

Invasive Plant ID & Herbicide Treatments for Forest Management

Beau Brodbeck, PhD
Alabama Cooperative Extension System

Slides taken from:
Stephen F. Enloe, Nancy J. Loewenstein, Jim Miller



Invasive impacts...

- Displacing native vegetation
- Degrading wildlife habitats
- Hindering and changing forest management
- Eroding forest productivity
- \$97 billion in losses between 1906 and 1991 from 79 invasive species (OTA 1993)
- 400 of 958 species listed as endangered are related to competition or predation from non-native species





Over 500 nonnative invasive species in the Southeast

- ✿ 384 plants
- ✿ 72 vertebrates
- ✿ 92 invertebrates
- ✿ 16 pathogens



Non-native plants

- ✿ Introduced through human activity
- ✿ Many wildlife and ornamental plants
- ✿ 1 in 10 escapes and becomes ‘free living’
- ✿ 1 in 10 of these becomes ‘naturalized’
- ✿ 1 in 10 of these becomes ‘invasive’

... adds up when 1000's are introduced!

50% of the species on Alabama's invasive plant list are escaped ornamentals



planted for wildlife ...

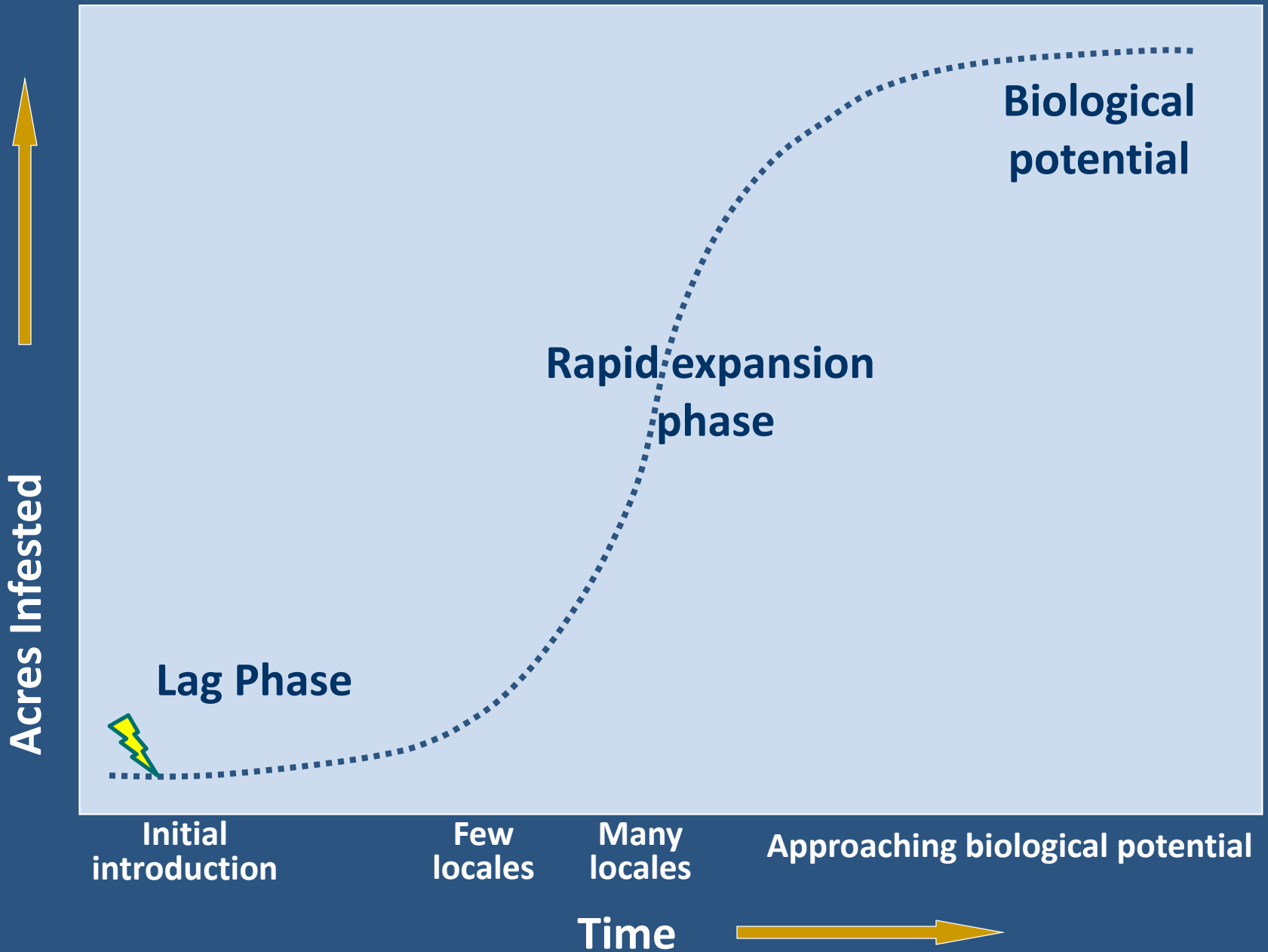




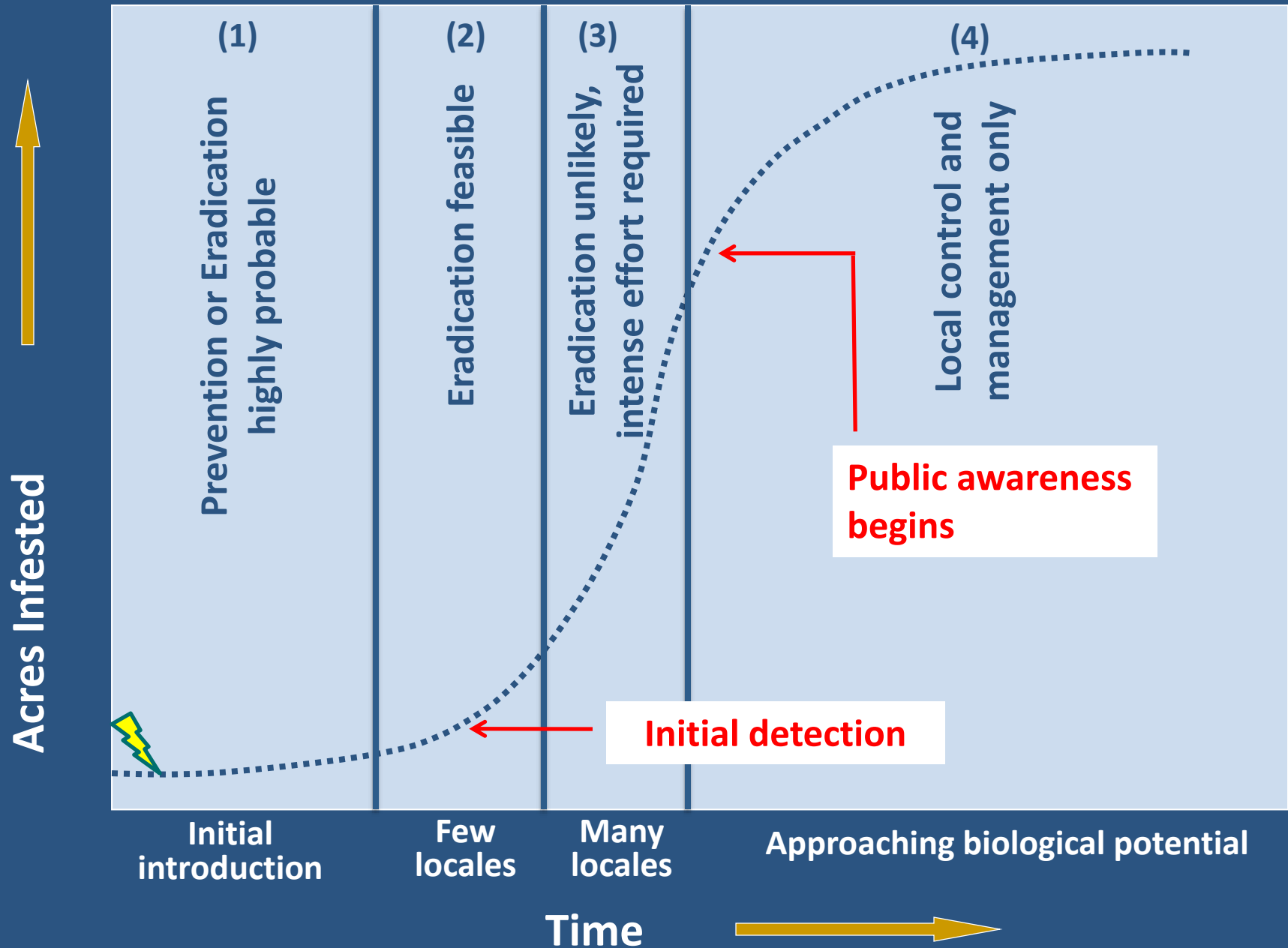
Characteristics of invasive plants

- ✿ Competitive
- ✿ Strong reproductive pressure
- ✿ Tolerant and adaptive
- ✿ Rapid response to disturbance
- ✿ Release from natural enemies
- ✿ Hybrid vigor

Weed Increase Over Time



Weed Increase Over Time



Site disturbance is a
key factor in the
establishment and
management of
invasive plants







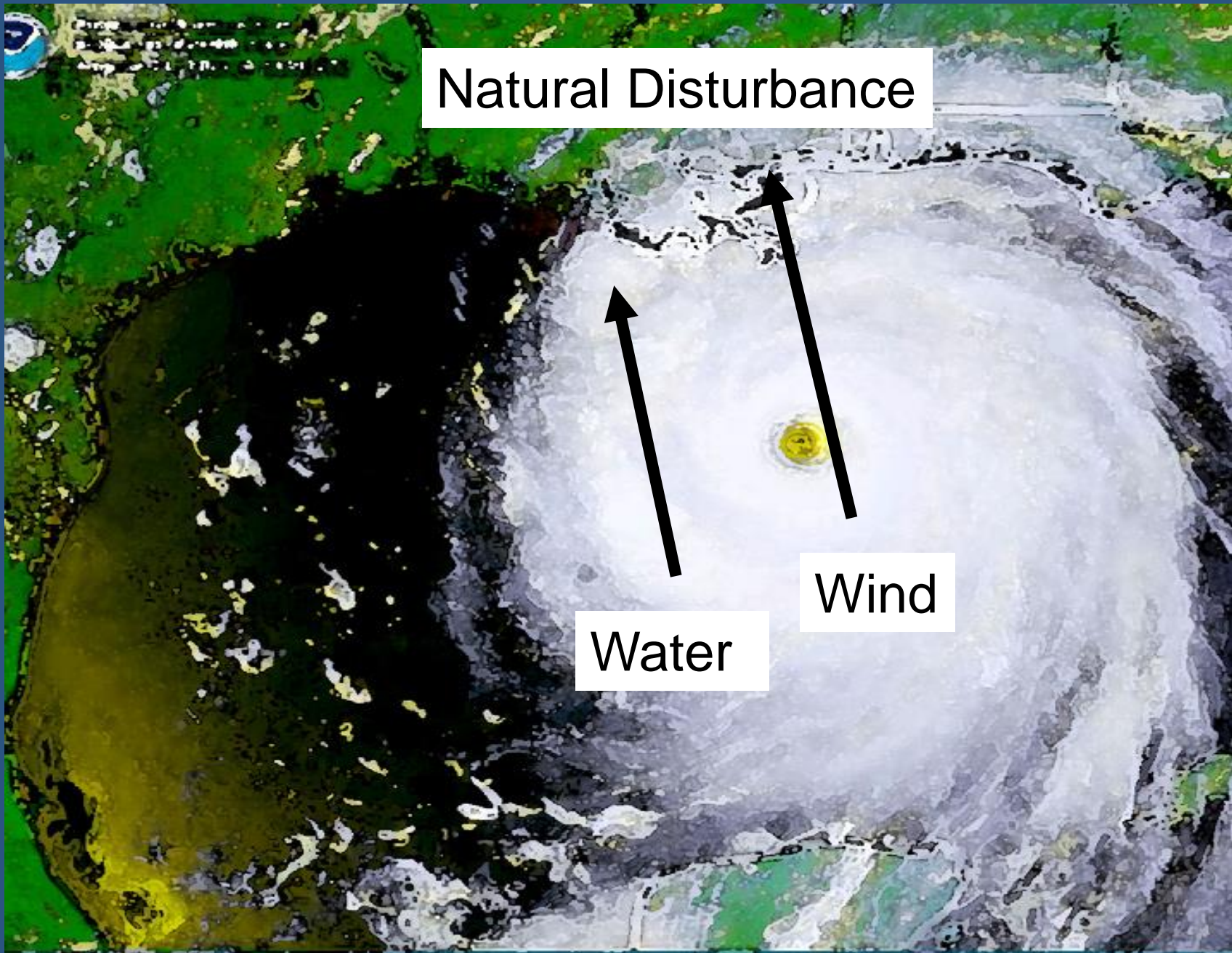
Right-of-ways are
common points of
introduction...



Natural Disturbance

Water

Wind





Slide by: Jim Mille, US Forest Service



Images by:
Alabama Wildlife &
Freshwater Fisheries

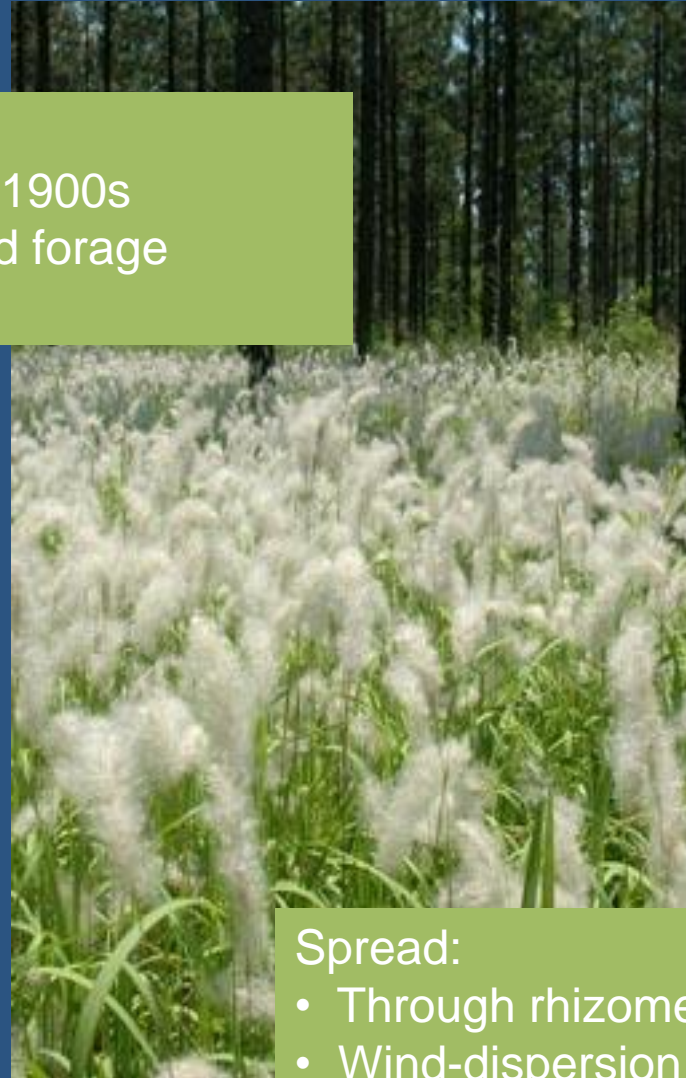
Review of common
invasive plants of
Alabama's coastal
forests

Cogon Grass

Imperata cylindrica

History:

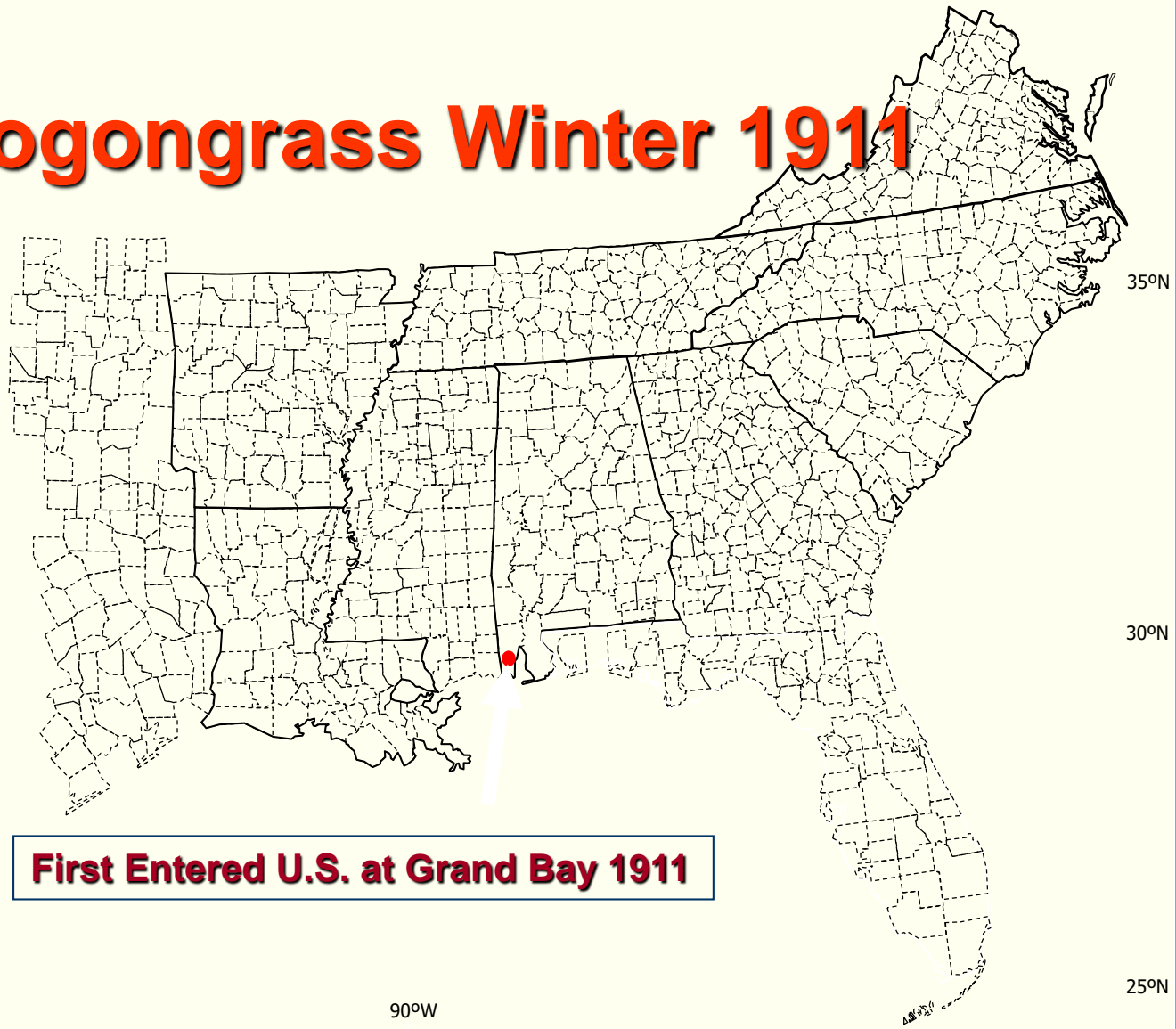
- Introduced from Southeast Asia in early 1900s
- Initially for soil stabilization and improved forage unrealized



Spread:

- Through rhizomes
- Wind-dispersion of seed
- Promoted by burning

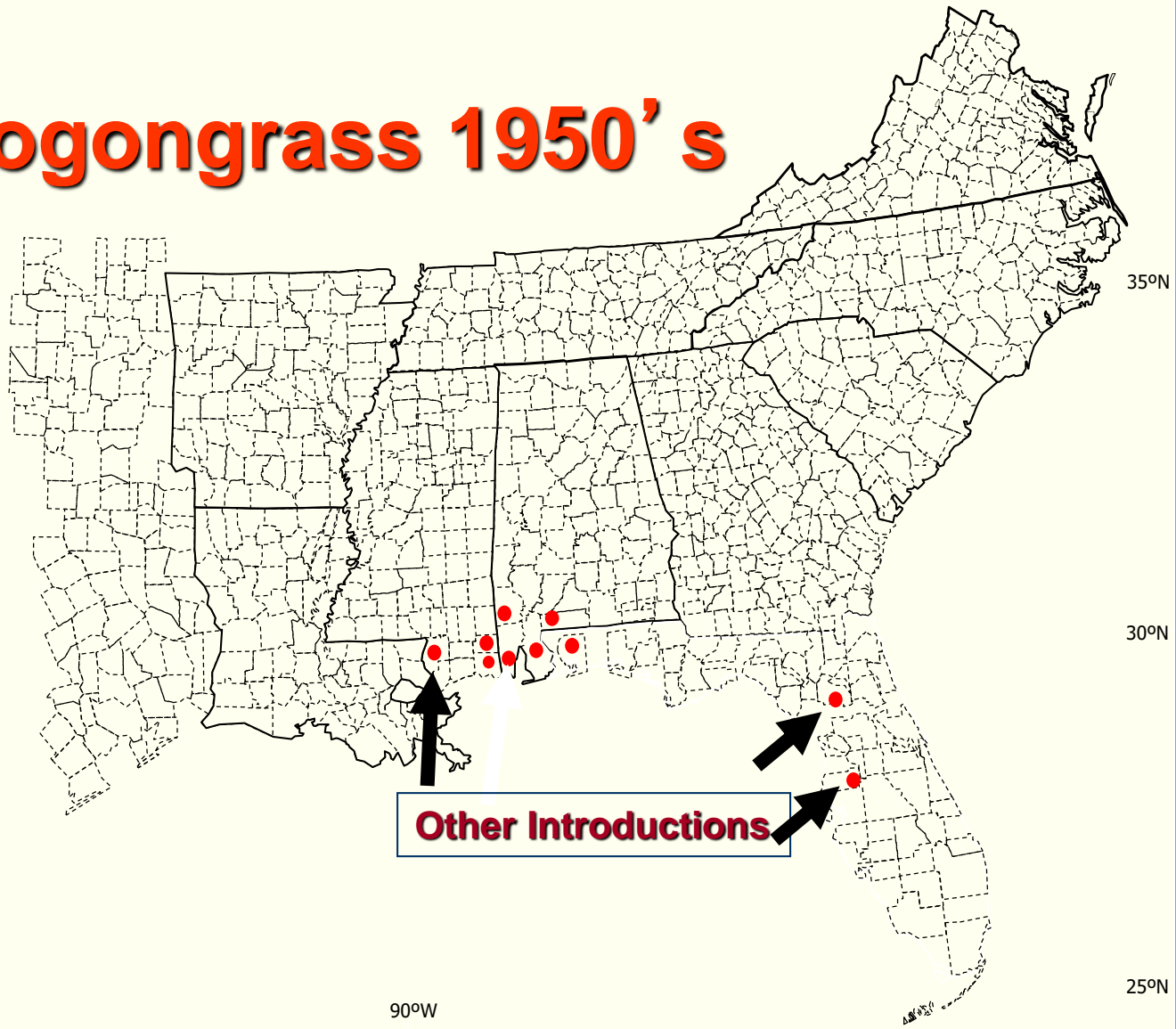
Cogongrass Winter 1911



First Entered U.S. at Grand Bay 1911

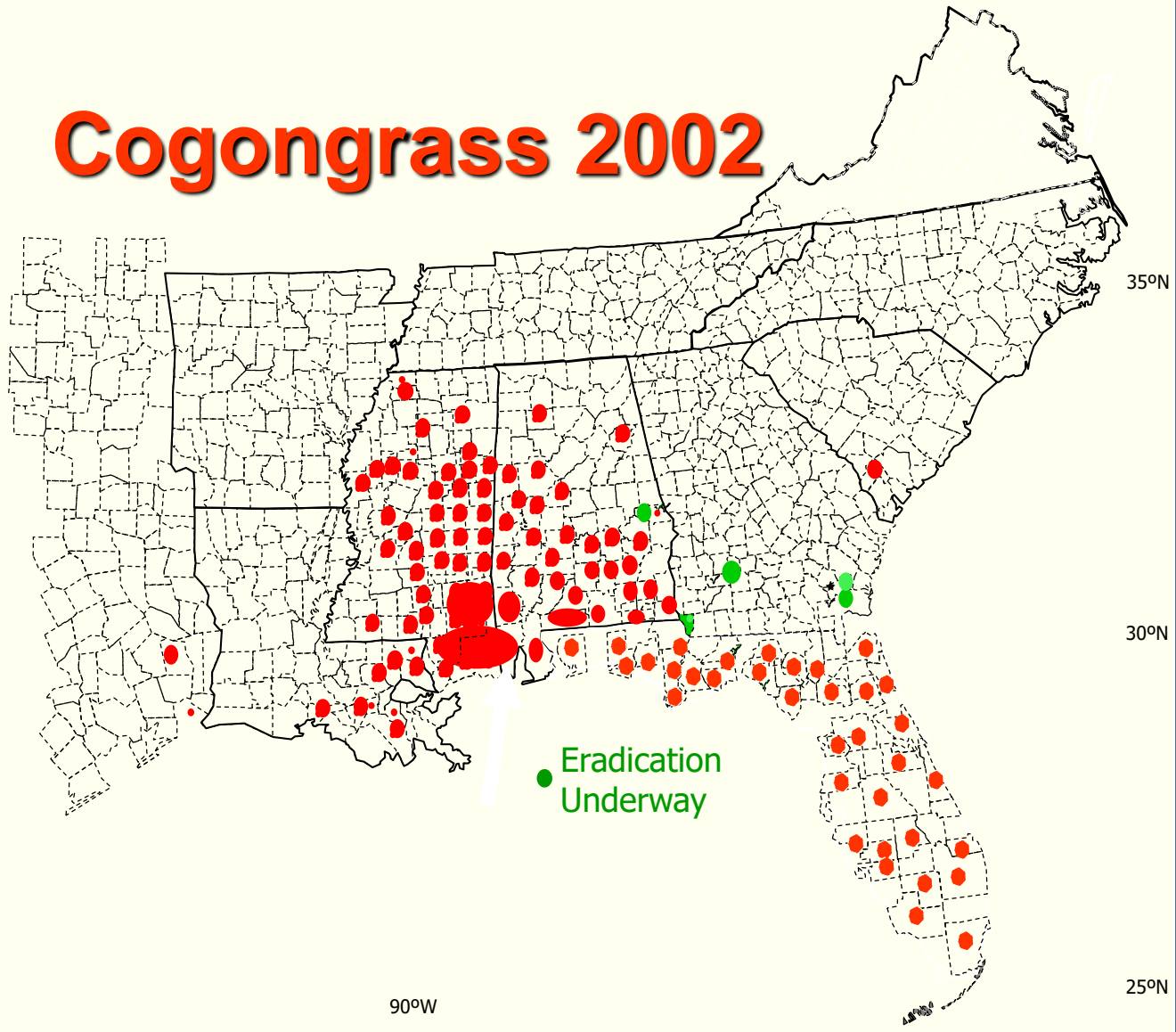
Slide by: Jim Miller, US Forest Service

Cogongrass 1950' s



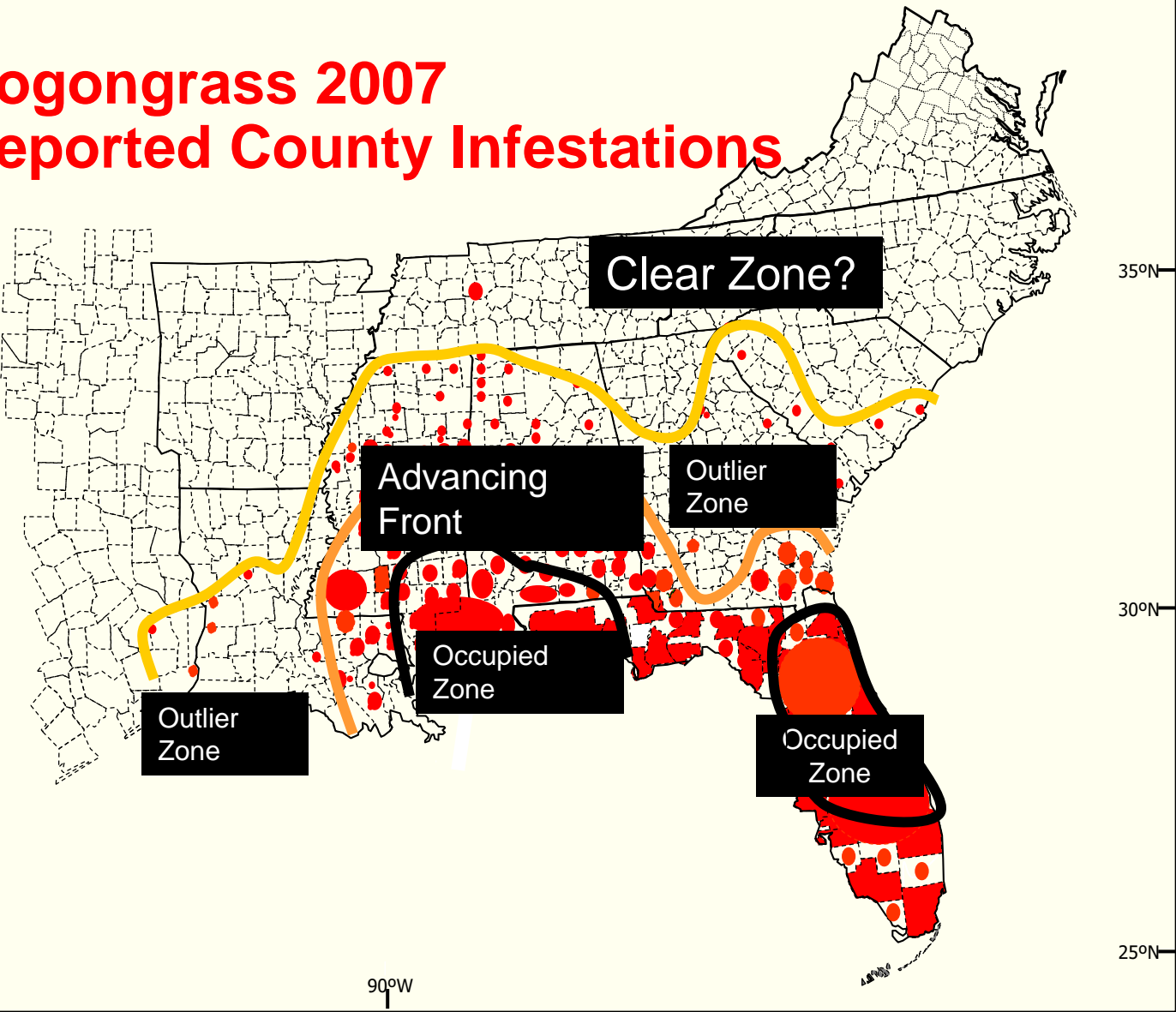
Slide by: Jim Miller, US Forest Service

Cogongrass 2002

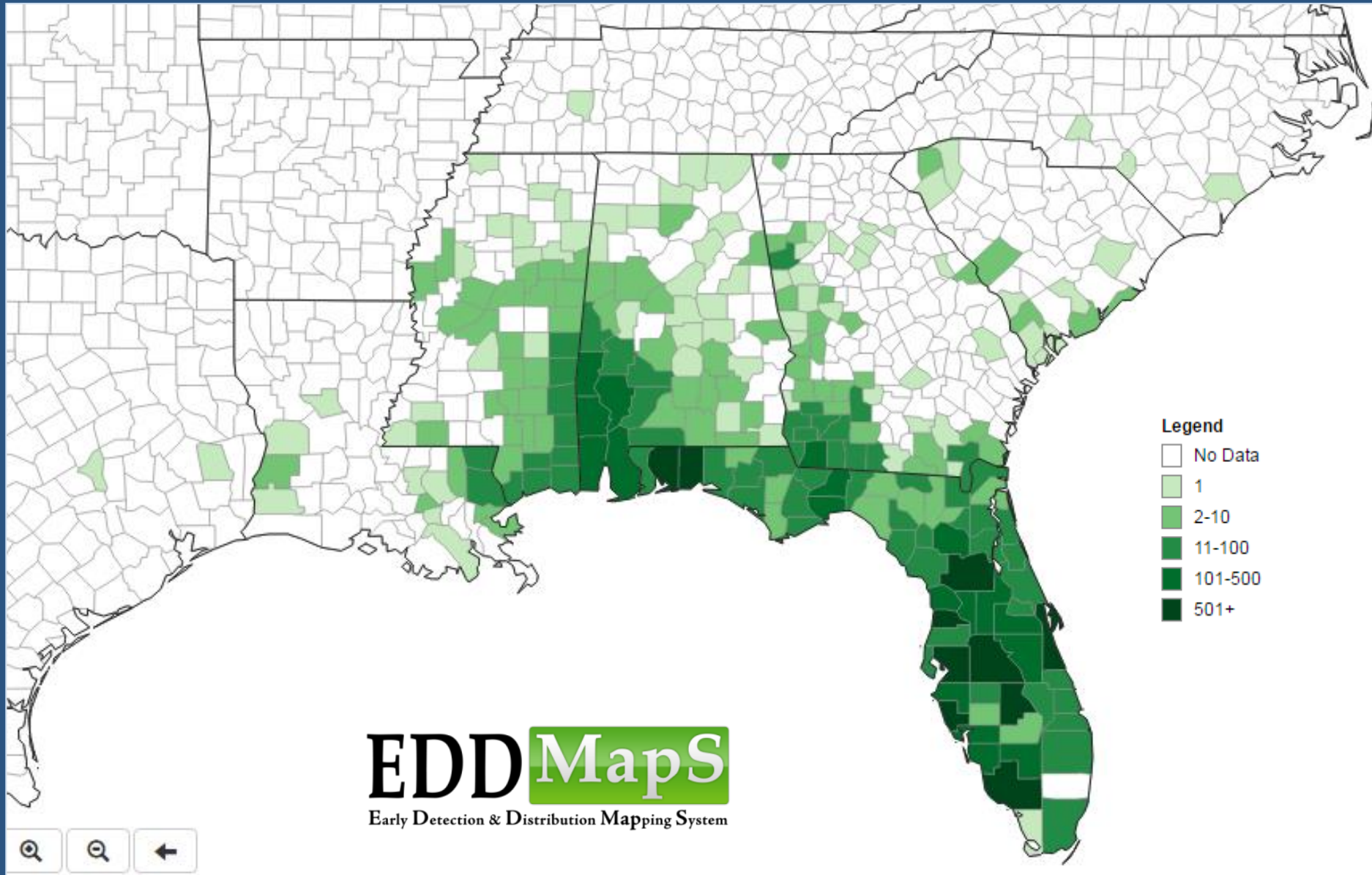


Slide by: Jim Miller, US Forest Service

Cogongrass 2007 Reported County Infestations



Cogongrass



Cogongrass seed dispersal

- ✿ wind
- ✿ vehicles
- ✿ equipment
- ✿ clothing
- ✿ agronomic products



In Fallow Sites, Pastures, and Hay Fields It Can Dominate



Slide by: Jim Miller, US Forest



©2008 Penny Sanford Fike

Identification



- Leaves rise from the base 1 -6' long



- Off-center mid-rib

- Minutely-sharply serrated edges





NJL

Reddish tan color in the winter



- ✿ Showy white flowers
- ✿ 2-8 inches long
- ✿ Blooms in the spring



NJL

Just-opened cogongrass flowers are often purple.



Rhizomes

- ✿ Very sharp points
- ✿ Segmented
- ✿ Papery scales
- ✿ Dense and matted
- ✿ > 50% of plant



Root tips are sharply pointed



UGA3970057

Stems are not apparent as they are hidden by overlapping leaf sheaths



Control Options

Cogon Grass	
Timing	Spring - May <ul style="list-style-type: none">• Burn or mow to remove last year's thatch• Spray when grass 12" long and before flowering Fall - September – Most effective time
Application Method	Foliar
Herbicide	Glyphosate or Imazapyr
Forested areas (hardwoods present)	5-7% glyphosate
Open fields (no trees present)	1% imazapyr

Tallowtree or Popcorn tree

(*Triadica sebifera*)

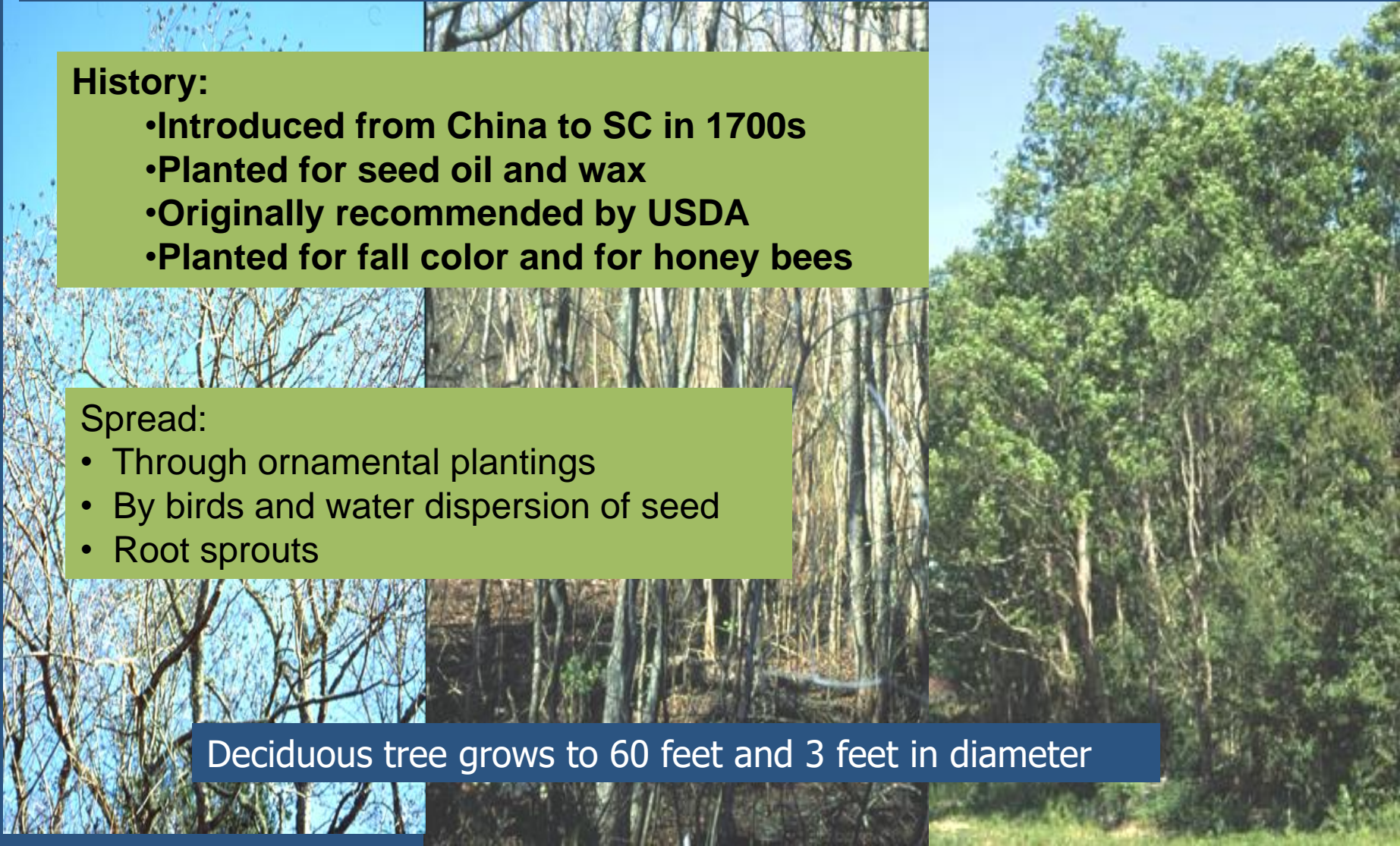
History:

- Introduced from China to SC in 1700s
- Planted for seed oil and wax
- Originally recommended by USDA
- Planted for fall color and for honey bees

Spread:

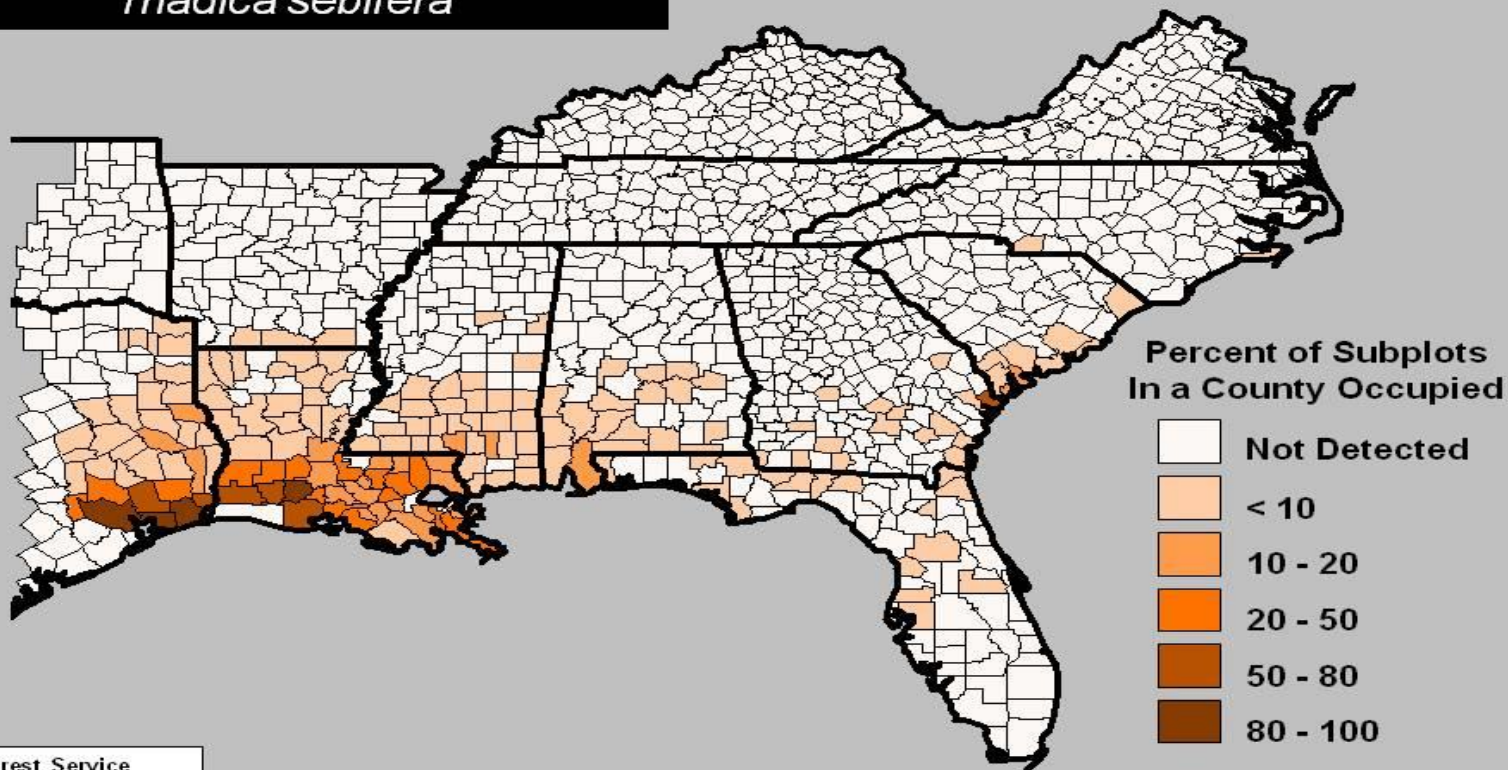
- Through ornamental plantings
- By birds and water dispersion of seed
- Root sprouts

Deciduous tree grows to 60 feet and 3 feet in diameter



Tallowtree, Popcorn tree

Triadica sebifera



USDA Forest Service
SRS FIA database March 2008
Miller and Chambliss, Auburn

Identification

- Leaves are alternate
- Wide ovate or deltoid leaf shape
- Leaves 2-3 inches long and 1.5-2.5 inches wide
- Dark green with light green mid-rib and lateral veins



©2007 Will Cook



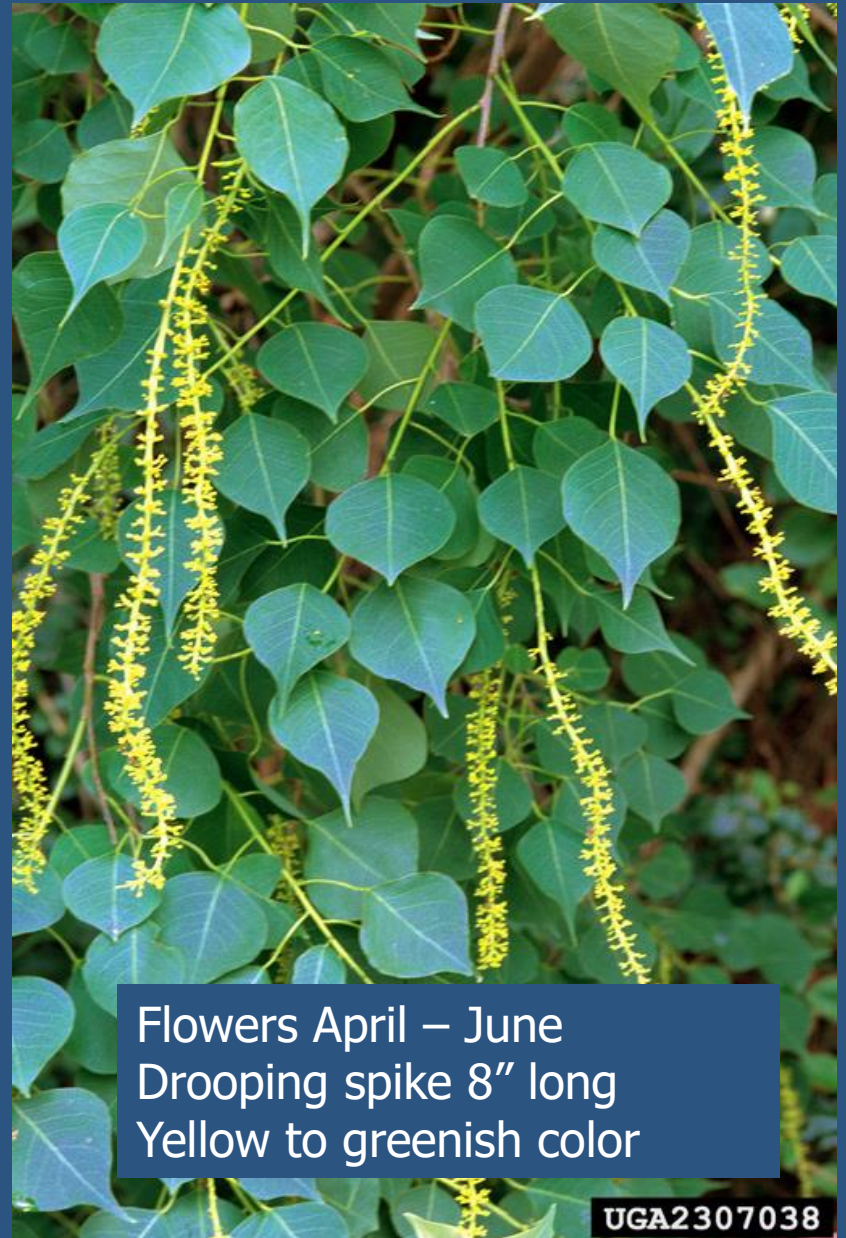
School of Renewable Natural Resources
LSU AgCenter
2003 -- Adam A. Agosta

Tallowtree or Popcorn tree



Bright red fall color

UGA0016234



Flowers April – June
Drooping spike 8" long
Yellow to greenish color

UGA2307038

Tallowtree or Popcorn tree




- Fruits August – September
- Small terminal clusters of 3-5 lobed capsules
- Dark green in summer, becoming black and splitting to reveal 3 white-wax coated seeds

A close-up photograph of a tree trunk showing its bark. The bark is a light gray color and has a highly textured, fissured appearance with deep, vertical grooves and smaller horizontal cracks. Several thin, brown, woody stems or vines are wrapped around the trunk, crisscrossing in various directions. The background is dark and out of focus, showing some green leaves on the left and right sides.

Gray fissured bark

Control Options

Chinese Tallow	
Timing	Foliar – May-September Cut-Stump – Year round (expect March/April) Stem Injection – Year round (expect March/April)
Application Methods/Herbicides	
Large Trees	Cut-Stump or Stem Injection <ul style="list-style-type: none"> • Glyphosate or Triclopyr (water soluble)– 20% solution
Saplings	Basal spray or cut stump <ul style="list-style-type: none"> • Basal spray – Triclopyr - ester formulation (oil soluble) - 15% solution in labeled oil carrier • Cut stump - Glyphosate or Garlon 3A – 20% solution
Seedlings	Foliar <ul style="list-style-type: none"> • Triclopyr Ester Formulation – 2% solution • Imazapyr - .75% solution (only in fields) • Clearcast – 2% solution



Japanese Climbing Fern

Lygodium japonicum

History:

- Native to Asia and Australia
- Introduced from Japan in 1930s as an ornamental

Spread:

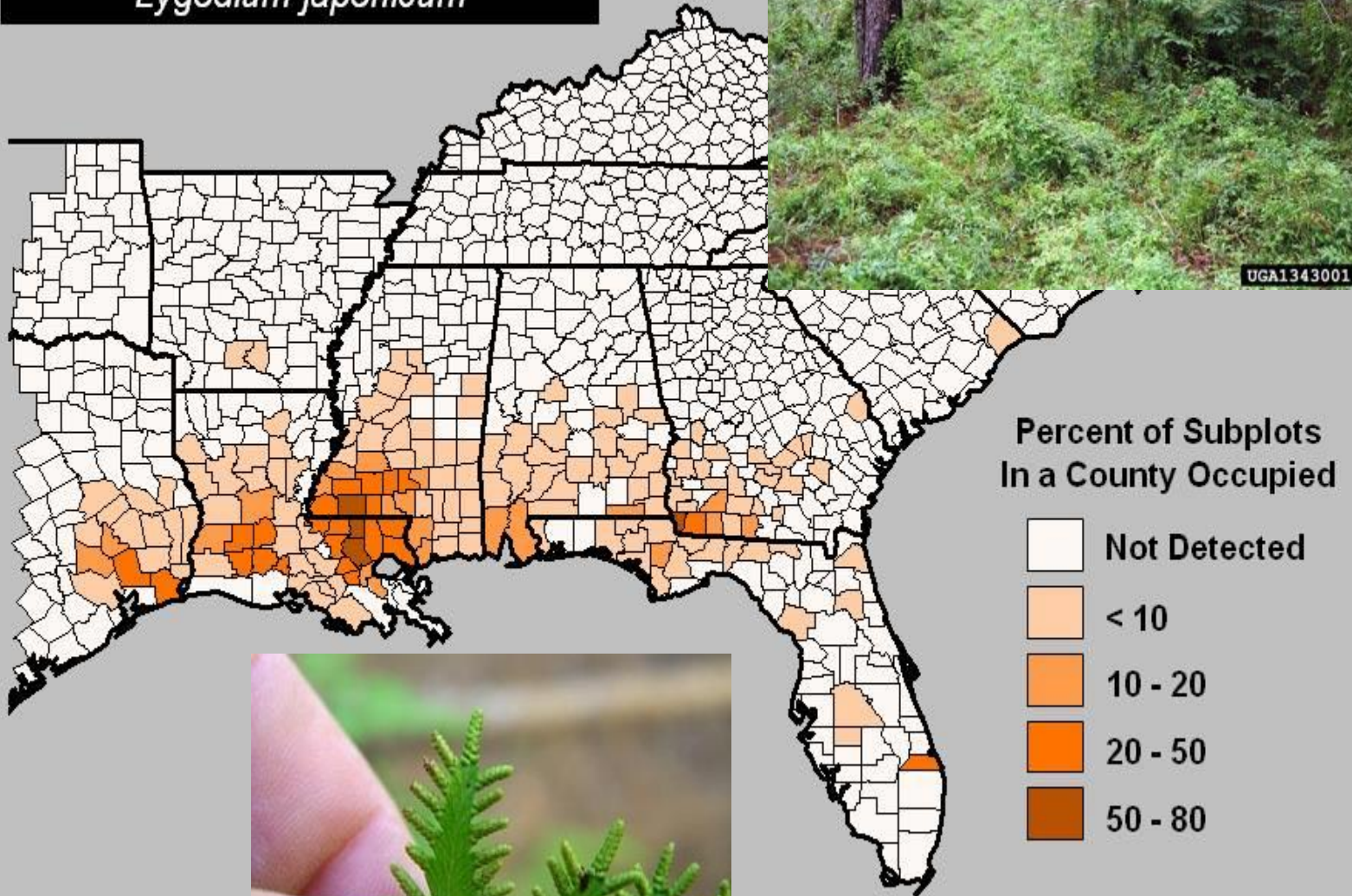
- Through rhizome colonizing roots
- Wind dispersion of spores

UGA0016175

UGA1264035

Japanese Climbing Fern

Lygodium japonicum



USDA Forest Service
SRS FIA database March 2008
Miller and Chambliss, Auburn

Slide by: Jim Miller, US Forest Service

Identification







UGA5078024

Pine Straw Production



Control Options

Japanese Climbing Fern	
Timing	June – September (before spores)
Application Methods	
Vines	Foliar <ul style="list-style-type: none">• Glyphosate - 4% solution• Thoroughly wet all leaves and avoid spraying non-target plants.

Chinese privet

Ligustrum vulgare L.

History:

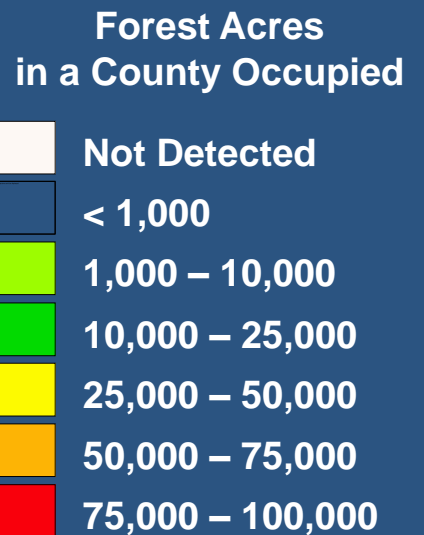
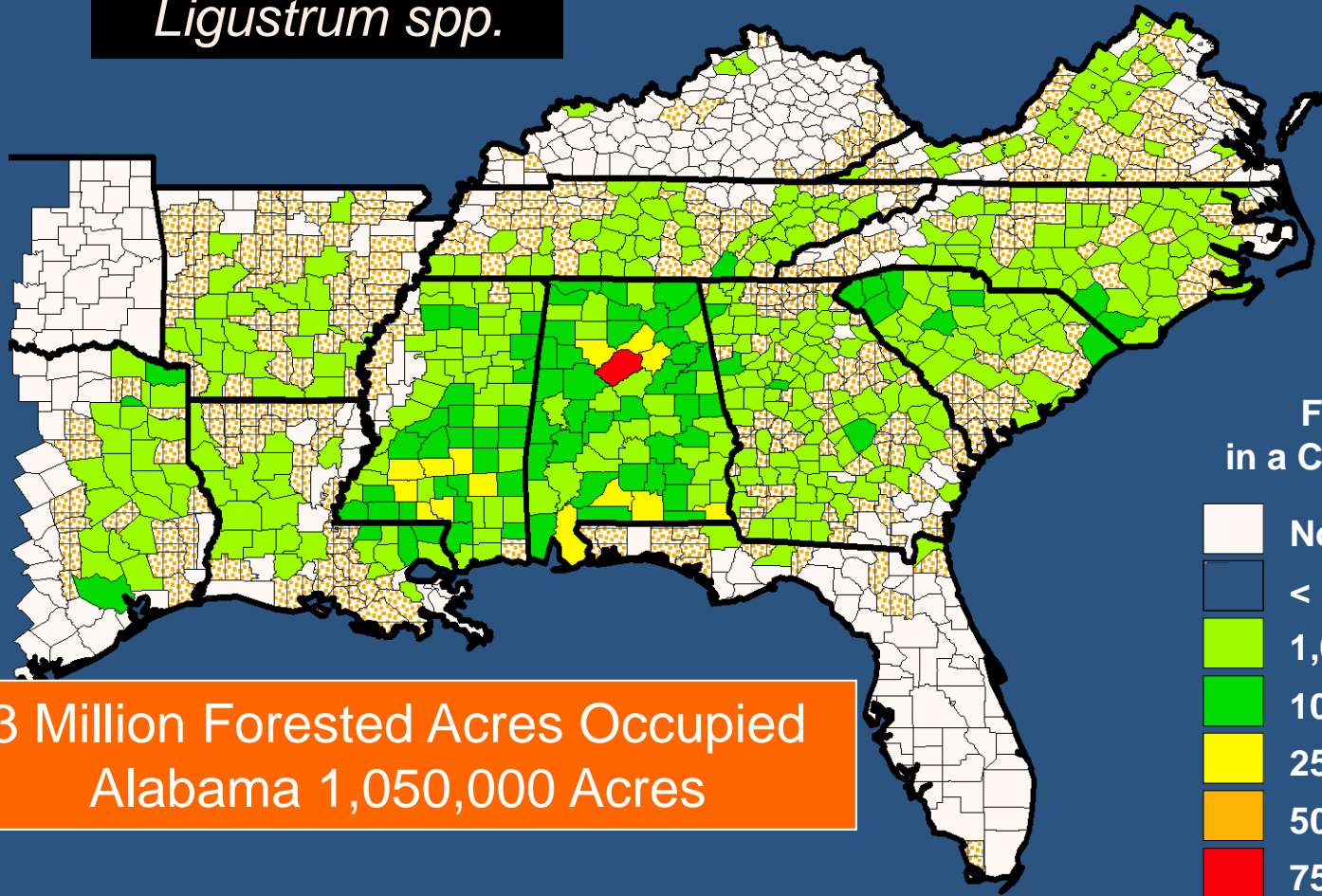
- Introduced from China, Japan, & Korea
- Introduced in mid 1800s
- Introduced as early southern ornamentals

Ecology:

- Semi evergreen thicket forming shrub
- Shade tolerant
- Grows to 30' tall
- One of the most widely occurring
- Very aggressive
- Occurs in:
 - Bottomlands forests
 - Fencerows and gaining access to fields and forests

Privet Species

Ligustrum spp.

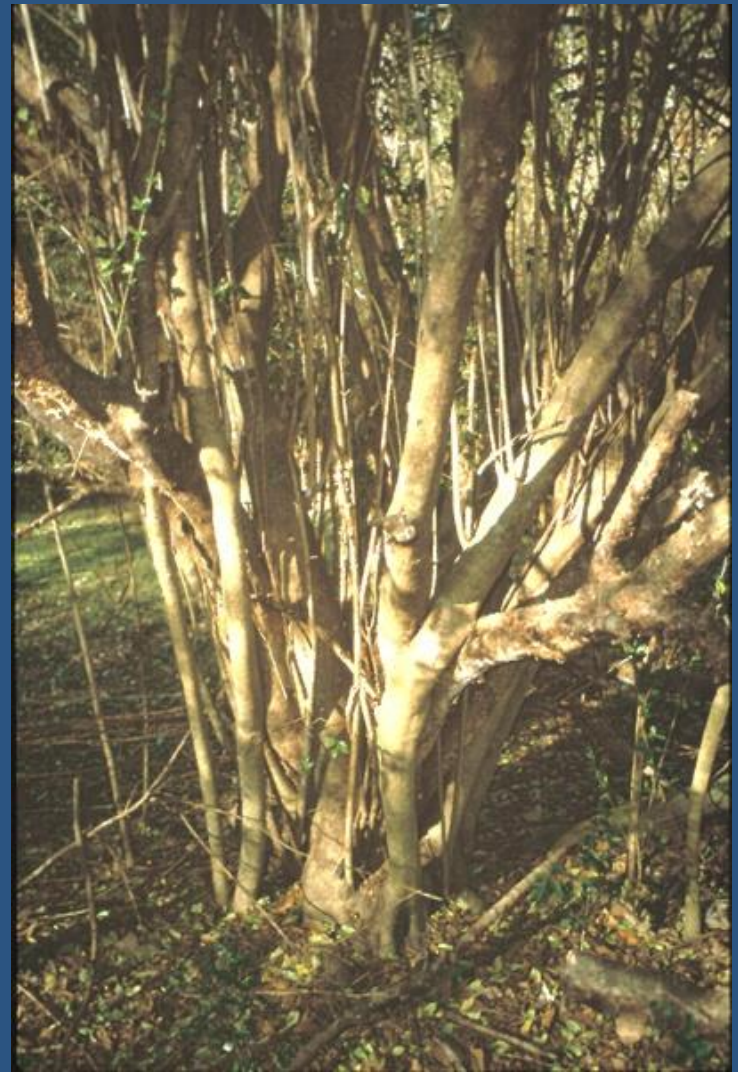


3 Million Forested Acres Occupied
Alabama 1,050,000 Acres

Identification



5344089



Typical height is 5 to 12 feet but can reach 30



- Leaves are evergreen to semi-evergreen
- Leaves are oppositely arranged along the stem at near right angles
- Leaves are oval in shape and .8 to 1.6 inches long
- Lustrous green above and pale green below



Flowers in April to June

Chinese, European, Glossy, and Japanese Privet



- **Seeds in July-March**
- **Green in summer and turning purple to almost black in winter**

Widely spread by bird and animal-dispersed seed

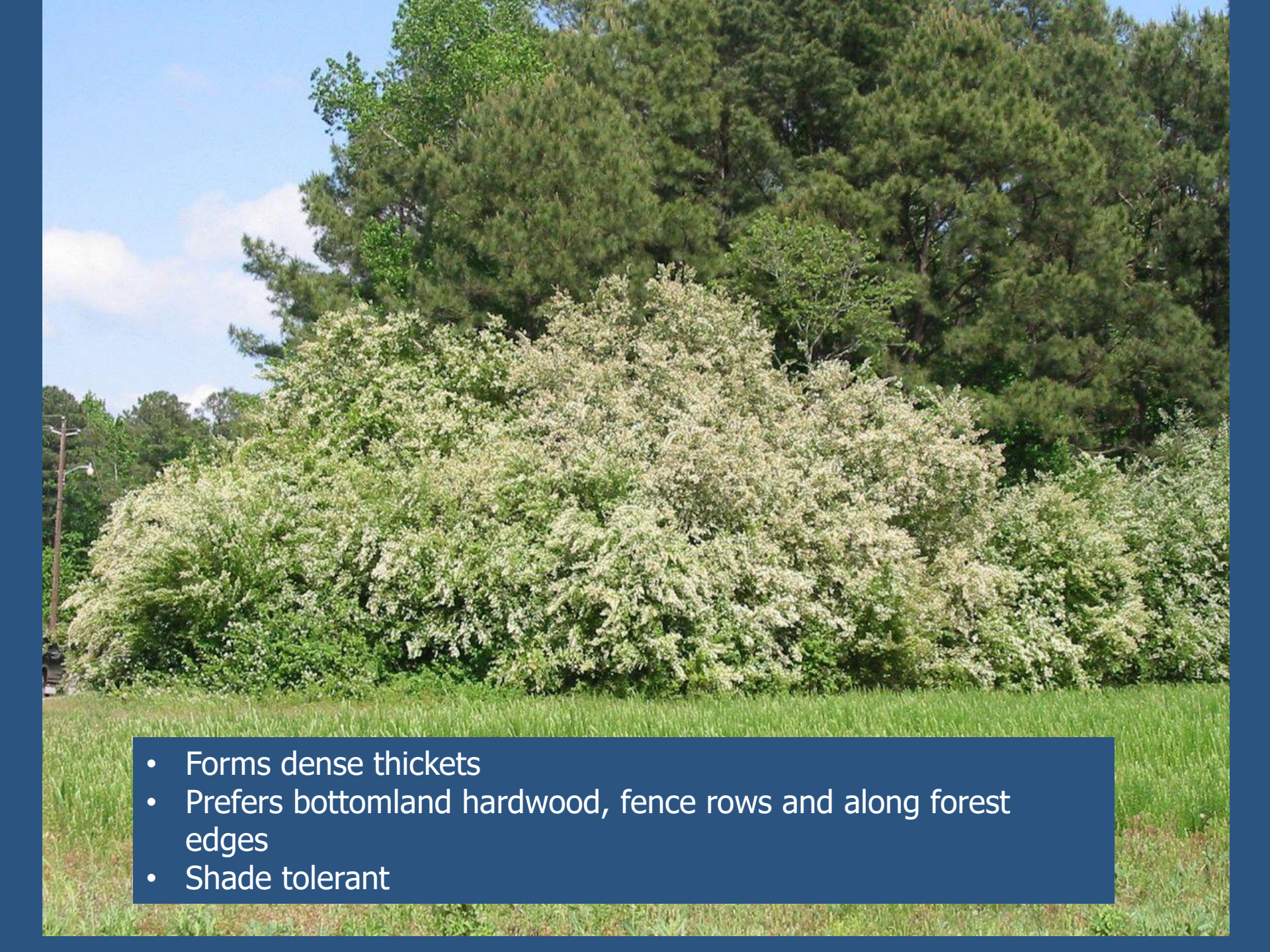


UGA2307081



- Long slender branching
- Short twigs project outward at near right angles
- Brownish-gray color
- Light dots or lenticels on bark





- Forms dense thickets
- Prefers bottomland hardwood, fence rows and along forest edges
- Shade tolerant



UGA5302027

Control Options

Chinese Privet	
Timing	Foliar – May-September Cut-Stump – Year round (expect March/April) Stem Injection – Year round (expect March/April)
Application Methods	
Cut stump	<ul style="list-style-type: none"> • Glyphosate or Triclopyr (water soluble) – 20% solution (wet tops and sides of stems)
Basal spray	<ul style="list-style-type: none"> • Triclopyr–ester formulation (oil) - 20% solution in labeled oil carrier (wet stems 12-15 inches, all stems)
Foliar	<ul style="list-style-type: none"> • Glyphosate – 3% solution • Imazapyr - 1% solution (only in fields)



Kudzu,

Pueraria montana

History:

- Introduced from Japan in early 1900s
- Introduced for erosion control and livestock feed

Spread:


- Wind, animal, and water dispersed seeds

Ecology:

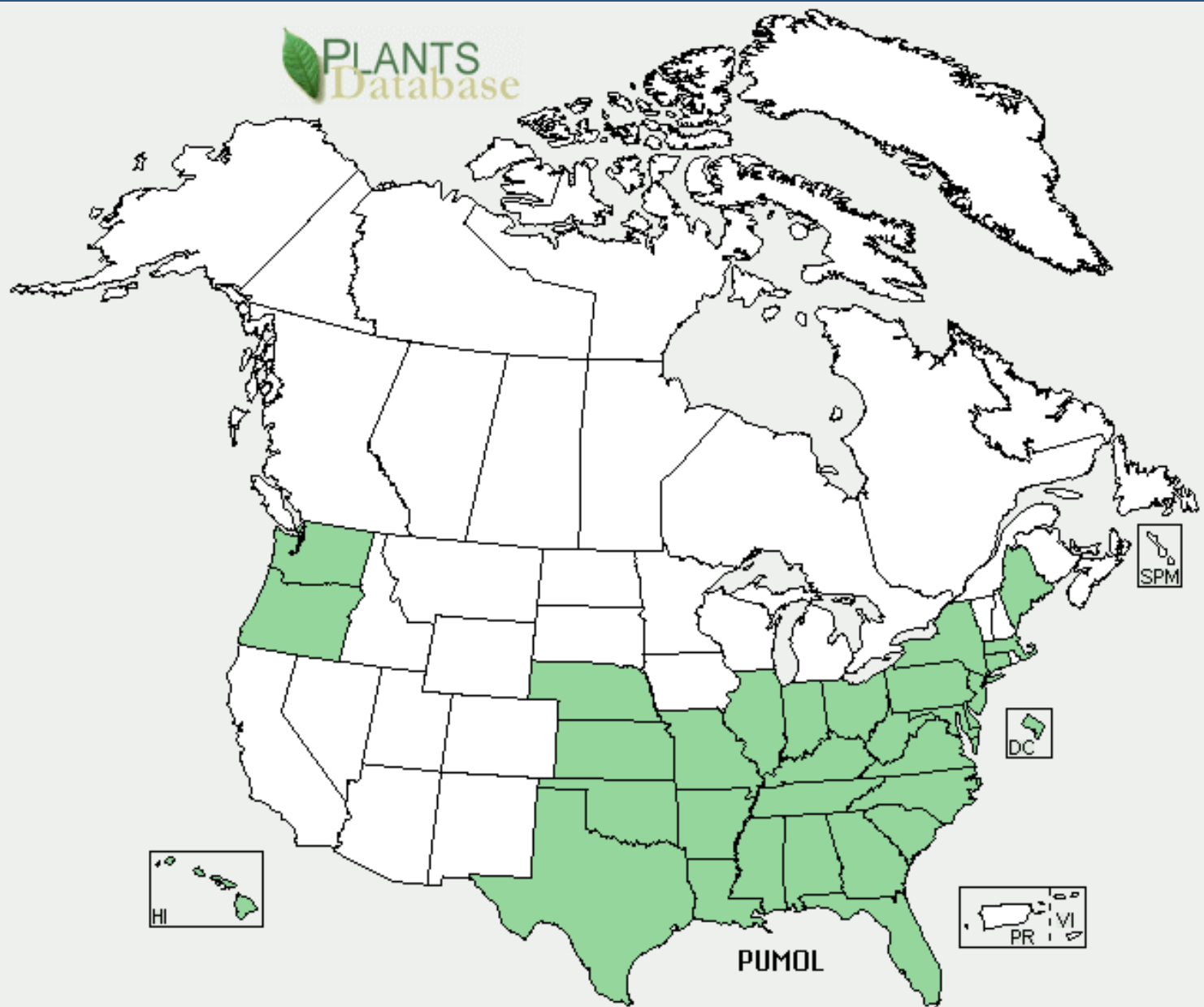
- Can reach height of 35-100'
- Roots can go 3-16' deep
- Occurs:
 - Along right-of-ways
 - Stream banks
 - Form mats over structures and trees



UGA3037001



UGA0581050



Identification



Deciduous vine that is mat-forming



- Leaves are alternate, pinnately compound and usually slightly lobed

UGA2307160



Flowers in June – September

Flowers are 2-12" long and have petals that are lavender to wine colored



- Fruits in September to January
- Fruit are clusters of flattened legume pods
- Pods bulge around the seeds



Control Options

Kudzu	
Timing	June - October
Application Methods	
Foliar (sensitive sites)	<ul style="list-style-type: none">• Transline (clopyralid) - .5% solution• <u>Partial control</u> with glyphosate – 4% solution
Foliar (soil active)	<ul style="list-style-type: none">• Tordon 101 – 3% solution

Invasive Plants on the Horizon

Sawtooth Oak,
Quercus acutissima

Watch list

Origin: China

Habitat: Highly adaptable but performs best on sunny ridge tops and in deep loamy soil

Possible Threat:
Produce lots of acorns and seedlings at a young age and out grow native oaks

NOT LISTED AS AN
INVASIVE in AL....YET



Sawtooth Oak, *Quercus acutissima*

- Have lower protein, fat and carbohydrates than natives
- Only produce acorns in Sep/Oct.
- Native alternatives:
 - Swamp chestnut oak, White oak, Shumard oak, nuttall oak

CHEMICAL ANALYSIS OF SAWTOOTH OAKS COMPARED WITH NATIVE SPECIES

Species	Protein	Fat	N-Free	Crude	Ash	Moisture
Sawtooth oak ¹	2.69	1.68	47.96	4.02	1.42	42.23
Sawtooth oak ²	3.63	1.94	47.3	7.11	1.74	38.38
Sawtooth oak ³	3	1.4	48.2	6.5	1.4	45.4
White oak ⁴	6.3	5.6	69.72	15.54	2.72	
Post oak	5.94	6.33	70.01	14.92	2.54	
Live oak	6.26	6.61	70.2	14.06	2.92	
Southern red oak	5.41	14.85	59.03	18	2.69	
Bluejack oak	6.81	20.46	55.2	15.24	2.18	
Blackjack oak	6.56	15.5	55.31	20.25	2.38	
Water oak	4.46	23.18	55.33	15.45	1.57	
Willow oak	4.74	20.51	55.08	17.75	3.88	

Chinese elm, lacebark elm (*Ulmus parvifolia*)

Watch list B



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www.carolinanature.com



Nancy Loewenstein, Auburn University

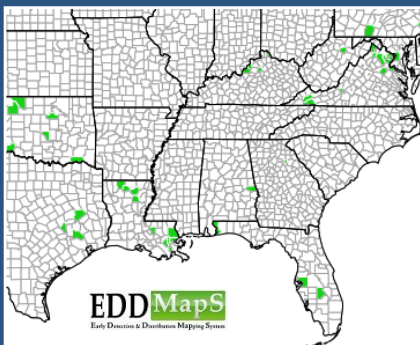
distinctive bark



flowers and
fruits in the
fall

Franklin Bonner, USFS, www.bugwood.org

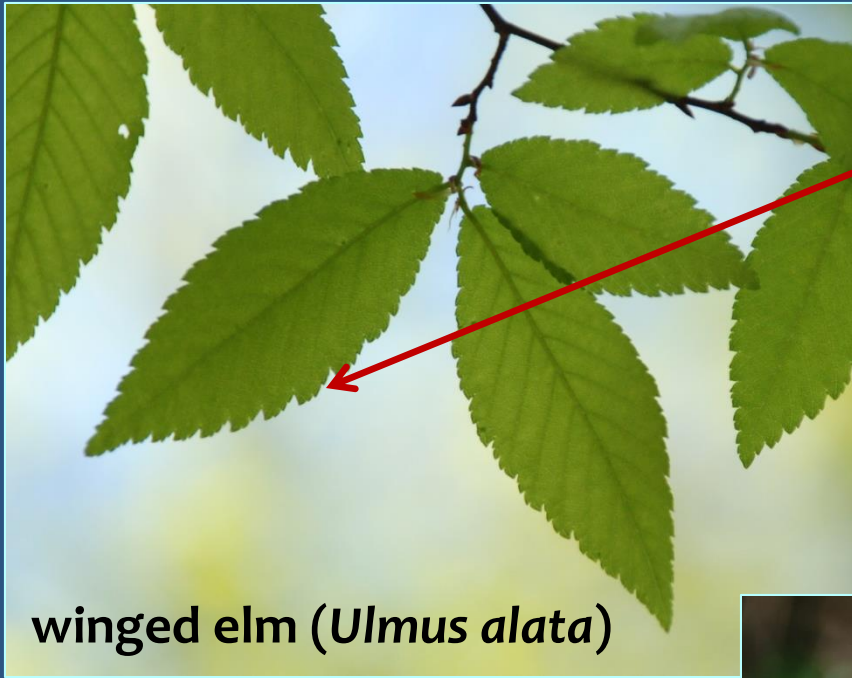
5423972



EDD MapS
Early Detection & Diagnostics Mapping System

serrate margin,
base may be
slightly unequal

no corky ridges on
stems



doubly serrate margin

winged elm (*Ulmus alata*)

singly serrate margin



Chinese elm

loquat (*Eriobotrya japonica*)



5362

Howard F. Schwartz, Colorado State University, Bugwood.org

- Evergreen shrub to small tree
- Leaves dark green, glossy, 'wrinkled', with brownish fuzz on underside
- Fragrant, off-white flowers
- 2 inch yellowish orange fruit (edible)



- Showing up in wooded areas in south AL
- Fairly cold tolerant (plant to 8-10 F; flowers and fruit to 27 F)



5470611

Rebekah D. Wallace, University of Georgia, Bugwood.org

yew podocarpus, Buddist pine, yew pine ... (*Podocarpus* spp.)



- Evergreen shrub to small tree
- Leaves long and narrow, may bunch at ends of branches
- Berry-like seed cones
- USDA zones 8-10
- Showing up on wooded sites in south Alabama



Forest and Kim Starr, Starr Environmental, Bugwood.org

Callery pear 'Bradford'

(*Pyrus calleryana*)

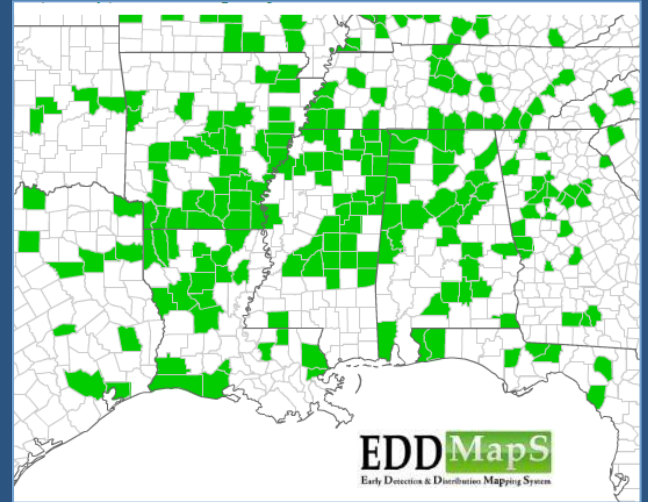


Cut Stump: Glyphosate 25-50% solution

NJL



NJL

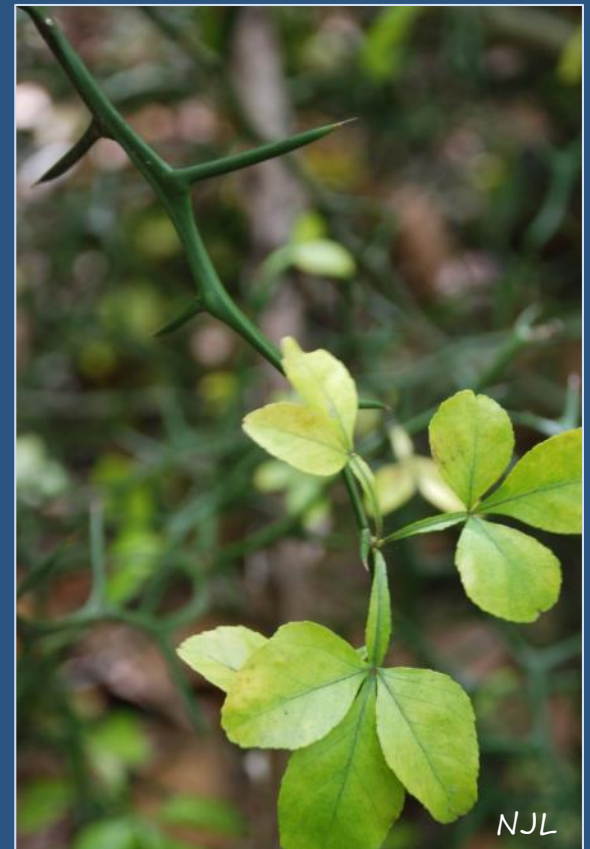
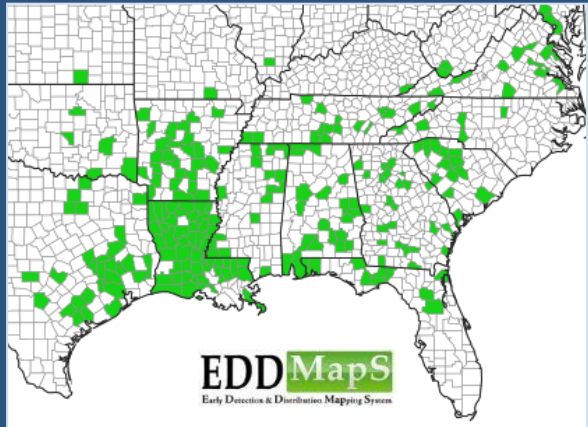


NJL



NJL

trifoliate orange (*Citrus trifoliata*)

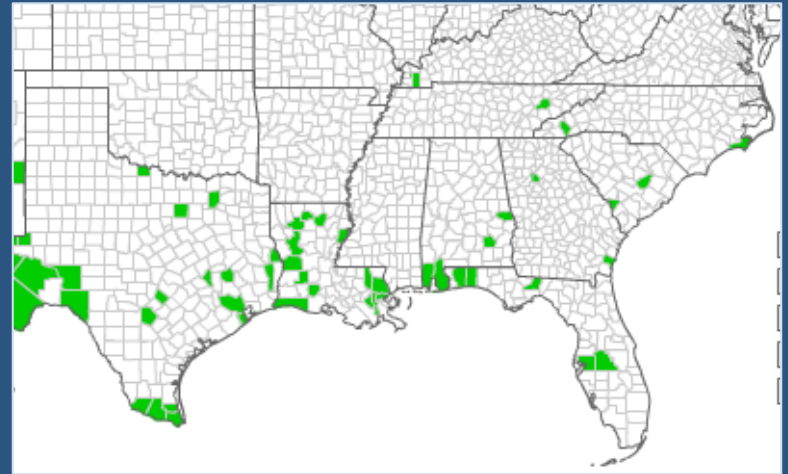




NJL

pampas grass

(*Cortaderia selloana*)



pampas grass (*Cortaderia selloana*)



NJL



Gena Todia

Gena Todia



Invasive trees

- ✿ tree-of-heaven (*Ailanthus altissima*)
- ✿ silk tree (*Albizia julibrissin*)
- ✿ camphor tree (*Cinnamomum camphora*)
- ✿ Chinaberry (*Melia azedarach*)
- ✿ princess tree (*Paulownia tomentosa*)
- ✿ trifoliolate orange (*Poncirus trifoliata*)
- ✿ ‘Bradford’ pear (*Pyrus calleryana*)
- ✿ sawtooth oak (*Quercus acutissima*)
- ✿ Chinese tallow tree (*Triadica sebifera*)
- ✿ tungoil tree (*Vernicia fordii*)
- ✿ Chinese parasol tree (*Firmiana simplex*)



Invasive shrubs

- ✿ thorny olive (*Elaeagnus pungens*)
- ✿ autumn olive (*Elaeagnus umbellata*)
- ✿ bicolor lespedeza (*Lespedeza bicolor*)
- ✿ Chinese privet (*Ligustrum sinense*)
- ✿ glossy and Japanese privet (*L. lucidum*,
L. japonicum)
- ✿ bush honeysuckles (*Lonicera maackii*, etc.)
- ✿ leatherleaf mahonia (*Mahonia bealei*)
- ✿ nandina (*Nandina domestica*)
- ✿ coralberry (*Ardesia crenata*)
- ✿ multiflora rose (*Rosa multiflora*)
- ✿ tropical soda apple (*Solanum viarum*)

Resources

Alabama Invasive Plant Council (ALIPC)

<http://www.se-eppc.org/alabama/>

Southeast Invasive Plant Council

<http://www.se-eppc.org/index.cfm>

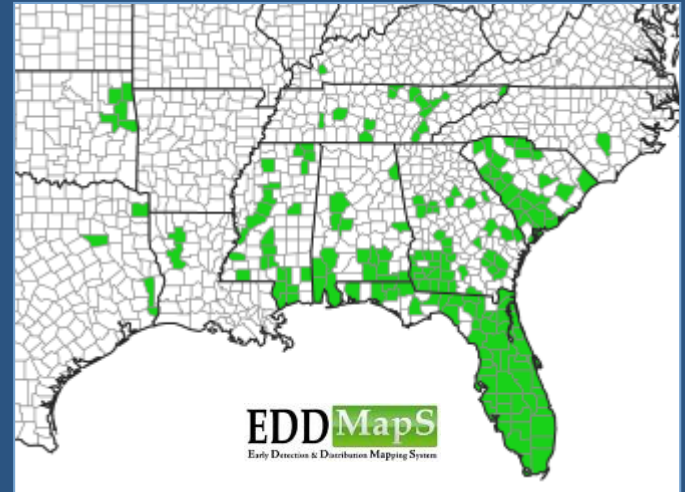
Invasive in Southern Forests

https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs062/

Resources

Invasive in Southern Forests App





tropical soda apple
(TSA)



tropical soda apple

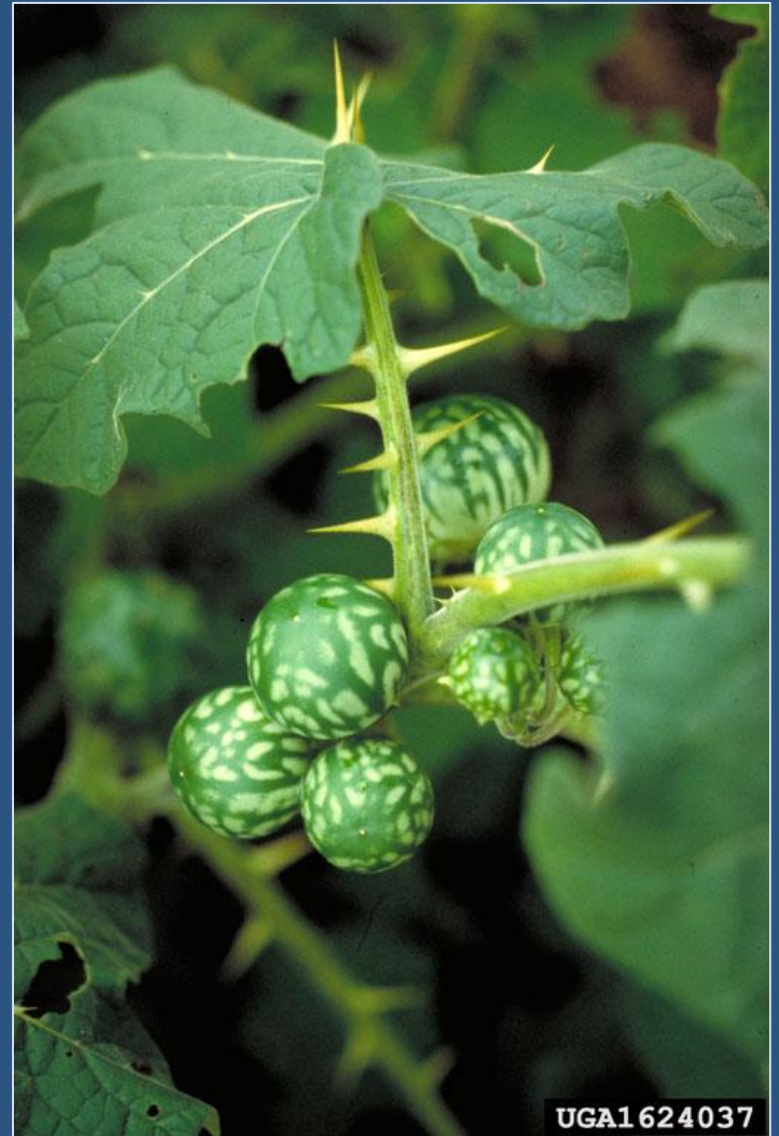


- broad, shallowly lobed
- densely pubescent, sticky (both sides)
- large prickles on stem and major leaf veins



NJL

- Fruit (2-3.5 cm) occur in the leaf axils
- Mottled white and green when immature, turning yellow when mature



UGA1624037



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Southeast Invasive Plant Council

<http://www.se-eppc.org/index.cfm>

Invasive in Southern Forests

https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs062/

Resources

Invasive in Southern Forests App





Beau Brodbeck
Alabama Cooperative Extension System
Tel: 251-937-7176
Email: brodbam@auburn.edu

www.aces.edu