

**Update on Perennial Grass
Weed control in Hawaii's
Sport Turf**

-

03/03/20209

with

**J. DeFrank – UH MANOA
In Consultations with
Rey Ito – The Green Doctor
David Kira – West Loch G.C.**



Tropical Plant & Soil Sciences Department
University of Hawaii at Manoa

Topics Covered

- Review of Goose and Bermuda grass management in Seashore paspalum turf
- Herbicides for perennial grassy weed control
- Research update: Focus on Torpedo Gr.
- Participant Q & A: What's your weed control problems in turf?



Factors to consider for Bermuda and Goose grass control in seashore paspalum greens and fairways

Bermudagrass-BG
(Cynodon dactylon)



Goosegrass-GG
(Eleusine indica)



SENCOR® 75%

1. OK for Estb. Bermuda Grass ½” or higher
2. Not for greens, tees, aprons. Not for SP.

Pylex™ herbicide

1. BG & SP, OK tolerance = marginal .
2. 1 application/year, see supl. label
3. Not for greens or collars = aprons.

Tenacity®

1. OK on BG & SP “avoid...unless control or injury can be tolerated”.
2. Not for greens w/5 ft. b/w treated area.

PROGRASS® SC

1. St. Aug OK w/pest = BG. SP not listed as site!
2. No restrictions for greens, tees, aprons.
3. Milky liquid, 4 lb ai/gal

PROGRASS®

1. SP as site with BG suppression
2. Not on greens. Fairways & tees OK.
3. Clear yellow liquid 1.5 lb ai/gal



Seashore paspalum fairways, control Bermuda and Goose grass

In turf heavily infested with goose grass apply preemergence prior to the start of the post emergence application

Provides seedling control in turf gap due to Gosse grass control

45 days prior to post emergence spray application
1st Barricade 65 WG at 1.0 lb./a

+ N-fertilizer

10-14 days prior to postemergence spray application
2nd Barricade 65 WG at 1.0 lb/a

+ N-fertilizer

Start 2-spray sequence of post emergence herbicides

Turf Species	Barricade 65 WG	
	Lb product/A	Oz product/1,000 sq ft
Bermudagrass ²	1.0-2.3 ¹	0.36-0.83
Bahiagrass		
Centipedegrass		
Kikuyugrass		
Seashore Paspalum		
St. Augustinegrass ³		
Tall Fescue (including turf-type)		
Zoysiagrass		

Do not apply more than 2.3 lb./a per year!



Seashore paspalum fairways, control Bermuda and Goose grass

- Winter best for BG suppression due to slower growth recovery
- Sequence of **TWO** 3-way tank mixes for maximum BG suppression and SP safety!

1st of 2 applications

Tenacity +	4 oz/a
Sencor +	4 oz/a
Prograss SC (4.0 lb ai/gal)	32
Prograss (1.5 lb ai/gal)	85.3 oz (6 gallons/yr limit)
MSO	2%

- Tenacity + Prograss provides long lasting growth suppression of BG, goose grass=NO, smut grass=YES control, UH tests show Tenacity helps with reduction of Pylex green color loss in next application
- Sencor provides reduced green color loss in SP due to growth suppression of SP
- Follow up 3-way tank mix provides goose grass control and added BG suppression
- Apply 14 days after 1st application

EXPERIMENTAL PROTOCOL – JUSTIFICATION FOR PRODUCT LABEL MODIFICATIONS



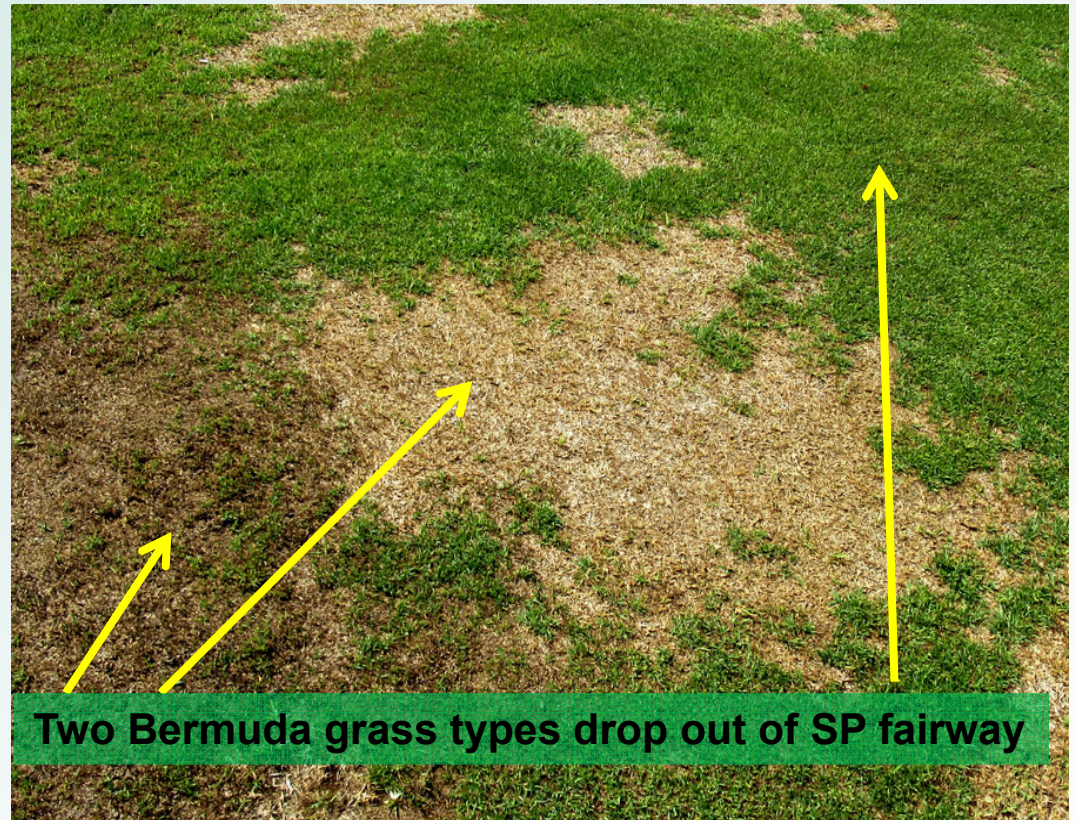
Seashore paspalum fairways, control Bermuda and Goose grass

- Follow up 3-way tank mix for goose grass control and added BG suppression

2nd of 2
applications

Pylex +	1 oz/a
Sencor +	4 oz/a
Prograss SC	32 oz/a
Prograss	85.3 oz
MSO	2%

- Pylex for goose grass control
- Sencor provides reduced green color loss in SP
- Mix adds to growth suppression of BG



- Questions: next step to help SP fill BG space?

1. Methods to enhance SP encroachment into BG patches: verticut, top dress & plug planting?
2. Follow up applications for continued BG suppression: Pro-G alone or tank mix sequence repeat?

EXPERIMENTAL PROTOCOL – JUSTIFICATION FOR PRODUCT LABEL MODIFICATIONS



Seashore paspalum greens, Goose grass control only!

- Summer best for rapid SP recovery
- Minimize BG loss if present

Pylex +	.5 oz/a
Sencor +	2 oz/a
MSO	1%

- Pylex for goose grass
- Sencor provides reduced green color loss in SP



21DAS01-03/07/17

- “1 and done” needs 3-5 day post spray dry down.
- Dry down keeps Pylex in root zone longer for better GG kill
- Good drainage essential for flushing & rapid greens recovery

EXPERIMENTAL PROTOCOL – JUSTIFICATION FOR PRODUCT LABEL MODIFICATIONS



Hoakalei Country Club

Pylex Discoloration Reduced with Sencor 75% DF

14 DAS-01 08/15/17

SeaDwarf Seashore Paspalum fairway.



Pylex alone
1.0 oz/a

Pylex 1.0 oz/a+ Sencor 4.0 oz/a



Good drainage provides better control of Pylex leaching from root zone for more rapid turf recovery of turf green color



Bermudagrass ('TifGrand') response to Pylex 0.5 oz/a 14 DAS-01, green band above tile drain at Magoon (**push up green w/heavy clay soil**)



Suggested wording on all herbicide labels to allow experimental use pattern discussed here on seashore paspalum & Bermuda Grass greens, tees aprons & fairways

Suggested wording would be published in the form of a “Special Local Need Label”

EFERA

Section 24(c) Special Local Need Label

FOR DISTRIBUTION AND USE ONLY WITHIN THE STATE OF HAWAII

SENCOR 75 DF – TENACITY - PYLEX

Do not apply to warm season turf (Seashore/Bermuda grass) less than ½ inch high unless injury or removal of turf can be tolerated

**TALK TO YOUR COMPANY REPRESENTATIVES
AND ASK FOR A 24c LABEL**



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Perennial Grassy Weeds in Bermuda grass

- Australian carpet grass (*Axonopus compressus*)
- Torpedo Grass (*Panicum repens*)
- West Loch Paspalum (*Paspalum spp.*) – larger mutation of turf type SP
- Tropical Signal Grass (*Urochloa distachya/ Brachiaria subquadrifera*)

ENABELING SOIL CONDITION = HIGH TO EXCESSIVE SOIL MOISTURE

MUST BE ADDRESSED FOR LONG TERM CONTROL IN ALL TURF GRASS SETTINGS





Forest Starr & Kim Starr

Australian carpet grass

Axonopus compressus



Tropical Plant & Soil Sciences Department
University of Hawaii at Manoa

Torpedo Grass

Panicum repens



West Loch Paspalum

Paspalum spp.



Torpedo Grass
Panicum repens

West Loch Paspalum
Paspalum spp.

Seashore paspalum
Paspalum vaginatum



Tropical Signal Grass

Urochloa distachya/ *Brachiaria subquadriflora*



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Australian Carpet, Tropical Signal grass, Torpedo grass control in Bermuda and Zoysia



MSMA restrictions:

- For newly constructed golf courses, One broadcast application only
- Established golf courses: only spot treatment with 100 ft² maximum per spot.
- Spot applications not to exceed 25% of total golf course acreage per year

For Bermuda & Zoysiagrass	Average size of golf course (acres)		
	100	150	200
MSMA Spot rate/1000 ft ² w/1– 2.5 gallons of water	25% of total course area (acres)		
	25 a	37.5 a	50 a
	Gallons of MSMS per 25% of total course area/year		
add ↓ 0.9 oz	7.6 gal	11.4 gal	15.2 gal
1.8 oz	15.2 gal	22.8 gal	30.4 gal



Australian Carpet, Tropical Signal grass, Torpedo grass control in Bermuda and Zoysia

MSMA + Sencor 75 DF –tank mix



MSMA restrictions:

- Weeds controlled: Brachiaria spp. (TSG), some level of control, inconsistent
- Guineagrass (Panicum spp.)

Sencor 75 DF

- 5-11 dry oz./ a
- Reapply tank mix 2 weeks later



Australian Carpet, Tropical Signal grass, Torpedo grass control in Bermuda and Zoysia

Monument: **Monument[®]75WG**

- 2 Xs 0.53 dry oz. /a, always use NIS, max yearly = 1.7 oz./acre/yr.
- Tropical SG, Torpedo G = suppression



Tribute total :

- 2 Xs 3.2 dry oz./a, w/ NIS or MSO , 6.4 oz./acre/yr.
- Tropical SG (4-tiller stage ?)

Celsius: **Celsius[®]WG**

- Broadleaf signal grass listed as controlled, same genus as Tropical Signal Grass
(Urochloa platyphtha) *(Urochloa subquadrifera)*
- 3.7 dry oz/a (2.4 grams/1000 ft²), not more than 7.4 oz/a/year
- Apply 2 Xs 21-30 days apart, with active growth and good soil moisture.
- Post applications imposed dry down needed for optimum effect
- Site modification to reduce/eliminate excessive moisture
- Constant wet conditions reduce herbicide effectiveness, weeds will return.



Australian Carpet, Tropical Signal grass, Torpedo grass control in Bermuda and Zoysia

Manuscript

Manuscript®

+ Agidor – recommended surfactant

Tropical Signal Grass:

Australian carpet grass

Bahia grass, Dallis grass, Seashore paspalum = all Paspalum species

Suppression of Torpedograss

Broadcast Label rate: 19.2 fl oz/a, applied 1 time

9.6 fl oz/a, applied 2 times 14 days apart



Australian Carpet, Tropical Signal grass, Torpedo grass control in Bermuda and Zoysia

Manuscript + Spot treatment rates to match UH-research rates

For Bermuda & Zoysiagrass	Average size of golf course (acres)		
	100	150	200
Manuscript Spot rate 9.6 oz./20 gallon	No more than 10,000 ft. ² / acre Total treatable acres as “spot treatment”		
	23 a	34.5 a	46 a
Spray to wet but not runoff	Gallons per total course area/year with yearly maximum of 19.2 oz./a		
	3.4 gal	5.1 gal	6.9 gal
To obtain 41 oz./a As “spot treatment” apply 20 gallons to 10,200 ft. ² 85 GPA	46 total - 20-gallon batches	69 total - 20-gallon batches	92 total - 20-gallon batches



Manuscript, Monument & Tribute Total on Tropical Signal Grass at West Loch G.C. - 2017

Applications: 3 X's at 0, 21 & 42 days

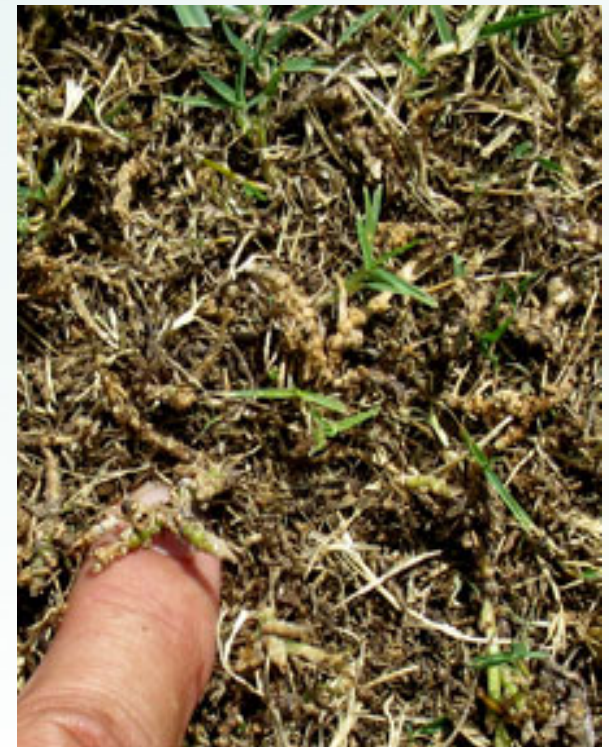
Monument 22 g/a



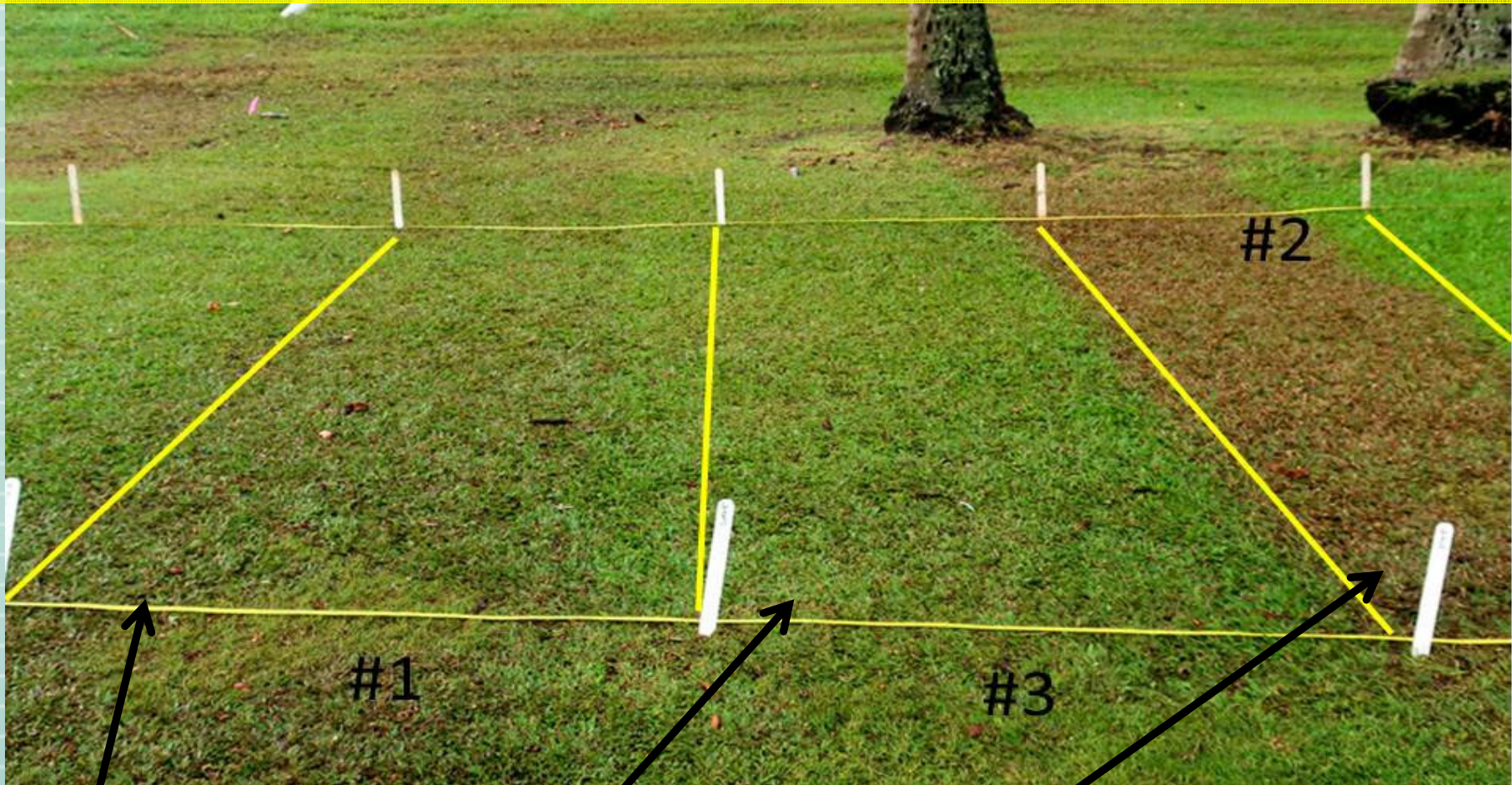
Tribute Total DF 3.2 oz/a



Manuscript 38.3 oz/a



Monument, Manuscript order of application vs a tank mix on Australian Carpet grass



#1 Monument 15 g/a 7-D
then Manuscript 19.2 oz/a

#3 Monument 15 g/a +
Manuscript 19.2 oz/a

#2 Manuscript 19.2 oz/a
7-D then Monument 15 g/a

14 days from start and 7 days after 2nd application

SEQUENCE & TANK MIX PARTNERS - MATTER



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Monument, Manuscript multiple applications & a tank mix on West Loch Paspalum

MAN 21 oz/a



0, 14 & 35 DAY

**MAN 21 oz/a +
MON 5 G/A -AGD**



0, 14 & 35 DAY

MON 15 G/A



0 & 35 DAY

MAN 41 oz/a



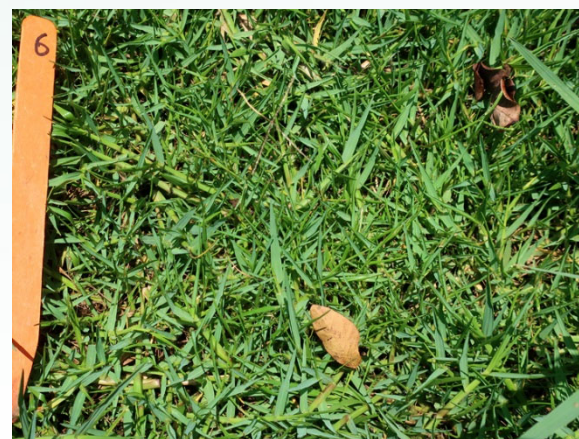
0 & 14 DAY

**MAN 41 oz/a then
MON 15 G/A then MAN 41 oz/a**



0 - 14 - 35 DAY

NOT TREATED



ALL TREATMENT OK ON BERMUDA (419)

Results at 50 DAS03

Determine the response of TG to sequence of split application of selective systemic herbicides

West Loch Torpedo Grass Study



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University of Hawaii at Manoa

Determine the response of TG to sequence of systemic herbicides

West Loch Torpedo Grass Study – Aug 2019

Rational for herbicides used in this study

Monument[®]75WG

Torpedo grass suppression

Celsius[®]WG

Label lists grassy weed control for Switchgrass, Common millet, Texas Panicum & Fall panicum all same species as Torpedo grass (Panicum repens)

Manuscript[®]

Torpedo grass suppression

 **Dismiss[®]NXT**

Torpedo grass suppression



Determine the response of TG to sequence of systemic herbicides West Loch Torpedo Grass Study – Aug 2019

- Timing for split applications based on return of normal green leaves with active growth
- Sequence designed to maximize impact of AI then change mode of action
- Treated foliage replaced by new stems able to carry AI into root/stolon system

Treatment	Formulated product oz or g/ acre	Application time Days after start (DAS #) - start 08/02/19		
		0-08/02/19	35-DAS01-09/06/19	41-DAS02-10/17/19
1a-Monument + NIS ¹	15 g	APPY TRT 1a	APPY TRT 1b	APPY TRT 1c
1b-Manuscript + Agidor (0.5%)	41 oz			
1c-Monument + NIS ¹	15 g			
2a-Celsius WG + NIS ¹	105 g	APPY TRT 2a	APPY TRT 2b	APPY TRT 2c
2b-Manuscript + Agidor (0.5%)	41 oz			
2c-Celsius WG + NIS ¹	105 g			
3a-Dismiss NXT	15 oz	APPY TRT 3a	APPY TRT 3b	APPY TRT 3c
3b-Manuscript + Agidor (0.5%)	41 oz			
3c-Dismiss NXT	15 oz			
4a-Manuscript + Agidor (0.5%)	41 oz	APPY TRT 4a	APPY TRT 4b	APPY TRT 4c
4b-Monument + NIS ¹	15 g			
4c-Manuscript + Agidor (0.5%)	41 oz			
5a-Manuscript + Agidor (0.5%)	41 oz	APPY TRT 5a	APPY TRT 5b	APPY TRT 5c
5b-Dismiss NXT	15 oz			
5c-Manuscript + Agidor (0.5%)	41 oz			
6a-Manuscript + Agidor (0.5%)	41 oz	APPY TRT 6a	APPY TRT 6b	APPY TRT 6c
6b-Celsius WG + NIS ¹	105 g			
6c-Manuscript + Agidor (0.5%)	41 oz			
7 Non-treated				



Torpedo Grass 13 DAS01 - Visual signs for 2nd app.

7-Untreated



Manuscript 41 oz/a

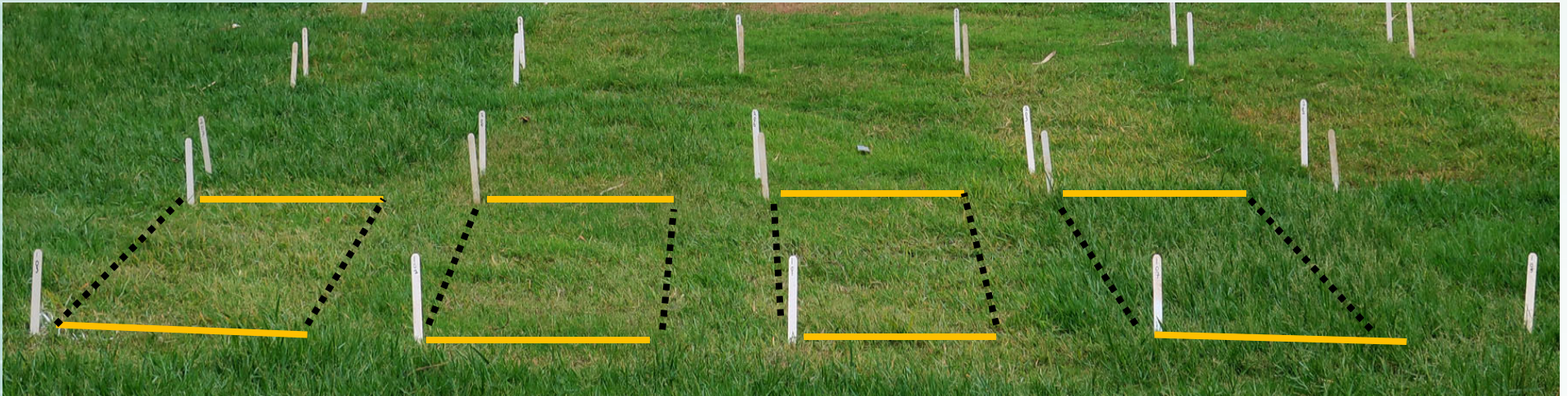


Any follow up application needs fresh normal looking leaves for optimum impact on perennial grassy weeds



Torpedo Grass 14 DAS02

Single Manuscript application



3a-D-NXT15 oz/a
35 days
3b-Manus 41 oz/a

2a-Celsius 105 g/a
35 days
2b-Manus 41 oz/a

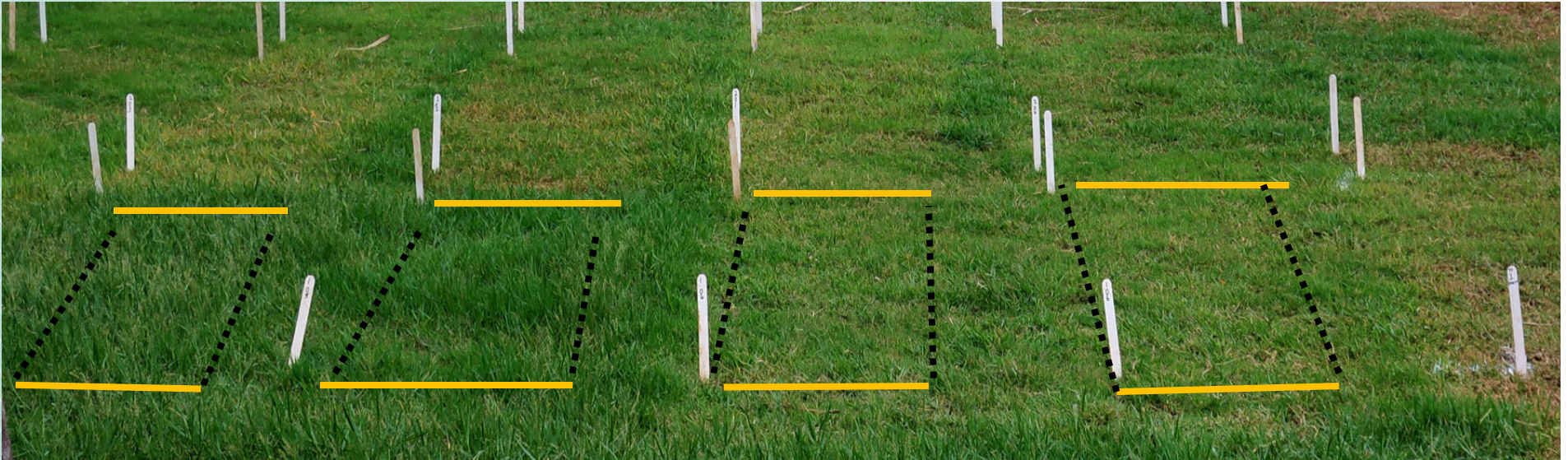
1a-Monum15 g/a
35 days
1b-Manus 41 oz/a

7-Untreated



Torpedo Grass 14 DAS02

Two Manuscript applications



Untreated

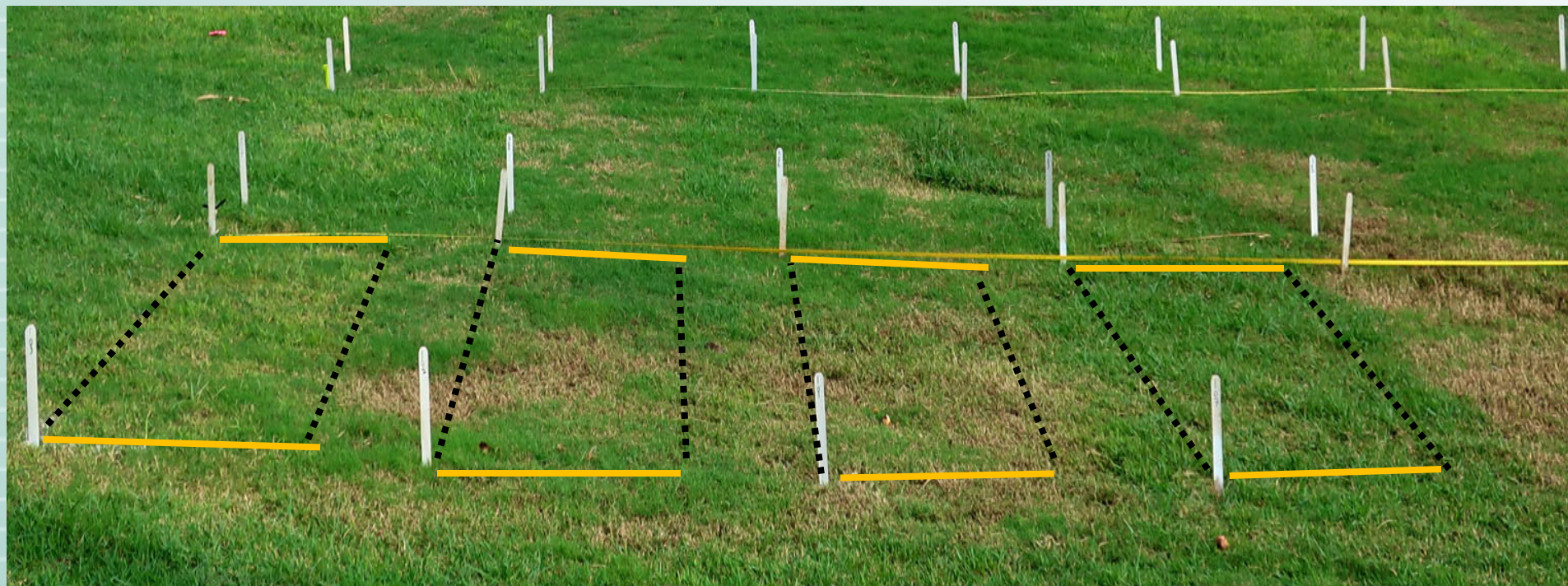
5a-Manus 41 oz/a
35 days
5b-D-NXT15 oz/a

4a-Manus 41 oz/a
35 days
4b-Monum15 g/a

6a-Manus 41 oz/a
35 days
6b-Celsius 105 g/a



Torpedo Grass 15 DAS03 - Single Manuscript applications



3a-D-NXT15 oz/a
35 days
3b-Manus 41 oz/a
41 days
3c-D-NXT 15 oz/a

2a-Cels 105 g/a
35 days
2b-Manus 41 oz/a
41 days
2c-Cels 105 g/a

1a-Monum15 g/a
35 days
1b-Manus 41 oz/a
41 days
1c-Monum 15 g/a

7-Untreated



Torpedo Grass 15 DAS03 – Two Manuscript applications



Untreated

5a-Manus 41 oz/a
35 days
5b-D-NXT15 oz/a
41 days
5c-Manus 41 oz/a

4a-Manus 41 oz/a
35 days
4b-Monum15 g/a
41 days
4c-Manus 41 oz/a

6a-Manus 41 oz/a
35 days
6b-Cels 105 g/a
41 days
6c-Manus 41 oz/a



Torpedo grass response 29 Days after 3rd (#c) spray application
76 days between 1st and 3rd application

Conclusions

Most consistent suppression of Torpedo Grass using a single Manuscript application

#2 Celsius -35 days- Manuscript -41 days Celsius

Most consistent suppression of Torpedo Grass using a two Manuscript applications

#6 Manuscript -35 days-Celsius -41 days Manuscript



Conclusions

Changes in Torpedo grass growth habit

1. Dismiss-NXT caused TG top-burn in 3-5 days, regrowth with increase in new stems
2. Multi-stem regrowth due to D-NXT provides more conduits for systemic uptake.
3. Celsius provided longest lasting TG yellowing and growth suppression.
4. Longer intervals for sequential sprays when Celsius used.



Conclusions

Management considerations for Torpedo Grass Management

1. Start the cycle April-Aug to enhance systemic herbicide action and BG fill in
2. Delay mowing for 3-5 days after sprays to allow for uptake/movement
3. Insure full TG regrowth with normal looking foliage prior to next spray.
4. Long term TG management will require reduced soil moisture levels to favor BG.
5. ***Be vigilant***, TG will return and multi-season treatment is required, fight seed head development in cool rainy seasons with summer treatments.



Australian Carpet, Tropical Signal grass, Torpedo grass control in Bermuda and Zoysia

The Green Doctor Says:

Celsius® WG

+

Revolver®

Tank mix

- Celsius: 3.0 grams/ 1,000 ft² +
- Revolver: 14 ml/ 1,000 ft² + MSO 1%

Apply then allow for 3-5 day dry down

2nd application requires flush of new normal looking green foliage

When any surviving grasses recover, use alternating single treatment applications of Monument 15 g/a

Allow for new foliage to appear then followed with

Manuscript 9.6 oz./20 gallon spray to wet and cover 10,000 ft²

Recommended time of year is May-Oct in Hawaii, seed head suppression during rainy season



Take home points

Torpedo grass @ irrigation head



1. Persistent perennial grassy weeds favored by wet conditions
2. Allow systemic herbicides time to work before next application
3. Elimination of top growth breaks buds on underground stems
4. Fresh stems/foilage best target for subsequent treatment
5. Mixing certain herbicide modes of actions can cause tank mix antagonisms.
6. Avoid herbicide tolerance need to rotate herbicide mode of action



For more information

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On line video and slideshow:

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