

Herbicide Safety Varies on 'Sea Spray' Seashore Paspalum Seedlings

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Photo by Aaron Patton

Herbicide damage on seashore paspalum seedlings

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 2008 to assess the tolerance of seeded Sea Spray seashore paspalum to various herbicides. Treatments were applied two weeks after emergence of seedlings and compared to an untreated control and a salt water treatment. Greatest phytotoxicity and reduction in turfgrass coverage resulted from applications of Fusilade II, MSMA, Image 1.5 EC,

Prograss, Velocity, Acclaim Extra, and Turflon Ester. Turfgrass coverage at two weeks after application was greatest for seashore paspalum treated with Lontrel, SedgeHammer, Blade, Drive 75DF, Quicksilver, salt water, Tourney, Pendulum Aquacap 3.8 AC, Dismiss, Barricade 4L, Ronstar G, Kerb, Trimec Classic, Trimec Southern, Spotlight, Certainty and the untreated check.

Abbreviations: NTEP, National Turfgrass Evaluation Program; DAA, days after application; WAA, weeks after application; WAE, weeks after emergence

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A number of new seashore paspalum (*Paspalum vaginatum*) cultivars have appeared on the market in the past decade as several commercial and academic breeding programs have begun to identify and work with new germplasm. The interest in this species, which has excellent salinity tolerance, has increased and cultivars have been evaluated nationally since 2007 through the National Turfgrass Evaluation Program (NTEP), including a location in Fayetteville, Ark (Patton et al., 2009).

Seeded cultivars provide a quick, easy, and economical way to establish a high-quality seashore paspalum turf. As seeded cultivars are relatively new compared to vegetatively established cultivars of seashore paspalum, 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. Additionally, bermudagrass continues to be an aggressive weed in seashore paspalum swards. 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 Drive (quinclorac) is labeled for use on seashore paspalum seedlings. Most herbicide labels specify use only on established seashore paspalum. On established Salam seashore paspalum, Lontrel (clopyralid), Banvel (dicamba), SedgeHammer (halosulfuron), Image (imazaquin), Trimec Southern (mecoprop + 2,4-D + dicamba), Blade or Manor (metsulfuron), and

Drive were found to cause little toxicity (Unruh et al., 2006). Duncan (1998) also identified that Kerb (pronamide), Ronstar (oxadiazon) and Pendulum (pendimethalin) could be used for pre-emergence control of weeds in seashore paspalum turf. Lastly, sea water 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, Dismiss (sulfentrazone), Quick-silver (carfentrazone), Lontrel, Speedzone Southern (2,4-D + mecoprop + dicamba + carfentrazone), SedgeHammer, Ronstar, Dimension (dithiopyr), and Barricade (proflumicafene) are labeled for use on established seashore paspalum, but not on seedlings. The objective of this research study is 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 on 13 June 2008 with 0.9 lb pure live seed 1000/ft² of 'Sea Spray' seashore paspalum in an area that was fumigated with methyl bromide in 2007. The experimental area was tilled and raked immediately prior to seeding. This provided a relatively weed-free site on which herbicide injury could be closely monitored. Additional weed germination was minimal, and those weeds were mechanically removed so as not to interfere with analysis. 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 of each herbicide treatment and an individual plot size of 20 ft². Plots were treated with various herbicides (Table 1) at two weeks after emergence (WAE). A fungicide, thought to be injurious to bermudagrass, was also included. Emergence occurred on 25 June 2008 and 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 8 July 2008. Herbicides were applied in 30 gal/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 gal/A per plot using NaCl. Salt water was applied on three consecutive days starting at 2 WAE. Five untreated plots were used as an untreated check 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) starting 1 week after herbicide application (WAA) and continued on until the majority of the plots reach 100% coverage. Herbicide injury was rated visually three times during the first 10 days after application (DAA) using a scale of 0 to 100 where 0 = no visible injury and 100 = brown turf.

Results and Discussion

There were significant differences in herbicide phytotoxicity and seashore paspalum coverage following application. Greatest phytotoxicity and reduction in turfgrass coverage resulted from applications of Fusilade, MSMA, Image, Prograss, Velocity, Acclaim Extra, and Turflon Ester (Table 2). Turfgrass coverage at 2 WAA was greatest for seashore paspalum treated with Lontrel, SedgeHammer, Blade, Drive, Quicksilver, salt water, Tourney, Pendulum, Dismiss, Barricade, Ronstar, Kerb, Trimec Classic, Trimec Southern, Spotlight, Certainty, or the untreated check (Table 2). Coverage at 6 WAA was greatest for Dismiss, Quicksilver, Lontrel, Spotlight, Speedzone Southern, Trimec Classic, Trimec Southern, Drive, Blade, Certainty, SedgeHammer, Kerb, Ronstar, MSMA, Pendulum, Prograss, Dimension, Barricade, Tourney, Image, salt water treatment, and the untreated check (Table 2). Although Image, Prograss, and MSMA caused

injury during the 2008 trial, turfgrass coverage in plots treated with these herbicides was not different than the untreated control at 6 WAA. Coverage at 6 WAA was lowest for Acclaim Extra, Tupersan, Turflon Ester, Fusilade II, and Velocity (Table 2). Based on first- and second-year results, Lontrel, SedgeHammer, Blade, Drive, Quicksilver, salt water treatment, and Tourney provided the greatest safety for applications to seedling seashore paspalum (Table 3). Other recommendations for more established seedlings as well as herbicides that should be avoided are provided in Table 3.

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Table 1. Herbicides or fungicide, trade names and application rates evaluated in 2008 for safety on 'Sea Spray' seedlings.

Trade name	Common name	Rate	
		pounds a.i. /A	oz product / A
Acclaim Extra	fenoxaprop-ethyl	0.089	20
Barricade 4L	prodiamine	1.5	48
Blade	metsulfuron	0.02	0.5
Certainty	sulfosulfuron	0.05	1.0
Certainty	sulfosulfuron	0.06	1.25
Dimension 2EW	dithiopyr	0.5	32
Dismiss 4L	sulfentrazone	0.25	8
Drive 75DF	quinclorac	0.75	16
Fusilade II	fluazifop-P-butyl	0.06	4
Image 1.5 EC	imazaquin	0.5	42.7
Kerb 50WP	pronamide	1.0	32
Lontrel 3L	clopyralid	0.37	16
MSMA 6	MSMA	2.0	42.6
Pendulum Aquacap 3.8 AC	pendimethalin	1.5	50
Prograss 1.5EC	ethofumesate	1.5	128
Quicksilver	carfentrazone	0.031	2.1
Ronstar G	oxadiazon	3.0	2,400
Sedge Hammer	halosulfuron	0.05	1.0
Speedzone Southern	carfentrazone + 2,4-D + MCPP + dicamba	0.01 + 0.13 + 0.05 + 0.01	32
Spotlight 1.5L	fluroxypyr	0.37	32
Tourney	metconazole	0.05	1
Trimec Classic	2,4-D + MCPP + dicamba	0.5 + 0.13 + 0.05	32
Trimec Southern	MCPP + 2,4-D + dicamba	0.33 + 0.36 + 0.07	32
Tupersan 50WP	siduron	4.0	128
Turflon Ester 4L	triclopyr	1.0	32
Velocity	bispyribac-sodium	0.1	9

Table 2. Herbicide or fungicide injury and Sea Spray seashore paspalum coverage at various timings after application in 2008.

Treatment	Herbicide or fungicide injury			Seashore paspalum coverage		
	3 ^z DAA	6 DAA	8 DAA	2 WAA	3 WAA	6 WAA
	-----%-----					
Acclaim Extra ^y	10.0 c-g ^x	78.8 a	89.3 a	3.2 f	18.8 e	66.4 b
Barricade	1.3 g	11.3 g-i	5.0 ij	97.4 a	97.4 a	97.0 a
Blade	0.0 g	6.7 h-i	6.7 h-i	98.1 a	99.0 a	98.0 a
Certainty (1.0 oz/A)	1.3 g	7.5 h-i	10.0 g-j	92.6 ab	98.2 a	97.6 a
Certainty (1.25 oz/A)	6.3 d-g	33.8 bcd	25.0 efg	80.7 bc	79.7 c	97.1 a
Dimension	2.5 fg	13.8 f-i	12.5 g-j	69.4 cd	76.8 c	98.1 a
Dismiss	41.3 ab	28.8 c-g	12.5 g-j	98.2 a	99.2 a	96.6a
Drive	7.5 d-g	18.8 d-i	8.8 h-i	98.6 a	98.6 a	98.6 a
Fusilade	15.0 cde	86.3 a	94.3 a	0.7 f	0.8 f	8.9 c
Image	15.0 cde	41.3 bc	52.5 cd	63.0 d	82.9 bc	99.8 a
Kerb	7.5 d-g	13.8 f-i	21.3 fgh	95.7 a	96.2 ab	99.1 a
Lontrel	2.5 fg	5.0 h-i	5.0 ij	99.2 a	99.2 a	98.1 a
MSMA	51.3 a	77.5 a	71.3 b	45.9 e	88.7 abc	98.1 a
Pendulum	1.3 g	2.5 i	0.0 j	99.2 a	98.9 a	96.9 a
Prograss	16.3 cd	47.5 b	55.0 c	6.6 f	36.1 d	86.7 a
Quicksilver	3.3 fg	13.3 f-i	0.0 j	98.3 a	99.1 a	96.0 a
Ronstar	1.7 g	15.0 e-i	20.0 ghi	96.6 a	98.6 a	97.3 a
Salt	5.0 efg	15.0 e-i	13.8 g-j	98.8 a	99.4 a	99.1 a
SedgeHammer	0.0 g	6.7 h-i	6.7 h-i	98.3 a	99.4 a	99.2 a
Speedzone Southern	10.0 c-g	18.8 d-i	7.5 h-i	98.5 a	99.4 a	98.6 a
Spotlight	12.5 c-f	21.3 d-h	21.3 fgh	87.7 ab	97.0 a	98.0 a
Tourney	5.0 efg	15.0 e-i	13.8 g-j	99.5 a	99.6 a	99.7 a
Trimec Classic	12.5 c-f	30.0 b-f	18.8 ghi	94.8 ab	97.7 a	99.2 a
Trimec Southern	31.3 b	41.3 bc	36.3 ef	91.1 ab	96.5 ab	97.9 a
Tupersan	0.0 g	32.5 b-e	37.5 de	1.9 f	2.6 f	34.0 c
Turflon	37.5 b	76.3 a	83.8 ab	4.5 f	8.4 ef	34.7 c
Velocity	20.0 c	85.5 a	90.8 a	0.5 f	1.2 f	7.9 c
Untreated check	3.1 fg	8.8 h-i	6.3 h-i	99.0 a	99.1 a	99.2 a

^z DAA, days after application; WAA, weeks after application.

^y Treatments sorted according to turfgrass coverage at 8 weeks after application (WAA).

^x Values in a column followed by the same letter are not significantly different from one another (LSD, $\alpha=0.05$).

Table 3. Recommendations for herbicide application to Sea Spray seashore paspalum seedlings based on two years of research.

Application timing	Herbicides
Recommended for use on seedlings 2 weeks after seedling emergence or later:	Lontrel, SedgeHammer, Manor/Blade, Drive 75DF, Quicksilver, salt water treatment, Tourney fungicide
Safe to use on seedlings at least one month after emergence (NOTE: this is a conservative recommendation, some of these products could be used earlier with little additional risk)	Dismiss, Spotlight, Speedzone southern, Trimec Classic, Trimec Southern, Certainty, Kerb, Ronstar, Pendulum, Dimension, and Barricade
Do not use on Sea Spray seedlings:	MSMA, Image, Tupersan, Turflon Ester, Fusilade, Acclaim Extra, Velocity, and Prograss