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PREFERENCE OF *Camelus dromedarius* TO FORAGE SPECIES IN SUB-HUMID ZONE OF NIGERIA

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ABSTRACT

An observational study was carried out to identify the forage species browsed by camels in the Sub-Humid zone of Nigeria with the objective of improving their productivity and that of the range at a Livestock Research Farm. Focus group discussions and field observations of grazing camels were the methods used for data collection. The results indicated that most of the forage species selected by the camels during the wet season were browse plants and or shrubs. The camels spent most of their grazing time on 9 preferred plants. Percentages of total bite counts for some preferred forage species were summed up and the overall bite counts were computed for each species in the study area. There was no significant difference (P> 0.05) in the species bite counts for dry season. Forages consumed during wet season however, showed significant differences (P<0.05) in preference with *Dalbergia sisso* having the highest mean bite/day (76.82 %). This is closely followed by *Gmelina arborea* (68.61%), *Dichrostarchys cineria* (67.47%), *Khaya senegalensis* (67.22%) *Ziziphus mauritania* (66.64%), and *Acacia hoskii* (65.47%).

Key words: Camel, Browse plants, Bite counts, Sub-humid zone

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INTRODUCTION

Camels generally enjoy a global unique ecological and socio-economic status arising from their numerous services to humans under harsh climatic conditions and in highly marginalized ecosystems (Altaf, 2000). The total large camelids population in the world in 2013 was estimated at around 25 million animals. This number is probably underestimated because camels are migrant animals (Faye, 2013). It is difficult to conduct a census for camels such as the wild Australian camel population. The general estimate of the camel world population may probably be around 30 million head (Faye, 2013). About 88% of the camels are found in Africa, while Asia has 12%. The main concentration of dromedary camels in Africa is in the East African countries with 80% of the total camel population raised under various production systems. Nigeria in particular has about 28,000 camels (NASS, 2011) which are concentrated in the Sahelian region of the North western part of Nigeria (FDCPLS, 1992).. Some of the uses of camel include provision of milk, meat, hides and skin. Others include transportation, draught power for agricultural operations, traded for goods and exhibited in the zoo (Iqbal, 1999). The versatility of camel to survive and perform in arid and semi-arid regions and its unique physiological system needs to be studied more closely to further exploit its potentials. A number of browse plants worldwide serve as alternative feedstuffs for livestock (Fayemi *et al*., 2011), as a result, animals under semi-intensive and free-range systems have been observed feeding on them (Isah *et al*., 2007). Information concerning feeds and their nutrients content consumed by camel in the Southern

Guinea Savannah is required in order to improve their performance. Although camel is an important domestic animal species in country like Ethiopia that possesses a large pastoralists and agro-pastoralist population, little has been done on their nutritional status (Temesgen and Mohammed, 2012). Therefore, this study was designed to document the forage species concentration and the browsing habit of the camels introduced into the study area.

MATERIALS AND METHODS

Study area:

This study was carried out at the National Animal Production Research Institute, Ahmadu Bello University, Shika-Zaria, Nigeria on latitude $11^{0}12^{0}$N, longitude $7^{0}33^{0}$E and on altitude of 610m above sea level (Meterological Service Unit, I.A.R (2015).

Sample collection

The methods used to gather information included focus group discussions (FGD) which comprised of 12-15 purposively selected experienced camel keepers. For purposes of sampling, these camel keepers helped the research team to identify the forage species consumed by camels in wet and dry seasons. The other methods used in this study were field observation of grazing camels. Field observation of grazing camels was done to confirm/verify the forage species identified during the FGD as recommended by Schwartz (1989). The feeding observations were done for six (6) randomly selected camels. These observations were conducted between 08:00am to 10:00am and 4:00pm to 6:00pm when the camels were actively grazing. Each camel was observed for 15 minutes, recording the number of complete bites made by the camel on various forage species and also the plant parts eaten by the camels. The research team were accompanied by seven experienced local camel herders who knew all the plants in vernacular for quick identification and recording.

RESULTS AND DISCUSSION

The sources of camel feeds in the study area comprises of browse plants. Observed plant parts consumed by camels are leaves, twigs, seeds and pods. More than 20 forage species consumed by the camels were identified in the study area. These indicate that camels have wider choice for browse in the study area. In this study, the most important browse plants consumed by the camels in both dry and wet seasons are *Ziziphus var-spinachristi, Dichrostachys cinerea, Gmelina arborea, Acacia hoskii, Dalbergia sisso, Khaya senegalensis, Borreria verticillata, Piliostigma thanningii, Anogeissus leiocarpus, Sida acuta, Lephatadenia hastala, Mangifera indica, Lantana camara, Ficus glomosa, Pterocarpus erinaceous, Cassia singueana, Guiera senegalensis, Nauclea latifolia, Sida rhombifolia, Amaranthus spinosus. Amaranthus hybiridus, Sporobulus pyramida, Andropogan gayanus, Adenodelicus paniculatus, Faidherbia albida, Ziziphus Mauritania, Celtis integrifolia,* and*Gardenia erubescens.*However, camels were know to traverse long distance browsing on different part of desert vegetation, therefore restricted camels require supplementary feed to meet up there nutritional requirement. The forage species recorded in this study and the limited grazing hours may not be enough to meet up the nutritional requirement of the camels as evident in there phenotypic appearance.

Forages Preferred by Camels in Dry and Wet Seasons:

Table 1 showed the principal sources of camel feeds in the study areas which constitute of browse species, shrub and grasses. Table 2 showed the preferred forages during dry and wet seasons in National Animal Production Research

Institute, Shika-Zaria were identified by respondents as presented in the following tables. Note that the vernacular names are all in Hausa language and the forage species are not arranged in order of preference. Table 3 and 4 showed the preferred shrubs, grasses and climbers consumed by the camels in the study are.

Data collected on bite counts (Table 5 and 6) were subjected to analysis of variance using SAS package (2005). Total bite counts for some selected forage species were summed up and percentages of the overall bite counts were computed for each species in the study area. There was no significant differences in the species bite counts for dry season which may be attributed to the scarcity of the forage species or lack of palatability. While there were significant differences between the forages consumed during wet season with *Dalbergia sisso* having the highest mean bite/day as compared to the other species. This is followed by *Gmelina arborea*, *Ziziphus Mauritania, Dichrostarchys cineria and Khaya senegalensis. Acacia hoskii* have almost similar mean bite/day with *khaya senegalensis*. These differences in mean bite counts per day may be attributed to palatability and abundance of the forage species in the study area.

Table 1: Dominant forage species as perceived by the grazers in the study area

Category						
Local name	**Botanical name**	**Family name**	**Freq. (N= 7)**	**Tree**	**Shrub**	**Grass**
Magayar kura	*Ziziphus var-spinachristi*	**RHAMNACEAE**	7		✓	
	Dichrostachys cinerea	MIMOSOIDEAE	7		✓	
Malayna	*Gmelina arborea*	LAMIACEAE	7	✓		
	Acacia hoskii	MIMOSACEAE	7		✓	
Shirya	*Dalbergia sisso*	FABACEAE	7	✓		
Madaci	*Khaya senegalensis*	MELIACEAE	7	✓		
	Borreria verticillata	RUBIACEAE	5		✓	
Kalgo	*Piliostigma thanningii*	COMBRETACEAE	3	✓	✓	
	Sida acuta	MALVACEAE	4		✓	
DiyaDiya	*Lephatadenia hastala*	ASCLEPIADACEAE	6		✓	
	Lantana camara	VERBENACEAE	7		✓	
	Ficus glomosa	MORACEAE	6	✓	✓	
	Cassia singueana	FABACEAE	6		✓	
	Pterocarpus erinaceus	FABACEAE	5	✓		
	Guiera senegalensis	COMBRETACEAE	5	✓		
	Nauclea latifolia	RUBIACEAE	5	✓	✓	
	Sida rhombifolia	MALVACEAE	2		✓	
Alaiyaho	*Amaranthus spinosus*	AMARANTHACEAE	6		✓	
Alaiyaho	*Amaranthus hybiridus*	AMARANTHACEAE	6		✓	
	Sporobulus pyramida,	POACEAE	4			✓
	Andropogan gayanus	POACEAE	6			✓
Gawo	*Faidherbia albida*	FABACEAE	7	✓		
	Gardenia erubescens	RUBIACEAE	5		✓	
	Adenodelicus paniculatus	CELASTRACEAE	5		✓	
Magarya	*Ziziphus Mauritania*	RHAMNACEAE	7	✓	✓	
	Celtis integrifolia	CANNABACEAE		✓	✓	

Freq. = Frequency, N= Number of respondent. Kaouthar *et. al*., 2015

Table 2: Preferred Forage Species as Perceived by Pastoralist during Dry and Wet Seasons in National Animal Production Research Institute, Shika-Zaria

Vernacular Name	Botanical Name
Shirya	*Dabergia sissio*
Neem	*Azaditrachta indica*
Gawo	*Faidherbia albida (Acacia albida)*
Baure	*Ficus capensis*
Gamji	*Ficus igens/platyphylla*
Kadanya	*Butyrospermuum paradoxum*
Dorawa	*Parkia clappertoniana*
Mango	*Mangifera indica*
Madaci	*Khaya senegalensis*
Malayna	*Gmelia arborea*
Marke	*Anogeissus leiocarpus*
Tsamiya	*Tamarindus indica*
Madobia	*Pterocarpus paniculatus*
Gaude	*Gardenia erubescens*
Zogala	*Moringa oleifera*
Fa'ru	*Lannea spp*

Table 3: Preferred Shrubs as Perceived by Pastoralist during dry and wet seasons in Nation Animal Production Research Institute, Shika-Zaria

Vernacular (Hausa) Name	Botanical Name
Fara kaya	*Acacia hoski*
Karya garma	*Boreria vertislata*
Kalgo	*Piliostigma thaningil*
Sabara	*Guira senegalensis*
Magarya	*Ziziphus Mauritania*
Nill	*Lantana camera*
Miyar tsanya	*Sida acuta*
Zarangade (small leave)	*Amaranthus vividus*
Tsamiya kasa(H)	*Nelsonia conencens*
Magaryar mutane	*Ziziphus spp*
Kuiwa	*Adenodelicus paniculatus*

Table 4: Preferred Grasses and Climbers as Perceived by Pastoralist during dry and wet seasons in National Animal Production Research Institute, Shika –Zaria

Vernacular (Hausa) name	Botanical name
Yadiya	*Lephtadenia hastala*
Gamba	*Andropogan gayanus*
Tsintsiya	*Sporobolus pyramidalis*

Table 5: Browse Plants Bite Counts Expressed as Percentage of the total in Dry Season

Local Name	Botanical name	Mean Bite count/day (NS)	%Bite/day	SEM
Labadiya	*Gmelina arborea*	75.97^{ab}	17.81	3.69
Magarya	*Ziziphus Mauritania*	72.39^{abc}	16.91	2.54
FararKaya	*Acacia hoskii*	65.47^{c}	15.35	2.23
Madaci	*Khaya senegalensis*	67.22^{bc}	15.76	2.55
……..	*Dalbergia sisso*	76.82^{a}	18.01	3.64
Dundu	*Dichrostachys cineria*	68.65^{abc}	16.10	2.98
	Total	**426.52**	**100.00**	

Table 6: Browse Plants Bite Counts Expressed as Percentage of the total in Dry Season

Local Name	Botanical name	Mean Bite count/day (NS)	%Bite/day	SEM
Labadiya	*Gmelina arborea*	68.61	16.90	3.63
Magarya	*Ziziphus Mauritania*	66.64	16.41	2.43
FararKaya	*Acacia hoskii*	66.81	16.46	2.16
Madaci	*Khaya senegalensis*	67.88	16.72	2.24
……..	*Dalbergia sisso*	68.58	16.89	2.53
Dundu	*Dichrostachys cineria*	67.47	16.62	2.94
Total	**405.99**	**100.00**		

CONCLUSION AND RECOMMENDATION

Few forage species are available in the study area for grazing camels and other livestock species, supplementary feed should be provided to ensure optimum production. Further study should be carried out to ascertain the nutritional composition of the forage species in order to improve the productivity of the camel and that of the range.

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