Sulfonylurea Herbicide Safety on Sprigged Bermudagrass and Seashore Paspalum

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Photo by Aaron Patton

Planting of seashore paspalum sprigs

Summary. Sulfonylurea herbicides are a relatively new class of herbicides whose use is increasing on golf courses and athletic fields. Depending on the active ingredient, these herbicides can be used to control cool-season grasses, warm-season grasses, sedges, broadleaves, and other troublesome weeds. Many sulfonylurea herbicides are labeled for use on established bermudagrass, but their label recommendations on sprigged turf vary. Only two sulfonylurea herbicides are labeled for use on established seashore paspalum. The objective of this study was to determine the safety of various sulfonylurea herbicides on newly planted Tifway bermudagrass and Aloha seashore paspalum sprigs. There was no discernable herbicide injury to or reduction in 'Tifway' bermudagrass coverage at any point in the study regardless of herbicide, herbicide rate, or application timing, suggesting that all of these products could be used successfully to control weeds in newly sprigged bermudagrass. Blade or SedgeHammer applied at 2 or 4 weeks after sprigging (WAS), and Certainty applied at 4 WAS allowed maximum establishment of seashore paspalum from sprigs. Monument and Revolver reduced establishment of seashore paspalum more than other herbicides tested in this study.

Abbreviations: WAS (weeks after sprigging)

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Bermudagrass (*Cynodon* spp.) remains the most commonly used turfgrass on golf courses and sports fields in Arkansas and throughout southern and transition-zone environments. Bermudagrass has many positive attributes that have made it a successful turfgrass species, including good heat and drought tolerance, pest resistance, traffic tolerance, and tolerance to a wide range of soil types and water quality. Seashore paspalum (*Paspalum vaginatum*) is a new turfgrass species now being used on golf courses and sports fields and a number of new cultivars have appeared on the market in the past decade. Seashore paspalum has excellent salinity tolerance, color, and mowing quality. Thus, the interest in and use of seashore paspalum has increased in recent years. Both of these species are commonly planted using sprigs.

Sulfonylureas are a relatively new class of herbicides used by turfgrass managers (Yelverton, 2004). These herbicides can be used to selectively remove broadleaf weeds, grasses, sedges, and other problematic weeds. These herbicides effectively control weeds with low use rates, generally in ounces per acre. The commonly used sulfonylurea herbicides include chlorsulfuron (Corsair), foramsulfuron (Revolver), halosulfuron (SedgeHammer), metsulfuron (Manor or Blade), rimsulfuron (TranXit), sulfosulfuron (Certainty), and trifloxysulfuron (Monument).

There are little published data on the safety of sulfonylurea herbicides on newly sprigged turf, although there is a growing body of literature on the use of these herbicides in newly seeded turf. The general objective of this experiment was to determine the safety of sulfonylurea herbicides on newly sprigged bermudagrass and seashore paspalum turf with specific objectives to (1) identify differences in herbicide safety within bermudagrass and seashore paspalum, (2) identify the appropriate use rates of each herbicide based on labeled use rates, and (3) identify the optimal timing for applications after planting sprigs.

Materials and Methods

Research was conducted at the University of Arkansas Agricultural Research and Extension Center in Fayetteville, Ark. Two separate experimental areas were each planted with one of the turfgrass species. Aloha seashore paspalum was sprigged on 15 July 2008 at 20 bushels/1000 ft^2 and another area was also sprigged on 15 July 2008 with Tifway bermudagrass at 12 bushels/1000 ft^2. Existing weeds were killed with glyphosate, the area tilled, and then raked to prepare the soil prior to sprigging. These areas were fumigated with methyl bromide in 2006. This provided a relatively weed-free site on which herbicide injury of various herbicides could be closely monitored. To limit additional weed pressure, oxadiazon (Ronstar G) was applied at 100 lbs/A (2.0 lbs a.i./A) on the day of sprigging to bermudagrass and 2 weeks after sprigging (WAS) on seashore paspalum. Prior to the first treatment application, plot areas with the most uniform establishment were selected for use. Experimental design was randomized complete block with four replications and an individual plot size of 4 by 5 ft. Each experimental area contained the same treatments but in a different randomization. Treatments were arranged as a 5 × 2 × 2 factorial with five herbicides, two herbicide rates (low and high), and two application timings at 2 or 4 WAS (Table 2).

A non-ionic surfactant (Latron AG-98, 0.25% v/v) was added to each herbicide prior to application on each date except for foramsulfuron (Revolver) since no additional surfactant was recommended by the pesticide label. Herbicides were applied in a spray volume of 30 gal/A using an XR8001VS Teejet nozzle with a CO_2-pressurized sprayer at 30 psi. An untreated check was included for comparison. Plots were mown as needed at 0.5 inch. Coverage of each species was determined using digital image analysis (Richardson et al., 2001). Herbicide injury was rated visually on a scale of 0 to 100 where 0 = no visible phytotoxicity and 100 = dead turf.

Results and Discussion

There was no herbicide injury to or reduction in Tifway bermudagrass coverage at any

point in the study regardless of herbicide, herbicide rate, or application timing (data not shown). These results suggest that all of these sulfonylurea herbicides could be used successfully to control weeds in newly sprigged bermudagrass despite current label recommendations for some products, which recommend delaying use until the turf has reached full coverage or is one year old.

Herbicide injury on Aloha seashore paspalum varied by herbicide and application rate for the 2 WAS applications when rated on 5 August (Fig. 1). Monument caused the greatest injury to seashore paspalum. Revolver also caused significant injury to seashore paspalum, but was less injurious at the "low" recommended label rate. Certainty was injurious when applied at both rates, although the high rate in this study was a 2x label rate since only one rate (1.25 oz/A) is labeled for use in warm-season turf. Certainty applied at the labeled rate caused 22.5% injury. Blade was injurious at both rates, although maximum injury was only 10%. SedgeHammer herbicide injury was similar to the untreated check.

When herbicide injury was evaluated on 26 August for both application timings, there were significant herbicide-by-rate and herbicide-by-timing interactions (Figs. 2 and 3). Most herbicides performed similarly at both application rates with the exception of Revolver, which was less injurious at the "low" label application rate of 17.4 oz/A. Herbicide by timing interactions indicated differences in herbicide injury as affected by application timing (Fig. 3). Monument injury to seashore paspalum was initially less for the 4 WAS application timing compared to the 2 WAS application timing when rated on 26 August (Fig. 3), but this difference in injury between application timings was short lived as both application timings ultimately caused >99% herbicide injury (data not shown). Revolver injury was less for the 2 WAS application timing than for the 4 WAS application timing on 26 August (Fig. 3), but this was due to seashore paspalum recovery after the initial herbicide injury (data not shown).

There was a significant herbicide-by-rate-by-timing interaction on seashore paspalum coverage on 18 September (10 weeks after planting) (Fig. 4). Blade and SedgeHammer applications at either rate or timing allowed for maximum seashore paspalum establishment. Certainty applications at either application rate at 4 WAS also allowed for maximum seashore paspalum establishment. Certainty applications at the 2x rate and the 2 WAS application timing resulted in less seashore paspalum establishment than when applied at the label rate of 1.25 oz/A at the same timing. Revolver reduced establishment most when applied at the high rate at 4 WAS although seashore paspalum coverage was also unacceptable when Revolver was applied at the high rate at 2 WAS. Revolver applications at the low rate of 17.4 oz/A allowed for >80% coverage at either the 2 or 4 WAS application timing. Regardless of application rate or timing, Monument caused the greatest reduction in seashore paspalum establishment.

Blade or SedgeHammer applied at 2 or 4 WAS, and Certainty applied at 4 WAS allowed maximum establishment of Aloha seashore paspalum from sprigs. Both Monument and Revolver were the most injurious herbicides in this study and reduced seashore paspalum establishment more than other herbicides. Neither Monument nor Revolver are currently labeled for use in seashore paspalum but are labeled to control other *Paspalum* species, so these results were not completely unexpected. Blade is not labeled for use in seashore paspalum, but these results suggest that it could be used on Aloha seashore paspalum and possibly additional cultivars.

The Blade label recommends application to turf one year old or more, but this research suggests that it would be useful for controlling weeds in newly sprigged bermudagrass and seashore paspalum. The Certainty label is currently under revision and will likely include additional instructions regarding its use in newly sprigged areas. The Monument label recommends delaying applications to bermudagrass until "100% cover and root system is developed beyond 2-inch depth", but this research suggests it would be safe to use in newly sprigged bermudagrass. Our data were consistent with Revolver label recommen-

dations that state not to apply within two weeks of sprigging bermudagrass. Our data for SedgeHammer suggest it would be safe to use in both newly sprigged bermudagrass and seashore paspalum. This is contrary to the SedgeHammer label which states to delay applications to sprigged turf until the turf is well established with a good root system. Overall, these results suggest that sulfuonylurea herbicides can be safely applied shortly after sprigging bermudagrass and that Blade, SedgeHammer, and Certainty could be useful herbicides when establishing seashore paspalum sprigs.

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Literature Cited

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Yelverton, F. 2004. New weed control in warm-season grasses: The sulfonylurea family of herbicides welcomes a new member that controls some sedges, grasses and broadleaf weeds in bermudagrass and zoysiagrass. Golf Course Manage. 72(1):203-206.

Table 1. Herbicide trade name, common name, formulation, and label notes for each species denoting use instructions on sprigged turf.

Trade name	Common name	Formulation	Label notes about bermudagrass sprigging	Label notes about seashore paspalum sprigging
Blade	metsulfuron	60WDG	Do not apply to turf less than one year old	Not labeled for use[z]
Certainty	sulfosulfuron	75WDG	No instructions[y]	No instructions[y]
Monument	trifloxysulfuron	75WG	Delay applications until turf is at 100% cover and root system is developed beyond a 2-inch depth	Not labeled for use[z]
Revolver	foramsulfuron	0.19SC	Do not apply within two weeks of sprigging	Not labeled for use[z]
SedgeHammer	halosulfuron	75WDG	This product may be used on … sprigged turfgrass that is well established. Allow the turf to develop a good root system and uniform stand before application	This product may be used on … sprigged turfgrass that is well established. Allow the turf to develop a good root system and uniform stand before application

[z] Not labeled for use on sprigged turf at the time of this writing.
[y] Labeled for use on these species, but no application instructions on sprigged turf are provided based on label recommendations at the time of this writing.

Table 2. Herbicide trade name, common name, formulation, product application rate and timing.

Trt	Trade name	Common name	Formulation	oz. product/A	Rate	Application timing
1	Certainty	sulfosulfuron	75WDG	1.25	Low	2 WAS[z]
2	Certainty	sulfosulfuron	75WDG	2.50	High	2 WAS
3	Certainty	sulfosulfuron	75WDG	1.25	Low	4 WAS
4	Certainty	sulfosulfuron	75WDG	2.50	High	4 WAS
5	SedgeHammer	halosulfuron	75WDG	0.66	Low	2 WAS
6	SedgeHammer	halosulfuron	75WDG	1.33	High	2 WAS
7	SedgeHammer	halosulfuron	75WDG	0.66	Low	4 WAS
8	SedgeHammer	halosulfuron	75WDG	1.33	High	4 WAS
9	Monument	trifloxysulfuron	75WG	0.53	Low	2 WAS
10	Monument	trifloxysulfuron	75WG	1.06	High	2 WAS
11	Monument	trifloxysulfuron	75WG	0.53	Low	4 WAS
12	Monument	trifloxysulfuron	75WG	1.06	High	4 WAS
13	Blade	metsulfuron	60WDG	0.5	Low	2 WAS
14	Blade	metsulfuron	60WDG	1.0	High	2 WAS
15	Blade	metsulfuron	60WDG	0.5	Low	4 WAS
16	Blade	metsulfuron	60WDG	1.0	High	4 WAS
17	Revolver	foramsulfuron	0.19SC	17.4	Low	2 WAS
18	Revolver	foramsulfuron	0.19SC	35.2	High	2 WAS
19	Revolver	foramsulfuron	0.19SC	17.4	Low	4 WAS
20	Revolver	foramsulfuron	0.19SC	35.2	High	4 WAS
21	Untreated check					

[z] WAS, Weeks after sprigging.

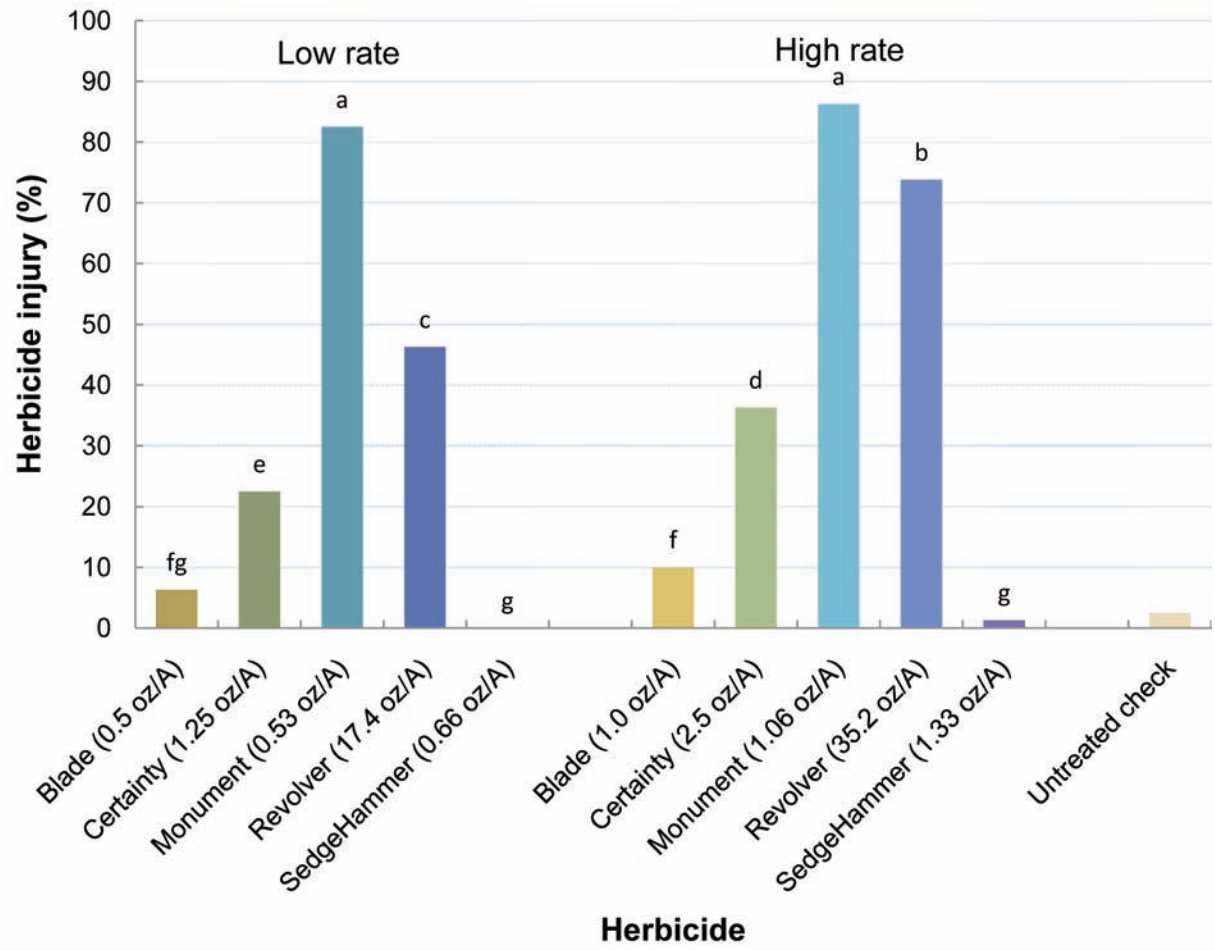

Fig. 1. Herbicide injury (5 August 2008) on Aloha seashore paspalum as influenced by applications of sulfonylurea herbicides at various rates 2 weeks after sprigging.

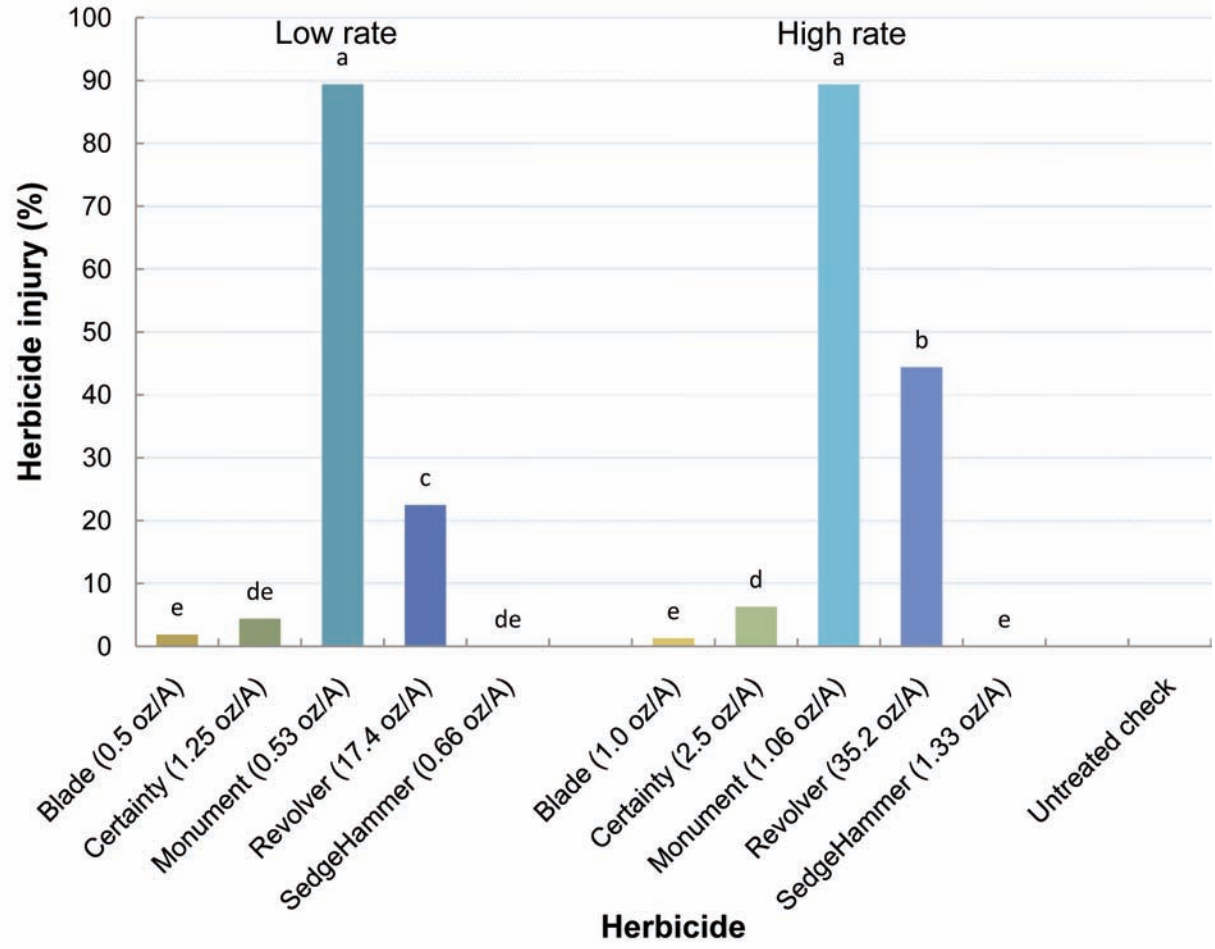

Fig. 2. Herbicide injury (26 August 2008) on Aloha seashore paspalum as influenced by applications of sulfonylurea herbicides at various rates across two timings (2 or 4 weeks after sprigging).

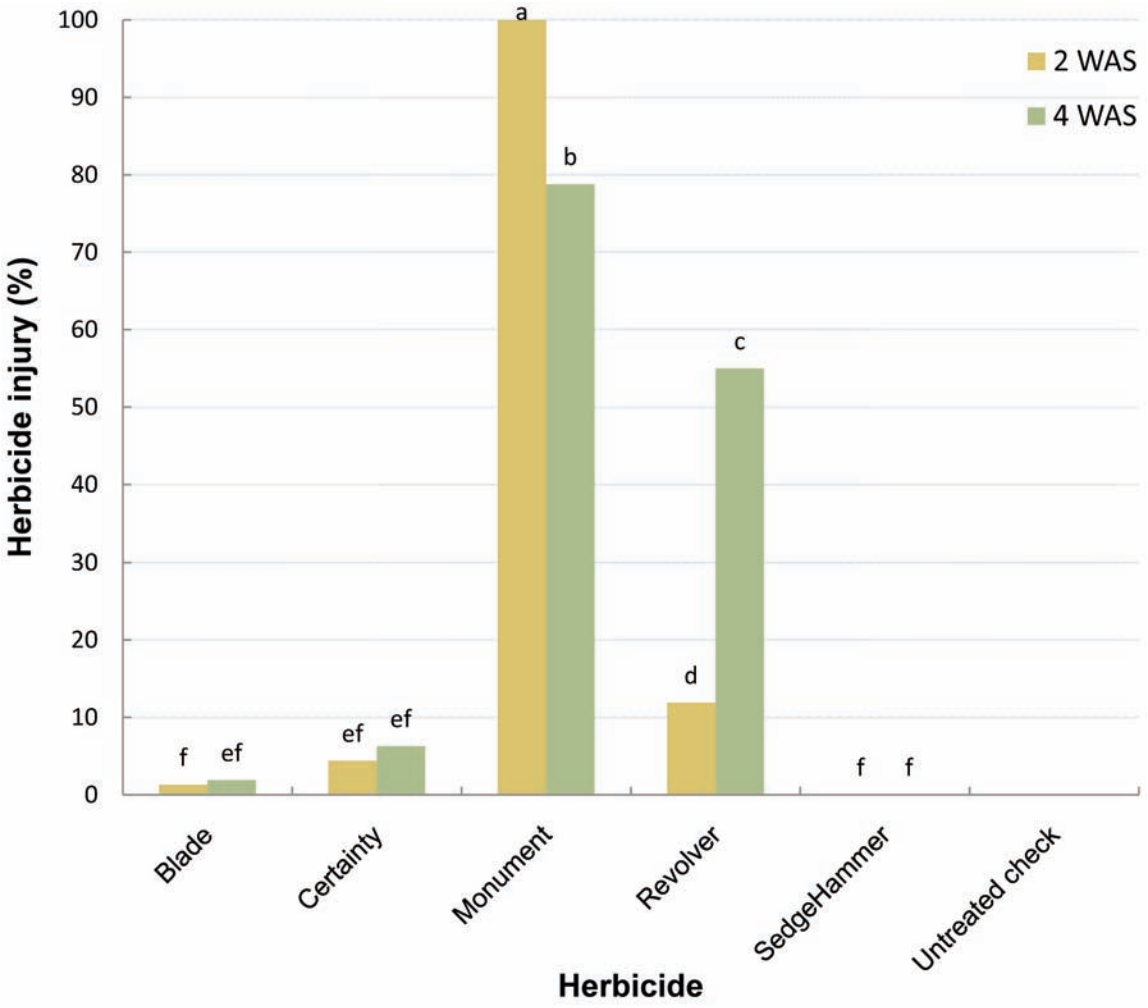

Fig. 3. Herbicide injury (26 August 2008) on Aloha seashore paspalum as influenced by applications of sulfonylurea herbicides at various rates and two timings (2 or 4 weeks after sprigging).

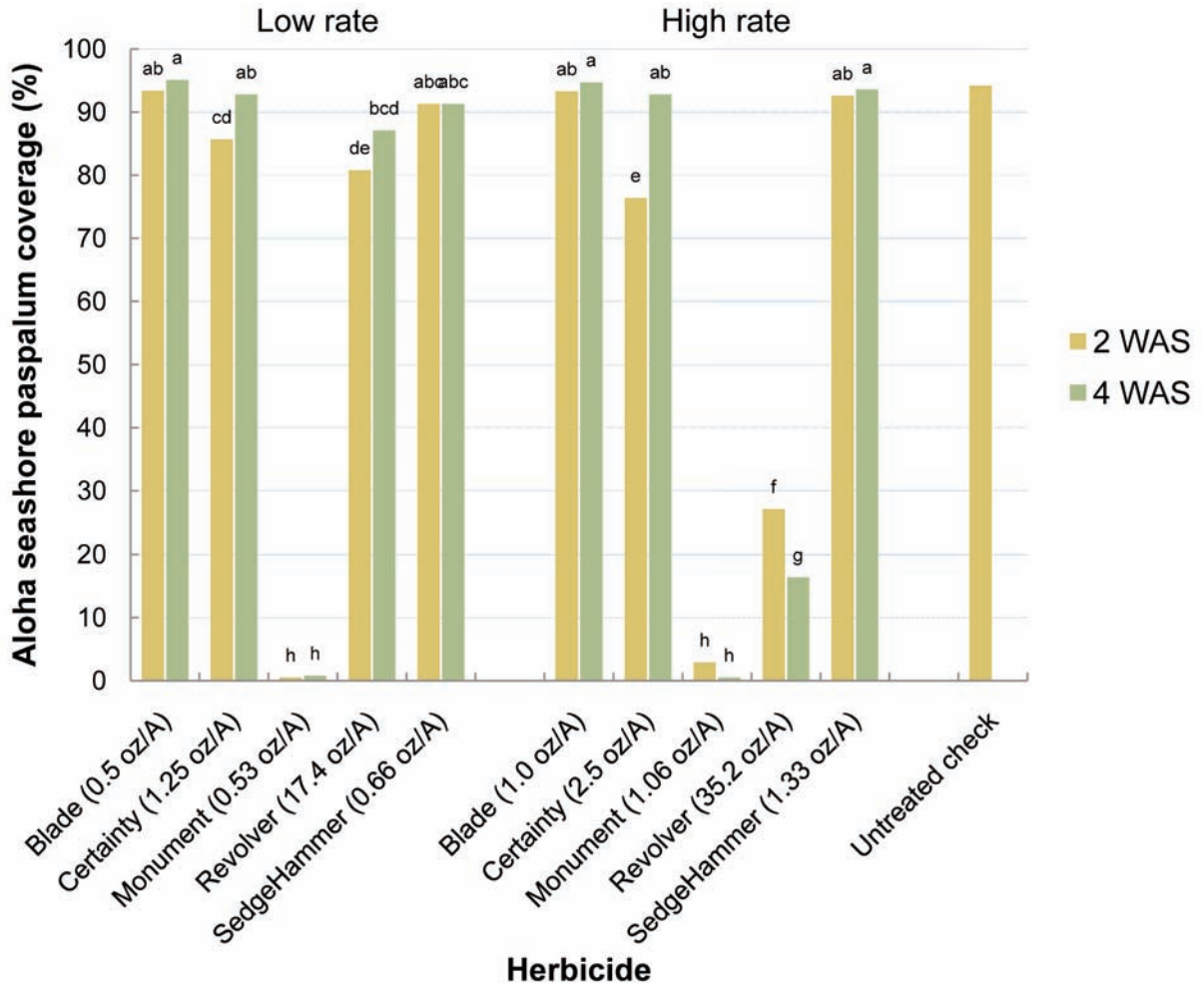

Fig. 4. Aloha seashore paspalum coverage on 18 September 2008 as influenced by applications of sulfonylurea herbicides at various rates and two timings (2 or 4 weeks after sprigging).