PROXIMATE COMPOSITION OF SOME NATURALLY OCCURRING PASTURE SPECIES FED TO RUMINANTS IN ALIERO LOCAL GOVERNMENT AREA OF KEBBI STATE, NIGERIA

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ABSTRACT
This study assessed the proximate compositions of some naturally occurring forages used as ruminant feed during the raining season of Aliero Local Government Area, Kebbi State. A total of seven (7) visits on fortnightly basis were done for the collection of the forage samples contained in sacks of various sizes from hawkers at different locations within the town. Eight (8) pasture species were sampled from the sacks, comprising of four (4) grasses; *Pennisetum pedicellatum, Mitracarpus hiristus, Eragrostis tremula* and *Digiteria alata*, three (3) forbs and one (1) legume; *Monechma ciliatum, Commelina banghalensis, Ipomoea kotschyana* and *Euphorbia convolvuloides*, respectively and analyzed for their proximate compositions. All the parameters measured showed significant ($P<0.05$) differences among the treatments. Digitaria alata had the highest dry matter (99.00%) while the highest crude protein (11.93%), nitrogen free extract (52.07%), and ether extract (3.50%) were recorded for Euphorbia convolvuloides. Ipomoea kotschyana had the highest crude fiber (20.50%) and ash (11.50%). This study showed that mixture of forages in the diet of ruminants may optimize nutrients intake for growth and development.
Key words: Nutrients composition, pastures, season, ruminants

INTRODUCTION
Pastures are extensively used to feed domesticated farm animals and comprise a wide variety of plant species which are predominantly grasses or legumes and can be fed fresh or conserved. The effect that rich pasture species can have on animal nutrition is related to its chemical composition. Thus, (Fisher and Baker, 1996) have worked on the nutritive aspects of naturally occurring pasture species, reporting that their concentrations of Ca, Mg, Na, Co, and Se are higher than those found in sown species. The protein content of legumes is typically much higher than that of grasses and legume fiber contents tends to digest faster than that of grasses allowing ruminants to eat more of legumes than grasses (Buckmaster, 1990). Buxton (1996) reported that the nutritional values of forage species are low in the dry seasons in contrast to rainy season. In spite of this, there is still lack of information to accurately evaluate the nutritive value, expected yield and management conditions of naturally occurring pastures (Fisher and Baker, 1996). The major problem facing ruminant animal production in the tropics is poor quality pasture species particularly during the dry season since the bulk of ruminant animals in developing countries are produced on natural grassland. The supply of good quality forage throughout the year is quite necessary if a higher level of production is to be obtained from these animals (Onwuka *et al*., 1997).
During the rainy season (cropping period), ruminant production systems in the study area includes full confinement, partial confinement or by tethering in order to prevent crop damages by these animals. With this, some farmers either engaged in cut and carry or purchased cut natural pasture species from youth hawkers who have taken this as a livelihood to feed their animals. In spite of this, there is dearth of information on the nutritive composition of uncultivated native pasture species used as ruminant feed. Therefore, this study was designed to determine the proximate composition of some naturally occurring pasture species in Kebbi State.

MATERIALS AND METHOD
Study area
The research was conducted at Aliero Local Government Area between the months of July to September, 2019. Aliero is a town located in the southeastern part of Kebbi State, in north-western

Nigeria. The town lies between the Latitude $12^0$19"06"N and Longitude 4^0 3^0 10"5. It has a short wet season lasting from May to October. The people of the town embark mostly on onion and pepper production, although mixed farming is also common among the farmers along with cattle, sheep and goats reared, they also produce other crops like maize, groundnut, millet and tree crops like mango, cashew etc (KARDA, 2012).

Sample collection and sorting

A total of seven (7) visits on fortnightly basis were done for the collection of the forage samples contained in sacks of various sizes from hawkers at different locations within the town. The collected samples were sorted and bulked together to represent a composite for each species. Thereafter they were air dried until constant weight was achieved and taken to the laboratory for analysis. The species encountered were identified by their local names through the assistance of the local farmers in the study area.

Chemical analysis

Thoroughly mixed dried leaves of each species were used for the analysis. Fifty grams (50g) of dried leaves from each specie were used to determine the proximate composition of the sample collected in the laboratory according to A.O.A.C (2000) procedures.

Data analysis

All the data obtained were subjected to analysis of variance using the procedure of SAS (2004). Treatment means were compared using Duncan's multiple range tests (Duncan, 1955).

RESULTS AND DISCUSSION

The pasture species encountered in the study area are presented in Table 1. A total of eight (8) pasture species were encountered comprising of four (4) grass species namely; *Pennisetum pedicellatum, Mitracarpus hiristus, Eragrostis tremula* and *Digiteria alata,* three (3) forbs and one (1) leguminous species namely; *Monechma ciliatum, Commelina banghalensis, Ipomoea kotschyana* and *Euphorbia convolvuloides* respectively. These species are annual types. de Ridder and Breman. (1993) reported that in the Sudan and Sahel rangelands, the vegetation consisted mainly of annual plants. Presently, the most frequently cultivated forage grass species in Nigeria are northern *gamba* (*Andropogon gayanus*), wooly finger grass (*Digiteria smutssi*), *Sorghum almum* (Columbus grass), *kyasuwa* (*Pennicetum pedicellatum*), *setaria* (*Setaria anceps*) (Agishi, 1984; de Leeuw and Schilhorn, 1978). However the encountered species in the study area were uncultivated types.

Table 1: Naturally occurring pasture species in the study area during 2019 rainy season

Botanical names	Family names	Common names	Local names (Hausa)
Pennisetum pedicellatum	*Poacea*	Hairy fountain grass	*Kyasuwa*
Monechma ciliatum	*Commelinisea*	Milne redhead	*Danfarkami*
Mitracarpus hiristus	*Poacea*	Button grass	*Harwatsi*
Eragrostis tremula	*Poacea*	Love grass	Bubburwa
Commelina banghalensis	*Commelinisea*	Banghal day flower	*Bulasa*
Ipomoea kotschyana	*Commelinisea*	Morning glory	*Takalmin kwado*
Euphorbia convolvuloides	*Legumenisea*	Fula pulaar	*Nonon kurciya*
Digitaria alata	*Poacea*	Crab grass	*Harkiya*

Source: field survey, 2019

The proximate composition of the pasture species encountered is presented in Table 2. There was significant ($P<0.05$) difference in the values obtained among the treatments. However the values did not follow any consistent trend.

The highest dry matter (DM) value (99.00%) was obtained in a grass species (*Digitaria alata*) while the least (94.00%) was obtained in a forb species (*Commelina banghalensis*). The mean DM values obtained in this study were higher than those reported by Fadiyimu *et al*. (2011) but similar to those obtained from selected forages by Eyoh *et al*. (2018).

The highest (11.93%) crude protein (CP) value was observed in a leguminous species (*Euphorbia convolvuloides*) while the least (6.41%) was recorded in a grass species (*Digitaria alata*). The high

CP in the leguminous species relative to the grass and forbs indicated the importance of having grass-legume mixtures offered in the diet of ruminants as reported by Tudsri *et al*. (2002).

The highest (20.50%) and the lowest (9.00%) values of crude fiber (CF) were recorded in forbs species; *Ipomoea kotschyana* and *Commelina banghalensis*, respectively. The CF values obtained were lower than those reported by Eyoh *et al*. (2018). The significant (P<0.05) differences observed among the forage species in this study is in agreement with the work of Durr *et al*. (2005).

The values of the carbohydrate (NFE) obtained indicated that grass species had higher values than the legumes. The highest (52.07%) value of NFE was recorded in *Eragrostis tremula*. The NFE values obtained in this study were higher than those reported by Ukorebi *et al*. (2019).

The range of the ash content of the forages in this study ranged from is 4.50% to 11.50%, with the highest value (P<0.05) recorded in forbs specie (*Ipomoea kotschyana*) and the least in a grass species (*Digitaria alata*). The ash content which is an indication of the presence of mineral concentration in the soil area where the forage species are obtained is within the range (Kubmarawa *et al.*, 2008; Amata and Lebari, 2011).

The lipid (EE) compositions recorded among forage species varied significantly (P<0.05). The highest EE (3.50%) was recorded in the leguminous species (*Euphorbia convolvuloides*) while the least (1.0%) was among the forbs (*Commelina banghalensis*) and grass (*Digitaria alata*) species. The values observed in this study were higher than those obtained by Onyeonagu and Eze. (2013).

Buckmaster (1990) reported that differences in forage quality between grasses and legumes can be very large which is in agreement with the present study.

Table 2: Proximate composition of some pasture species

Species	%DM	%CP	%CF	%NFE	%ASH	%EE
Pennisetum pedicellatum	96.50 ± 0.76^{ab}	4.90 ± 0.26^{d}	14.50 ± 0.60^{b}	67.10 ± 0.21^{d}	7.50 ± 0.76^{b}	2.50 ± 0.35^{b}
Monechma ciliatum	94.50 ± 0.7^{6ab}	5.95 ± 0.05^{cd}	15.50 ± 0.66^{b}	76.35 ± 0.09^{b}	10.50 ± 0.66^{a}	2.00 ± 0.13^{b}
Mitracarpus hiristus	95.50 ± 0.82^{a}	6.21 ± 0.05^{c}	15.50 ± 0.61^{b}	65.29 ± 0.20^{c}	8.50 ± 0.50^{b}	1.50 ± 0.5^{c}
Eragrostis tremula	98.50 ± 0.76^{b}	7.61 ± 0.05^{b}	14.00 ± 0.21^{b}	81.09 ± 0.36^{a}	4.50 ± 0.40^{c}	2.00 ± 0.13^{b}
Commelina banghalensis	94.00 ± 0.76^{b}	4.29 ± 0.06^{d}	9.00 ± 0.51^{c}	74.71 ± 0.19^{c}	4.50 ± 0.40^{c}	1.00 ± 0.15^{c}
Ipomoea kotschyana	94.50 ± 0.76^{b}	4.55 ± 0.05^{d}	20.50 ± 0.60^{a}	55.95 ± 0.06^{g}	11.50 ± 0.56^{a}	2.00 ± 0.15^{b}
Euphorbia convolvuloides	98.33 ± 1.45^{a}	11.93 ± 0.05^{a}	9.50 ± 0.59^{c}	59.39 ± 0.19^{f}	5.50 ± 0.54^{c}	3.50 ± 0.36^{a}
Digitaria alata	99.00 ± 0.50^{a}	6.41 ± 0.05^{c}	9.50 ± 0.51^{c}	76.55 ± 0.33^{h}	10.50 ± 0.66^{a}	1.00 ± 0.15^{c}

Means in the same column with different superscript are significantly (P<0.05) different

CONCLUSION AND RECOMMENDATION

The study area consist of various forages; grasses, legumes and forbs which are important as ruminant feed and also serves as a means of livelihood for youth hawkers especially during the rainy season. Mixture of forage species in the diet of ruminants may optimize nutrients and minerals intake and utilization for growth and development. The legumes were richer in crude protein and lipid than the forbs and grass species. Adequate management such as fertilization, irrigation, conservation practices and proper storage are necessary to improve the all year round production of these forages.

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