

YEAR AND SEASON EFFECTS ON DIET QUALITY OF BEEF CATTLE GRAZING NORTHERN GREAT BASIN RANGELANDS

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Performance of beef cattle on native range is affected by many factors. One of the most important factors is the quality of the diet selected. While many things can influence diet quality (plant species available, stocking density), climate is probably the most important. Climatic changes can be either short-term, such as changes during the growing season, or more long-term, such as year-to-year changes. Forage quality decreases as the season advances, due to increases in plant fiber constituents and decreased amounts of digestible protein. While these season-long changes have been well documented, the effects of longer-term climatic change on forage quality have not been studied. The objectives of this study have been to determine changes in diet quality both across the growing season and between growing seasons.

This study, when completed, will encompass four consecutive growing seasons (1990, 1991, 1992, 1993). Diet quality samples were obtained from five to six esophageally fistulated steers on two consecutive days of each month from April to September of each year; 1993's collection period has not yet begun. So far, only samples from 1990 and 1991 have been analyzed. Collections were made in mid-morning from the same 160 acre native range pasture. This pasture is grazed in late fall or winter to remove the previous growing season's vegetative material (20 AUM's/year). Precipitation received from September through the following August is reported as growing season precipitation. All samples were (or will be) analyzed for dry matter, ash, crude protein (CP), acid detergent insoluble nitrogen (ADIN, a measure of the unavailable protein), neutral and acid detergent fiber (NDF and ADF), acid detergent lignin (ADL), and in vitro organic matter digestibility (OMD).

Growing season precipitation for 1990, 1991, and 1992 measured 5.5 in, 8.8 in, and 9.1 in, respectively; these are 55 percent, 87 percent and 90 percent of the long-term average. Precipitation for 1993 should be much higher, however. Results from 1990 and 1991 indicate that diet quality improved early in the growing season, then began to decline as the summer wore on. Fiber constituents (ADF, ADL, NDF) were high early in the season, declined as forage growth began, then rose again in late summer as the forage became dormant. Crude protein and OMD followed opposite trends, being low early, then increasing during plant growth, only to decrease again late in the season. Reductions in diet quality associated with the advancing season are likely caused by increasing amounts of fiber and a reduction in the amount of digestible protein. In addition, increased lignification and a decreased leaf:stem ratio also contribute to declines in nutritive value.

Diet quality was generally higher in 1991. Precipitation received that year was nearly 60 percent greater than in 1990. This increased level of precipitation may have stimulated increased plant growth, as well as promoting active plant growth and maintaining diet quality longer into the season. Water stress tends to retard plant growth and maturity, causing plants to remain in a vegetative state, which increases digestibility at the cost of dry matter yield. Thus, we would expect higher diet quality in dry years. However, adapted perennial desert plants may resort to dormancy in a dry year, pulling reserves into their roots and leaving an aboveground part of lower nutritive value. These plants may respond to increased moisture by continuing growth, and retain higher quality by not reverting to dormancy. Increased forage production during these times would provide more plants, giving animals more grazing opportunities and increasing their chances of selecting a higher quality diet.

Both 1992 and 1993 should provide more insight into the effects of year on diet quality. Higher precipitation levels in 1993 will allow comparisons to the drier years of 1990-92. In addition, estimates of total forage production will be available for 1992 and 1993, to investigate the potential role of forage availability on diet quality. While seasonal effects on diet quality do exist, yearly effects also occur and may, in some instances, have a greater influence on the quality of the diet selected. We anticipate having results from this study by January of 1994.