

SPRANGLETOP CONTROL IN ST. AUGUSTINE SOD PRODUCTION

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Additional index words. Preemergence, herbicide, weed control, *Leptochloa fascicularis*, *Stenotaphrum secundatum*.

Abstract. Field experiments were conducted on commercial sod farms to evaluate metolachlor, napropamide, proflam, pendimethalin, atrazine, simazine, and diclofop for bearded sprangletop (*Leptochloa fascicularis*) control and growth effects on freshly ribbon-cut harvested St. Augustine grass (*Stenotaphrum secundatum*). Generally, none of the herbicides tested were excessively injurious to St. Augustine. Metolachlor, napropamide, and pendimethalin provided good control of sprangletop without reduction of runner development.

In the last 6 years bearded sprangletop (*Leptochloa fascicularis*) has gone from an occasional pest in St. Augustine (*Stenotaphrum secundatum*) turf to a major infestant of commercial sod farms, according to interviews with producers in west central and southwest Florida. Most sod producers rely on atrazine for weed control, particularly after harvest in a ribbon-cutting operation (Pat Hamilton, Turfgrass Producers Association of Florida, personal communication). Although atrazine provides good control of many weeds (1, 2), it seldom controls sprangletop, thus allowing it to flourish without competition (Keith Hamilton, University of Arizona, personal communication). Presently, most of the large sod producers in west central and southwest Florida consider sprangletop control a serious problem (Pat Hamilton, personal communication). Research was conducted on two commercial farms in 1989 to evaluate selected preemergence herbicides for control of bearded sprangletop in freshly harvested St. Augustine sod.

Materials and Methods

Field sites were selected in areas of 'Floritam' St. Augustine heavily infested with bearded sprangletop on a farm near Bradenton, FL and on another farm near Fort Lonesome, FL. Soil in both locations was a similar fine sand with less than 1% organic matter and pH in the range

of 5.5 to 6.3. The same herbicide treatments were applied at the two sites. Both sites were irrigated by seepage irrigation. Treatments (Table 1) were applied to 7 ft by 20 ft plots arranged in a randomized complete block design with 4 replications. The sod had been ribbon-cut harvested 4 hours before herbicide application at Bradenton and 24 hours before application at Fort Lonesome. Preemergence herbicides were applied with a CO₂ back pack sprayer equipped with a four nozzle boom on 20 and 28 April, 1989 at Fort Lonesome and Bradenton, respectively. Spray preparation application volume was 20.0 gal/acre at Fort Lonesome and 44.4 gal/acre at Bradenton. St. Augustine phytotoxicity was evaluated 14 days after treatment application (DAT) using a 0 to 100 percent scale where 0 indicates no injury and 100 represents death of affected tissues. St. Augustine vigor and sprangletop control were evaluated 21, 40, and 60 DAT at both locations and 81 DAT at Bradenton. St. Augustine vigor was evaluated using a 0 to 100 percent scale where 0 represents all plants were dead and 100 indicates optimum growth. Sprangletop control was evaluated visually on a 0 to 100% scale 21 DAT at Fort Lonesome, 40 and 60 DAT at both locations, and 81 DAT at Bradenton. The number of sprangletop plants per plot were counted for the initial 21 DAT date at Bradenton. Additional counts were not made because sprangletop plants became too numerous in the untreated plots. Runner development was evaluated 40 and 60 DAT at both locations and 81 DAT at Bradenton using a visual rating scale where 0 = runners were not forming, 1 = runners just beginning to develop, 2 = runners one-half the distance between ribbons, and 3 = runners had grown from one ribbon to the next.

Results and Discussion

When evaluated 14 DAT only 2.0 lb./acre diclofop at Bradenton produced significant phytotoxicity (2%) and that level was not considered important from the grower's

Table 1. Phytotoxicity of preemergence herbicides to 'Floritam' St. Augustine grass 14 days after application at two locations. Spring 1989.

Herbicide	Rate (lb./acre)	Phytotoxicity (%) ²	
		Bradenton	Ft. Lonesome
Untreated	0.0	0b ³	0a
Metolachlor	2.0	0b	0a
Metolachlor	4.0	0b	5a
Napropamide	4.0	0b	0a
Proflam	1.0	0b	0a
Proflam	2.0	1ab	0a
Proflam	4.0	0b	2a
Pendimethalin	1.0	0b	0a
Pendimethalin	2.0	0b	0a
Atrazine	2.0	0b	0a
Simazine	2.0	0b	2a
Diclofop	1.0	0b	2a
Diclofop	2.0	2a	2a

²Phytotoxicity was evaluated visually on a 0 to 100% scale where 0 indicates no injury and 100 represents death of all tissues.

³Mean separation within columns by Duncan's multiple range test, 5% level.

Florida Agricultural Experiment Station Journal Series No. N00066. The authors wish to thank A. Duda and Sons, Inc. and SMR Turf for their excellent cooperation in this research.

Table 2. Effect of preemergence herbicides on vigor of 'Floritam' St. Augustine grass 21, 40, 60, and 81 days after application at two locations. Spring 1989.

Herbicide	Rate (lb./acre)	Vigor rating (%) ^z						
		Days after application						
		Bradenton			Ft. Lonesome			
		21	40	60	81	21	40	60
Untreated	0.0	98a ^y	96ab	99a	94abc	82a	82a	88a
Metolachlor	2.0	94ab	98ab	96ab	95ab	78a	70a	88a
Metolachlor	4.0	92ab	100a	91bc	94abc	70a	65a	78a
Napropamide	4.0	92ab	100a	96ab	96a	65a	68a	68a
Prodiamine	1.0	95ab	98ab	94ab	92abc	78a	72a	88a
Prodiamine	2.0	96ab	98ab	88c	91abcd	68a	62a	70a
Prodiamine	4.0	94ab	92bc	88c	85e	72a	68a	78a
Pendimethalin	1.0	91ab	95abc	88c	92abc	75a	80a	88a
Pendimethalin	2.0	98a	94abc	94ab	92abc	72a	72a	78a
Atrazine	2.0	96ab	100a	92bc	92abc	75a	80a	80a
Simazine	2.0	94ab	98ab	94ab	90bcde	75a	70	78a
Diclofop	1.0	85b	90c	80d	89cde	78a	78a	82a
Diclofop	2.0	85b	91bc	88c	86de	58a	68a	68a

^zVigor was evaluated visually on a 0 to 100% scale where 0 indicates all plants were dead and 100 represents optimum growth.

^yMean separation within columns by Duncan's new multiple range test, 5% level.

perspective (Table 1). The soil surface was moist at both locations at time of application, but there was no rainfall within one week and little for the duration of the experiment. At Fort Lonesome the surface of the field tended to be dry for most of the experiment. Generally, St. Augustine grass was less vigorous at Fort Lonesome than at Bradenton, presumably due to much drier soil conditions and accumulation of salts in the surface soil horizon (Table 2). At Fort Lonesome none of the treatments significantly affected vigor, but at Bradenton differences in vigor existed. Diclofop (both rates) reduced St. Augustine vigor at Bradenton compared to the untreated check at several evaluation dates. Vigor also was reduced by the high rate of prodiamine and the low rate of pendimethalin 60 DAT. However, grass in the pendimethalin treated plots had recovered by 81 DAT, while the high rate of prodiamine continued to suppress vigor.

Differences in sprangletop control were evident within 21 DAT at Bradenton. All of the herbicide treatments reduced the number of sprangletop plants emerged at this time, but metolachlor and pendimethalin had some of the lowest numbers of plants per plot. Superior performance of metolachlor and pendimethalin was noted throughout the 81 days of the experiment. Napropamide also provided good control of sprangletop and was similar to metolachlor and pendimethalin. By the end of the experiment at Bradenton, none of the other herbicides provided sprangletop control comparable to metolachlor or pendimethalin.

Early germination of sprangletop was delayed at Fort Lonesome (Table 3), presumably due to the very dry conditions in the top 2 inches of the soil. At this location, metolachlor (both rates), napropamide, and the high rate of pendimethalin provided good control of sprangletop

Table 3. Effect of preemergence herbicides on control^z of bearded sprangletop in 'Floritam' St. Augustine grass 21, 40, 60, and 81 days after application at two locations. Spring 1989.

Herbicide	Rate (lb./acre)	Days after application						
		Bradenton			Ft. Lonesome			
		21	40	60	81	21	40	60
		No./plot	-----% Control-----					
Untreated	0.0	120a ^y	5f	0e	0e	— ^x	0d	0d
Metolachlor	2.0	3f	96ab	96a	96a	—	68abc	94ab
Metolachlor	4.0	1f	93ab	98a	96a	—	98a	98a
Napropamide	4.0	11def	84abc	86ab	84ab	—	64abc	94ab
Prodiamine	1.0	51bc	48d	58c	52c	—	91ab	98a
Prodiamine	2.0	39bcd	51d	54cd	56c	—	95a	94ab
Prodiamine	4.0	28cdef	78bc	79b	80b	—	98a	99a
Pendimethalin	1.0	2f	98a	92ab	97a	—	46bc	58bc
Pendimethalin	2.0	7ef	97a	91ab	94a	—	100a	95a
Atrazine	2.0	45bc	45d	41d	20d	—	0d	12d
Simazine	2.0	61b	25e	12e	0e	—	40cd	46c
Diclofop	1.0	32cde	52d	51cd	19d	—	69abc	61abc
Diclofop	2.0	12def	70c	62c	75b	—	74abc	84ab

^zWeed control was evaluated visually on a 0 to 100% scale where 0 indicates no control and 100 represents 100% (complete) control.

^yMean separation within columns by Duncan's multiple range test, 5% level.

^xNo sprangletop had emerged at this time.

for the duration of the experiment, but poor control was obtained with the low rate of pendimethalin at Fort Lonesome as contrasted with the excellent control experienced at Bradenton. This difference in pendimethalin performance was probably due to the higher surface soil moisture at Bradenton, as soil moisture can greatly effect efficacy of preemergence surface-applied herbicides (3, 4). Pro-diamine (all rates), and the high rate of diclofop also provided good to excellent control of sprangletop at Fort Lonesome unlike Bradenton where they performed poorly. This difference in results is probably related to the soil moisture differences and the related lower germination of sprangletop seed at Fort Lonesome which produced less "weed pressure" in the test.

Runner development was slower at Fort Lonesome than Bradenton and no differences among treatments were observed at Fort Lonesome (Table 4). Differences in runner development were minor at Bradenton. However it was important to note that those herbicides which controlled sprangletop, metolachlor, napropamide, and pendimethalin; did not reduce sod growth as indicated by runner development ratings. There was a trend for runner development to reduce as pro-diamine rate increased, but this reduction was not significant when compared with the untreated control.

This research demonstrates good control of bearded sprangletop can be obtained with metolachlor (2 or 4 lb.a.i./acre), 4 lb.a.i./acre napropamide, or pendimethalin (1 or 2 lb.a.i./acre) without seriously affecting vigor and growth of 'Floritam' St. Augustine grass under commercial sod production conditions.

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Proc. Fla. State Hort. Soc. 102:293-295. 1989.

INSECTICIDAL CONTROL OF MAGNOLIA WHITE SCALE AND LONG-TAILED MEALYBUG ON SAGO-PALMS¹

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Abstract. (Populations of magnolia white scale (= false oleander scale), *Pseudaulacaspis cockerelli* (Cooley), infesting sago-palm, *Cycas revoluta* Thunberg, were reduced > 96% with a single application of dimethoate and two applications

¹This paper reports the results of research only. Mention of a product or trademark name in this paper does not constitute a recommendation or endorsement by the University of Florida, nor does it imply registration of a pesticide under FIFRA. The following companies supplied materials for testing: American Cyanamid Co., Ciba-Geigy Corp., Dow Chemical Co., Mobay Corp., and E.I. de Pont de Nemours & Co. I thank Drs. Robin Giblin-Davis and Stephen Verkade for critically reading the manuscript. This work was partially funded by a contract with the California Department of Food and Agriculture and is published as Florida Agricultural Experiment Station Journal Series No. N-00055.

Proc. Fla. State Hort. Soc. 102: 1989.

Table 4. Effect of preemergence herbicides on runner development in 'Floritam' St. Augustine grass 40, 60, and 81 days after application at two locations. Spring 1989.

Herbicide	Rate (lb./acre)	Rating ² Days after application				
		Bradenton			Ft. Lonesome	
		40	60	81	40	60
Untreated	0.0	1.3bc ^y	2.4bcd	2.2bc	1.0a	1.6a
Metolachlor	2.0	1.4b	2.9a	2.6abc	1.0a	1.5a
Metolachlor	4.0	1.2bc	2.6ab	2.4abc	1.0a	1.2a
Napropamide	4.0	1.5b	2.9a	2.7ab	0.5a	1.2a
Pro-diamine	1.0	1.2bc	2.6ab	2.6abc	1.0a	1.5a
Pro-diamine	2.0	1.5b	2.3bcd	2.5abc	0.8a	1.1a
Pro-diamine	4.0	1.2bc	2.2cd	2.2bc	0.8a	1.4a
Pendimethalin	1.0	1.1c	2.4bcd	2.8a	1.0a	1.6a
Pendimethalin	2.0	1.2bc	2.7ab	2.2bc	1.0a	1.4a
Atrazine	2.0	1.4b	2.6ab	2.1c	1.0a	1.5a
Simazine	2.0	1.9a	2.5abc	2.1c	0.5a	1.2a
Diclofop	1.0	1.5b	2.1d	2.4abc	1.0a	1.5a
Diclofop	2.0	1.5b	2.5abcd	2.7ab	0.8a	1.4a

²Runner development was evaluated using a visual rating scale where 0 = runners not forming, 1 = runners just beginning to develop, 2 = runners one-half the distance between ribbons, 3 = runners have grown from one ribbon to the next.

^yMean separation within columns by Duncan's multiple range test, 5% level.

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two weeks apart of methidathion, each at 0.6 g AI/l H₂O. Populations of long-tailed mealybugs, *Pseudococcus longispinus* (Targioni-Tozzetti) were eliminated from sago-palms, by single foliar applications of methidathion and chlorpyrifos and nearly eliminated by a single application of dimethoate, all applied at 0.6 g AI/l H₂O.

The magnolia white scale, also known as the false oleander scale, *Pseudaulacaspis cockerelli* (Cooley) (Homoptera: Diaspididae), was considered by Dekle (1) to be the most serious insect pest of ornamental plants grown in Florida. This species and the longtailed mealybug, *Pseudococcus longispinus* (Targioni-Tozzetti) (Homoptera: Pseudococcidae), are common pests of cycads (Cycadaceae), a few species of which are important in the Florida nursery and landscaping industries. Reinert (2) reported that acephate, dimethoate, monocrotophos and oxydemetonmethyl were effective against the magnolia white scale infesting *Bischofia javanica* Blume (Euphorbiaceae). Thompson et al. (4)