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We examined responses of rangeland vegetation to exclusion of cattle and control of black-tailed prairie dogs (n m s ludovicianus). Our objective was to determine the response in: 1) annual net primary production (ANPP) and 2) mean grass height (PH) to prairie dog control and/or livestock exclusion. We conducted the research in the northern mixed-grass prairie of Nebraska's central Panhandle. Average annual rainfall is shout 3 5 cm (14 in).

We conducted the study from 1990 to 1992 in two prairie dog towns located in a 214 ha (514 ac) pasture. The prairie dog towns averaged 12 ha (28 ac) and 14 ha (34 ac) during the three year period. Before and throughout the three year study, we surveyed for sign of black-footed ferrets (Mustela ni ri , but found none.

Treatments were No Grazing, Cattle Only, Prairie Dogs Only and Cattle and Prairie Dogs. Landowners applied moderate to high stocking rates of 0.9-1.0 Animal Unit Months/ha (0.31-0.38 Animal Unit Months/ac) during the study.

Cattle were excluded from treatments with 10 m x 10 m barbed wire exclosures. Prairie dogs were removed from one half of each town with aluminum phosphide fumigant.

We sampled ANPP each year using 36 to 48 qaedrats, size 1.92 sq. ft. or 0.5 sq. meter. Samples were taken at I-m intervals along random line transects. Mean PH was sampled at 1,200 locations each year. A 10-cm sampling loop was placed at I-m intervals along random line transects. We used a split plot design in space and time to test differences in ANPP and PH across the four treatments.

ANPP for both grasses and forts were significantly different across years ($P < 0.05$), but not across treatments. Total ANPP averages each year were lower in Prairie Dogs and Cattle treatments than in the No Grazing treatments. In 1990 and 1992, ANPP treatment averages for Cattle and Prairie Dogs were 1,026 kg/ha (908 lbs/ac) and 933 kg/ha (826 Ibs/ac), respectively. But ANPP treatment averages for No Grazing treatments were 1,238 kg/ha (1,096 lbs/ac) and 1,749 kg/ha (1,548 lbsJac), respectively.

In 1991, a high seasonal rainfall year, treatment production averages ranged from 956 kg/ha (846 lbs/ac) in Cattle and Prairie Dogs to 2,253 kg/ha (1,994 lbs/ac) in No

Grating. The three year average ANPP varied from 971 kg/ha (859 lbs/ac) for Cattle and Prairie Dogs treatments to 1,747 kg/ha (1,546 lbs/ac) for No Grazing treatments. Differences in annual and growing season rainfall distribution across the three year period was variable for the study area and probably contributed for most of these differences.

Average April to July rainfall for the three years *ranged from* 99% in 1990 to 112% in 1991. In 1991, average May to July rainfall was 150% of normal. One year prior to the study, the average April to July rainfall was 45% of normal.

The three year average ANPP for grasses and forbs showed different trends across treatments. Grass ANPP varied from 445 kg/ha (394 lbs/ac) when both species grazed to 1,501 kg/ha (1,328 lbs/ac) when cattle were excluded and prairie dogs controlled. Conversely, the three year average ANPP of forbs was higher in the Cattle and Prairie Dogs treatment [527 kg/ha (466 Ibs/ac)] than in the No Grazing treatment [166 kg/ha (147 lbs/ac)]. The forb component was 54% of total ANPP for the Cattle and Prairie Dogs treatment but only 10% of the No Grazing treatment. Although there appear to be differences, ow preliminary analyses indicate that these differences are statistically insignificant due to variation in local forb production across treatments and years.

Mean PH for grasses, forbs, and for all species were found significantly different across years (P- < 0.05). Two dominant grasses, blue grams (Bouteloua r ili) and western wheatgrass (Aoropyron mithii), show the effects of variable rainfall across years. In the No Grazing treatment, mean PH for blue grams was 17.6, 38.1 and 18.2 cm for years 1990, 1991, and 1992, respectively. Mean PH for western wheatgrass was 20.4, 53.0 and 20.6 cm for years 1990, 1991 and 1992, respectively. We believe that beneficial seasonal rainfall during 1991 was responsible for most of the variation.

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