Perennial Weed Research
1987 - 1988

Crop Science Department, Oregon State University

Oregon Department of Agriculture

County Extension Agents

Coordinated by

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CONTENTS

INTRODUCTION

Research reported here was done by or in collaboration with the people listed on each report. In most cases, a landowner cooperated as well. Each study was conducted over a 2-year period because first-year control of perennial weeds is not necessarily indicative of long term control.

We hope that the data generated will assist you and us in responding to inquiries. We will also use the information to make the PNW Weed Control Handbook more complete.

I would like to continue doing this type of field work and will appreciate being informed of opportunities to collaborate on important weeds.

Creeping Buttercup Control in Coastal Pastures

L.C. Burrill and L. Cannon

Creeping buttercup (*Ranunculas repens*) is a creeping perennial that infests most of the low pastures on the Oregon coast. In addition to crowding out desirable forage plants creeping buttercup is known to be poisonous.

Experiments conducted by Whitesides in 1980 and Whitson in 1985 demonstrated that MCPA will give good season-long control of creeping buttercup. Neither experiment was carried into the following year. The experiment reported here was established to verify earlier results and to demonstrate the level of control the year following application.

The site selected is on a dairy farm just east of North Bend. The field was uniformly infested with creeping buttercup. On June 10, 1987, treatments were applied to 12 by 20 foot plots replicated three times. A hand-held sprayer fitted with four 8003 nozzles was used.

Curly dock (Rumex crispus) was not dense enough nor uniform enough for easy evaluation so the data should be used cautiously. There was a mixed stand of orchard grass, ryegrass, timothy, and some weedy grasses, but none of the species were thick enough to be evaluated separately. When there was a heavy stand of clover and buttercup it was often difficult to evaluate the effect of treatments on grass. At other times it was difficult to evaluate the clover stand because the grass was too thick.

In those cases where there is a wide difference among the three replications our advice to the reader is to give more weight to the lower number. This is an indication of poor control or injury because the plants were obviously visible. A high number is an indication that the plants could not be readily seen but not necessarily because they were controlled by the treatments.

From the tables it is obvious that metsulfuron controlled the buttercup into the second season. Unfortunately the clover was also killed and did not regrow during the following summer. Grasses were not harmed by metsulfuron.

As in the earlier experiments, the most promising treatment was MCPA. Buttercup control was good through the second season and clover injury was not serious. This is a treatment that should be used more on coastal pastures.

% Creeping Buttercup Control

Evaluation Date:		August 31, 1987				May 26, 1988				July 11, 1988			
Treatment	Rate	1	2	3	Avg	1	2	3	Avg	1	2	3	Avg
	(lb. ai/A)												
Metsulfuron	.05 oz	100	100	100	100	99	100	99	99	100	100	90	97
Metsulfuron	.1 oz	100	100	100	100	99	99	98	99	100	100	100	100
Metsulfuron	.2 oz	100	100	100	100	99	99	98	99	100	100	100	100
2,4-D LVE	1.5	30	40	50	40	0	20	20	13	50	20	20	30
2,4-D amine	1.5	90	90	70	83	80	30	20	43	90	85	30	68
2,4-D amine	3.0	90	50	98	79	70	75	80	75	90	80	80	83
MCPA ester	1.5	98	95	95	96	85	80	90	85	70	98	85	84
MCPA amine	1.5	95	100	90	95	85	85	80	83	95	90	80	88
Triclopyr (Garlon 4)	1.0	60	70	80	70	50	30	30	37	0	0	0	0
2,4-D LVE + Triclopyr (Crossbow)	.5 .25	50	30	75	52	40	30	20	30	30	0	20	17
2,4-D LVE + Triclopyr (Crossbow)	1.0 .5	80	70	98	83	30	80	90	70	40	70	80	39
2,4-D amine + Dicamba (Weedmaster)	.75 .25	50	40	40	43	30	0	20	17	30	30	0	20
2,4-D amine + Dicamba (Weedmaster)	1.5 .5	95	60	85	80	40	30	40	37	0	0	0	0

% Curly Dock Control

Evaluation Date:		August 31, 1987				May 26, 1988				July 11, 1988			
Treatment	Rate	1	2	3	Avg	1	2	3	Avg	1	2	3	Avg
	(lb. ai/A)												
Metsulfuron	.05 oz	70	95	80	82	80	100	50	77	50	80	0	43
Metsulfuron	.1 oz	50	95	90	78	85	80	95	87	50	0	80	43
Metsulfuron	.2 oz	70	90	50	70	70	90	0	53	50	30	0	27
2,4-D LVE	1.5	50	0	30	27	0	30	0	10	70	0	20	30
2,4-D amine	1.5	80	50	70	67	80	90	50	73	80	80	50	70
2,4-D amine	3.0	60	0	50	37	100	70	50	73	85	0	90	58
MCPA ester	1.5	0	60	85	48	90	40	100	77	80	0	40	40
MCPA amine	1.5	0	70	50	40	90	100	80	90	50	80	0	43
Triclopyr (Garlon 4)	1.0	0	0	0	0	0	0	0	0	0	0	50	17
2,4-D LVE + Triclopyr (Crossbow)	.5 .25	0	0	50	17	0	0	30	10	0	0	20	7
2,4-D LVE + Triclopyr (Crossbow)	1.0 .5	0	0	--	0	0	90	95	62	0	50	80	43
2,4-D amine + Dicamba (Weedmaster)	.75 .25	30	30	0	20	0	30	0	10	0	80	0	27
2,4-D amine + Dicamba (Weedmaster)	1.5 .5	75	0	50	42	30	20	80	43	50	0	80	43

% White Clover Injury

Evaluation Date:		August 31, 1987				May 26, 1988				July 11, 1988			
Treatment	Rate	1	2	3	Avg	1	2	3	Avg	1	2	3	Avg
	(lb. ai/A)												
Metsulfuron	.05 oz	95	100	100	98	100	95	70	88	98	95	80	91
Metsulfuron	.1 oz	100	100	100	100	100	100	100	100	98	90	90	93
Metsulfuron	.2 oz	100	100	100	100	100	95	100	98	98	80	100	93
2,4-D LVE	1.5	0	40	65	35	90	50	50	63	50	40	90	60
2,4-D amine	1.5	0	0	0	0	0	0	0	0	0	30	50	27
2,4-D amine	3.0	20	70	60	50	80	30	30	47	50	20	20	30
MCPA ester	1.5	0	30	20	17	0	0	20	7	30	30	0	20
MCPA amine	1.5	0	60	70	43	0	0	20	7	0	0	20	7
Triclopyr (Garlon 4)	1.0	100	100	100	100	80	90	100	90	98	90	100	96
2,4-D LVE + Triclopyr (Crossbow)	.5 .25	80	100	60	80	20	80	60	53	0	100	80	60
2,4-D LVE + Triclopyr (Crossbow)	1.0 .5	100	80	100	93	30	70	98	60	90	50	90	77
2,4-D amine + Dicamba (Weedmaster)	.75 .25	70	100	60	77	0	30	30	20	30	70	80	60
2,4-D amine + Dicamba (Weedmaster)	1.5 .5	95	100	100	98	70	90	90	77	70	70	100	80

% Grass Injury*

Evaluation Date:		August 31, 1987				May 26, 1988				July 11, 1988			
Treatment	Rate	1	2	3	Avg	1	2	3	Avg	1	2	3	Avg
	(lb. ai/A)												
Metsulfuron	.05 oz	0	0	50	17	0	0	30	10	0	0	0	0
Metsulfuron	.1 oz	30	75	40	48	0	0	0	0	0	0	0	0
Metsulfuron	.2 oz	50	60	40	50	0	0	0	0	0	0	0	0
2,4-D LVE	1.5	0	0	30	10	0	20	0	7	0	0	0	0
2,4-D amine	1.5	0	0	0	0	0	0	50	17	0	0	0	0
2,4-D amine	3.0	0	0	20	7	0	0	0	0	0	0	0	0
MCPA ester	1.5	0	20	20	13	0	50	0	17	0	0	0	0
MCPA amine	1.5	0	0	0	0	40	0	30	23	0	0	0	0
Triclopyr (Garlon 4)	1.0	40	50	0	30	50	0	0	17	0	0	0	0
2,4-D LVE + Triclopyr (Crossbow)	.5 .25	0	0	20	7	40	30	0	23	0	0	0	0
2,4-D LVE + Triclopyr (Crossbow)	1.0 .5	80	0	30	37	0	0	0	0	0	0	0	0
2,4-D amine + Dicamba (Weedmaster)	.75 .25	70	40	0	37	30	0	30	20	0	0	0	0
2,4-D amine + Dicamba (Weedmaster)	1.5 .5	80	0	20	33	0	0	0	0	0	0	0	0

* Mixed stand of orchard grass, ryegrass, timothy, and weed grasses.

Western Wild Cucumber Control with Herbicides

L. Burrill and J. Leffel

Western wild cucumber is a perennial vine that regrows each year from an enormous root. It is common to fields of Western Oregon and causes serious economic loss by competing with crops or reducing crop quality as is the case with Christmas trees deformed by the weight of the vines.

Research done in 1981 showed that plants treated with glyphosate did not regrow one year later. Grower results have not been this good and in many cases the infestation is so thick that a broadcast application is needed. For these situations a selective herbicide is required.

A field experiment was conducted near Gaston in Washington County, Oregon, to test the effectiveness of several herbicides in controlling wild cucumber in the season following application. In an area uniformly infested with wild cucumber, plots 12 by 25 ft. and replicated three times were treated on July 2, 1987. Thirty gallons of water per acre was used as the carrier and was sprayed through four 8002 flat fan nozzles. The wild cucumber was mature and had produced mature fruits.

Evaluation of control was done on May 30, 1988. A mature crop of Italian ryegrass was growing in the field and made evaluation difficult. This may explain the two cases of different results among replications although the observations were rechecked to confirm results.

We were surprised that all of the herbicides gave acceptable control. This may indicate that growers are getting control for one year but are not making follow-up applications until the plants have fully recovered (Crop Science Department, Oregon State University, Corvallis, OR 97331).

Wild cucumber control with herbicides

Herbicide	Rate	% Control			
	lbs ai/a	R1	R2	R3	Avg
glyphosate	1.5	90	90	100	93
glyphosate	3.0	100	90	100	97
picloram	0.5	90	80	100	90
picloram	1.0	50	95	100	82
dicamba	1.0	100	80	75	85
dicamba	2.0	100	90	90	93
triclopyr (ester)	0.5	80	30	100	70
triclopyr (ester)	1.0	95	100	100	98
triclopyr + 2,4-D (Crossbow)	0.5 + 1.0	90	0	100	63
triclopyr + 2,4-D (Crossbow)	1.0 + 2.0	95	75	90	87

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Scotch Broom Control with Herbicides

L.C. Burrill and G. Miller

Scotch broom is a woody perennial plant that is common to pastures, timber land, and other undisturbed sites in western Oregon. When plants are cut or mowed many new plants develop from the roots so that a field becomes totally covered with this aggressive weed. Scotch broom is a prolific seed producer and seeds are the major method of spread.

Competitive plants in a pasture or in other sites will help prevent establishment of new scotch broom plants but once established only tillage or herbicides will solve the problem.

Because scotch broom is a growing problem in western Oregon, we established a trial to compare the performance of several commercial herbicides.

The research site is about 10 miles west of Cheshire on highway 126 west of Eugene. A small hillside pasture had become infected with scotch broom. The owners had mowed the plants several times in 1987. The plants responded by sending up so many new shoots that the pasture became a meadow of 2 feet-tall scotch broom plants.

On April 5, 1988 herbicides were applied on plots that were 6 by 20 feet and replicated three times. Herbicides were applied with a hand-held boom fitted with four 8006 flat fan nozzles. Water at a rate of 85 gallons/A was used as the carrier. Moract, a commercial adjuvant, was added at a rate of 2% of the total spray volume to all treatments except the second series of metsulfuron. Activator 90 was added to these treatments at a 2% rate.

A preliminary evaluation of control was made on May 27, 1988 and the final evaluation was made on April 13, 1989. Results are in the table. Picloram, picloram plus 2,4-D, 2-4-D LVE, triclopyr ester, and triclopyr plus 2,4-D (Crossbow) were the most effective treatments one year after application (Crop Science Dept., Oregon State University, Corvallis, OR, 97331) and Noxious Weed Group, Oregon Department of Agriculture).

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Herbicide Screening for Scotch Broom
Schaefer Farm, Lane County, Oregon

Rate lbs ae/A	Evaluated May 27, 1988 1	2	3	Avg.	Evaluated April 13, 1989 1	2	3	Avg.
Picloram								
.5	75	50	70	65	95	95	85	92
.75	75	70	75	73	95	95	95	95
1.0	80	85	80	82	90	98	98	95
2,4-D LVE								
1.0	50	40	40	43	30	20	70	40
2.0	60	40	70	57	60	70	85	72
3.0	60	80	65	68	85	90	95	90
Glyphosate								
1.0	20	10	20	17	0	0	20	7
1.5	20	40	50	37	20	30	30	27
2.0	70	20	20	37	50	0	20	23
Dicamba								
.5	50	20	20	30	50	0	20	23
1.0	50	40	30	40	50	50	60	53
2.0	50	30	50	43	50	70	85	68
Triclopyr (E)								
.5	50	60	70	60	30	65	85	60
1.0	70	80	50	67	75	95	95	88
1.5	50	60	80	63	80	95	95	90
Triclopyr (A)								
.5	20	20	60	33	0	0	50	17
1.0	25	30	50	35	20	50	20	30
1.5	30	40	40	37	20	20	30	23
2,4-D amine								
1.0	40	30	40	37	0	20	20	13
2.0	40	30	20	30	0	0	20	7
3.0	50	30	40	40	20	0	40	20
Triclopyr + 2,4-D (Crossbow)								
.25+.50	50	70	80	67	85	70	90	82
.50 + 1.0	50	70	75	65	70	80	90	80
.75 + 1.5	70	60	80	70	95	80	98	91
Dicamba + 2,4-D (Weedmaster)								
.25 + .75	50	70	40	53	20	60	50	43
.5 + 1.5	60	50	60	57	70	60	75	68
1.0 + 3	70	70	60	67	90	75	85	83
Clopyralid								
.5	30	20	25	25	0	20	30	17
1.0	30	50	70	50	0	0	50	17
2.0	50	40	30	40	75	50	75	67
Metsulfuron								
1 oz.	20	75	75	57	30	80	80	63
2 oz.	20	50	30	33	70	75	60	68
3 oz.	20	80	70	57	65	90	80	78
Picloram + 2,4-D LVE								
.25 + 2.0	70	80	60	70	95	90	90	92
Glyphosate + 2,4-D LVE								
1.0 + 1.0	50	20	30	33	30	0	20	17
Metsulfuron + Activator 90								
1 oz.	50	50	50	50	60	50	80	63
2 oz.	60	60	60	60	80	70	90	80

Pacific Poison Oak Control with Herbicides in Southern Oregon

L.C. Burrill, R. Mobley, and G. Tiger

Poison oak is well known as a pest in wood lots and recreation areas. That it is also a serious invader of rangeland in southern Oregon is not as well known. The land most susceptible to invasion is hill land with shallow soils and annual rainfall of less than 15 inches.

Two tests were established to compare several herbicides for effectiveness on Pacific poison oak growing under these conditions. Individual plants were selected and treated as plots. The treatments were replicated three times. The plants were sprayed on June 12, 1987, with a single adjustable-cone nozzle. Each herbicide was applied as a 2% concentration of the formulated product except picloram which was applied as a 1% mix of the product.

The summer and fall of 1987 were extremely dry which normally would create conditions not conducive to herbicide penetration and translocation. Thirteen months following treatment all of the plants were essentially dead based on visual evaluation (see table). Three plants were given a rating of 98% control because a tip of one branch was still green. We assumed that this was caused by less than complete coverage with the spray.

Perhaps it is more important that only plants treated with glyphosate consistently showed evidence of regrowth from crowns or roots. One or two of the six plants treated with picloram, dicamba plus 2,4-D, and 2,4-D had started to regrow. None of the plants treated with triclopyr had new shoots. (Crop Science Department, Oregon State University, Corvallis, OR 97331)

Pacific poison oak control in southern Oregon

Herbicide	% conc.	% control	
		Site I	Site II
glyphosate	2	99	100
triclopyr (ester)	2	100	100
triclopyr + 2,4-D (Crossbow)	2	100	100
picloram	1	99	99
dicamba + 2,4-D (Weedmaster)	2	100	100
2,4-D LVE	2	100	100

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Spreading Dogbane Control on Roadsides

L.C. Burrill

Spreading dogbane is a common weed of roadsides in the Willamette Valley of Oregon. Because this perennial weed is not controlled by most commonly used roadside herbicides, it is often seen growing alone in large clumps or strips on roadsides. Several herbicides and combinations of herbicides were tested on spreading dogbane when it was found that the Oregon Extension Service had no information on chemical control of the weed.

On July 13, 1987, plots 6 by 20 feet were treated along a section of paved road where a uniform population of spreading dogbane was growing. Treatments were replicated three times. Herbicides were applied with a hand-held plot sprayer fitted with four 8002 flat fan nozzles. Water was used as the carrier at 31 gal/a.

Triclopyr, alone or with 2,4-D, was the only herbicide to give more than 80% control two months after treatment (see table) but one year after treatment control by glyphosate was complete. (Crop Science Department, Oregon State University, Corvallis, OR 97331)

Spreading dogbane control
Polk County Oregon

Herbicide	Rate	Percent Control	
	lb ae/a	Sept. 7, 1987	July 7, 1988
2,4-D LVE	2.0	40	17
picloram	0.5	17	13
picloram	1.0	10	43
dicamba	0.5	7	0
dicamba	1.0	13	10
dicamba + 2,4-D (Weedmaster)	0.5 + 1.5	27	13
dicamba + 2,4-D (Weedmaster)	1.0 + 3.0	47	13
triclopyr (ester)	1.0	84	57
triclopyr (ester)	2.0	92	85
triclopyr + 2,4-D (Crossbow)	0.5 + 1.0	48	45
triclopyr + 2,4-D (Crossbow)	1.0 + 2.0	78	13
glyphosate + X-77	1.0 + 0.5%	23	98
glyphosate + X-77	2.0 + 0.5%	73	100
bromacil	4.0	33	20
bromacil	8.0	30	7
metsulfuron + X-77	1 oz ai/a + 0.5%	28	7
metsulfuron + X-77	2 oz. ai/a + 0.5%	20	23

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Chaparral Broom (*Braccharis pilularis*) Control with Herbicides

L. Burrill and L. Cannon

Chaparral broom is a woody perennial shrub that infests hilly pastures of Coos County. Little is known about herbicide action on chaparral broom so five herbicides were tested in a single experiment at a site just east of Myrtle Point in Coos Co.

Individual plants were selected and treated as plots. The treatments were replicated two times. The plants were sprayed on June 9, 1987, with a single adjustable-cone nozzle. Each herbicide was applied as a 2% concentration of the formulated product except Picloram which was applied as a 1% mix of Tordon 22K.

The summer and fall of 1987 were extremely dry which normally would create conditions not conducive to herbicide penetration and translocation. On July 12, 1988, thirteen months after application, visual evaluations of control were made (see table). Glyphosate, triclopyr, and dicamba plus 2,4-D (Weedmaster) gave nearly complete control. Results from picloram, and triclopyr plus 2,4-D (Crossbow) were less clear. In both cases one replication received a control rating of 98% but in the second replication the control was 50%. This difference in control was probably a result of less than complete coverage with the spray. (Crop Science Department, Oregon State University, Corvallis, OR 97331).

Chaparral broom control in Coos Co., Oregon

Herbicide	% Conc.	% Control
Picloram	1	74
Glyphosate	2	98
Triclopyr (Garlon 4)	2	99
Triclopyr + 2,4-D	2	74
Dicamba + 2,4-D	2	97

Effect of Surfactants on Glyphosate Activity on Gorse

L.C. Burrill, L. Cannon, and A. Poole

Gorse is a woody perennial with spine-like leaves that limit herbicide penetration. Addition of a surfactant to a spray mixture is generally considered to improve herbicide entry into gorse plants. Few field experiments have been done specifically to test the effect of surfactants on herbicides applied to gorse. In the experiment reported here glyphosate formulated as Roundup was applied without additional surfactant, with two rates of the surfactant X-77 and with two rates of Surphtac. Surphtac contains 25% surfactant, 25% Enquik and 50% water.

On April 16, 1987 applications were made to large single plants that were treated as plots. The treatments were replicated three times. The chemicals were applied through a single adjustable-cone nozzle on a hand-held wand. Sufficient chemical was added to water to make one gallon of a 1, 2, or 4% concentration of Roundup with the appropriate amount of surfactant. We attempted to apply the spray mix so that the entire plant was uniformly wet.

The research site is 2 miles south of Bandon on the Oregon coast. Gorse was well established in an area that had been a pasture. Evaluation of gorse control was made on July 12, 1988, which was 15 months after treatment. At 1 and 2% concentration of Roundup there was an obvious improvement in control when either of the surfactants was used. Increased activity was most noticeable at the lowest rate of Roundup, which would be expected. At 1% concentration of Roundup plus additional surfactant, gorse control was equal to control with 2% concentration of Roundup without additional surfactant.

There are reports that a new surfactant-penetrant called Silwet L-77 by Union Carbide and Pulse by Monsanto is more effective than other surfactants. We plan to test this material in 1989.

There was no obvious difference between the two surfactants tested or between rates of the surfactants.

Effect of surfactants on glyphosate activity on gorse

Surfactant	% Conc.	% Conc. Roundup	% Gorse Control			
			RI	RII	RIII	Avg.
None	0	1	40	40	50	43
	0	2	80	75	80	78
	0	4	80	100	100	93
X-77	1	1	75	80	75	77
	1	2	90	95	80	88
	1	4	90	85	100	92
	2	1	95	50	70	72
	2	2	90	90	85	88
	2	4	98	100	90	96
Surphtac	0.5	1	95	90	40	75
	0.5	2	90	85	90	88
	0.5	4	75	90	90	85
	1	1	75	85	80	80
	1	2	95	90	75	87
	1	4	95	95	100	97

Influence of Surfactants on Metsulfuron Activity on Gorse

Glenn Miller[1] and Chris Miller[2]
Knapp Ranch, Port Orford, 1988

Researchers in Hawaii and New Zealand have reported good activity by metsulfuron (Escort, Ally) on gorse (Ulex europaeus). At low rates metsulfuron is used as a selective postemergence herbicide on wheat and barley. At higher rates it is used to control broadleaf weeds and brush in noncropland. Metsulfuron is normally used with a nonionic surfactant.

The experiment reported here was conducted to test the effectiveness of metsulfuron, with and without surfactants, on established gorse.

The research site was on the Knapp Ranch which is located between the town of Port Orford and the Elk River. The gorse in the research area had regrown to a height of about 2 feet after being cut by a "mower" in the previous year. There was a thick and uniform growth of gorse so plots 4 by 50 ft. were sprayed rather than individual plants.

On March 18, 1988, herbicides were applied with a hand-held boom fitted with four 8003 flat fan nozzles. A CO2 powered sprayer with a pressure of 30 psi was used. Treatments were replicated three times.

Metsulfuron was applied at two rates; 90 or 180 g/ha (36 or 73 g/A) of the active ingredient. Two nonionic surfactants; Activator 90 to R-11 were tested at 0.25% and 1.0% of the spray volume.

Evaluations made on July 12, 1988, show that there was no difference between the two surfactants or between rates of surfactants. When surfactants were added to the low rate of metsulfuron control equaled that by the high rate of metsulfuron without a surfactant. In the herbicide screening trial conducted at the same site and also reported in this volume, results with metsulfuron improved considerably between 7 months and 10 months after application. We expect to evaluate the metsulfuron experiment again in the spring of 1989.

[1]Department of Agriculture Weed Control Group
[2]Coos-Curry Electric Coop

Influence of Surfactants on Metsulfuron Activity on Gorse

Knapp Ranch - Port Orford, OR - 1988

Treatment	Rate g/ha	Surfactant and rate	% Control 1	2	3	Avg
Metsulfuron	90	none	50	60	75	62
Metsulfuron	180	none	70	80	70	73
Metsulfuron	90	R-11 @ 1%	75	75	75	75
Metsulfuron	180	R-11 @ .25%	65	80	--	73
Metsulfuron	90	R-11 @ .25%	70	80	70	73
Metsulfuron	180	R-11 @ 1%	80	80	--	80
Metsulfuron	90	Activator 90 @ 1%	70	80	70	73
Metsulfuron	180	Activator 90 @ .25%	80	80	70	73

Evaluated by Larry Burrill on July 12, 1988, four months after application.

Herbicide Screening for Control of Gorse

G. Miller* and L. Burrill

The first reported research on the control of gorse in Oregon was started in 1945 in Coos and Curry Counties. Both counties still have major infestations of gorse. The research in this 1988 report was done on the Knapp ranch located between the town of Port Orford and the Elk River. This is near one of two places where gorse is reported to have been planted before the turn of the century.

Herbicides are important for gorse control in several situations. One is for lasting control on roadsides and other areas where the invasion must be slowed. Another is to desiccate the plants prior to a burn and hopefully to get crown control as well. A third use of herbicides as compared to other methods is for control of new infestations. When a gorse plant is found in an area where none have been reported before, the most effective and lasting control method should be used. This is usually a herbicide.

An experiment was established to compare the performance of several herbicides on gorse that had regrown to a height of about 2 feet after being cut by a large "mower" in the previous year. There was a thick and uniform growth of the gorse over the plot area so plots 12 by 25 feet were sprayed rather than individual plants.

On September 1, 1987, herbicides were applied with a hand-held boom fitted with four 8003 flat fan nozzles. A CO2 powered, hand-held plot sprayer was used. Treatments were replicated three times. Because most gorse spraying is done with a handgun we opted to mix the herbicides at an appropriate concentration rather than spray on an area basis. Herbicides were applied with enough water to create the desired concentration. In an attempt to demonstrate the role of a surfactant we applied the low rate of each herbicide with, and without, X-77 at 0.2% by volume. Because metsulfuron is formulated as dispersable granules it was applied on an area basis rather than on a concentration basis. A surfactant was added to both rates of metsulfuron.

Conditions for herbicide activity on gorse were not good. The summer had been extremely dry so that the plants had been under moisture stress for several months. Because we used relatively small nozzles the volume of water was low and coverage was probably not complete.

Evaluation of gorse control was made on March 29 and again on July 12, 1988. As seen on the table overall activity was much less than observed with some of the same herbicides in a test conducted earlier under better conditions. The evaluation made on March 29 was included to illustrate that initial activity is not necessarily a good indication of final control. For most of the treatments the control was less in July than observed in March. Exceptions were metsulfuron (Escort), and dicamba at the high rate. In July of 1988 only metsulfuron, dicamba, triclopyr, and Crossbow were giving control of 75% or better. These results were particularly encouraging considering the poor environmental conditions for the test.

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Herbicide Screening for Gorse

Knapp Ranch - Curry County - Port Orford, OR

Herbicide	% Conc.	% Control							
		Evaluated March 19, 1988				Evaluated July 12, 1988			
		1	2	3	Avg	1	2	3	Avg
picloram (Tordon 22K)	.5	20	15	30	23	0	0	2	7
picloram + X-77	.5	25	50	50	42	0	0	0	0
picloram	1	40	40	40	40	0	0	20	7
2,4-D LVE	2	30	35	50	38	40	0	0	13
2,4-D LVE + X-77	2	40	20	20	27	0	0	0	0
2,4-D LVE	4	40	35	50	42	0	0	0	0
2,4-D amine	2	30	20	20	23	0	0	0	0
2,4-D amine + X-77	2	30	10	15	18	0	0	0	0
2,4-D amine	4	45	-	60	53	0	0	0	0
glyphosate (Roundup)	2	70	70	75	72	40	0	30	23
glyphosate + X-77	2	75	80	80	78	40	40	30	37
glyphosate	4	80	75	80	78	40	30	50	40
dicamba (Banvel)	1	10	10	10	10	0	20	30	17
dicamba + X-77	1	20	15	20	18	40	30	50	40
dicamba	2	40	30	40	37	80	75	75	77
triclopyr (Garlon 4)	.5	60	60	75	65	0	70	40	37
triclopyr + X-77	.5	75	70	70	72	50	50	50	50
triclopyr	1	80	90	85	85	80	80	75	78
Crossbow	1.5	80	80	50	70	75	50	40	55
Crossbow + X-77	1.5	85	75	85	82	70	60	75	68
Crossbow	3	95	90	90	92	90	85	95	90
Weedmaster	2	-	20	20	20	30	0	0	10
Weedmaster + X-77	2	30	20	40	30	20	20	20	20
Weedmaster	4	60	30	15	35	30	30	20	27
clopyralid (Stinger)	.75	15	10	10	12	20	0	0	7
clopyralid + X-77	.75	20	15	10	15	30	20	25	25
clopyralid	1.5	40	15	20	25	40	20	30	30
metsulfuron + X-77 (Escort)	1 oz/A	20	10	20	17	95	90	90	92
metsulfuron + X-77	2 oz/A	55	40	25	40	80	80	90	83

Gorse Control With Herbicides

L.C. Burrill, L. Cannon, and A. Poole

Gorse is a woody perennial plant that has spread over more than 30,000 acres in the southern coastal counties of Oregon. Other than certain trees, no vegetation seems to be able to compete with this vigorous, dense-growing plant. Once established, burning and large equipment are the only methods to remove the plants from a field. Regrowth from crowns following mechanical removal of gorse will be much less if an effective herbicide is applied prior to disturbance.

An experiment was conducted on well-established plants to evaluate the effectiveness of certain herbicides in preventing regrowth in addition to giving top kill.

On April 16, 1987 applications were made to single large plants that were treated as plots. The treatments were replicated three times. Chemicals were applied through an adjustable-cone nozzle on a hand-held wand. Chemical was added to water to make one gallon of spray mix at the desired concentration. One gallon of the spray mix was prepared to treat all three plants, but because of difference in plant size the whole gallon was not necessarily used each time. We attempted to apply the spray mix so that the entire plant was uniformly wet.

The research site is 2 miles south of Bandon on the Oregon coast. Gorse was well established in an area that had been a pasture.

Evaluation of gorse control was made on July 12, 1988 which was 15 months after treatment. All of the plants were still brown except one of the plants treated with 2,4-D and one treated with glyphosate. In both of these cases tips of only one or two branches were green. This was probably a result of poor distribution of the spray on the plant. Desiccation of the plant is important to get better results when the field is burned, but it may also be an indication of long-term crown control. In this test only the two plants mentioned above and another plant treated with 2,4-D were growing new branches from the crown.

Gorse control in this experiment was better than expected for most of the herbicides used. Conditions were about right for maximum herbicide activity except that the soil was unusually dry in 1987, and the gorse was in full bloom. It is usually more effective to apply herbicides soon after bloom because the blossoms tend to absorb herbicide and drop off. The unusually good results are likely an indication of the importance of thorough coverage with the spray.

Gorse Control With Herbicides

Wayne Peters Farm, Bandon, OR, 1987-88

Herbicide	% Conc	% Gorse Control 1	2	3	Avg
picloram (Tordon 22K)	1	100	100	100	100
picloram (Tordon 22K)	2	100	100	100	100
glyphosate (Roundup)	2	100	80	100	93
glyphosate (Roundup)	4	100	100	100	100
dicamba (Banvel)	2	100	100	100	100
dicamba (Banvel)	4	100	100	100	100
triclopyr (Garlon 4)	2	100	100	100	100
triclopyr (Garlon 4)	4	100	100	100	100
triclopyr + 2,4-D (Crossbow)	2	100	100	100	100
triclopyr + 2,4-D (Crossbow)	4	100	100	100	100
dicamba + 2,4-D (Weedmaster)	2	100	100	100	100
dicamba + 2,4-D (Weedmaster)	4	100	100	100	100
2,4-D LVE (Esteron Conc. 99)	2	100	100	100	100
2,4-D LVE (Esteron Conc. 99)	4	100	100	100	100

Gorse (*Ulex europaeus*) control with herbicides

L. Burrill, G. Miller, L.Cannon, and A. Poole

Introduction

Gorse is a dense, spiny, evergreen, legume shrub which infests more than 30,000 acres in the southern coastal counties of Oregon. It grows up to 10 feet tall and has spreading branches ending in a sharp spine and bearing stiff spine-like leaves. Where adapted gorse increases rapidly, crowding out other vegetation, forming dense thickets that render land almost worthless. The individual plants grow outward, forming a central area of dry, dead vegetation. The oil in the plant combined with the dead dry-matter creates a serious fire hazard.

Propagation is largely by seed. The plants are prolific seed producers, and bursting seed pods scatter seed for several feet. Seed is also carried by animals, machinery, and water. New infestations any distance from existing stands can usually be traced to movement of machinery. The seeds have hard coats and will lie in the soil for years before germinating.

Control

Cultivation. Cultivation is one of the best methods of controlling gorse in areas accessible with equipment. Methods of cultivation that remove the old gorse crowns and bring them to the surface are the most successful. For well established stands large tractors or graders with blades and rippers are used to clear the land and push the gorse into piles for burning. Because gorse usually becomes established on nontillable land and in inaccessible places, such as fence rows, river banks, and rough sites, cultivation is often not possible.

Grazing. Livestock will eat the tender new tips of gorse plants if heavily stocked for a short time. Occasional mowing or herbicide application may be required if plants escape control by the livestock.

Burning. Burning will destroy most of the existing growth and some of the seeds on the soil surface. To be effective, burning must be done under conditions of low humidity. If conditions are unfavorable for a good burn, the area can be sprayed with a desiccant and oil to dry the foliage.

Crowns of gorse plants are usually not killed by cutting or burning top growth. Many crowns can be killed with a herbicide applied prior to burning. An option is to spray the regrowth from crowns after it has reached 12 to 18 inches in height.

Chemical Control

Several tests were established to compare the effectiveness of various herbicides on established gorse. Two herbicide screening trials and a surfactant trial with glyphosate will be reported here.

Herbicide Screening Trial Number 1.

An experiment was conducted on well-established gorse plants to evaluate the effectiveness of certain herbicides in preventing regrowth in addition to giving top kill. The research site is 2 miles south of Bandon on the Oregon coast. Gorse was well established in an area that had been a pasture.

On April 16,1987 herbicide applications were made to single large plants that were treated as plots. The treatments were replicated three times. Herbicides were applied through an adjustable-cone

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nozzle on a hand-held wand. Herbicides were added to water to make one gallon of spray mix at the desired concentration. One gallon of the spray mix was prepared to treat three plants, but because of difference in plant size the whole gallon was not necessarily used each time. We attempted to apply the spray mix so that the entire plant was uniformly wet. Herbicides tested were picloram, glyphosate,dicamba,triclopyr,triclopyr + 2,4-D, dicamba + 2,4-D, and 2,4-D LVE.

Evaluation of gorse control was made on July 12, 1987 which was 15 months after treatment. Results can be found on Table No. 1. All of the plants were still brown except one of the plants treated with 2,4-D and one treated with glyphosate. In both of these cases tips of only one or two branches were green. This was probably a result of poor distribution of the spray on the plant. Desiccation of the plant is important to get better results when the field is burned, but it may also be an indication of long-term control. In this test only the two plants mentioned above and another plant treated with 2,4-D were growing new shoots from the crown.

Gorse control in this experiment was better than expected for most of the herbicides used. Conditions were about optimum for maximum herbicide activity except that the soil was unusually dry in 1987, and the gorse was in full bloom. It is usually more effective to apply herbicides soon after bloom because the blossoms tend to absorb the herbicide and drop off. The unusually good results are likely an indication of the importance of thorough coverage with the spray.

Herbicide Screening Trial Number 2

An experiment was established to compare the performance of several herbicides on gorse that had regrown to a height of about 2 feet after being cut by a large "mower" in the previous year. There was a thick and uniform growth of the gorse over the plot area so plots 12 by 25 feet were sprayed rather than individual plants.This experiment was conducted on the Knapp ranch located between the town of Port Orford and the Elk River. This is one of two places where gorse is reported to have been planted before the turn of the century.

On September 1, 1987, herbicides were applied with a hand-held boom fitted with four 8003 flat fan nozzles. A CO2 powered, hand-held plot sprayer was used. Treatments were replicated three times. Because most gorse spraying is done with a handgun we opted to mix the herbicides at an appropriate concentration rather than spray on an area basis. Herbicides were applied with enough water to create the desired concentration. In an attempt to demonstrate the role of a surfactant we applied the low rate of each herbicide with, and without, X-77 surfactant at 0.2% by volume. Because metsulfuron is formulated as dispersible granules it was applied on an area basis rather than on a concentration basis. A surfactant was added to metsulfuron at both rates.

Conditions for herbicide activity on gorse were not good. The summer had been extremely dry so the gorse plants had been under moisture stress for several months. Because we used relatively small nozzles the volume of water was low and coverage was probably not complete.

Evaluation of gorse control was made on March 29 and again on July 12, 1988. As seen on Table No. 3 overall activity was much less than observed with some of the same herbicides in a test conducted earlier under better conditions and reported earlier in this paper.The evaluation made on March 29 was included to demonstrate that initial activity is not necessarily a good indication of final control. For most of the treatments the control was less in July than observed in March. Exceptions were metsulfuron, and dicamba at the high rate. In July of 1988 only metsulfuron, dicamba, triclopyr, and Crossbow were giving control of 75% or better. These results were particularly encouraging considering the poor environmental conditions for the test.

Effect of surfactants on glyphosate activity on gorse

Addition of a surfactant or an oil to a spray mixture is generally considered to improve herbicide entry into gorse plants. Few field experiments have been done specifically to test the effect of surfactants on herbicides applied to gorse. In the experiment reported here glyphosate formulated as Roundup was applied without additional surfactant, with two rates of the surfactant X-77, and with two rates of Surphtac. Surphtac contains 25% surfactant, 25% Monocarbamide Dihydrogen Sulfate as Enquik, and 50% water. The research site and conditions were the same as described in the first experiment in this paper.

On April 16, 1987 applications were made to large single plants that were treated as plots. The treatments were replicated three times. The herbicides were applied through a single adjustable-cone nozzle on a hand-held wand. Sufficient herbicide was added to water to make one gallon of a 1, 2, or 4% concentration of Roundup with the appropriate amount of surfactant. We attempted to apply the spray mix so that the entire plant was uniformly wet.

Evaluation of gorse control was made on July 12,1988 which was 15 months after treatment. Results can be found in Table No. 2. At 1 and 2% concentrations of Roundup there was an obvious improvement in control when either of the surfactants was used. Increased activity was most noticeable at the lowest rate of Roundup, which would be expected. At 1% concentration of Roundup plus additional surfactant, gorse control was equal to control with 2% concentration of Roundup without additional surfactant.

Summary

Results reported here demonstrate that several herbicides applied under good conditions will give complete control of mature gorse for at least 15 months after treatment. Even under poor environmental conditions for herbicide activity metsulfuron, dicamba, triclopyr, and Crossbow gave at least 75% control. A surfactant added to Roundup increased activity. Short term use of herbicides should not be expected to give complete control of a gorse problem. The difficulty of achieving complete crown kill and the supply of seeds in the soil dictate a long term program using appropriate mixtures of control methods.

Table 1. Herbicide Screening Trial Number 1. Wayne Peters Farm, Bandon, OR, 1987-88

Herbicide	% Conc	% Gorse Control 1	2	3	Avg
picloram (Tordon 22K)	1	100	100	100	100
picloram (Tordon 22K)	2	100	100	100	100
glyphosate (Roundup)	2	100	80	100	93
glyphosate (Roundup)	4	100	100	100	100
dicamba (Banvel)	2	100	100	100	100
dicamba (Banvel)	4	100	100	100	100
triclopyr (Garlon 4)	2	100	100	100	100
triclopyr (Garlon 4)	4	100	100	100	100
triclopyr + 2,4-D (Crossbow)	2	100	100	100	100
triclopyr + 2,4-D (Crossbow)	4	100	100	100	100
dicamba + 2,4-D (Weedmaster)	2	100	100	100	100
dicamba + 2,4-D (Weedmaster)	4	100	100	100	100
2,4-D LVE (Esteron Conc. 99)	2	100	100	100	100
2,4-D LVE (Esteron Conc. 99)	4	100	100	100	100

Table 2. Effect of Surfactants on Glyphosate Activity on Gorse. Wayne Peters Farm, Bandon, OR. 1987-88

Surfactant	% Conc.	% Conc. Roundup	% Gorse Control RI	RII	RIII	Avg.
None	0	1	40	40	50	43
	0	2	80	75	80	78
	0	4	80	100	100	93
X-77	1	1	75	80	75	77
	1	2	90	95	80	88
	1	4	90	85	100	92
	2	1	95	50	70	72
	2	2	90	90	85	88
	2	4	98	100	90	96
Surphtac	0.5	1	95	90	40	75
	0.5	2	90	85	90	88
	0.5	4	75	90	90	85
	1	1	75	85	80	80
	1	2	95	90	75	87
	1	4	95	95	100	97

Table 3. Herbicide Screening Trial Number 2. Knapp Ranch - Curry County - Port Orford, OR

Herbicide	% Conc.	% Control							
		Evaluated March 19, 1988				Evaluated July 12, 1988			
		1	2	3	Avg	1	2	3	Avg
picloram (Tordon 22K)	.5	20	15	30	23	0	0	2	7
picloram + X-77	.5	25	50	50	42	0	0	0	0
picloram	1	40	40	40	40	0	0	20	7
2,4-D LVE	2	30	35	50	38	40	0	0	13
2,4-D LVE + X-77	2	40	20	20	27	0	0	0	0
2,4-D LVE	4	40	35	50	42	0	0	0	0
2,4-D amine	2	30	20	20	23	0	0	0	0
2,4-D amine + X-77	2	30	10	15	18	0	0	0	0
2,4-D amine	4	45	-	60	53	0	0	0	0
glyphosate (Roundup)	2	70	70	75	72	40	0	30	23
glyphosate + X-77	2	75	80	80	78	40	40	30	37
glyphosate	4	80	75	80	78	40	30	50	40
dicamba (Banvel)	1	10	10	10	10	0	20	30	17
dicamba + X-77	1	20	15	20	18	40	30	50	40
dicamba	2	40	30	40	37	80	75	75	77
triclopyr (Garlon 4)	.5	60	60	75	65	0	70	40	37
triclopyr + X-77	.5	75	70	70	72	50	50	50	50
triclopyr	1	80	90	85	85	80	80	75	78
Crossbow	1.5	80	80	50	70	75	50	40	55
Crossbow + X-77	1.5	85	75	85	82	70	60	75	68
Crossbow	3	95	90	90	92	90	85	95	90
Weedmaster	2	-	20	20	20	30	0	0	10
Weedmaster + X-77	2	30	20	40	30	20	20	20	20
Weedmaster	4	60	30	15	35	30	30	20	27
clopyralid (Stinger)	.75	15	10	10	12	20	0	0	7
clopyralid + X-77	.75	20	15	10	15	30	20	25	25
clopyralid	1.5	40	15	20	25	40	20	30	30
metsulfuron + X-77 (Escort)	1 oz/A	20	10	20	17	95	90	90	92
metsulfuron + X-77	2 oz/A	55	40	25	40	80	80	90	83