Improving Fescue Native Range

Allen Toly, Bob Wroe and Barry W. Adams

Range production has decreased on many ranges in southern Alberta due to drought and overgrazing. Normally, range management practices such as lighter stocking rates and delayed grazing are prescribed to improve range condition. This approach usually takes time for recovery to occur. A herbicide application is another option that may be a solution to the problem. There have been some herbicide applications on poor condition ranges, but the effects of spraying fescue rangeland in Alberta have not been well documented or demonstrated. A Farming For the Future on-farm demonstration project was initiated in 1986, near High River, Alberta. The herbicide demonstration was applied on 160 acres of native prairie rangeland 20 miles southwest of High River. The project was made possible by the cooperation of Mr. Cecil Longson, who provided the native rangeland and deferred the grazing until August each season.

Approach

The demonstration site is representative of the rough fescue grasslands in the foothills region of southwestern Alberta. This area is described as a grassland dominated by rough fescue with Parry oat grass as the co-dominate.

Untreated check.

The site is located some 25 miles northwest of the Canada Department of Agriculture Stavely Range Station, 75 northwest of Lethbridge, or 50 miles south of Calgary. The Alberta Soil Survey describes the soil in the area as a shallow black loam, 3 to 6 inches deep, formed under an annual rainfall of 16 to 18 inches, with a fairly high evaporation rate.

On June 23, 1986 four different herbicides were aerially applied with untreated checks separating each herbicide. The herbicide was applied with a fixed wing aircraft in one-half mile strips across the quarter section at a cost of $3/acre. Each herbicide was applied at two dilutions, 5 and 10 gallons of water/acre. The weather conditions at the time of application were excellent for herbicide effectiveness.

Chemical	Rate*	Water*	Chemical Cost
1. Tordon 101 (Picloram + 2,4-D)	0.77 gal	5 gallons/acre	$32/acre
2. Tordon 101 (Picloram + 2,4-D)	0.77 gal	10 gallons/acre	$32/acre
3.	---- Untreated Check Field ----		
4. Banvel LH + 2,4-D Ester 600	0.14 gal Banvel LH + 0.29 gal 2,4-D	5 gallons/acre	$21/acre
5. Banvel LH + 2,4-D Ester 600	0.14 gal Banvel LH + 0.29 gal 2,4-D	10 gallons/acre	$21/acre
6.	---- Untreated Check Field ----		
7. Desermone 7 (2,4-D + Dichlorprop)	0.66 gal	5 gallons/acre	$17/acre
8. Desermone 7 (2,4-D + Dichlorprop)	0.66 gal	10 gallons/acre	$17/acre
9.	---- Untreated Check Field ----		
10. 2,4-D Ester 600	0.33 gal	5 gallons/acre	$ 6/acre
11. 2,4-D ester 600	0.33 gal	10 gallons/acre	$ 6/acre

** - Rates of herbicides and water volumes are in imperial gallons.*

Each treatment field was 30 acres and the untreated check strips were 13 acres in size. Tordon 101 is presently not licensed for application in Canada on native pasture, but was included in the demonstration because its past performance on native range was very effective.

To fully evaluate the relative merits of herbicides on rangeland, grazing was deferred until August each year so that the full growth potential for the season could be measured. During the years from 1987 to 1989, the area was grazed from mid-August until snowfall forced the animals to the buildings and winter feeding.

The herbicide treatments were monitored in 1987, 1988 and 1990. The measurements included estimates of native forage yield (lb./acre of dry matter) as well as canopy cover estimates of plant species composition on each treatment. In June/90 the range condition was rated again.

The range yield was estimated by clipping 10 randomly located .30 sq.-yard frames per treatment. Samples were separated into grass, forbs, and shrubs and litter, oven dried, weighed and expressed as pounds per acre dry material. There was little or no difference between the 5

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Table 1. Dry matter yields in pounds per acre.

	Untreated Check	Tordon 101	Desermone	Banvel + 2,4-D	2,4-D
1987					
Grasses	610	561	556	514	608
Forbs	444	3	88	41	154
Shrubs	53	0	0	4	8
Total	1107	569	644	559	770
Litter	228	196	366	192	250
1988					
Grasses	607	697	735	707	568
Forbs	240	5	10	5	83
Shrubs	51	0	0	3	15
Total	698	702	795	715	666
Litter	356	246	576	253	90
1990					
Grasses	841	1110	1591	1260	1135
Forbs	586	7	54	32	121
Shrubs	160	7	7	7	50
Total	1587	1124	1652	1299	1306
Litter	202	278	350	271	111

Precipitation in Inches

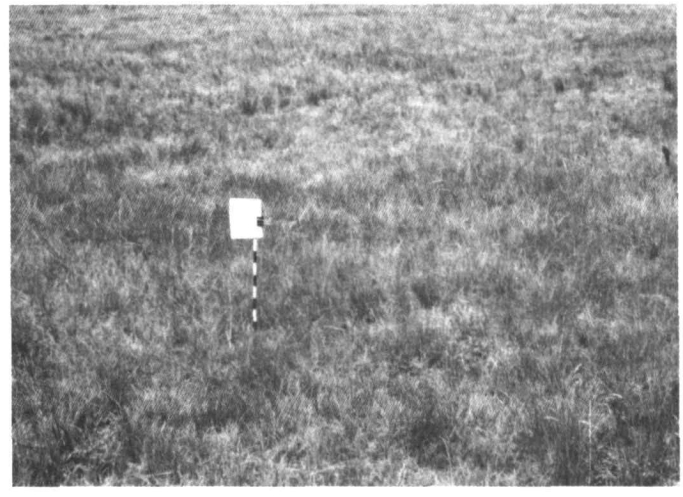
Year	March	April	May	June	July	August	Sept.
1986	0.6	0.8	2.5	3.6	3.8	1.9	3.8
1987	2.0	0.9	0.4	1.6	4.9	2.9	1.3
1988	1.4	0.7	1.0	2.6	2.2	3.3	0.8
1989	0.7	1.7	1.9	3.4	2.1	2.1	2.0
1990	0.7	2.4	4.6	1.7	4.5	6.6	

and 10-gallon treatments of each herbicide in 1987 and 1988, so samples were combined for the 1990 sampling. Plant species composition was estimated from 15 randomly located .12-square yard microplots in each treatment (Daubenmire method) and expressed as a percentage with the composition of all species totalling 100%.

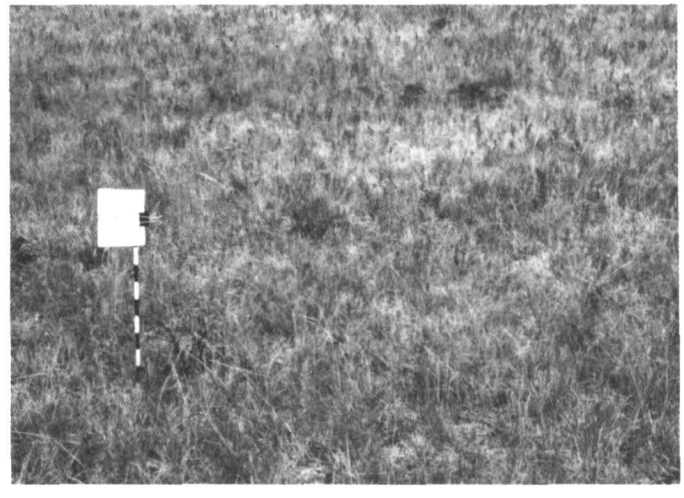
Results and Discussion

According to the Alberta Guide to Range Condition, the range was initially rated in low-fair condition (32% of the climax or original vegetation for the range site) in 1986. In 1990, the herbicide treated strips were rated in fair condition (32 to 47% of climax). Measuring range condition with the Alberta Guide is complicated by the fact that it is adapted to measuring changes due to ecological factors. In this project, the broadleaf plants were removed artificially by a herbicide and not by competition.

Table 1 shows dry matter production in 1987, 1988 and 1990. The years 1987 and 1988 were very dry (Table 1). Production was not sampled in 1989 because of drought. The years 1986 and 1990 were considered good production years. All the herbicides reduced the forb and shrub production the first year after spraying. Also, the total grass and litter production following the herbicide treatments was reduced in the year after spraying, however, precipitation may have been a factor. The dry spring was



Tordon 101 - soil water/acre (picloram + 2,4-D Ester) 3.5 litres/acre product.



Banvel + *2,4-D Ester 600 (0.63 liter Banvel and 1.3 litres Ester (600/acre).*

Desermone 7 (2,4-D + Dichlorop) 3.0 litres/acre product.

more likely the cause for the decreased production than the affect of the herbicide. This is shown when the native grasses responded to early spring moisture when 3.8 inches of rain came in September, 1986, yet without adequate early spring moisture in 1987, grass growth was poor (Table 1).

The annual growth of forbs and shrubs was still reduced in the 4th season after herbicide application. This was apparent when inspecting the treatments. The Tordon and the Banvel treatments appeared the most striking in 1990. Table 1 suggests that herbicides, the deferred grazing and the increased spring moisture increased the grass production in 1990. Good grass growth resulted from 2.4 inches of rain in April and 4.6 inches in May of 1990. This was more than four times the precipitation in April and May of 1987 and 1988. An average grass yield of 1,274 lbs/acre in the treated fields compares to 841 lbs/acre in the untreated check fields, and represents a 33% improvement.

One may relate this average yield increase of grass production to beef production by estimating that a cow/calf pair requires approximately 26 pounds of forage dry matter/day. Applying an average daily gain of 2.2 pounds on the calf and with a price of $1.00/lb., one can estimate value of beef produced on the increased grass production as $18.27/acre.

2,4-Ester-5 gals water/acre 600. 1.5 litres/acre product.

Table 2. Percent composition based on canopy cover estimates (Daubenmire 1969) made June 1987 and 1990.

Species	Spray Treatments									
	Untreated Check		Tordon 101		Desermone		Banvel + 2,4-D L.V. Ester		2,4-D V. Ester	
	1987	1990	1987	1990	1987	1990	1987	1990	1987	1990
Grasses										
Wheatgrasses	0.0	9.5	2.4	30.9	13.9	24.4	14.3	21.0	24.5	20.1
Bromegrass	0.0	0.1	0.4	0.0	0.3	0.0	0.9	1.2	0.0	0.0
Carex spp.	11.6	23.7	15.0	30.6	10.0	21.4	9.5	25.8	9.0	23.8
Reedgrass	0.1	0.0	0.7	0.0	6.3	0.0	3.1	0.0	2.3	0.0
Rough Fescue	37.4	7.0	63.1	20.6	40.8	11.4	46.2	16.9	30.5	6.2
Junegrass	2.6	8.3	0.0	8.6	1.9	14.5	0.1	16.8	8.3	15.6
Poa spp.	8.7	6.3	16.9	1.8	16.7	7.9	13.6	3.1	12.6	6.2
Stipa spp.	0.0	0.6	0.3	0.4	0.0	1.3	0.9	0.0	0.0	0.8
Oat Grasses	0.0	5.7	0.0	5.8	0.0	4.6	0.0	5.7	0.0	6.0
Mat Muley	0.0	0.2	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.7
Hair Grass	0.0	0.5	0.0	0.0	0.0	9.0	0.0	0.2	0.0	0.1
Totals =	60.4	61.9	98.8	99.0	89.9	95.5	88.6	90.7	87.2	80.5
Forbs										
Yarrow	2.0	0.5	0.0	0.0	0.1	0.0	0.2	1.2	0.2	0.1
Columbine	0.4	0.0	0.7	0.0	1.6	0.0	2.4	0.0	0.2	0.0
Pygmy Flower	0.3	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Prairie Crocus	4.5	5.2	0.2	0.0	0.2	0.0	2.2	0.0	6.2	4.5
Pussytoes	2.5	0.0	0.0	0.0	0.2	0.0	0.0	1.2	0.0	0.0
Sage	3.2	2.3	0.0	0.0	0.0	0.0	0.0	1.2	0.0	7.2
Northern Bedstraw	4.4	1.2	0.0	0.0	2.7	1.1	2.9	5.1	2.2	2.3
Geranium	1.2	5.0	0.0	0.0	5.1	1.2	3.1	0.0	3.3	0.0
Three-flowered Avens	13.4	11.6	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.0
Puccoon	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golden Bean	0.7	1.5	0.0	0.0	0.0	0.0	0.2	0.2	0.0	2.8
Miscellaneous	0.9	8.7	0.0	0.0	0.1	1.2	0.0	0.2	0.0	1.2
Totals =	34.5	32.2	0.9	0.0	10.2	3.5	11.2	9.1	12.1	18.6
Shrubs										
Rose	1.4	0.0	0.0	0.0	0.2	0.0	0.3	0.0	0.3	0.2
Western Snowberry	3.7	1.4	0.0	1.2	0.0	0.2	0.3	0.0	0.3	0.4
Totals =	5.1	1.4	0.0	1.2	0.2	0.2	0.3	0.0	0.3	0.4

Table 2 lists the composition of the native plants found in the treated and untreated strips in 1990. The untreated check has 16 forbs. The Tordon spray treatment shows none of the forbs in the check four years after being sprayed. A small amount of the shrub western snowberry started to show up in 1990. The Tordon sprayed strip had the greatest reduction of forbs and shrubs.

Conclusions

1. Although the herbicide treatment strips visually appeared quite different, the range condition did not change very much. Herbicide treatments removed most of the broadleaf plants, reducing composition and allowing the native grasses to increase in size and yield.
2. Increased and early precipitation in 1990 resulted in a 33% grass yield increase. The average grass yield in the untreated fields produced 841 lbs/acre and the treated fields produced 1,274 lbs/acre.
3. The herbicide treatment, increased April and May precipitation in 1990, and deferred grazing increased grass production which comes close to paying for the treatment. Therefore we can conclude the herbicides may be one of the options to be considered for improving a range condition problem.

A Nevada Ranch Family: Their Success Through Four Generations

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Family cattle ranching is becoming more difficult in northern Nevada, due to economic constraints and public land uncertainties. For family-operated ranches to persist, the owners must adjust to changing conditions. Successful ranchers have been cautious, managing their operations as efficiently as possible, and tend to be dedicated and progressive. Following is an account of a family ranch operation which has met this challenge over time.

Ranch Family

The T Quarter Circle Ranch is located along the Humboldt River, approximately 4 miles west of Winnemucca, Nevada. Various ranchers raised cattle on this land since the 1870s. William Pearce, an experienced cattleman, purchased the ranch in 1913 and it has been managed under the same family ownership since that time. Three generations were interviewed who either are or have been living and working on the ranch. Family members interviewed included Kelly Pearce and his sister Lillian Pearce Harrer, children of the original purchaser, William Pearce. Also, Jane (Lillian's daughter) and her husband, Hank Angus; and Nancy (Jane and Hank's daughter) and her husband, Frosty Tipton, were interviewed. A fifth generation of this ranching family are Nancy and Frosty Tipton's children, Katie, Karla, and Guy.

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The authors would like to thank the T Quarter Circle Ranch family members for their cooperation and assistance in this project.

The T Quarter Circle Family. First row: Karla Tipton. Second row: Jane Angus, Hank Angus, Guy Tipton. Third row: Nancy Angus Tipton, Katie Tipton, Frosty Tipton. Taken by Nancy Tipton, 1990.