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NUTRITIVE VALUE FOR SOME IMPORTANT RANGE SPECIES NORTHERN KORDOFAN, SUDAN

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ABSTRACT: *This study was conducted in North Kordofan State in the year 2009. The objectives were to identify the nutritive value, for the rangelands prevailing in the region .To achieve the objectives field and laboratory works were done. The field work was for sample collection while the lab work include proximate chemical analysis according to (A.O.A.C, 1990), was done for some range plants and trees to identify the nutritional and mineral content. Data were analyzed using SPSS software. The results showed that CP (crude protein), CF (crude fiber), ash, E.E (Ether Extract) and NFS (Nitrogen Free Extract) were in the range from 6-10, 35-45, 7-10, 1.1-2.1 and 36.7-46.7% respectively. The chemical analysis for selected browse trees were CP5.1%, CF 31-33%, EE 0.4-0.9%, ash 7-8.1% and NFE 53-56.9%. Mineral contents ranged from 0.0144-0.075 ppm for P, 0.002-0.063 ppm for K and 1-2.9 ppm for Iodine. Based on the findings it can be concluded that rangelands of North Kordofan is not poor in the term of nutritive value but it suffers of mineral deficiency. The study recommends that water and dams should be made with optimum distribution to access the non-reachable rangeland because of water deficiency, also supplementary feeding is needed in the term of concentrates and minerals.*

ORIGINAL ARTICLE

Key words: *Rangelands, Crude Protein, Crude Fiber, Ash, Ether Extract and Nitrogen Free Extract*

INTRODUCTION

Pastoral and agro-pastoral systems are the mainstay of the economy of North Kordofan State. Livestock and its products are the primary source of income for over 60% of the population. Animal raised are mainly sheep, goats and camels in the northern part of the state. Sheep, goats and some cattle in the southern parts. The major food grown are millet and sorghum, major cash crop include sesame, roselle and ground nut (RPA, 2005). The quality of forage depends largely upon its protein content and total digestible nutrients because it affects the digestibility of feed. Elnazeir (2008), stated that the important range species include plants, such as *Aristida mutablis, Cenchrus biflorus, Fimbristylis dicotomo, Zalea pentandra, Zornia glochidiata* and *Eragrostis tremula. and tress such as Acacia senegal(Hashab) Acacia tortilis(seyal) Balanites aegyptiaca and Maerua crassifolia (Sarah).* This work is undertaken as a result of previous study that recommends going forewords in term identifying nutritive value for rangelands of north Kordofan. There for understanding the nutritive value for some selected rangelands of north Kordofan is very important when planning for supplementary additives such as concentrates and minerals.

MATERIALS AND METHODS

Study Area

This study was conducted in North Kordofan State, which lies between latitudes 11°20' to 16°36' N, and longitudes 27° 13' to 32° 24'E. The State area amount to almost 25 million hectares, out of this area 14.5 million hectares are rangeland (Ministry of Agriculture, 2005). The State had a total population of 2.9 million, (5th population and houses census, 2009).

Field Work

The field work was carried out during the rainy season 2009. The samples were taken from two sites. The first site was south of Errahad town and the second site was north-east of Damukia about 60 km North West of Elobeid town. The proximate chemical analysis and mineral content was undertaken at range-livestock research laboratory, El-Obeid Agricultural Research Station. Selected samples were analyzed for CF, CP and minerals (P, K, I, Na, Mn) according to (AOAC, 1990).

Data Collection

Tools used for obtaining samples for proximate analysis are: Pair of scissors; Paper bags; Digital electric balance; Oven; Recording sheet.

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The selected grasses (Palatable and dominant species) species were clipped at 2.5 cm above ground level, using a pair of scissors. The harvested plants species were placed in paper bags and then oven dried at 70° C for 48 hours. Samples were then analyzed for Crud Fiber, Crude Protein, Ether Extract, Dry matter, Nitrogen Free Extract , and minerals (P, K, I, Na, Mn) according to (AOAC, 1990).

Statistical Analysis

SPSS software was used for statistical analysis.

RESULTS

Chemical analysis of selected range vegetation

The nutritive value for grasses species is illustrated in Table 1. The grasses include *Cenchrus biflorus* (Huskneet), *Fimbristylis dichtomo* (Um fissiat), *Eragrostis tremula* (Banu) and *Aristida sp* (Gaw), and the legumes *Zornia glochidiata* (lisseg), *Zalea pentandra* (Rab'a), *Crotalaria pycnosthya* (tagtag),. *Zornia glochidiata* (lisseg), *Cenchrus biflorus* (Huskneet) and *Fimbristylis dichtomo* (fissiat) had the highest crude fiber content (41%, 40%and 38%, respectively) while *Eragorstis tremula* (Banu) and *Zalea pentandra* (Rab'a) *Crotalaria pycnosthya* (tagtaga) recorded the highest crude protein content (11%). *Fimbristylis dichtomo* (fissiat), *Cenchrus biflorus* (Huskneet), *Eragrostis tremula* (Banu) and *Aristida sp* (Gaw) had the lowest crude protein content (6.2, 6.7, 6.8 and 6.6%, respectively).

The nutritive value for dominant trees is illustrated in Table 2. *Acacia senegal* (Hashab) had the highest crude protein (7%) and CF (31%) while *Ziziphus spina-christi* (sidir) contained the lowest CP and CF content with the other two trees recording intermediate contents.

Phosphorus content is shown in Table 3. *Fimbristylis dichtomo* (fissiat) was 0.0149 ppm while *Zalea pentandra* (Rab'a), *Aristida* sp (Gaw) and *Eragorstis tremula* (Banu) were 0.097ppm, 0.08ppm and 0.075ppm, respectively. Table 3 also showed that the potassium content was 0.063 ppm for *Eragorstis tremula (Banu)* while *Fimbristylis dichtomo* (fissiat), Aristida sp. (Gaw) and *Zalea pentandra* (Rab'a) were 0.055, 0.045 and 0.020 ppm, respectively. For Iodine content *Zalea pentandra* (Rab'a) and Aristida sp (Gaw), showed high content of 2.9 and 2.8 ppm, respectively, while *Fimbristylis dichtomo* (fissiat) and *Eragorstis tremula (Banu)* were 1.95 and 1.88 ppm, respectively.

Table 1 - The nutritive value for some important dominant grasses species

Dominant plant Species	CP%	CF%	DM%	ASH%	E.E%	NFE%
Aristida sp(Gaw)	6.2	38.8	93	7	1.2	46.7
Eragrositis tremula (Banu)	6.8	37	94.2	7.8	2.2	46.2
Cenchrus biflorus (Huskneet)	6	40	93.7	13	1.5	38.8
Zalea pentandra (Rab'a)	11	37	84	13	2.3	36.7
Zornia glochidiata (lisseg)	9	41	81	11	1.2	37.7
Crotalariat pycnosthya (gtaga)	10	35	80	11	2.2	37.8
Fimbristylis dichtomo (fisyat)	6.2	39	94	10	1.1	43.7
S.E	1.0	1.2	1.0	2	0.5	0.5

CP=Crude Protein, CF= Crude Fiber, DM=Dry Matter, E.E=Ether Extract, NFE=Nitrogen Free Extract

Table 2 - Nutritive value for some important dominant trees

	Dominant plant Species					
Dominant plant Species	**CP%**	**CF%**	**DM%**	**ASH%**	**E.E%**	**NFE%**
Acacia tortillas (Seyal)	5.7	30.5	94.5	7	0.4	56.9
Leptadenya pyrotechnica	5.1	33	94	8.1	0.54	53.3
Balanites aegyptiaca (higleeg)	5.2	31	93.5	7.6	0.8	55.4
Acacia Senegal (Hashab)	7	31	93.7	8	0.7	53.3
Ziziphus-spainna-christi (sidir)	5	31	93.4	7.5	0.9	55.6
SE	1	1.4	1.1	2.5	0.5	0.3

CP=Crude Protein, CF= Crude Fiber, DM=Dry Matter, E.E=Ether Extract, NFE=Nitrogen Free Extract

Table 3 - Chemical Analysis for mineral Content

	Mineral Content		
Species	**P (ppm)**	**K (ppm)**	**I (ppm)**
Zalea pentandra (Rab'a)	0.097	0.02	2.9
Aristida sp (Gaw)	0.08	0.05	2.8
Eragrositis tremula (Banu)	0.075	0.06	1.88
Cenchrus biflorus (Huskneet)	0.066	-	-
Zornia glochidiata (lisseg)	0.03	-	-
Fimbristylis dichtomo (fisyat)	0.15	0.06	1.95
SE	1	0.9	1.3

P=Phosphorus, K= Potassium, I = Iodine, ppm= part per million

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DISCUSSIONS

The nutritive Value for some selected plants.

The study found that *Cenchrus biflorus*, Zornia *glochidiata* (lisseg), and *Fimbristylis dichtomo* (fissiat) had high crude fiber content while *Eragrostis termula, Zalea pentandra* (Rab'a) and *Crotalariat pycnosthya* (tagtag) had crude fiber content of 37, 37 and 35%, respectively. *Zalea pentandra* (Rab'a) had high crude protein content of 11% while *Fimbristylis dichtomo* (fisyat), *Cenchrus biflorus* (Huskneet), *Eragoristis tremula* (Banu) and *Aristida* sp. (Gaw) had crude protein content of 6.2, 6.7, 6.8 and 6.6%, respectively. This means that the Crude Protein of these grasses is sufficient for maintenance (Buter and Baily, 1973). A critical value of about 3.6% crude protein in feed is required (NRC, 1981), below which the apparent crude protein digestibility declines. It was obvious from the analysis that these species were not poor in nutritive value although they grow in the semiarid areas. However, the most critical time for livestock in the area is the dry season (Feb-June) when the nutritive value of range grasses decline sharply and reach CP levels of below 2% (El-Hag and El Wakeel, 1998).

For trees Acacia senegal (Hashab) had crude protein and crude fiber contents of 7% and 31%, respectively, while *Ziziphus spina-christi* (sidir) had respective values of 5 and 31%. Other trees in the two studied zones had values lying between these means. Trees and shrubs are estimated to contribute 20-30% of livestock feed sources in greater Kordofan (Darag and Suliman, 1988).

Mineral content for the dominant plants

Range plants in the area had lower mineral contents. This necessitates provision of supplementary mineral sources for livestock grazing these rangelands. K deficiency affecting the normal growth, also Tetanus symptoms will be observed. These deficiencies might be one of the major causes of the lower animal productivity in these areas. Iodine deficiency would lead to Endemic-goiter, reproductive failure, death and hairless of embryos. Also, toxic symptoms can be observed for calves of 100 kg wt when an iodine concentration of 500 mg/kg was offered Wilson (1980).

CONCLUSION AND RECOMMENDATION

Based on the findings it can be concluded that rangelands of North Kordofan is not poor in the term of nutritive value such as protein and fibre but it suffer of mineral deficiency.

Water and dams should be made with optimum distribution to access the non-reachable rangeland because of water deficiency. Supplementary feeding is needed in the term of concentrates and minerals.

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