PROXIMATE COMPOSITION OF UNCULTIVATED FORAGES AS AFFECTED BY POULTRY MANURE IN ALIERO LOCAL GOVERNMENT OF KEBBI STATE

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ABSTRACT
Adequate management of grasslands are crucial for efficient supply of quality uncultivated forages that will support optimum livestock production. Therefore, the proximate composition of uncultivated forage species as affected by varying levels of poultry manure was investigated in the semi-arid area of Aliero LGA of Kebbi State at the Botanical Garden of Kebbi State University of Science and Technology during the 2021 rainy season. Treatments consisted of two varying poultry manure rates (0.00kg/T and 1.50kg/T) representing treatments 1 and 2 respectively which were applied two weeks before the commencement of the experiment, on two blocks consisting of three plots per block with each plot measuring (2.5m x 1.5m). The plots were laid out in a Randomized Complete Block Design (RCBD). All the free growing natural pasture within each plot were cleared to allow regrowth under rain-fed regime. There were two (2) weeks fortnightly visits to observe the regrowth of the forage species and to remove weeds from the experimental plots and to clear the paths which lasted for nine weeks. After nine weeks of free growth, one (1) replicate from each treatment was randomly selected for herbage harvest with the use of a sharp sickle. The cut forages were oven dried at 65^0C for 48 hours to determine the proximate composition. The dominant forage species identified are; two forbs (Euphobia convolvuloides and Sida cordifolia), three grasses (Eragrotis tremula, Axonopus spp and Pennisetum horndeoides) and one legume (Crotalaria spp). The poultry manure application rates had significant ($p<0.05$) effect on the proximate composition of the uncultivated forage species with the highest CP (15.90%) and NFC (68.60%) were recorded for Crotalaria spp and Axonopus spp respectively. The study indicated a positive response of the uncultivated forages to poultry manure application for better proximate composition.
Key words: proximate composition, poultry manure, uncultivated forages

INTRODUCTION

Forage grasslands are used to feed livestock and globally it has been estimated that they represents 26% of the land area, and 70% of agricultural area which is the major support for traditional ruminant production (Girei, 2013). Forage crops are usually grasses (Poaceae) or herbaceous legumes (Fabaceae). Some tree legumes such as malga (Acacia aneura), lead tree (Leucaena leucocephala) etc, and are also grown in desert and tropical grasslands (Adegbola *et al*., 2018). However, natural forage grassland are often confined to rather unproductive soils and unfavorable climatic conditions (Schneiter and Rimieri, 2001; Schaub *et al*., 2019) which affect its productivity.

Adequate management of grasslands are crucial for efficient supply of quality uncultivated forages that will support optimum livestock production. Among the management innovation is the selective use of animal manure such as poultry dung, when applied adequately will supply essential plant nutrients and serve as a soil amendment, which helps to improve the soil's moisture and nutrient retention to support high quality forage grassland (Agbede, 2008) as the nutritional status of a forage crop depends upon the concentration (and ratios) of carbohydrates, proteins, and lipids. There is still need to assess the potential impacts and critical application levels of poultry manure on the nutrients composition of uncultivated pasture species. There is no documented information in the study area on the proximate composition yield of uncultivated pasture species as affected by graded levels of poultry dung. Thus, the study aim to evaluate the effect of poultry manure rates on the proximate composition of natural growing forages.

MATERIALS AND METHODS

Study area

The experiment was conducted during the raining season period (June to August, 2021) at the Botanical Garden of Kebbi State University of Science and Technology, Aliero. The area is located in the Sudan-Sahelian zone north-western part of Nigeria and lies between latitude $12^0$19'06''N and longitude $4^0$3'10'S with an average temperature and annual rainfall of 28.3^{0}C and 400mm respectively (KARDA, 2018).

Experimental Procedure and Design

The experiment was laid down in a Randomized Complete Block Design (RCBD). Two levels of poultry manure were applied two weeks after clearing the site to two treatment groups at the rate of 0.00kg/T and 1.50kg/T representing treatments; 1 and 2 respectively and replicated three times amongst two blocks. Gross plots measuring 5.75m x 4.13m (23.75m^2) were demarcated having two blocks separated by 1m between were laid out in an east-west direction containing three plots each (2.5m x 1.5m) separated by 0.5m within making a total of six plots.

At the onset of the experiment, an area where there is free growth of natural pasture was located and demarcated using hoes according to the required sizes of the experimental plots. All the free growing natural pasture within each plot were cleared to allow regrowth under rain-fed regime. However, spaces between the plots were clearly weeded and served as paths for easy access to the plots. There were two (2) weeks fortnightly visits to observe the regrowth of the forage species and to remove weeds from the experimental plots and clear the paths. The whole of the experiment lasted for nine weeks. At the end of the experiment, local farmers were employed to identify the forage species across the experimental plots using their local names. Thereafter, the common and scientific names of all identified species were sorted from the Botany laboratory of the Kebbi State University of Science and Technology, Aliero.

After nine weeks of free growth, one (1) replicate from each treatment was randomly selected for herbage harvest using a sharp sickle, all the forages of the selected plots were individually cut from 5cm above the ground level. Fresh herbage for individual specie were oven dried at 65^{0}C for 48 hours and taken to the laboratory for proximate analysis according to the procedure of AOAC (2015).

Data Analysis

The data on the proximate composition Dry Matter (DM), Crude Protein (CP), Crude Fiber (CF), Ether Extract (EE), Non Fiber Carbohydrate (NFC) and Ash of each specie were analyzed by General Linear model Analysis of variance (ANOVA) procedure using SPSS (2015). Significant differences among treatments were detected while, means were compared using the LSD (Least significant difference) at 5% probability.

RESULTS AND DISCUSSION

Table 1 shows the dominant species identified in the study area. The dominant forage species identified were; two forbs (*Euphobia convolvuloides* and *Sida cordifolia*), three grasses (*Eragrotis tremula*, *Axonopus spp* and *Pennisetum pedicellatum*) and one legume (*Crotalaria spp*). These species were among the annual and perennial types. Most authors (De Ridder and Breman, 1993; Muftau *et al*., 2021) reported that in the Sudan and Sahel rangelands, the vegetation consisted mainly of annual and perennial plants.

Table 1: Dominant forage species in a natural pasture in Botanical Garden, Kebbi State University pf Science and Technology, Aliero

Specie names	Family names	Common names	Local names (Hausa)
Euphobia convolvuloides	*Euphorbiaceae*	Dove milk	*Nonon kurciya*
Eragrotis tremula	*Poacea*	Love grass	*Burburwa*
Axonopus spp	*Poacea*	Carpet grass	*Harkiya*
Pennisetum pedicellatum	*Poacea*	Elephant grass	*Kyasuwa*
Crotalaria spp	*Fabaceae*	Goats ground nut	*Gyadan awaki*
Sida cordifolia	*Mallows*	Flannel weed	*Garmani*

Results of proximate composition of uncultivated forage species as affected by poultry manure rates is presented in Table 2. Results shows that poultry manure application significantly (P<0.05) affected the

proximate composition of all the dominant species across the group. Generally the fertilized group had the highest values in all the proximate composition than the unfertilized group with some exceptions. The fertilized group recorded highest values among the species in their; DM (*Eragrotis tremula*, 99.52%), CP (*Crotalaria spp*, 15.90%), CF (*Axonopus spp*, 28.50%), NFC (*Axonopus spp*, 68.60%) and EE (*Euphobia convolvuloides*, 11.20%) compared with the unfertilized group. While the unfertilized group had the highest value in ash (*Euphobia convolvuloides*, 12.50%). The range values of DM, CP, EE and ash obtained among the two groups were higher than those reported by Yahaya *et al*. (2020) on the nutritional composition (88.65-83.62%, 1.43-8.52%, 0.61-7.22%, 1.43-8.52%) for DM, CP, EE and ash respectively of major forages obtained in Gombe State grazing reserve.The variations observed on the proximate composition among the species in this study may be due to the effect of poultry manure application. The Legume species were significantly affected ($p<0.05$) in their CP and EE than the grass and forb species. This findings is in line with the report of Yalewa *et al*. (2020) where the chemical composition (90.21-90.30%, 8.81-15.13% and 6.67-7.69%) for DM, CP and ash respectively of natural pasture in the highland of Ethiopia were significantly affected by fertilizer types.

Table 2: Proximate composition of natural forages as affected by poultry manure at Botanical Garden, Kebbi State University Science and Technology, Aliero.

		Proximate parameters (%)					
		DM	CP	CF	NFC	EE	ASH
PMR(kg/T)	Species						
0.00	E. c	97.35^{bc}	13.93^{b}	21.50^{c}	55.39^{d}	10.50^{b}	12.50^{a}
	E. t	98.40^{ab}	7.61d^{e}	28.00^{a}	65.09^{c}	6.50^{d}	4.00^{e}
	P. p	97.50^{bc}	6.50^{c}	27.50^{ab}	65.10^{c}	5.50^{c}	5.50^{d}
	A. s	96.65^{cd}	6.90^{e}	28.50^{a}	67.36^{ab}	4.00^{f}	4.50^{e}
	C. s	94.85^{c}	15.21^{ab}	20.67^{c}	50.29^{c}	11.50^{a}	9.50^{b}
	S. c	95.00^{c}	10.29^{c}	20.50^{c}	54.71^{d}	9.00^{c}	8.50^{c}
1.50	E. c	98.33^{ab}	14.64^{ab}	20.50^{c}	54.50^{d}	11.20^{a}	11.60^{bc}
	E. t	99.52^{a}	8.61^{d}	26.50^{b}	66.00^{bc}	6.10^{d}	5.35^{d}
	P. p	98.50^{ab}	6.90^{e}	27.50^{a}	65.40^{bc}	6.15^{d}	6.00^{d}
	A. s	97.50^{bc}	7.00^{e}	28.50^{a}	68.60^{a}	4.60^{e}	5.55^{d}
	C. s	95.50^{d}	15.90^{a}	20.50^{c}	51.53^{e}	11.00^{ab}	12.30ab
	S. c	94.00^{d}	11.29^{c}	21.10^{c}	55.41^{d}	8.50^{c}	11.35^{c}
	SEM	0.302	0.283	0.274	0.389	0.100	0.153

a,b,c,d,e,f = means with different superscripts on the same row were significantly ($P<0.05$) different

PMR (Poultry Manure Rates), DM (Dry Matter), CP (Crude Protein), CF (Crude Fiber), NFC (Non Fiber Carbohydrate), EE (Ether Extract)

Keys: E. c =*Euphobia convolvuloides;* E. t=*Eragrostic tremula*; A. s= *Axonopus spp; P.p= Pennisetum pedicillatum*; C. s= *Crotalaria spp*; S. c= *Sida cordifolia*

CONCLUSION

The study revealed that the area constitutes grasses, forbs and legume species; *Euphobia convolvuloides*, *Sida cordifolia*, *Eragrotis tremula*, *Axonopus spp*, *Pennisetum horndeoides*, and *Crotalaria spp* which are of good forage materials that could support ruminant production. This study also indicated the significant impact of poultry manure on the proximate composition of uncultivated forages

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