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Research Update on Using a Rotary Wiper

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UC research on controlling smutgrass has led to the testing of a rotary wiper for weed control. The advantage of a rotary wiper is the ability to make herbicide contact with weeds only, as desirable forage can be grazed short and not contacted by the wiper. The wiper delivers herbicide via an adjustable, carpet-covered spinning drum set to a height that will only contact the weed species. A covered spray boom is on top of the drum. When a button is pressed, herbicide is pumped from the holding tank and sprayed onto the backside of the carpet covering the drum. The herbicide soaks into the carpet and the drum spins backwards, providing optimal herbicide contact. A greatly reduced total spray volume is needed compared to a traditional spray rig because herbicide is only applied to the foliage of the weed species.

Glyphosate Rate

The most common herbicide used in a rotary application is glyphosate (Roundup, Buccaneer, etc.) because the herbicide translocates through plants very well. Glyphosate is non-selective, making it important that desirable forages are grazed below the weed height so that the weeds are the only thing killed.

Since a low volume of spray is used, UC research looked at the effectiveness of a variety of glyphosate rates for controlling smutgrass in an irrigated pasture. Rates from 10% (10% glyphosate, 90% water) up to 68% (68% glyphosate, 32% water) were applied to a pasture heavily infested with smutgrass. RoundUp Pro Concentrate was the herbicide used in this trial. All treatments were statistically significant, demonstrating a linear effect, with the control rate increasing with the rate of glyphosate.

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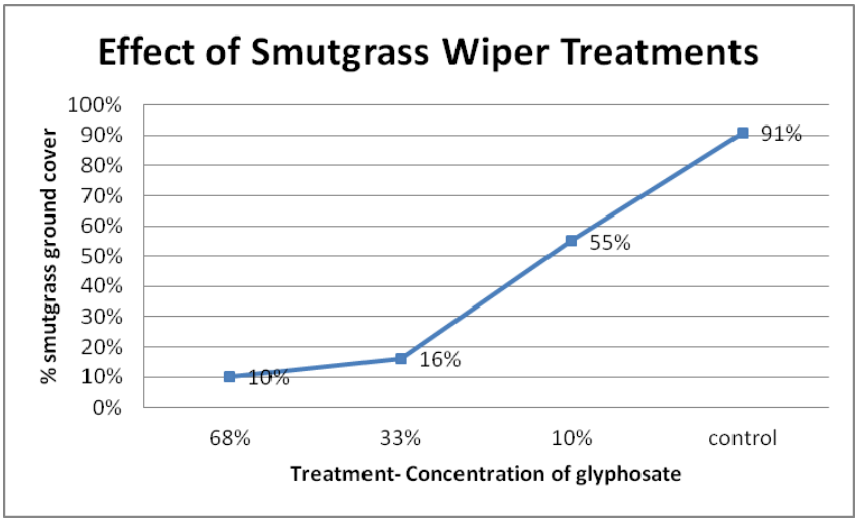

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To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products not mentioned.

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RESEARCH UPDATE ON USING A ROTARY WIPER (Continued from front page)

Rates below 33% were not considered acceptable for smutgrass control, and the research would suggest that rates of 50% to 70% glyphosate are optimal. A separate trial testing a rate of 50% yielded excellent control of smutgrass. The rate used in a rotary wiper application is far higher than the traditional rate of 2% in a spray application, but the lower volume of material used makes the amount of actual herbicide applied very similar between the two methods. Thus the herbicide costs are not generally different between the two application methods.

Broadleaf Weed Herbicides

Treatment	*Average slender aster plants/meter^2*
2,4-D 50%	2.8
Control	6.3
Garlon 50%	6.9

The next problem confronted was with broadleaf weed control when pastures are not able to be grazed below the weed height. This can be the case when pastures are in an establishment phase. In this situation, the goal was to control slender aster, a woody type plant that is not palatable to livestock. We tested the common broadleaf weed herbicides 2,4-D (Weedar 64, etc.) and tryclopyr (Garlon 3A, Element 3A, etc.) for their effectiveness in slender aster control with a rotary wiper. A rotary wiper was desired over a spray application because the pasture had clover that we wanted to protect. A rate of 50% glyphosate to water was applied. Results were successful with 2,4-D, but were not successful with tryclopyr. The tryclopyr treatment showed no difference in slender aster plant counts from the control. It appears that 2,4-D could be used instead of glyphosate as a substitute herbicide in a rotary wiper if it is desired to only control broadleaf weeds. Note that this treatment would not be successful on smutgrass.

Figure 1. Rows comparing smutgrass treated with a rotary wiper vs. non-treated

Wiregrass

Wiregrass or rush is a problem weed in poorly drained pastures. A change in irrigation management is the first step that needs to be taken before applying herbicides to get long term control. Demonstration plots were established on both wire grass species with wiper application of 33% and 66% Roundup Weather Max at the same stage that spray application are normally applied, which is bloom. The small wiregrass was treated in first week of April and the tall soft rush in the first week of May. In both cases the 66% was much more effective, though larger diameter soft rush plants were so thick that only one side of the plant died.

Figure 2. A large diameter soft rush with the side the wiper contacted dead (left side), but the rank plant did not allow the wiper to contact all of the foliage leaving the right side still alive.

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RESEARCH UPDATE ON USING A ROTARY WIPER (Continued from page 2)

One of two ways are suggested to address this problem. One is to chop the plants in the fall so that only the new growth the next spring is present to be wiped, or secondly wipe both direction in one year.

Multiple Applications

As discussed above, none of the trials yielded 100% weed control with a single application. This is because a small number of plants were lower growing and therefore not contacted with the weed wiper. These small plants may require a later application in most fields to increase control and start depleting the weed seed bank. A follow up trial conducted the year following the rate trial referenced before demonstrated a smutgrass cover of 6% in an area treated the subsequent year (area treated twice, 1 time each year) versus 27% in plots treated only one time in the previous trial. Ongoing research is working on controlling the soil seed bank to help prevent smutgrass reinvasion of the pasture.

Rotary wipers are available for rent if desired. For more information contact one of the authors at the Tehama, Glenn, or Yuba/Sutter UC Cooperative Extension Offices (530) 527-3101, or (530) 865-1107, or (530) 822-7515, respectively.

Slender Aster Control

Josh Davy – UC Farm Advisor
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Slender aster is a becoming a common occurrence in irrigated pastures in the Sacramento Valley. The plant is not palatable to livestock. It appears to be most associated with heavier or finer textured soils. It is most recognizable by its "woody" type plant base that is not characteristic of many other irrigated pasture plants.

UC research trials were conducted in the summer of 2011 to determine the most appropriate chemical control strategy for slender aster. Since slender aster is a broadleaf weed, we wanted to determine if it was possible to control it with a broadleaf weed controlling herbicide while incurring the least amount of impact on the clover in the pasture as possible. Table 1 shows the chemical and the associated brand name that were used for the trial. Table 2 shows the results of slender aster plant counts per square meter (10.7 square feet) and white clover percentage plant cover after each herbicide treatment.

Table 1. Chemical and associated herbicide name

Chemical name	Herbicide name
Triclopyr	Garlon 3A
2,4-D	Weedar 64
2,4-D + Triclopyr	Crossbow
Dicamba + 2,4-d	RangeStar
Bromoxynil	Bucrtil
Dicamba + diflufenzopyr	Overdrive

Table 2. Slender aster plants per square meter and percent white clover cover after herbicide treatment

Herbicide and per acre rate	*Slender aster plants per sq meter* [1]	*Herbicide and per acre rate*	*% white clover plant cover*[1]
Crossbow 8 pt	0a	Crossbow 8 pt	0a
Weedar 64 4 pt	0a	Overdrive 8 oz	0.1a
Rangestar 2 pt	0a	Garlon 3A 2.67 pt	0.7a
Weedar 64 2 pt	0.3a	Rangestar 2 pt	0.7a
Garlon 3A 2.67 pt	1.6a	Overdrive 4 oz	1.2ab
Overdrive 8 oz	2.3a	Weedar 4 pt	4bc
Buctril 1 pt	2.3a	Buctril 1 pt	5.3cd
untreated	7.9b	Weedar 2 pt	6.7cd
Overdrive 4 oz	9.1b	untreated	8d

[1]If the letter are the same with the column, then there is no real difference between treatments

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SLENDER ASTER CONTROL (Continued from page 3)

All treatments except Overdrive at 4 oz/acre were successful in slender aster control. The lower treatment of 2,4-D (Weedar 64 at 2 pints per acre) and bromoxynil (Buctril at 1 pint/acre) did not injure white clover, and in fact were not different than the control in clover content. Both were equally effective in controlling slender aster. It appears that herbicides containing triclopyr and dicamba should be avoided for slender aster control if a goal is to minimize damage to white clover in the pasture.

Slender Aster

No herbicide treatments had a significant impact on the plant cover of ryegrass, orchardgrass, dallisgrass, tall fescue, or bermudagrass. All herbicide treatments were successful in controlling plantain, which was 8% of the plant cover in the non treated control.

Read the label to determine appropriate application rates and contact your county Agriculture Commissioner to determine if products are registered for pasture applications and/or if a private applicators license or an operator ID is required to purchase them. Special thanks to the Strickler Ranch for project completion!

Slender Aster

Controlling Wire Grass in Irrigated Pastures

Glenn Nader – UCCE Farm Advisor

There are two main types of wire grass that are present in Sacramento Valley pastures. They grow mainly in poorly drained areas. They are called wire grass as they have a round stem. The stems are dark green in color. Soft rush or bog rush (Juncus effusus var. pacificus) grows from two to three feet tall and is not consumed by livestock. Baltic wiregrass is small 3 to 9 inches tall and will be consumed by livestock early in the season, but not in late summer. In some sites they will dominate the irrigated pasture making it of lower value to livestock grazing. Ranchers have controlled it in the past by digging up the pasture and reseeding it. With time and poor drainage it returns to dominance. The long term solution is to improve the drainage of the pasture by changing the irrigation management, land leveling, or improved drainage ditches. The other approach is to use herbicides. The short Baltic wiregrass can be controlled by 2 pounds of 2,4-D per acre applied during its fastest growing season (April). This coincides with the time the buttercups are blooming. The taller bog or soft rush, which is of greatest concern to livestock operators, can be controlled with glyphosate at the 1.5 percent rate during flowering (which is usually late April to early May). Application at this time will optimize the translocation of glyphosate to the roots to kill the plant. Application at other times of the year will not provide control of the plant. The broad spectrum control of glyphosate will require hand treating each clump or spaying all the pasture and reseeding. If you are using older or cheaper form of glyphosate and have high calcium water, consider adding ammonium sulfate to the water before the glyphosate is added. This will neutralize the calcium before it has a chance to bind to the glyphosate (Check the label to see if this is required). This is one of the main reasons for reported lack of effectiveness by glyphosate. Some producers have asked if a rope wick application would be effective. It may work, as long as there is a spatial separation between the weed and the plants that you want to save. A rotary wiper with 66% Roundup Weather Max was very effective at controlling both rushes when applied as they bloom in the spring.

Soft or Bog Rush

Fertilizer for Annual Clover Establishment

Josh Davy—UCCE Farm Advisor
Casey Dykier—UCCE Intern

Seeding annual clovers has been a practice to improve forage quality on annual rangeland. To help ensure stand establishment, phosphorus fertilization at seeding is a standard practice. A trial was set up during the 2010/2011 growing season in western Tehama County to observe the effects of different methods of phosphorus fertilization on annual clover establishment. Particularly, knowing that nitrogen enhances grass growth, the aim of the trial was to determine if utilizing phosphorus fertilizer with even a minimal amount of nitrogen would have a negative effect on clover establishment by encouraging grasses. A mix of the following annual clovers were seeded in early fall at 18 lbs/acre with all the fertilizer treatments.

23% denmark sub clover
23% dalkeith sub clover
23% campeda sub clover
29.9% hykon rose clover

Seed and fertilizer were drilled at the same time in 8 ft rows that were 50 ft long with three replications. Berber orchardgrass, hardinggrass (perla koleagrass), filaree, and annual grasses were the major components of ground cover. The treatments are outlined in Table 1. The forms of nitrogen and phosphorus were the same in all three fertilizer treatments (mono-ammonium phosphate), with the differences being solely in their rates. Both are very commonly used forms of phosphorus.

Treatments provided a high, medium, and low rate of phosphorus. The medium rate of phosphorus fertilizer was applied with 16-20-0 as compared to the high and low rates that used 11-52-0. This was done so that a higher rate of nitrogen (32 lbs/acre) could be applied to compare with lower rates of nitrogen (0, 3, and 11 lbs/acre) irrespective of the amount of phosphorus application (see Table 1).

Table 1. Fertilizer treatments with associated amounts of nitrogen and phosphorus

Fertilizer	Nitrogen lbs/acre	Phosphorus lbs/acre
25 lbs/acre of 11-52-0	3	13
100 lbs/acre 11-52-0	11	52
200 lbs/acre 16-20-0	32	40
Control—seeded with no fertilizer	0	0

The plots were first monitored in late January. Following the first monitoring, the plot was heavily grazed to a uniform level ensuring an equal comparison of regrowth between all treatments. Additionally, grazing created a real life scenario where if additional grass was produced from the inclusion of nitrogen, it was thought that it may not affect clover establishment due to the cattle consuming the extra forage. This was important because cattle are generally not excluded from clover plantings. The plots were monitored and grazed a second time in late March. The first monitoring yielded little clover establishment. No differences in either the plant cover or production existed between the control and the two low rates of nitrogen fertilizer (0, 3, 11 lbs/acre of N). However, the application of 32 lbs of N significantly increased total production from 890 lbs/acre in the control to 2,127 lbs/acre with 32 lbs of nitrogen. An increase in the hardinggrass composition with the application of 200 lbs/acre of 16-20-0 (32 lbs/acre of nitrogen) was evident. The percent of hardinggrass in the total composition significantly increased from 32 in the control plot to 53 percent in the plot fertilized with 200 lbs/acre of 16-20-0. The increase in hardinggrass in the higher nitrogen plot was to the detriment of the forbs. In particular, filaree dropped from as high as 33 to 13 percent of ground cover due to the addition of 32 lbs/acre of nitrogen.

The second monitoring in late March allowed enough growing time to evaluate clover establishment. As noticed in the first monitoring, including 32 lbs of nitrogen was detrimental to the forb ground cover.

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FERTILIZER FOR ANNUAL CLOVER ESTABLISHMENT (Continued from page 5)

Most importantly, the percent of clover establishment dropped from 18 percent in the control plot to 2 percent in the plot that had extra nitrogen. The inclusion of nitrogen increased hardinggrass by 21 percent more ground cover than the control. Unlike the January monitoring, the annual grass composition of the pasture also increased over the control in the March monitoring by 22 percent. Production was again significantly higher with the inclusion of 32 lbs/acre of nitrogen (1072 lbs/acre) compared to the control (686 lbs/acre). As seen in the January monitoring, no differences in either the composition of plants or production existed between the control and the low rates of nitrogen fertilizer.

This study has demonstrated that applying nitrogen fertilizer can have a negative impact on clover establishment. Annual grasses as well as hardinggrass increased production and competed with establishing clover when fertilized with 32 lbs/acre of nitrogen. Lower rates of 11 and 3 lbs/acre of nitrogen did not have these detrimental results. These results suggest that when seeding annual clovers on rangeland, the application of 16-20-0 should be carefully considered. In this case, applying 200 lbs/acre of 16-20-0 was detrimental to clover stand establishment even when to consume the extra grass produced with cattle. There was no evidence of additional clover establishment from the inclusion of phosphorus at seeding. This was likely because soil testing showed all treatments to have adequate levels of phosphorus to sustain clover establishment.

Monitoring will continue to see if the effects carry over into year two (2012) of the study. Special thanks to the Galper family for their help on the trial!

Effects of Heavy Grazing on Tarweed and Vinegarweed

Josh Davy—UCCE Farm Advisor
Casey Dykier—UCCE Intern

Tarweed (*Hemizonia*) and vinegarweed (*Trichostema lanceolatum*) are native plants that grow throughout the summer. They are not palatable to livestock. In order to provide information on how to best avoid large occurrences of vinegar and tarweed, a grazing study was conducted to determine how to best encourage them.

Personal observations have hinted that a lack of cover during spring encourages vinegar and tarweed growth, so a grazing study was conducted to determine if different timing of heavy spring grazing treatments made a difference in their composition. Note that a cool march made early spring grazing later than would normally occur. At the first grazing the grasses were in the late vegetative to early boot stage of development and the filaree was flowering. The final grazing occurred when all grasses were mature and dry except for medusahead, which was mature but still green. The following grazing treatments were applied using weaned heifers:

1. Control (no graze)
2. Single graze early (4/14/11)
3. Single graze late (5/22/11)
4. Season long heavy graze (4/14/11, 5/1/11 and 5/22/11)

To determine utilization, forage clippings were collected following grazing of each plot (see table 1). The site was a modestly productive gravelly loam, so grazing treatments only lasted between one and two days. Each grazing ended when roughly 100 lbs/acre was left in the plot area.

The single early grazing removed 435 lbs/acre from the plot area. This plot was then excluded from grazing and allowed to regrow for the remainder of the year.

The late season only grazing treatment excluded grazing from April 14th until May 22nd, where it was subsequently grazed just the one time. This grazing took off about 394 lbs/acre, leaving only 172 lbs/acre.

Table 1. Pounds per acre of residual forage left in each treatment by date.

Treatment	4/14/2011	5/1/2011	5/22/2011
Control	545	930	566[1]
late graze	545	930	**172**
early graze	**110**[2]	382	370
Season long graze	**110**	**71**	**42**

[1]weight decreased due to shattering dry matter from late rain. .
[2]bold indicates when grazing treatment occurred

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EFFECTS OF HEAVY GRAZING ON TARWEED AND VINEGARWEED (Continued from page 6)

The continuous heavy grazing treatment also began on April 14th and was conducted in the same manner as the early grazing except it was repeated May 1st and again on May 22nd.

Monitoring of species ground cover was conducted for all treatments at the end of June (see table 2). All grazing treatments significantly increased tarweed (5%) over the non-grazed control (1%), however, no significant differences in tarweed were seen between the three methods of grazing. This composition change equated to roughly a rise from no tarweed plants every four square feet to roughly 2 plants every four square foot. The management implication of this result suggests that heavy grazing which opens up the plant canopy at any point during spring will encourage tarweed growth.

Table 2. Species composition by percent for each grazing treatment

Species	no graze	single early graze	single late graze	Season long graze
tarweed	1 b*	4 a	5 a	4 a
vinegarweed	0.2 a	2 b	1 ab	1 ab

*Within rows, if the letters are the same, the values are not considered different.

Vinegarweed, on the other hand, only significantly increased with the single early grazing treatment. No other grazing treatments significantly raised vinegarweed ground cover. Although a small part of the overall composition, vinegarweed went from almost no presence to two percent of ground cover (0 plants every four square feet to 1 plant every four square feet).

Interestingly, rose clover was not affected by the single early grazing when compared to the control (both ~3% cover), but was significantly decreased to less 1 percent cover with heavy season long and late grazing treatments. Soft chess was exactly the opposite. The late grazing and control were not different, with 15% soft chess cover, while the early grazed treatment dropped soft chess cover to 9%. This indicates that the heifers initially sought out the soft chess, but as forages matured and quality dropped, cattle switched consumption to the higher quality clover and left the soft chess ungrazed.

The spring of 2011 was high for precipitation. The project will be repeated over several years to take yearly rainfall into account. Special thanks to the White Ranch for their help conducting the project!

Immature tarweed in late spring

Immature vinegarweed in late spring

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