New Herbicides and Recommendations for the Most Common and Troublesome Weeds in Pastures

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UF-IFAS Range Cattle REC

Outline

- Herbicides
- Dogfennel
- TSA
- Blackberry
- Thistle
- Pigweed (careless weed)
- Teaweeds
- Smutgrass
- Cogongrass
- Broomsedge
- Vaseygrass
- Sandbur

Herbicide Update

- Outrider
  - Sulfosulfuron
  - Use rate: 1 to 2 oz/acre; 1.33 oz/acre standard
  - Use for sedge/watergrass control
  - Approximate cost is $12/oz
  - Established bahiagrass, bermudagrass, stargrass & limpograss
  - 28 DAP bermudagrass, stargrass & limpograss

Herbicide Update

- Velpar
  - Grazing restrictions reduced to 0 days (<4.5 pt/A)
  - Haying restrictions 38 days (<4.5 pt/A)
  - Forages
    - Bahiagrass
    - Bermudagrass
    - Others- you're on your own

Herbicide Update

- Pastora
  - Nicosulfuron (Accent) and metsulfuron (Cimarron)
  - Labeled in April 2010
  - ESTABLISHED Bermuda only
  - Use Rate 1 to 1.5 oz/acre
  - Some yield loss during the growing season
    - 1 oz = 15% injury for 1 month; 5% by 40 days
    - 10 to 15% yield reduction from 1st cutting; no reduction by second cutting
    - Much safer if applied within 7 days after cutting

GrazonNext HL

GrazonNext

- 3.0 lb/gal (0.33 + 2.67 lb)
- 1.5 to 2.6 pt/a (24 to 41.6 fl oz/A)
- Standard use rate: 2 pt/A

GrazonNext HL

- 3.74 lb/gal (0.41 + 3.33 lb)
- 1.2 to 2.1 pt/A (19 to 34 fl oz/A)
- Standard use rate 1.6 pt/A

Cost is approximately $2 more per gallon for the HL formulation

Pasturegard HL: New rate structure is ½ the old rates of Pasturegard

Herbicides on the Horizon

- Aminocyclopyrachlor (MAT28)
  - MAT28 + metsulfuron (Rejuvra)
  - MAT28 + Telar
  - MAT28 + triclopyr (Invora)
  - MAT28 + 2,4-D

Troublesome Weeds

Dogfennel

- Dogfennel is the most encountered broadleaf weed in Florida pastures
  - Perennial plant
    - Dormancy: January to March
    - Bolting: April to July
    - Flowering: September to October
    - Seed Dispersal: November to December
  - Spread
    - Seed
    - Lateral rootstock growth

Dogfennel

- Dogfennel is a problem in grazing systems
  - Reduces light interception
  - Decreases forage production
  - Contains tremitol; dehydration
  - Dry season in FL occurs when dogfennel are small
    - Drought = reduced herbicide activity
      - Delay herbicide applications

Dogfennel

- Three species look very similar:
  - Dogfennel (*Eupatorium capillifolium*)
  - Yankeeweed (*Eupatorium compositifolium*)
  - False fennel (*Eupatorium leptophyllum*)
- Dogfennel and yankeeweed are very similar; yankeeweed is sticky and cauline leaves >1mm wide
- False fennel is distinguished by smaller stature and flowers only on one side of branches

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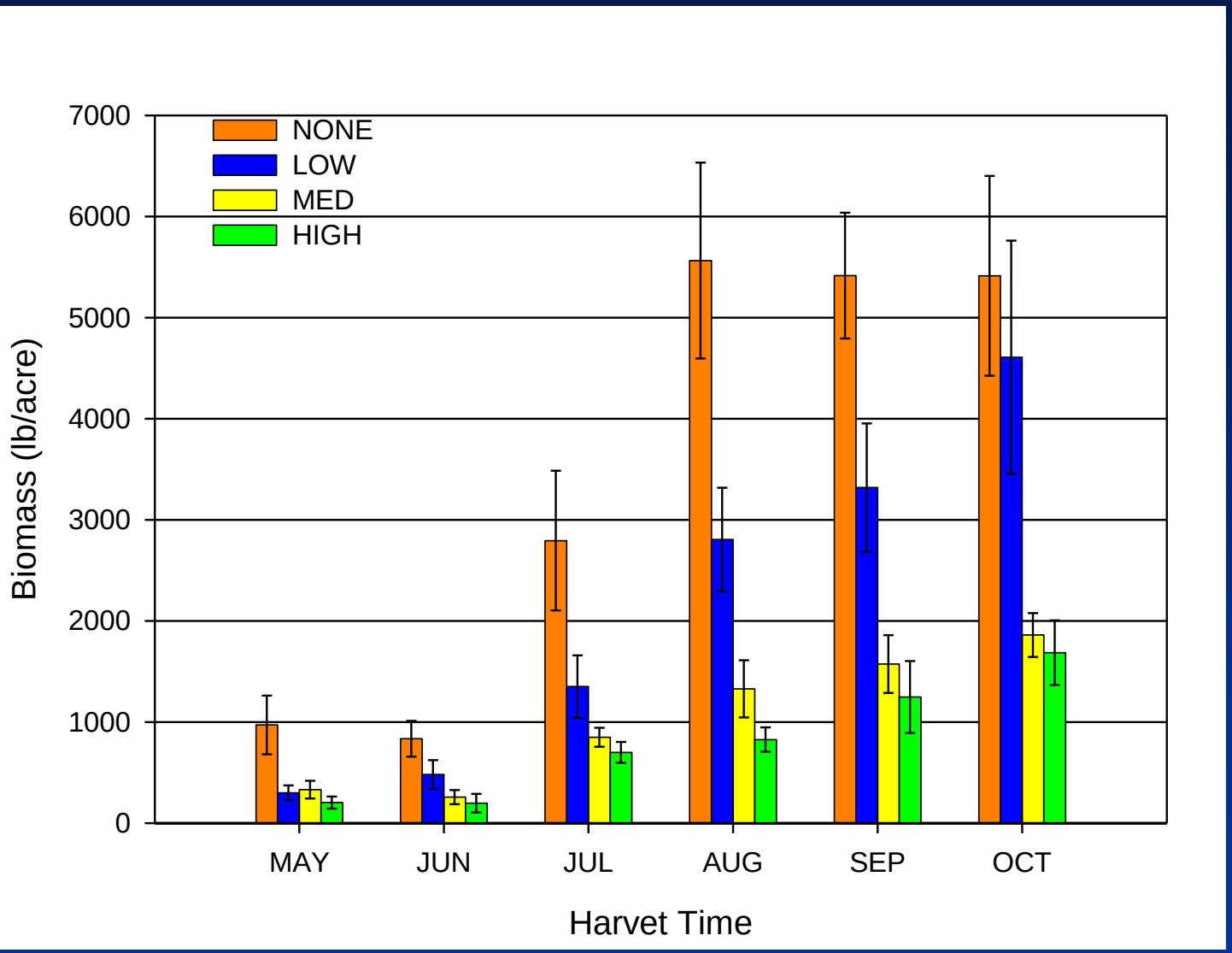
Monthly Bahia Yield



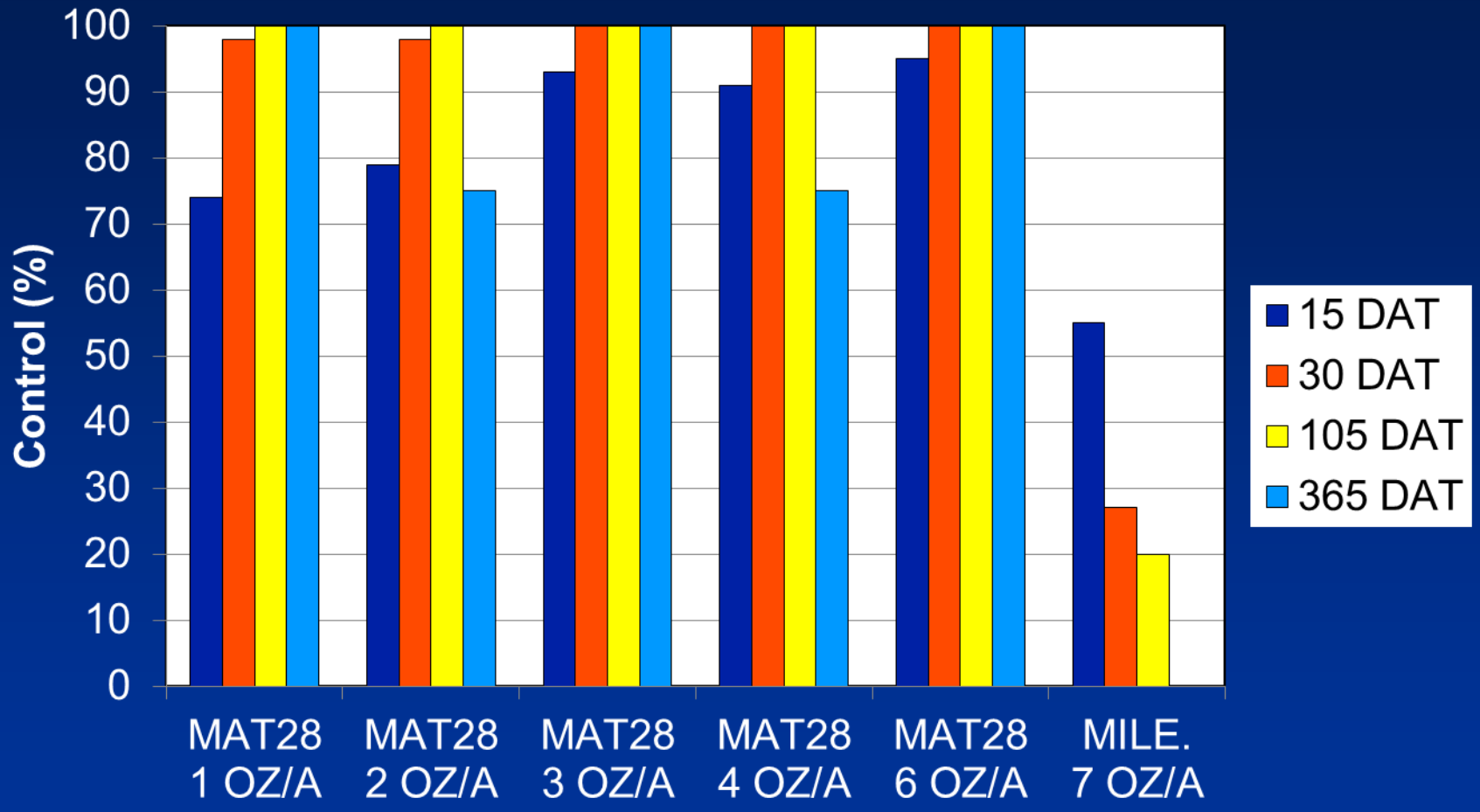
Dogfennel (30”) Control

Herbicide	Cost	Rate	Control
	$/acre	pt/acre	%
GrazonNext	10	2.0	60
GrazonNext	13	2.6	95
WeedMaster	6	2.0	68
WeedMaster	9	3.0	86
PastureGard	18	3.0	98

42” Dogfennel; 60 DAT

Herbicide	Cost	Rate	% Control (SD)	
	$/acre		Dog	
GrazonNext	10	2 pt/acre	61 (3)	
GrazonNext	13	2.6 pt/acre	66 (3)	
GrazonNext + PastureGard	16	2 pt/acre + 1 pt/acre	93 (4)	
GrazonNext + WeedMaster	16	2 pt/acre + 2 pt/acre	88 (10)	
GrazonNext + 2,4-D amine	16	2 pt/acre + 2 qt/acre	95 (4)	

Dogfennel Control



0.5 oz ai

1.0 oz ai

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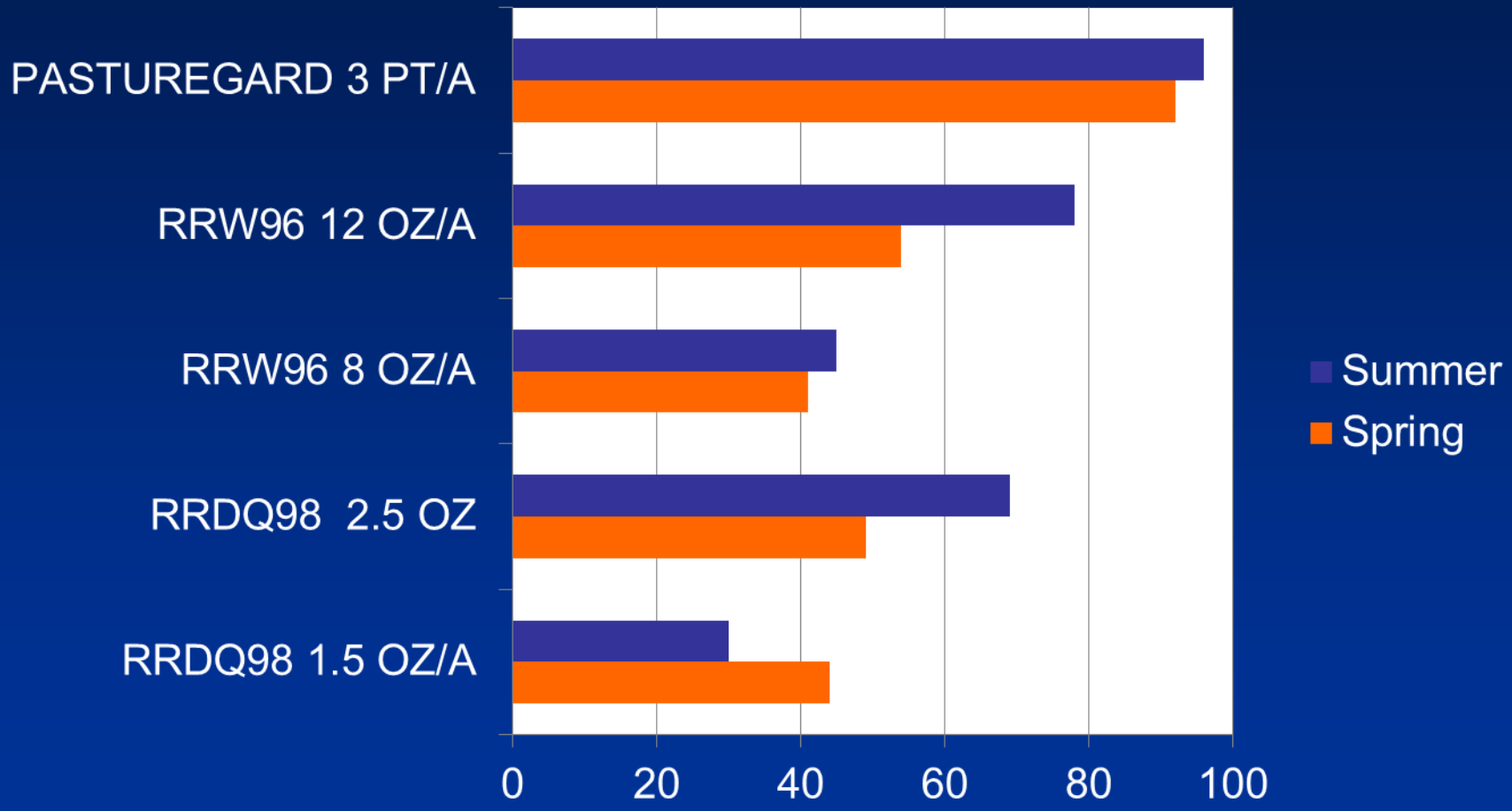
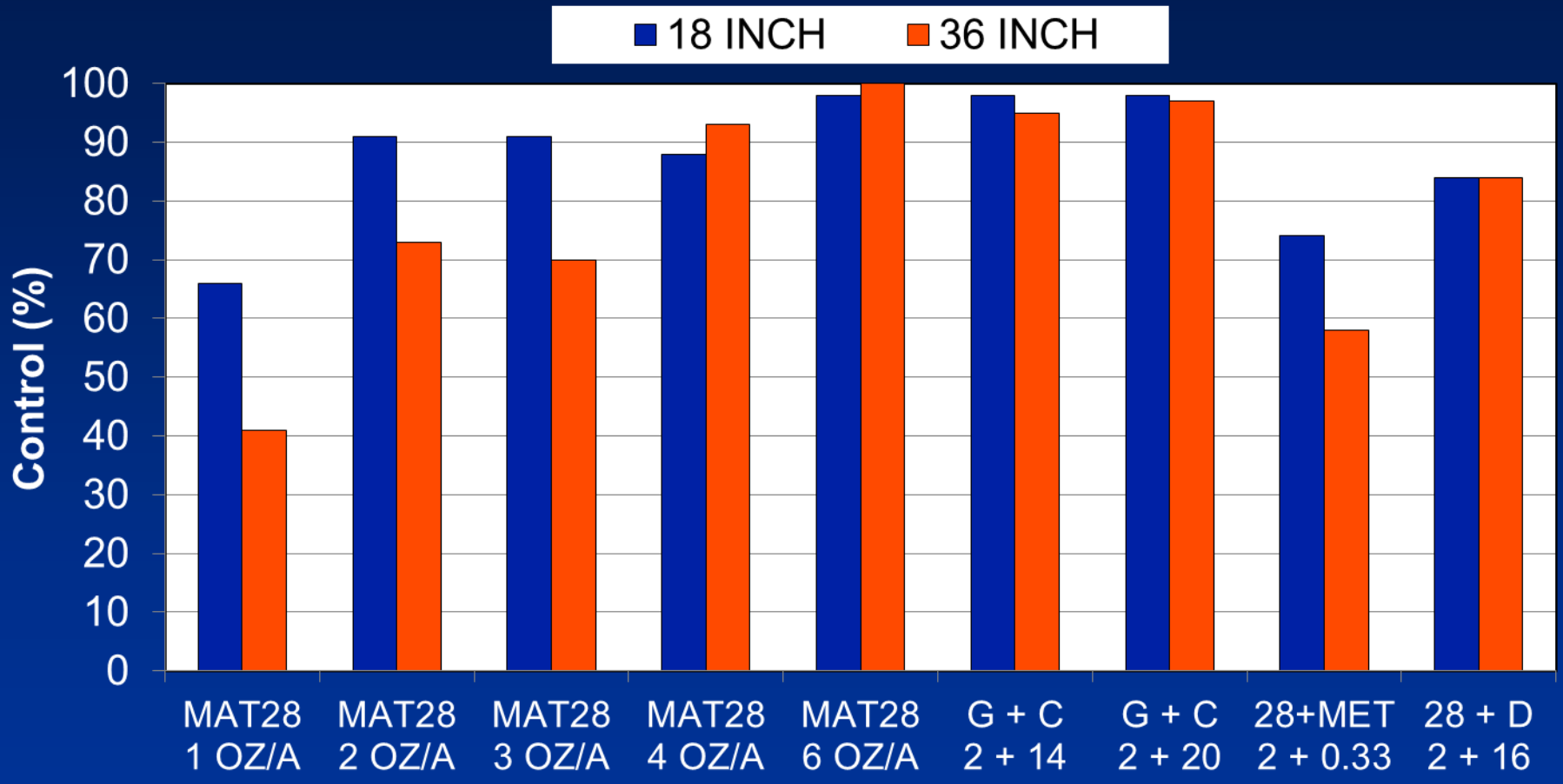
MAT Premixes 30 DAT



Dogfennel Control – 60 DAT



Recommendations

- <36 inches
  - 3-4 pt/A 2,4-D
  - 3 pt/A 2,4-D + dicamba
  - 2 (1) pt/A Pasturegard (Pasturegard HL)
- >36 inches
  - 4 pt/A 2,4-D + dicamba
  - 3 (1.5) pt/A Pasturegard (Pasturegard HL)
  - 14-26.6 oz/A Cleanwave **PLUS**
    - 2 (1.6) pt/A GrazonNext (GrazonNext HL)
    - 4 pt/A 2,4-D Amine

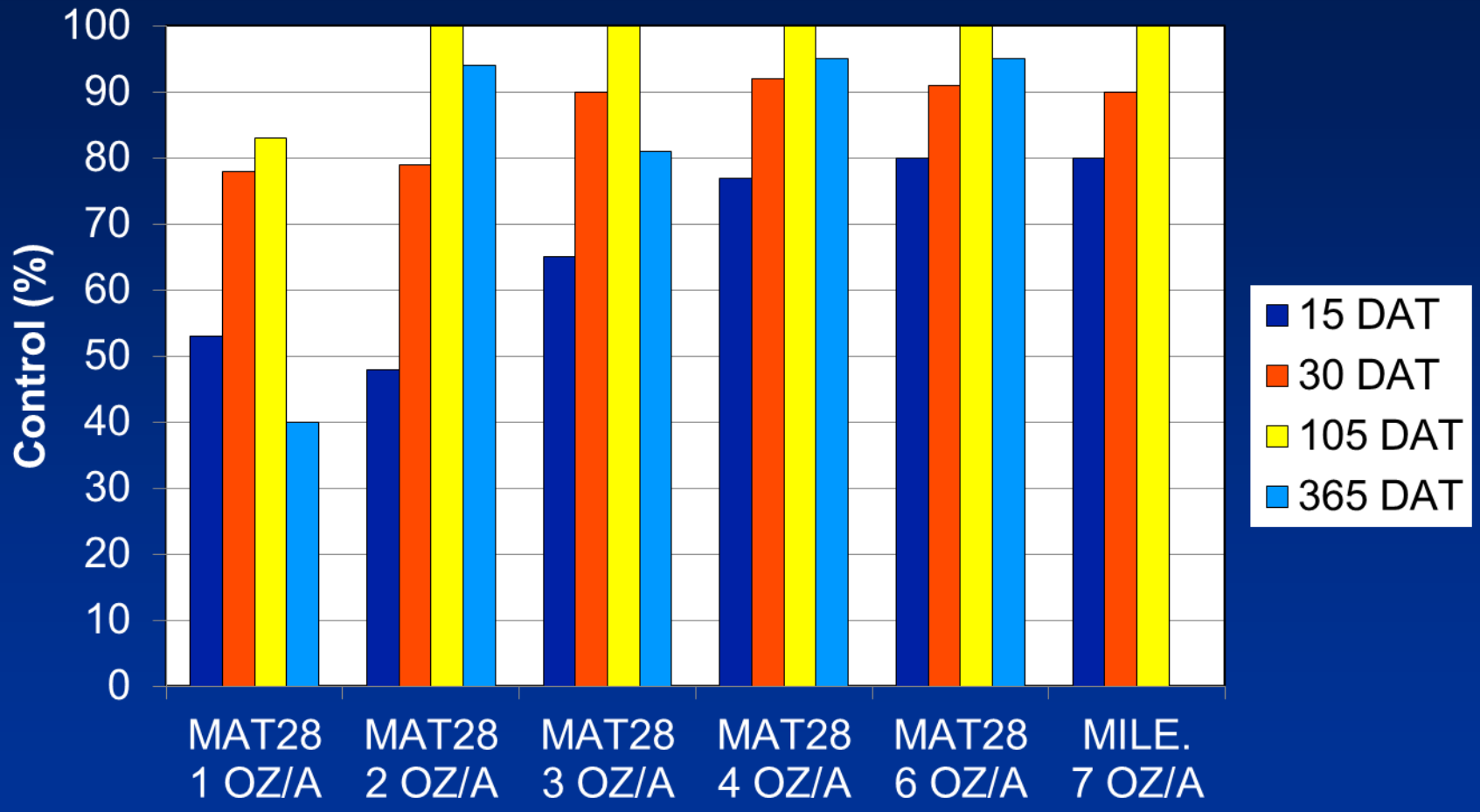
TSA

- Broadcast: All forage grasses
  - Milestone 5 to 7 fl oz/acre
  - Grazonnext 2 to 2.6 pints/acre
    - Apply anytime during the year except when frost is likely (January through February)
    - Plants must be actively growing after frost events
    - Use in limpograss ONLY during November - April
- Spot spraying: All forage grasses
  - 0.11% v/v Milestone solution (3 tsp/gallon)
  - 1 oz/gallon for ForeFront/Grazonnext
  - Spray the entire plant

42” Dogfennel; 60 DAT

Herbicide	Cost	Rate	% Control (SD)	
	$/acre		Dog	TSA
GrazonNext	10	2 pt/acre	61 (3)	88 (6)
GrazonNext	13	2.6 pt/acre	66 (3)	88 (5)
GrazonNext + PastureGard	16	2 pt/acre + 1 pt/acre	93 (4)	97 (6)
GrazonNext + WeedMaster	16	2 pt/acre + 2 pt/acre	88 (10)	86 (3)
GrazonNext + 2,4-D amine	16	2 pt/acre + 2 qt/acre	95 (4)	93 (9)

TSA Control



untreated

1 oz ai

2 oz ai

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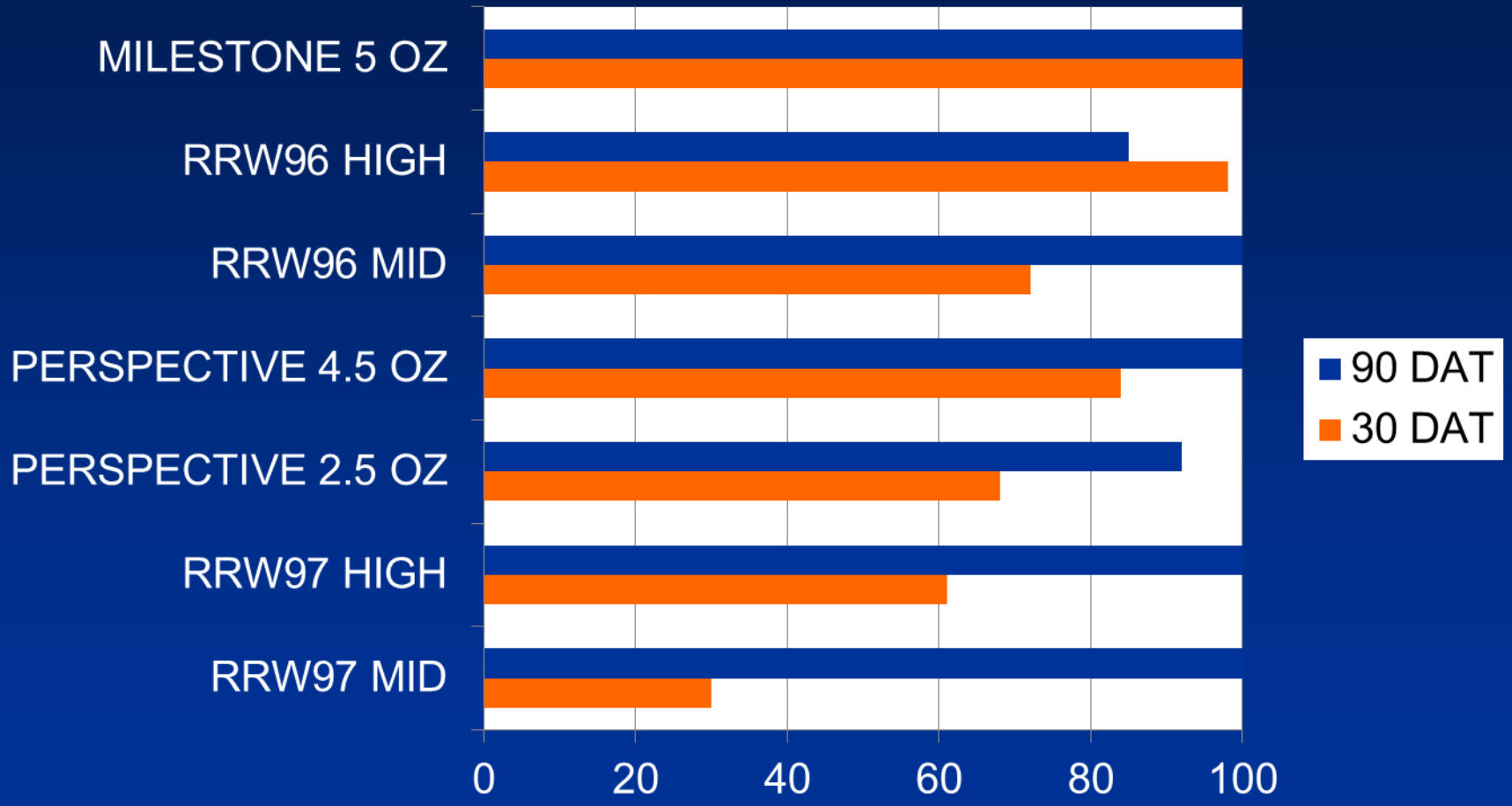
MAT Premixes



Blackberry Species in Florida

highbush blackberry
Rubus argutus

sand blackberry
Rubus cuneifolius

Photograph Credits: Shirley Denton

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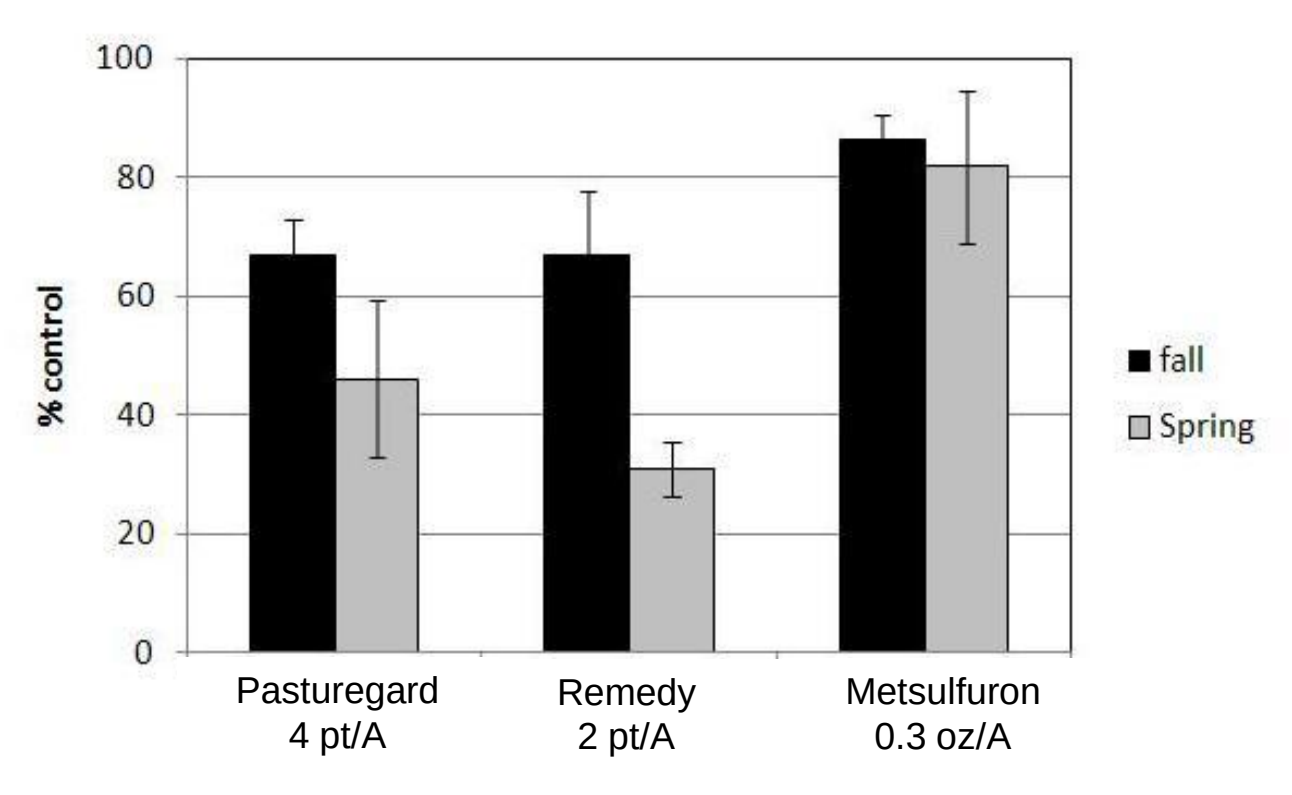
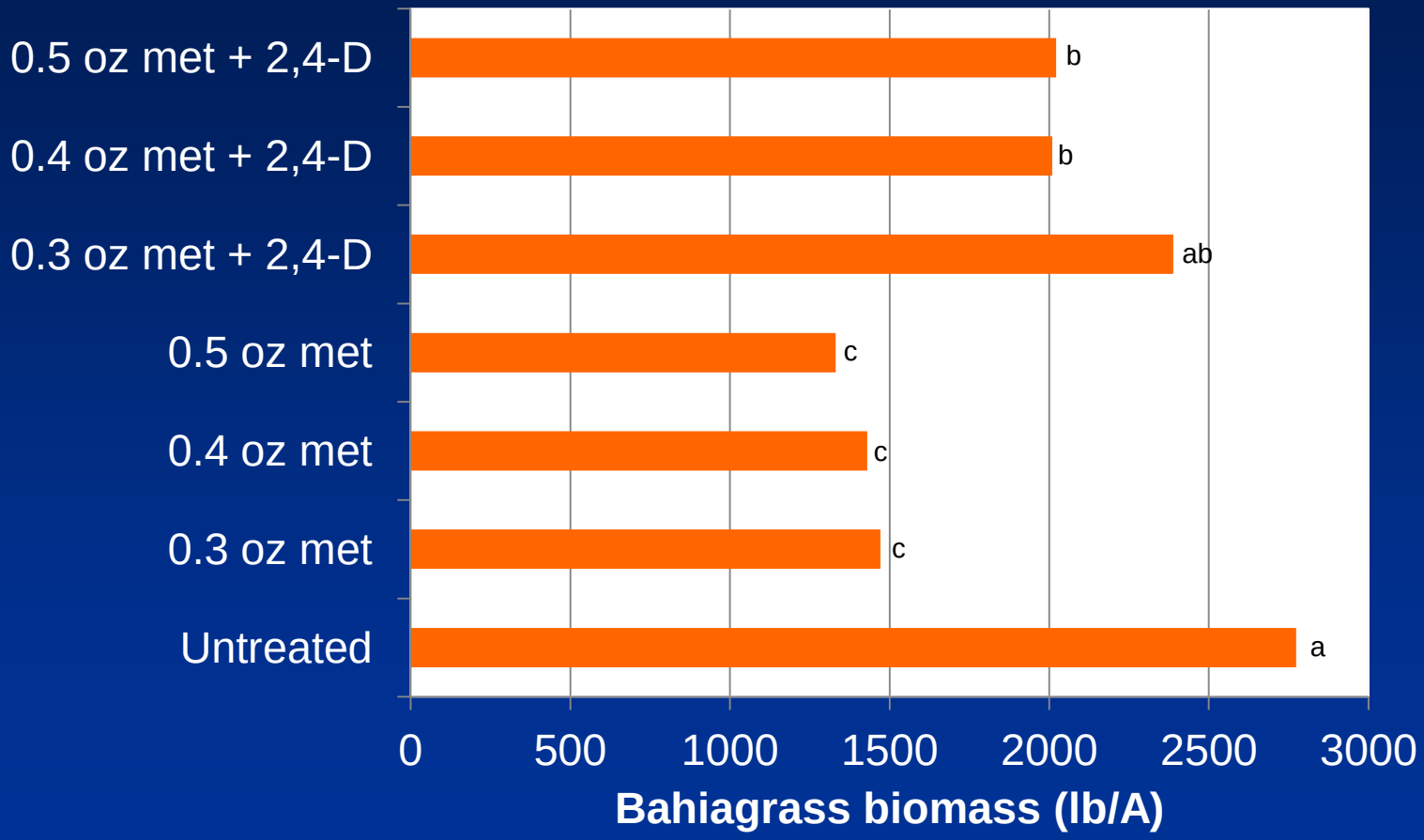
Blackberry Control-24 MAT

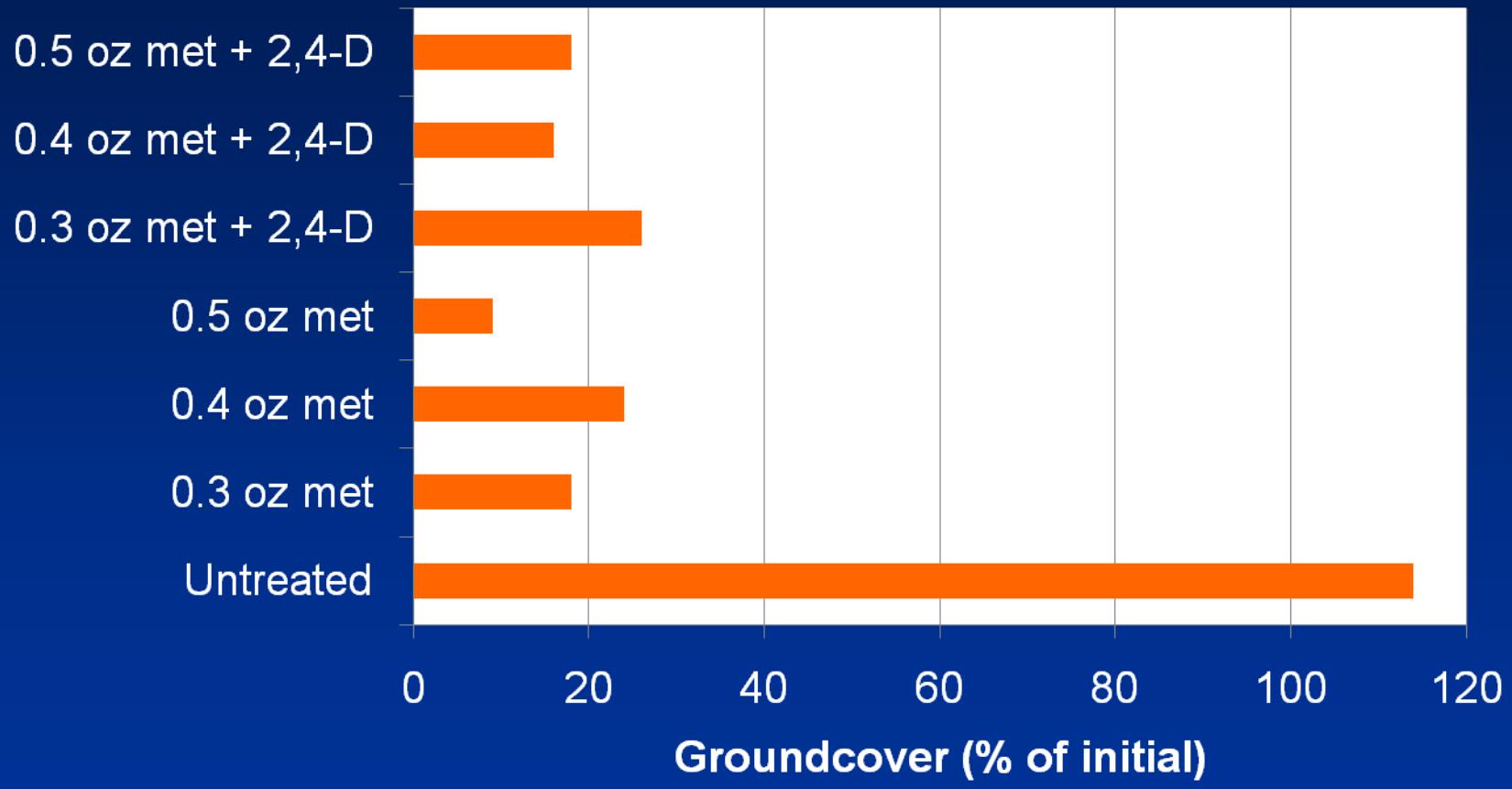


Source: Ferrell et al. 2009. Weed Technol. 23:531-534.

Results-Ona



Blackberry Control



Blackberry

- Full vs. reduced rates
  - Remedy
    - Full rate = rapid brown out
    - 1 pt/A = slower brown out
  - Telar
    - 1.0 oz/acre – more consistent
  - Chaparral
    - Apply only in late fall after bahia is dormant
    - Addition of 2,4-D helps safen bahiagrass

Dewberry

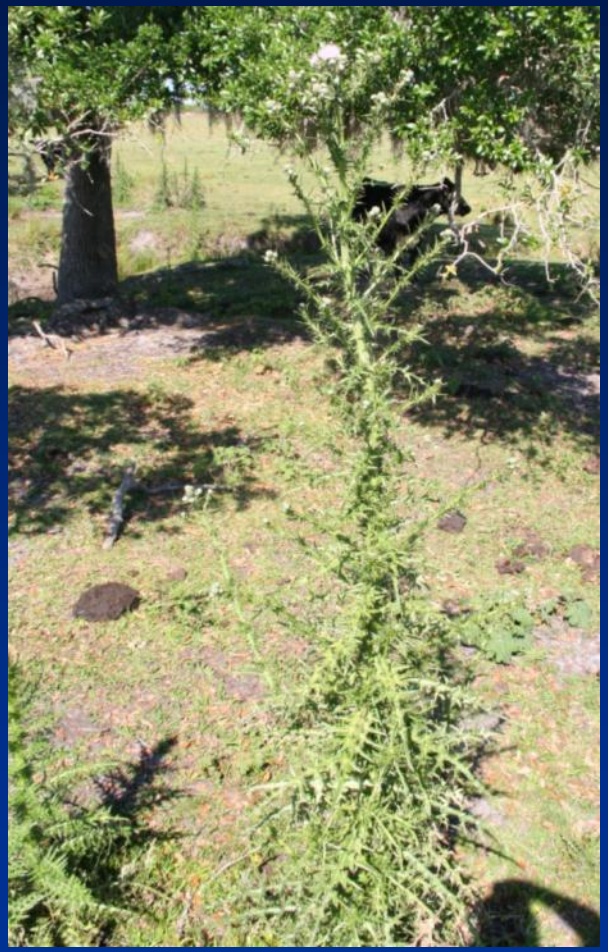
- Telar 1 oz/A
  - Repeated applications are necessary

Thistle Control

- Biennial species
- Two species are most numerous
  - Nuttall's thistle
  - Horrible/purple thistle
- Control is always better when sprayed at the rosette growth stage

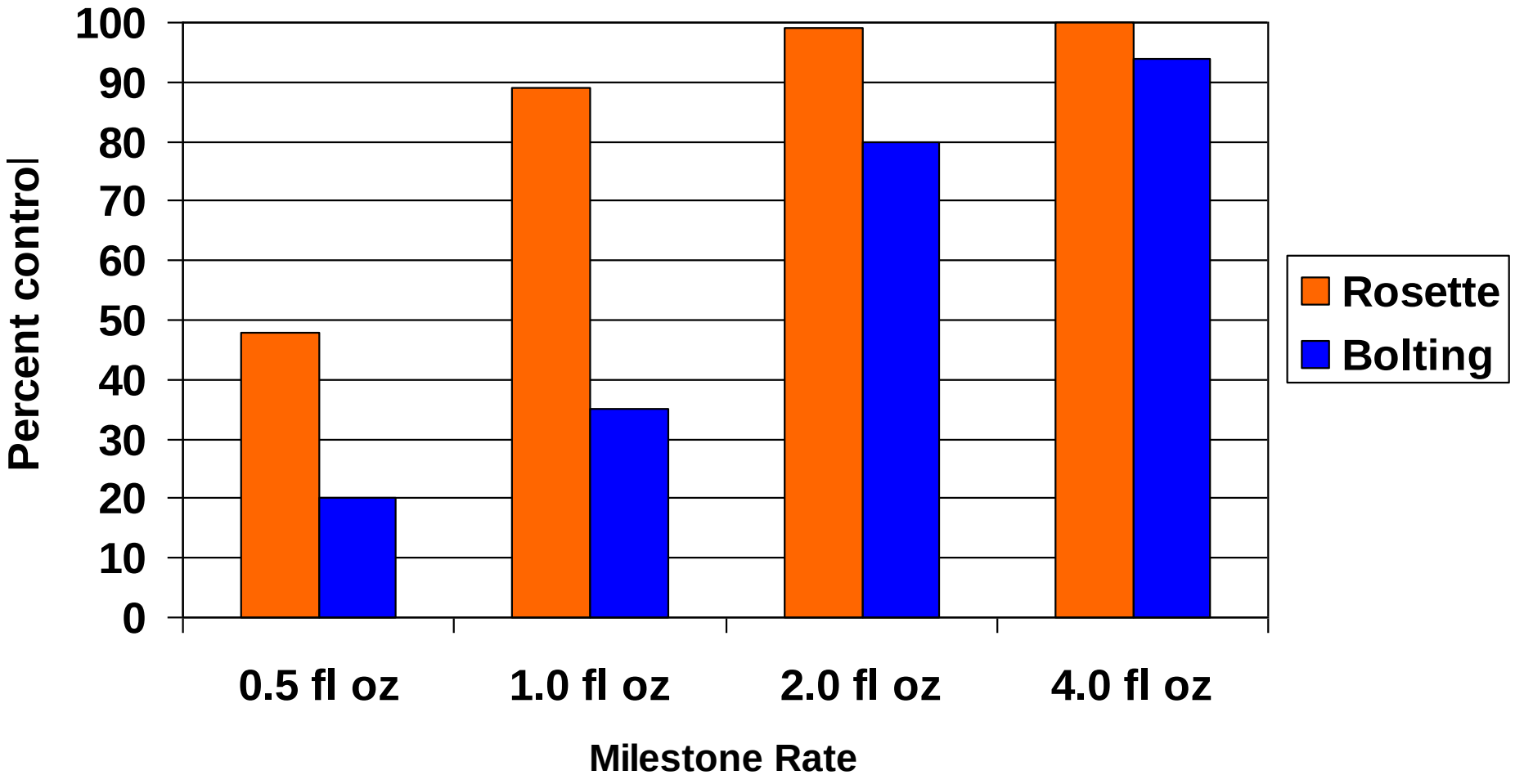
Thistle Growth Stages

Rosette

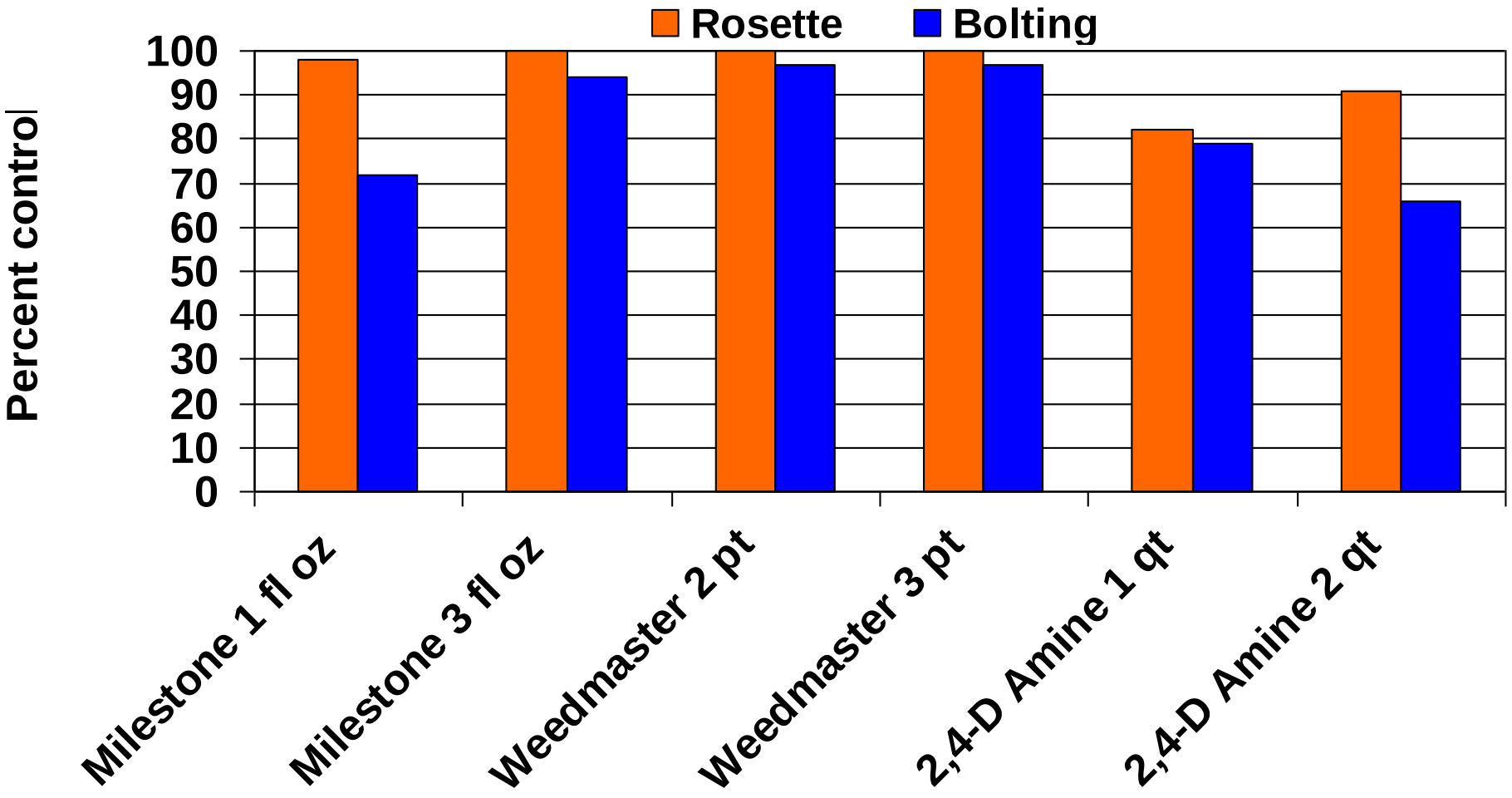


Bolting

Thistle Control with Milestone



Comparing Milestone with Standards



Pigweed (Careless weed)

- Annual plants
  - Redroot pigweed
  - Smooth pigweed
  - Spiny pigweed
  - Palmer amaranth
  - Livid amaranth
  - etc.
- Prolific seed producers (600,000/plant!!!!)
- Require light for germination
- Generally see new flushes after rainfall

Pigweed Control

- 0.1 oz/acre Telar
- 4 oz/acre Milestone
- 1.5 pt/acre Forefront
- 2 oz/acre Chaparral

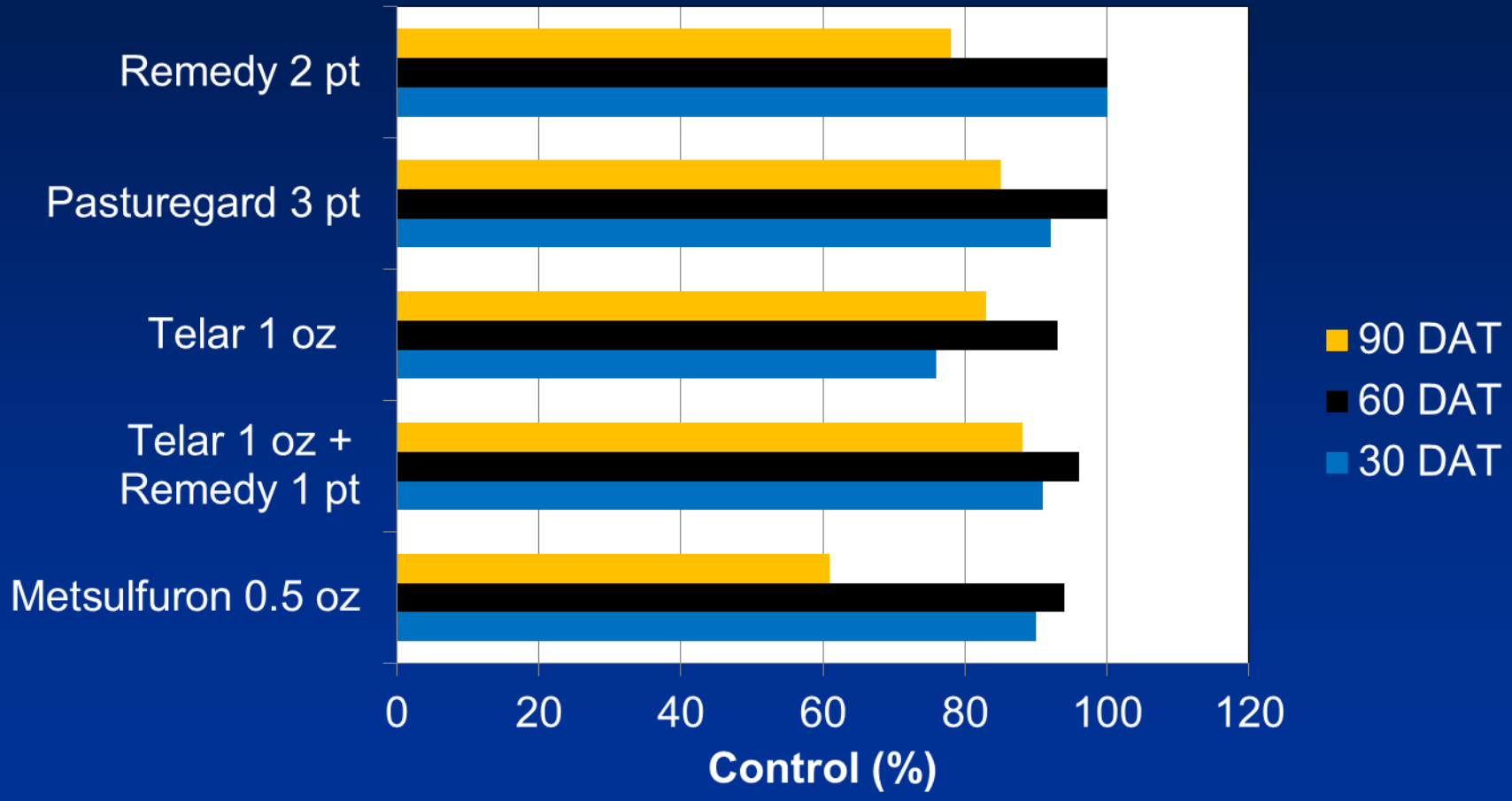
0.1 oz/acre Telar 30 DAT

1.5 pt/acre GrazonNext 30 DAT

Typical Pigweed Re-infestation

Teaweeds

Teaweed Control

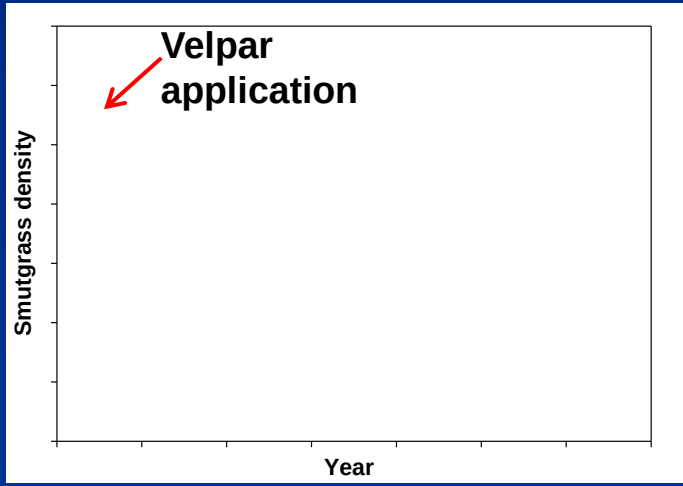


Smutgrass

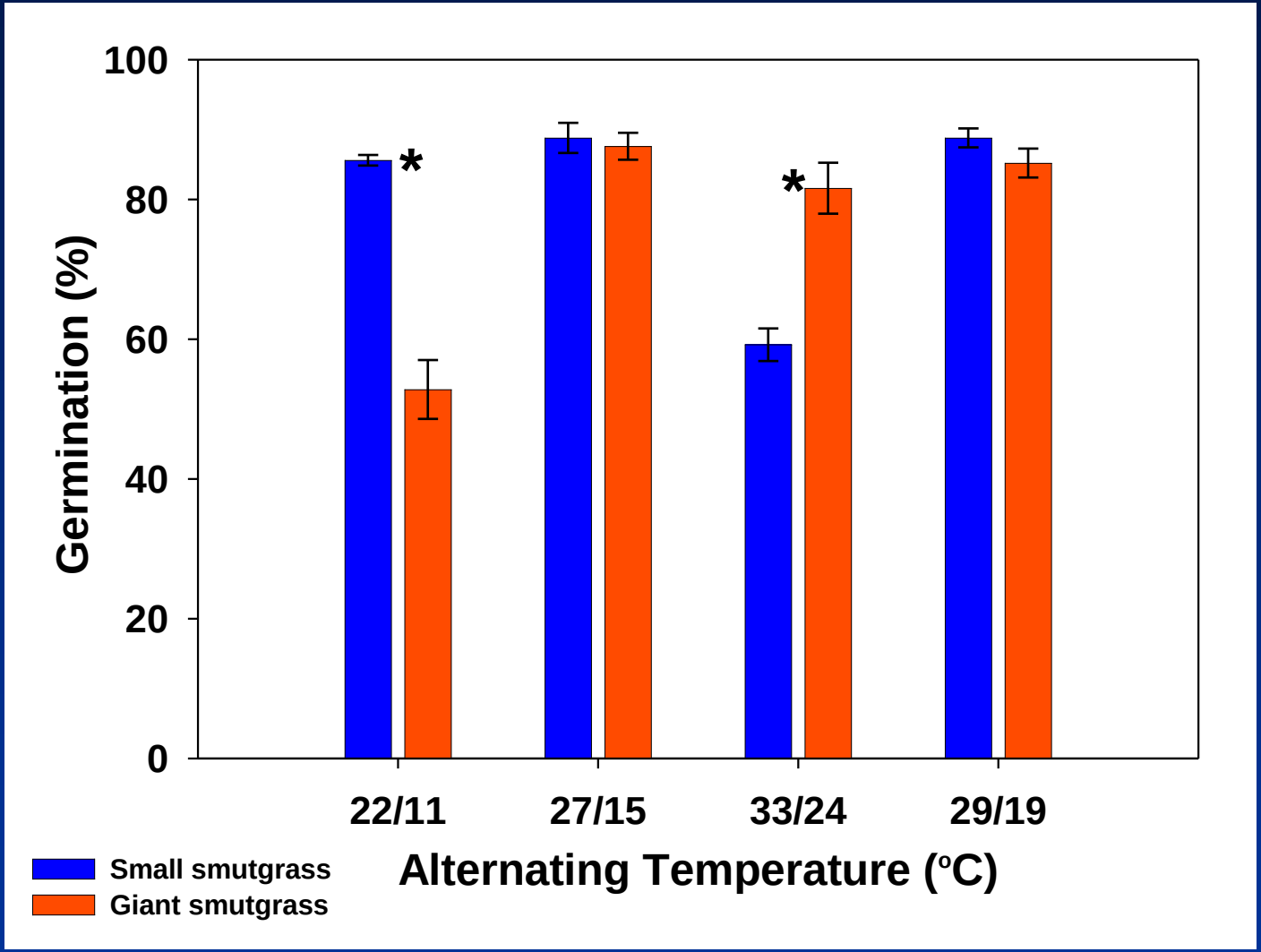
- Two species in Florida
  - Small smutgrass
  - Giant Smutgrass
- Control
  - 4 pt Velpar-rainy season
  - No surfactant is required
- Grazing restriction = 0; 38 d haying restriction

What We Know

- Cultural inputs alone are unsuccessful
- Chemical control alone is successful initially
- Integrated strategy for extended control is needed
  - Seed biology
  - Competition
  - Cultural plus chemical control



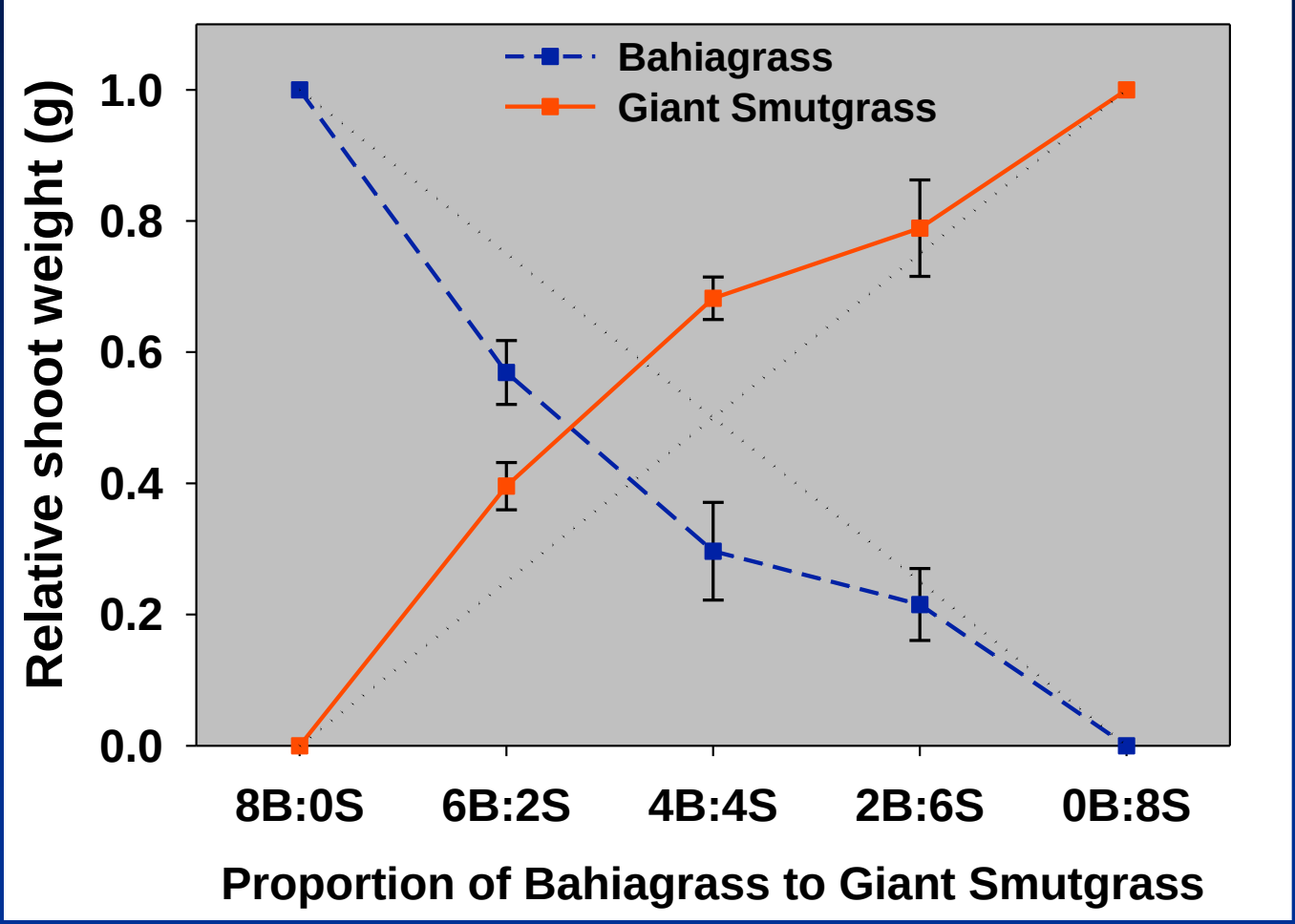
Diurnal Temperature Flux



Seed Summary

- Seed germination was higher at diurnal temperature flux than at constant temperatures
  - Both varieties germinated equally well at spring and fall temperature flux
  - Lower germination of small (59%) and giant (53%) smutgrass at summer and winter temperature flux, respectively
  - Small prefers moist and cool, and giant prefers moist and hot

Bahiagrass : Giant Smutgrass (pH 5.5)

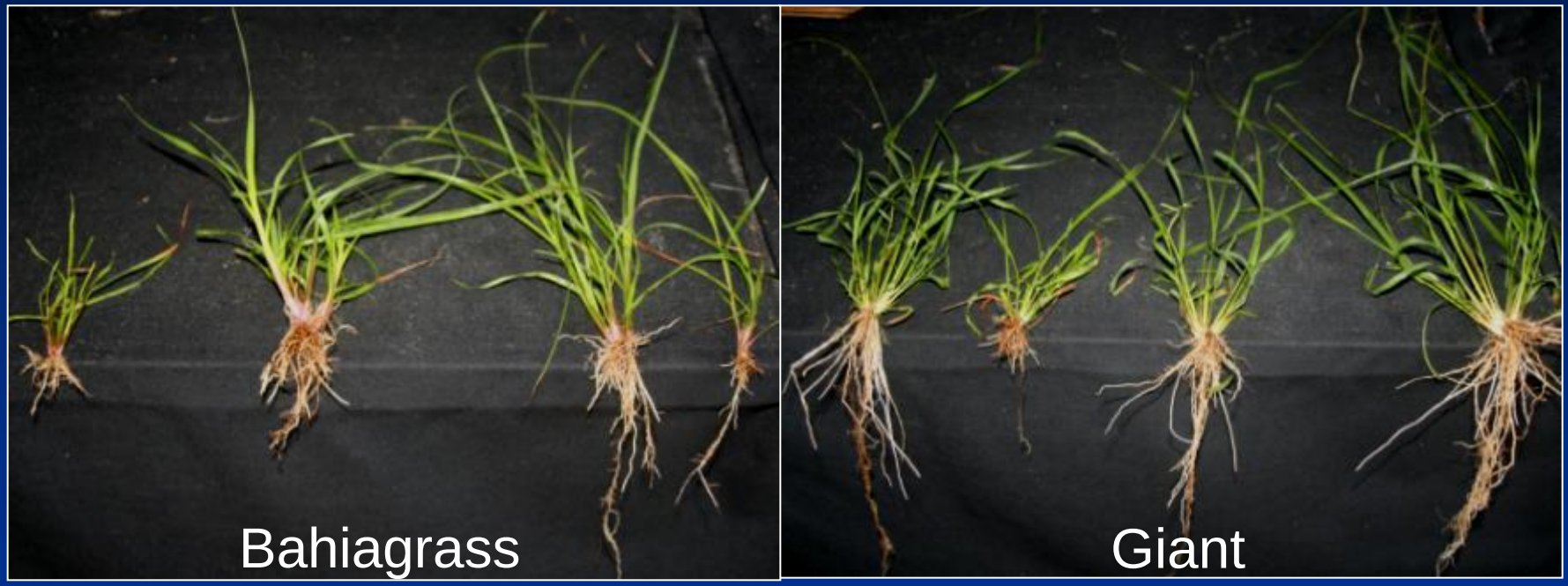


Replacement Series Summary

Bahiagrass:Giant Smutgrass

	4 plants/pot			8 plants/pot		
pH	75:25	50:50	25:75	75:25	50:50	25:75
4.5	B	G	G	B	G	G
5.5	B	G	G	B	G	G
6.5	B	G	G	B	G	G

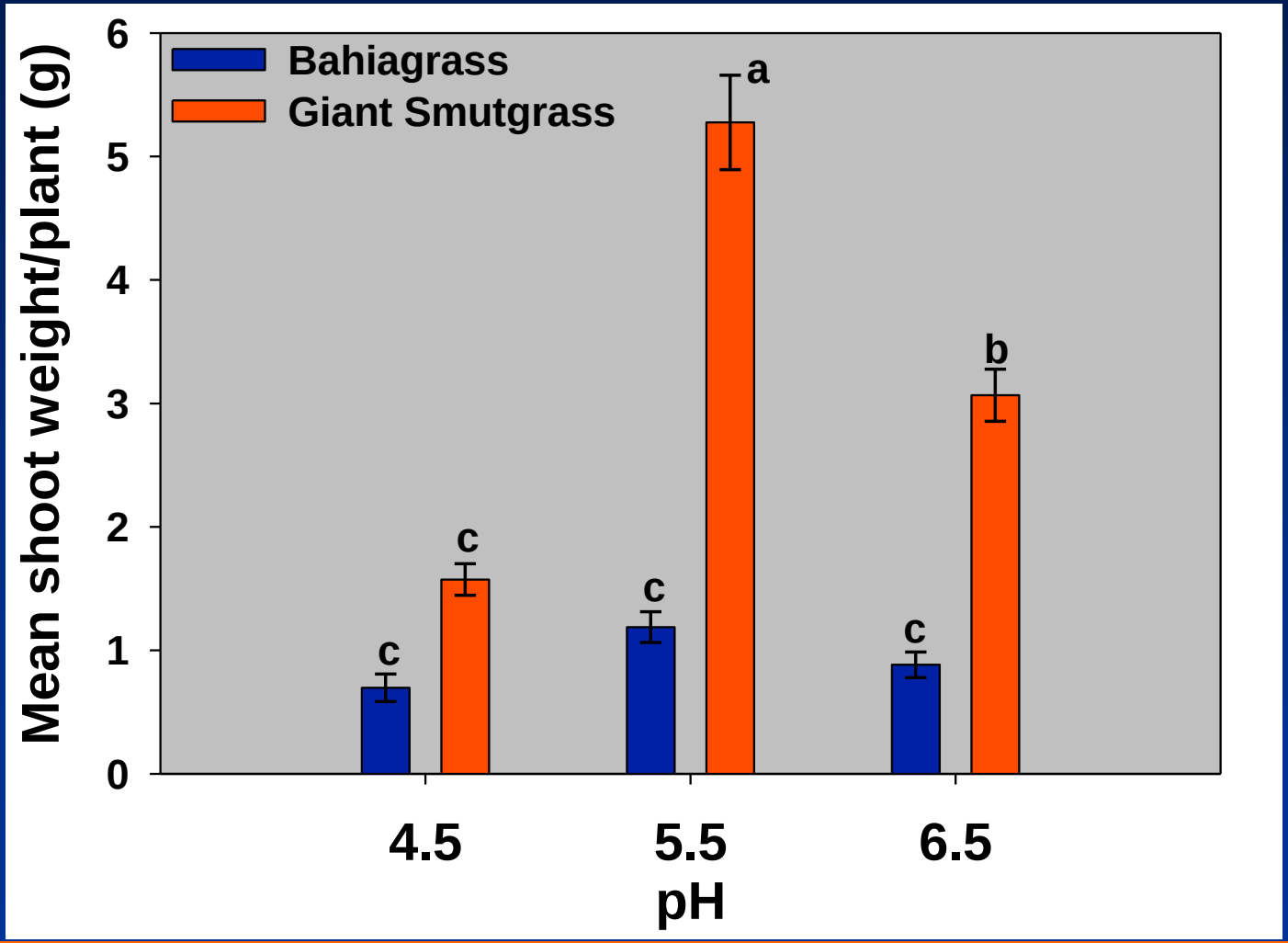
4B:4S (pH 4.5)



4B:4S (pH 5.5)

4B:4S (pH 6.5)

4Bahiagrass:4Giant Smutgrass



Replacement Series Summary

Bahiagrass:Small Smutgrass

	4 plants/pot			8 plants/pot		
pH	75:25	50:50	25:75	75:25	50:50	25:75
4.5	B	B	S	B	B	S
5.5	B	B	S	B	B	S
6.5	B	S	S	B	S	S

4B:4S (pH 4.5)

4B:4S (pH 5.5)

Bahiagrass

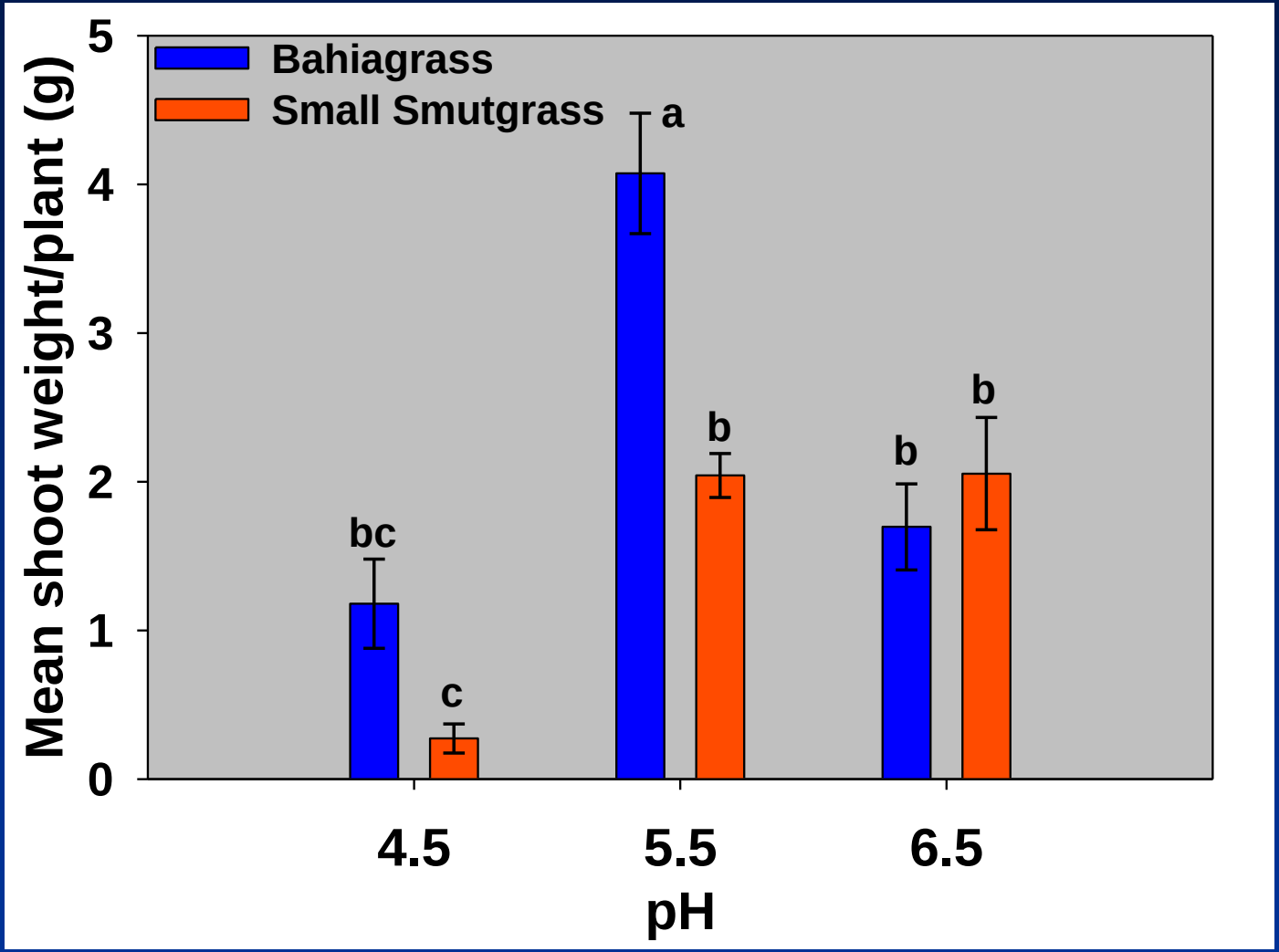
Small Smutgrass

4B:4S (pH 6.5)

Bahiagrass

Small Smutgrass

4Bahiagrass :4Small Smutgrass



Field Experiment 1

Treatments		Year			
2008 (kg/ha)	2009 (0.56 kg/ha)	2008	2009	2010	2011
		----------No. of plants/m^{-2}----------			
Hexazinone (1.12)	Hexazinone	2.80 a	0.48 bc	0.13 cd	0.18 bc
Renovation (4.48)	Hexazinone	2.88 a	5.53 a	0.23 bc	0.60 b
Fall roller chopping	Hexazinone	2.93 a	0.33 bc	0.03 d	0.39 b

Field Experiment 2

Treatments			2008	2009	2010	2011
2008	2009					
	Velpar	Nitrogen	----------No./m^2----------			
1.12 kg/ha	0 kg/ha	0 kg/ha	2	0.2	0.2	0.6
1.12 kg/ha	0 kg/ha	56 kg/ha	2	0.1	0.2	0.8
1.12 kg/ha	0.56 kg/ha	0 kg/ha	2	0.1	0.1	0.7
1.12 kg/ha	0.56 kg/ha	56 kg/ha	2	0.1	0	0.3

Treatments					
2008 Hexazinone rate (kg a.i. ha^{-1})	2009 Hexazinone rate (kg a.i. ha^{-1})	No. of plants plot^{-1} (24 MAT)	Annual Cost in 2008 ha^{-1}($)	Annual Cost in 2009 ha^{-1} ($)	Total cost in 2 years ha^{-1} ($)
0.00	0.00	11.7 a	0.00	0.00	0.00
0.00	0.56	12.7 abcdef	0.00	50.00	50.00
0.00	0.84	5.0 efg	0.00	76.00	76.00
0.56	0.56	1.0 fg	50.00	50.00	100.00
0.56	0.84	1.3 fg	50.00	76.00	126.00
0.84	0.00	2.5 cdefg	76.00	0.00	76.00
0.84	0.56	0.8 g	76.00	50.00	126.00
0.84	0.84	4.7 g	76.00	76.00	152.00
1.12	0.00	1.5 g	100.00	0.00	100.00
1.12	0.56	4.8 bcdefg	90.00	50.00	150.00
1.12	0.84	1.2 defg	90.00	76.00	176.00

Cogongrass (*Imperata cylindrica*)

Cogongrass Biology

- C^4 species
- Rhizomatous, warm season, invasive perennial
- Present on every continent except Antarctica
  - 200 million acres world-wide
- Rhizome formation begins at the 3-4 leaf stage
- Seed production = 3,000 seeds/plant
  - Viability and germination is variable among populations

Cogon Dominance

- Grows best in moderate soils with low pH, fertility and O.M.
- Adapted to full sun, but has a light compensation point of 32-35 μmol/m^2/s
- Subtropical and tropical areas
  - Dry cycle-leaf death-sacrifice for rhizome biomass
    - Lots of dead leaf biomass; doesn't decay
    - Pyrogenic
- Allelopathy
  - Chemical
  - Mechanical injury from rhizomes on other plants

Cogongrass

Cogongrass Control With Tillage

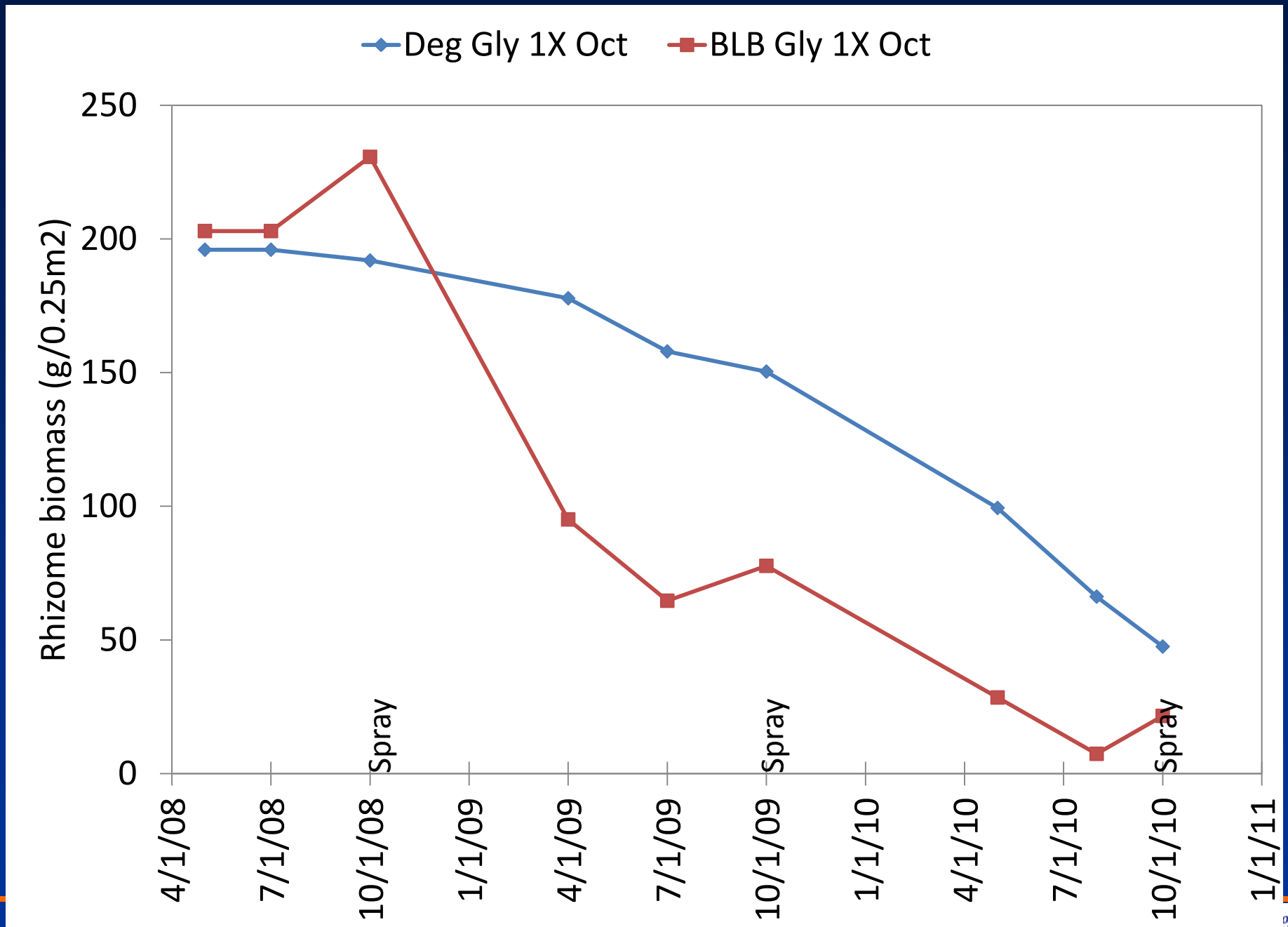
- Farm it out!
  - Repeated, frequent tillage that breaks up the entire rhizome layer is effective
- Recreational tillage FAIL
  - Infrequent tillage spreads cogongrass rhizomes and seed
  - Tillage for wildlife food plots can be a major source of cogongrass spread
- Cutting firebreaks can also spread rhizomes

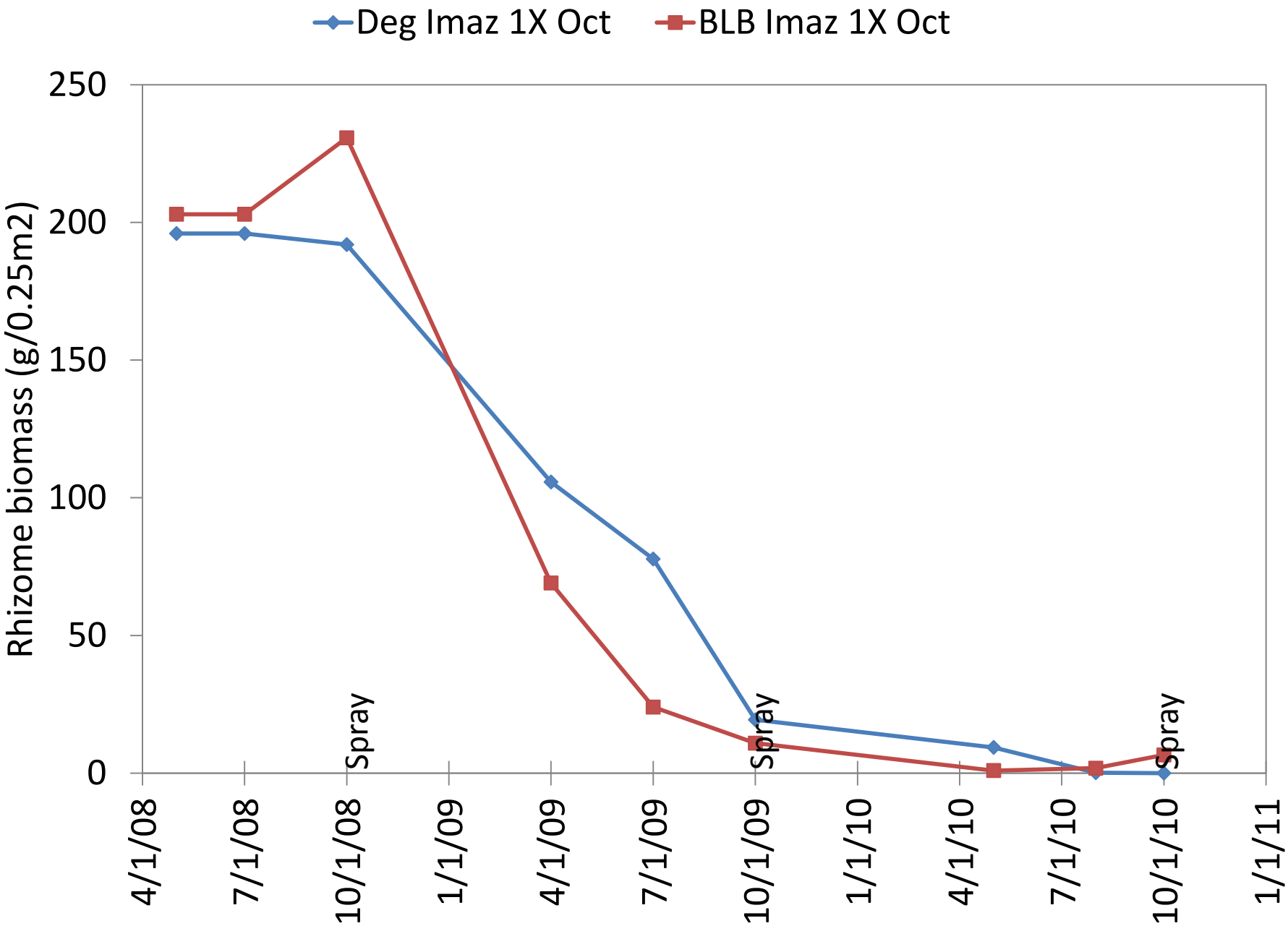
Herbicides that do work

- Glyphosate
  - 3-4 lb ae/A
  - 2-5% v/v depending on the product
- Imazapyr
  - 0.5-1 lb ai/A
  - 0.5%-2% v/v depending on the product

Control Versus Eradication: What does eradication really mean?

- The complete elimination of ALL living propagules, including sexual and asexual.


Deg Gly 1X Oct
BLB Gly 1X Oct
Rhizome biomass (g/0.25m2)
250
200
150
100
50
0
Spray
Spray
Spray
4/1/08
7/1/08
10/1/08
1/1/09
4/1/09
7/1/09
10/1/09
1/1/10
4/1/10
7/1/10
10/1/10
1/1/11


Deg Imaz 1X Oct
BLB Imaz 1X Oct
Rhizome biomass (g/0.25m2)
250
200
150
100
50
0
Spray
Spray
Spray
4/1/08
7/1/08
10/1/08
1/1/09
4/1/09
7/1/09
10/1/09
1/1/10
4/1/10
7/1/10
10/1/10
1/1/11

What works:
(99% reduction in rhizomes over three years)

- Imazapyr (1X per year)
  - Spring, summer, or fall
- Glyphosate (2X per year)
  - Spring + fall
- Imazapyr + Glyphosate (1X per year)
  - Spring, summer, or fall
  - Not any better than imazapyr alone

What is iffy

- Glyphosate (1X per year)
  - Summer
    - ~80% reduction at Degussa
    - ~95% reduction at Bayou LaBatre
  - Fall
    - ~75% reduction at Degussa
    - ~83% reduction at Bayou LaBatre

Broomsedge

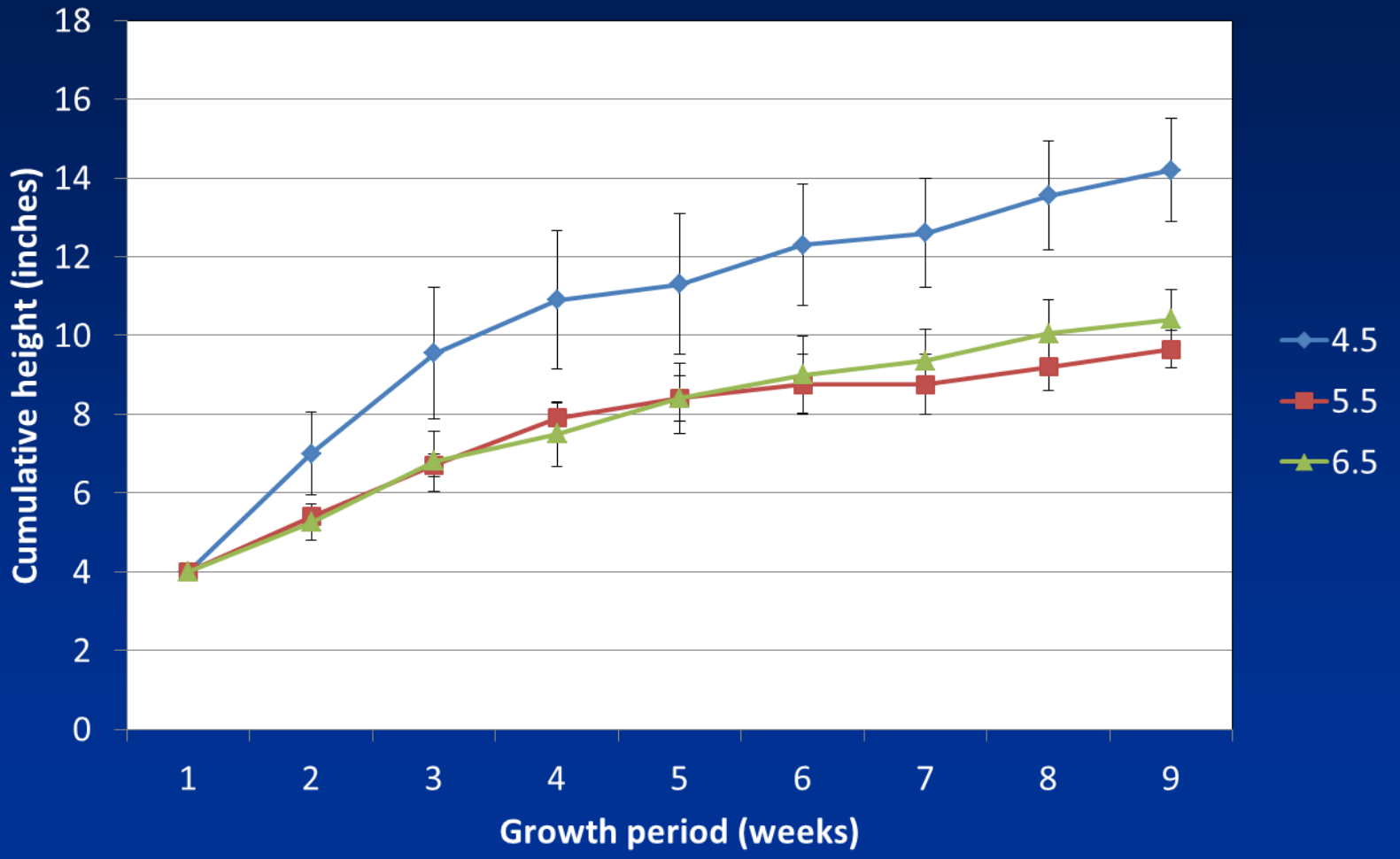
- ± 5 different species
- No selective herbicides
- Spot-treat with glyphosate in bahia & limpo
- Broadcast glyphosate at 1 pt/A immediately after harvest in bermudagrass & stargrass

Broomsedge & Soil

Location	pH	P	K	Mg	Ca	Cu	Mn	Zn
		----------ppm----------						
Hardee	5.9	42	11	12	1382	0	0.09	1.46
Polk	5.1	1	9	2	275	0	0.15	0.74
Polk**	6.0	105	17	26	872	1.37	1.12	19.39
Polk	4.5	3	26	20	250	0	0.03	7.34
Okeechobee	5.4	0	19	19	467	0	0	3.38
Highlands	4.1	2	40	124	873	0	0.66	3.97
Manatee	5.6	0	11	19	260	0	0	0.43
Ona	4.3	2	19	24	116	0	0	0.95
Glades	5.8	0	29	11	356	0	0	6.55

** Broomsedge population has declined

Cumulative Broomsedge Height



Vaseygrass

- Bahia = no options other than spot-trt
- Limpo = don’t overgraze; no options
- Bermudagrass & stargrass
  - 1.5 oz/A Pastora fb 1.0 oz/A ($$$$$$$)
  - 1 – 2 pt/A glyphosate after cutting
  - 1 oz/A Pastora + 1 pt/A glyphosate

Sandbur

- Bahia = no options
- Bermudagrass
  - 1.5 oz/A Pastora fb 1.0 oz/A ($$$$$$$)
  - 1 – 2 pt/A glyphosate after cutting
  - 1 oz/A Pastora + 1 pt/A glyphosate
- Stargrass
  - 1 – 2 pt/A glyphosate after cutting

Links of Interest

- Weed Management in Pastures and Rangeland – 2012: http://edis.ifas.ufl.edu/WG006
- Weed Science Extension Website: www.uflweed.com