

Herbicide Safety on Sea Spray Seashore Paspalum Seedlings

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Seashore *paspalum stolon*

Photo by Aaron Patton

Summary. There are no reports of herbicide tolerance on seedling seashore paspalum, and currently only one herbicide is labeled for use on these seedlings. The objective of this study was to determine which herbicides cause the least amount of injury to seashore paspalum seedlings. Field studies were conducted in 2007 to assess the tolerance of seashore paspalum (cv. Sea Spray) to various herbicides. Herbicide treatments included sulfentrazone, carfentrazone, triclopyr, clopyralid, fluroxypyr, carfentazone + 2,4-D + MCPP + dicamba, 2,4-D + MCPP + dicamba, quinclorac, MSMA, imazaquin, metsulfuron, sulfosulfuron, halosulfuron, pronamide, siduron, oxadiazon, pendimethalin, dithiopyr, prodiamine, ethofumesate, and fluzifop-P-butyl.

Treatments were applied two weeks after emergence of seedlings and compared to an untreated control and a salt water treatment. Turfgrass coverage at two weeks after application was greatest for seashore paspalum treated with clopyralid, halosulfuron, metsulfuron, quinclorac, carfentrazone, salt water, or the untreated check. Greatest phytotoxicity and reduction in turfgrass coverage resulted from application of fluzifop-P-butyl, MSMA, imazaquin, ethofumesate, 2,4-D + MCPP + dicamba, and triclopyr.

Abbreviations: WAA, weeks after application; WAE, weeks after emergence

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In the past decade, a number of new seashore paspalum (*Paspalum vaginatum*) cultivars have appeared on the market, as several commercial and academic breeding programs began to identify and work with new germplasm. The interest in this species, which has superior salinity tolerance, has grown to the point that cultivars are being evaluated nationally starting in 2007 through the National Turfgrass Evaluation Program, including a location in Fayetteville, Ark. (Morris, 2008).

Seeded varieties provide a quick, easy, and economical way to establish a high-quality seashore paspalum turf. As the seeded cultivars are relatively new, there are several factors that need to be investigated. Weed control is often very important in establishing turf from seed as effective weed control programs will decrease competition, increase establishment rate, and decrease the grow-in period.

The ability to control weeds during the first six to eight weeks after emergence is a key factor to the success of seeded warm-season grasses such as bermudagrass and zoysiagrass. Summer annual grasses such as crabgrass and goosegrass are very competitive with new seedlings and broadleaf weeds may also create problems through shading of young seedlings. Therefore, competition during the seedling stage could significantly prolong stand establishment and reduce overall stand density. Little is known about effective herbicides that may be used during the establishment of seashore paspalum from seed.

There are no reports of herbicide tolerance on seedling seashore paspalum, and currently only quinclorac is labeled for use on seashore paspalum seedlings. Most labels specify use only on established seashore paspalum. On established 'Salam' seashore paspalum clopyralid, dicamba, halosulfuron, imazaquin, mecoprop + 2,4-D + dicamba, metsulfuron, and quinclorac were found to cause little toxicity (Unruh et al., 2006). Duncan (1998) also identified that pronamide (Kerb), oxadiazon (Ronstar), and pendimethalin (Pendulum) could be used for preemergence control of weeds in seashore paspalum turf. Lastly, seawater has even been found to be an effective herbicide for postemergence control of weeds in

'Adalyad' seashore paspalum (Wiecko, 2003). It is important to evaluate a range of herbicides to determine which are optimal during establishment from seed.

Currently, sulfentrazone (Dismiss), carfentrazone (Quicksilver), clopyralid (Lontrel), carfentrazone + 2,4-D + mecoprop + dicamba (Speedzone), quinclorac (Drive 75DF), halosulfuron (SedgeHammer), oxadiazon (Ronstar), dithiopyr (Dimension), and prodiamine (Barricade) are labeled for use on established seashore paspalum, but not on seedlings. The objective of this research study was to determine which herbicides are safe for use on 'Sea Spray' seashore paspalum seedlings.

Materials and Methods

Research was conducted at the Arkansas Agricultural Research and Extension Center, Fayetteville, Ark. Experiments were seeded 20 June 2007 with 0.7 lbs pure live seed per 1000 ft² of Sea Spray seashore paspalum in an area that was tilled, fumigated with methyl bromide, and raked to prepare the soil for seeding prior to seeding. This provided a weed-free site on which herbicide injury could be closely monitored. Plots were covered with a germination blanket until germination occurred to prevent the movement of seed. Experimental design was a randomized complete block with four replications and an individual plot size of 20 ft². Plots were treated with various herbicides (Table 1) at two weeks after emergence (WAE) which occurred on 4 July 2007. Emergence was defined as a uniform stand of one-leaf seedlings. A non-ionic surfactant (Latron AG-98, 0.25% v/v) was added to each herbicide prior to application on 19 July 2007. Herbicides were applied in 30 gallons / A with a CO₂-pressurized sprayer at 30 psi. A salt water treatment was included and applied as 32,000 ppm (50 dS / m) in 288 gallons / A per plot using NaCl. Salt water was applied on three consecutive days starting at 2 WAE. Two untreated checks were included for comparison. Plots were mown as needed at 0.5 inch when seedlings first reached 0.75 inch.

Digital image analysis was used to determine seashore paspalum coverage (Richardson et al., 2001). Herbicide injury was rated visually on a scale of 0 to 100 where 0 = no visible phytotoxicity and 100 = brown turf. All data were analyzed using analysis of variance and treatment means were separated using Fisher's protected least significant difference at $\alpha = 0.05$.

Results and Discussion

There were significant differences in herbicide phytotoxicity and bermudagrass coverage following application. Greatest phytotoxicity and reduction in turf coverage resulted from applications of Fusilade II, MSMA, Image, Prograss, Trimec Classic, Turflon Ester (Table 2). Turfgrass coverage at 2 weeks after application (WAA) was greatest for Lontrel, SedgeHammer, Blade, Drive, Quicksilver, salt water treatment, and the untreated check (Table 2). Coverage at 4WAA was greatest for Lontrel, SedgeHammer, Blade, Quicksilver, Kerb, Pendulum, salt water treatment, and the untreated check (Table 2). Coverage at 8WAA was greatest for Dismiss, Quicksilver, Lontrel, Spotlight, Speedzone, Trimec Classic, Trimec Southern, Drive, Balde, Certainty, SedgeHammer, Kerb, Ronstar, Pendulum, Dimension, Barricade, salt water treatment, and the untreated check

(Table 2). Coverage at 8WAA was least for MSMA, Image, Tupersan, Turflon, Fusilade, and Prograss (Table 2). Based on first year results, Lontrel, SedgeHammer, Blade, Drive, Quicksilver, or salt water treatment are recommended if weed control is needed in Sea Spray seedlings (Table 3). This study will be repeated in the summer of 2008.

Literature Cited

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Table 1. Herbicides, trade names, and application rates evaluated for safety on 'Sea Spray' seedlings.

Common name	Trade name	Rate	
		pounds ai / A	oz product/A
2,4-D + MCPP + dicamba	Trimec classic	0.5 + 0.13 + 0.05	32
carfentrazone	Quicksilver	0.031	2.1
carfentrazone + 2,4-D + MCPP + dicamba	Speedzone southern	0.01 + 0.13 + 0.05 + 0.01	32
clopyralid	Lontrel 3L	0.37	16
dithiopyr	Dimension 2EW	0.5	32
ethofumesate	Prograss 1.5EC	1.5	128
fluzifop-P-butyl	Fusilade II	0.06	4
fluroxypyr	Spotlight 1.5L	0.37	32
halosulfuron	Sedge Hammer	0.05	1.0
imazaquin	Image 1.5 EC	0.5	42.7
MCPP + 2,4-D + dicamba	Trimec southern	0.33 + 0.36 + 0.07	32
metsulfuron	Blade	0.02	0.5
MSMA	MSMA 6	2.0	42.6
oxadiazon	Ronstar G	3.0	2400
pendimethalin	Pendulum Aquacap 3.8 AC	1.5	50
proflaminate	Barricade 4L	1.5	48
pronamide	Kerb 50WP	1.0	32
quinclorac	Drive 75DF	0.75	16
siduron	Tupersan 50WP	4.0	128
sulfentrazone	Dismiss 4L	0.25	8
sulfosulfuron	Certainty	0.05	1.0
triclopyr	Turflon Ester 4L	1.0	32

Table 2. Herbicide injury and Sea Spray seashore paspalum coverage at various timings after application.

Treatment	Herbicide injury			Seashore paspalum coverage		
	0.5 ^z WAA	1 WAA	1WAA	2WAA	4WAA	8WAA
-----%-----						
Check B ^y ^x	10.0 ghi	6.3 j	13.1 a-d	32.8 abc	79.3 ab	94.0 a
SedgeHammer	7.5 ghi	12.5 ij	16.3 ab	37.5 ab	89.7 a	93.9 a
Salt	13.8 f-i	7.5 j	16.7 ab	43.2 a	89.5 a	93.9 a
Drive	12.5 f-i	12.5 ij	13.5 a-d	28.0 bc	69.7 b-e	93.5 a
Quicksilver	25.0 efg	11.3 ij	10.5 b-g	27.7 bc	88.5 a	92.7 a
Dismiss	73.8 ab	60.0 cde	3.9 g-k	14.2 d-g	51.6 fg	92.7 a
Check A ^x	5.0 i	7.5 j	14.7 abc	39.3 ab	83.6 abc	91.8 a
Ronstar	16.3 e-i	16.3 hij	9.1 c-h	24.6 cd	63.3 b-f	91.1 a
Kerb	17.5 e-i	21.3 hij	11.7 a-f	23.6 cde	73.0 a-d	90.7 a
Blade	6.3 hi	15.0 hij	13.5 a-d	34.1 abc	82.1 ab	89.4 a
Speedzone Southern	28.8 ef	47.5 efg	5.2 f-k	10.4 f-h	54.3 ef	88.5 a
Lontrel	2.5 i	5.0 j	17.7 a	41.9 a	89.6 a	88.4 a
Certainty	23.8 e-h	33.8 fgh	6.8 d-k	10.4 f-h	54.0 ef	88.4 a
Pendulum	15.0 f-i	23.8 hij	12.9 a-e	22.5 c-f	74.6 abc	88.3 a
Barricade	17.5 e-i	18.8 hij	8.6 c-i	23.5 cde	68.9 b-f	84.6 a
Spotlight	25.0 efg	52.5 def	6.2 e-k	6.8 gh	35.2 gh	83.0 a
Trimec southern	48.8 cd	70.0 bcd	3.3 h-k	2.7 gh	22.2 hi	82.2 a
Trimec classic	28.8 ef	77.5 abc	3.3 h-k	3.8 gh	22.4 hi	81.4 a
Dimension	11.3 f-i	31.3 ghi	8.4 e-i	11.4 e-h	56.9 def	80.1 ab
MSMA	77.5 a	90.0 ab	1.3 jk	2.3 gh	14.2 ij	64.9 bc
Image	48.8 cd	83.8 ab	1.8 ijk	0.8 h	8.3 ij	63.4 c
Tupersan	17.5 e-i	30.0 ghi	7.7 d-j	9.4 gh	13.8 ij	39.7 d
Turflon	57.5 bc	76.3 abc	2.0 ijk	0.4 h	0.1 j	18.9 e
Fusilade	33.8 de	95.5 a	0.8 k	0.0 h	0.0 j	15.2 e
Prograss	50.0 cd	81.3 ab	1.9 ijk	0.1 h	0.4 j	13.1 e

^z WAA, weeks after application.^y Treatments sorted according to turfgrass coverage at 8 weeks after application.^x Check A and check B refer to the two untreated control plots used in this study.**Table 3. Recommendations for herbicide application to Sea Spray seashore paspalum based on preliminary research.**

Application timing	Herbicides
Recommended for use on seedlings 2WAE:	Clopyralid, halosulfuron, metsulfuron, quinclorac, carfentrazone, salt water treatment
Safe to use on seedlings at least one month after emergence:	Sulfentrazone, carfentrazone, fluroxypyr, carfentrazone + 2,4-D + MCPP + dicamba, 2,4-D + MCPP + dicamba, MCPP + 2,4-D + dicamba, sulfosulfuron, pronamide, oxadiazon, pendimethalin, dithiopyr, prodiamine
Do not use on 'Sea Spray' seedlings:	MSMA, imazaquin, siduron, triclopyr, fluzafop, and ethofumesate