Forest health issues affecting AL-LA-MS

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

Pineville location
USDA Forest Service, Southern Research Station
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Pineville location

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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)
URL: 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-brevicomin (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

Initial discovery in 2002
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

Initial discovery in 2002
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 repellant 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:

- *Ips avulsus*
- *Ips grandicollis*
- *Ips calligraphus*
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 nor 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