Control of Perennial Ragweed on Western Nebraska Rangeland[1]

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Highlight

One application of 2,4-D 2,4,5-T, and 2,4-D plus 2,4,5-T by aerial and ground equipment usually gave excellent control of perennial ragweed. A repeat application of the herbicide one year after original treatment increased control but generally not enough to warrant retreatment. In many plots perennial ragweed persisted after two herbicide applications.

Perennial ragweed (*Ambrosia psilostachya* DC.) is a persistent and competitive pasture weed that reproduces by rhizomes and seeds. It produces erect stems usually less than 20 in high and has no forage value. The species

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Table 1. Original and subsequent number of perennial ragweed stems/16 ft² after one and two aerial herbicide treatments at Haigler, Nebraska.

Treatment	Rate lb/A	Original 1960	Number of years after treatment[1]: One application 1	One application 2	One application 3	Two applications 1	Two applications 2
Check	—	124	58	49	90	58	90
2,4–D[2]	½	96	0	2	2	0	0
2,4–D	1	126	0	0	2	0	0
2,4–D	2	78	0	0	0	4	0
2,4–D + 2,4,5–T	1+1	90	2	0	0	0	0
2,4,5–T	½	84	2	0	2	0	0
2,4,5–T	1	62	0	0	0	0	0
2,4,5–T	2	76	0	0	2	0	0

[1] Original treatments made June 24, 1960, repeated treatments were made on June 21, 1961. The propylene glycol butyl ether esters of each herbicide were applied in No. 2 diesel fuel at 5 gal/A on plots 99x440 ft. One-half of each plot was used for retreatments.

[2] Repeated treatment was 2,4–D at 1 lb/A.

Table 2. Original and subsequent number of perennial ragweed stems/16 ft² after aerial treatment with 2,4-D at 1 lb/A in different carriers at Haigler and Halsey, Nebraska.

Location and Treatment	Original 1961	Number of years after treatment[1]: One application 1	One application 2	Two applications 1
Halsey				
Check	66	29	22	50
2 gpa water	80	7	1	1
2 gpa water + surfactant[2]	44	11	10	0
2 gpa No. 2 diesel oil	46	1	0	0
5 gpa water	94	6	3	1
5 gpa water + surfactant[2]	55	1	2	1
5 gpa No. 2 diesel oil	57	2	1	2
Haigler				
	1962			
Check	86	91		
2 gpa water	62	3		
2 gpa water + surfactant[2]	80	1		
2 gpa No. 2 diesel oil	74	2		
5 gpa water	76	2		
5 gpa water + surfactant[2]	58	0		
5 gpa No. 2 diesel oil	74	0		

[1] Original treatments were made on June 13, 1961 and retreatment on June 11, 1962 on plots 66x330 ft at Halsey. One-half of each plot was used for retreatments. At Haigler treatments were made on June 19, 1962, on plots 66x330 ft.

[2] Alkylaryl polyoxyethylene glycols (Multifilm-X-77) at 0.1%.

is widely distributed from California, Idaho, and Saskatchewan eastward to Illinois and Louisiana (Fernald, 1950; Gates, 1941).

Elder (1951) reported that some pastures in Oklahoma produced 1000 lb/acre dry weight of perennial ragweed and that it is considered the most harmful pasture weed on most of the 18 million acres of grassland in that state. He further stated that mowing to control ragweed is not effective but that 2,4-D at ½ to ¾ lb/A will eradicate it. However, Klingman and McCarty (1958) found no significant reductions in perennial ragweed stands treated with 2,4-D in southeastern Nebraska. Furthermore, some clones have persisted after 15 years of annual treatment with 1 lb/A 2,4-D.

Perennial ragweed is prevalent on range and pasture lands in Nebraska, and heavy infestations are reported in some areas especially where overgrazing and drouth have caused deterioration of the grass stand. Perennial ragweed is also undesirable because it sheds large quantities of pollen which causes hay fever during the summer and fall months (Fassett et al. 1938; Wodehouse, 1945). This study was undertaken to develop effective and economical control methods for perennial ragweed under Nebraska conditions.

Materials and Methods

We studied perennial ragweed control at Halsey and Haigler, Nebraska, on Valentine fine sand and Dundy loamy fine sand soil, respectively. The predominant species at the Haigler location were blue grama (*Bouteloua gracilis* (H.B.K.) Lag.); prairie sandreed (*Calamovilfa longifolia* (Hook.) Scribn.); little bluestem (*Andropogon scoparius* Michx.); and sand sagebrush (*Artemisia filifolia* Torr.). At Halsey the most abundant species included prairie sandreed; little bluestem; sand dropseed (*Sporobolus cryptandrus* (Torr.) A. Gray); hairy grama (*Bouteloua hirsuta* Lag.); leaf plant (*Amorpha canescens* Pursh); and wild rose (*Rosa arkansana* Porter).

Aerial Treatments — A Piper Super Cub was used for the herbicide applications in three experiments. The spray boom and 37 Whirljet-type nozzles were located to give uniform spray coverage (Shafer, 1960). Constant spray output was accomplished by a hydraulic drive pump system.

We counted perennial ragweed stems before and after treatment using four randomly-placed 2x4-ft sampling frames per plot. Evaluations of weed control were based on live stem reduction one year (and in some cases two and three years) after treatment (Tables 1 and 2).

Ground Treatment — Triplicated plots, 12 by 23 ft were sprayed at Halsey, Nebraska with a hand-carried boom. We retreated all plots in 1962 using the same herbicide rates, carriers, and dates of application as in 1961 (Table 3). Perennial ragweed control evaluations were made by taking stand counts prior to treatment in 1961, recounts in 1962 prior to retreatment, and final counts in July, 1963. Duplicate 2x4-ft areas were selected at random for counting live ragweed plants in each plot.

Table 3. Percentage perennial ragweed stand reduction one year after one and two applications of 18 herbicidal treatments at Halsey, Nebraska[1,2]

Treatment	Rate lb/A	May 30 Treatments One appl.	May 30 Treatments Two appl.	June 12 Treatments One appl.	June 12 Treatments Two appl.	July 3 Treatments One appl.	July 3 Treatments Two appl.	Herb. avg.
Check		80	82	60	68	72	81	
Water								
2,4–D	½	54	89	96	97	94	99	88
2,4–D	1	100	100	97	98	99	96	98
2,4–D	2	100	98	90	97	99	99	97
2,4–D + 2,4,5–T	½	94	97	85	89	95	97	93
2,4–D + 2,4,5–T	1	100	100	86	96	100	98	97
2,4–D + 2,4,5–T	2	100	98	98	98	100	97	99
Average		91	97	92	96	98	98	
Water + surfactant[3]								
2,4–D	½	100	96	75	98	87	79	89
2,4–D	1	100	94	97	97	99	98	98
2,4–D	2	97	100	95	100	100	99	99
2,4–D + 2,4,5–T	½	92	73	85	89	92	96	88
2,4–D + 2,4,5–T	1	71	98	86	96	96	99	91
2,4–D + 2,4,5–T	2	100	97	98	98	98	100	99
Average		93	93	89	96	95	95	
1:3 oil: water emulsion								
2,4–D	½	100	83	65	84	39	98	78
2,4–D	1	100	83	75	75	84	95	85
2,4–D	2	100	91	72	93	92	97	91
2,4–D + 2,4,5–T	½	97	75	86	96	80	99	89
2,4–D + 2,4,5–T	1	100	92	78	87	85	96	90
2,4–D + 2,4,5–T	2	100	91	83	95	94	90	92
Average		99	86	77	88	79	96	

[1] The coefficient of variation for single treatment was 137.5% and 28.6% for two herbicide treatments.

[2] Plots were sprayed at 20 gal/A when ragweed plants averaged 2, 4 and 8 in. tall respectively on the three dates of treatment in 1961. Plots that received a second treatment were sprayed in 1962 on the same respective dates as 1961.

[3] Alkylaryl polyoxethylene glycols (multifilm X-77) at 0.1%.

Results and Discussion

Aerial Treatments — All herbicide treatments at Haigler controlled perennial ragweed after one or two applications (Table 1). Two applications were not necessary because one herbicide treatment gave effective control for at least three years.

Herbicide carriers and surfacants did not significantly alter the response of perennial ragweed to a treatment of 1 lb/A of an ester of 2,4-D (Table 2). Control was slightly better at Haigler than Halsey. A single application of herbicide at Halsey was effective for at least two years after treatment. Repeated treatment at Halsey improved control but did not eradicate the weed.

Ground Treatments—A single application of most herbicide treatments gave effective stand reductions. No significant differences were found among herbicide treatments after the second application using Duncan's multiple range test, although the oil: water emulsion carrier tended to be less effective than the water carriers in May and June. The May 30 treatment was more effective for a single herbicide application than the June or July treatments when the oil: water emulsion carrier was used but was less effective after the second herbicide application. Treatments receiving two annual herbicide applications usually afforded similar control whether applied May 30, June 12 or July 3. The second herbicide application killed additional plants but did not always eliminate perennial ragweed.

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