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Rangeland Assessment of Derived Savanna around Egume in Kogi state Nigeria Based on Livestock Forage Preference and Palatable Species

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Abstract: *Rangelands are important in resources management and grazing is the most economical way of utilizing rangeland vegetation. Therefore, this research was designed to assess the rangeland condition of the vegetation around Egume, Kogi state, Nigeria based on the major livestock forage preference. The experimental animals that were used in the study were healthy tagged sheep and cattle which were followed alongside with the Nomads in Ochaja and Egume according to their traditional practices in the area. Four (4) herbaceous species. Sporoboluspyramidalis, Andropogongayamus, Euphorbia granulate and Eragrotisciliaris were respectively observed as the most palatable species recorded in the study area. Moreso, Andropogongayamus was found to be the most frequent grazed herbaceous species. Meanwhile Hyperthermia subplusmosa was observed to be the less palatable herbaceous species preferred by the livestock during the study. The result also showed that monocotyledonous herbaceous plants were the most preferred group of browses by the livestock in the study area. The degree of utilization of these forage species by the livestock may be a function of growth forms, particularly the presence of protective structure like thorns of plants which are effective in limiting browsing. Thus, both the type of animal and the forage species are important in determining utilization of the forage species of the study area. Therefore, the information obtained during the study may give room for the establishment a game reserve in the area.*

Keywords: *Rangeland, Forage, Preference, Livestock, Experimental animals*

I. Introduction

Rangelands are important in resource management and grazing is the most economical way of utilizing rangeland vegetation.Forages are the backbone of any ruminant livestock operation. The ruminant digestive system is designed to utilize cellulose for a majority of the energy needs of the grazing animal. Palatability is a plant characteristic that refers to the relish with which plants or its parts or feed is consumed as stimulated by the sensory impulses of grazing animal (Heath et al., 1985). While preference refers to the selection of a plant species by the animal as a feed. Animal factors such as differential preference for forage species, age, stage of pregnancy, general health and hunger of animal; and plant factors including seasonal availability, degree of maturity, growth stage, phenology, morphological and chemical nature, relative abundance of associated species, accessibility to plants/sites and climate affect palatability (Wahid, 1990; Kababia et al., 1992; Grunwaldt et al., 1994; Nyamangara and Ndlovu, 1995). It has been frequently observed that sheep generally prefer grasses and forbs more than shrubs; while goats prefer shrubs and degree of dietary overlap between sheep and goats is greater in dry season because of limited forage availability (Wilson et al., 1995; Huston, 1978; Grunwaldt et al., 1994; Khan, 1996). In view of this, the researchis aimed at assessing the range land condition of the vegetation around Egume, Kogi State, Nigeria based on the major livestock forage preference.

II. Materials And Methods

Assessment of the Major Livestock Forage Preference of the study Area

The experimental animals that were used in the study werehealthy tagged sheep and cattle. The animals were followed along side with the Nomads (herdsmen) in Ochaja and Egume according to their traditional practices in the area. The forage preference of the animals was assessed by direct observations described by Buechner, (1950) and Schwarz (1988). This exercise was performed for every two weeks of the month in both seasons (ie during wet and dry seasons). The time spent by each animal feeding on one plant was recorded to the nearest 10 seconds. The most fed plant species and the group preferred by those animals were also noted on each observation day.

III. Results

Livestock Relative Frequency Preferred and Palatable Species of the Study Area

The results of the livestock relative frequency preferred and palatable species is presented in Table 1, 2, 3 and 4. Accordingly, four herbaceous species; Sporobuluspyramidalis, Andropogongayanus, Euphorbia granulata and Eragrostisciliaris with their respective average relative palatability (Rp) values of 1.86, 1.84, 1.71 and 1.50 were observed to be the most palatable herbaceous species recorded in the study area. It was recorded in Table3 that,Andropogongayanus was the most frequent grazed herbaceous species with the mean relative frequency grazing (Rfg) of 26.1 and Aspiliaafricanawas the most frequent occurring species (Table2). Meanwhile Hyperthermia subplusmosa was observed to be the less palatable herbaceous species preferred by the livestock during the study. The result presented in Table4 have shown that monocotyledonous herbaceous plants where the most preferred group of browses by the livestock in the study area. The sheep spent more time feeding on both dicotyledons and monocotyledons than the cattle. Animals spent different times feeding on individual groups of plants at different seasons. Sheep spent relatively more time feeding on both dicotyledons and monocotyledon (browses) and in both seasons as compare to the cattle as presented in Table 5 and 6.

Table1: Frequency of List of Species Grazing Preference of the Study Area

	Species	Family	Sub-class	Mean (x̄) Rfo
1	AndropogongayanusKunth.	Poaceae	Monocotyledonae	14.3
2	AndropogontectorumSchum& Thom	Poaceae	Monocotyledonae	9.40
3	AspiliaafricanaPers	Asteraceae	Dicotyledonae	20.2
4	Dactylocteniumaegyptium Linn	Poaceae	Monocotyledonae	14.3
5	Eragrostisciliaris Linn	Poaceae	Dicotyledonae	6.40
6	EuphorabiagranulataForsk	Asteraceae	Monocotyledonae	8.20
7	Euphorbia heterophyllaLinn	Asteracae	Dicotyledonae	10.4
8	Hyparrhemia involucrate Sapt	Poaceae	Monocotyledonae	12.0
9	HyparrhemiasubplumosaStapt	Poaceae	Monocotyledonae	8.40
10	Ipomoea eriocarpa R. Br	Convolulaceae	Dicotyledonae	10.3
11	SolanumnigrumLinn	Solanaceae	Dicotyledonae	8.10
12	Sporoboluspyramidalis P. Beaur	Poaceae	Monocotyledonae	4.30

Note: RFO = Relative frequency occurrence.

Table 2: Livestock Relative Palatability of Herbaceous Species in the Study Area

S/No.	Herbaceous Species	Rfg	Rfo	RP
1	Andropogongayanus	26.1	14.2	1.84
2	Andropogontectorum	11.0	9.40	1.17
3	Aspiliaafricana	22.0	20.2	1.10
4	Dactylocteniumaegyptium	13.0	14.3	0.91
5	Eragrostisciliaris	14.0	6.40	1.50
6	Euphorabiagranulate	13.1	8.20	1.17
7	Euphorbia heterophylla	9.60	10.4	1.26
8	Hyparrhemia involucrate	6.00	12.0	0.50
9	Hyparrhemiasubplumosa	2.00	8.40	0.24
10	Ipomoea eriocarpa	10.0	10.3	0.97
11	Solanumnigrum	11.2	8.10	1.38
12	Sporoboluspyramidalis	8.00	4.30	1.86

Note:
Rfg = Relative frequency grazing
Rfo = Relative frequency occurrence
Rp= Rfg/Rfo = Relative palatability

Table 3: Mean (x̄) Relative Frequency Preferred Species by Livestock

Experimental Animal	Body Weight Range (kg)	Mean (x̄) No. of Plant Species Consumed	Total time (s) spent feeding on	
			Dicotyledon	Monocotyledon
Sheep	20 – 60	18.4	71	81
Cattle	170 – 368	13.1	41	53
Total			**112**	**124**

Note: S = second

Table 4: Forage by Livestock in Relation to Season

Total time spent feeding per observation days on forage during	Dry season	Wet season
Sheep	124	180
Cattle	76	112
Total	**200**	**292**

Table 5: Relative Frequency of Grazing Preference of Livestock during Dry Season in the Study Area

Experimental Animal	Body Weight Range (kg)	Number of Days Observed	Number of Plants Species (mean)	Total time (s) spent feeding on	
				Dicotyledon	Monocotyledon
Sheep	20 – 60	24	22.3	82	98
Cattle	170 – 368	24	16.2	46	66
Total		**48**	**38.5**	**128**	**164**

Table 6: Relative Frequency of Grazing Preference of Livestock during Wet Season in the Study Area

Experimental Animal	Body Weight Range (kg)	Number of Days Observed	Number of Plants Species (mean)	Total time (s) spent feeding on	
				Dicotyledon	Monocotyledon
Sheep	20 – 60	18	14.5	60	64
Cattle	170 – 368	12	10.0	36	40
Total		**30**	**24.5**	**96**	**104**

IV. Livestock Forage Preference And Palatable Species Of The Area

It is a recorded fact that, palatability is a plant characteristic that refers to the relish with which a plant or its parts is consumed as stimulated by the sensory impulses of grazing animals. The preference of it refers to the selection of a plant species by the animal as a feed (Health et al, 1985 and Behlet al.2010). The findings of this study on livestock forage preference and palatable species agrees with the one of Animut and Goetsch (2008). It was observed that the sheep which are intermediate feeders preferred grasses (monocotyledons) and spent more time feeding on them during the wet season when these species are of good quality and are available in sufficient quantities but that as the dry season starts, they switched to feed on dicotyledons species. This observation was similarly reported by Rutagwenda (1990). The sheep spent more time feeding on both forages (i.e. monocotyledons and dicotyledons) during both seasons (wet and dry) than do cattle which preferred grasses (monocotyledons) to dicotyledons species.

According to Wahid (1990); Kababia et al, (1995); Grunwaldt et al, (1994); Nyamangara and Ndlovu (1995), differential preference for forage species among livestock may depend on two main factors; animal factors such as the age, stage of the pregnancy, general health and hunger of the animal and the plant factors such as seasonal availability, degree of maturity, growth stage, morphological and chemical nature as well as relative abundance of associated species. Also, Hoppe et al,(1977) and Coppocket al ,.(1986) reported that different livestock species select diets of different compositions. Heady (1964) reported that, touch, sight, smell, taste and instinct are potential sensory factors which influence forage preferences by domestic animals.

Accordingly, four herbaceous species:Sporobuluspyramidis, Andropogusgayanus, Euphorbia granulate and Eragrostisciliaris were found to be most palatable species recorded during the study. Tribe, (1949) and Heady (1964) reported that, the degree of utilization of these forage species by livestock is also a function of growth forms, particularly the presence of protective structures like thorns of plants are very effective in limiting browsing, although some animals are capable of making good use of those plants. Thus, both the type of animal and the forage species are important in determining utilization of the forage species of the study area.

Conclusively, the findings of the study on livestock forage preference and palatability species showed that the sheep which are intermediate feeders spend more time feeding on both forages (monocotyledon and dicotyledon) during both seasons than do cattle which preferred monocotyledons to dicotyledons. Accordingly, four herbaceous species; Sporobuluspyramidis, Andropogusgayanus, Euphorbia granulata and Eragrostisciliaris were found to be the most palatable species recorded during the study,and this information may give room for the establishment a game reserve in the area,

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