

Weed Control in Establishing Dune Sedge (*Carex pansa*)

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Dune sedge (*Carex pansa*) forms a dense cover 8-10 in. tall. It tolerates a variety of soil types and climates. It can be mowed or left unmowed, if not mowed it makes an attractive meadow and remains green year-round. Broadcast seeding is not practical because it is slow to emerge, and establishment is sporadic due to weed competition and less than ideal seedbed conditions. Therefore, it is typically established by plugs or liners. It is planted 6 to 12 inches on center and spreads at a moderate pace by rhizomes. On weedy sites, active weed control for one year to reduce the weed seed bank is essential.

A turf demonstration trial was conducted in Sacramento in 2010-12, in which four turf species were compared at 40%, 60%, and 80% ET_o (reference evapotranspiration). Dune sedge was fairly drought tolerant, performing well at 60% ET_o and better than field sedge (*Carex praegracilis*). Weed growth was substantial until turf establishment, requiring three periods of extensive hand weeding. Unlike fine-leaved fescues, grass herbicides can be used on sedges, which facilitates establishment. But information on the effects of herbicides on *Carex* is lacking.

The goal of this project was to test weed several control methods in a dune sedge planting and to evaluate the phytotoxicity of herbicides on the young sedge plants.

Materials and Methods

Three trials were conducted at Cornflower Farms (Elk Grove) during 2012. Randomized complete block design was used for the experiments, with 10 treatments and 4 replications. On May 24, dune sedge plants in small pots were planted 12 in. apart in 40 plots that were 5 x 7 ft. In the first trial, four pre-emergence herbicides, four organic post-emergence herbicides, and wood chip mulch were compared for weed control and phytotoxicity to sedge plants (Table 1). The pre-emergence herbicides and wood chip mulch were applied on May 26 and post-emergence herbicides were applied June 7 (2 and 14 days after planting, respectively).

Plots were rated for weed control (0-100% control) for pre-emergence herbicides, wood chips, and untreated plots, and on percent weed damage (phytotoxicity) for post-emergence herbicides. In early August all plots were hand weeded and then weeds were allowed to regrow.

A second trial was conducted on the same plots using post-emergence herbicides, with four new products used on plots in treatments 1-4, and the same four organic post-emergence herbicides used on plots in treatments 5-8 (Table 2). However, the concentration of FinalSan was doubled and that of Fiesta was more than tripled. All herbicides were applied Aug. 29, when most weeds were beyond the 3-5 leaf stage. Plots were rated for weed control of the four most prevalent species (oats, clover, filaree, and vetch) based on percent weed damage, as well as for phytotoxicity to sedge plants.

Table 1. Weed control treatments and rates used in Trial 1 (pre-emergence herbicides applied May 26, post-emergence herbicides applied June 7).

	Common Name	Product	Type	Rate/Acre
1	Prodiamine	Barricade 65 WG	Pre-emerg.	1.5 lbs.
2	Pendimethalin	Pendulum AquaCap	Pre-emerg.	4 qts.
3	Oryzalin	Surflan AS	Pre-emerg.	4 qts.
4	Dithiopyr	Dimension 2 EW	Pre-emerg.	2 qts.
5	Ammoniated soap of fatty acid	FinalSan	Post-emerg.	10% v/v
6	Fatty acid	BioLink	Post-emerg.	6% v/v
7	Acetic acid	WeedPharm (20%)	Post-emerg.	Full strength
8	Iron (FeHEDTA)	Fiesta	Post-emerg.	3% v/v
9	Wood chip mulch			2 in. deep
10	Untreated			

Table 2. Weed control treatments and rates used in Trial 2 (herbicides applied Aug. 29).

	Common Name	Product	Rate/Acre	Spectrum	Surfactant
1	Clethodim	Envoy Plus	12 fl. oz.	Grasses	Herbimax [®] , 0.25% v/v
2	Carfentrazone	Shark	10 oz.	Broadleaves	
3	Halosulfuron	Sedgehammer	1 oz.	Sedges	
4	Clove leaf oil	Matran	20% v/v	Broad	Natural Wet [®] , 1% v/v
5	Soap of fatty acid	FinalSan	20% v/v	Broad	
6	Fatty acid	BioLink	6% v/v	Broad	
7	Acetic acid	WeedPharm	Full strength	Broad	
8	Iron (FeHEDTA)	Fiesta	10% v/v	Broad	None
9	Wood chip mulch	N/A	2 in. deep	N/A	N/A
10	Untreated	N/A			N/A

In the third trial, weeds were mowed to 6 in. height on Sept. 20. New plots were established, using three treatments with four replications; for each plot, three or four adjacent plots from the previous trials were combined. Plots were sprayed on Oct. 3, using two post-emergence herbicides and the combination of the two (Table 3). Plots were rated for weed control of the four most prevalent species based on percent weed damage, as well as for phytotoxicity to the sedge plants.

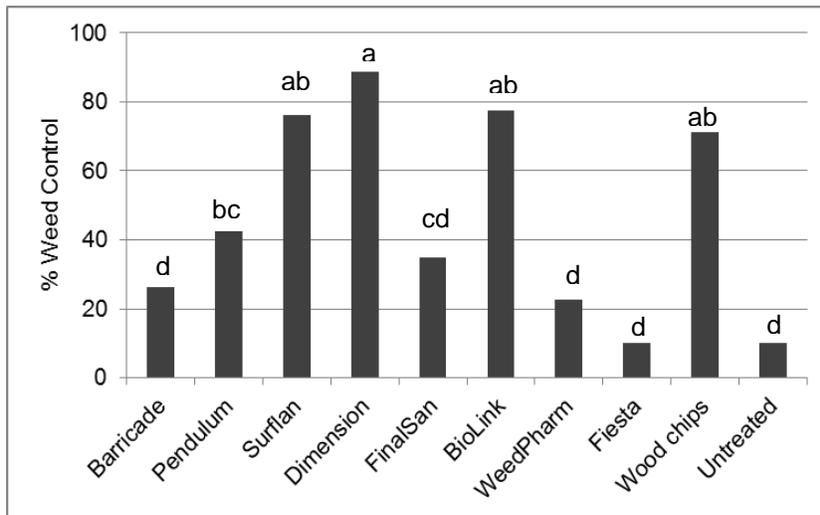
Table 3. Weed control treatments and rates used in Trial 3 (herbicides applied Oct. 3).

	Common Name	Product	Surfactant	Rate/Acre
1	Carfentrazone + 2,4-D + Mecoprop + Dicamba	SpeedZone Southern	None	4 pts.
2	Fluazifop-p-butyl (24.5%)	Fusilade II	Herbimax (0.25%)	20 fl. oz.
3	Combination of Treatments 1 & 2			

Results

Trial 1. On June 26, 33 days after applying pre-emergence herbicides and wood chips and 19 days after post-emergence herbicide sprays, the use of Surflan, Dimension, BioLink, and wood chips had 70-90% weed control; all the others resulted in less than 50% control (Fig. 1). The most prevalent weeds (from seedlings) were broadleaf filaree, white clover, turkey mullein, and umbrella sedge. BioLink caused the most severe leaf burn to the *Carex* plants at 60% damage, followed by FinalSan at 50% damage (data not shown), with no damage from the other products.

Figure 1. (Trial 1) Percent weed control on 6/26. (Mean separation by Tukey HSD test, $p < 0.01$)



Trial 2. Weed control was evaluated three times after the Aug. 29 application date, at which time weeds were beyond the 3-5 leaf stage. Two days after treatment (DAT), the organic herbicides generally burned back the weeds severely, especially Matran, FinalSan, and BioLink (Fig. 2). WeedPharm controlled clover initially, but otherwise WeedPharm and Fiesta were less effective, and Fiesta had almost no effect on oats. Envoy and Sedgehammer had little or no effect yet, and Shark largely controlled clover and slightly burned back filaree.

By Sept. 18 (20 DAT), all weeds in the organic treatments resumed growth except for vetch in the FinalSan treatment, which was killed (Fig. 3). Envoy was about 60% effective against oats, Shark was about 70% effective against clover, and surprisingly Sedgehammer was about 80% effective against filaree and vetch. Umbrella sedge plants (large) were only present in one of the Sedgehammer plots, and this product had no effect on them. All of the organic products had phytotoxic effects on the *Carex* except Fiesta (data not shown). Evaluations of *Carex* spread showed that only BioLink led to significantly less vigor than other treatments (data not shown).

Trial 3. Fusilade provided 80% control of oats, and SpeedZone Southern provided 60 to 70% control of clover and filaree and nearly complete control of vetch (Fig. 4). Combining the two products resulted in similar control. No phytotoxicity to the *Carex* was observed.

Figure 2. (Trial 2) Percent total weed control on Aug. 31 (2 DAT) based on weed damage.

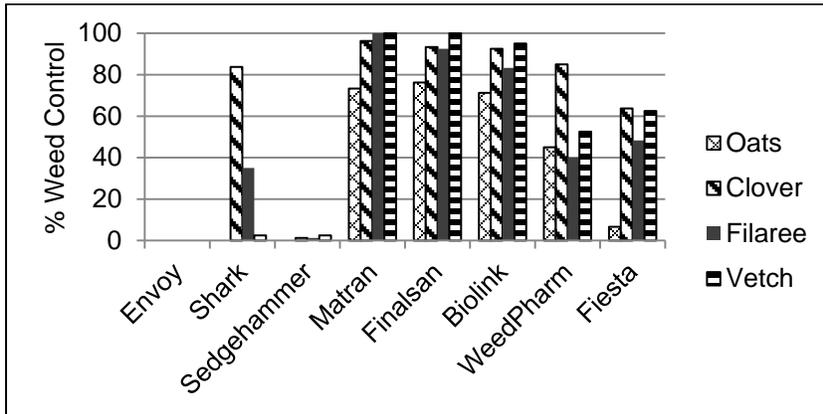


Figure 3. (Trial 2) Percent weed control on Sept. 18 (20 DAT), based on percent weed damage.

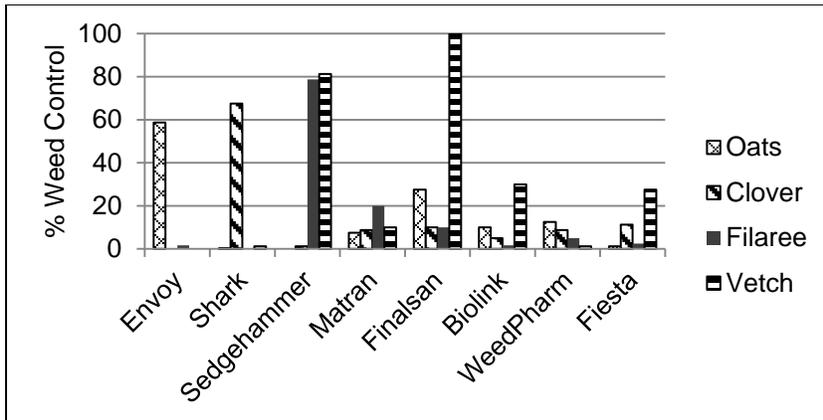
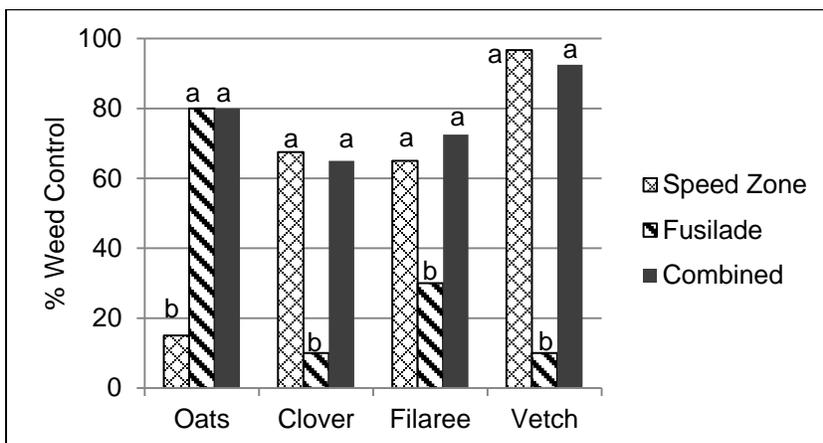


Figure 4. (Trial 3) Percent weed control on Sept. 18 (20 DAT), based on percent weed damage. (Mean separation within weed species by Tukey HSD test, $p < 0.01$)



Discussion

Dune sedge is an excellent ground cover that is best planted as 2-in. pots. Establishment is slow, leaving spaces for weed growth until fully established. The pre-emergence herbicides Surflan and Dimension provided reasonably good control of most annual weeds and did not harm the *Carex*. Wood chips also provided good control, and they also moderate soil temperature and help conserve soil moisture. Wood chips allowed the *Carex* rhizomes to spread as quickly as other treatments. For the post-emergence organic herbicides, only BioLink controlled most young weeds in Trial 1.

Weeds were somewhat larger in Trial 2 than in Trial 1. Organic herbicide treatments generally provided only a temporary knockdown, as nearly all weeds began regrowing within 1-2 weeks after application, and most of these herbicides seriously damaged the dune sedge. Envoy and Shark provided partial control of oats and clover, respectively, and almost no damage to the dune sedge. Doubling the rate of FinalSan resulted in greater damage to *Carex* and no better control of weeds, and tripling the rate of Fiesta led to no damage to *Carex* and marginal (but temporary) improvement in weed control.

In Experiment 3, the post-emergence herbicides Fusilade and SpeedZone Southern controlled grown oats and broadleaves, respectively, and a single combined spray controlled both. Sedgehammer appeared to control filaree and vetch, but didn't seem to harm either umbrella sedge or the dune sedge.

Perhaps an ideal strategy would be to apply Dimension, Surflan, or a 2-in. layer of wood chips shortly after planting, followed by hand weeding or spot treatment of weeds with SpeedZone + Fusilade. Where weed seeds are abundant, pre-irrigating followed by flaming, cultivation, or glyphosate application would reduce the weed seed bank. Because of limited use of *Carex* few herbicides are registered for use – always check the label before using. Consideration should be given to preventing off-site movement of herbicides during severe rain events from runoff and movement of sediment.

References

- Harivandi, A. 2010. No-Mow Fineleaf Fescue Grasses for California Urban Landscapes. University of California Agriculture and Natural Resources. Pub. 8391.
- Ingels, C. and J. Fetler. 2011. Turf demonstration project. UCCE Sacramento Web pages, <http://UCANR.org/turfproject>.

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