

1

Numbers across the Southeast

Average number of grass or grass-like non-natives and/or invasives per state= 106

Category	Number of Species	Number of Records
Grass or Grasslike	109	48,576

2

Top ten in EDDMapS (SE)

(number of reports)

- ◆ cogongrass (*Imperata cylindrica*) ★
- ◆ Japanese stiltgrass (*Microstegium vimineum*) ★
- ◆ torpedo grass (*Panicum repens*)
- ◆ Johnson grass (*Sorghum halepense*)
- ◆ tall fescue (*Lolium arundinaceum*)
- ◆ Bermuda grass (*Cynodon dactylon*)
- ◆ giant reed (*Arundo donax*)
- ◆ Chinese silvergrass (*Miscanthus sinensis*)
- ◆ weeping lovegrass (*Eragrostis curvula*)
- ◆ golden bamboo (*Phyllostachys aurea*) ★

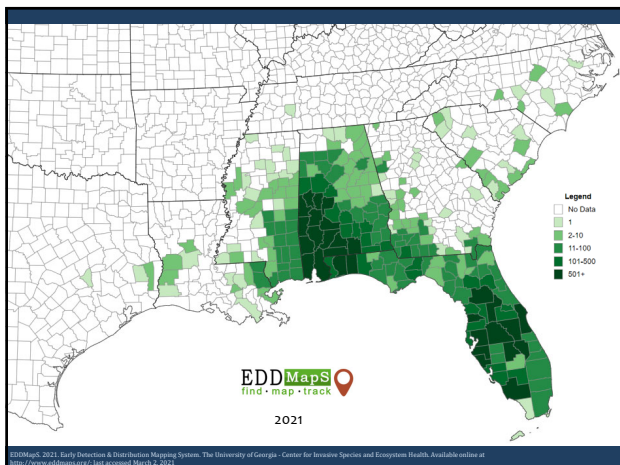
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cogongrass

(*Imperata cylindrica*)

- One of top 10 weeds in the world
- Federal Noxious Weed
- Fire hazard
- Little wildlife value
- Inhibits growth of other plants
- Spreads easily ... wind and equipment
- Difficult to control once established

4



5

cogongrass



Federal Noxious Weed

- ◆ **Leaves**
 - Yellowish green
 - 0.5-1 inch wide, serrated edge
 - No obvious stem
 - Dense winter thatch
- ◆ **Flowers**
 - 2-8 inches, bright white
 - Wind-dispersed seed
 - Spring (March-June)
- ◆ **Rhizomes**
 - Very sharp points
 - Segmented with papery scales
 - >50% of plant
- ◆ **Form**
 - Often in circular patches
 - Dense growth (not a bunch grass)
 - 1-5 feet tall

6

Off set white mid-rib

- not necessarily a good feature to key in on
- not always seen on cogongrass
- common feature of many grasses

7

Morphological differences in cogongrass ...




... above and below ground.

8




Just-opened cogongrass flowers are often more purple than white.

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~ two weeks

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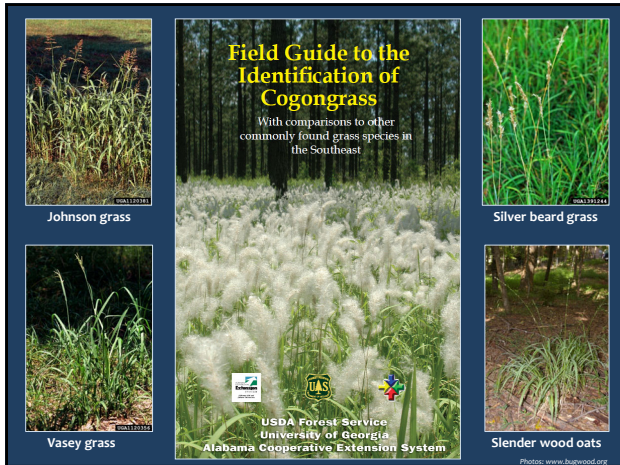
- “cogongrass has >3000 seeds per plant”
- about 60 spikelets per inch of flower panicle, so could have 150-350 spikelets per flower

11



Cogongrass look-alikes

12



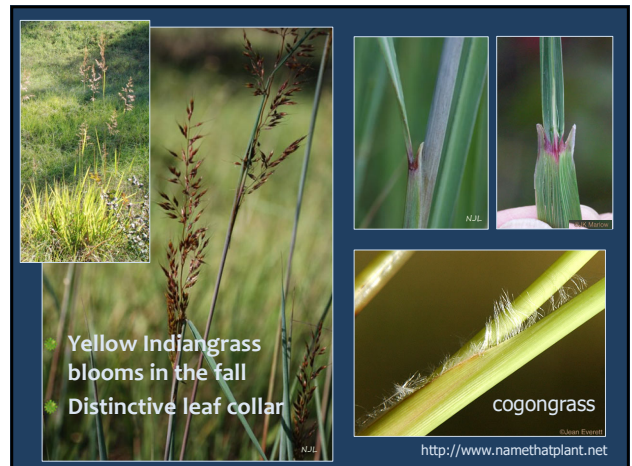
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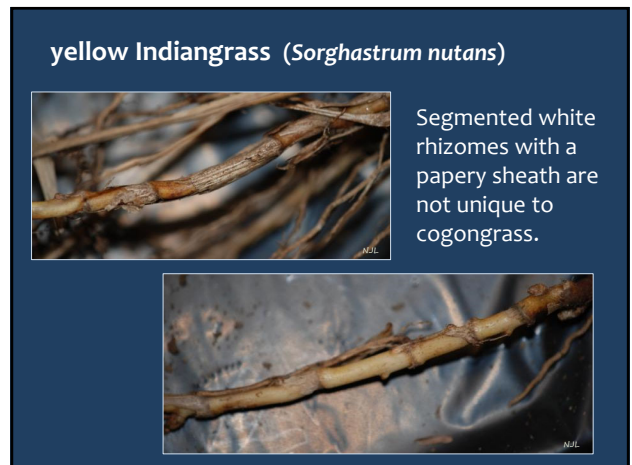
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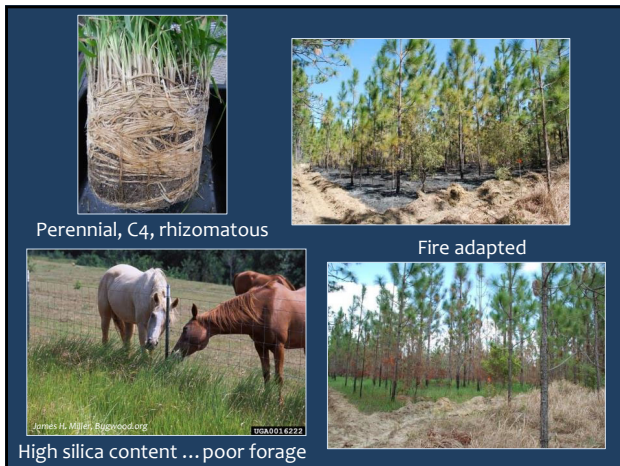
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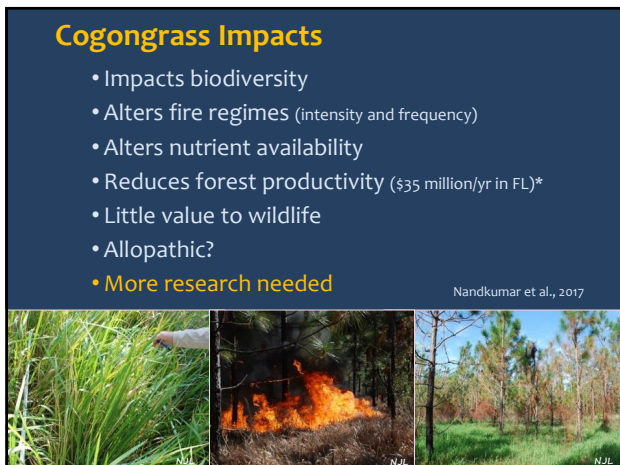
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21



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23



24

Rhizomes - cogongrass has a LOT of them



25

There are buds at each node.



26

Cogongrass spread via rhizomes

- On equipment
- Grading
- Ditch maintenance
- Fill dirt



27

Cogongrass seed dispersal

- ◆ wind
- ◆ vehicles
- ◆ equipment
- ◆ clothing
- ◆ agronomic products



28

Flowering is stimulated by burning (and other disturbances)



29


Cogongrass seed production

- ◆ Obligate out-crosser ... successful pollination only occurs between plants of different genetic background
- ◆ Seed set variable, but viability high
(Cogongrass doesn't always set seed, but when it does, they germinate.)
- ◆ No dormancy requirements
- ◆ Seed longevity generally < 1 year
- ◆ Seedling survival ~20% after 1 year




McDonald et al. (1995, 1996); Shilling et al. (1997); Holly and Ervin (2007); Yager (2007)

30



Mobile



Tuscaloosa

- ◆ Are there regional differences in cogongrass seed production? Yes
- ◆ Do outlying populations of cogongrass produce viable seed? Sometimes

31

- ◆ Cogongrass seed production is variable **across** and **within** regions
 - ◆ Highest production of viable seed occurred within the 'occupied' zone, but was still highly variable
 - ◆ Production of viable seed was sporadic outside of the 'occupied' zone, but did occur
 - ◆ Cogongrass spread by seed cannot be ignored!
- ◆ Viable seed may be present before seed heads appear fully mature.

32



Treatment Options

33

Cogongrass Control with Tillage



- ◆ Repeated, frequent tillage that breaks up the rhizome mass is effective over time (follow up with glyphosate may help)
- ◆ Infrequent tillage can spread cogongrass
- ◆ Clean equipment to prevent rhizome spread




34


Cogongrass and burning

- ◆ Fire cannot be used for control
 - ◆ Fire hazard
 - ◆ Fire stimulates flowering
 - ◆ Rapid regrowth
- ◆ Fire can be used to reduce thatch before chemical treatments
 - ◆ But use caution!





35

Cogongrass Control with Herbicides



- ◆ **Glyphosate** (Accord, Roundup, Glypro, ...)
 - ◆ 3-4 lb ai/A broadcast
 - ◆ 2-5% v/v spot
- ◆ **Imazapyr** (Arsenal, Arsenal AC, Chopper Gen 2, ...)
 - ◆ 0.5-1 lb ai/A broadcast
 - ◆ 0.5-2% v/v spot
- ◆ **Glyphosate + Imazapyr**
 - ◆ Cogongrass can be eradicated on individual sites.
 - ◆ Some sites are easier to control than others, especially when using glyphosate.



36

Some promise, but more research needed

- Aminocyclopyrachlor (Method)
- Aminocyclopyrachlor + Glyphosate

AL-DOT Trials

- 1st yr: **Perspective @ 8 oz/a + Arsenal @ 8 oz/a**
- 2nd yr: **Perspective @ 8 oz/a + Arsenal @ 4 oz/a**
(Perspective = Aminocyclopyrachlor + Chlorsulfuron)

Goal: reduce flowering and seed production while allowing other turf to filter in and help cover the area (a slower process) - Randy Rankin, AL-DOT

37



Japanese stiltgrass
Stiltgrass
Nepalese browntop
Nepal grass
Mary's grass
Basketgrass
Bamboo grass
Eulalia
Packing grass
Flexible sesagrass

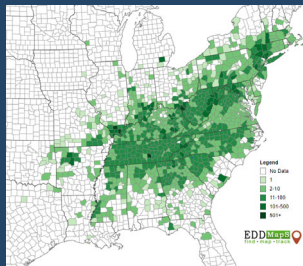
Microstegium vimineum

38

Japanese stiltgrass

Microstegium vimineum

- Annual, shade tolerant, C₄
- Dense infestations
- Prefers moist soil
- High phenotypic plasticity
- Cleistogamous and chasmogamous flowers
- Prolific seed production
- Seed bank 1 to 5 years



39

Japanese stiltgrass



40



Photo: Chris Evans, bugwood.org

- Winter thatch of a Japanese stiltgrass infestation in Illinois.
- Sprawling plants reach 6 feet long.



Photo: Chris Evans, bugwood.org

41

42



43



44

Potential Impacts

- Nutrient regime
 - N-mineralization and nitrification ↑
 - pH ↑
- Microbial composition in the soil
- Litter depth ↓
- Allelopathic?
- Plant biodiversity ↓
 - Understory
 - Overstory regeneration
- Unpalatable to deer
- May alter invertebrate and amphibian abundance

45

Japanese stiltgrass control

- Pulling
- Mowing or weed trimming
- Flame weeding
- Chemical control
 - Pre-emergent
 - proflaminate (ProClipse)
 - pendimethalin (Pendulum AquaCap)
 - can add a low rate of flumioxazin (SureGuard SC) or imazapic (Plateau)
 - Post-emergent
 - Imazamox (Clearcast)
 - Metsulfuron + sulfometron (Sulfomet Extra)
 - Glyphosate (Rodeo) ... very sensitive
 - Glufosinate (Finale)
 - Aminocyclopyrachlor (Method)

<https://content.ces.ncsu.edu/japanese-stiltgrass-identification-and-management>

46

Japanese stiltgrass (*Microstegium vimineum*)

Management Keys

Treatment	Application Rate	Comments
Proflaminate (ProClipse)	1.0 lb/1000 sq ft	Pre-emergent herbicide for Japanese stiltgrass control.
Pendimethalin (Pendulum AquaCap)	0.5 lb/1000 sq ft	Pre-emergent herbicide for Japanese stiltgrass control.
Imazamox (Clearcast)	0.05 lb/1000 sq ft	Post-emergent herbicide for Japanese stiltgrass control.
Metsulfuron + sulfometron (Sulfomet Extra)	0.05 lb/1000 sq ft	Post-emergent herbicide for Japanese stiltgrass control.
Glyphosate (Rodeo)	1.0 lb/1000 sq ft	Post-emergent herbicide for Japanese stiltgrass control.
Glufosinate (Finale)	0.5 lb/1000 sq ft	Post-emergent herbicide for Japanese stiltgrass control.
Aminocyclopyrachlor (Method)	0.05 lb/1000 sq ft	Post-emergent herbicide for Japanese stiltgrass control.

<https://plantscience.psu.edu/research/projects/wildland-weed-management/publications/invasive-species-quick-sheets/stiltgrass>

47

Bamboo

- Perennial grass
- 1000 to 1400 species
- Most are native to Asia, Africa, and South America.

48



49



Moso bamboo (*Phyllostachys edulis*)

50



Moso bamboo (*Phyllostachys edulis*) growing in central Alabama

51

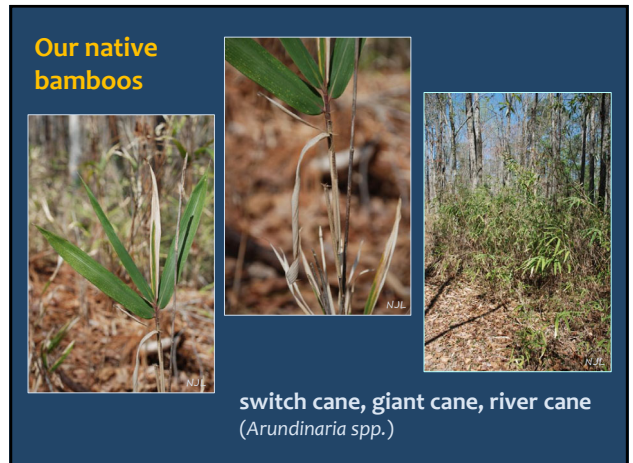


A lot of variety across species ...

52



53



Our native bamboos

switch cane, giant cane, river cane
(*Arundinaria* spp.)

54

Clumping bamboos

Pachymorph rhizomes – very little horizontal growth before turning upwards and producing a culm (stem)

55

Running bamboos

Leptomorph rhizome – more horizontal growth, with culms and roots arising from lateral buds at the nodes

56

golden bamboo
(*Phyllostachys aurea*)

Chuck Balgeron, UGA, bipwood.org UGA1237039

57

Is bamboo invasive?

- Spread
 - by seed is unlikely
 - Running bamboos *will* run unless they are contained.
- Control
 - Established bamboo can be extremely difficult to eradicate.
- Impact
 - can outcompete many natives; little wildlife value

58

Outcompeting privet!

Little grows in understory

Bamboo encroaching into woodland areas

59

Bamboo control

- Bull doze and root rake
 - rhizomes are fairly shallow
 - have to get it all though
- Cut and mow
 - takes a long time to exhaust reserves
- Cut and treat stumps or the regrowth
 - glyphosate and imazapyr at high rates
 - labor intensive
 - Cut stump not well studied

60

