

Common (and uncommon) insect and fungal pests of longleaf pine

2021 Virtual Longleaf Academy



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 @drdavecoyle 



COOPERATIVE EXTENSION
College of Agriculture, Forestry and Life Sciences



Department of
**FORESTRY AND ENVIRONMENTAL
CONSERVATION**

Native bark beetles

Ips calligraphus



Dendroctonus terebrans

Ips pini



Dendroctonus valens

Ips grandicollis



Dendroctonus frontalis

Ips avulsus



Southern pine beetle

Ips calligraphus



Ips pini



Ips grandicollis



Ips avulsus



Dendroctonus terebrans



Dendroctonus valens



Dendroctonus frontalis



Southern pine beetle

(*Dendroctonus frontalis*)

Native to North & Central America



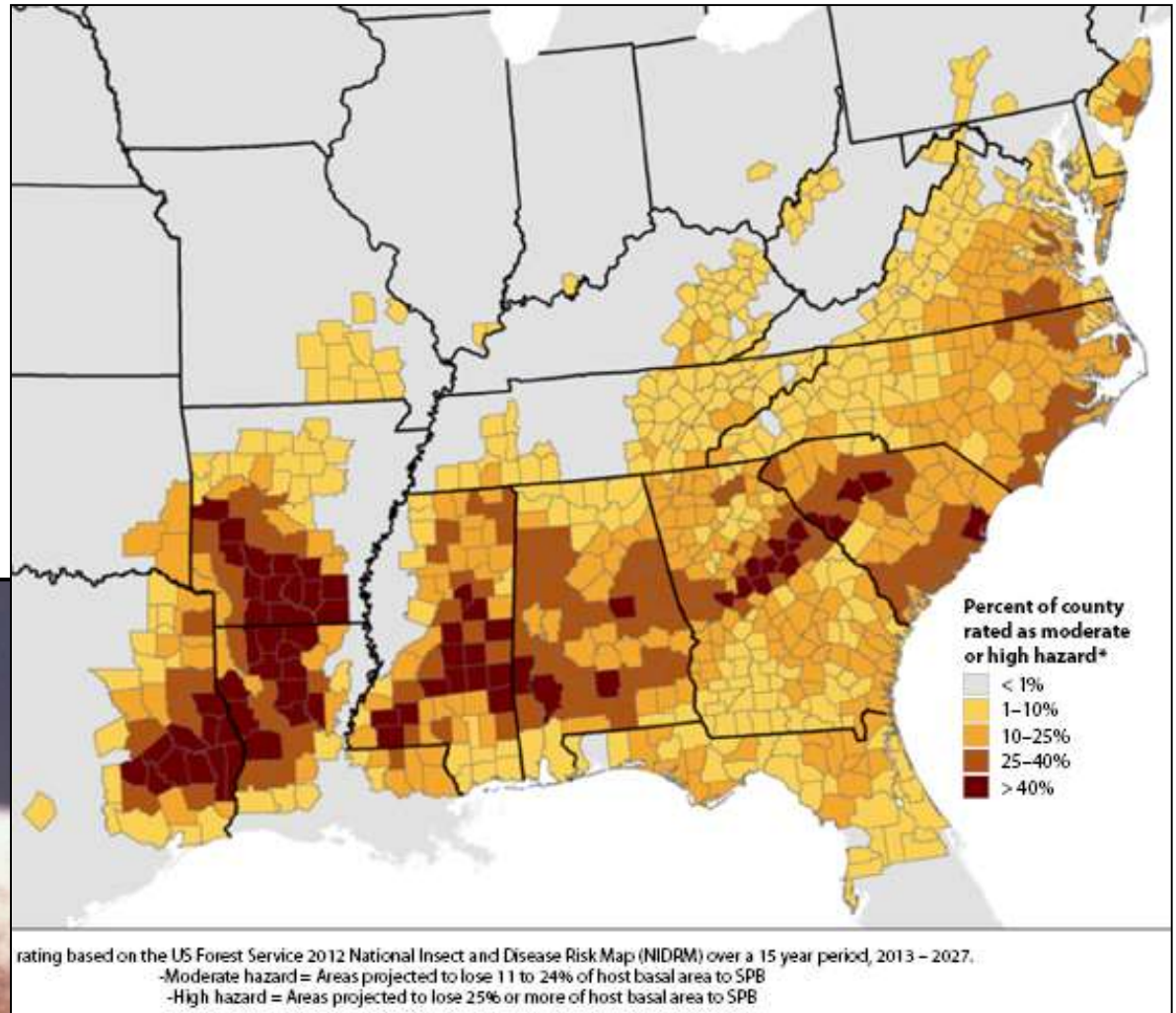
UGA2108092

Southern pine beetle

Attack weakened, damaged, or dying trees

SPB populations oscillate (i.e. can “disappear” and then explode)

Outbreaks usually coincide with droughts



Southern pine beetle



Adult attacks tree

**Mass attack &
Pitch tubes**



Southern pine beetle



S-shaped galleries

Larvae feed on phloem



Southern pine beetle



Blue stain fungi

Tiny circular exit holes



Southern pine beetle management



Trapping



Salvage



Predators



Buffer



Debark



Proper management

SPB Prevention Program

Program started in 2003

Designed to take a proactive approach to reducing the impact of SPB

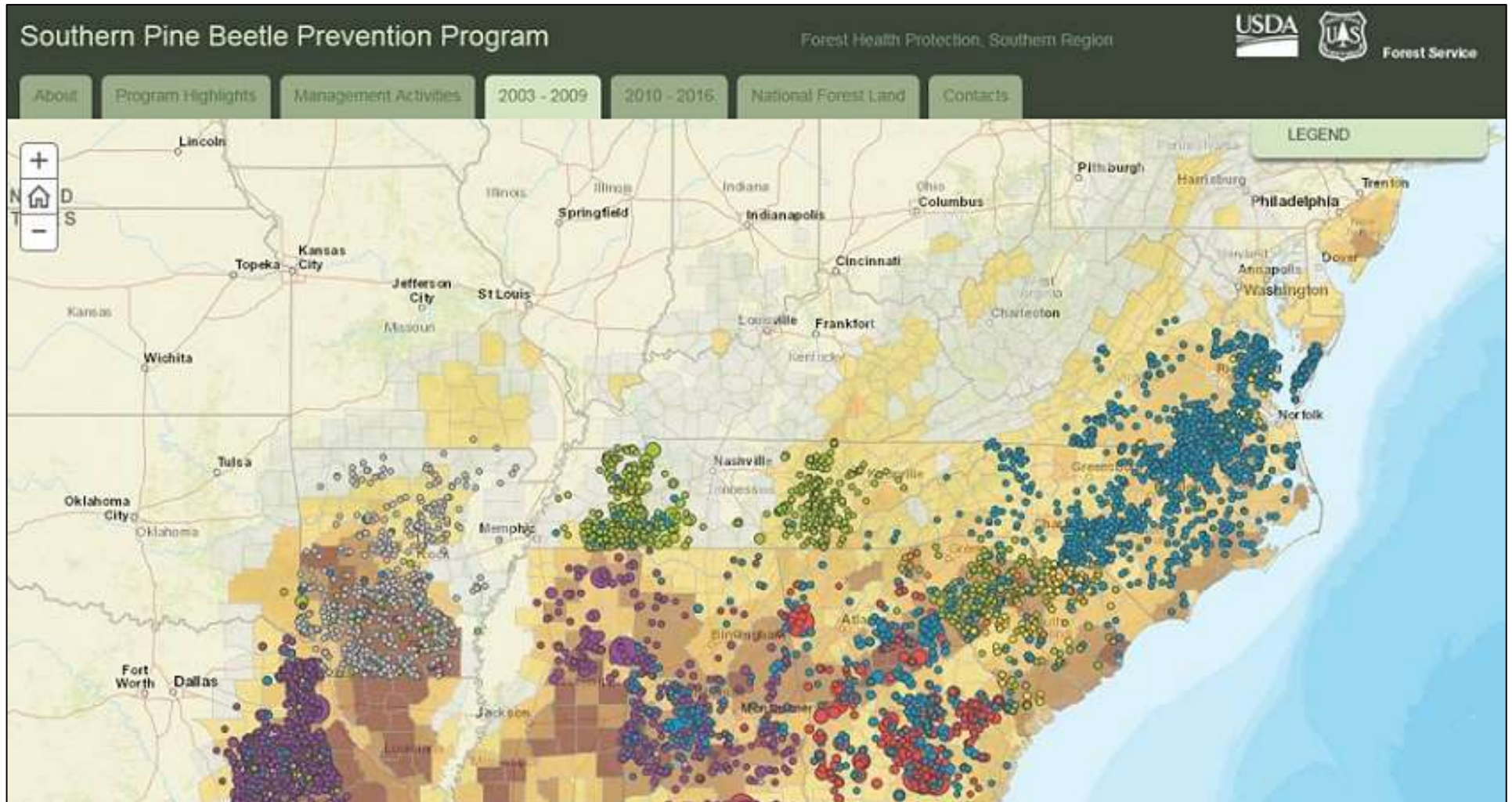
Cost-share provided to thin pine stands

Administered by USFS FHP but implemented in 12 National Forests and 11 States

Treated more than 1.2 million acres



Google: “southern pine beetle prevention program arcGIS”



Southern pine beetle Mississippi outbreak, 2012

Total spots = 910

Bienville NF, MS: 100% of spots in unthinned

Homochitto NF: 99.7% spots in unthinned

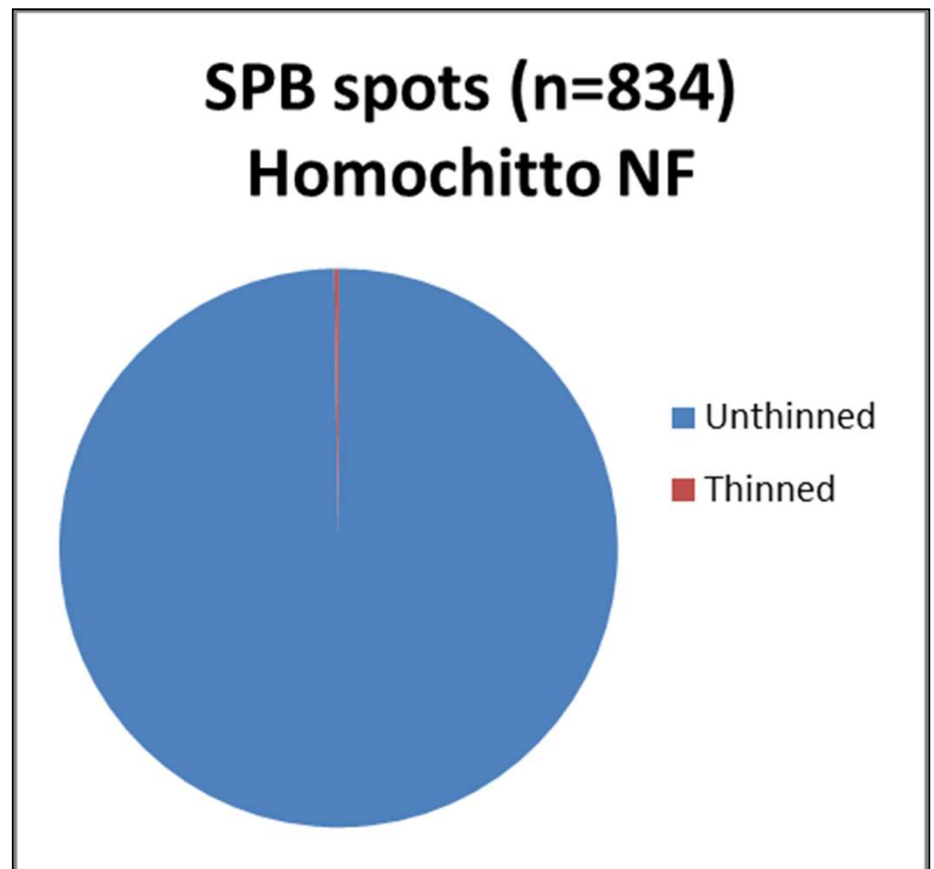
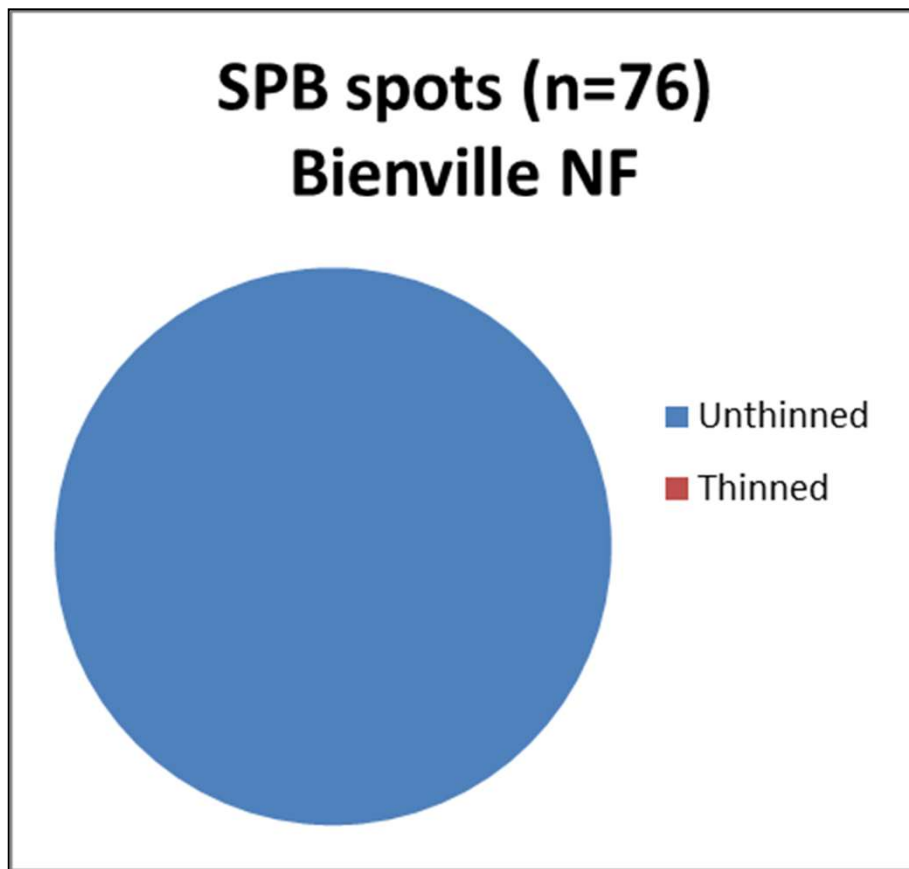
entomology & pathology

Southern Pine Beetle Infestations in Relation to Forest Stand Conditions, Previous Thinning, and Prescribed Burning: Evaluation of the Southern Pine Beetle Prevention Program

John T. Nowak, James R. Meeker, David R. Coyle,
Chris A. Steiner, and Cavell Brownie

2015, Journal of Forestry 113: 454-462.

SPB spots were more common in unthinned stands for BNF ($p = 0.044$) and HNF ($p = 0.001$)



11/14/2012

2012 SPB Spot

After Thinning (2011) and Southern
Pine Beetle (2012)



Ips bark beetles

*Ips
calligraphus*



*Ips
pini*



*Ips
grandicollis*



*Ips
avulsus*



*Dendroctonus
terebrans*



*Dendroctonus
valens*



*Dendroctonus
frontalis*



Ips bark beetles

Common in SE US

Generally attack weakened or stressed trees

Male starts gallery, calls female using odors (pheromones)

Can cause mortality during droughts





Ips bark beetles



Ips outbreak characteristics



Sporadic mortality
throughout the
stand

Small clusters of
attacked trees

Short-lived

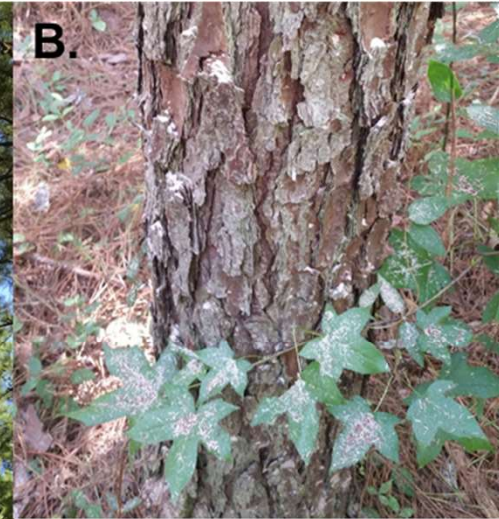
Due to heavy natural
pressures against the
population

Ips monitoring

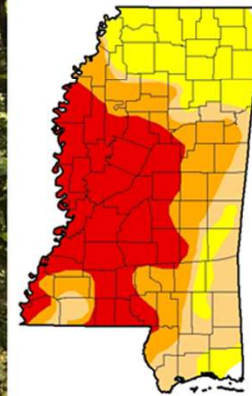
Trapping does not occur specifically for Ips
Monitoring is mostly visual assessments on the
ground



Ips bark beetles



**C. U.S. Drought Monitor
Mississippi**



October 20, 2015
(Released Thursday, Oct. 22, 2015)
Valid 9 a.m. EDT

	Drought Conditions (Percent Area)				
	None	D0-D4	D1-D4	D2-D4	D3-D4
Current	0.55	99.45	75.40	58.13	35.14
Last Week sat-sun	17.10	82.90	74.85	56.69	33.77
3 Months Ago sat-sun	89.66	10.34	0.07	0.00	0.00
Start of Calendar Year sat-sun	87.99	12.01	0.00	0.00	0.00
Start of Water Year sat-sun	18.20	81.80	56.71	31.08	6.55
One Year Ago sat-sun	79.74	20.26	0.11	0.00	0.00

Intensity:
■ D0 Abnormally Dry ■ D3 Extreme Drought
■ D1 Moderate Drought ■ D4 Exceptional Drought
■ D2 Severe Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for localized statements.

Author:
Brad Rippey
U.S. Department of Agriculture



<http://droughtmonitor.unl.edu/>

Ips bark
beetles in
longleaf pine





Turpentine beetles

Ips calligraphus



Ips pini



Ips grandicollis



Ips avulsus



Dendroctonus terebrans



Dendroctonus valens



Dendroctonus frontalis



Black turpentine beetle

(*Dendroctonus terebrans*)

Attack weakened or stressed trees

Can cause mortality during droughts



Black turpentine beetle



Black turpentine beetle



Southern pine beetle webinar

6 May 2020 by Dr. John Nowak (USFS)

The screenshot shows a web browser window displaying the Southern Forest Health website. The browser's address bar shows the URL: southernforesthealth.net/webinars/webinar_folder_view?b_start:int=5&-C=. The website header includes navigation links for ABOUT, DIRECTORY, NEWS, EVENTS, WEBINARS, and CONTACT, along with social media icons for Facebook, Twitter, and YouTube. The main content area features the "FOREST HEALTH" logo and a search bar. Below the logo, there are tabs for "Plants", "Insects", "Diseases", and "Other". A "WEBINAR SEARCH:" section is visible, with a red arrow pointing to a search input field. Below this, a list of webinar topics is shown, including "Annosum Root Rot", "Asian Longhorned Beetle", and "Chinese Privet". The "Southern pine beetle: Biology, monitoring and management" webinar is highlighted, with a "VIEW" button. The footer contains logos for USDA and Southern Regional Extension Forestry, along with copyright information and a "Log in" link. The Windows taskbar at the bottom shows the system clock as 10:59 AM on 3/17/2021.

Webinars — Southern Forest H X +

southernforesthealth.net/webinars/webinar_folder_view?b_start:int=5&-C=

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Search Site

Plants Insects Diseases Other

Webinars By Topic

Annosum Root Rot

- Heterobasidion (aka Annosum or Fomes) Root Disease of Pines in the South

Asian Longhorned Beetle

- Asian longhorned beetle: A new invasive pest in South Carolina

Chinese Privet

- Privet biology and management in

WEBINAR SEARCH:

Southern pine beetle: Biology, monitoring and management
May 06, 2020

The southern pine beetle (SPB), *Dendroctonus frontalis*, is the most destructive insect pest of pine in the southern United States. Dr. John Nowak will be giving a general overview of the biology, range and impact of and possible management strategies for preventing the spread of this insect pest.

VIEW

Laurel wilt biology, monitoring, and management

USDA Southern Regional Extension Forestry

Southern Forest Health website is sponsored by the USDA Forest Service and Southern Regional Extension Forestry.
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Log in

Type here to search

10:59 AM
3/17/2021

Field identification

How can I distinguish an SPB infestation from mortality associated with other bark beetles?

Southern pine beetle

Dendroctonus frontalis



Other pine bark beetles

Ips engraver beetles

Ips avulsus

Ips grandicollis

Ips pini

Ips calligraphus

Turpentine Beetles

Dendroctonus terebrans

Dendroctonus valens

Field ID: Tree mortality patterns

Southern pine beetle

Mortality progresses in rapidly expanding “spots”



Other pine bark beetles

Mortality often more limited, scattered, associated with stress



Field ID: Pitch tubes

Southern pine beetle

Often located in bark crevices



Other pine bark beetles

Ips engravers: Often on flat face of bark plate

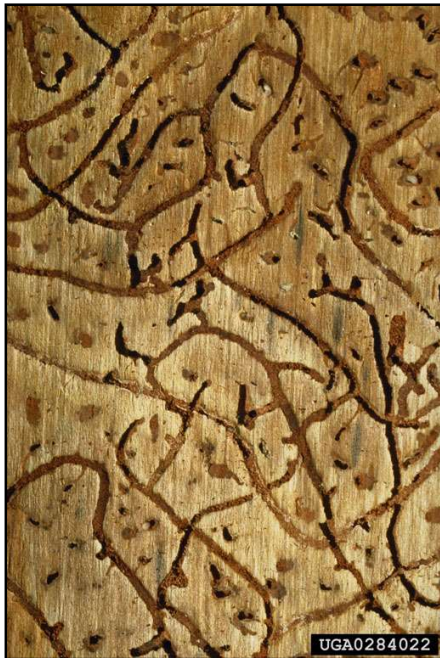
Turpentine beetles: large, limited to lower trunk



Field ID: Galleries

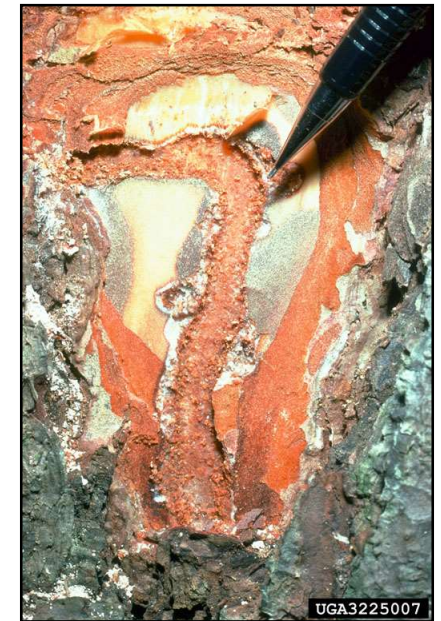
Southern pine beetle

Winding “S”-shaped galleries
packed with frass



Other pine bark beetles

Ips engravers: H, Y, or I-shaped
Turpentine: large, low



Control of SPB infestations

First confirm that the infestation is SPB and is “active”
forester assistance

Decide on best control option for the given situation:

Cut and Remove

Cut and Leave

Cut, Pile and Burn (limited use)

Cut and Spray (limited use)



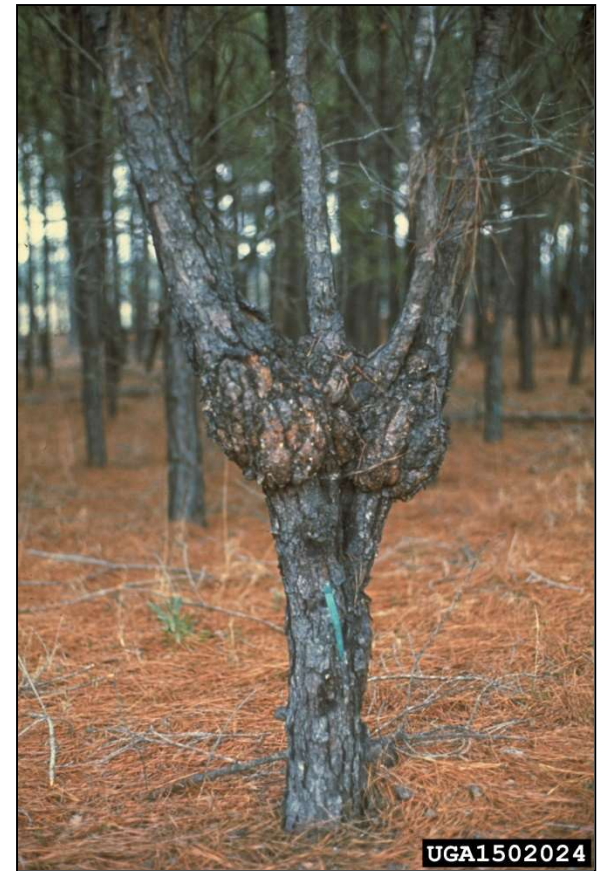
Fusiform rust

(Cronartium quercuum f. sp. fusiforme)

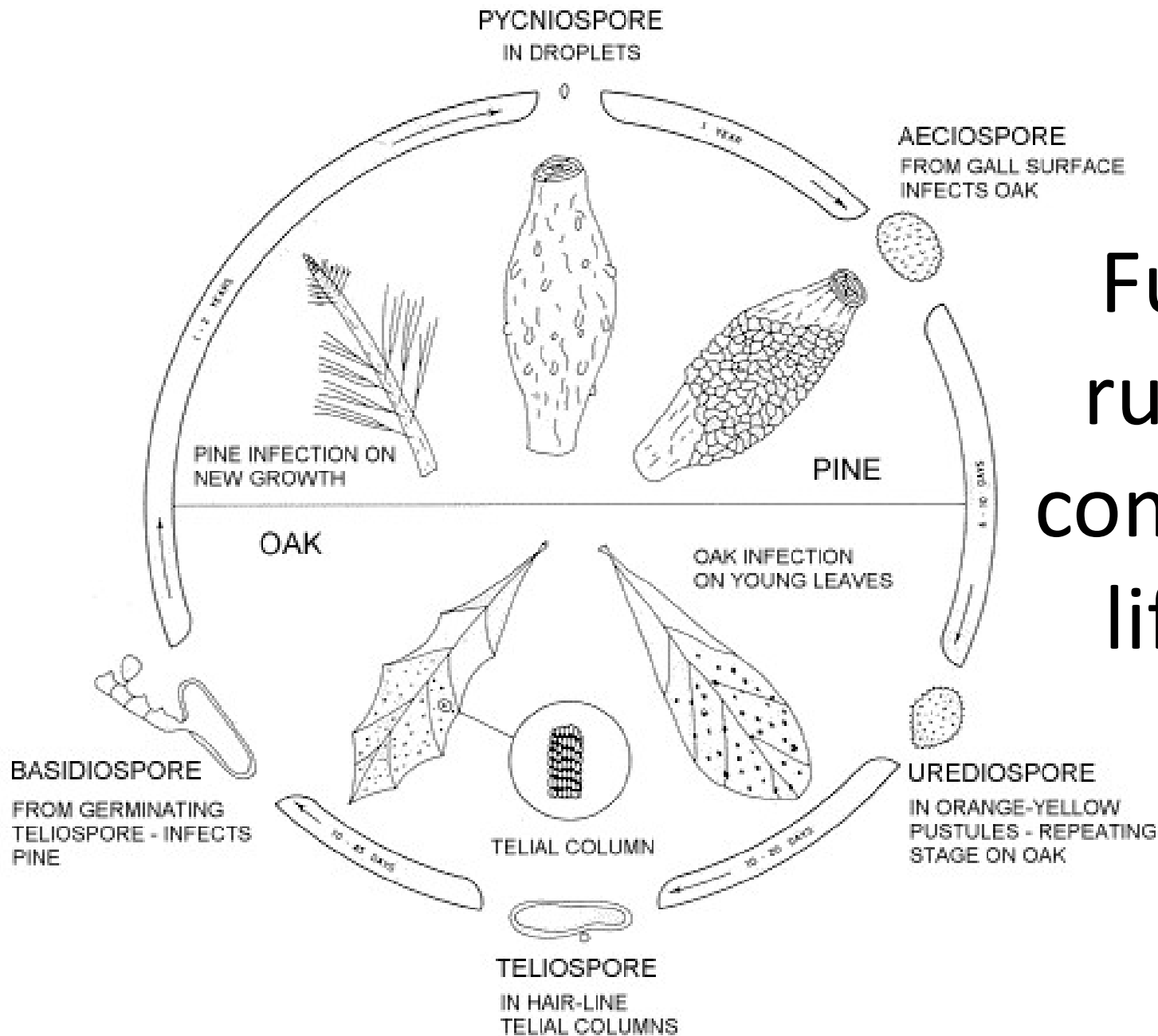
Worst forest disease in SE US

Stem / branch cankers

Nursery and plantation issue



LIFE CYCLE OF *Cronartium fusiforme*



Fusiform rust has a complicated life cycle



What you really
need to know is

the fungus
alternates
between oak and
pine hosts



2-yr lifecycle

Susceptibility:

Loblolly/slash
Longleaf

Black oak group
most susceptible

Fusiform rust



Fusiform rust



Stems often break at canker



Fusiform rust impacts growth



Fusiform rust management



Chemical treatment in nurseries



Resistance through breeding



Fertilize after age 8



Luck

Annosum root rot (*Heterobasidion irregulare*)

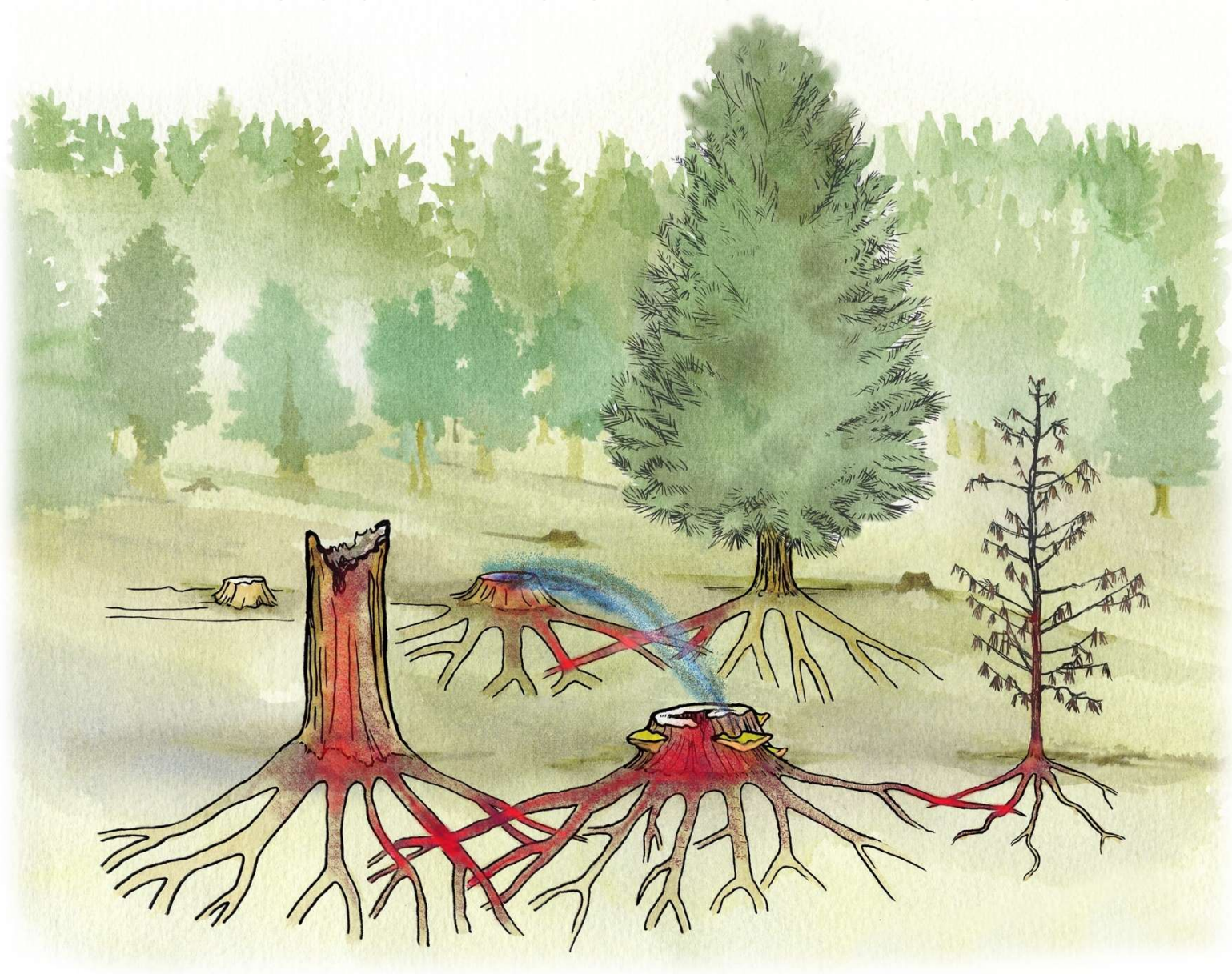
One of the worst forest diseases in SE US

Invades/degrades root system

Spores spread by wind



Annosum root rot infection



Annosum
root rot

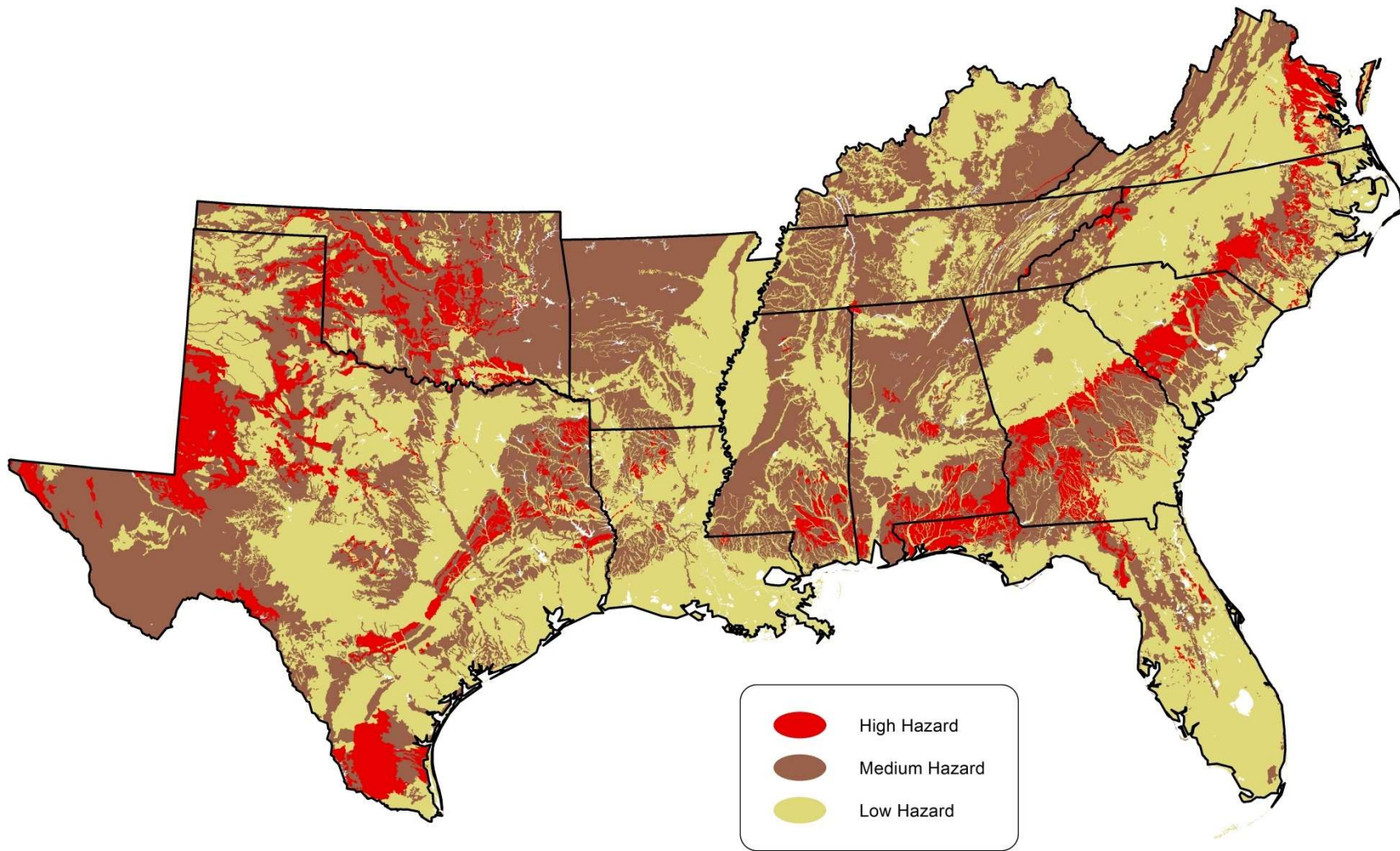


02.07.2012 15:05

Annosum root rot



Annosum root rot hazard map





Bee Branch, AL
Bankhead NF quad sheet

Areas of hazard for
annosum root rot:

High (red)

Moderate (yellow)

Low (green)

USGS 1:24000 scale

Annosum root rot management



Clearcuts halt disease progression

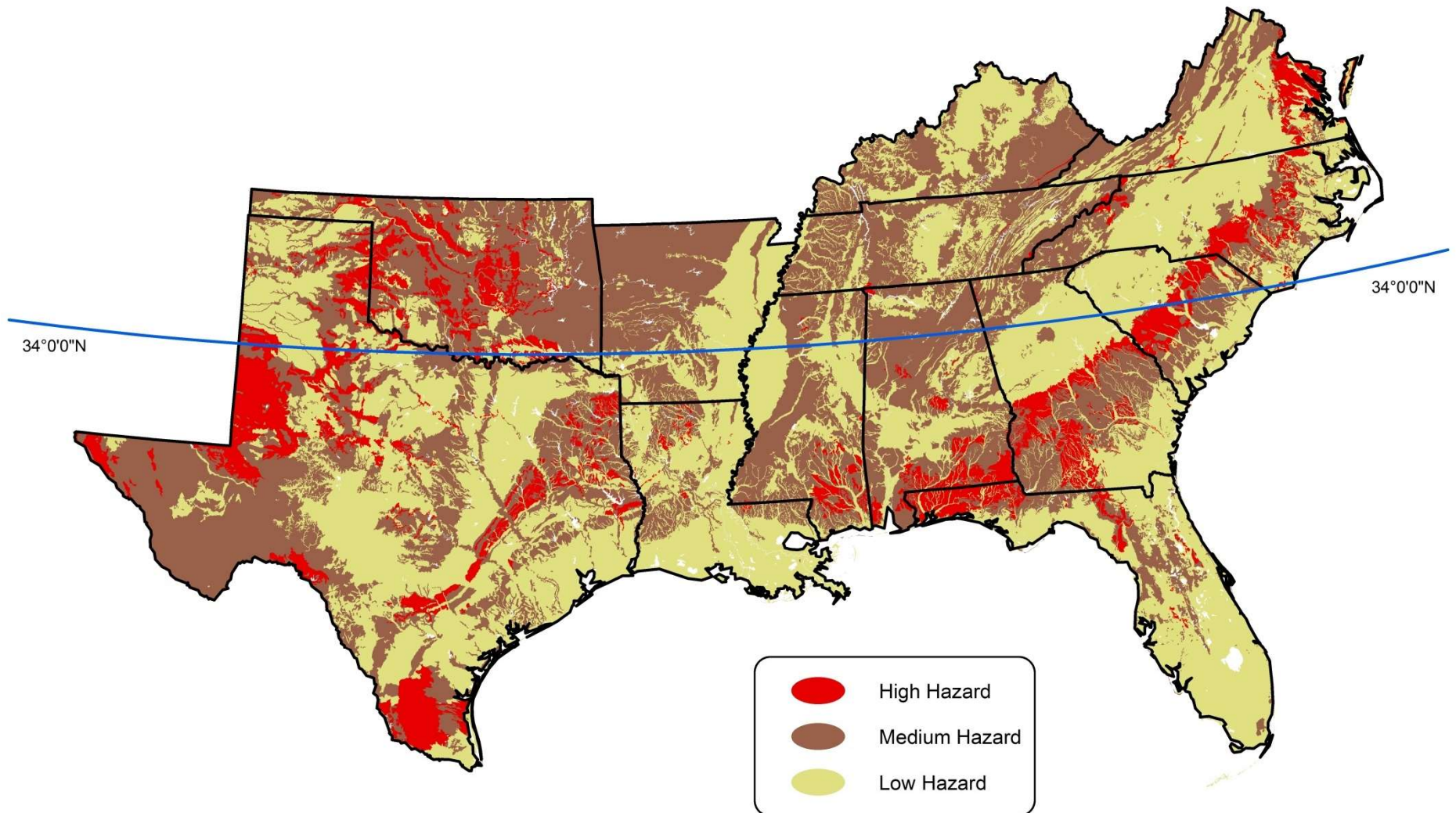


Thin during summer months



Stump treatment

Annosum root rot hazard map



Pitch canker

(*Fusarium circinatum*)

Named for large amount of resin at canker

Can be problem in seed orchards

Occasional outbreaks

Insect association



Pissodes nemorensis





Primary symptoms are
dead needles and
extremely heavy resin
flow on the terminal
leader(s)

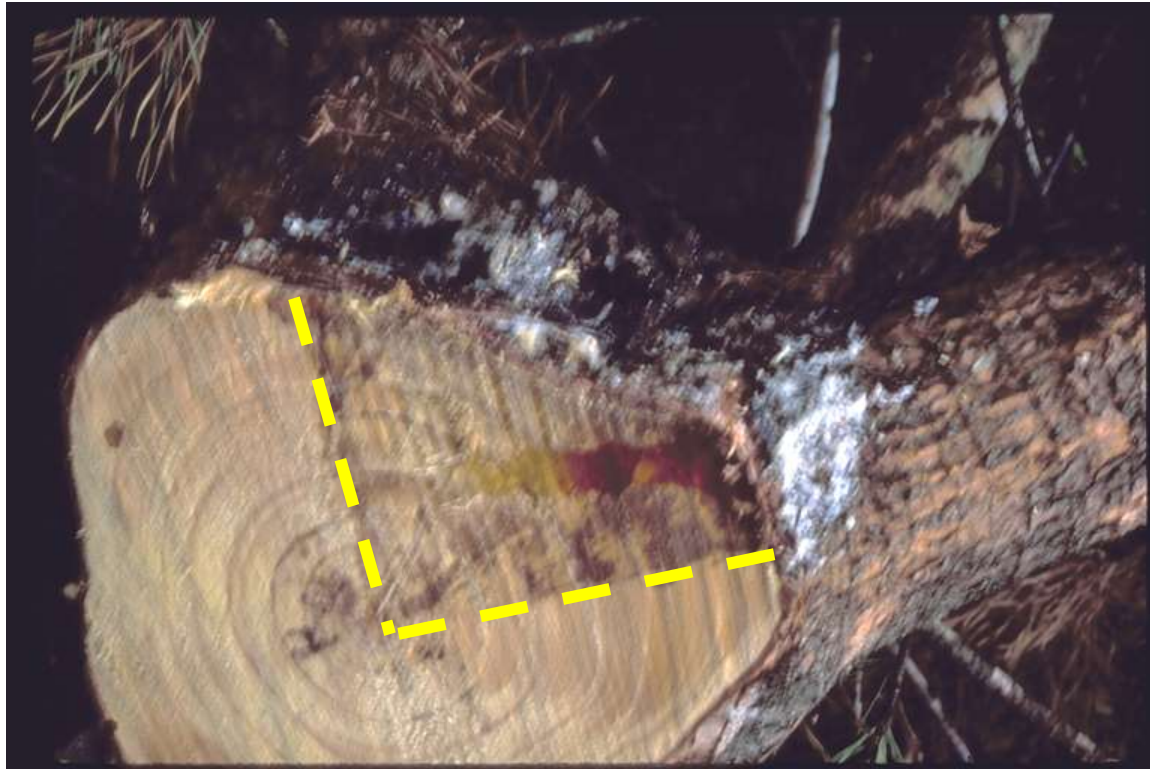


Chief hosts of this disease are slash, shortleaf, Virginia, and longleaf pines



Resin soaking of the
internal canker on a
terminal leader

Heavy pitch flow on
the terminal leader



Cross section of an infected stem showing the typical triangular extension of the canker into the stem

Severe infection can result in almost 100% of the stems in
a stand being infected

Sanitation is the only forestry control measure



FL seed orchard
June 2016
Pitch canker episode

Damage $\frac{1}{2}$ way up tree
Trees ~60' tall

20% infected





Brown spot needle blight (*Mycosphaerella dearnessii*)

Primarily damages longleaf, also loblolly/slash

Delays growth, but rarely kills tree

Spores spread by wind/rain



Brown spot needle blight





**Brown spot
needle blight**

Brown spot needle blight management

Plant resistant seedlings

Promote aeration in young stands

Foliar fungicides

Fire!



Pine sawflies (*Neodiprion* spp.)

Most impactful defoliators of southern pine

All southern pines are susceptible

Native, several species in the Southeast

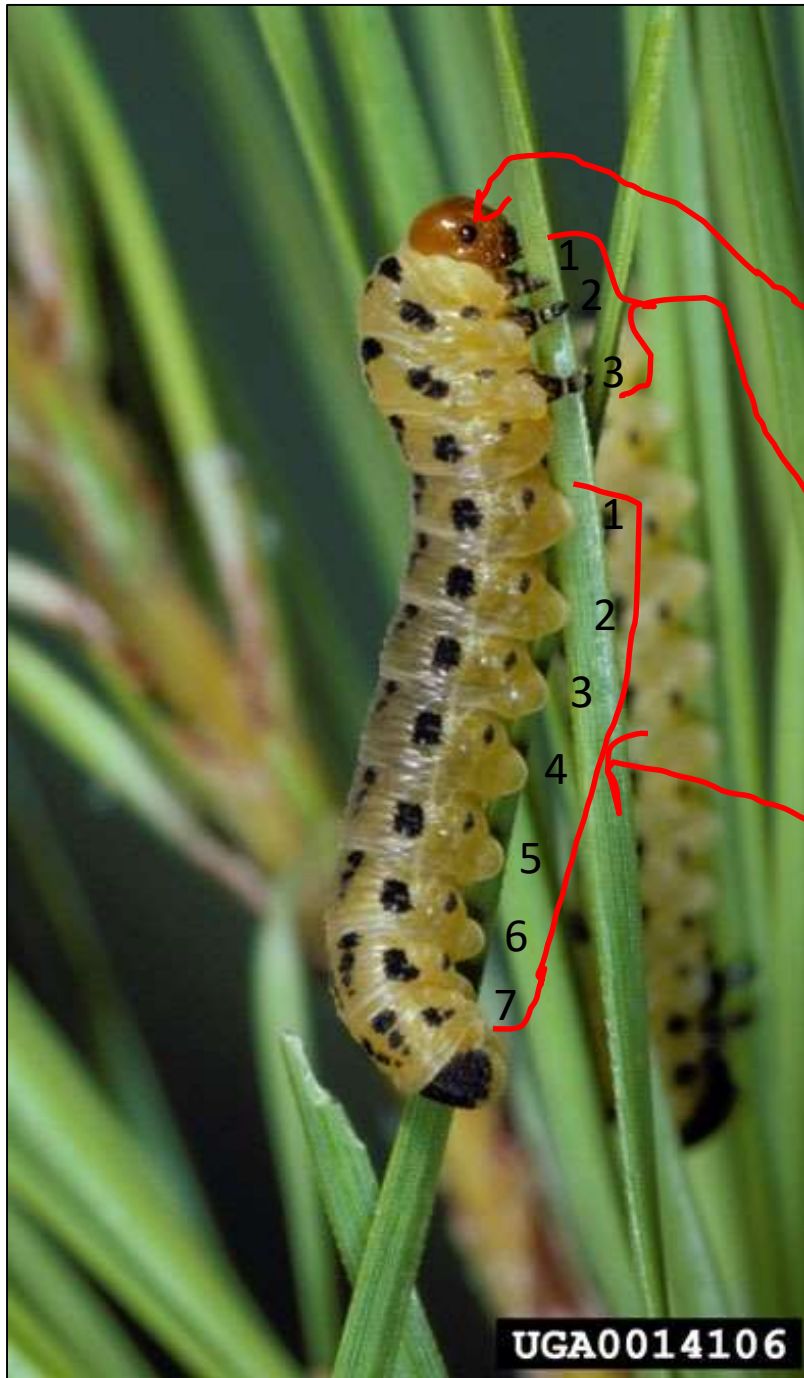
Damage is usually spotty, but large
infestations can occur

Usually more damage in single-species plantations

Most common on younger trees

Repeated defoliation can reduce growth and
potentially cause tree mortality

NOT a caterpillar



UGA0014106

Redheaded pine sawfly (*Neodiprion lecontei*)



UGA0284087



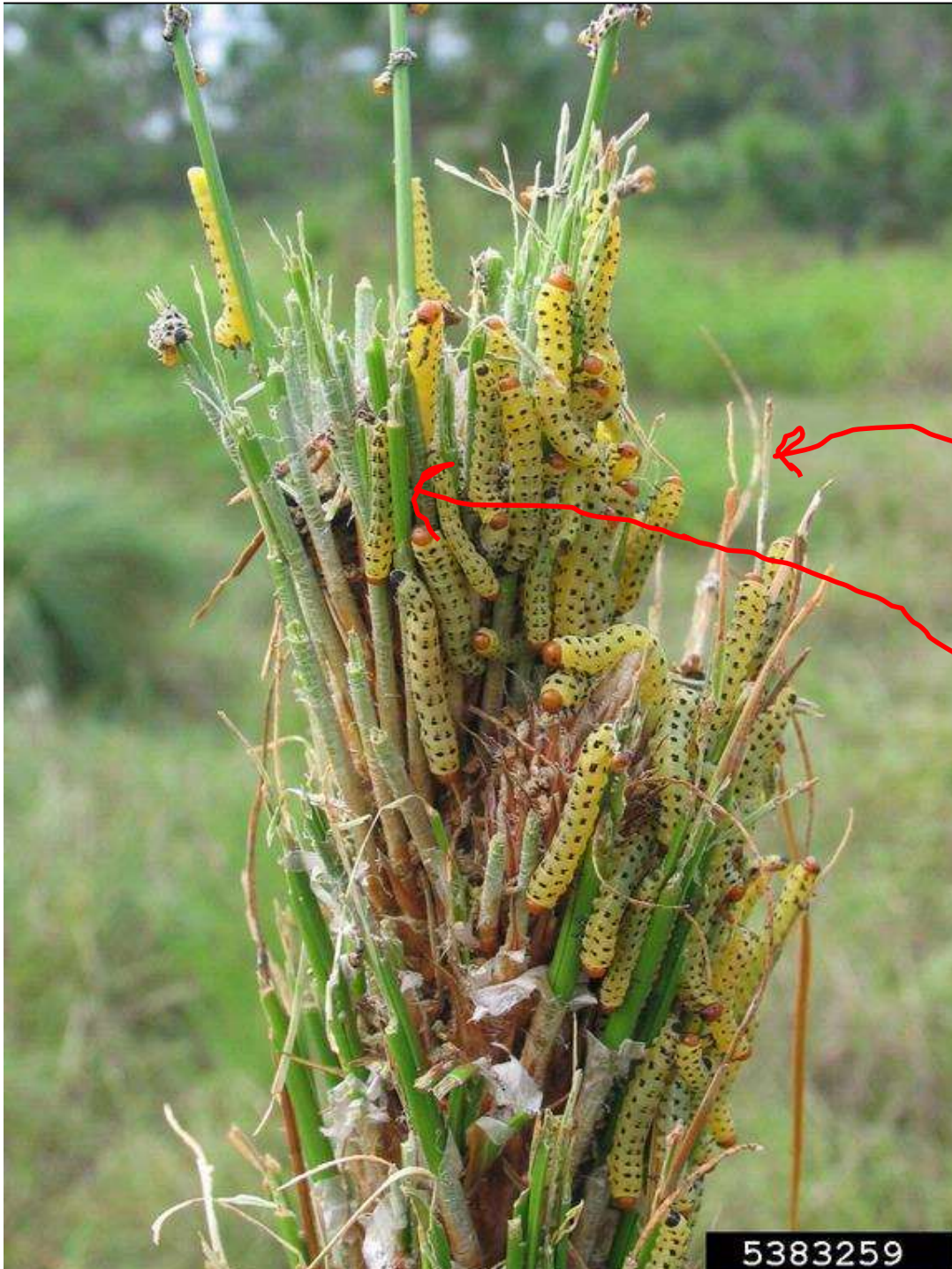
UGA4060074

Blackheaded pine sawfly
(*Neodiprion excitans*)



Loblolly pine sawfly
(*Neodiprion taedae linearis*)





Pine sawfly
damage

5383259



Pine sawfly damage



Pine sawfly damage



5383255

Pine sawfly management

Control usually not recommended or necessary

If defoliation persists multiple years chemical control may be used

Natural enemies generally take care of populations

Regeneration pests?

What is a Regeneration Pest?

Any insect, disease, animal, or weed that causes significant damage or death to newly planted trees

Why is control important?

Lengthen the stand establishment period

Deform trees

Stunt growth

Devalue trees

Kill trees

Lowers return on investment

Pales weevil (*Hylobius pales*)

Larvae feed in dying/dead pine roots



Pales weevil



Pitch-eating weevil (*Pachylobius picivorous*)

Very similar to pales weevil, only bigger



Damage caused by both weevils is very similar.

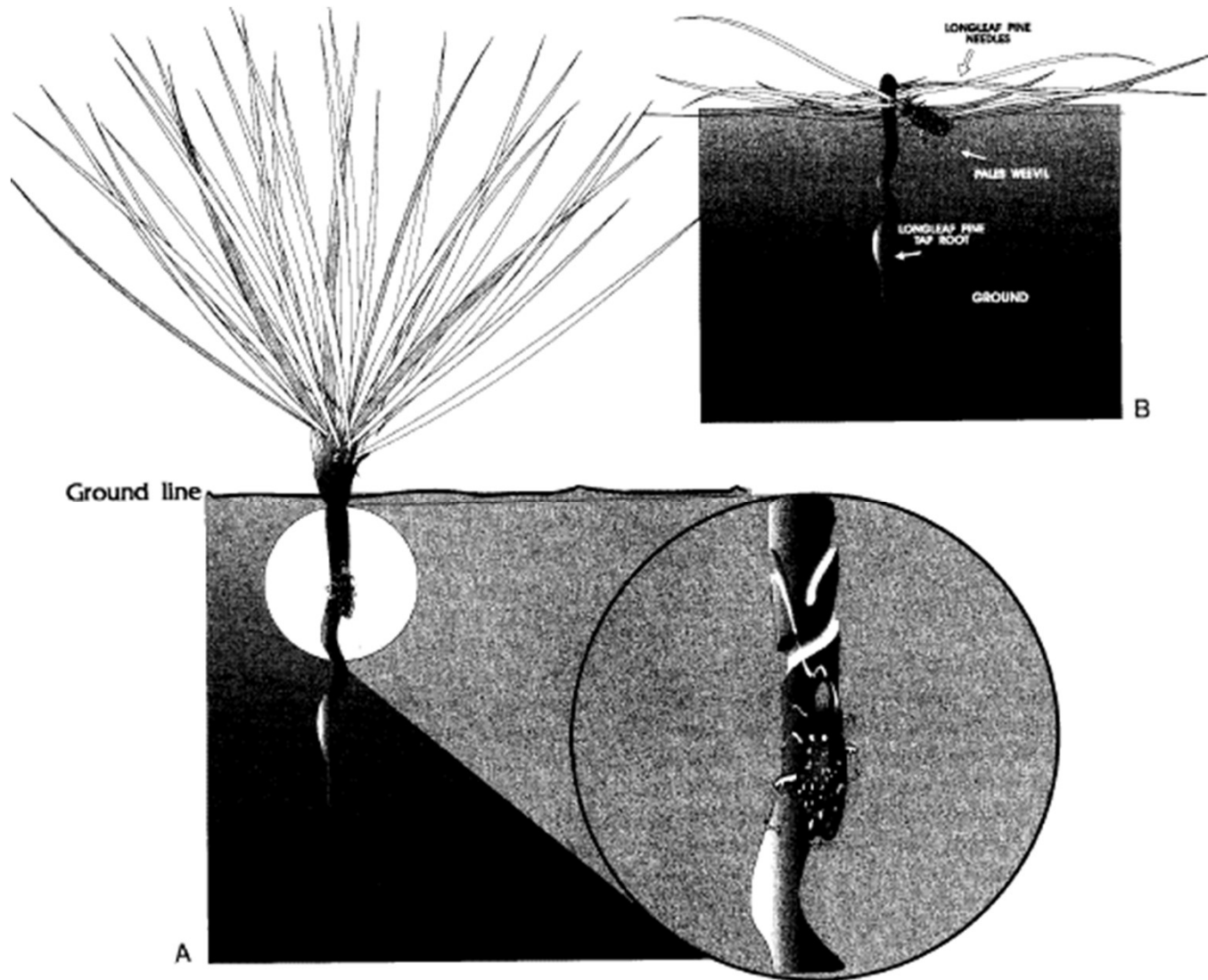


Pales weevil

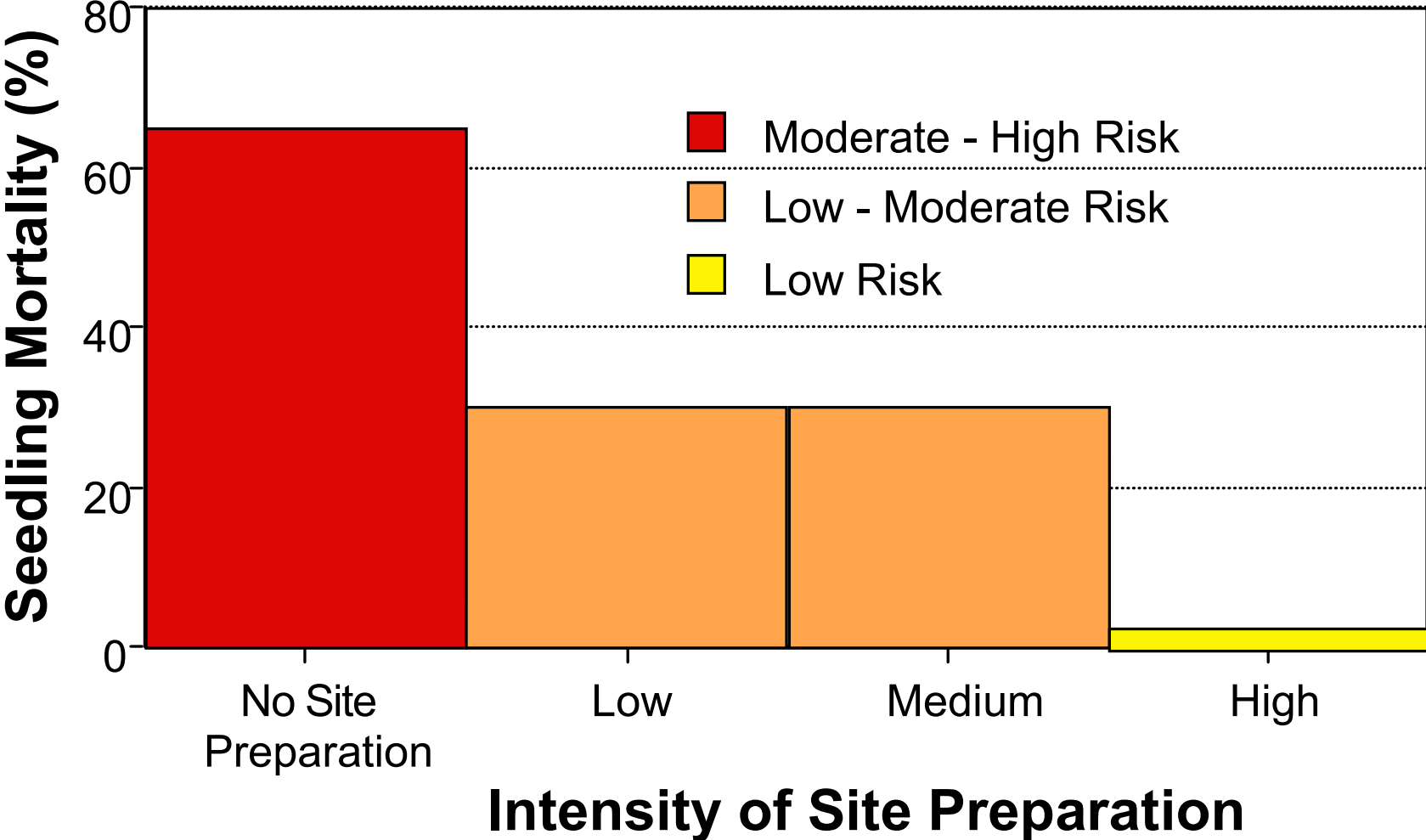
Pitch-eating weevil



Regeneration weevil damage in longleaf pine



Potential risk of weevil-caused pine seedling mortality based on intensity of site preparation



Regeneration weevils

Several options for avoiding weevil problems:

Delay planting to following year (or 9-12 mo)

Intensively prepare sites before planting

Treat seedlings with an insecticide (at nursery)

If harvest to planting interval is less than 6 months, consider planting permethrin-treated seedlings

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"Can you tell me more about this school?" Ask
"Are you accepting new students?" Ask
Type a question... Ask

YOUR PAGES
Forest Health & Invasi... 4
Proactive Forest Healt... 1

CONTACTS
Amy Nietz 7h
Ryan Rastok 2h
Karl Borge 6h
Bobbie Vickerman 7h
Holly Johannsen Fuller
RodnAub Johnson 6h
Andrea Decker Olson 6m
Katie Termer 1h

GROUP CONVERSATIONS
Create New Group

6:07 AM 11/19/2018

[facebook.com/southernforesthealth/](https://www.facebook.com/southernforesthealth/)

The screenshot shows a web browser window displaying the Facebook page for the Forest Health & Invasive Species Outreach & Education Program - FHIS. The browser's address bar shows the URL <https://www.facebook.com/southernforesthealth/>. The page header includes the Facebook logo, the page name, and navigation options like Home, Find Friends, and Settings. The main content area features a large green forest background with the text: "Providing education and training materials on forest health and invasive species in the southeastern US." Below this is a "Learn More" button. The left sidebar contains the page's profile picture, name, and a navigation menu with options like Home, Posts, Reviews, Videos, and Photos. The right sidebar lists "YOUR PAGES" and "CONTACTS" with names and profile pictures. At the bottom, there is a Windows taskbar with various application icons and a system tray showing the time as 8:49 AM on 5/7/2017.

Forest Health & Invasive Species Outreach & Education Program - FHIS
@southernforestheath

Providing education and training materials on forest health and invasive species in the southeastern US.

Learn More

Write something...

School in Athens, Georgia
5.0 ★★★★★

Page Tips
Write a Post to Connect With Your Page Visitors
Post an update, photo or video. Posting on your Page gives your visitors a chance

YOUR PAGES
Forest Health & Invasive ...

CONTACTS
Betty Borsa
Micheal Hovey
Marcus Vitse
Mario Contarini
Karl Borge
Angela Coyle
Michelle Borsa Coyle
RodnAub Johnson
Cindy Coyle
James Carr
Bobbie Vickerman
James Johnson

[facebook.com/groups/SouthernTreeHealthDiagnostics/](https://www.facebook.com/groups/SouthernTreeHealthDiagnostics/)

The screenshot shows a web browser window displaying the Facebook group page for 'Southern Forest and Tree Health Diagnostics'. The browser's address bar shows the URL <https://www.facebook.com/groups/SouthernTreeHealthDiagnostics/>. The page header includes the group name and a search bar. The main content area features a large image of a forest with tall trees and green undergrowth. Below the image are buttons for 'Joined', 'Notifications', 'Share', and a three-dot menu. A 'Write Post' section is visible, along with options to 'Add Photo/Video' and 'Add File'. A 'PINNED POST' by Jiri Hulcr is shown, dated March 14, with three images of plants and insects. On the right side, there are sections for 'YOUR PAGES', 'CONTACTS', 'ADD MEMBERS', 'MEMBERS' (150 Members, 5 new), and 'SUGGESTED MEMBERS'. The Windows taskbar at the bottom shows various application icons and the system clock indicating 8:52 AM on 5/7/2017.

Southern Forest and Tree Health Diagnostics
Public Group

Discussion
Members
Events
Photos
Files
Manage Group

Search this group

Shortcuts
Southern Forest and Tr...
Forest Health & Invasive...
Frass & Noodles
Harmony High School C...

Write Post
Add Photo/Video
Add File
More

Write something...

PINNED POST
Jiri Hulcr edited a doc...
March 14

ADD MEMBERS
Enter name or email address...

MEMBERS
150 Members (5 new)

SUGGESTED MEMBERS
Hide

Raeanne Ryan
Add Member

Celia K Boone
Add Member

Sherry Weber Blanchar
Add Member

YOUR PAGES
Forest Health & Invasive ...

CONTACTS
Betty Borsa
Michele Ehler
Micheal Hovey
Marcus Vitse
Mario Contarini
Karl Borge
Angela Coyle
Michelle Borsa Coyle
RodnAub Johnson
Cindy Coyle
James Carr
Bobbie Vickerman

8:52 AM
5/7/2017

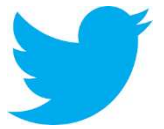
Questions?

dcoyle@clemson.edu



drdavecoyle

@drdavecoyle



Thank you!