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Cogongrass Management: Past, Present, and Future

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Questions?

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Cogongrass

An Update and Progress Forward…

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Weed Scientist

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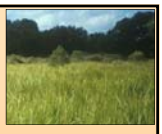
Introduction



- Native to southeast Asia
- Infests nearly 500 million acres worldwide
- Found on every continent
  - Except Antarctica
  - Tropical and subtropical areas, limited spread to northern temperate regions

Introduction

- First appearance
  - Grand Bay, Alabama
  - Escaped from crate packing in 1912
- Intentional introduction
  - Mississippi as a possible forage in 1921
  - Florida introduction 1930s and 1940s
- However, little economic (forage) benefit

Cogongrass

Leaves and Rhizomes

Perennial grass, 2 to 6 feet
Extensive rhizome system

Adaptations

- Forms large monocultures
- Successful in low light environments
- Fire adapted
- Drought tolerant

Prevention and Cultural

- Reduce the sources
- Clean equipment
- Good cover to reduce seedling establishment
- Maintain good growth of desirable species

Biological

- Limited success with natural pests
- Isolated pathogens, but no effective control
- Grazing is probably not feasible
- Limited insect pests, even in native range

Mechanical

1. Small infestations can be removed with repeated, aggressive tillage
   - Limited to open (non-forested) sites
   - Deep plow or disk, several times during season
   - Desiccates rhizomes & exhaust food reserves
   - Cut to a depth of at least 12 inches

Burning removes shoots, enhances chemical control – but no control!!

Herbicide	Rate	6 MAT[2]	12 MAT	6 MAT	12 MAT
	kg/ha	----------	% [4]	----------	
Fluazifop	0.56	75	48	50	5
	0.28	48	15	21	0
	0.14	30	20	44	0
Glufosinate[3]	2.24	43	30	80	65
	1.12	33	10	33	33
	0.56	25	5	10	23
Glyphosate	4.48	53	25	100	86
	2.24	53	13	99	66
	1.12	45	18	96	46
Imazameth[3]	0.12	10	20	60	45
	0.06	3	5	30	26
	0.03	15	5	8	5
Imazapyr	2.24	83	58	90	96
	1.12	83	23	84	88
	0.56	65	15	88	89
Nicosulfuron	0.07	15	20	38	25
	0.03	20	15	29	0
	0.015	13	23	29	0

Application timing and control of cogongrass

	May	August	November	February
Imazapyr	69	77	87	70
Glyphosate	27	50	63	58

Imazapyr and Glyphosate Movement in Cogongrass Under Different Light Levels

Light Level	*Glyphosate* Shoots	*Glyphosate* Roots	*Imazapyr* Shoots	*Imazapyr* Roots
3%	5	0.60	13	0.5
9%	11	12	16	11
30%	12	12	18	11
60%	10	17	13	10

Chemical

1. Broadcast applications for large areas
   - ✓ Glyphosate (Roundup, etc.) - 2 to 4 quarts/A
   - ✓ Imazapyr (Arsenal, etc.) - 1 to 2 quarts/A
2. Spot treatment for smaller areas
   - ✓ Glyphosate – 2 to 3% solution
   - ✓ Imazapyr – 0.5 to 1% solution
3. Use surfactant at 0.25% (10 mls/gallon)
4. *Adhere to planting restrictions for imazapyr, may cause residual damage*

Studies on Cogongrass

- Chito Branch preserve – Hillsborough Co., Florida – near Tampa
- 2-3 feet at time of treatment
- Unless otherwise specified, non-ionic surfactant included at 0.25% v/v
- Visual ratings

Journey and Plateau

Herbicide	Rate (oz.)	2 months	6 months	12 months
Journey	32	32	22	26
Plateau	12	12	2	2
Plateau	24	25	17	48
Plateau + Glyphosate	12+64	92	76	80
Arsenal + Glyphosate	32+64	95	94	84
Clearcast	64	20	22	5
Clearcast	128	27	60	30
Glyphosate	96	95	82	71
Arsenal	48	30	98	97

Cogon–X and MSO

Herbicide	Rate (oz.)	2 months	6 months	12 months
Cogon-X	32	3	0	0
Glyphosate	32	85	10	6
Glyphosate	96	95	87	78
Cogon-X + Glyphosate	32+32	90	23	23
Cogon-X + Glyphosate	32+96	97	85	67
Cogon-X + Arsenal	32+32	63	96	93
Arsenal+NIS	32	78	99	97
Arsenal+MSO 1%	32	71	99	95
Arsenal+MSO 2%	32	78	99	95

Recently registered aminocyclopyrachlor containing herbicides for cogongrass control.

Herbicide	Rate/A	% control – 12 MAT
Streamline	11.5 oz	24
Viewpoint	20.0 oz	73
Perspective	11.0 oz	24
Method + glyphosate	8 oz + 96 oz.	36
Streamline + glyphosate	11.5 + 96 oz.	57
Viewpoint + glyphosate	20 oz + 96 oz.	90
Perspective + glyphosate	11 oz + 96 oz.	57
glyphosate	96 oz.	65
imazapyr	48 oz.	81

Alternative herbicides and herbicide combinations for cogongrass control.

Herbicide	Rate lbs-ai/A	% control – 12 MAT
glyphosate	3.0	44
imazapyr	0.75	72
imazapyr + glyphosate	0.75 + 3.0	66
imazapyr + glufosinate	0.75 + 1.0	64
imazapyr + imazapic	0.75 + 0.19	89
imazapic + glyphosate	0.19 + 3.0	59
2x imazapic + glyphosate	0.38 + 3.0	54
imazapic + glufosinate	0.19 + 1.0	41
imazapic + fluazifop	0.19 + 0.25	26

Tenoroc Fish Management Area [TFMA]

- Land abandoned for 20+ years, heavily invaded by cogongrass
- Study site treated 2X in fall + spring; late summer cogongrass reemerged in small, random patches throughout the site (2007)
- 3 revegetation regimes were situated adjacent to these patches to determine ability to resist cogongrass (February 2008)
- Half planting replicates (6) were treated with glyphosate at 3% solution at 9 & 21 months

% Cover – 40 months

	Grass Only	Grass/Forb Mixture	Control – No Planting
No Glyphosate			
Native Species	62	81	12
Cogongrass	38	19	88
Glyphosate			
Native Species	91	93	68
Cogongrass	9	7	32

Regardless of planting density, species composition or supplement herbicide treatments *– cogongrass was still surviving and invading all plots*

Zero tolerance policy for restoration

Fall 2012 – almost 5 years after establishment

Integrated

1. For best results combine:
   - Burning
   - Chemical applications (glyphosate and/or imazapyr)
   - Tillage (mechanical disturbance)
2. Burn or mow before herbicide
   - remove excess thatch and older leaves
   - initiate regrowth from rhizomes, reduces biomass
3. Tillage following herbicide works best

A word about seeds

- Originally thought to be all one clone
- Increasing reports of seed vectored populations
- Good? News – poor seedling vigor and short viability period… < one year

Varieties of Cogongrass?

- Var. major
- Var. europa
- Var. africana
- Var. condensata
- Var. latifolia
- *Imperata brasiliensis* – Brazilian satintail

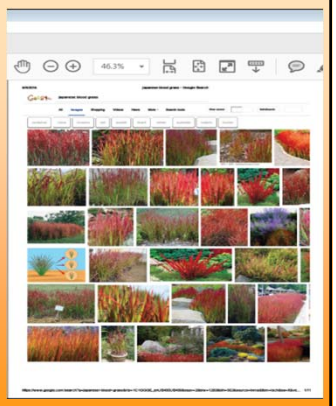
Var. rubra

‘Rubra’

- Will revert to the normal green biotype
- Conflicting reports on aggressiveness
- Appears to be cold-tolerant
- Genetically related to *Imperata brasiliensis*??

var. ‘Rubra’

- Red variety of cogongrass
- Sold widely in the ornamental trade
- Red Baron, Japanese Blood Grass



Are we in trouble?

Pollen from Red Baron population growing in a garden in Maryland

✖

Wild cogongrass growing in Alachua County, Florida

⇩

Produced a viable cross between the 2 populations that appears to be genetically distinct

Where do we go from here?

- We are currently doing a pretty good job of managing populations that we target
- Aggressively targeting the outlier populations
- Still almost exclusive reliance on glyphosate & imazapyr herbicides, nothing new in 40 years
- Seed viability and spread by seeds is concerning and could pose big issues
  - Population shifts
  - More rapid expansion
  - Resistance

Research to Date

- Genetic analysis supports and shows that multiple introductions occurred
- Rapidly changing flowering times and frequency
- High genetic diversity within populations suggest intraspecific hybridization
- No evidence that interspecific hybridization has occurred with Brazilian Satintail

Questions Arise….

- Although some work has been conducted on population dynamics, there is *confusion and conflicting data*
- Several reports of non-viability, but is this accurate????
- How much diversity exists and to what level is cogongrass diversifying?