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Effect of Supplementation on Intake of Grazing Animals[1/]

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Some of the questions that arise when considering supplementation of cattle on range forage are when to start, what to use and how much to supplement. One of the first steps toward answering these questions is to properly evaluate the range forage at various stages during the grazing period for nutrients available for animal utilization. In order to assess available nutrients in range forage, the quantitative and qualitative intake of the animal utilizing this forage must be determined. Methods to attain these measures have been studied extensively and reviewed by several workers. Among reviewers are Harris et al. (1959), Schneider et al. (1955), Reid et al. (1950), Valentine (1956) and Weir et al. (1959). Results presented in these reviews indicate that due to selective grazing by animals it is essential that evaluation of forages represent forage actually consumed rather than forage available.

Chemical and in vitro analysis (Wallace et al., 1961) of range forage collected at various times during the grazing season by clipping and rumen clearance sampling procedures, such as that described by Lesperance et al. (1960), indicated that probably the nutrients we should be most concerned with in this area, in regard to both deficiencies and economics, are protein and energy. Other nutrients are important; nevertheless, one can hardly expect improved performance from the supplementation of minor nutrients to a ration deficient in protein and/or energy.

Range grass is the major source of energy and it should be available in sufficient quantity so animals can consume all they want if we expect to improve performance through protein supplementation. If ample grass is available, it might be possible to increase gains profitably with supplementation of readily available energy as the plants become mature and digestible energy decreases.

The objectives of the work reported herein were to determine if forage intake could be estimated by the use of nutrient standards or requirements for a specific standard of performance, and if certain levels of supplementation would affect intake of grazing animals as reflected by animal performance.

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Experimental Procedure

The nutrient content of forage at various stages of growth has been evaluated from clipped samples, from animal trials and from laboratory analysis at this station over the past several years. These studies have provided the data to calculate the protein and TDN content of crested wheatgrass at various times during the grazing season. These data (figure 1) were used to calculate the pounds of crude protein and TDN that yearling cattle should take from a crested wheatgrass pasture during the grazing season, providing adequate grass was available.

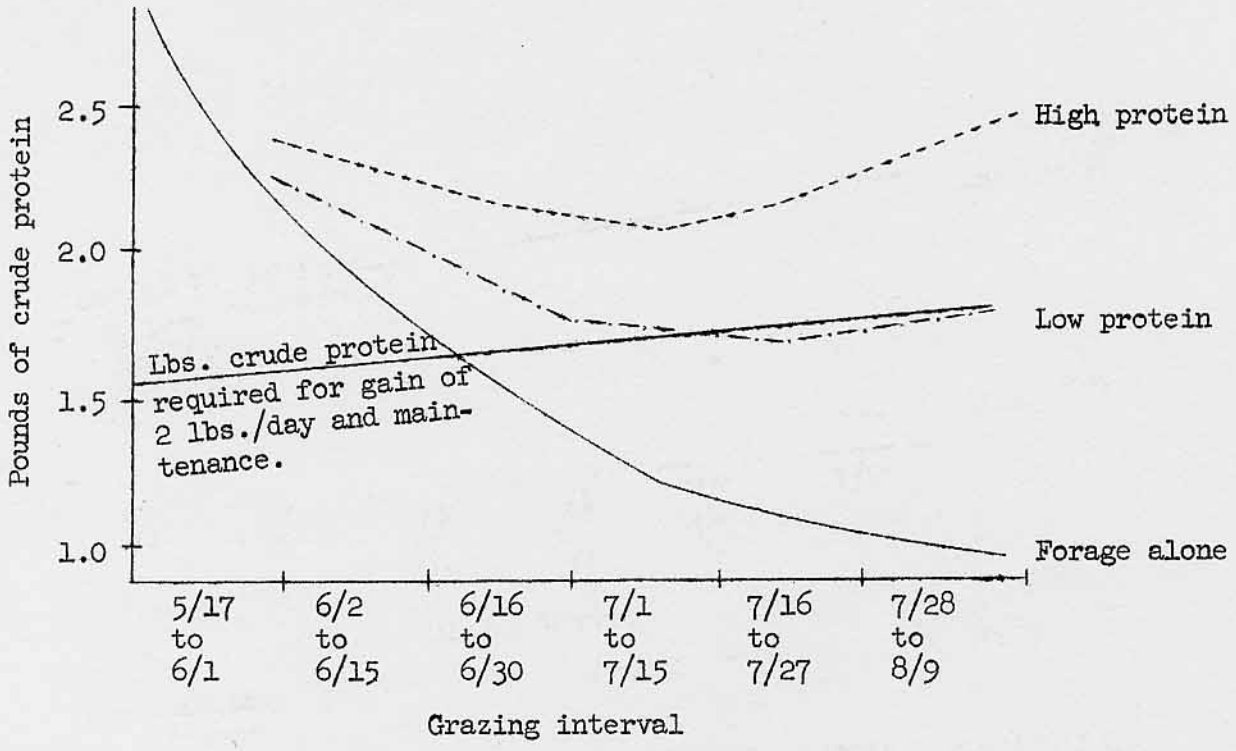

Figure 1. Calculated pounds of crude protein consumed per animal on each treatment.

Thirty uniform yearling heifers were randomly allotted to five treatments with six animals per treatment. Treatment 1 was a control group receiving only crested wheatgrass pasture. Treatment 2 received a low level of protein and a low level of energy supplementation. Treatment 3 received a low level of protein with a high level of energy supplementation. Treatment 4 was a high level of protein with a low level of energy supplementation. Treatment 5 received a high level of protein with a high level of energy supplementation.

The basis for selecting the levels of supplementation is shown in figures 1 and 2. These figures show the calculated amount of protein and energy that yearling heifers should take from a crested wheatgrass pasture during various intervals of the grazing season when adequate forage dry matter is available. They further show the amount of calculated protein and energy required to make a specified gain. These were calculated using the formula of Winchester and Hendricks (1953) and requirements for beef cattle recommended

by the National Research Council (1958). The rations were adjusted during the grazing season so the decrease of nutrients in the forage were supplied by supplements. Table 1 shows the ingredients of the supplements.

The animals were corralled at 7:00 a.m. daily and fed their respective supplements in individual stalls. This normally took about an hour for corralling and eating. Control animals were treated in the same manner except they received no supplements. Individual body weights were taken each 28 days after an overnight restriction from feed and water.

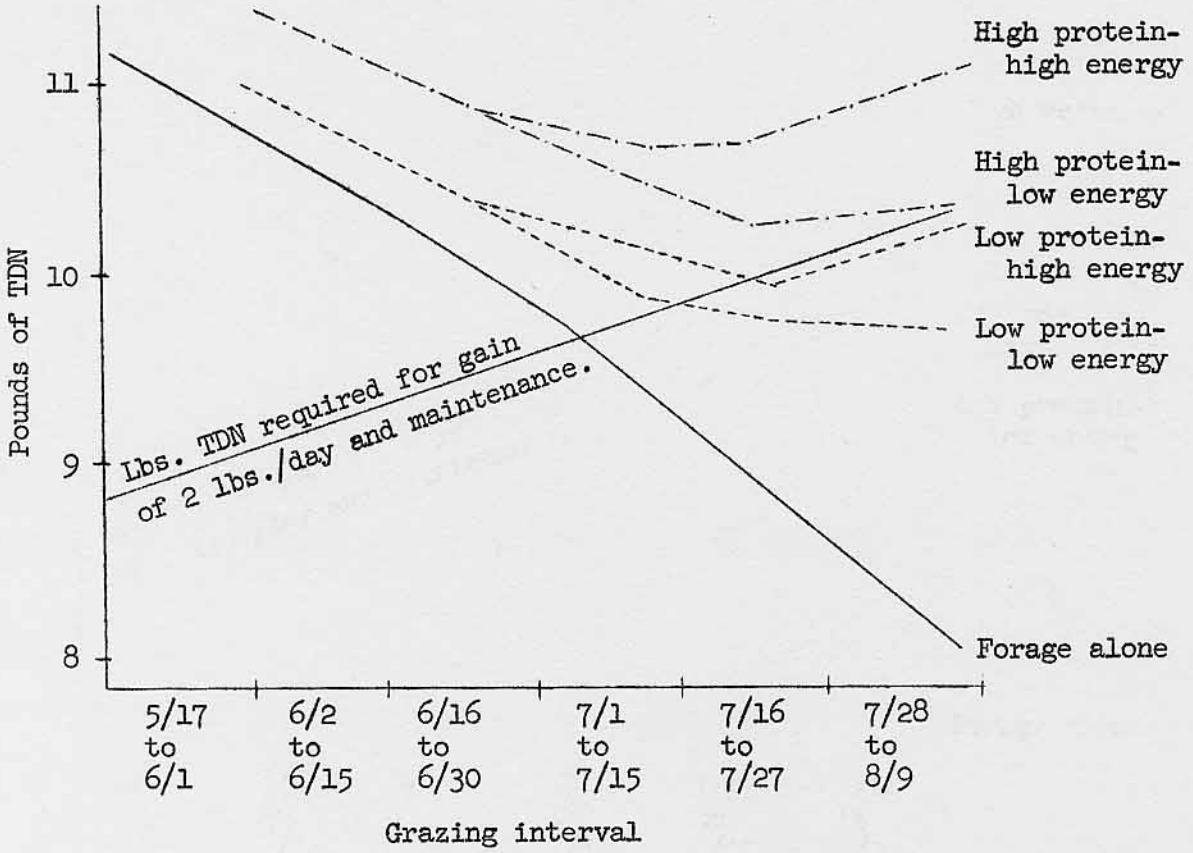

Figure 2. Calculated pounds of TDN consumed per animal on each treatment

Results and Discussion

The average daily gains for each 28-day period are presented in table 2. The animals did not gain as well during the forepart of the grazing season as expected even though the protein and energy content of the forage during the early part of the season was considerably above that normally required for maintenance and 2 pounds gain per day. This indicates that dry matter intake was lower than expected during this part of the grazing season. Apparently the high moisture content of the forage limited dry matter intake. This could explain the increased gains with each level of supplementation during the first 28-day period (table 2).

Table 1. Composition of supplements for different treatments during various intervals of the 1962 grazing period.

Interval of grazing period	Treatment number[1] 2		3		4		5	
	Barley	CSM	Barley	CSM	Barley	CSM	Barley	CSM
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
5/17 - 6/1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6/2 - 6/15	0.0	0.45	0.0	0.45	0.0	0.95	0.0	0.95
6/16 - 6/30	0.0	0.73	0.10	0.70	0.0	1.40	0.0	1.40
7/1 - 7/7	0.0	0.65	0.33	0.60	0.0	1.35	0.0	1.35
7/8 - 7/15	0.30	0.60	0.60	0.60	0.30	1.30	0.60	1.30
7/16 - 7/27	0.60	0.68	1.20	0.60	0.60	1.50	1.20	1.40
7/28 - 8/9	0.96	0.96	1.80	0.80	0.96	1.96	1.80	1.80

1/ Treatment number 1 was a control and received no supplement. Cottonseed meal containing 41% protein was used from June 2 to July 1, after which time a mixture of cottonseed meal and urea was used which contained 58% crude protein equivalent.

Table 2. Average daily gain of animals on different treatments during each 28-day interval of the test period.

Treatment number	Grazing interval			Average
	May 17 to June 14	June 14 to July 12	July 12 to August 9	
	lb.	lb.	lb.	lb.
1	1.37	1.82	1.72	1.64
2	1.55	2.26	2.35	2.05
3	1.50	2.02	2.29	1.94
4	1.82	2.08	2.14	2.01
5	1.67	2.26	2.29	2.07
Average	1.58	2.09	2.16	1.94