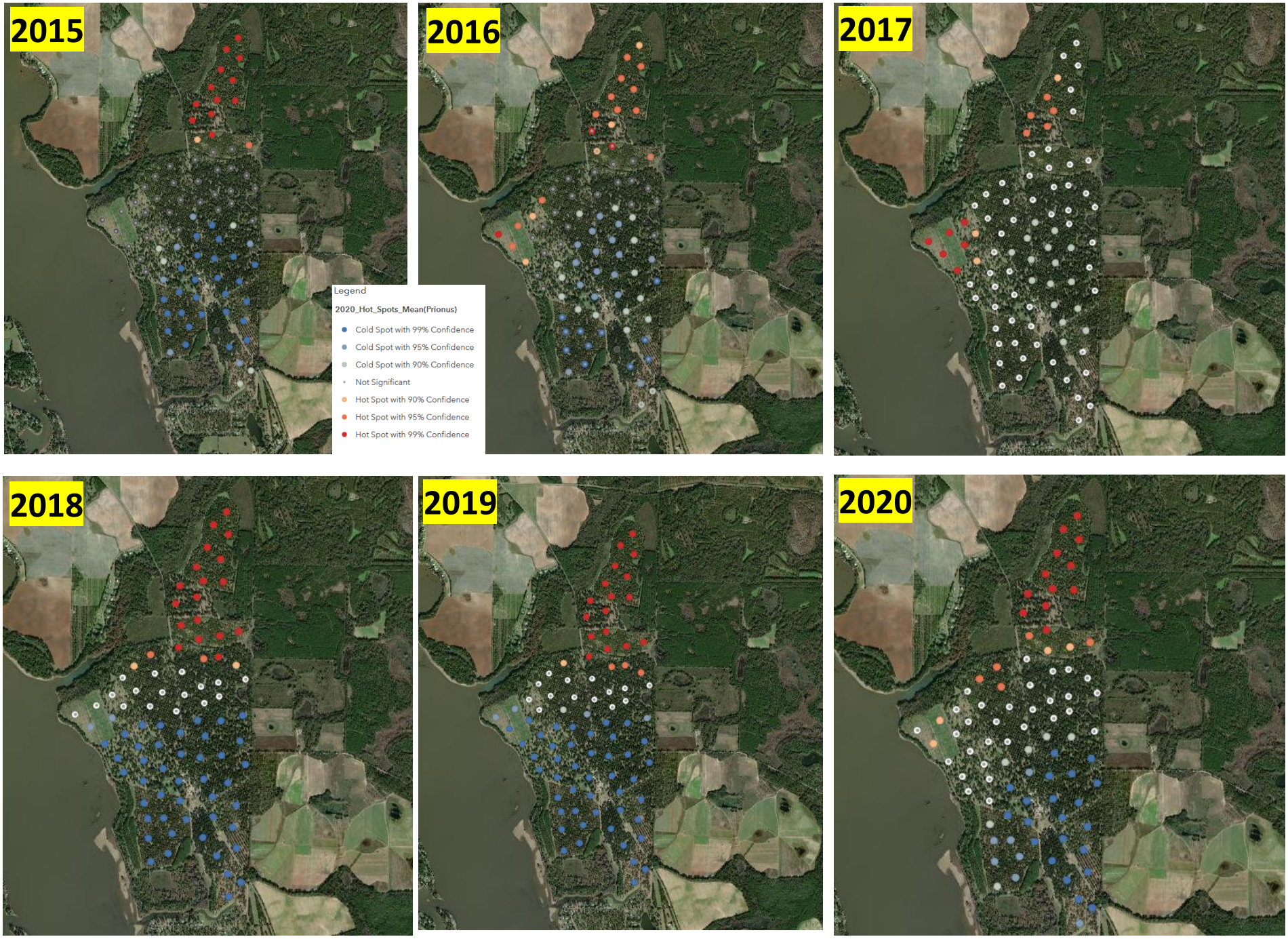
- Cannon Farm, Cordele, GA
- 84 traps, Approximately 800 Acres
- Trapping since 2015 and continuing

Prionus beetle trapping- Cordele, GA

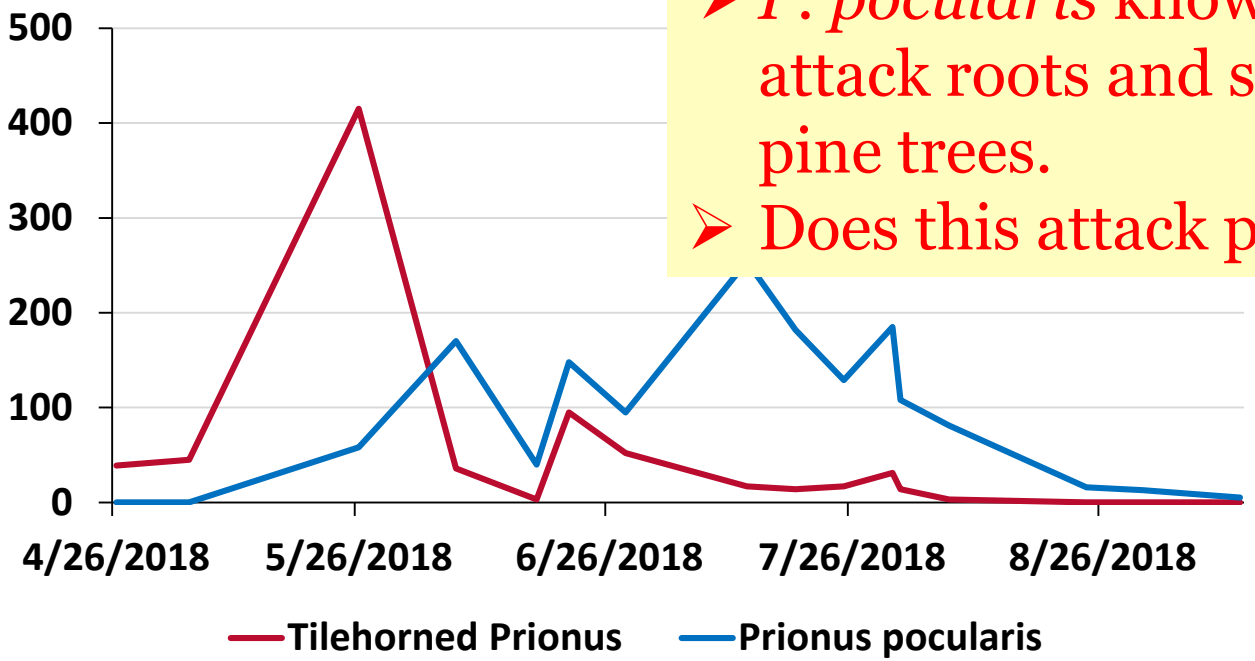


Peak in May, but run until August




2015
2016
2017
2018
2019
2020
Legend
2020_Hot_Spots_Mean(Prionus)
Cold Spot with 99% Confidence
Cold Spot with 95% Confidence
Cold Spot with 90% Confidence
Not Significant
Hot Spot with 90% Confidence
Hot Spot with 95% Confidence
Hot Spot with 99% Confidence

Prionus trap capture in 2018



- *P. pocularis* known to attack roots and stumps of pine trees.
- Does this attack pecan?

Identified by,
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Prionus californicus

- Widely distributed in western US
- Infested crops: cherry, apple, hazelnut, hop
- Current management:
  - Trapping
  - Soil fumigation

Why prionus root borers are hard to manage?

- Many alternate hosts next to orchards (oaks, hickories, grapes, poplars, chestnuts, etc.)
- Removal of infested trees does not eliminate infestation
- Immature larvae are hard to control due to being underground and/or protected by root tissues.
- Long life cycle (impacts of management difficult to measure)
- Limited studies on management options

Management options for prionus

Avoidance/Preventative:

- Keep the infested area fallow or under cover crop for at least 2 year
- Fumigate the soil prior to planting
- Trapping
  - Light trap, pheromone trap
  - Mating disruption

Management options for prionus

- **Curative**
  - Apply insecticide on tree base to kill adults and young immature(?) (timing will be critical)
  - Chlorpyriphos is no longer available to use!
  - Entomopathogenic nematodes (?)

Potential use of entomopathogenic nematodes for *Prionus* beetle

- Soil dwelling, belowground immature stages of prionus borer are perfect target for nematodes
- Nematode can infect both young and older larvae
- This could be a self sustaining, or may need periodical augmentation
- Nematodes can move around the soil and search
- Nematode can reach deep in soil (up to 25 cm, Shapiro-Ilan and Gardner, 2012)

Future direction

- Could we develop more specific pheromone?
- Are there other prionus borer species on pecan that the two know?
- Do prionus beetle infest roots of younger trees?
- Mating disruption field experiments
- Experiments with EPN on prionus larvae

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Research

OXFORD

Ecology and Behavior

Mating Disruption for Managing *Prionus californicus* (Coleoptera: Cerambycidae) in Hop and Sweet Cherry

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