

## **EFFECT OF VARIOUS HERBICIDES ON YIELD OF ESTABLISHED 'COASTAL' BERMUDAGRASS.**

T.J. Butler and S.M. Interrante. Texas A&M University Research and Extension Center, Stephenville.

### **Summary and Application**

Several new herbicides have been labeled for pasture weed control, however their effect on 'Coastal' bermudagrass [*Cynodon dactylon* (L.) Pers.] dry matter (DM) yield is not well documented. The objective of this study was to determine the effect of some "newer" herbicides [Starane (fluroxypyr), Remedy (triclopyr), Redeem R&P (triclopyr + clopyralid), Pasturegard (triclopyr + fluroxypyr), LAF004 (picloram + fluroxypyr), Envoke (trifloxysulfuron), and Plateau (imazapic)] on 'Coastal' bermudagrass DM yield, and to compare them to traditional pasture herbicides. Cimarron Max, 2,4-D LV6, Fuego, Reclaim, and Weedmaster did not reduce yields in any harvest. Envoke and Grazon P+D reduced yield only in the first harvest, 2001 (low rainfall year), but not in 2002 (higher rainfall year). Remedy, Redeem, PastureGard, and Plenum reduced yield in the first harvest both years, but did not reduced total DM yield in either year. Tordon 22K and Starane reduced DM yields in the first harvest and total harvests both years. Plateau reduced DM yields in all harvests both years.

### **Introduction**

Weeds compete with pasture plants for moisture, light, and nutrients. It is estimated that every lb of weed reduces the production of forage by an equal amount. Weeds can also reduce the quality and value of hay. It is important to control weeds in order to maximize forage

production and quality.

Herbicides used for forage and pasture management should provide effective weed control without negatively affecting forage growth and yield. Research indicates that herbicides such as 2,4-D amine, dicamba, 'picloram + 2,4-D amine' (Grazon P+D), and 'dicamba + 2,4-D amine' (Weedmaster) applied to established Coastal bermudagrass for post-emergent weed control had no inhibitory effects on forage quality or yield (1, 2, 3). However, picloram applied during periods of low rainfall has been found to severely reduce the density and yield of 'Coastal' bermudagrass (1).

The objective of this study was to determine the effect of newer herbicides Starane, Remedy, Pasturegard, LAF004, Redeem R&P, Envoke, and Plateau on DM yield of 'Coastal' bermudagrass, and to compare them to traditional pasture herbicides.

### **Methods and Materials**

A randomized complete block design experiment with three replications was initiated on fully established Coastal bermudagrass during the 2001 and 2002 growing seasons in Stephenville, TX. The herbicides and application rates evaluated in this study are listed in Table 1. In 2001, Plateau treatments were made to dormant bermudagrass on 15 March and all herbicide treatments were applied to actively growing bermudagrass on 19 April. In 2002, Plateau treatments were applied to dormant bermudagrass on 15 February and all herbicide treatments were applied to

actively growing bermudagrass on 19 April. All herbicide treatments were made using a backpack CO<sub>2</sub> sprayer delivering 15 gallons per acre (GPA). All plots were fertilized with 100 lb N/A and 40 lb P<sub>2</sub>O<sub>5</sub> (recommended according to soil test) in late April, and an additional 100 lb N/A was applied after each harvest. Yields were estimated by harvesting 3.5 by 20 ft from each plot throughout the growing season when sufficient growth was present

(approximately monthly intervals). Samples were dried at 120° F for 48 hr and yields are reported as lb DM/A. Year 2001, which was considered to be a low rainfall year, only received 7.59 in rainfall during April – August; Year 2002, which was considered to be a normal year, received 16.06 in rainfall from April – August compared to the 30 yr average of 15.03 in for the same time period.

Table 1. Herbicide product names, chemical names, rates, and active ingredient (a.i.) used in this study.

Product Name	Chemical Name	Product Rate <sup>#</sup>	lb a.i./A
<b>Traditional Herbicides</b>			
AgriStar 2,4-D LV6	2,4-D LV6	3 pt/A	2.25
Cimarron Max <sup>†</sup>	metsulfuron + 2,4-D + dicamba	0.5 oz/A + 2 pt/A	0.019 + 0.97
Fuego	triasulfuron + dicamba	1:8	0.028 + 0.4
Grazon P+D	picloram + 2,4-D amine	3 pt/A	0.95
Reclaim	clopyralid	2 pt/A	0.75
Tordon 22K	picloram	2 pt/A	0.5
Weedmaster	dicamba + 2,4-D amine	3 pt/A	1.45
<b>New Herbicides</b>			
Envoke <sup>‡</sup>	trifloxysulfuron	0.5 oz/A	0.019
PastureGard <sup>§</sup>	triclopyr + fluroxypyr	3 pt/A	0.75
Plateau	imazapic	6-12 oz/A	0.09-0.18
LAF004 <sup>§</sup>	picloram + fluroxypyr	2 pt/A	0.34
Redeem R&P	triclopyr + clopyralid	3 pt/A	1.125
Remedy <sup>¶</sup>	triclopyr	3 pt/A	1.5
Starane	fluroxypyr	2 pt/A	0.375

<sup>†</sup> Cimarron Max was only applied in 2002.

<sup>‡</sup> Envoke is not currently labeled for pastures, but may be in the future.

<sup>§</sup> Pasturegard and LAF004 are awaiting EPA clearance and should be available in late 2003.

<sup>¶</sup> In this study, Remedy was considered a new pasture herbicide due to lack of published data on its effect on Coastal bermudagrass.

<sup>#</sup> The maximum labeled rate for each herbicide was used to verify the effects on Coastal bermudagrass, which may not be the appropriate rate to use if the weeds are small and actively growing.

**Results and Discussion**

In both 2001 and 2002, 2,4-D LV6, Weedmaster, Fuego, and Reclaim did not effect the DM yield of 'Coastal' bermudagrass in any harvest or total yield (Table 2 and 3), and Cimarron Max did not reduce the yield of Coastal bermudagrass in any harvest during the 2002 growing season (the only year it was tested).

In 2001 (low rainfall year), DM yield of Coastal bermudagrass in the first harvest was reduced 54% by Envoke, and 31% by Grazon P+D, (Table 2), but not in the first harvest of 2002 (normal year) (Table 3) or total yield in either year. In both 2001 and 2002, DM yield of Coastal bermudagrass in the first harvest was reduced 38% by Remedy, 47% by Redeem R&P, 38% by Pasturegard, and 49% by LAF004, but the total yield was not reduced in either year.

Table 2. Herbicide tolerance based on yield of established Coastal bermudagrass to various herbicides in 2001.

	<b>Harvest 1</b>	<b>Harvest 2</b>	<b>Harvest 3</b>	<b>Total</b>
	<b>05-23-01</b>	<b>07-05-01</b>	<b>08-15-01</b>	
<b>Treatment – April 19, 2001</b>	<b>Lb/A</b>			
2 pt Reclaim	2029	1989	3268	7285
No herbicide	1959	1647	3371	6976
Fuego (1 container/8 Ac)	1786	1863	3320	6969
3 pt 2,4-D LV6	1856	1704	3305	6865
3 pt Grazon P+D	1358	1918	3373	6649
2 pt Remedy	1234	1739	3547	6520
3 pt Weedmaster	1710	1552	3023	6286
2 pt LAF004 (experimental)	983	1524	3360	5867
3 pt/A PastureGard (experimental)	1216	1581	3063	5860
2 pt Tordon 22K	666	2202	2286	5754
4 pt Redeem	1110	1784	2796	5691
2 pt Starane (experimental)	1460	1626	2467	5553
0.5 oz Envoke (experimental)	897	1261	3098	5256
9 oz Plateau	94	1227	2092	3438
6 oz Plateau-dormant <sup>†</sup> (03-19-01)	520	1379	1516	3415
6 oz Plateau	59	1038	1960	3057
9 oz Plateau-dormant (03-19-01)	246	1252	720	2193
12 oz Plateau-dormant (03-19-01)	109	881	677	1667
<b>LSD within each harvest</b>	<b>591</b>	<b>562</b>	<b>711</b>	<b>1432</b>

Table 3. Herbicide Tolerance based on yield of established Coastal bermudagrass to various herbicides in 2002.

	<b>Harvest 1</b>	<b>Harvest 2</b>	<b>Harvest 3</b>	<b>Harvest 4</b>	<b>Total</b>
	<b>05-15-02</b>	<b>06-14-02</b>	<b>07-15-02</b>	<b>09-10-02</b>	
<b>Treatment – April 19, 2002</b>	<b>Lb/A</b>				
3 pt 2,4-D LV6	3031	3722	4279	3078	14112
No herbicide	2402	3942	4243	2858	13446
Cimarron Max Rate II	3078	3234	4212	2927	13411
Fuego (1 container/8 Ac)	2436	3581	4129	2569	12716
3 pt Grazon P+D	1852	3580	4140	2819	12393
0.5 oz Envoke (experimental)	1976	3345	4049	2857	12227
2 pt Reclaim	1805	3430	4107	2435	11778
9 oz Plateau (applied 02-15-02)	1240	2717	3917	3655	11530
3 pt Weedmaster	2024	3075	3901	2454	11454
2 pt Remedy	1479	3193	3992	2587	11252
3 pt Redeem	1202	3613	3825	2219	10860
3 pt/A PastureGard (experimental)	1511	3306	3816	2346	10978
2 pt LAF004 (experimental)	1282	3365	3954	2000	10600
2 pt Tordon 22K	960	3183	3964	2396	10504
2 pt Starane (experimental)	1218	2793	3788	2048	9848
6 oz Plateau	376	2399	3669	2557	9002
9 oz Plateau	321	1835	3474	2567	8198
12 oz Plateau	281	1003	2785	2248	6317
<b>LSD within each harvest</b>	<b>938</b>	<b>939</b>	<b>552</b>	<b>N.S.</b>	<b>2460</b>

In 2001 and 2002, the DM yield of Coastal bermudagrass in the first harvest was reduced 63% by Tordon 22K, and 37% by Starane, and the total harvest yield were reduced by 21% with Tordon 22K, and 23% with Starane, averaged across years (Table 2 and 3).

Actively growing applications of 6, 9, 12 oz/A Plateau reduced Coastal bermudagrass DM yield in all three harvests and total yield by 46, 52, and 62%, respectively, averaged across years. Dormant applications of 9 oz/A Plateau reduced DM yield in all three harvests in 2001 and the first two harvests of 2002, which caused total DM yield to be reduced by 47%, averaged across years (Table 2 and 3).

### Conclusions

The herbicides in this study were relatively safe on Coastal bermudagrass, except for Tordon 22K, Starane, and Plateau, which caused reduction in total DM yield. Tordon 22K and Starane are typically used as spot-treatments for “hard-to-control” weed or brush species; therefore their effects on pasture weed control are minimal. Based on these results, herbicide selection for broadleaf weed control should be based on price and weed efficacy. Plateau is the only labeled herbicide for grass and sedge control in pastures, and should only be used when there is a specific grassy-weed problem, because it reduces bermudagrass production.

### **Literature Cited**

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