on the College Ranch near Las Cruces. Pastures in good and fair ecological condition are nested within each grazing intensity (moderate and conservative). Detailed records are being kept of managerial costs and livestock returns on each pasture. Budgets quantifying fixed and variable costs and livestock efficiency measures (calf crop, death loss, calf weaning weights, supplemental feed costs, etc.) will be reported periodically.

Rate of Mesquite Invasion into Chihuahuan Desert Grasslands

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Key Words: desert transition, mesquite recruitment, competition

Many areas in the Chihuahuan Desert in southern New Mexico are in a transition from perennial grassland to mesquite (*Prosopis glandulosa*) dominated shrubland. To determine changes in mesquite dominance across the grasslands, mesquite density and cover were measured in 1982, 1988, 1993, 1996, and 1999 at 14 sites on the Chihuahuan Desert Rangeland Research Center north of Las Cruces, New Mexico. At each of the sites, soil type, plant production, grazing use, and rainfall data were also collected. Average annual rainfall for the area is 235 mm with 53% falling from July through September. From 1982 to 1993 rainfall averaged 26% above average, from 1994 to 1996 it averaged 24% below average, and near average the remainder of years. Between 1982 and 1999 mesquite canopy cover increased from 1.9% to 4.5% and density increased from 123 to 175 plants/ha. Recruitment of new plants increased from 3.4 to 6.4 new plants/ha/year. Greatest recruitment of new plants did not occur in areas of highest density, but rather in areas having light-moderate populations (125-150 plants/ha). Total perennial grass production was highest in 1988 (324 kg/ha) and lowest in 1996 (83 kg/ha). Correlation coefficients found comparing total perennial grass production with mesquite density and mesquite cover were r = -.64 and r = -.49, respectively. The rate that mesquite is becoming dominant appears to be affected by past grazing practices, weather events, soil types, and closeness of seed producing plants.

Influence of Season and Grazing Management on Forage Quality and Yearling Steer Gain

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Key Words: Protein, fiber, grazing treatments

Nutritional value of forages may change as the season progresses, and may differ under different grazing strategies. The objective is to determine the response of yearling steer gain to the quality of forage in relation to the season and grazing management. The trial was located at the Corona Range and Livestock Research Center in Corona, NM. Cross-bred steers were randomly allocated to three grazing treatments, 1) brush control, continuous grazing (n=40), 2) brush control, rotational grazing (n=70) and 3) no brush control, continuous grazing (n=40). Steers were weighed on a 28 day cycle for a duration of 161 days. Diet samples were obtained in conjunction with the 28 day weights of steers, using two rumenally fistulated cows. Average daily gain was significantly lower (P< .05) for CON (0.7 kg/d) than for either BCC (.83 kg/d) or BCR (.79 kg/d). Average daily gain peaked across grazing treatments in August of 1.14 kg/d. Crude protein values were higher in 98 (15 % CP) than 99 (12 % CP), but were comparable across grazing treatments. Crude protein values peaked in August at 16.5 % (SE=.7) and ended with a low in November of 8.5 %. Neutral detergent fibers were comparable among years and grazing treatments, and varied among the season. Neutral detergent fiber values ended with a high in November of 77.6 %, and had the lowest values in June of 67.9 %. Forage production ranged from 1520 kg/ha in the brush control, rotational grazing treatment to 602.7 kg/ha in the no brush control, continuous grazing treatment. Influence of grazing management on forage quality was not reflected in animal gain. However, forage quality showed seasonal trends.

Ecological Relationships of Creosotebush and Bush Muhly when Growing Alone and in Common

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Key Words: photosynthesis, water use efficiency

Cresosotebush competes with Bush muhly for water as the shrub plants, when growing alone, had a higher integrated photosynthesis rate than creosote plants growing in competition with bush muhly during a heavy rainfall event. Creosotebush had lower water use efficiency than bush muhly plants. Bush muhly plants did have greater xylem water potential when the soil water was above -30 bars. Small sized creosote plants had the greatest stomatal conductance, followed by large creosote plants and bush muhly. When muhly was growing with creosote, defoliation of the muhly plants resulted in higher rates of photosynthesis for Creosotebush. Net assimilation rates were not different between the two species, however muhly had a higher water use efficiency. During the fall season, while still actively growing, muhly had higher xylem water potential, lower stomatal conductance and higher water use efficiency than Creosotebush. Small Creosotebush