Cogongrass (Imperata cylindrica): Keep it OUT of North Carolina AND

Japanese stiltgrass: (*Microstegium vimineum*) Minimize the Impact

> Rick Iverson NCDA&CS



Objective: Cogongrass Awareness – Extend Efforts for Detection

- Current distribution
- Ecological characteristics
- Key identification features
- Update on Red Baron varieties in NC
- How to report finds
- Control



Cogongrass is High Threat

High

Low threat
 Low (With cultivation)

- Need cultivation
- Persist after cultivation but do not spread
- Spread locally by veg.
 Means

 Spread locally by veg.means & seed High threat (Without cultivation)

- Spread only in manmade landscapes
 - Spread into native landscapes
- Reduce native species
 - Change ecosystem

Cogongrass (Imperata cylindrica) – One of world's worst weeds

- It is a Federal Noxious Weed and by reference a Class A Noxious Weed in NC
- Native to SE Asia but found on every continent except Antarctica
- Infests nearly 500 million ha worldwide
- First appeared in Grand Bay, AL 1912 (escaped from crate packing)
- Evaluated as forage in MS (1921) and FL 1930's-40's)-but little forage benefit



Cogongrass Infestation in Southeastern United States



South Carolina Infestations





Source: Mark McClure, Forest Health Specialist, Georgia Forestry Commission.

- 29 counties
- 257 spots



Wide Ecological Amplitude

Adapted to poor soils

- Ability to survive low nitrogen, phosphorus
- Prefers low pH soils w/low % organic matter
- May outcompete native pine-savanna sp. for phosphorous
- Extremely drought tolerant through specialized rhizome features
 - 60% of the biomass is rhizomes
 - Covered with scale leaves forming protective sheath
- C4 photosynthetic mechanism permits greater water use efficiency
- Adapted to low light environments (<5% sunlight)



Allelopathic

- Rhizomes exude substances that retard the growth of other plants
- Increasing cogongrass density excludes the establishment of other plants







UGA3970058



Cogongrass has the potential to impact community ecosystem function because of it's ability to produce hotter fires than native habitat





Slide from TNC Wildland Invasive Team presentation





Slide from TNC Wildland Invasive Team presentation



Can dominate in fallow sites, pastures and hayfields

C. Bryson, USDA, ARS, Bugwood.org

J. Miller, USFS



UGA111500

Cogongrass is spreading along our highways





Seed moves on vehicles and in fill dirt





Photo Jim Miller, USFS

Reduces native species diversity, degrades wildlife habitat and forest productivity

> **C.Evans**, River to River, CWMA, Bugwood.QKg80040

C. Bryson, USDA, ARS, Bugwood.org CWMA, Bugwood.org UGA1334122

C.Evans, River to River





Pine plantation with cogongrass competition – 20% survival



Spreads readily via wind and rhizomes.

G. Leach, I.P.Co., Bugwood.org





Identification

- http://www.cogongrass.org/cogongrassid.pdf
- Whole plant
- Seed head
- Leaves
- Plant base
 Leaf collar/ligule
 Rhizome/roots



Whole Plant

Densely growing patches
Tall grass (up to six feet, averaging 3-4 feet)
Circular infestations
Plants often turn brown in winter (at least partially, but may depend on local climate)



Dense Patches



Utility R-O-W



Forest - Flowering



Forest – Non-flowering

Roadside – light yellow-green color







Dormant season



Circular - flowering



Circular – non-flowering



Seed Head



Up to 3,000 seeds per plant.

Cylindrical; 2 – 8 inches in length; silvery-white; light, fluffy dandelion-like seeds, blooms late March to mid June depending on climate





Leaves

- Blades up to 6 feet long
- About ½ to 1 inch wide
- Whitish, prominent midrib, that is often off center
- Margins finely serrate
- Some leaves are very erect, but some may droop or lie flat
- Often light yellowish-green in color
- Could have a reddish cast in fall/winter or brown after frost or freeze



Yellowish-green, Prominent, off-center midrib.

Mark Atwater, Weed Control Unlimited, Inc., Bugwood.org



UGA2307192

Finely serrate margin

Plant Base





No apparent stem, leaves appear to arise directly from ground, heavy thatch, plants appear to spread out – not clumped, overlapping sheaths give rounded appearance.



Leaf Collar/Ligule

Ligule – membranous appendage arising from inner surface of leaf at junction with leaf sheath

Leaf sheaths overlapping giving a rounded appearance; ligule is hairy and plant base at root collar region may also be hairy.







Rhizomes

40 tons per acre or possibly 2M shoots/A
Penetrate soil to depth of 4 feet, but most found in top 6 to 10 inches



Scales (cataphylls)

Scales removed

Strongly segmented

Many sharp points



UGA2132089

Summary of key Characteristics

Photo by C. Evans, River to River CWMA, Bugwood.org Leaves 1/2 - 1 inch wide 1 - 6 feet long

> Flower/seedhead 2 - 8 inch long March to June

Overlapping leaf sheaths

> New plants arise from sharp-tipped rhizomes

Stem not apparent Leaves arise near base



Japanese Bloodgrass or Red Baron

Nursery cultivation, sales and distribution now prohibited in NC
New policy effective Oct. 31, 2008
Purported to be sterile, there is some risk in hybridization w/wild invasive type



Reports of Reversion

- Clemson University Botanical Garden
 - 1st revertant 1992-93
 - Escape 2008
- Maryland producing flowers
- Sharon Talley (USDA APHIS) DNA sequencing showed revertant and red baron var. are identical
- Morphology slightly different than red baron or wild type but more closely related to the wild type.



How to Report Suspected Infestation

- NCDA&CS, Plant Industry, Plant Protection Section, Weed Specialist: 1-800-206-WEED (1-800-206-9333) and indicate you located a suspected infestation of cogongrass.
- Mark the location.
- Do not move plant material, take digital pictures if possible and email to (rick.iverson@ncagr.gov). Moving the plant could present a risk of spreading it.



Information Needed

- Site location: city and county, nearest road, mile marker, other landmarks, GPS coordinates
- Approximate size of infestationFlowering?
- Your contact information
- Contact information for landowner/land manager, if possible.



Targeted Cogongrass Initiatives

- Memo of understanding circulated and signed by several Southern State Foresters
 CW/MA's intensifying offerts, particularly in
- CWMA's intensifying efforts, particularly in FL
- Region 8 of USFS \$2.2M funding for AL, GA, FL and SC



Control

Herbicides

- Imazapyr (0.375 lb a.i./acre)
- Glyphosate (2% V/V with 4 lb a.i./gal product)

Mechanical

- Repeated frequent mowing (every week) for several seasons.
- Deep plowing (6 inches) and planting to ryegrass in pastures 2 consecutive years (successful in LA with >95% control)
- Combinations of tilling and herbicides.



Recap

- Cogongrass must not establish in NC
- It is difficult to control Cost approx. \$300/A
- Key ID Characteristics: fluffy seed heads, pointed rhizomes, 4 – 6 feet tall, circular patterns, off center mid rib. May through June in NC good time to look.
- Report any infestations found in NC to NCDA&CS.
 1-800-206-weed
- More information: <u>http://www.cogongrass.org</u>



Japanese stiltgrass/Napalese browntop (Microstegim vimineum)



- Annual
- Decumbent w/ branches
- Height to 1 m
- Spreads by rooting of nodes along stem
- Alternate lanceolate leaves w/white midrib 4-8 cm long, 5-8 cm wide
- Sheath glabrous and shorter than the internode



Invasive Characteristics

- Grows quickly First discovered in U.S. (TN) in 1919. Located in all states East of MS river south of and including Connecticut
- Fruits in a single season
- Produces abundant seed
- Easily invades areas disturbed by natural or man made causes
- Displaces native wetland and forest understory vegetation (in 3 to 5 years)



Adapts to Wide Range of Habitats



- Disturbed areas
- Moist/shady
- Sites include: forest edges, moist grasslands, open fields, wetlands, crop field margins, ditch banks, trails and occasionally in gardens and crop fields.



How did it get here?



D. Moorehead, UGA, Bugwood.org

- Native to India, Nepal, China and Japan
- Potentially introduced as packing material for porcelain imported from China
- Spread from TN probably by hay and soil
- Each plant can produce up to 1,000 seeds
- Seeds viable in soil
 3 5 years



Control

Dependent on resources and site characteristics

- Sensitivity of native plant community
- Availability of labor (hand weeding)
- Funding (herbicides)
- Treatment types
 - Manual/Mechanical
 - Environmental/Cultural
 - Herbicides
 - Biological (NOT YET AVAILABLE)



Manual/Mechanical



Hand pulling

- Shallow weak roots facilitate this method
- Must be thorough and timed before seed production (late in season, early Sept.)
- Labor intensive

Mechanical

- Mowing (late in season, early Sept.)
- Early mowing not effective since plants can resprout and will produce
- seed in lower leaf axils

Environmental/Cultural

 Grazing – not an option since cattle, deer and even goats avoid feeding on it
 Flooding – for more than 3 months or intermittent during season. Seeds can survive at least 10 weeks of inundation.



Herbicides

- Most efficient for large infestations
- Selectivity of the herbicide important to encourage desirable plant community
- An aquatics clearance required if application will enter water (e.g. permanent wetlands)





Post-applied Herbicides

Post-applied Grass Herbicides

- Fluazifop-P-butyl (Fusilade II Turf and Ornamental®) – 1 pt/ac – leaves less desirable plant community than imazapic
 Sethoxydim (Poast®, Vantage®) - 1pt/ac, and
- will release dicots



Post-applied Herbicides (Continued)

Glyphosate Effective BUT non-selective

glyphosate 2% v/v 3 WAT Mowed throughout season





Herbicides (continued)

Pre-emergent herbicides

 Pendimethalin (potentially but stiltgrass not currently in list of species controlled)

Pre and Post emergent herbicide

- Imazapic (Plateau®) 4 6 fl oz/ac Allows the development of native sedges/ragweeds and legumes
- Imazapic + glyphosate (Journey®) 22 to 32 fl oz/ac

Pre and Post herbicides

Aminopyralid (Milestone® VM)



Treated April 21: 7 fl. oz/a Milestone VM. Photo August 11

Can be used under mature trees: caution with legumes

Results following season to be evaluated.



Aquatic Herbicides

- Use a herbicide registered for aquatic sites when near water and there is a clear risk of overspray to the water
 - Glyphosate (Rodeo®)
 - Imazamox (Clearcast®) (TIMBERLINES Spring, 2009) stiltgrass not yet listed in species controlled section of the label

