

GROUNDSEL STRATEGIES AND CONTROL OF NUTSEDGE; TWO GROWING PROBLEMS

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ABSTRACT

Common Groundsel and Yellow Nutsedge are two major weeds of alfalfa that are becoming more difficult to control. Historically, they have been effectively managed with herbicides and cultural practices. Recently, documented failures of common groundsel occurring after herbicide treatment have been cited. Preliminary investigations suggest that large rain events may be affecting the residual activity and/or tolerance to Velpar herbicide may be increasing.

Yellow Nutsedge, a summer perennial weed, is becoming widespread and occurring more frequently in old and newer stands. The lack of control options is leading to shorter stand life and reduced alfalfa yields. Research trials show how difficult it is to control this weed with herbicides.

Key Words: groundsel, nutsedge, Velpar, Zorial, Gramoxone, Buctril, Raptor, Pursuit, Roundup, Sandea.

Problem

Common Groundsel

In the winter of 2003, alfalfa growers in the northern San Joaquin and Sacramento Valleys, noticed an increase in common groundsel populations following winter Velpar applications. Historically, control has been easily achieved with the herbicide Velpar used preemergence or early postemergence to germinating groundsel. We are especially concerned about Common Groundsel since it is a major weed of alfalfa that grows throughout the central and north valley and is of particular importance since it contains toxic alkaloids, which are poisonous to livestock. Additional concern lies with Velpar as the only effective preemergence herbicide for groundsel control. Without an effective soil active herbicide, reliance would shift to multiple applications of a postemergence herbicide. Increasing the number of herbicide applications needed to keep a field weed free during the winter would be inconvenient and more costly.

Yellow nutsedge

Yellow Nutsedge is arguably the state's number one perennial weed problem in field and vegetable crops. In alfalfa, their deeply buried tubers are not disturbed and propagate rapidly to rob alfalfa of moisture and nutrients. High populations impact stand vigor, reduce alfalfa yield and lower the nutritional quality. The increased problem of nutsedge probably can be attributed to several reasons. The most notable are changes in cropping patterns to more summer irrigated vegetable and field crops with reduced tillage practices. Fewer and less frequent rotational crops such as cereal grains and corn also play a major role.

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In alfalfa, two areas can be attributed as to contributing to the problem:

1. Alfalfa herbicides to control nutsedge are few in numbers; they are short-lived and not highly effective. Currently, Eptam® and Zorial® are the only herbicides used for nutsedge management.
2. In the northern San Joaquin valley, the alfalfa industry has shifted towards more dormant varieties (FD 3-4) compared to less dormant types of the past (FD 6-7). Dormant varieties generally grow slower providing less soil coverage before irrigation. In general, with slower re-growth varieties that provide less soil shading, weeds will become more problematic. With less competition nutsedge populations will flourish.

Groundsel Testing

To determine the extent of problems of common groundsel and yellow nutsedge, field trials were conducted to answer questions and look for solutions.

For the groundsel study, two field locations were used having similar failures, Roberts Island and Hastings Island located in the central and north delta farming regions between Stockton and Sacramento. In November 2002 commercial applications of Velpar and diuron were applied. Two to four weeks after treatment weed kill was acceptable. Four weeks later new germination of seedlings began to emerge.

Two test scenarios were used to evaluate the problem.

1. An herbicide trial was set up to look at weed size and herbicide rate interactions.
2. Seeds were collected from plants surviving Velpar treatment and retreated in a greenhouse environment.

The herbicide trial was conducted on Hastings Island 1/ 8/2003 (see Figure 1). Velpar treatments were applied at rates beginning at 0.5 up to 3.0 Lbs/A. Gramoxone® and Buctril® herbicides were tested as alternative control strategies. Two sizes of plants were flagged to determine the influence of weed size.

Seeds collected from Velpar treatments (survivors) were cleaned, conditioned and planted in the greenhouse. Velpar was sprayed at 0.75 Lb/A preemergence and watered for germination. Post treatments of Velpar were made to surviving plants ranging in size from 2 leaves to 6 leaves.

Groundsel Results

The field trial on Hastings Island:

1. Velpar control was short-lived. At 30 days following treatments new groundsel plants began germinating. This same pattern was also observed in the greenhouse test.
2. Postemergence treatments showed that plant size and rate was clearly a factor in control; small plants were killed but larger ones survived (Figure 2).

3. The 0.5 lb/A (commercial rate) did effectively control groundsel postemergence. High rates (above label) were more effective.
4. Gramoxone and Buctril effectively controlled all sizes of groundsel.

Greenhouse summary.

1. Preemergence control was effective for only 30 days at the 0.75lb/A rate. New plants began to germinate after 30 days.
2. Many of the larger plants (3-4 leaf or larger) survived the post treatments of Velpar and continued growing and are forming seeds. These seeds will used to further test levels of herbicide tolerance.
3. Short-lived preemergence control and variable control postemergence was similar to field studies.

Yellow Nutsedge Testing

An herbicide trial was started in the fall of 2002 on a two-year stand of alfalfa heavily infested with Yellow nutsedge. In mid-October after the last harvest, treatments of halosulfuron (Sanda®) herbicide were made to nutsedge plants between 6 and 12" tall. Sandea is registered in field and vegetable crops and very effective in controlling emerged nutsedge at this size. However, it is also injurious to alfalfa during the growing season, thus the application timing after the final alfalfa harvest. In the December dormant period, over the top winter applications of Zorial were applied to part of the Sandea plots. This in effect gave us plots containing each herbicide or a combination of both.

In the summer of 2003 (May-August), a postemergence test was conducted to control emerged nutsedge between harvest. The herbicides included Pursuit, Raptor, Sandea, and Roundup. They were applied one and two times by themselves or in combination with each other. This tested the need of a sequential application, which is usually the case when trying to control nutsedge.

Nutsedge Results

Fall and winter preemergence treatment.

In the spring evaluations were made by counting nutsedge plants within areas of the plots (see Figure 3). The Sandea + Zorial treatments were suppressing nutsedge at this time. The Zorial treatments alone and the untreated plots were beginning to show low populations beginning to emerge. By the June evaluation, all treatments had high populations of nutsedge having little or no effect. There was no difference showing between any of the treatments.

Summer postemergence treatments.

The postemergence trial between harvests on emerged nutsedge showed favorable results in some treatments (see Figure 4). Applications of Roundup or Sandea provided the best control of nutsedge at 83% and 77% respectively. *This rating was using the two application treatments in May and July.* Combining Pursuit + Roundup gave 78%, Pursuit alone was 74% and Raptor provided 47% nutsedge control.

SUMMARY

Groundsel

Observations from preliminary results of field and laboratory studies suggest:

1. Changes may be occurring in the general weed population to Velpar rates.
2. Environmental conditions such as heavy rains at one event are leaching the herbicide below the seed zone.

Historically, Velpar has been successfully used to control common groundsel as well as many other weeds. Preemergence or postemergence rates to small weeds at 0.25 to 0.50 lb/A have been reliable and provide protection through the winter months. In November 2002 and 2003, heavy rainfall events totaling 1" precipitation occurred. Velpar, applied onto a dry cracked soil, followed by significant rainfall, raises the possibility of herbicide movement off the field or leaching below the seed zone. Velpar is a triazine type compound with a high water solubility of 32,000 ppm. It is easily moved by large water amounts in all types of soil. Our greenhouse studies also confirmed a pattern with frequent watering giving less control. What still remains unclear is the poor control of small plants that were sprayed at the two to four leaf stages. Some died and some did not, which would suggest some degree of tolerance may be developing. Further testing is needed to answer this question!

Nutsedge

Controlling yellow nutsedge in alfalfa is not an easy undertaking. The best recommendation at this time is to avoid planting into a field where nutsedge is a known problem. Once it becomes established in the alfalfa field, it is only suppressed and not totally controlled by preemergence herbicides. It is possible to keep the two early cuttings clean of nutsedge with spring applications of preemergence herbicides but eventually it will break through and become a problem.

The potential to control nutsedge with **postemergence herbicides** has future potential. Roundup® and Sandea are clearly the most effective in truly killing nutsedge tubers and reducing the population. This will not be accomplished in a single application but likely will require two or more applications per season.

Sandea is fairly injurious to alfalfa during the growing season and probably will not be accepted by most growers. The fall application of Sandea after the final harvest was not damaging to alfalfa the following season but nutsedge control did not last. The two

applications of Pursuit definitely had an impact on nutsedge. However, one would have to evaluate the prudence of two applications and consider plant back and crop rotation implications.

Most optimism appears to be Roundup herbicide in a Roundup tolerant variety. It provided as good or better kill to nutsedge plants as any other treatment without having the soil residual concerns, and will not have a pre harvest interval restriction so multiple applications can be made between harvests.

Figure 1

Groundsel Trial
Hastings Island

	Treatment	Rate Lb/A	% Groundsel control of Size 1-2 leaf*	% control of Size 4-6 leaf
1	Velpar	0.5	0	0
2	Velpar	1.0	10	0
3	Velpar	1.5	100	25
4	Velpar	3.0	100	50
5	Gramoxone + NIS	.47	100	100
6	Buctril 4	.50	100	100
7	Untreated	--	0	0

*Evaluation – 20 days after treatment

Figure 2

**Groundsel Evaluation
Hastings Island**

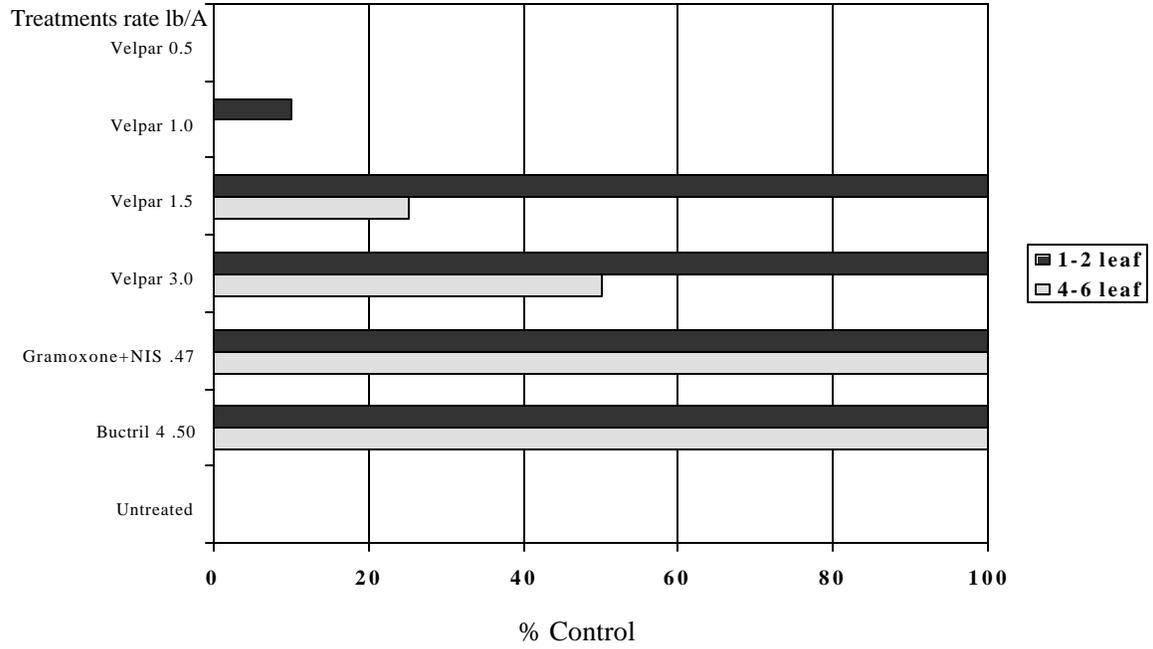


Figure 3

Fall and winter treatments

Treatment	*Nutsedge 3/25/03	Nutsedge 6/15/03
UTC	Present	Present
Sandea+Zoriel	Absent	Present
Sandea	Absent	Present
Zoriel	Present	Present

4 rep avg

Figure 4

Yellow Nutsedge Control

