Mineral Content of Grasses from Natural Pasture in South West Nigeria

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Introduction

Nigeria's grassland grows on uncultivated land on which animals have access for grazing. These are found along roadsides and fallow lands in the coastal forest zones of Nigeria. Most of the natural grassland/rangeland assumes more important proportions in the open derived savanna zones of the country. Ruminant production during dry season is limited by low productivity of pasture forages, which often contain too low mineral concentration to meet the minimum requirement for optimal productivity of livestock (Annison and Bryden, 1998).

Materials and Methods

The experimental site was south west with selected villages which include Afami, Atokun, Iboro, Ile-niku, Ipaya and Oke-rori and the experiment was carried out at the laboratory of the Department of Pasture and Range Management, Federal University of Agriculture, Abeokuta. An area of $100m^2$ was mapped out on the natural pasture along the grazing path of the Fulani cattle in each selected village. The area was sub-divided into five (5) plots of 5x4m dimension each for effective sampling based on the topography of each area. Thereafter, $1m^2$ quadrat was thrown randomly thrice in each sub-plots. The grass species that dominate the area were oven dried to obtain constant weight then milled for chemical analysis in the Laboratory. Macro minerals (Ca, P, K, Mg and Na) and micro minerals (Cu, Zn, Mn and Fe) according to AOAC, (1995). The study was carried out using CRD comprising four seasons (Early rain, Late rain, Early dry and Late dry). Data collected were subjected to one-way analysis of variance and the treatment means were separated using Duncan's Multiple Range Test using SAS (1999) package.

Results and Discussion

The mineral composition of grass species found in study areas was affected by season were significant ($P<0.05$). The P content was significantly higher in rainy season (Table 1) then there was a decline in the P level with advancement of the dry season, though the P content of the grasses irrespective of the season fell within the range of requirement for ruminants as reported by McDowell (1997). The Ca content of the grasses did not follow definite pattern with regards to season. The Ca content in this study as affected by season was higher than that reported by AFRC (1991) for growing cattle with 300kg live weight. The increase in the calcium level in the grass samples in the water stress period (dry season) could be that the plant accumulated the calcium to deal with all injuries which happen as a result of the water stress. The decrease in magnesium level of the grasses in the dry season could be attributed to the fact that in the dry season competing cations in the soil prevent magnesium uptake by the plant. It could also be as a result of the fact that magnesium content of plants are highly used in the growth of roots in the dry season so that it can absorb all available water and nutrients in the soil during the dry season where there is water stress. The decrease in potassium level in the dry season could be due to the excessive use of K by the plant in the dry season to carry out its physiological processes.

The trace elements in grass species as effected by season was significant ($P<0.05$). The Cu value ranged from 12.33mg/kg in late dry season to 34.48mg/kg in late rainy season and Zn value also ranged from 36.33mg/kg in late dry season to 50.89mg/kg in early dry season. Whereas, the highest value (305.00mg/kg) for Fe were observed in late dry season with the least value (248.33mg/kg) in late rainy season while the Mn significantly ($P<0.05$) ranged from 20.95mg/kg in late rainy season to 43.15mg/kg in early dry season.

The copper content of pastures and forages varies with the species, strain and maturity of the plant, with certain soil conditions and with the fertilizers used (Table 1).

Season	P	Ca	Mg	K	Na	Cu	Zn	Fe	Mn
			g/kg				Mg/kg		
Early rain	2.66[a]	3.15[d]	4.16[a]	50.47[a]	1.46[c]	27.61[c]	46.22[b]	411.67[b]	22.33[c]
Late rain	2.17[b]	4.63[b]	3.96[b]	33.00[d]	1.60[a]	34.83[a]	41.67[c]	248.33[d]	20.95[d]
Early dry	1.46[d]	6.56[a]	4.21[a]	36.97[c]	1.51[b]	29.33[b]	50.89[a]	348.33[c]	43.15[a]
Late dry	1.98[c]	4.14[c]	2.24[c]	45.20[b]	1.30[d]	12.33[d]	36.33[d]	705.00[a]	38.87[b]
SEM	0.21	0.47	0.23	2.14	0.06	8.04	2.82	38.46	1.92

Table 1: Effects of season on the Mineral composition of grass species found in study areas
[a, b, c, d]: Means in same column with different superscripts are significantly ($p<0.05$) different, SEM = Standard Error of Mean

Conclusion

The research revealed that calcium level in grasses in the wet season was lower than in the dry season whereas levels of magnesium, phosphorus and potassium were higher in the wet season than in the dry season. It can therefore be concluded that changes in season have much significant impact on the mineral content in grass species in study areas. Therefore nutritional qualities of grasses are affected by season and stage of maturity.

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