TECHNICAL NOTES

THE APPROXIMATION OF CATTLE DIET THROUGH HERBAGE SAMPLING

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A convenient and expedient method of expressing range forage values is through analysis of certain chemical and biological factors. Basic to this idea is the supposition that, through herbage sampling, the true animal diet can be simulated to a reasonable degree. Effective and reliable sampling is very difficult and sometimes open to question in the complex, heterogeneous vegetation common to native range lands. Recent studies and observations on "wiregrass" range in south Georgia indicate that close approximations of cattle diet can be obtained by sampling vegetation with special emphasis on the consumption ratio of plant groups and the plant parts grazed.

In this study,[1] samples were obtained of actual cattle diet during June and September for two herds grazing separate but similar ranges. Two individuals, working separately and following each herd on alternate days, made the herbage collections. Gentle cattle enabled the collectors to observe very closely the kind, portion and relative amounts of plants eaten. It was assumed that forage intake by cattle confined to definite range units was similar over each two-day period. Also, the closeness with which two individuals, working independently, could agree in their sample collections was assumed to be an indication of how close the actual cattle diet was approximated.

Individuals collecting herbage samples did not train or attempt to standardize their procedures in the June trials. Before the trials were repeated in September the collectors spent several hours together observing grazing animals and comparing techniques of herbage col-

Table 1. Estimates of cattle diet and nutrient content of representative herbage samples from wiregrass range

Plant Species	Ratio of Plant Groups and Grass Species Comprising Cattle Diet in June			
	Range 1		Range 2	
	Collector A	Collector B	Collector A	Collector B
	Percent		*Percent*	
Grasses: Total	88	86	88	89
Pineland threeawn	3	1	9	6
Curtiss dropseed	1	1	5	14
Bluestems	50	27	23	24
Carpetgrass	7	29	18	22
Misc. grasses	27	28	33	23
Broad-leaved herbs	8	13	10	10
Shrubs	4	1	2	1
Composition of herbage sample (oven dry)				
Ash	13.88	12.54	12.40	10.00
Crude protein	9.50	8.12	8.95	7.63
Ether extract	2.25	2.35	2.20	2.11
Crude fiber	29.30	30.38	31.65	32.95
N-free extract	45.07	46.61	44.80	47.31
Calcium	.21	.21	.21	.21
Phosphorus	.17	.15	.15	.12
	Ratio of Plant Groups and Grass Species Comprising Cattle Diet in September			
Grasses: Total	92	91	94	90
Pineland threeawn	—	—	1	1
Curtiss dropseed	—	1	1	—
Bluestems	43	42	41	35
Carpetgrass	22	21	17	19
Fingergrass	15	9	20	14
Misc. grasses	12	18	14	21
Broad-leaved herbs	7	8	6	10
Shrubs	1	1	—	—
Composition of herbage sample (oven dry)				
Ash	6.69	8.86	8.63	8.93
Crude protein	7.24	6.89	6.84	6.64
Ether extract	1.99	2.05	2.01	2.06
Crude fiber	33.30	32.90	34.00	34.45
N-free extract	50.78	49.30	48.52	47.92
Calcium	.18	.19	.19	.17
Phosphorus	.15	.15	.13	.12

[1] *Cooperative investigations by the U. S. Forest Service and Agricultural Research Service of the U. S. Dept. of Agriculture and the Georgia Coastal Plain Experiment Station.*

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lection. Evident differences were discussed and adjusted.

In June, the two collectors agreed fairly closely on the ratio of plant groups eaten, i.e., grasses, broad-leaved herbs and shrubs. There was, however, considerable difference in estimates of the ratio of grass species eaten (Table 1). The greatest variation was in the estimates for Range 1. Comparison of notes and discussion by collectors, after samples were taken, showed considerable variation in the amount of time the cattle spent grazing different grass sub-types on Range 1, thus, accounting for variation in ratios of plant species eaten. Cattle were more consistent in their grazing habits on Range 2 and so, therefore, were estimates of the cattle diet.

Composition of forage samples, as shown by proximate chemical analysis, differed somewhat between collectors and also between ranges. However, taking into consideration the great number and kinds of plants eaten, the relative amounts of nutrients in the herbage samples were fairly similar. More important than the magnitude was the consistency and trend of differences in nutrient content of samples between collectors.

The differences in species composition of herbage samples were not consistent between individuals from one range to the next but the chemical composition of herbage was very consistent. On both ranges, collector A obtained samples which were proportionately higher in ash, crude protein and phosphorus, but lower in crude fiber and nitrogen free extract than did collector B. Regardless of the fact that estimates of cattle diet were more alike on Range 2 than Range 1, the same relative difference in chemical composition existed between samples. Thus, the variation in ratio of plant species within the grass group had little effect on chemical composition of herbage samples and it was inferred that collector difference in technique, i.e., selecting the actual grazed portion of the plant, explained the differences in chemical composition.

In September the collectors' estimates of the relative proportion of species contributing to the animal diet were in close agreement as was the chemical composition of the samples (Table 1). Nevertheless, more noticeable differences in chemical composition were found in samples from Range 1 than from Range 2. This occurred in spite of the fact that the estimated ratios of plant species were more nearly alike on Range 1 than Range 2. As with the June collections, close agreement as to plant species composition of cattle diet did not necessarily mean close agreement in chemical makeup of herbage samples. Similarity in chemical composition seemed more dependent upon proper selection of plant parts than upon proper ratio of species within plant groups.

In estimating cattle diet by herbage sampling techniques, a list of plant groups and a record of plant parts eaten compose the necessary records. Estimates of the contribution of individual species to cattle diet are difficult to obtain and are of little importance in the light of the forage analysis. Species ratio estimates may vary considerably within a class or group of plants without being accompanied by changes in the chemical composition of the forage. A precise evaluation can be made only when special emphasis is placed on the selection of plant portions actually being grazed

A COMPARISON OF THE INCLINED POINT QUADRAT, LINE INTERCEPT AND SQUARE FOOT METHODS FOR EVALUATING COMPOSITION OF PASTURE VEGETATION IN WEST TEXAS

Abstract of thesis submitted in partial fulfillment of the requirements for the degree of Master of Science, Department of Range and Forestry, Texas A. and M. College, June, 1950.

Data were obtained on the percentage species composition in a short grass type on the Texas Range Station near Barnhart, Texas, by the inclined point contact, line intercept and square foot methods of sampling. When the data obtained from the three methods were compared on a basis of accuracy, time required and average species composition, the following conclusions were apparent:

1. The inclined point contact, line intercept and square foot methods were equally applicable in the type of vegetation sampled. About the same amount of time was required to sample the vegetation by each method.

2. The three methods used gave approximately the same relative evaluation of the percentage species composition as indicated by correlation coefficients.

3. The inclined point contact method was less variable for the dominant grasses than the other two methods. The line intercept method was less variable than the square-foot method.

4. From an evaluation of vegetational composition the sample means by the inclined point contact method were smaller on the dominant sod-forming grasses but higher for all the other species groups represented in the study with the exception of the woody plants.—JACOB T. DAMERON