

Sweet Resinbush Herbicide Study at Marijilda and Frye Mesa Sites, 1998-1999

L.J. Clark and R. Walser

Abstract

Ten herbicide treatments were applied to two sites containing high infestation levels of Sweet Resinbush (Euryops subcarnosus sub. Vulgaris, originally known as Euryops multifidus). Granular or pelleted materials were applied prior to monsoonal rainstorms and foliar materials were applied after the rains had promoted foliar growth. The most effective treatment was a 25 pound per acre rate of Pronone 10G granules with an average control of 98.8% one year after application.

Introduction

Sweet Resinbush is a small shrub with bright yellow daisy-like flowers that was brought into Arizona in the 1930's to aid in erosion control. It has subsequently been found to not control erosion, but to form mono-cultures that exclude erosion controlling plants, thereby exacerbating the erosion problem. Livestock and wildlife do not use the plant and its ability to expand its boundaries at the expense of the native ecosystems place it in a category where it should be eliminated while its infestation sites are relatively contained.

Materials and Methods

This study was performed at two sites in Graham County, both distinct, but representative of the sites where the pest is found in the county. The first site was along Marijilda Canyon road on Forest Service land. The test site is 3800 feet above sea level and located at 32° 42' North Latitude and 109° 46' West Longitude (9.3 miles @ 212° from the Safford Agricultural Center). The site is on a slope varying from 5 to 10%, with mesquite, prickly pear and other species interspersed with an incomplete stand of Sweet Resinbush.

The second site was on Frye Mesa on Arizona state land. This test site was at an elevation of 4800 feet and located at 32° 45.9' North Latitude and 109° 49.8' West Longitude (9.4 miles @ 249° from the Safford Agricultural Center). This site was more uniformly infested with Sweet Resinbush (approaching a mono-culture) than the Marijilda site and with a gentle slope diagonally across the plots of 2 to 5%.

The selection of herbicides to be tested was made based on consultations with people with experience in controlling weeds in rangeland settings, namely: David Fisher, NRCS; Dr. William McCloskey, University of Arizona Weed Specialist and several chemical company representatives. Rates selected were within the recommended ranges for weed control, but toward the top end of the range to magnify the chances for control.

The treatments were:

1. Tordon 1 qt/ac in 20 gal water to active plants
2. Reclaim 1.3 pts/ac in 20 gal + surfctnt to active plts
3. Crossbow 2 gal/ac in 20 gal water to active plants
4. Spike 10 lbs/ac pellets to soil before rainfall
5. Remedy 2 qts/ac in 20 gal water to active plants
6. Banvel 2 qts/ac in 20 gal water to active plants
7. WeedMaster 2 qts/ac in 20 gal water to active plant
8. Pronone 10G granules 25 lbs/ac to soil before rainfall
9. Pronone Pwr Pellets 4' x 4' grid spng prior to rainfall
10. Roundup 3 qts/ac in 20 gal water to active plants

This is a part of the University of Arizona College of Agriculture and Life Sciences 2000 Forage and Grain Report. Index at: <http://ag.arizona.edu/pubs/crops/az1185/>

Rainfall data for the two sites was not collected and data from the Safford Agricultural Center, approximately 9 miles from either site, is only indicative of general weather conditions in the area. Table 1 shows the monthly rainfall at the Agricultural Center over the time period of the experiment and also the average rainfall. When the experiment was initiated in August, insufficient rain had fallen at either site to promote leaf growth, so only the soil applied treatments were applied. It should also be noted that rainfall during the time of the trial was only 75% of normal.

Treatments 4, 8 and 9 are dry formulations either granular or pellets and need to be applied to soil prior to a rainfall event. These were applied at the Marijilda site on August 10th and Frye Mesa site on August 26th of 1998. Between the 26th of August and the middle of September a little more than an inch of rain fell at the Ag Center, but local reports indicated between 2 and 3 inches of rain had fallen on the experimental sites. Sufficient rain had fallen to green the Resinbush and to run water across the surface. Spike was transported into the root zone and some adverse effect on the Resinbush were seen by mid September. Pronone is very water soluble and its effects were seen in plots where it was applied as well as plots down the slope from the treated plots where rain had run. In case of the Marijilda site, the lower replicate was so adversely affected by Pronone carried in the rain water that no further treatments were applied to that replicate. The foliar treatments (all except 4, 8 and 9) were applied by backpack sprayer to both replicates on the Frye Mesa site on September 16th and to the remaining replicate at Marijilda on September 17th.

Observations were made by a two-member team to determine if terminal death had occurred, if there was regrowth and if there were signs of reproduction. Where possible numbers were assigned to the observations, otherwise presence or absence was noted. Where possible, notations were made on the effect of the herbicides on other species existing in the plot areas.

Results and Discussion

Table 2 contains observations made at the Marijilda site throughout the year following treatment applications. In March (6 to 7 months after treatment), the first observation was made. There had been sufficient winter rainfall to initiate regrowth and reproduction in the control area and differences were observed throughout the treatments. Spike, Pronone 10G and Roundup had essentially stopped regrowth and Spike and both Pronone formulations had caused some terminal death. Six of the treatments had stopped seed set. Two months later seedlings had sprouted and flowers appeared in some plots and plants had died in other plots. Spike and Pronone 10G were the most effective herbicides in that evaluation.

Around a year after the first application, and after a fairly active monsoon period, another observation was made. Again Spike and Pronone 10G were the most effective, but other treatments, namely; Tordon, Reclaim, WeedMaster and Roundup had affected reproduction and mortality. A final inspection was made 2 months later to verify the treatment control over the plots.

Table 3 shows the observational data from the Frye Mesa site. The winter rains had apparently been more like rainfall in Safford - very small. In March no seed was observed in the untreated areas around the plots and there was only a small tinge of green regrowth in these untreated areas. All of the treated areas showed some control, the most effective was Tordon with 35% control of terminal growth. Two months later no seedlings were observed in the control area but 70% of the plants were in bloom and a few dead branches were seen in the tops of some plants. All of the treatments had suppressed flowering with Pronone (both formulations), Reclaim, Spike and Tordon all suppressing flowering to less than 2.5%. Plant mortality was still lower than hoped for with Pronone 10G being the most effective at 30% control.

A year after the first application and after another monsoon season had passed, no seedlings were observed in the control areas nor in any of the treatment areas. Considerable control, however, was exhibited by some of the treatments. Pronone 10G produced the most outstanding control with an estimate of 97.5% control. Pronone Power Pellets was a close second but the other treatments did not exhibit sufficient control to be acceptable.

Table 4 is a summary of the observations of both sites in August, approximately one year after the experiment was initiated. Conditions were different at the two sites and Pronone 10G at 25 pounds per acre performed very well under both sets of conditions. Spike had a good overall average, but its weakness under the drier conditions seen

on Frye Mesa made it less acceptable. Pronone Power Pellets produced inconsistent control because of the distance between pellet placement. It's price also makes it a less acceptable choice. WeedMaster and Reclaim performed well at Marijilda but not at the higher, drier site. Their cost makes them a desirable option, but the uncertainty of having sufficient moisture to make them work is a big drawback.

Another aspect of the treatments is the effect of these herbicides on other species in the treatment sites. The next to the last column in Table 4 lists the effects observed. It is essential for recovering the sites that grasses and legumes not be adversely affected. These species need to reproduce rapidly to provide ground cover to prevent erosion as well as to provide feed for animals. Legumes, including Mesquite and Fairy Duster were found in all treatments and not adversely affected by any of the treatments. Grasses were also found to survive well in all treatments except Roundup. Cactus, mainly Prickly pear and Barrel, were only adversely affected by Crossbow, Spike and Banvel.

Considering the effectiveness of control of the Sweet Resinbush in both experimental sites and it's lack of detrimental effects on other observed species in the area, Pronone 10G is the recommended product to control Sweet Resinbush in southeastern Arizona. Further work could be done to refine the optimal rate of application, but it seems expedient to proceed at this time to control this pest before it infests more acres.

Table 1. Rainfall data at the Safford Agricultural Center, approximately 9 miles from both experimental sites, over the period of time that the herbicide study was being evaluated.

Month and year	Rainfall at Safford Ag Center	Average rainfall
July 1998	1.85"	1.73"
August 1998	1.02	1.69
September 1998	0.32	1.80
October 1998	0.55	0.78
November 1998	0.35	0.47
December 1998	0.30	0.91
January 1999	0.00	0.70
February 1999	0.00	0.65
March 1999	0.08	0.61
April 1999	0.87	0.23
May 1999	0.00	0.19
June 1999	0.00	0.29
July 1999	2.05	1.73
August 1999	2.95	1.69
September 1999	0.63	1.08
Totals	10.97"	14.55"

Table 2. Observations made at the Marijilda site during the year following the applications.

Treatment	3/23/99			5/12/99			8/19/99		10/12/99
	Terminal death (%)	Re-growth	Seed set	Seedlings	Flowers (%)	Dead (%)	Seedlings	Dead (%)	Dead (%)
1. Tordon 1 qt/ac	--	Yes	No	Yes	Yes	50	none	50	80
2. Reclaim 1.3 pts/ac	--	Yes	No	Yes	Yes	0	few	80	90
3. Crossbow 2 gal/ac	--	Yes	Yes	Yes	Yes	25	many	50	50
4. Spike (pellets) 10 lbs/ac	70	No	No	No	No	100	none	100	100
5. Remedy 2 qts/ac	25	Yes	Yes	No	Yes	10	-	10	20
6. Banvel 2 qts/ac	20	Yes	No	Yes	No	10	many	5	10
7. WeedMaster 2 qts/ac	10	Yes	No	Yes	Yes	0	none	95	95
8. Pronone 10G 25 lbs/ac	50	No	No	No	No	100	none	100	100
9. Pronone Power Pellets (4'X4' grid)	50	Yes	Yes	Yes	Yes	20	many	60	40
10. Roundup 3 qts/ac	0	No	Yes	Yes	Yes	10	none	20	30
Control	0	Yes	Yes	Yes	Yes	0	many	5	0

Table 3. Observations made at the Frye Mesa site during the year following the applications.

Treatment	3/23/99		5/12/99			8/24/99	
	Terminal death (%)	Seed set	Seedlings	Flowers (%)	Dead (%)	Seedlings	% Dead
1. Tordon 1 qt/ac	35	No	none	2.5	15	none	25
2. Reclaim 1.3 pts/ac	25	No	none	0	12.5	none	55
3. Crossbow 2 gal/ac	17.5	No	none	20	2.5	none	35
4. Spike (pellets) 10 lbs/ac	20	No	none	2.5	2.5	none	65
5. Remedy 2 qts/ac	25	No	v. few	22.5	0	none	50
6. Banvel 2 qts/ac	27.5	No	v. few	17.5	2.5	none	35
7. WeedMaster 2 qts/ac	15	No	few	20	5	none	35
8. Pronone 10G 25 lbs/ac	20	No	none	0	30	none	97.5
9. Pronone Power Pellets (4'X4' grid)	15	No	v. few	2.5	20	none	90
10. Roundup 3 qts/ac	20	No	few	12.5	17.5	none	25
Control	0	No	none	70	0	none	10

Table 4. Summary of herbicide effects approximately one year after applications and the cost per acre for the materials.

Treatment	Marijilda		Frye Mesa		Average % Dead	Notes	Cost per acre
	Seedlings	Dead (%)	Seedlings	Dead (%)			
1. Tordon 1 qt/ac	none	50	none	25	37.5	L, G, C	\$19.38
2. Reclaim 1.3 pts/ac	few	80	none	55	67.5	L, G, C	\$24.40
3. Crossbow 2 gal/ac	many	50	none	35	42.5	L, G, -C	\$79.00
4. Spike (pellets) 10 lbs/ac	none	100	none	65	82.5	L, G, -C	\$65.00
5. Remedy 2 qts/ac	-	10	none	50	30	L, G, C	\$39.13
6. Banvel 2 qts/ac	many	5	none	35	20	L, G, -C	\$41.80
7. WeedMaster 2 qts/ac	none	95	none	35	65	L, G, C	\$15.00
8. Pronone 10G 25 lbs/ac	none	100	none	97.5	98.8	L, G, C	\$87.60
9. Pronone Power Pellets (4'X4' grid)	many	60	none	90	75	L, G, C	\$207.00
10. Roundup 3 qts/ac	none	20	none	25	22.5	L, -G, C	\$28.50
Control	many	5	none	0	2.5	L, G, C	\$0.00

L = Legumes including mesquite and/or fairy duster were observed in the plots.

G = Grass species were observed in the plots.

-G = Grass species appeared to be damaged by the treatment.

C = Cactus species including Prickly Pear and/or barrel were observed in the plots.

-C = Cactus species appeared to be damaged by the treatment.