Nutritional value of haitian forages

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SUMMARY

Thirty-six samples of forage grasses and legumes from Haiti were analyzed for mineral and proximate composition. Proximate values were quite similar to values reported from other countries. Mineral composition included calcium, magnesium, copper, zinc, iron, manganese, molybdenum, and cobalt. Deficiencies although not common, were encountered for copper and cobalt usually in grass samples. These deficient samples came from several of the coastel plaines. In only two samples were molybdenum concentrations of concern encountered, and these were samples of Sorghum vulgare from the eastern Cul de Sac.

INTRODUCTION

One important approach to an improved general plane of human nutrition in most tropical and semi-tropical areas is development of an economically-efficient animal industry. In most such areas poor animal management limits production eve nmore seriously than does the genetic background of the livestock.

Part of the inadequate management consists of inadequate feeding. Unfortunately data on the nutritional value of locally-grown forages and feed ingredients is usually lacking. As a result feed value has to be estimated from references such as Morrison (4), and because of differences in climate, soil, and variety these reference values may be greatly in error. In addition, areas such as Florida with their high ambiente tem-

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peratures and rainfall as well as sandy soils are likely to produce crops severely deficient in trace minerals.

The present publication reports the proximate and trace mineral composition of the typical forages of Haiti. Comparable data on the Haitian cereals potentially available as concentrate ingredients appear in a companion publication (3).

MATERIALS AND METHODS

Forage samples were collected during 1958 and 1965 taking care to avoid contamination by soil or dust. All of the forages were collected in the rainy season of rapid forage growth during May and June. After botanical identification they were dried in a forced-draft oven at 100°C and shipped to the United States, arrangements having been made for admission without chemical sterilization. Soil pH values were determined by the staff of the Department of Agriculture in Haiti. Samples were obtained from most of the importante forage-producing areas of Haiti as indicated in Figure 1.

Proximate analyses were conducted according to A.O.A.C. (1) procedures. Calcium, magnesium, copper, zinc, iron, and manganese were determined on wet-ashed samples using Perkin-Elmer 303 Atomic Absorption Spectrophotometer Methods. Molybdenum analyses followed the procedures of Evans *et al.* (2). Cobalt was determined according to A.O.A.C. (1) methods. Samples were obtained from locations 3, 5, 6, 7, 8, 9, 10, 11, 12, 14, and 15 on th map shown in the companion publication on Haitian foods.

RESULTS AND DISCUSSION

The results are summarized in Tables 1 and 2.

In the majority of instances the mineral values tend to be considerably higher for the Haitian forages than the most nearly corresponding values in references such as Morrison (4). This is particularly true of calcium and magnesium. Haitian soils tend to be relatively alkaline as seen in Table 2, and it may well be that this high alkalinity is the major contributing factor to the high levels of calcium and magnesium.

TABLE 1

PROXIMATE COMPOSITION OF HAITIAN FORAGES (AVERAGE ± STANDARD DEVIATION)

Scientific Name	Common Name	No. of Forage Samples	PROXIMATE COMPONENTS IN PERCENT *				Nitrogen-free Extract
			Protein	Ether Extract	Crude Fiber	Ash	
Panicum maximum	guinea grass	7	10.0±0.53	1.78±0.078	31.7±0.23	13.2±0.18	43.3±1.02
Digitaria decumbens	pangola grass	11	10.1±2.32	2.23±0.18	34.1±1.17	10.8±0.59	42.7±2.18
Tripsacum laxum	guatemala grass	6	6.1±1.95	1.19±0.35	36.1±0.94	8.0±1.09	48.6±3.68
Brachiaria mutica	para grass	2	8.1±0.30	1.62±0.02	32.0±0.11	7.5±0.00	50.7±0.17
Botriochloa pertusa	angleton grass	2	6.8±3.10	1.44±0.36	33.4±1.16	11.2±2.51	47.2±2.11
Melinis minutiflora	molasses grass	2	8.8±1.94	2.89±0.13	35.3±0.23	7.0±0.13	46.0±2.17
Pueraria phaseolides	tropical kudzu	2	15.6±1.77	1.85±0.38	28.4±4.93	8.6±4.2	45.6±2.08
Pennisetum purpureum	napier grass	3	6.2±0.79	1.89±0.13	34.1±1.57	11.1±0.23	46.7±0.42
Brachiaria ruziziens	none	1	6.0	1.68	28.4	8.7	55.3

* On a moisture free basis.

TABLE 2

COMPOSITION OF HAITIAN FORAGES (AVERAGE ± STANDARD DEVIATION)

(MINERALS AS PARTS PER MILLION DRY BASIS)[1]

Scientific Name	Common Name	No. of Samples	Soil pH	Calcium	Magnesium	Copper	Zinc	Iron	Manganese	Molybdenum	Cobalt
Panicum maximum	guinea grass	7	5.8	10,775± 35	4,212±583	9.9±4.6	23.6±13.2	181±42	54.9±41	1.06± .99	0.15± .08
Digitaria decumbens	pangola grass	11	7.2	5,722± 797	1,892±302	16.7±4.7	39.7±14.1	196±28	64.8±32	0.81± .41	0.11± .04
Tripsacum laxum	guatemala grass	6	7.6	2,171± 301	1,587±429	11.4±0.8	33.2±11.4	188±26	41.1±15	0.53± .53	0.05± .02*
Brachiaria mutica	para grass	2	8.4	4,013± 18	1,275± 35	13.7±0.0	26.6± 0.2	170± 2	101 ±13	1.81± .13	0.12± .01
Botriochloa pertusa	angleton grass	2	8.2	6,162±2,245	962±265	12.0±0.0	39.5± 6.4	215± 7	50 ±31	0.69± .90	0.08± .01
Melinis minutiflora	molasses grass	2	7.3	4,237± 724	3,362±159	15.6±1.2	63.0± 9.9	203±32	22.1± 6	1.30± .04	0.08± .02
Stylosanthes gracilis	tropical alfalfa	2	7.3	26,470±2,156	3,750±177	24.0±3.5	47.7± 1.6	180±11	27.6± 0	0.37± .18	0.06± .01*
Pueraria phaseolides	tropical kudzu	2	6.6	24,125±1,503	4,125±601	18.0±6.4	23.8± 4.2	204±23	134 ±82	1.12±1.5	0.09±0
Pennisetum purpureum	napier grass	3	6.8	4,750± 353	2,475±671	10.1±3.8	29.4±14.1	188± 0	21.6± 9	0.61± .4	0.04± .03*
Brachiaria ruziziens	none	1	6.7	7,775	2,350	9.5	32	195	40.0	0.70	0.11
Cynodon dactylon	chiendient	2	—	—	—	12.5±1.8	8.5± 2.1	—	88.5± 9.2	1.12±1.17	—
Trifolium repens	clover	1	—	—	—	12.5	21.2	—	54.0	—	—
Andropon gracilis	herbe fine	2	—	—	—	7.7±0.1	26.3± 9.5	—	42.0±56	1.76±0.54	0.79±1.10
Sorghum vulgare	petit mil	2	—	—	—	10.0±1.1	24.1±21.7	—	16.0± 4.2	3.63±2.36**	0.15±0.07
Sorghum halepense	yaguida grass	2	—	—	—	9.6±2.8	36.8± 6.2	—	27.8± 7.4	1.14±0.78	0.11±0.07
Trichachne insularis	herb à blé	1	—	—	—	8.8	18.5	—	38.0	1.18	0.23
Pennisetum ciliare	buffel grass	1	—	—	—	6.0*	10.5	—	13.0	0.53	—
Paspalum pleaslachyum	none	1	—	—	—	5.0*	9.0	—	13.0	0.55	0.17
Paspalum laxum	none	1	—	—	—	10.1	23.7	—	60.0	0.54	—
Tricholeana rosea	tête rose	1	—	—	—	5.4*	18.7	—	11.0	0.43	0.20

[1] dashes indicate no analysis.

* indicates levels deficient for grazing animals.

** indicates levels likely to be toxic grazing animals.

Instances of deficient mineral content do occur, however, as noted in Table 2. Deficiency in cobalt (less than 0.07 ppm) is restricted to samples from the Plaine de Cayes in the southern Peninsula. Copper deficiencies (values less than 7 ppm) occurred only in forages from the Port-au-Prince and Gonaives areas. The only instance of molybdenum content being high enough to cause concern (values greater than 2.0 ppm) were in the samples from the eastern Cul de Sac Valley. In the areas with cobalt and copper deficiencies use of trace mineral-supplemented salt or the crude local salt, obtained from impounded sea water, "sel de mer", should be strongly encouraged in feeding grazing livestock.

The discrepancies between these values and those of similar crops from temperate climates, the presence of regions of the country producing mineral-deficient forages, and the extensive use of species not used in temperate climates all emphasize the need for analytical studies of the nutrient value of livestock feeds in the tropical and semitropical countries. Without such basic information improvement of livestock management will continue indefinitely to be based on blind empiricism.

It is clear from Table 1 that many of the grasses provide quite low levels of protein, emphasizing the importance of developing Kudzu and similar leguminous forage production.

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RESUMEN

Se analizaron 36 muestras de gramíneas y leguminosas forrajeras de Haití obteniéndose resultados similares a los publicados de otras partes del mundo. Entre los análisis se incluyeron los siguientes minerales: calcio, magnesio, cobre, zinc, hierro, manganeso, molibdeno y cobalto. Sólo algunos casos de deficiencia de cobre y cobalto fueron detectados en muestras

de gramíneas oriundas de las planicies de la costa. En dos muestras de Sorghum vulgare procedentes de "Cul de Sac" oriental se observaron contenidos altos de molibdeno.

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