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Mineral Concentrations of Texas-Grown Bermudagrass Hay

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Summary

Texas-grown bermudagrass (*Cynodon dactylon* (L.) Pers.) hay samples collected from 74 Texas counties in 1992 were analyzed for mineral concentrations. More than 70% of the 105 samples analyzed did not meet the recommended levels of calcium, phosphorus, magnesium, sodium, zinc, or copper for lactating beef cattle. Less than 20% of the samples had concentrations of potassium, iron, or manganese that were below the recommended levels.

Introduction

Minerals are an important part of cattle production because of the impact they have on reproduction, feed utilization, growth, and animal health. Many Texas cow-calf producers use bermudagrass hay as the base of their feeding programs. Therefore, it becomes important to know the mineral concentrations of bermudagrass hay so that producers can make informed decisions about mineral supplementation. Limited data are available documenting the mineral concentrations of Texas-grown forages. The objective of this study was to determine the mineral concentrations of bermudagrass hay grown in Texas during 1992.

Procedure

This study was conducted at the Texas Agricultural Extension Service Soil, Water and Forage Testing Laboratory at Texas A&M University in College Station. More than 1,000 bermudagrass hay samples from 74 Texas counties were collected from August 1992 through December 1992. Each sample was dried overnight at 140 °F and ground first through a Wiley mill with a 80-mesh screen and then through a Tecator cyclone mill with a 40-mesh screen.

Samples were sorted according to Extension district and county (Fig. 1). Each district set was then divided into groups of 50 to 60 samples. All the district's counties were represented. This resulted in 21 groups being created. All samples were scanned on a Technicon InfraAlyzer 500 and given a ranking based on their spectra. The PICKS program, which is part of the InfraAlyzer data analysis software package, was used to determine the ranking. The five most diverse samples from each of the 21 groups were selected for mineral analysis.

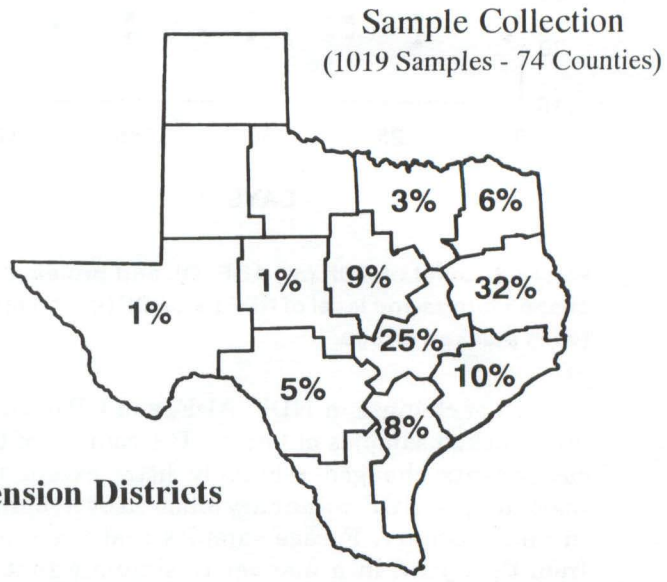

Figure 1. Distribution of bermudagrass samples used in this study.

Samples were digested and analyzed in triplicate. A modified Kjeldahl digestion method (Parkinson and Allen 1975) was used, and then an inductively coupled argon plasma spectrophotometer was used to determine the mineral concentrations of the 105 selected samples. The minerals analyzed were calcium (Ca), phosphorus (P), potassium (K), magnesium (Mg), zinc (Zn), iron (Fe), copper (Cu), manganese (Mn), and sodium (Na). The mean, range, and standard error for each element were calculated.

Results and Discussion

According to recommended mineral levels for lactating beef cattle (Table 1), K, Fe, and Mg were sufficiently supplied by bermudagrass on an average basis (Table 2). Although sample numbers were limited in most districts (less than 20 samples analyzed), more than 50% of the samples from each district did not meet the minimum levels of Ca, P, Mg, Na, Zn, or Cu (Table 3) for lactating beef production. These results suggest that many bermudagrass hays should be supplemented with the appropriate minerals to ensure the high performance of lactating beef cattle.

Keywords: calcium / copper / iron / magnesium / manganese / phosphorus / sodium / zinc.

Table 1. Recommended mineral levels as percentage or ppm of total diet for lactating beef cattle (Herd 1992).

Mineral	Unit	Recommended level
Ca	%	0.45
P	%	0.3
K	%	0.8
Mg	%	0.2
Na	%	0.1
Zn	ppm	40
Fe	ppm	50
Cu	ppm	10
Mn	ppm	40

Table 2. Mineral concentrations of 105 Texas-grown bermudagrass hay samples.

Mineral	Ca	P	K	Mg	Na	Zn	Fe	Cu	Mn
Units					%				
Mean	0.38	0.19	1.58	0.15	0.05	24	101	6	119
Minimum	0.14	0.06	0.37	0.05	0.02	11	26	0	16
Maximum	0.95	0.41	3.16	0.29	0.31	47	500	15	566
SE	0.007	0.004	0.031	0.003	0.003	0.4	3.7	0.1	5.9
% deficient†	73.3	90.5	5.7	81.5	89.5	98.1	8.6	95.2	18.1

†Refer to Table 1.

Table 3. Percentage of bermudagrass samples in each Extension district not meeting the minimum levels for specified minerals in Table 1.

District	(n)†	Ca	P	K	Mg	Na	Zn	Fe	Cu	Mn
						%				
4	(5)	60.0	100.0	20.0	60.0	80.0	100.0	20.0	100.0	40.0
5	(10)	70.0	70.0	0.0	80.0	100.0	100.0	0.0	90.0	10.0
8	(10)	60.0	100.0	10.0	70.0	80.0	100.0	0.0	90.0	60.0
9	(30)	73.3	90.0	6.7	76.7	90.0	96.7	3.3	93.3	10.0
10	(25)	80.0	92.0	4.0	96.0	84.0	100.0	8.0	96.0	8.0
11	(10)	80.0	80.0	10.0	70.0	100.0	90.0	0.0	100.0	10.0
13	(5)	60.0	100.0	0.0	100.0	100.0	100.0	40.0	100.0	20.0
14	(10)	80.0	100.0	0.0	90.0	90.0	100.0	30.0	100.0	30.0

†N = number of samples.

Acknowledgments

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Literature Cited

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