

Safety of Various Herbicides on 'Sea Spray' Seashore Paspalum Seedlings

Abstract

There are no reports of herbicide tolerance on seedling seashore paspalum (*Paspalum vaginatum* Swartz), and currently no herbicides are 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 ('Sea Spray') to herbicides. Applications including sulfentrazone, carfentrazone, triclopyr, clopyralid, fluroxypyr, carfentrazone + 2,4-D + MCPP + dicamba, 2,4-D + MCPP + dicamba, quinclorac, MSMA, imazaquin, metsulfuron, sulfosulfuron, halosulfuron, pronamide, siduron, oxadiazon, pendimethalin, dithiopyr, proflaminate, ethofumesate, and fluzifop-P-butyl were made 2 weeks after emergence of seedlings and compared to an untreated control and a salt water treatment. Coverage 2 weeks after application was greatest among clopyralid, halosulfuron, metsulfuron, quinclorac, carfentrazone, salt water treatment, and the untreated check. Greatest phytotoxicity and reduction in turf coverage resulted from applications of fluzifop-P-butyl, MSMA, imazaquin, ethofumesate, 2,4-D + MCPP + dicamba, and triclopyr.

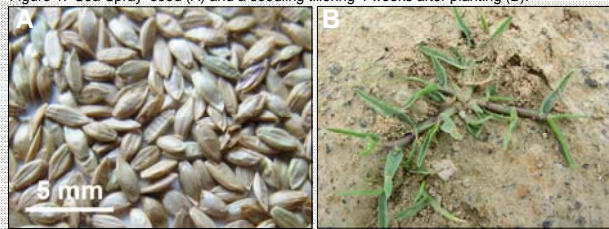
Introduction

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 important in establishing turf from seed. Proper weed control will decrease competition, increase establishment rate, and decrease the grow-in period.

Little is known about effective herbicides that may be used during the critical period for stand establishment of seashore paspalum from seed. 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 pre-M (pendimethalin) could be used for preemergence 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 'Adalya' seashore paspalum. It is important to evaluate a range of herbicides to determine which are optimal during establishment from seed.

Currently, sulfentrazone, carfentrazone, clopyralid, carfentrazone + 2,4-D + mecoprop + dicamba, quinclorac, halosulfuron, oxadiazon, dithiopyr, and proflaminate are labeled for use on established seashore paspalum, but not on seedlings.

Figure 1. 'Sea Spray' seed (A) and a seedling tillering 4 weeks after planting (B).



Materials and Methods

- Randomized complete-block design with four replications
- 'Sea Spray' seashore paspalum was seeded on 20 June in 2007 at 32 kg ha⁻¹ (0.66 lbs PLS/1000 ft²)
- 1.2 by 1.5 m plots were covered with a germination blanket for two weeks after seeding to prevent seed movement
- Plots were treated on 19 July 2007 with various herbicides (Table 1) two weeks after emergence (WAE)
- A non-ionic surfactant (Latron AG-98, 0.25% v/v) was added to each herbicide prior to application. Herbicides were applied in 281 L/ha (30 gpa) water with a CO₂-pressurized sprayer at 207 kPa (30 psi).
- A natural organic herbicide of salt water treatment was included applying 50 dS/m in 500 mL per plot using NaCl 3 consecutive days starting at 2 WAE.
- Two untreated checks were included for comparison.
- Turf were mown as needed at 1.3 cm when seedlings first reached 1.9 cm.
- Turf coverage was collected weekly using digital image analysis (Richardson et al., 2001)
- Plots received 49 kg ha⁻¹ N with urea once every month after seeding

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

Common name	Trade name	Rate	
		kg ai/ha	oz product/A
sulfentrazone	Dismiss 4L	0.28	8
carfentrazone	Quicksilver	0.035	2.1
triclopyr	Turfion Ester 4L	1.12	32
clopyralid	Lontrel 3L	0.42	16
fluroxypyr	Spotlight 1.5L	0.42	32
carfentrazone + 2,4-D + MCPP + dicamba	Speedzone southern	0.01 + 0.15 + 0.06 + 0.01	32
2,4-D + MCPP + dicamba	Trimec classic	0.55 + 0.15 + 0.06	32
MCPP + 2,4-D + dicamba	Trimec southern	0.37 + 0.40 + 0.08	32
quinclorac	Drive 75DF	0.84	16
MSMA	MSMA 6	2.24	42.6
imazaquin	Image 1.5 EC	0.56	42.7
metsulfuron	Blade	0.02	0.5
sulfosulfuron	Certainty	0.05	1.0
halosulfuron	Sedge Hammer	0.05	1.0
pronamide	Kerb 50WP	1.12	32
siduron	Tupersan 50WP	4.48	128
oxadiazon	Ronstar G	3.36	2400
pendimethalin	Pendulum Aquacap 3.8 AC	1.68	50
dithiopyr	Dimension 2EW	0.56	32
proflaminate	Barricade 4L	1.68	48
ethofumesate	Progress 1.5EC	1.68	128
fluzifop-P-butyl	Fusilade II	0.07	4

Results and Discussion

- Greatest phytotoxicity and reduction in turf coverage resulted from applications of fluzifop-P-butyl, MSMA, imazaquin, ethofumesate, 2,4-D + MCPP + dicamba, and triclopyr (Table 2).
- Coverage 2 weeks after application (WAA) was greatest among clopyralid, halosulfuron, metsulfuron, quinclorac, carfentrazone, salt water treatment, and the untreated check.
- Coverage 4 weeks after application (WAA) was greatest among clopyralid, halosulfuron, metsulfuron, carfentrazone, pronamide, pendimethalin, salt water treatment, and the untreated check.
- Coverage 8 weeks after application (WAA) was greatest among sulfentrazone, carfentrazone, clopyralid, fluroxypyr, carfentrazone + 2,4-D + MCPP + dicamba, 2,4-D + MCPP + dicamba, MCPP + 2,4-D + dicamba, quinclorac, metsulfuron, sulfosulfuron, halosulfuron, pronamide, oxadiazon, pendimethalin, dithiopyr, proflaminate, salt water treatment, and the untreated check.
- Coverage 8 weeks after application (WAA) was least among MSMA, imazaquin, siduron, triclopyr, fluzifop, and ethofumesate (Figure 2).

Table 2. Herbicide injury and 'Sea Spray' seashore paspalum coverage after application.

Treatment	Herbicide injury			Seashore paspalum coverage		
	0.5 WAA	1 WAA	1WAA	2WAA	4WAA	8WAA
Check B ¹	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 j	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	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
Turfion	57.5 de	76.3 abc	2.0 jk	0.4 h	0.1 j	18.9 e
Fusilade	33.8 ef	95.5 a	0.8 k	0.0 h	0.0 j	15.2 e
Progress	50.0 cd	81.3 ab	1.9 ijk	0.1 h	0.4 j	13.1 e

¹ WAA, weeks after application.
² Treatments sorted according to 8WAA.

In Summary, we would classify the chemistries accordingly based on first year results:

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, proflaminate
Do not use on 'Sea Spray' seedlings:	MSMA, imazaquin, siduron, triclopyr, fluzifop, and ethofumesate

Figure 2. Field plots of 'Sea Spray' seedlings one week after application of carfentrazone (A) and fluzifop (B), and the whole study three weeks after application (C).



Literature Cited

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