

INFLUENCE OF SOIL MOISTURE AVAILABILITY ON SNAKEWEED SEEDLINGS AND MATURE PLANTS

P. N. Berry and K. C. McDaniel

(Key Words: Snakeweed, Range)

Little is known about the importance of soil moisture for propagation of snakeweed seedlings and for survival of mature plants under field conditions. The primary objectives of this study are to determine the effects of added moisture to the soil to stimulate germination and survival of seedlings; and to evaluate effects of drought stress on mature broom snakeweed. The study is being conducted on the New Mexico State University Experimental Ranch located about 14 miles east of Corona on Torrance and Lincoln counties. Study sites were established in two areas in 1990 using a randomized complete block design with five treatments and three replications. Treatments applied included prescribed fires in March and June; an application of picloram at 0.375 lbs/acre in March; and untreated controls. Nine permanent meter square quadrats were established in each 0.13 acre plot.

To determine seedling germination, artificial rainfall is being added to one-third of the quadrats to simulate 100% above average rainfall for the months of November 1990 to April 1991. Another one-third of the quadrats will receive 100% above average rainfall for the months of May 1991 to October 1991. The remaining one-third will be kept as controls. Seedling densities will be recorded monthly as well as soil moisture readings using a neutron probe.

To determine the influence of soil drought on mature snakeweed, 60 plants of relatively the same size have been selected from both study areas. These plants were randomly divided into two sets. The first set is being used from November 1990 to April 1991 while the second set is being used from May 1991 to October 1991. In each set 15 plants were excavated, containerized, and then replaced in the soil with the remaining 15 becoming controls. Leaf water potential is being determined monthly on all plants by the pressure chamber method. Soil moisture within containerized and non-containerized plants is also determined monthly.

SEASONAL EFFECTS OF BURNING BROOM SNAKEWEED AND ASSOCIATED GRASSES

C. R. Hart and K. C. McDaniel

(Key Words: Broom Snakeweed, Range)

A study was initiated in 1990 to evaluate effects of seasonal prescribed burns on broom snakeweed [*Gutierrezia sarothrae* (Pursh) Britt. and Rusby] and associated grasses. Prescribed burns were conducted in March and June on the NMSU Corona Experimental Ranch in New Mexico. A third burn scheduled for November was cancelled because the area would not carry

a fire. An application of picloram at .375 lbs. ae/ac was also applied in March for comparison with burning treatments.

Prior to, and during each burn, environmental measurements were taken with hand-held instruments and computerized data loggers. Fine and coarse fuel loads and herbage cover estimates were determined before burning. Snakeweed numbers, size and yield were also recorded at pre-burn to relate later to plant mortality (see table below).

Data recorded during each fire event included temperature, rate of spread and duration of heat. These parameters will be correlated with pre-burn and post-burn measurements to predict the optimum combination of environmental and vegetation conditions in which to burn snakeweed infested rangeland.

Four grasses were chosen for study of their response to prescribed burning: squirreltail [*Sitanion hystrix* (Nutt.) J. G. Smith], wolftail (*Lycurus phleoides* H.B.K.), sand dropseed [*Sporobolus cryptandrus* (Torr.) A. Gray] and blue grama [*Bouteloua gracilis* (H.B.K.) Lag. ex Steud.]. Various measurements were made monthly on each grass to determine reproductive and growth activities during post-burn months. This information will be combined with snakeweed mortality data to determine the most efficient time of year to conduct prescribed burns.

In 1991, a number of additional burns will be conducted between March and September in order to develop a more complete knowledge of optimum burning conditions that most influence snakeweed mortality, and associated vegetation response.

Study site	Apparent snakeweed mortality by			
	Month burned		Herbicide	Control
	March	June	March	
	----- % -----			
1	82	92	100	21
2	97	98	100	10

CHANGE IN GRASS COVER AFTER THINNING BIG SAGEBRUSH

D. L. Anderson and K. C. McDaniel

(Key Words: Sagebrush, Range, Brush Control)

A thinning study was initiated in 1987 on a Wyoming big sagebrush stand near Huerfano Mountain southeast of Bloomfield, N.M. with the intention of determining some critical point at which sagebrush density significantly reduced forage production. Average sagebrush canopy