

Forest health issues affecting AL-LA-MS

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RWU 4552: Insects, Diseases and Invasive Plants



USDA Forest Service, Southern Research Station
LA-MS-AL State Line Meeting, 17-18 August 2017



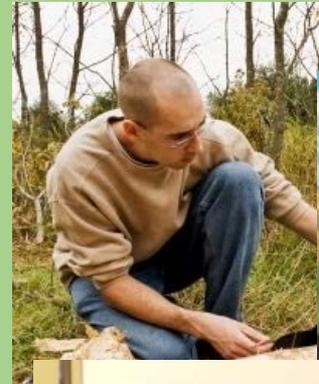
USDA Forest Service, Southern Research Station

RWU 4552: Insects, Diseases and Invasive Plants

- Unit locations: Asheville NC, Pineville LA, Athens GA
- 8 Research Scientists
- www.srs.fs.usda.gov/idip



Pineville location



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Pineville location



J. T. Vogt
Project Leader



USDA Forest Service, Southern Research Station
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State of knowledge on topics relevant to forest health management in LA-MS-AL

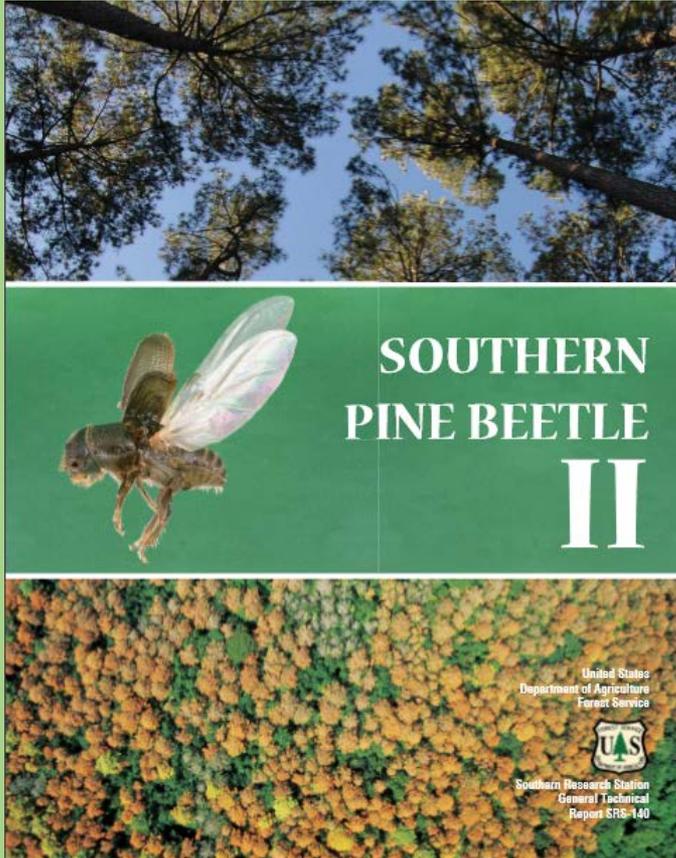
Mentioned in notes from pre-meeting conference call

- Southern pine beetle
- Emerald ash borer

Also...

- *Ips* engraver beetles
- Redbay ambrosia beetle and laurel wilt

Current State of Knowledge on Southern Pine Beetle



- Ecology (individual to community level)
- Impact (assessment and monitoring)
- Silviculture and management
- Treatment tactics
- Integrated pest management

2011: Southern Research Station General
Technical Report SRS-140 (512 pages)
<https://www.srs.fs.usda.gov/pubs/>

Current State of Knowledge on Southern Pine Beetle



Satisfactory understanding (basic science):

- 1) Life history
- 2) Taxonomy
- 3) Natural enemies (i.e., predators and parasitoids)
- 4) Host selection (i.e., effect of host species, tree condition)
- 5) The process of infestation establishment and growth
- 6) Symbiotic fungi and their significance
- 7) Host defenses against SPB



Current State of Knowledge on Southern Pine Beetle



Satisfactory understanding (applied science):

- 1) Site and stand factors that increase risk (i.e., how to manage forests for SPB risk reduction)
- 2) Chemical control



Thinning to
reduce risk



Systemic insecticide

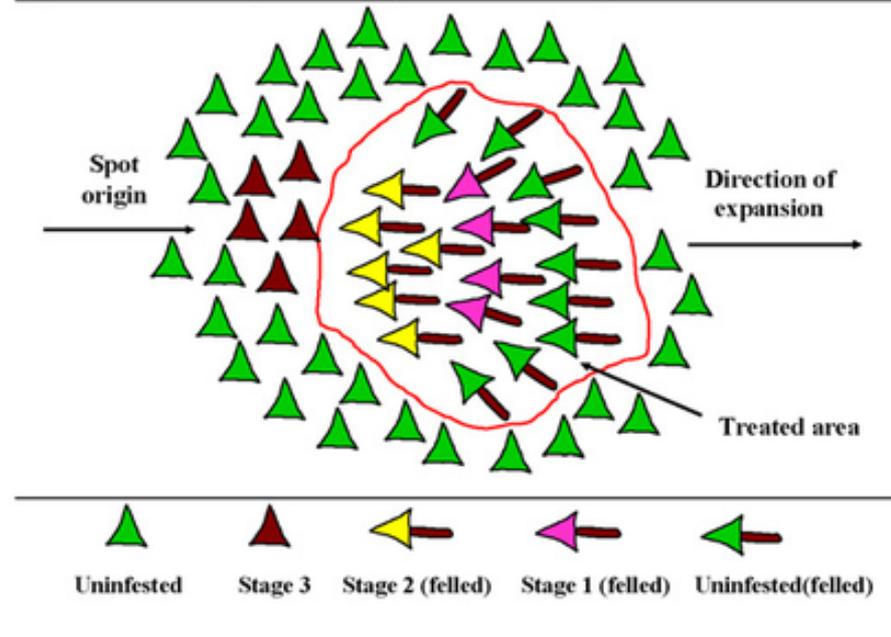
Current State of Knowledge on Southern Pine Beetle



Satisfactory understanding (applied science):

- 3) Mechanical suppression of growing SPB infestations
- 4) Detection and sampling of populations

(B) *Dendroctonus frontalis* spot controlled by cut-and-leave.



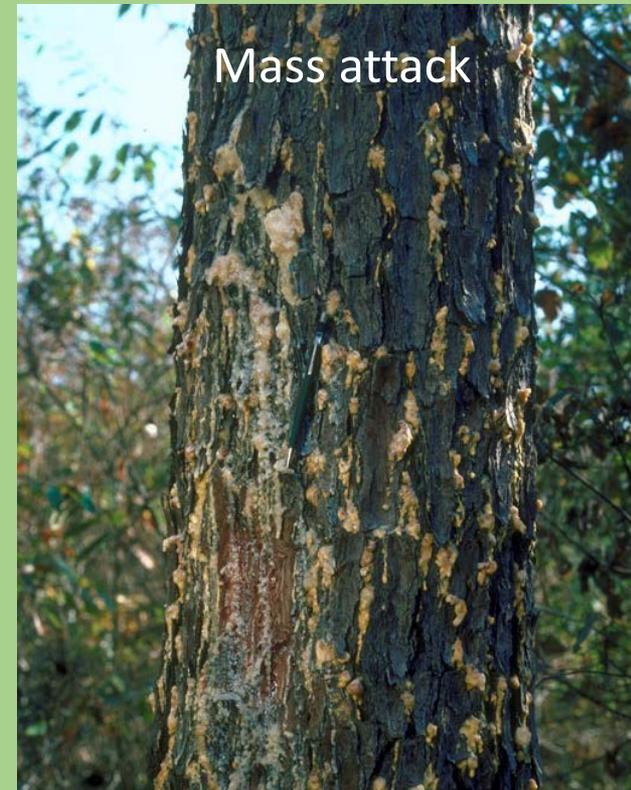
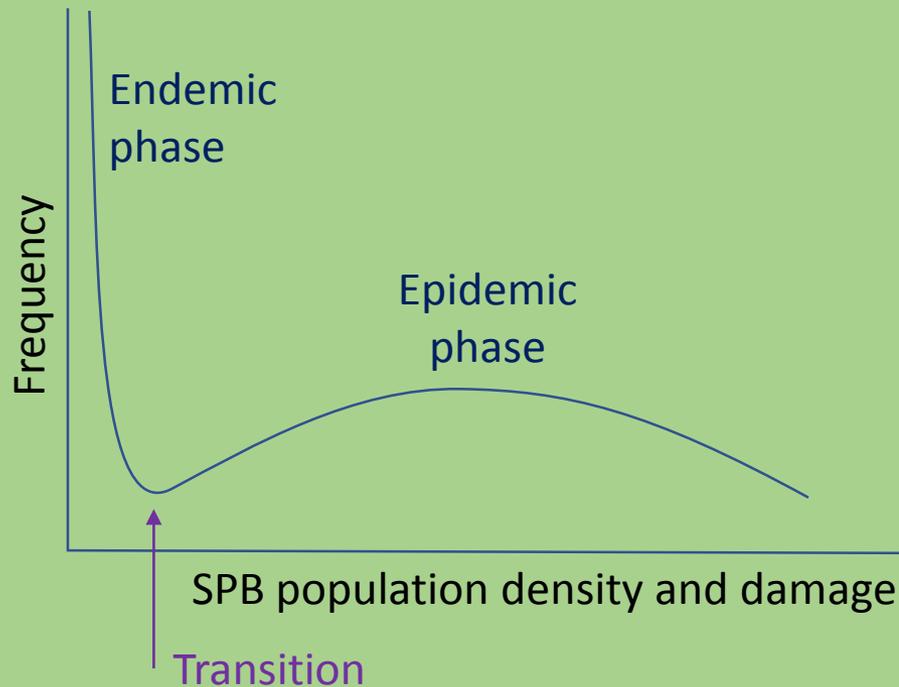
Release device for *endo-brevicommin* (potent lure adjuvant)

Current State of Knowledge on Southern Pine Beetle



Significant gaps (basic science):

- 1) Factors that cause SPB to shift from endemic to epidemic population levels
- 2) Biology of SPB during endemic periods



Current State of Knowledge on Southern Pine Beetle



Significant gaps (basic science):

- 3) The influence of suppression of individual infestations (spots) on severity and duration of outbreaks
- 4) Long-range dispersal of SPB and influence of “imported” populations

Cut and leave treatment of SPB



Current State of Knowledge on Southern Pine Beetle



Significant gaps (applied science):

- 1) Suppression of infestations without cutting trees
- 2) Detection of infestations prior to expansion

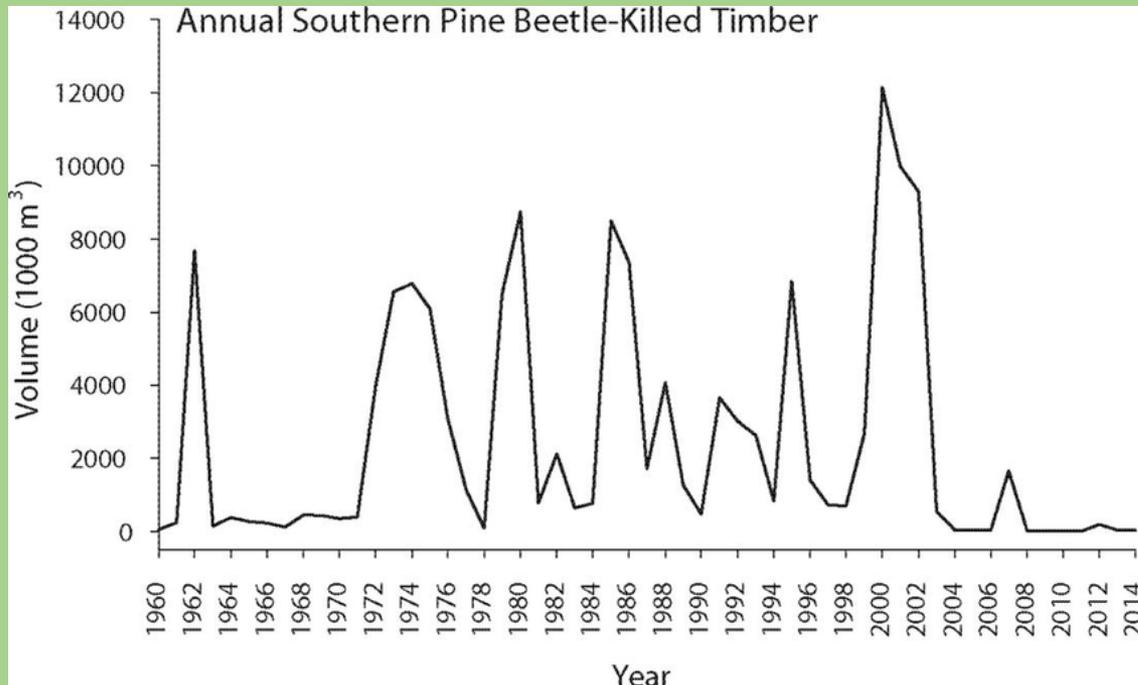


Current State of Knowledge on Southern Pine Beetle



Significant gaps (applied science):

- 3) Forecasting of outbreaks over periods >1 year
- 4) Maintaining SPB at sub-outbreak population levels

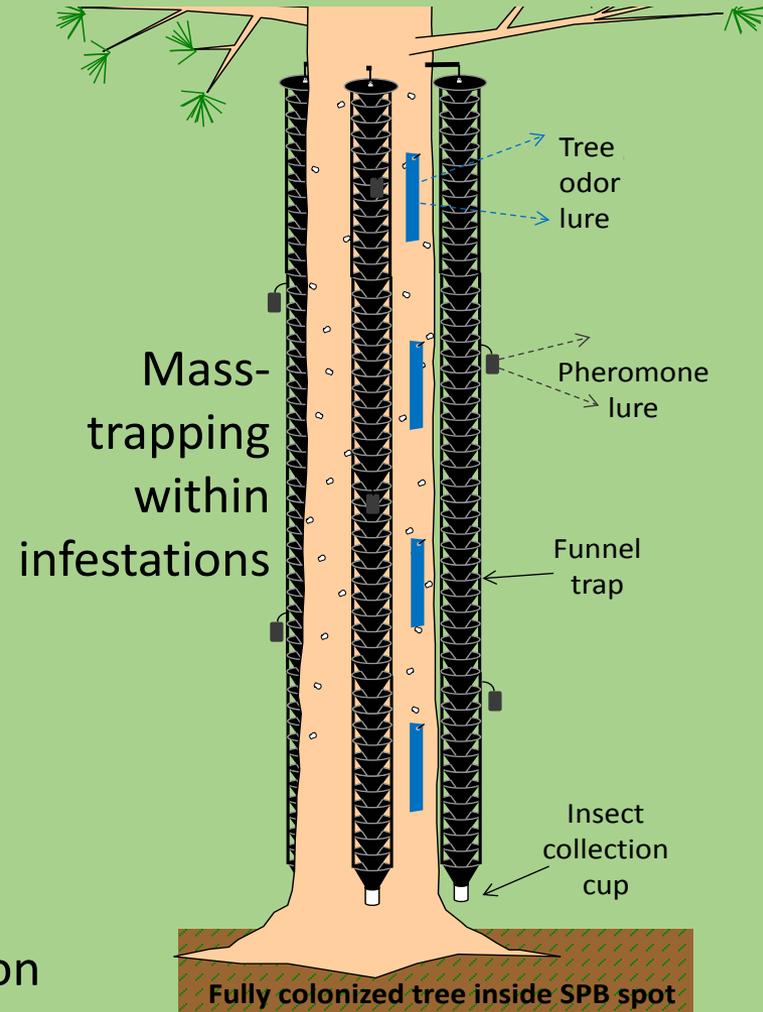


Current State of Knowledge on Southern Pine Beetle

Ongoing research (SRS & FHP):



- 1) Manipulation of SPB with semiochemicals (e.g., pheromones)

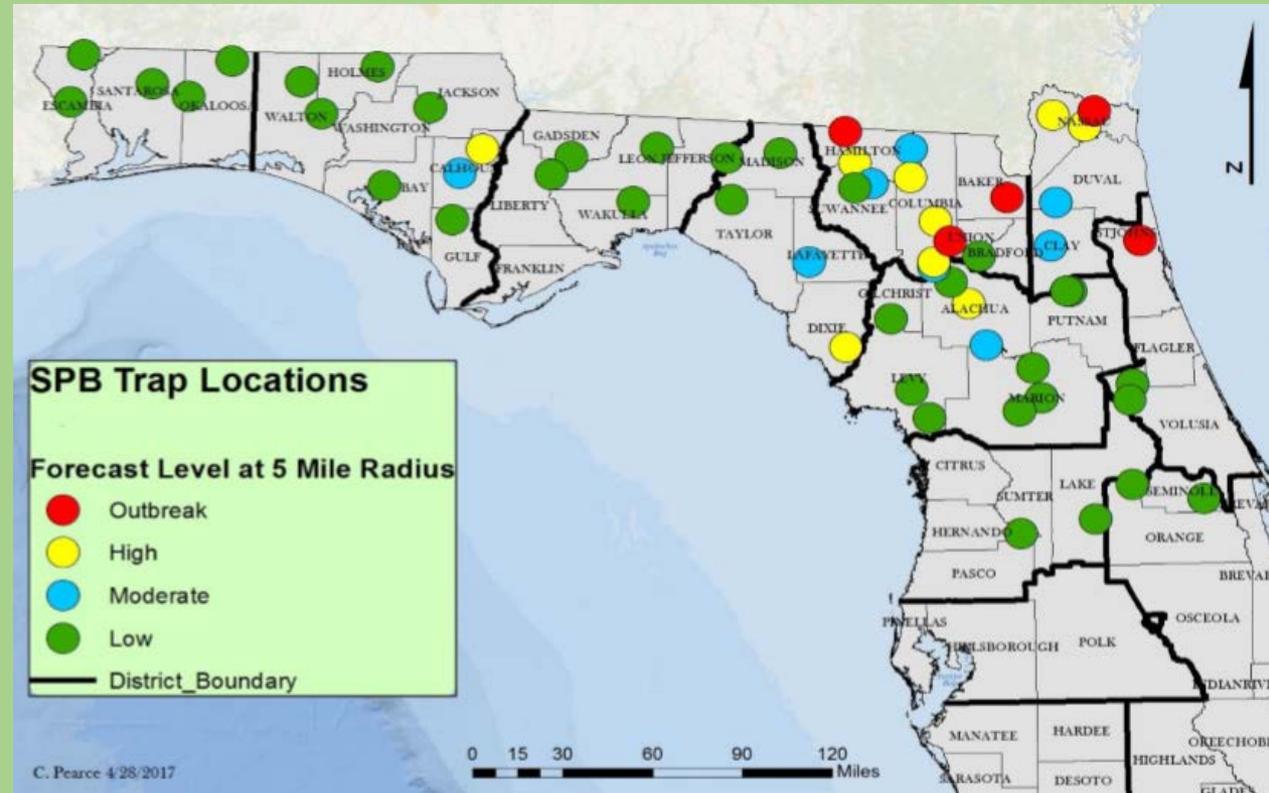


ALSO: Area-wide (as opposed to local) manipulation

Current State of Knowledge on Southern Pine Beetle

Ongoing research (SRS & FHP):

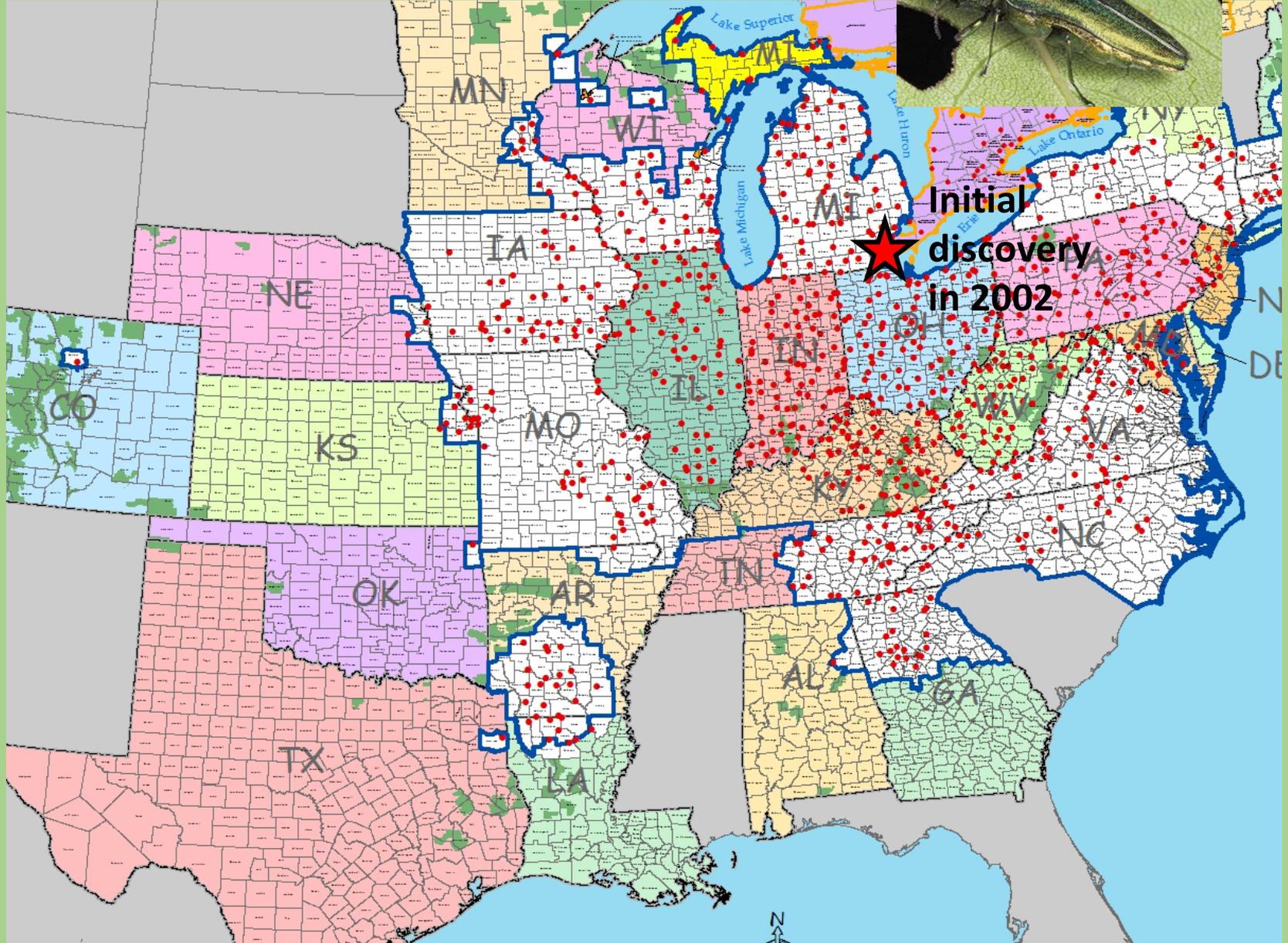
- 2) Improvements to trap-based SPB forecasting



Current State of Knowledge on Emerald Ash Borer



Current range of emerald ash borer



Current State of Knowledge on Emerald Ash Borer



- 1) Arrived from Asia, probably China in pallets, dunnage etc.
- 2) Attacks all native species of ash, particularly green and white
- 3) Rapidly expanding range; likely through movement in firewood
- 4) No silvicultural management known
- 5) No long-range pheromone; detection methods not sensitive
- 6) Could extirpate native ash; impact expected to be similar to chestnut blight and Dutch elm disease
- 7) Systemic insecticides can provide protection to single trees
- 8) Introduction of natural enemies (parasitoids) underway and cautious hope of success
- 9) Possibly genes for resistance in Asian species of ash; future production of resistant strains

Current State of Knowledge on Redbay Ambrosia Beetle and Laurel Wilt

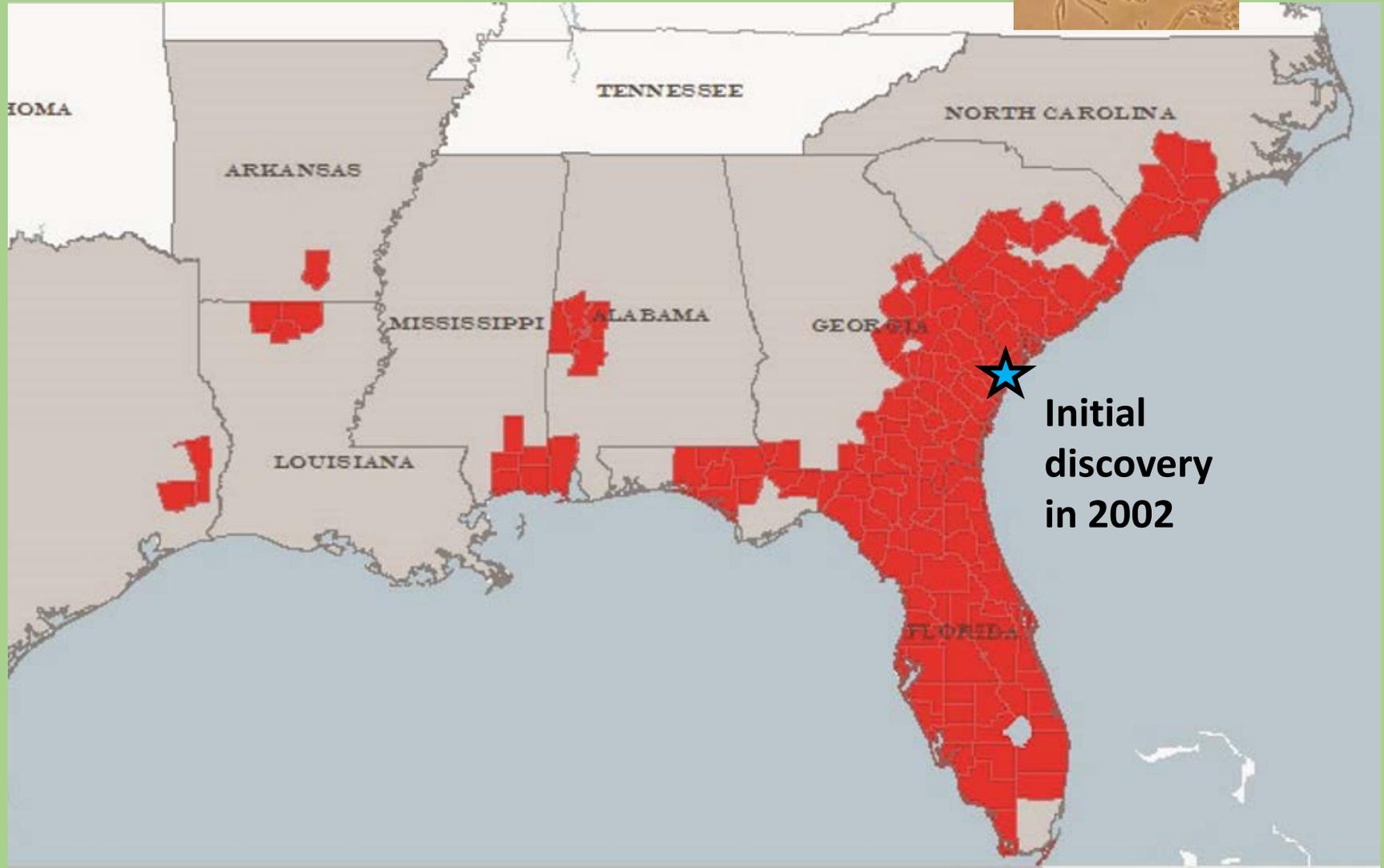
Xyleborus glabratus -
Redbay Ambrosia Beetle



Laurel wilt fungus,
Raffaelea lauricola



Current range of laurel wilt and its vector



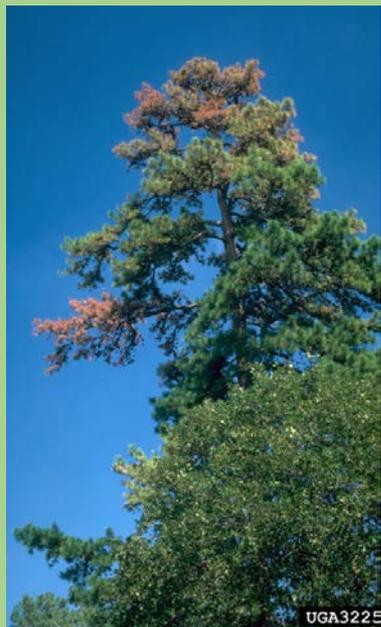
Current State of Knowledge on Laurel Wilt



- 1) Represents a threat that could decimate or extirpate redbay and potentially sassafras. All North American Lauraceae susceptible.
- 2) Biggest economic concern is for avocado.
- 3) Good attractant exists for detection with traps
- 4) No natural enemies known
- 5) The compound verbenone may have efficacy as a repellent for protecting trees
- 6) Contact insecticides show efficacy in protecting avocado, but not anticipated for use in natural forest settings

Current State of Knowledge on *Ips* pine beetles

Three
southern
species:



SPB

Current State of Knowledge on *Ips* pine beetles



- 1) May kill more trees than SPB
- 2) Records much less detailed than for SPB
- 3) Always present in significant numbers but rarely cause outbreaks
- 4) Unlike SPB rarely attack vigorous trees
- 5) Drought renders trees susceptible and regional mortality may increase in response to drought (no scientific studies however)
- 6) Local infestations typically do not grow continuously (as SPB) and therefore SPB-type suppression efforts are not recommended
- 7) Good sanitation practices can prevent some mortality
- 8) Silvicultural practices that minimize potential for tree stress should reduce risk, but no direct controls exist for forest settings