TECHNICAL NOTES

Seasonal Protein Content of Four Southern Mixed Prairie Grasses

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Highlight

Seasonal protein percentages of buffalograss, blue grama, sideoats grama and black grama were highest in June and lowest in February and March. Blue grama contained the highest average per cent protein. Buffalograss showed the least yearly fluctuation. Average protein percentages of the four grasses seldom met protein requirements for beef cows.

Protein content of range plants has long been considered one of the major contributors to forage quality. Studies in the Southern Mixed Prairie have related protein content to stage of growth (Fudge and Fraps, 1945; Savage and Heller, 1947). Fudge and Fraps (1945) sampled major range grasses in April, June, September, and November. They reported that protein was deficient for range animals in less than one-fourth of the grasses sampled in April and June, in about half those collected in September, and almost all those collected in November.

Watkins (1943) reported a decline in protein content of Southern Mixed Prairie grasses with maturity and leaching losses of from 37% to 73% from October to March. During the 5-year period of his study, 1936-1941, he reported one winter with adequate forage protein content for lactating cows, three years with slight protein deficiencies, and one year with a pronounced and extended deficiency of protein.

It is a common practice to feed a protein supplement during winter months on Southern Mixed Prairie ranges. This paper presents data showing biweekly trends in crude protein of four important Mixed Prairie grasses as a guide for critical periods of protein deficiency.

Methods and Procedures

Four range grasses, in aggregate composing more than two-thirds of the total vegetation (Rodgers, 1966), were sampled biweekly on the Post-Montgomery's Double-U Ranch from December 1962 through June 1964. The ranch is located about 15 miles southeast of Tahoka in Lynn County, Texas. Vegetation was typical of the Southern Mixed Prairie as described by Allred (1956).

Composite samples of buffalograss (Buchloe dactyloides (Nutt.) Engelm.), blue grama (Bouteloua gracilis (HBK) Lag. ex Steud.), sideoats grama (Bouteloua curtipendula (Michx.) Torr.), and black grama (Bouteloua eriopoda (Torr.) Torr.) were collected in each of 4 pastures each two weeks. Hand plucking to simulate grazing was used for buffalograss, blue grama, and sideoats grama. Black grama was clipped.

Individual samples were dried, ground in a Wiley mill, and analyzed for crude protein by the Gunning method (AOAC, 1945) except that ammonia was collected in boric acid as described by Scales and Harrison (1920). Crude protein was presented as percent of oven-dry weight.

Results and Discussion

Blue grama was generally highest in percentage crude protein of the
four species studied (Fig. 1). Sideoats grama usually contained the smallest percent crude protein. Black grama and buffalograss were intermediate in percent crude protein, but followed the same general seasonal trend (Fig. 2).

Buffalograss forage had the least seasonal fluctuation of the species studied. It varied from a low of 3.88% crude protein to a high of 9.71% for a change of 3.86% between high and low. The average annual fluctuations for crude protein in blue grama (5.92%), sideoats grama (4.58%) and black grama (5.07%) were somewhat greater than in buffalograss.

The highest percent crude protein in all species corresponded to peak precipitation at Post, Texas, during late May and early June. Lowest percent protein occurred in February and March after long, dry winters and before temperatures increased in the spring.

Crude protein percentages increased each year as soon as temperatures warmed, regardless of rainfall. However, the increase in percent crude protein may not mean an increase in pounds of protein for livestock consumption. Forage in late winter is usually short, and as the stubble "greens up" the percentage crude protein immediately rises. Total pounds of protein may be limited until new forage is produced following rain.

Average percentage crude protein of the four grasses studied were plotted against protein requirements of dry and lactating beef cows as published by the Committee on Animal Nutrition, National Research Council (1958). During 1963, the dry cow requirements were met only once during the year (Fig. 3) and those of lactating cows were never reached. Minimum protein requirements were met in only 3 months of 1964. However, cattle on the pastures weaned a 90% calf crop of 487-lb calves, although they were not fed supplemental protein.

Quality of forage hand plucked to simulate grazing seldom equals that selected by grazing animals (Van Dyne and Torell, 1964). Animals apparently select the plant parts highest in quality. Likewise, shrubs and minor species may contribute large amounts of protein during stress periods (Cook and Harris, 1950). The four grasses in this study constituted only about two-thirds of the total vegetation available. It is apparent that other species are of major importance in the diet of range animals.

Supplemental feeding of protein is probably most needed in late February and March on the Southern Mixed Prairie ranges. Forage quality is at its lowest during February and quantity is usually least in early March before spring production begins.

LITERATURE CITED


New Forest Supervisors

Andrew C. Wright has been transferred from the Okanogan Forest where he has been supervisor since August 1965 to the Wenatchee Forest, where he succeeds J. K. (Ken) Blair as supervisor. Wright in turn was succeeded on the Okanogan by Don R. Campbell of the Siuslaw National Forest Supervisor's staff in Corvallis, Oregon.