Materials and methods:

The study area:

The study area Dinder National Park was established in 1935 following the London convention of 1933 for the convention of Africa flora and fauna (Mohamed 1994). The study area is situated by the river Rahad at latitude 120 42' N and longitude 350 02' E, and to northwestern to latitude 120 42' N and longitude 340 48' E at Dinder river then latitude 120 32' N and longitude 340 32' E along khor Kennan and finally to the southeast to latitude 110 55' N and longitude 340 32' E (figure 2).

Kenyi (2001) described the climate of the study area, and the topography and soil were covered and described by both Horsworth (1968) and Dasman (1972). In term of flora and fauna of the study area were identified described by Dasman (1972) and Nikolas (1987).

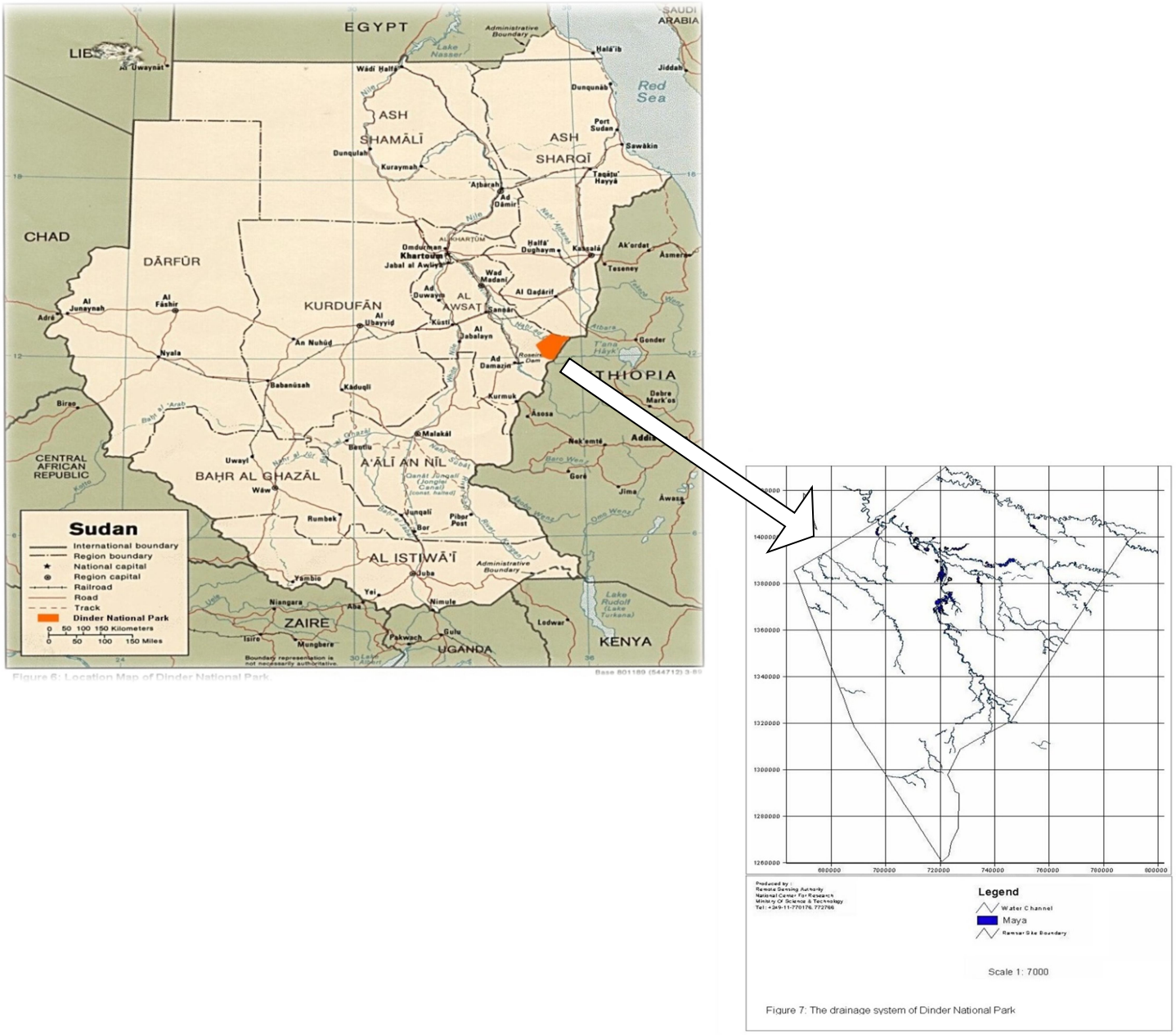


Figure (2) The water system of Dinder National Park
Source: Management plan of Dinder National Park 2004

Methods:

The road side counts population status and the activity patterns were carried during dry season February – March 2018. The study site was divided into five transect line which include Galago – RasAmir, EinAshamis , Musa, Grerrisa and Galago – Senate and this was done in order to cover different types of habitat, Thomas et al (2002), Burraclogh (2000), Greenwood and Robinson (2009), Shorrocks (2007). These sampling were done as follow

Population size:

The survey of bohor reed buck was conducted and counting performed starting at 7:00 am – 11:00 pm. The binocular and the field guide for mammal were used during the count. The individuals of reedbucks were recorded in a designed sheet a brief identification notes. The sex and ages category was determine on the basis of the body size, horns size and the presence or absence of horn, (Estes 1991, Afework el al 2010).

Activity patterns:

Group of bohor reedbucks traced to record their activity pattern with 10 minutes time interval (Martin and Bateson 1993 and Funston el al 1994, Altman 1974). The nocturnal activity pattern was difficult to be scanned due to the facts that no modified scan equipment facilities that can be used for scanning during the night and no security measurements available during the night hour which starts at 18:00 pm to 6:00 am. Therefore reedbucks were scanned diurnally in a hidden tree in AbdelGani Mayas the location of their preferred grazing site for consecutive five days. Observations of each day were compiled as the total number of activities preformed 12 hours period i.e 7: 00 – 8:00, 8:00 – 9:00, to 15:00 – 16:00 (Seddon and Ismail 2002, and Afework el at 2010).

Statistical analysis: Data on the population abundance, status and activity patterns were analyzed using micro-soft excel.

Results:

Reedbuck population size:

As indicated in table (1) and table (2). There were 153 reedbuck animals counted in the study site of which 41.2% (n = 63) was confined to Galago – Ein Alshamis area. However, the population varied between the transect line A, C, D and E were not significant (chi X^2 = 8.7, 3,0, 6.5 and 6.1 respectively at 4 d.f., $p>0.05$) and it is significant in transect line B (Chi - X^2 = 20.6 at 4 d.f, $p>0.05$).

The proportion of adults' reedbucks of study area was higher than the lower age's structure. However, was significant (Chi - X^2 = 22.0, 21.5 at 4 d.f, $p>0.05$) and not significant at lower ages structure (Chi - X^2 = 5.9, 8.0, and 7.6 at 4 d.f, $p>0.05$). The sex ratio of reedbuck was 1:1. For all transect lines census, the population of Bohor reedbucks were female biased 51.6% (n = 79) was female excluding juveniles, and 39.2% (n = 60) was male. More male adults (19.4%, n = 45) were observed than sub adults (9.8%, n = 15) and juveniles (9.2%, n = 14). The group size of reedbucks showed variation from 1 – 5 individual animals. Herds were seen in aggregation of up to 45 individual during the dry season in EinAshamis Mayas. Bohor reedbuck showed a transect movement pattern. More individual of reedbuck were counted in transect A & B during the morning census in dry season. The female accounted for 51.6% excluding juveniles and 39.2% male of the total population of reedbuck at study site. However, the sub adult group contributed 24.8% individual to the total population and the juveniles contributed 9.2% to the population at the study site.

Group composition:

Bohor reedbucks according to many studies the results showed that they normally known to forms different groups. Likewise, in the field Bohor reedbuck observed in different group which is not commonly stand for long period of time, these included group formed by dominant male with adults, sub-adult females and juveniles. Another group comprised of

bachelor adults and sub-adult females. The third group formed by sub-adult males only. The last groups were older isolated male of reedbucks or sometimes form groups of individuals. Regardless of the grouping, however, the herd of reedbuck population were loose and dispersion in all direction.

Table (1): Comparison of individual animals Bohor reedbuck counted in different transect line in Dinder National Park

Transect line	Total Count					Total	M.D	Percent
	AM	AF	SAM	SAF	J	Row		%
Galago-RasAmir (A)	11	13	4	6	4	38	3.6	24.8
Galago- Ein Alshamis (B)	20	23	6	8	6	63	9.2	41.1
Galago – Grerrisa (C)	2	3	1	2	0	8	0.8	5.2
Galago – Musa (D)	4	6	1	2	1	14	1.8	9.2
Galago – Alsenat (E)	8	1	3	5	3	30	2.8	19.0
Total	45	56	15	23	14			
M.D	5.2	5.4	1.6	2.0	1.8	Grand Total 153		

Value Mean Deviation, AM = Adult male, AF = Adult female, SAM = Sub-adult male, SAF = Sub-adult female, J = Juvenile

A= Galago – RasAmir, B= Galago – EinAshamis, C= Galago – Grerrisa, D= Galago – Musa, E= Galago – Alsenat. M.D = Mean deviation

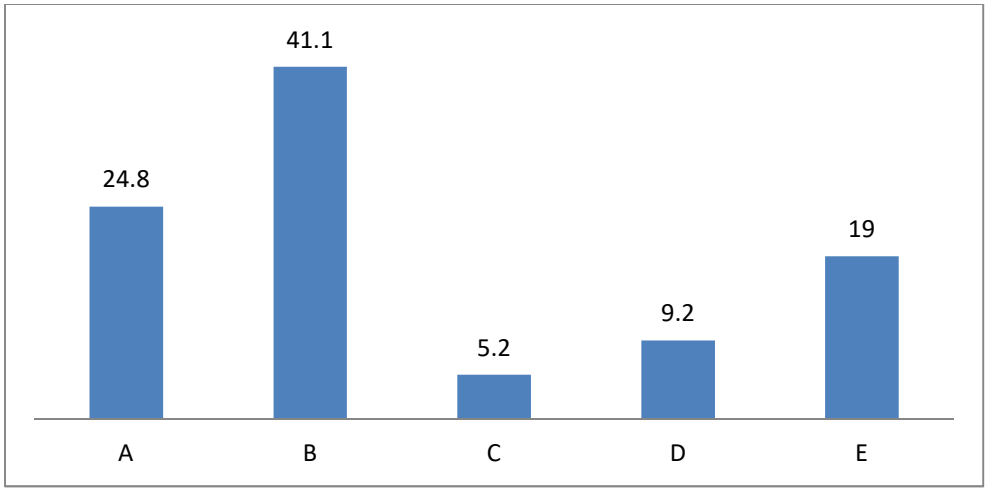


Figure 1 Comparison of total individual count of Bohor reedbuck in percent % in different transect lines

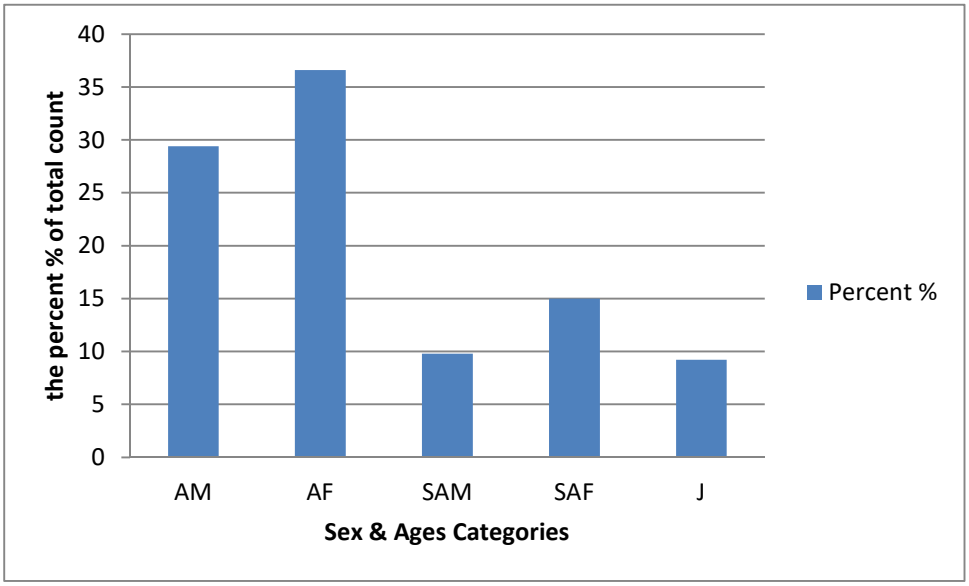
A= Galago – RasAmir, B= Galago – EinAshamis, C= Galago – Grerrisa, D= Galago – Musa, E= Galago – Alsenat

Table (2): Comparison of ages and sex categories of Bohor reedbuck population between different transect at study site:

Transect line	Group size	Total count					Total Row	Chi- X^2 d.f = 4
		Age and Sex Structure						
		AM	AF	SAM	SAF	J		
A	2.3	11	13	4	6	4	38 ± 3.7	8.7*
B	5.0	20	23	6	8	6	63 ± 7.3	20.6

C	0.2	2	3	1	2	0	8 ± 1.4	3.0*
D	0.3	4	6	1	2	1	14 ± 1.9	6.5*
E	1.0	8	1	3	5	3	30 ± 3.1	6.1*
Total		45 ± 6.3	56± 6.9	15± 1.9	23± 2.4	14 ± 2.1	153±8.2	Total Chi-X^2 44.9
Percent %		29.4	36.6	9.8	15.0	9.2	100 %	
Chi – X^2 d.f = 4	8.75*	22.0	21.5	5.9*	8.0*	7.6*	Total Chi –X^2 65.0	

Value Mean ± SD, AM = Adult male, AF = Adult female – SAM -= Sub-adult male, SAF = Sub-adult female, J = Juvenile,
A= =Galago – RasAmir, B= Galago – EinAshamis, C= Galago – Grerrisa, D= Galago – Musa, E= Galago – Alsenat
Value are not significantly different at $p>0.05$, value * are significantly different at $p<0.05$



, AM = Adult male, AF = Adult female – SAM -= Sub-adult male, SAF = Sub-adult female, J = Juvenile

Figure (2) Comparison of sex and ages categories of Bohor reedbuck in percent % of the total count in different transect at study site

The diurnal activity:

A total of 330 time budget for every 10 minute scan sampling for five days consecutive of bohor reedbuck diurnal activity for dry season in AbdelGani Mayas Table (3) and figure (5). During the dry season the diurnal activity pattern of Bohor reedbuck group the result in table (4) indicated that most animals were actively feeding throughout early morning and late in afternoon with a resting period around mid day. Feeding activity began early and intensified between 7:00 – 9:00 am, 9:00 – 11:00 hrs then it gradually decreased between 11:00 – 13:00 hrs and 13:00 – 15:00. This time mostly used for lying down and ruminating. Feeding restarted again between 15:00 – 17:00 and increased gain up to late 17:00 – 19:00 hrs see figure (6). As a part of their diurnal activity reedbuck in the park used to move regularly from one location such as bedding site to other such as grazing or watering site which may involve crossing of the transects.

Table (3) Comparison of five days of diurnal activity pattern of Bohor reedbuck in Abdgani Mayas at Dinder National Park:

Activity	F	LD	W	SR	V	O	Total
Day							
Day 1	25	16	10	3	7	6	67
Day 2	20	13	8	3	6	5	55
Day 3	23	14	9	3	7	6	62
Day 4	27	17	11	4	8	7	74
Day 5	26	16	11	4	8	7	68
Total	121	76	49	17	36	31	330
A.M.	24.6	15.1	9.8	3.4	7.2	6.2	66
Percent %	36.7	23	14.8	5.2	10.9	9.4	100

A.M = arithmetic's means, F = Feeding, LD = Laying down, W = Walking, SR = Standing at rest, V = Vigilance, O = Others

Other* = Defending, urinating, ritual playing, soil licking, fighting, chasing, suckling, drinking, courtship

Table (4) Comparison of diurnal activity of Bohor reedbuck and time spent at the study site in Dinder National Park:

Activity	7 – 9	9 – 11	11 – 13	13 – 15	15 – 17	Total	Percent %
F	8	7	1	3	6	25	39.7
LD	0	1	6	5	2	13	20.6
W	1	2	3	3	0	9	14.3
RS	0	1	1	0	1	3	4.8
V	2	1	1	1	2	7	11.1
O	1	1	2	1	1	6	9.5

F = Feeding, LD = Laying down, W = Walking, SR = Standing at rest, V = Vigilance,
O = others* = Defending, urinating, ritual playing, soil licking, fighting, chasing, suckling, drinking, courtship

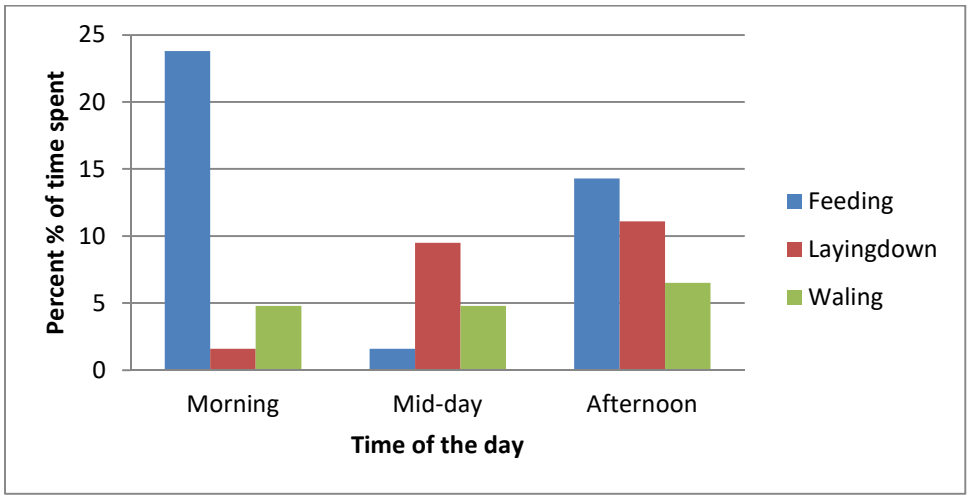


Figure 3 Diurnal activity pattern of Bohor reedbuck, the time of the day was divided into three periods of time (morning from 7:00 - 11;00, midday from 11:00 - 13:00, afternoon from 13:00 - 17;00)

Discussion:

This survey provided important pioneer steps in investigation of the status and the population dynamics in Dinder National Park (DNP), Sudan. These surveys resulted in observation of 153 individual animals of reedbuck along the five transect line, a total of 330 scanned diurnal activity pattern of reedbuck within five days, one case of predation in reedbuck and human activities factors such as livestock grazing, fishing, cultivation of crops, collection of firewood and any other factors which leads to poaching of the species.

Population Size:

The population size of reedbuck includes 24.8% in Galago - RasAmir, 41.1% Galago - EinAshamis, 5.2% Galago - Grerrisa, 9.2% Galago - Musa and 19.0% Galago - Alsenit. However, the result showed the land use pattern of the surrounding transect s based on their security for animal species, as such the aggregation and concentration of reedbuck were observed in Mayas EinAshamis where fodder , water and security were available. Similar result were obtained by Tigani Allam (2006) who reported that in the dry season the animals were found in the center of the park around water pool where green fodder and water were available. However, Balakrishnan and Ndhlovu (1992) stated that wild animals avoid localities where human activities are frequents and high. This was clearly observed in Mayas Grerrisa and RasAmir where there was fishing activities in frequent.

The population dynamics of reedbuck of study site were unknown. The population was biased toward female. Moreover, in assessing the age categories of reedbuck is biased toward adult 66 % (n = 101) adult. Similar results were reached by Tadesse Habtamu, Afework Bekele and Berhanu Belay (2012). However, this biased result toward adults is unfavorable for the population dynamic of reedbuck in the future. in the present study the sex ratio of the adult individual was 1: 1 and between the sub adult group was proportionally 1:1 and the finding agrees with many studies which reported that the sex ratio is 1; 1 since the breeding behavior of reedbuck is harem forming (Skinner and smithers 1990, Taylor 2004).

Many researchers: Estes (1991), Afework el al (2010) and Taylor (2004) reported that reedbucks are known to form a group of different individual composition. Likewise in the field different group of reedbuck were identified and observed in the study area and this include a dominant male with female and juveniles. A group of bachelor sub adult male, other group comprised of adult and sub adult female and isolated older male with female and sometimes without females groups.

Diurnal Activity:

The pattern of diurnal activity in reedbuck is specified during the period of early morning and late afternoon. At Dinder reedbuck were observed to be actively feeding throughout early morning and late afternoon with a resting period around the midday. Similarly in the work done by Roberts and Dunbar 1991, they accept reedbuck nocturnal behavior but considered environmental factors such as habitat fragmentation and shortage of food that forced their activity at least to be during a certain time of the day (early morning and late afternoon). Many studies (Jarman, P.J., 1974, Mloszewskmi, J., 1983., Beekman, J.H. and H.H.T. Prins, 1989) reported of rumination in ungulates are closely correlated with resting period that occur intermediately during feeding bunts. However, the reedbuck population at Dinder have their resting pattern occurring around the midday which is the time mostly used for lying and ruminating.Likewise, Mitchell 1976 reported pattern of resting for animals are in a suitable shade to avoid heat stress. Feeding was the major diurnal activity of reedbuck during the time of day, then followed by lying down, walking, vigilance and others and the minor diurnal activity for reedbuck was standing at rest.

Conclusion:

There is a limited study on wet season diurnal and nocturnal activity pattern and breeding behavior. The population size and sex and ages categories of reedbuck of the study site may creates a good opportunity to conduct a detailed long term study on population of diurnal and nocturnal activity and breeding in both dry and wet season. From these results it is possible to conclude that for the sustainability and maintenance of the existing population in Bohor reedbucks in Dinder National Park (DNP) should be

Maintain sufficient habitat not to be subjected to excessive degradation.

Reducing human depredations on population of these a

ntelopes.

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The impact assessment of direct fence with some treatments on rangeland improvement in Semi –Arid area - - Sudan

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Abstract:
The study was conducted at Babanousa area in West Kordofan State the aim of this study was to assess the impact of direct fence with some treatments on rangeland improvement. The rangelands were divided into four blocks A, B, C and D. the three blocks (A, B, C) were replicated in three sites, block D was taken in open rangeland in three sites used as control. Eighty quadrate samples were taken in the each sites, twenty quadrates for each block were placed in ten meter along transect during two rainy seasons. The three blocks (A, B, C) were treated by different improvement process. For vegetation measurements the quadrate method (Wilm et al, 1944) was used to study the differences in biomass productivity, vegetation cover, and plants diversity. The data obtained were analyzed to compare between the improved blocks A, B and C and the opened area (D control) using stander equations. The results showed that, the average percentages of the three fenced rangeland were higher than opened one in term of ground cover, in addition to twenty sex deferent plant species were found in the three fenced rangeland most of them were desirable plants, while eighteen deferent plant species has been found in open rangeland with more undesirable plant species. Also, the results showed differences in average plant density in the three fenced rangeland that 97 plant/meter² were found, while the average plants density in open rangeland were 62 p/m².

Keywords*:* Plant density, , biomass, rangeland, diversity, fenced rangeland

Introduction:

Sudan is a large country with an area of 1.882.000 square Kilometers this area extended over different ecological zones including desert, semi desert, low rain-fall savannah and high rain-fall savannah, in addition to mountain regions. Sudan is located in the northern parts of African between. Longitudes 49 – 21 and 38 – 34 E. and 23.8 – 8.45 N. it is known by its rich natural resources, with fast rangelands and forest (Fashir, 2014). The rangeland in Sudan subjected to be intensive use due to increasing animal and human population, ecological change and increase in human demands and over economical activities. These factors cause severe rangeland deterioration (Abdalla, 2008). The livestock; cattle, sheep and goats that owned by pastoralists are the main consumers of rangeland plants and grazing is considered a natural influence on rangeland environment components. (Fashir, 2014). Open rangelands are grazed heavily by animals since no rule to recognize grazing practices, which lead to rangeland deterioration semi- arid grazing land . Livestock have a major impact on rangeland vegetation composition and stability of grassland, if over exploitation by grazing animals desired plants could change by other undesired plants species (Cordon, 2007). Natural re-vegetation practices particularly grazing management may restore and spread of desirable species, while, grazing management alone may not accelerate the succession towards

desirable species in arid and semiarid rangelands, due to limited precipitation where artificial re-vegetation would involve the establishment of adapted species either by seed or transplanting seedlings (Ahmad et al, 2011). Restoration and rehabilitation are the two main procedures for regeneration of a depleted rangeland. Restoration or biological recovery means to bring the ecosystem to their pristine situation and rehabilitation or artificial recovery is the artificial establishment of a new type of vegetation different from the pristine native vegetation (Le Houerou, 2000). Biological or artificial recovery may include increase in biomass, plant cover, organic matter, soil micro and macro-organisms, better water intake and turnover, lower evaporation and runoff. Biological recovery may be obtained by protecting the target area from human and livestock intrusion. The purpose of rehabilitation of rangelands may be diverse like forage production, (Le Houerou, 2000).These study used double improvement procedures direct fencing and treatment process to find out which procedures is best for rangeland improvements.

Methodology:

Study area:

The study area lies between latitude 11° 30 ′ – 12° 00′ N and longitude27 º 30′ – 28° 00′E. The area is about 1000 Km^2, which belongs to Babanousa Locality in South Kordofan State (Mohammed et al, 2015). The area located in western part of State and it has vast sandy areas suitable for grazing practices especially during rainy season.

Sampling:

An area about (7.3 feddan) (209 × 146m) was fenced or closed. Then was divided into three equal block each one about 209m/42m0 (2.1) feddan. Each block was divided in to three small blocks with an area about 50 × 42m for all (0.5 feddan). The three blocks were named randomly as A, B. C. and D. Two kgs of seed of deferent herbaceous plants were broadcasted in block A1, A2 and A3 without using any treatment. The block B1, B2 and B3 were improved using 11.8 horse power tractor coupled with chease L, and then two kgs of above mentioned four plants were broadcasted. The block C1, C2 and C3 were improved with same mentioned tractor, in additional to water harvesting, then two kg of the same plants of all treatment were broadcasted. The block D1,D2 and D3 were taken in open rangeland as control without using any treatment, all the treatment were used after the shower of the rainfall in the targeted area.

Vegetation measurements:

Vegetation measurements in the four blocks A, B.C and D were used to study the biomass productivity, vegetation cover and biodiversity for the two seasons 2012 and 2013 respectively. Quadrate double sample methods (Wilm et al, 1944) was used to determine plants attribute, eighty quadrate sample were taken in the four block, 20 quadrate for each block were placed in 10 meter along transect during two rainy seasons. The data obtained were analyzed to compare between the fenced (closed) area A, B and C and the opened area (D control) using stander equations. Such as:

1. Plants cover $= \frac{\text{total hits of all plants specieces}}{\text{total hits}} \times \%100$
2. Average plants density per/meter square $\frac{\text{Total number of plants species in all quadrate}}{\text{Total number of quadrates}}$
3. Relative plants density per/meter $= \frac{\text{Total number of individual plants species}}{\text{Total number of quadrate}}$
4. Range productivity per $/\text{m} = \frac{\text{average biomass}/\text{m}^2 \times 10000 \times 0.5}{100000} = \text{ton/ha}$

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Results and discussion:

Table (1): Average Plants cover percent (%) in two seasons

Blocks	Season 2012 Plants cover percent (%)	Season 2013 Plants cover percent (%)	Average Plants cover percent (%)
Block (A)	55	60	57.5
Block (B)	60	70	65
Block (C)	75	90	82.5
Block (D)	50	45	45.5

According to table (1) the average percentage of ground cover in the fenced rangeland was 93% and the average percentage of the open rangeland was 75%, this result indicated that, the average percentage of fenced (closed rangeland) was higher than open rangeland in term of ground cover, this may attributed to different vegetation types in two site that can result in variation in plant density and relative botanical composition. Moreover, the variation of ground cover within two site may also attributed to growth performance, because some forbs area sensitive to grazing process.(Fashir, *et al, 2013*) reported that, the extensive grazing can affects plants attribute such as botanical composition, density, ground cover and biomass production.

Table (2): Four desirable plants species shown higher percentage in fenced rangeland

N	Botanical name	Block (A)		Block (B)		Block (C)		Block (D)	
		Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013
1	*Zornia glochidiata*	6.2	11.5	11.3	15.1	14.6	18.3	5.2	4.5
2	*Cenchrus spp*	6.2	9.0	9.9	12.8	13.4	14.0	3.4	2.0
3	*Blepharis linariifolia*	4.6	12.8	7.1	13.9	9.8	15.1	0.0	0.0
4	*Oldenlandia herbacea*	6.2	10.3	8.5	11.6	10.9	14.0	0.0	0.0

Table(3): Four undesirable plants species shown higher percentage in open rangeland

N	Botanical name	Block (A)		Block (B)		Block (C)		Block (D)	
		Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013
1	*Acanthospermum hespidum*	7.7	3.8	4.2	2.3	2.2	1.1	8.6	8.0
2	*Datura stramonium*	7.7	2.6	5.7	3.5	4.9	2.2	10.0	12.0
3	*Senna abtosifolia*	9.2	5.1	7.1	2.3	3.7	22	12.1	14.0
4	*Sida cordofolia*	10.7	5.1	7.1	3.5	4.9	23	13.8	16.0

Table (4) revealed four desirable plants shown higher percentage in the fenced rangeland, that *Zornia glochidiata , 12.9%, Cenchrus spp 11.6%, Blepharis linariifolia 10.6% and Oldenlandia herbacea 10.3%,* while four undesirable plants showed higher percentage *like Acanthospermum hespidum, Datura stramonium, Senna abtosifolia and Sida cordofolia,* in the open rangeland 14.9%, 13.5%, 11.2 and 8.3% respectively as shown in table (3).

These result may be attributed to seeds broadcasting process that used inside fenced rangeland, also the open grazing area may be subjected to frequent grazing process that may increased the number of undesirable plants species. (Fashir *et al, 2013*) stated that, extensive grazing system on open grazing land decreased desirable plants species especially forbs like *Ipomia Spp* and increased undesirable plants species such as *Acanthospermum hespidum* and *Senna abtosifolia.* (Nasra 2009) reported that, the degree of grazing process strongly affects the structure, composition, quality and productivity on rangeland vegetations. Also (Samia, 2012) stated that, continuous intensive grazing leads to vegetation change such as

replacement of palatable plants by less palatable species, replacement of perennial grasses by annuals bushes, encroachment lower standing biomass and reduced basal cover.

Table(4):The plants diversity in four blocks under study within two seasons

N	Botanical name	Block (A)		Block (B)		Block (C)		Block (D)	
		Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013	Season 2012	Season 2013
1	*Zornia glochidiata*	6.2	11.5	11.3	15.1	14.6	18.3	5.2	4.5
2	*Cenchrus spp*	6.2	9.0	9.9	12.8	13.4	14.0	3.4	2.0
3	*Blepharis linariifolia*	4.6	12.8	7.1	13.9	9.8	15.1	0.0	0.0
4	*Oldenlandia herbacea*	6.2	10.3	8.5	11.6	10.9	14.0	0.0	0.0
5	*Acanthospermum hespidum*	7.7	3.8	4.2	2.3	2.2	1.1	8.6	8.0
6	*Datura stramonium*	7.7	2.6	5.7	3.5	4.9	2.2	10.0	12.0
7	*Senna abtosifolia*	9.2	5.1	7.1	2.3	3.7	22	12.1	14.0
8	*Sida cordofolia*	10.7	5.1	7.1	3.5	4.9	23	13.8	16.0
9	*Dactylactinum yptioum*	4.6	2.6	5.7	8.1	7.3	8.6	3.4	2.0
10	*Eragrostis Spp*	4.6	3.8	7.1	3.5	6.1	4.3	5.2	4.0
11	*Chrozophora Spp*	3.1	2.6	5.7	3.5	4.9	3.2	3.4.	0.0
12	*Ipomoea cordofana*	3.1	2.6	2.8	2.3	2.4	2.2	3.4	4.0
13	*Aristida Spp*	3.1	2.6	2.8	2.3	2.4	1.1	3.4	4.0
14	*Cenium elegans*	3.1	2.6	2.8	2.3	2.4	2.2	3.4	4.0
15	*Echinocola colonum*	3.1	5.1	2.8	2.3	2.4	2.2	3.4	4.0
16	*Acanthus spp*	3.1	2.6	2.8	2.3	0.0	0.0	3.4	4.0
17	*Ipomoea spp*	3.1	2.6	2.8	2.3	2.4	2.2	3.4	40
18	*Aerva Javonica*	3.1	2.6	2.8	1.2	2.4	2.2	3.4	4.0
19	*Striga hermonthica*	1.5	1.3	1.4	1.2	1.2	1.1	1.7	2.0
20	*Schonfeidia gracilis*	1.5	1.3	1.4	1.2	0.0	0.0	1.7	2.0
21	*Ceratotheca sesamoides*	1.5	1.3	1.4	0.0	0.0	0.0	1.7	2.0
22	*Fimbristyls dichotomo*	1.5	1.5	1.4	1.2	1.2	1.1	1.7	2.0
23	*Corchorus ditorius*	1.5	1.3	1.4	1.2	0.0	0.0	1.7	2.0
24	*Calotrophis procers*	0.0	1.3	0.0	0.0	0.0	2.3	0.0	0.0
25	*Desmodium dichotomum*	0.0	1.3	0.0	0.0	0.0	2.2	0.0	0.0
26	*Senna elxandarina*	0.0	1.3	0.0	0.0	0.0	2.2	0.0	0.0

Table (5) showed twenty sex different plant species were found in fenced rangeland, while eighteen different plant species has been found in open rangeland, the high plants diversity in fenced rangeland may be due to broadcasting seeds as management or rangeland improving strategies, in addition to that, the fencing can protect the rangeland from grazing especially during the earlier growing period, this can increase plants diversity in rangeland, and the low diversity in open rangeland may attributed to grazing process that animals effect growth desirable plants species. (Nasra, 2009) confirmed that, the tangible impact of management practices including improvement of the vegetation composition may increase vegetation diversity. Leopold (1939) mentioned that, reduced the population of native fauna changed under the reduced native animal impacts and increased grazing pressure of domestic animals.(Myers, 1983) indicated that, by protecting habitats, the variety of plants species they contain also can be protected.

Table(6): Average Plants density per meter squares (P/m²) in two seasons

Blocks	Season 2012 Plants density per meter squares (P/m²)	Season 2013 Plants density per meter squares (P/m²)	Average Plants density per meter squares (P/m²)
Block (A)	73	82	78
Block (B)	81	112	98
Block (C)	102	130	116
Block (D)	68	56	62

Table (6) revealed the average plant density in the closed rangeland 98 plant/meter²; while the average plants density in open rangeland were 62 plant/meter².The differences between plants densities p/m² in two sites may be attributed to effects of different grazing intensities

on vegetation, (Holechek, 2004) reported that, vegetative changes have frequently been documented under different level of stocking rate. The increase of plant density in fenced or closed site when compared with open site may also reflect the impact of management intervention such as seed spreading, soil improvement and water harvesting, besides using the direct fencing system. This agree with (Doten,1951) who recognized that, the possibility of rangeland improvement is depending on using native or foreign plants from similar climates to be reseeded.

Table(7): Average Biomass Production per gram meter squares (g/m²) in two seasons

Blocks	Season 2012	Season 2013	Average Biomass Production gram meter squares (g/m²)
Block (A)	122.4	133.9	128.1
Block (B)	131.5	148.1	139.3
Block (C)	144.2	164.6	154.4
Block (D)	111.8	98.6	105.2

According to the results in table (5) the average weight of biomass production in the closed site was 140.8 gm², while it was 105.2gm² in open rangeland.

The variation in biomass production could be attributed to the impact of closed or fencing on the growth performance or the protected plants(Stoddar *el at,* 1975) state that, native range plants don not always provide the maximum usable forage of which they are capable. Further more, heavy and indiscriminate grazing or other factors may have so modified the natural vegetation that only low, value species remain. In other cases, bush fires occurring on rangeland where herbaceous plants are few in number leave an area without sufficient vegetative cover to protect it from erosion. For these and other reasons improvement practices have been developed to increase forage production without waiting for nature to restore the area to it is potential. The variation in biomass production could be also attributed to the environmental factors. (Elham, 1988) stated that, the production of grazing is determined by environmental factors. Environmental factors include climatic factors such as rain-fall, temperature, radiation and humidity etc. fencing the rangeland can increase the density of plant which leads to increase the humidity in the site. (Stoddart *et al,*1975) stated that, humidity is an important factor determining the effectiveness of moisture for plant growth.

Conclusion:

The study concluded that, direct rangeland fencing can improve rangeland condition in term of biomass productivity, plant diversity, increased plants density p/m² and increased vegetation cover. Also the study concluded that, the direct fencing with seed broadcasting were the best method for improve degraded rangeland in semi-arid regions.

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