PATTERNS OF VARIATION IN PLANT COVER OF GRASSLAND VEGETATION IN CENTRAL NEW MEXICO

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(Key Words: Ecology, Plant Distribution, Communities, Vegetational Classification)

Plant ecologists and plant sociologists have long been concerned about distribution patterns of individual plant species in plant communities and factors which control these patterns. Common patterns are random, regular, or clumped. These patterns were generally considered at fine scales of resolution. Other concerns have involved groupings of species into discernible communities and ecotones between communities.

Little work has been done on grassland vegetation in central and eastern New Mexico. These have been classified as Plains Grassland or Plains Mesa Grassland by different workers. However, quantitative information on species composition and structure of these grasslands is lacking. When the Department of Animal and Range Sciences at NMSU acquired the Nalda Ranch near Corona, the opportunity to study both plant patterns and structure of the grassland vegetation was presented.

Detailed information on plant cover and composition was obtained during the summer of 1991 by sampling 192 locations in grassland portions of the Corona Range and Livestock Research Center. Each of the locations, systematically placed in a grid pattern, was divided into 4 quadrants. A 1x1 m grid with 100 points was located in each quadrant. Point sampling at each intersection of the 100 points was used to determine basal cover and composition at the four quadrats at each location. Plant communities were identified with aid of a cluster analysis of the data using the SAS program. Each location was assigned to one of the plant communities and a map of the communities constructed using Geographic Information System software in ERDAS. The distribution of each major species was plotted across the ranch generally from a west to east gradient to determine patterns at this scale. Analysis of variance was used to determine variation among the 192 locations and among the four quadrats at each location.

Five communities were identified: blue grama (*Bouteloua gracilis*), sideoats grama (*B. curtipendula*), wolftail (*Lycurus phleoides*), New Mexico feathergrass (*Stipa neomexicana*), and the snakeweed (*Gutierrezia sarothrae*)-purple threeawn (*Aristida purpurea*)-blue grama (*Bouteloua gracilis*). These communities are intermingled across the ranch, and apparently the blue grama community forms the background of the vegetational matrix while the other communities are variants related to soils, topography, and past grazing and climatic patterns.

Blue grama and purple threeawn were well distributed across the center while winterfat (*Ceratoides lanata*), snakeweed and wolftail were more abundant on western portions of the ranch. New Mexico Feathergrass was more abundant on the eastern portion of the ranch except for one location on the eastern boundary of the Center. None of the species displayed typical overlapping curves characteristic of the continuum concept, but transitions between communities were gradual.

Variation among the 192 locations was greatest compared to variation within the locations for blue grama, wolftail, and New Mexico feathergrass. Variations among locations were only about 3 times as great as that within locations for purple threeawn and winterfat. Explanations for these differences are not completely understood at this time.

GROWTH PATTERNS AND DEFOLIATION RESPONSES OF MESA DROPSEED AND LEHMANN LOVEGRASS

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(Key Words: Clipping, Plant Development, Phenology)

Mesa dropseed (*Sporobolus flexuosus*) is a native perennial grass species while Lehmann lovegrass (*Eragrostis lehmanniana*) is an introduced perennial grass. Both species have increased in abundance during recent favorable growing seasons in southern New Mexico. Studies were initiated in 1993 to determine growth patterns and their relation to precipitation and soil water content for both species. Additional studies were aimed at determining response of the two species to defoliation patterns.

These studies should provide clues to the mechanisms involved for Lehmann lovegrass to become established in the Chihuahuan desert and why mesa drop seed is successful in these environments. Such information should improve our management of area where these two species occur. Data will be collected for at least one more growing season under different climatic regimes.

PIÑON-JUNIPER ECOLOGY IN WESTERN AND CENTRAL NEW MEXICO

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(Key Words: Woodlands, Wildlife, Herbage Response)

Based on pellet group numbers, elk utilized the *Pinus edulis-Juniperus deppeana/Bouteloua gracilis* habitat type and the *Pinus edulis/Cercocarpus/Bromus anomalus* habitat more extensively than other habitats types in the Gila National Forest in western New Mexico. Mule deer, on the other hand, utilized a wide variety of habitat types. These data suggest that elk are more restrictive in habitat selection than mule deer. Both elk and mule deer responded to mechanical treatment and fire in these piñon-juniper woodlands, but the response was not uniform from season to season or from area to area.

Herbaceous response to mechanical removal of trees in piñon-juniper woodlands in central New Mexico also was not consistent. Blue grama (*Bouteloua gracilis*) was only poorly represented on one site but had a higher basal cover on untreated areas compared to treated areas on another site. Sideoats grama (*Bouteloua curtipendula*) and wolftail (*Lycurus phleoides*) both