

The inflationary environment of the 1970's favored active management practices such as brush control that gave quick increases in forage production but required high monetary inputs or leverage (debt). These practices were considered economically sound because the inflationary environment tended to magnify financial returns relative to debt or holding cash. In the early 1980's this situation began to change as a result of tighter monetary policy by the federal government. The deflationary environment of the last few years has tended to lower the financial rewards of using leverage to finance active range management practices such as brush control. Many economists expect this trend to continue for the next three to five years. Under deflationary/recessionary conditions passive range management approaches for increasing range livestock production such as conservative stocking and/or herd improvement can be desirable.

One of the problems with past brush control studies is that they have involved relatively short time periods of 5 to 10 years. It has been assumed that major financial benefits occur beyond this period although this has not been validated. This issue is important because under best case scenarios investment recovery requires 12 years and another five to eight years of treatment life are needed to yield enough profit to justify the risk.

In the fall of 1990 research was initiated on the College Ranch to evaluate differences in forage production between areas with herbicidal and mechanical treatment of brush in the 1960's, 1970's and 1980's compared to non-treated areas. Stocking rates on both treated and non-treated areas had been moderate (30-35% use of forage species). Data from 1990 through 1993 have shown that total perennial grass production was similar between treated and non-treated areas. However there was also a tendency for more broom snakeweed to occur on the non-treated areas. This study showed perennial grass cover and standing crop actually had a weak positive association with mesquite cover, height, and canopy diameter. However, these relationships may not hold if mesquite cover exceeds 15%. The results from this and other studies in the southwest indicate that benefits of herbicidal mesquite control on forage production are generally minimal or non-existent 15-20 years after treatment.

REGIONAL HISTORY AND LOCAL SPATIAL VARIATION OF THE PIÑON-JUNIPER TYPE

R. D. Pieper, G. B. Donart, and G. M. Southward

(Key Words: Plant Patterns, Vegetation, Woodlands)

Pre-historic and historic climate and anthropogenic activities have had a major influence on the ecology and distribution of today's piñon-juniper community. Temporal variation of the composition and distribution of ecological attributes within the piñon-juniper region has been significant. During pre-historic times when cooler climates prevailed, the piñon-juniper community occupied areas at lower elevations and more southerly latitudes than at present.

Results showed that plant growth was associated with soil moisture rather than precipitation received during the summer. Increase in plant height and tiller length of both species was moderately associated with soil moisture at 0-10 cm depth. The association of plant height and tiller length growth of Lehmann lovegrass ($R^2 = 0.22-0.59$) was stronger than that for mesa dropseed ($R^2 = 0.15-0.31$). Growth of total number of leaves per tiller and number of green leaves per tiller was generally associated with sub-soil moisture at 10-20 cm depth. Association of total leaves and green leaves per tiller of Lehmann lovegrass ($R^2 = 0.14-0.23$) was generally stronger than that of mesa dropseed ($R^2 = 0.20-0.66$). Growth of plant basal area, number of brown leaves per tiller, number of missing leaves per tiller, and first top leaf length was not correlated with either soil moisture or precipitation. Plant basal area of both species did not show dramatic changes during the season. Year-to-year differences in plant growth was obvious, with plant growth during summer of 1994 (dry) very low compared to that of 1993 (average). Growth of plant height, tiller length, total number of leaves per tiller, and number of green leaves per tiller of Lehmann lovegrass peaked one to two weeks earlier than mesa dropseed.

Response of the plant-neighbor removal varied with species, locations, plant density, and dates. General plant response to neighbor-plant removal started during August. The responses of plant basal area, height, tiller length, total leaves per tiller, and green leaves per tiller to neighbor removal of mesa dropseed was stronger than that of Lehmann lovegrass. Mesa dropseed growth increased with decreasing plant density to 1 or 2 plant/m²; whereas Lehmann lovegrass either did not respond or showed negative responses. Drought of 1994 eliminated any possible outcome from lowering plant density. Most plant growth characters, such as, basal area, brown leaves, missing leaves, and first top leaf length did not respond to neighbor removal.

Results of seedling growth showed that general growth of Lehmann lovegrass seedlings was faster and the growing period was shorter than that for mesa dropseed. Lehmann lovegrass reached reproductive stage within the period between 40 to 60 days of age; whereas mesa dropseed reached tiller elongation stage and at 80 days of age and did not show senescence symptoms. Lehmann lovegrass root fresh volume, dry weight, and root to shoot ratio decreased dramatically after 60 days of age; however, its stems and leaves changed to yellowish brown in color which may compensate for the water needs during this stage of its life cycle.

FORAGE PRODUCTION AND WILDLIFE POPULATIONS ON POOR AND GOOD CONDITION CHIHUAHUAN DESERT RANGES

R. Gatewood and J. L. Holechek

(Key Words: Rangeland, Livestock, Grazing, Wildlife)

Research evaluating forage production and wildlife populations on poor condition and good condition Chihuahuan Desert ranges of similar climate and soils is lacking. Scientific studies show past and present grazing intensities by livestock play a major role in determining the type of vegetation on particular sites in the Chihuahuan Desert. Knowledge of vegetation