LOCATIONAL VARIATIONS OF FIBRE FRACTIONS AND MINERAL COMPOSITION OF GRASSES FROM NATURAL PASTURE IN SOUTH WEST NIGERIA

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ABSTRACT
The chemical composition of grass species from natural pasture in south west of Nigeria as affected by location was assessed through determination of its fibre and mineral composition. Results showed that the location had significant (P<0.05) effect on the parameters determined with neutral detergent fibre (NDF) values ranged from 68.75% in Oke-rori to 72.75% in Afami, while the Acid detergent fibre (ADF) value ranged from 41.00% in Atokun to 48.25% in Oke-rori. Whereas, acid detergent lignin (ADL) value ranged from 10.25% in Ipaya to 14.25% in Iboro. The Phosphorus (P) value had the highest in Ipaya (2.99g/kg) and the least value is observed in Oke-rori (1.62g/kg). The Calcium (Ca) value ranged from 2.55g/kg in Afami to 6.59g/kg in Oke-rori while Mg value ranged from 2.90g/kg in Atokun to 4.33g/kg in Iboro.

INTRODUCTION
Feed is known to be the single largest cost associated with raising ruminant animal. It accounts for more than 60% of the total cost of animal production but the increasingly high cost of conventional feed resources particularly concentrates diet limit their use in ruminant feeding. Forages continue to represent the single most important feed resource for livestock in developed and developing countries. Despite their important position in ruminant production, little effort is made to cultivate and conserve forage. Most livestock producers depend largely on natural pastures and crop residue as a main source of feed. Nigeria's grassland grows on uncultivated land on which animals have access for grazing. They 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. Most farmers rely on natural grassland for their grazing animals. Carrying capacity of the natural grassland is very low compared to that of planted fertilized pastures. Productivity of natural grassland is affected by factors such as soil fertility, the amount of browse species available, density of canopy and management practices such as rotational grazing, stocking rate, fertilizer application, burning and the length of the resting period (Ademosun, 1974).

MATERIALS AND METHODS
The experimental sites were selected villages in south west 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 harvested and oven dried to obtain constant weight then milled for chemical analysis in the Laboratory. Neutral detergent fibre (NDF), acid detergent fibre (ADF), acid detergent lignin (ADL) were determined according to Van Soest *et al.*, 1991, cellulose was taken as the difference between ADF and ADL while hemicellulose was calculated as the difference between NDF and ADF. Macro minerals (Ca, P, K, Mg and Na) and micro minerals (Cu, Zn, Mn and Fe) according to A.O.A.C. (1995).

RESULTS AND DISCUSSIONS
The effect of location on fibre composition was significant (P<0.05). The Neutral detergent fibre (NDF) values significantly (P<0.05) ranged from 68.75% in Oke-rori to 72.75% in Afami, while the Acid detergent fibre (ADF) value ranged from 41.00% in Atokun to 48.25% in Oke-rori.

Whereas, the Acid detergent lignin (ADL) had the highest value in Iboro (14.45%) with the least value in Ipaya (10.25%) (Table 1). The nutritional quality of a natural pasture is either positively or negatively influenced by the growth and sustainable production of ruminant animals (Hussain and Durrani, 2009). Tolera *et al.*. (1999) indicated that more than 90% of the feed for ruminant animals were derived from native forages, where the nutritional status of native forages may be affected by various factors. Seasonality, species specific feed resources, and site differences are known to be the major factors in affecting the nutritive value of native pasture (Mahala *et al.*, 2009; Subhalakshmi *et al.*, 2011). The NDF content of the grass species as influenced by location in this study was above the range of 60-65% suggested as the critical limit, which might impair the efficiency in utilization of tropical forages by ruminants (Van Soest, 1982; Muia, 2000) but were similar to that reported by Teka *et al.* (2012) for forages from natural pasture. The higher value of the NDF in the study area might be as a result of the grazing pattern of the animals coupled with pastoral system in the study areas as well as the fluctuation in the rainfall pattern and is in line with the report of Teka *et al.* (2012) that there were variation in structural component of plants which could be result in delayed grazing thereby the cell wall of the grasses become lignified. The Phosphorus (P) value had the highest in Ipaya (2.99g/kg) and the least value was observed in Oke-rori (1.62g/kg). The Calcium (Ca) value ranged from 2.55g/kg in Afami to 6.59g/kg in Oke-rori. The value for Magnesium (Mg) significant ranged from 2.90g/kg in Atokun to 4.33g/kg in Iboro while the Potassium (K) value had the highest in Afami (48.60g/kg) and the least observed in Oke-rori (37.95g/kg). The Sodium (Na) value ranged from 1.20g/kg in Iboro to 1.66g/kg in Atokun. (Table 2). The results obtained for P in this study for the grasses as affected by location was similar to the report of Ashagre (2008) with regards to the P content of grasses from natural pasture. The values recorded for Ca content of the grasses as influenced by the location in this study is in consonance with the range specified as adequate for ruminant requirement in the report of McDowell (1992, 1997) in which ranged between 1.8-8.2 g/kg. The Ca values reported in this study are higher than that reported by Minson (1990) as the average value for tropical grasses except for the Ca value of grasses from Afami though still adequate for ruminants. The practical importance of (Mg) is its relationship to the serious metabolic disorder, grass tetany (hypomagnesaemia). Grass tetany is a complex ruminant metabolic disorder that is affected by forage species and mineral composition, soil properties, fertilizer practices, season of the year, temperature, animal species, breed and age (McDowell and Valle, 2000). Mg concentrations of the grasses under study as affected by location and season generally exceeded 2 g/kg, a level above which tetany is unlikely to occur (Committee on Mineral Nutrition, 1973). The mean value of the Mg concentration in this study is similar to the mean calculated value of Mg as reported by Minson (1990) except for that of the grasses from Atokun and Oke-rori, this might be as a result of the soil properties of the different locations (Elkins *et al.*, 1986).

CONCLUSION

The structural constituents NDF, ADF and ADL and mineral contents of grass species as affected by locations which can be induced that seasonality and site potential differences are the major factors affecting nutritional qualities of a natural pasture.

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Table 1: Effects of location on the fibre composition (%) of grass species found in study areas

Factors	NDF	ADF	ADL	HEM	CELL
Locations					
Afami	72.75^{a}	47.50^{ab}	12.25^{b}	25.25^{bc}	35.25^{a}
Atokun	71.75^{ab}	41.00^{e}	11.50^{b}	30.75^{a}	29.50^{c}
Iboro	68.00^{c}	45.25^{bc}	14.25^{a}	22.75^{c}	31.00^{c}
Ile-niku	68.50^{c}	44.25^{cd}	12.25^{b}	24.25^{c}	32.00^{bc}
Ipaya	69.25^{bc}	42.00^{de}	10.25^{c}	27.25^{b}	31.75^{bc}
Oke-rori	66.75^{c}	48.25^{a}	13.75^{a}	18.50^{d}	34.50^{ab}
SEM	1.09	1.26	0.54	1.60	1.30

$^{a, b, c,d,e}$:Means in same column with different superscripts are significantly ($p<0.05$) different; SEM=Standard Error of Mean; NDF=Neutral detergent fibre; ADF=Acid detergent fibre; ADL=Acid detergent lignin; HEM=Hemicellulose; CELL=Cellulose

Table 2: Effects of location on the mineral composition of grass species found in study areas

Factors	P	Ca	Mg	K	Na	Cu	Zn	Fe	Mn
			g/kg				Mg/kg		
Location									
Afami	2.68^{b}	2.55^{e}	3.83^{c}	48.60^{a}	1.39^{c}	44.92^{b}	49.25^{a}	615.00^{a}	22.63^{e}
Atokun	1.66^{e}	4.98^{bc}	2.90^{e}	39.95^{c}	1.66^{a}	18.00^{c}	46.83^{a}	387.50^{c}	40.08^{a}
Iboro	1.73^{d}	3.66^{d}	4.33^{a}	42.85^{b}	1.20^{d}	7.25^{f}	42.00^{b}	526.50^{b}	31.73^{c}
Ile-niku	1.74^{c}	4.87^{c}	4.05^{b}	39.95^{c}	1.43^{bc}	61.25^{a}	47.50^{a}	340.00^{d}	27.63^{d}
Ipaya	2.99^{a}	5.08^{b}	3.63^{c}	39.15^{c}	1.48^{b}	10.25^{e}	41.00^{b}	332.50^{d}	31.80^{c}
Oke-rori	1.62^{f}	6.59^{a}	3.13^{d}	37.95^{d}	1.65^{a}	14.50^{d}	36.80^{c}	332.50^{d}	34.05^{b}
SEM	0.22	0.54	0.34	2.99	0.06	7.29	3.34	56.10	3.28

$^{a, b, c, d, e}$: Means in same column with different superscripts are significantly ($P<0.05$) different; SEM=Standard Error of Means