

Preferred Species of Goats in Semi-arid Zone at North Darfur State – Umkaddada Locality

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ABSTRACT

Umkaddada locality is located within 12th and 15th degree of latitude N and the 25th and 28th of longitude E, among the semi arid zone, it covering an area of some 40,000 km². The most preferred plants in open rangeland are *Echinocloa colonum*, *Ipomoea vagan*, *Trainthema portulacastrum* and *Alysicarpus* respectively. The frequency of these species is 25.6%, 18%, 16.4% and 30% respectively.

Umkaddada locality which located within 12th and 15th degree of latitude N and the 25th and 28th of longitude E, like all other areas of Darfur it influenced by war and tribal conflicts which led to migrate of many people, some of them being internal displacement people (IDPS) and other fled to neighbor countries.

Droughts and shortage of rainfall hits the area continuously since 1970, the miss land use include intensive cutting of trees, over grazing and expansion of farming areas was practiced as a result of crowded of peoples around a certain towns and cities. This situation made some changes on vegetation cover and range plants, there for animal changes their diet behavior and adapted to the new situation, goats are the most animal type over all umkaddada areas because it is raiser of poorer people.

The study is aiming to investigate and identifying the new preferred composition by goat, also frequency and density of the preferred range plants can be studied.

- a. To identify the preferred composition of diet by goats in the area
- b. To assess the range condition in the area
- c. To identify the decrease and increase plant species in rangeland

Keywords: *arid-zone, drought, internal displacement, preferred, relative preference index.*

1. INTRODUCTION

Range and pasure is the backbone of livestock production in the Sudan in general and Darfur in particular. The growth of forage plants and grazing grasses undoubtedly depends on the rainfall. And due to the droughts and shortage of rains in the last thirty years, the productivity of natural pasture has decreased. In North Darfur, for example, the carrying capacity of pasture in the seventies was forty to fifty animal units per square kilometer in the eastern sandy soils (one animal unit is three hundred- four hundred animal live weight). For comparison, the survey carried out by the Range and Pasture Department conducted in 2001/ 2002 which was an above average rainy season, the result of the carrying capacity was only 9 animal units per year. The deterioration was not limited to grasses, but included a

decrease in the production of trees in form of pods and leaves which normally add over thirty percent to range carrying capacity. This decrease was due to the death of the trees as the result of the droughts or due to continuous felling of trees for firewood and charcoal which became one of the important economic activities and source of income for most of the poor rural populations in Darfur, settled people and nomads as well, (Yagoub 2009). The study area is at eastern part of North Darfur state in Sudan country, it covering an area of some 40,000 km² bordered on the east by west Kordofan State, on the south by Eldein locality, on the north and west by Miliet and Elfasher localities respectively, map 1. There are three distinct seasons in the area, the hot rainy season (June – September), the relatively cool post rainy season

(November – February) and the hot dry summer. The two intermediate seasons are also recognized, the early dry

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season (late September to early November) and the early rainy season (in May). The long term average rainfall is 251.2mm. The mean relative humidity is 24.3% which decreases to 13% in the drier months of winter and summer, and increase to 51% in the wet season (July – September). The mean, minimum and maximum temperature are 17C° and 35C° respectively, temperature can reach up to 40C° during the hot summer months (Elfasher metrological station 2011). The vegetation of the area was studied by Harrison and Jackson (1958) and classified by Roberts, (1981). Roberts identified and described three vegetation types in the area: Acacia mellifera, commiphera desert serup. Acacia Senegal savannah on sand. Comberetum, Delbergia, Albizzia. During a recent survey (RPA, 1996), the whole

classes 1, 2 and 3 seems to be devoid of perennial grasses and tree species, the degree of deterioration decreases southward, ground cover is dominated by annual grasses such as Aristida spp; Aristida plumose, Eragrostis spp, Cenchrus biflorus and Termienthema pentandra. Dominant trees cover are Balanites aegyptiaca, Acacia tortilis, Acacia melifera, Leptadenia pyrotechnica, Acacia nobica and Boscia senegalensis. The total population of north Darfur State is estimated at 2.1 million census 2010. The rural, urban and nomadic population constitute 64%, 16.8% and 19.2% respectively. The majority of the rural populations are small farmers, who cultivate crops and raising small number of livestock, Adam (2002). The average rainfall recorded by Umkaddada Agricultural office for ten years approximately about 200mm, (Table1).

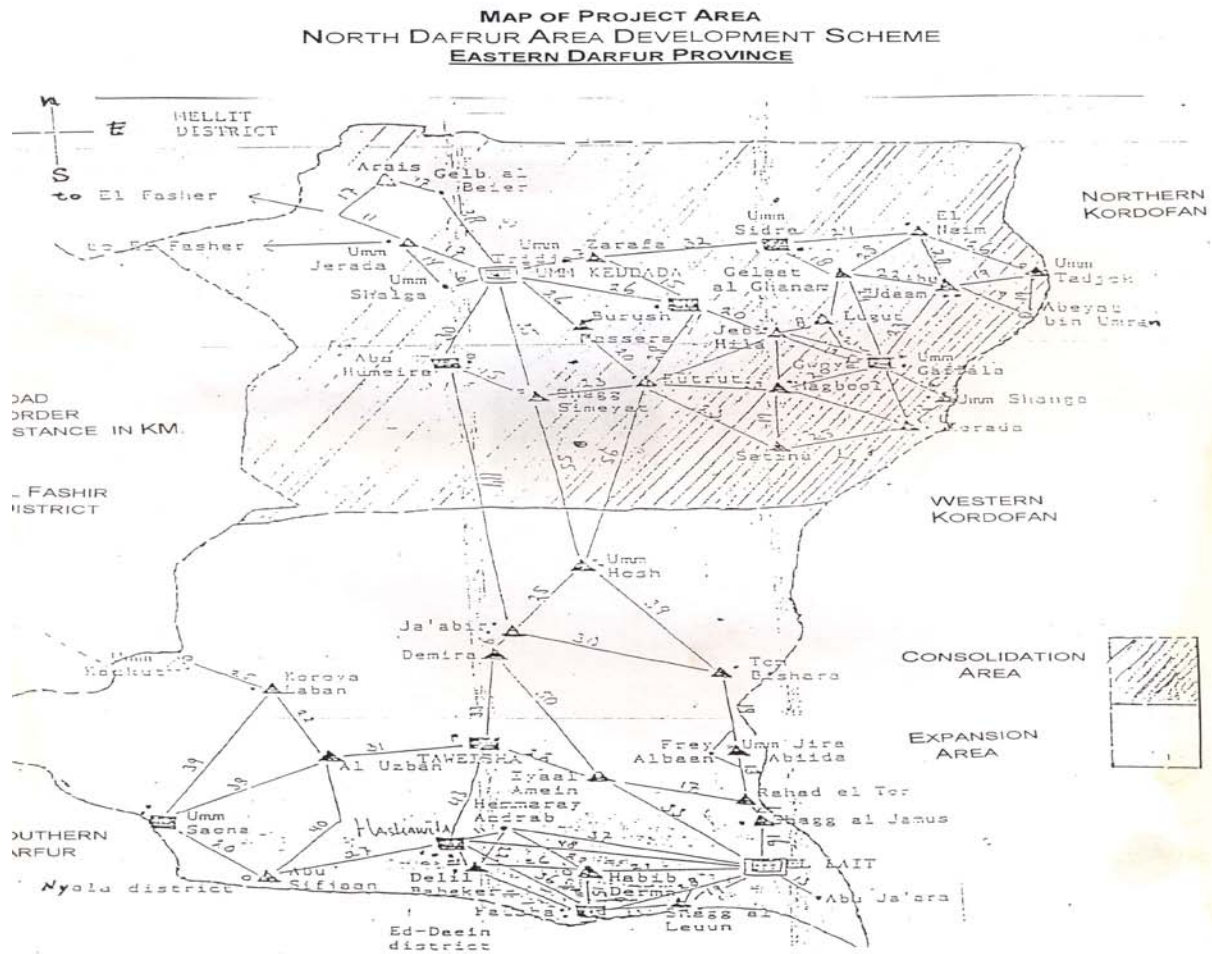
Table 1: annually average of rainfall/mm at Umkaddada locality

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
rainfall	210	102	161.7	308.2	279.6	155.4	233.1	237.4	153.9	147.1	157.6

Source: Umkaddada Agricultural office 2011

1.1 Research objectives

- a. To identify the preferred composition of diet by goats in the area
- b. To assess the range condition in the area
- c. To identify the decrease and increase plant species in rangeland



Map 1: Locality of Umkaddada

2. MATERIALS AND METHODS

2.1 Diet Selection by the Grazing Animals

Diet botanical composition had been estimated by using the bite-count technique. It is similar to that of Van Dyne (1968). Two sites had been selected (open and protected range sites), within each site 5 goats were

followed by observers for three days (during the morning and afternoon) and about 400 bites, with species of plant ingested / bite, had been recorded for each animal, then the selection can be determined by calculating the relative preference index (RPI). $RPI = \frac{\% \text{ of species in composition}}{\% \text{ of the same species in diet plate 1 and 2}}$.



Plate 1: Diet of goat in open rangeland



Plate 2: Diet of goats at protected rangeland

2.2 Density and Frequency of Range Plants

Density is the number of plants rooted within each quadrat, while frequency is the percentage of total quadrats that contain at least one rooted individual of a given species. The 250 quadrats within 100 km² sample plot at each of open and protected rangeland were used to measure density and frequency (plate 2 and 4).



Plate 3: the use of quadrat to measure density and frequency of plant species

3. RESULTS AND DISCUSSION

Table 1: Botanical composition of diet of goats in open range at seed set stage

Scientific name	Diet%	Composition%	RPI	Classification
<i>Echinochloa colonum</i>	26.0	3.3	7.9	Pp
<i>Ipomeoa vagan</i>	33.3	4.2	7.9	Pp
<i>Trainthema portulacastrum</i>	16.1	3.5	4.6	Pp
<i>Alycicarpus glumaceus</i>	13.4	4.7	2.7	Pp
<i>Oldenlandia senegalensis</i>	6.9	9.3	0.7	UD
<i>Eragrostis termula</i>	4.3	10.0	0.4	UD
<i>Aristida spp</i>	0.0	24.9	0.0	UC

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Cenchrus biflorus	0.0	10.3	0.0	UC
Acanthospermum hespidium	0.0	11.5	0.0	UC
Convolvulus deserti	0.0	2.1	0.0	UC
Desmodium hirtum	0.0	4.4	0.0	UC
Bracharia deflex	0.0	1.6	0.0	UC
Vigna sun hum	0.0	1.0	0.0	UC
Sesamum alatum	0.0	1.9	0.0	UC
Pappaphorum spp	0.0	1.6	0.0	UC
Sidacordofolia	0.0	1.3	0.0	UC
Cymbopogon proximus	0.0	1.1	0.0	UC
Zornia diphylla	0.0	1.0	0.0	UC
Hyparrhenia hirta	0.0	0.9	0.0	UC
Dactyloctenium aegyptium	0.0	0.9	0.0	UC
Tribulus terrestris	0.0	0.8	0.0	UC
Ceratotheca sesamouid	0.0	0.6	0.0	UC

Table 2: Botanical composition of the diet of goats at protected rangeland during seed set stage

Species	% in Diet	% in Composition	PRI	Classification
Echinochloa colonum	17.2	5.8	3.0	Pp
Dactyloctenium aegyptium	13.6	4.3	3.0	Pp
Zalya pentandra	18.5	7.7	2.4	Pp
Monsonia senegalensis	15.7	7.7	2.0	Pp
Bracharia deflex	18.7	16.4	1.1	DP
Sesamum alatum	2.5	9.2	0.3	UD
Trainthema portulacastrum	10.7	22.3	0.5	UD
Ipomoea vagan	2.6	9.3	0.3	UD
Bracharia obtussiflora	0.5	0.0	0.0	UC
Cenchrus biflorus	0.0	6.5	0.0	UC
Alysicarpus glumaceus	0.0	6.5	0.0	UC
Eragrostis termula	0.0	2.5	0.0	UC
Aristida spp	0.0	1.6	0.0	UC
Pappaphorum spp	0.0	0.0	0.0	UC
Sidacordo folia	0.0	0.0	0.0	UC
Cymbopogon proximus	0.0	0.0	0.0	UC
Convolvulus deserti	0.0	0.0	0.0	UC
Desmodium hirtum	0.0	0.0	0.0	UC

Table 3: Frequency of common species in protected and open rangeland

Botanical name	Type of plant	Open rangeland	Protected rangeland
Trainthemap ortulacastrum	Forb	16.4	89.0
Sesamum alatum	Forb	10.4	77.0
Eragrostis termula	Grass	25.2	54.0
Oldenlandia senegalensis	Forb	39.2	53.0
Cenchrus biflorus	Grass	33.2	50.0

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<i>Alysicarpus glumaceus</i>	Forb	30.0	49.0
<i>Ipomoea vagan</i>	Forb	18.0	32.0
<i>Aristida spp</i>	Grass	31.2	25.0
<i>Bracharia deflex</i>	Forb	22.8	24.0
<i>Dactyloctenium aegyptium</i>	Grass	4.4	16.0
<i>Echinochloa colonum</i>	Grass	25.6	12.0
<i>Desmodium hirtum</i>	Forb	18.8	10.0
<i>Monsonia senegalensis</i>	Forb	2.4	9.0
<i>Zalya pentandra</i>	Forb	4.4	8.0
<i>Acanthospermum hespidum</i>	Grass	6.0	0.3

Table 4: Relative density in two different range sites (protected/open) during seed set stage

Botanical name	Type of plant	Protected rangeland	Open rangeland
<i>Trainthema portulacastrum</i>	Forb	23.6	0.1
<i>Cenchrus biflorus</i>	Grass	13.2	5.9
<i>Aristida spp</i>	Grass	9.4	74.5
<i>Ipomoea vagan</i>	Forb	8.8	0.3
<i>Alysicarpus glumaceus</i>	Grass	8.0	0.7
<i>Oldenlandia senegalensis</i>	Forb	6.8	3.8
<i>Eragrostis termula</i>	Grass	5.7	8.5
<i>Echinochloa colonum</i>	Grass	1.9	0.3
<i>Desmodium hirtum</i>	Forb	1.8	0.1
<i>Bracharia deflex</i>	Forb	1.3	0.1
<i>Pappap horum spp</i>	Forb	1.0	0.0
<i>Citrullus colocynthis</i>	Forb	0.0	0.0
<i>Acanthospermum hespidum</i>	Forb	0.0	3.5
<i>Zornia diphylla</i>	Forb	0.3	0.1
<i>Sidacordo folia</i>	Forb	0.0	0.9
<i>Convolvulus deserti</i>	Forb	0.0	0.9
<i>Vigna sun hum</i>	Forb	0.0	0.2
<i>Fimbristyls dichotomo</i>	Grass	0.0	0.1
<i>Corchorus olitorius</i>	Forb	0.0	0.0
<i>Euphoebia aegyptiaca</i>	Forb	0.0	0.0

The preferred plants in open range land showed by the result in Table (1) are *Echinochloa colonum*, *Ipomoea vagan*, *Trainthema portulacastrum* and *Alysicarpus*. But in the protected rangeland there are three another species is appeared beside *Echinochloa colonum* include *Dactylactenium aegyptium*, *Zalya pentandra* and *Monsonia senegalensis*. *Echinochloa colonum*, present at the top in diet of goats in the deferent rangeland (open/protected) but the diet percent in open rangeland is high because there is no access of preferred plant species as in protected rangeland. *Ipomoea vagan* and *Trainthema portulacastrum* present as preferred plants in open rangeland and undesirable in protected rangeland (Tables 2/3/4). There are many factors attributes this result such as competition of animals in open rangeland, no access of alternative or most of available species are

unconsumed by goats. Tables (3,4) showed that many plant species are available in the two range sites but in diet selection stated as unconsumed (UC).

4. CONCLUSION

The most preferred plants in open rangeland are *Echinochloa colonum*, *Ipomoea vagan*, *Trainthema portulacastrum* and *Alysicarpus* respectively. *Ipomoea vagan*, *Trainthema portulacastrum* and *Alysicarpus* showed lower per average in diet in protected range site in spite of its accessibility, that means goats changed their behavior of diet selection in open range site. The condition of range in protected area is better than the open range area, because animals will not enter the protected rangeland before the peak of dry season (May – June),

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this system give the plant species a chance to establish them self every year.

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