Prescribed Burning: An Alternative for Snakeweed Management?

Charles R. Hart, Kirk C. McDaniel, Phillip N. Berry, and Donald B. Carroll

Prescribed burning may be an alternative for controlling broom snakeweed. However, several limitations must be considered.

Prescribed burning experiments were initiated in 1990 to evaluate the use of fire for the management of broom snakeweed. Research was conducted on the NMSU Range and Livestock Research Center near Corona, New Mexico in Lincoln and Torrance counties. The area lies within the shortgrass prairie ecotype and is dominated by blue grama and wolftail grasses and broom snakeweed. Specific aspects of the study focused on characterization of fires relative to fuel and environmental conditions; effects of fire on the growth, survival and propagation of broom snakeweed; and effects of fire on associated vegetation.

Fuel and environmental characteristics were measured before, during, and after burning events. A computerized thermocouple system was used to record fire temperature, rate of spread, and duration of heat. Fires during March burned faster and cooler relative to fires in June, which were hotter, of longer duration, and more intense. June fires were hotter due to burning under higher air temperatures. Our experience indicates that fine-fuel loads (grasses) of less than 350 kg/ha were inadequate to carry a fire sufficiently on blue grama prairie regardless of season. When fine-fuel loads exceeded about 500 kg/ha, fires uniformly consumed the fuel load irrespective of most environmental conditions.

During March burning, snakeweed was in early bud break (28% plant moisture); only 8% of monitored plants suffered complete canopy destruction and 33% produced regrowth from the base within one month of burning. Broom snakeweed mortality averaged 70% by the end of the first growing season.

During June when snakeweed vegetative growth was nearly completed (25% plant moisture), plants were more combustible—66% suffered complete canopy destruction and only 1% showed basal regrowth after one month. At the end of the growing season mortality averaged 88%, slightly less than from adjacent picloram-treated (.375 lb ae/ac) areas.

Grass production after March or June 1990 burning was about the same as untreated areas during 1990, 1991, and 1992 (Figure 1). Grass production increased only on picloram-treated areas relative to burned and non-burned rangeland.

Snakeweed seedling numbers averaged 0.3/m^2 in 1991 with a 44% survival rate (Table 1). Because rainfall was abundant during the spring, 1992 was more conducive to snakeweed germination with 0.9/m^2 and 89% survival rate. About 67% of seedlings counted in 1991 and 1992 occurred on plots burned during summer of the previous year. Seedling survival on summer-burned plots was 55% in 1991 and 93% in 1992.

Snakeweed plant.

We believe that seedling numbers following burning are increased by hotter, slower moving, more intense fires typical of June burns. These fires typically increase the amount of bare ground, which creates a favorable microenvironment for snakeweed germination.

Due to the potential for seedling reinvasion and initial damage to grasses, we do not at this time recommend burning during June. Burning during March may be an option available for broom snakeweed management; however, we stress several major limitations. First, pastures must be rested for one full growing season before and after burning to allow for adequate fuel accumulation and recovery. Second, the window within which to burn successfully is very narrow and may not be obtained within a given year. Finally, burning can be hazardous. We recommend that a great deal of planning be implemented prior to burning. At least one person experienced with prescribed burning techniques should be in charge of the entire operation. The greatest concern is safety.

Future plans for research on the Corona Ranch will focus on large-scale testing of specific burning prescriptions for broom snakeweed infested areas, and on an integrated herbicide-burning system for broom snakeweed management. Existing treatments will be used to determine expected treatment life, and re-treatment burning intervals.

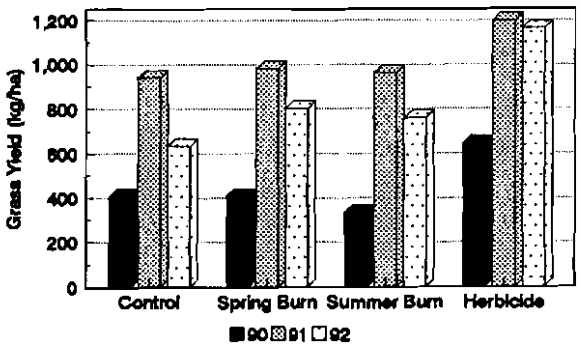

Figure 1. Average grass production for three growing seasons following treatments applied in 1990.

Table 1. Number of snakeweed seedlings and survival one year after treatments were applied on the NMSU Corona Ranch.

	1991		
	no.	no./m^2	% survival
Untreated	11	0.20	18
Spring burn	10	0.19	30
Summer burn	44	0.81	54
Herbicide	1	0.02	0

	1992		
	no.	no./m^2	% survival
Untreated	20	0.37	75
Spring burn	35	0.65	71
Summer burn	143	2.65	93
Herbicide	14	0.26	86

Charles R. Hart is a former graduate student, Kirk C. McDaniel is a professor of Range Science, Phillip N. Berry is a former graduate student, and Donald B. Carroll is a graduate student, all in the Department of Animal and Range Sciences.