SAVANNAH JOURNAL OF AGRICULTURE
ISSN 1597 - 9377

Volume 11(1); June, 2016

VEGATATION OF ZANGE GRAZING RESERVE, GOMBE STATE, NIGERIA

* Sadiq M.S[1] Tijjani H.U[1], Dikko I.M[1], Alkali H.A[1], I.R.Muhammad[2] and M.Baba[2]
1. Department of Animal Science, Faculty of Agriculture, federal University, Kashere
2. Department of Animal Science, Faculty of Agriculture, Bayero University, Kano
*E-mail: msskumo@gmail.com

ABSTRACT
The study was conducted to examine the forage species botanical composition, of Zange grazing reserve in Dukku local Government Area of Gombe state (latitude 10^0 28' to 12^0 49'N and longitude 10^0 05' to 12^0 06'E.). Grazing resource assessments was conducted to identify plant species within the pasture in 15 different locations within the reserve. Five (5) sampling blocks in the North, South, East, West and Central of the reserve each of 100m x 100m was demarcated. These sampling blocks were considered as site replication within the reserve. Sampling commenced in July and thereafter, at 30-days intervals until termination of the trail. On each of sampling dates, five transects were determined in each block. On each transect, at 20 metre interval, a 50cm x 50cm open-ended quadrat was placed to estimate pasture species composition (Muhammad *et al* 2005). In each of the block, a belt transect of 50 m x 4 m was randomly laid out and used for woody vegetation assessment.Twenty two (22) grass species were recorded, all of them were found to be ingested by livestock. Two of the grasses *Andropogan gayanus, Hyparrhenia rafa* ware tall grasses. Nine (9) Common legumes were encounted, those cherish by animals were *Stylosanthes, Alysicapus, Chamaecrista mimosoides* while those avoided by animals was *Senna obtusifolia* (Tafasa). Thirteen (13) forbs were also identified. Woody species identified included nineteen (19) shrubs, Three (3) were found to be frequently browsed, Three (3) were found to be rarely browse, and two (2) were found to be rejected by livestock (*Stychnus innocua* (Namijin kokirmo),*Combretum ghasalense)*. Twenty six (26) trees species were identified, five (5) were found to be frequently browse. There were Twenty eight (28) dominant forage species recorded during the survey, other 61 contributed less than 0.6%. On relative proportion trees had highest with 27.65% then followed by grasses 23.40%, the vegetation is endangered by encroachment of farmland and firewood. It is therefore recommended rapid reseeding of the reserve using multipurpose trees, fertilization and sowing of promise forages, enforcement of policy dealing with forest utilization to avoid over use is also recommended.
Keywords: *Grazing reserve, forage resources, botanical composition*

INTRODUCTION

The savanna zone of West Africa is a suitable environment for industrious livestock production but the low yields of the indigenous fodder species from native rangelands and seasonal bush fires make year round fodder availability one of the factors limiting livestock production. Most of these rangeland is available are the savannah zones of the country and large proportion of it is deteriorating because of overgrazing, environmental degradation and effect of Global warming. (Kallah and Muhammad, 2012). The situation is more brutal during the late dry season and the early part of the rainy season (Muhammad *et al* 2005). The problem of feed scarcity necessitated the practice of nomadic system of animal production (Kallah and Muhammad, 2012). Experience has also shown that, movements of the pastoralist from one grazing reserve to another leads to frequent bloody clashes between arable crop farmers and the pastoralist (Gefu, 2008). There is also the problem of competition for land arising from rapid urbanization and numerous deliberate administrative actions like building of dams, roads and industries (Hashimu, 2009). Zange grazing reserve is not an exception to these problems as such this study examined flora composition of Zange grazing reserve with a view to assessing its potentials for pastoralism. The flora of composition of a piece of vegetation deserves serious attention since it gives information on the nature of products and services which the ecosystem can provide both in time and in space.

MATERIAL AND METHODS

The research was conducted in Zange part of Wawa /Zange Grazing Reserve in Dukku local Govt Area of Gombe state having a total hectare of 35,000 ha. The grazing reserve lies on latitude 10^{0} 28' to 12^{0} 49'N and longitude 10^{0} 05' to 12^{0} 06'E. (Okereke *et al*. 1985).

Determination of botanical composition and forage yield

A reconnaissance survey was conducted to identify plant species within the pasture sward; thus were coded. Five (5) sampling blocks in the North, South, East, West and Central of the reserve each of 100m x 100m was demarcated. These sampling blocks were considered as site replication within the reserve. Sampling commenced in July and thereafter, at 30-days intervals until termination of the trail. On each of sampling dates, five transects were determined in each block. On each transect, at 20 metre interval, a 50cm x 50cm open-ended quadrat was placed to estimate pasture species composition (Muhammad *et al* 2005). In each of the block, a belt transect of 50 m x 4 m was randomly laid out and used for woody vegetation assessment.

Statistical analysis

The data collected were managed using the Microsoft Excel 2007 package and analyzed using simple Descriptive statistics.

RESULTS

Common Grasses at Zange grazing reserve

Common grasses encounter at Zange grazing reserve is presented in Table 1. There were 22 grass species, all of them were found to be ingested by livestock. Two of the grasses *Andropogan gayanus, Hyparrhenia rafa* ware tall grasses. These grasses grow along streams and isolated patches in the surrounding farming areas of the reserve. *Dactylotenium aegyticum* was observed growing in the degraded areas with open soil surface especially previously camped area.

Table 1 Common Grasses at Wawa Zange grazing reserve

Genus	Species	Commmon Name	Local Name
Dactylotenium	*aegytium*	Crowfoot-grass	Gude-Gude
Pennisetum	*pedicellatum*	Annual kyasuwa	Kyasuwa
Sporobulus	*festibus*	Fairy drop seed	Lalle biri
Setaria	*pallidefusa*	Cottail grass	Geron tsuntsu
Setaria	*longiseta*	Fox tail	NA
Eragroris	*ciliaris*	Love grass	Buburwa
Brachiaria	*deflexa*	Signal grass	Takoure
Chloris	*pilosa*	Rhode grass	Kafar fakara
Digitaria	*horizontalis*	Crabs grass	Harkiya
Elusine	*indica*	Yard grass	Tuji
Sporobulus	*pyramidalis*	Phyramid drop seed	Tsintsiya
Cenchrus	*ciliaris*	Bar grass	Karangiya
Andropogan	*gayanus*	Gamba grass	Gamba
Hyparrhenia	*rufa*	Thatching grass	Shumci
Cynadon	*dactylon*	Bahama grass	Kiri-kiri
Brachiaria	*lata*	Crepping signal grass	Shebu
Panicum	*rapens*	Torpedo grass	Tafartso
Brachiaria	*dystochyphyla*	NA	Garaji
Brachiaria	*jubata*	Stapf grass	Burgu
Grewia	*villosa*	Donkey berries	Gwiwa Rakumi
Pennisetum	*purpureum*	NA	Yanbana
Chloris	*gayana*	Finger grass	Kanarin doki

.NA= Not available

Common legumes at Zange grazing reserve

Common legumes encounter at Zange grazing reserve is presented in Table 2. There were Nine (9) legumes species. Seven (7) species were observed to be grazed by the animals. Legumes such as *Stylosanthes, Alysicapus, Chamaecrista mimosoides* are valuable feed materials. Two of the species were however found to be avoided by livestock. Those avoided by animals were *Senna obtusifolia* (Tafasa) and *Isoberlinia doka* (Doka).

Table 2 Common Legumes at Zange grazing reserve,Gombe

Genus	Species	Common Name	Local Name
Stylosanthes	*hamata*	cook stylo	Sitalo
Senna	*obtusifolia*	Tafasa	Tafasa
Alysicapus	*viginalis*	Buffalo clove	Gadegi
Chamaecrista	*mimosoides*	Japanes tea	GadeginDoki
Vigna	*recemosa*	NA	NA
Indigofera	*pulchera*	NA	Bakin bunu
Isoberlinia	*Doka*	Doka	Doka
Afzelia	*africana*	Pod mahogany	Kawo
Crotalaria	*Retusa*	Wedge leaf	Gyadan Awaki

NA= not available

Common Forbs at Zange grazing reserve

Common Forbs encounter at Zange grazing reserve is presented in Table 3 There were Thirteen (13) forbs species. Twelve (12) of them were found to be ingested by livestock. One (1) specie *Amorphophallus abyssinicus (*kunne jaki) was found to be avoided by livestock. Moreover, overgrazing tends to reduce perennial grassland vegetation types and allow invasion by annual forbs and grasses.

Table 3 .Common forbs at Zange grazing reserve, Gombe

Genus	Species	Comon Name	Local Name
Amorphophallus	*abyssinicus*	NA	Kunne jaki
Hypatis	*suaveolens*	Pig nut	Busuru
Cassia	*mimosoides*	Artillery plant	Bagaruwa kasa
Mimosa	*pudica*	Sensitive Plant	Dan kunya
Tridax	*procumbens*	Coat button	Harawan zomo
Sida	*cordifolia*	Bala	Hankufa
Aspilia	*africana*	Haemorrhage plant	Kandi
Stylochiton	*loncifollius*	Wild stylo	Makori
Sida	*acuta*	Wire weed	Miyar tsanya
Borreria	*radiate*	NA	Feshe
Urginea	*spp*	NA	NA
Mitracarpus	*villosus*	NA	Gadudal
Alternanthera	*pungens*	Khaki weed	Yarkure

NA= Not available

Common Shrubs at Zange grazing reserve

Common shrubs encounter at Zange grazing reserve is presented in Table 4. There were Nineteen (19) numbers of shrubs, Three (3) were found to be frequently browsed, Three (3) were found to be rarely browse, Eleven (11) of them were found to be occasionally browsed, and two (2) were found to be rejected by livestock (*Stychnus innocua* (Namijin kokirmo),*Combretum ghasalense).*

Table 4 .Common shrubs at Wawa Zange grazing reserve, Gombe

Genus	Species	Status	Commmon Name	Local Name
Comiphora	*africana*	OB	NA	Dashi,Tubule
Combretum	*glutinosum*	OB	NA	Wuyan damo
Guiera	*senegalensis*	OB	NA	Sabara
Leptadenia	*americana*	RB	Sea side plum	Tsada
Cochlosperum	*tincortum*	FB	NA	Rawaya
Acacia	*nilotica*	RB	Egyptain mimosa	Bagaruwa
Piliostigma	*reticulatum*	OB	Kalgo	Kalgo
Dichrostachys	*cinerea*	FB	Christmas bush	Dundu
Feretia	*conchiodes*	FB	NA	Lallen suri
Cissus	*gracilis*	OB	NA	Yakuwar maharba
Strychnus	*spinosa*	OB	Kaffir orange	Kokirmo
Gardenia	*aqulla*	OB	Gaude	Gaude
Asperagus	*africana*	OB	NA	Tarko bera
Pavetta	*corymbosa*	RB	NA	Gadu
Entada	*africana*	OB	NA	Tawatsa
Strychnus	*innocua*	NB	NA	Namijin kokirmo
Combretum	*ghasalense*	NB	NA	NA
Acacia	*sleberiana*	OB	NA	farar kaya
Allium	*ascalonicum*	OB	NA	`Runfu

FB= Frequently browse,RB= rarely browse,OB= occationally browse, NA= Not available

Common Trees at Zange grazing reserve

Common Trees encounter at Zange grazing reserve is presented in Table 5. There were Twenty six (26) trees species, Five (5) were found to be frequently browse, but two of the species had to be lopped to the livestock by herder. Fourteen (14) of them were found to be rarely browse, Four (4) were found to be occasionally browse and one was found to be rejected by livestock (*Detarium microcarpa* (Taura).

Table 5. Common Trees to grazing ruminants at Zange grazing reserve, Gombe

Genus	Species	Status	Common Name	Local Name
Anogeissus	*liecarfus*	RB	Chewin stick tree	Marke
Combretum	*nagricans*	RB	NA	Ciriri
Combretum	*benerianum*	RB	NA	NA
Detarium	*microcarpum*	NB	NA	Taura
Azadirachta	*indica*	RB	Neem	Dogonyaro
Pakia	*biglolosa*	OB	NA	Dorawa
Ziziphus	*mauritinia*	RB	Ber tree	Magarya
Ficus	*sycomorus*	LOPPED	Baure	Bore
Tamarindus	*indica*	RB	Tamarind	Tsamiya
Balanites	*aegyptiaca*	RB	Desert date	Aduwa
Khaya	*senegalensis*	RB	Dry zone mahogany	Madaci
Prosopis	*africana*	RB	Kirya	Kirya
Acacia	*albida*	RB	Gawo	Gawo
Lannea	*schiperi*	OB	Faru	Faru
Terminalis	*avicenniodes*	RB	Baushe	Baushe
Vitex	*doniana*	RB	Dinya	Dinya
Vitellaria	*paradoxa*	RB	NA	Kade
Daniellia	*oliveri*	LOPPED	Copaiba	Maje
Sterculia	*setegera*	FB	NA	Kukkuki
Boswellia	*dalzeilia*	FB	NA	Ararrabi
Bombax	*costatum*	FB	Cotton tree	Gurjiya
Adenedolichos	*paniculatus*	OB	NA	Kwiwa
Lonchocarpus	*laxiflora*	OB	NA	NA
Ptetecarpus	*erinaceus*	FB	NA	Madobiya
Monotes	*kerstingii*	FB	NA	Fara rura
Ziziphus	*spinachristi*	RB	Christ,s thorn	Kurna

.FB= Frequently Browse,RB= Rarely Browse,OB= Occationally Browse,NB= Not Browse, NA= Not available

Relative proportion of forage resources at Wawa Zange grazing reserve

In this study, relative proportions of sources of fodder to grazing ruminant at Zange grazing reserve were identified Table (6). The vegetation had three layers: ground cover, shrubs and trees. The ground cover was divided into grasses and legumes. Trees had the highest frequency and percentage (26.0% and 27.7%), followed by grasses with frequency and percentage of 22.0% and 23.4%, respectively. Legumes had less with frequency and percentage of (9.0% and 9.61%).

Table 6. Relative proportion of source fodder to grazing ruminants at Zange grazing reserve, Gombe

Variable	Frequency	Percentage
Grass	22	23.40%
Legume	9	9.60%
Forbs	14	14.89%
Shrubs	19	20.21%
Trees	26	27.65%

The seasonal trend of vegetation cover (%) at Zange grazing reserve

Figure (1) presents the seasonal trend of vegetation cover (%) at the Zange grazing reserve, Gombe. Vegetation cover (%) increased from early wet season (EWS) with the onset of rains through late wet season (LWS) and had its peak at early dry season (EDS) with least at late dry season (LDS).

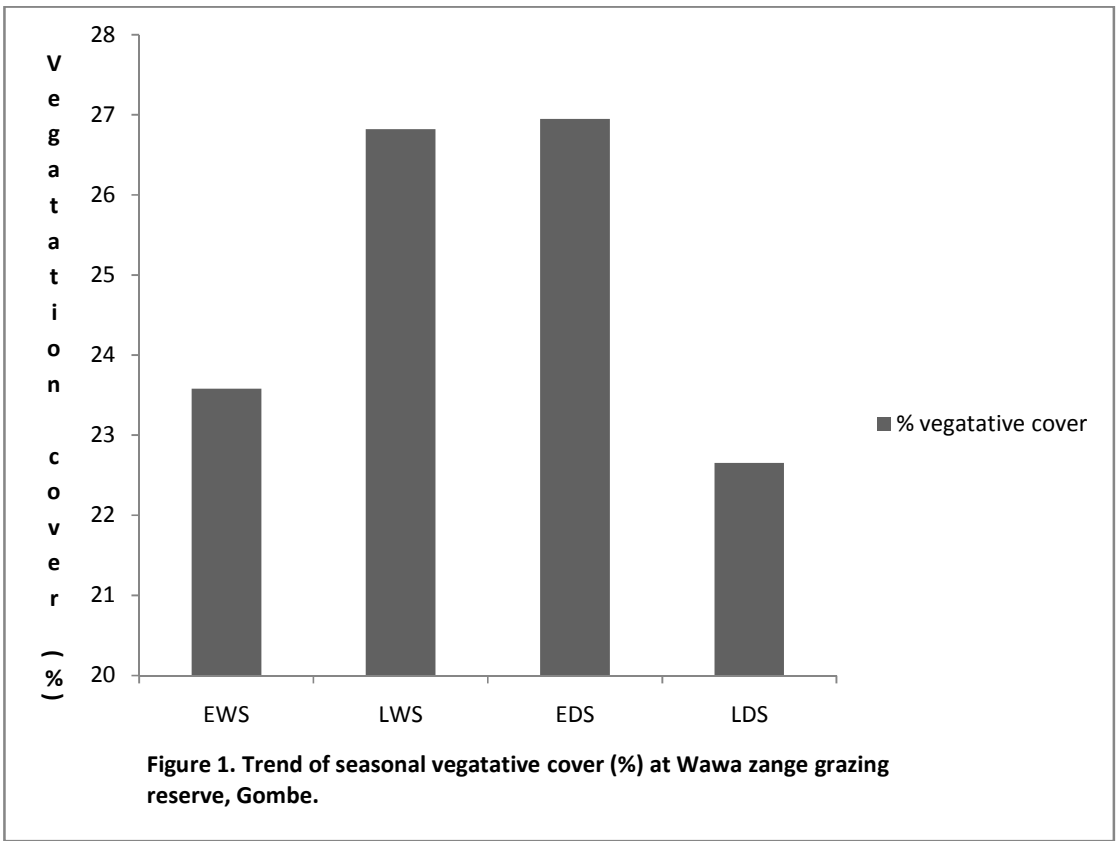

Figure 1. Trend of seasonal vegatative cover (%) at Wawa zange grazing reserve, Gombe.

Discussion

Forage specie composition at Zange grazing reserve

The desire of every stocker is encountering a pasture with a composition dominated by edible forage specie. In the present study, 22 grass species were recorded with dominant species as *pennisetum pedicellatum* followed by *Sprobolus festivus*. The result obtained was in agreement with report by Kallah (2004). However earlier report by Okereke *et al.* (1985) identified 13 species found along stream bed, the present study covered a wider vegetation zone comprising both upland and mesic lowland areas while findings Okereke *et al.* (1985) was based on study is conducted along stream bed. In the present study, 9 legumes species were encountered and 77% of the species observed were valuable grazing material, Species encountered that were avoided by livestock represented 22.22% of the legumes which were *Senna obtusifolia* (Tafasa) and *Isoberlinia doka* (Doka). These plant species are in most cases considered noxious and hardly contribute to the feed value of grazing areas. However, the proportion is still within management. Common Forbs encounter at Zange grazing reserve indicated 92.30% of the forbs species are edible material. These thus, add to the feed value of the feed resource. Only one (1) specie *Amorphophallus abyssinicus* (kunne jaki) which comprised of 7.69% was found to be avoided by livestock. Out of the 19 shrubs encountered, 15.78% each were found to be used as decreaser browse or increaser browses, 57.8% of them are only considered as browse under critical conditions when there the animals are challenged with feed scarcity. Two were however considered to be rejected by livestock irrespective of the situation (*Stychnus innocua* (Namijin kokirmo),*Combretum ghasalense).*

The tree species encountered were the common ones reported for the savanna environment (Agishi and Shehu, 2004), (Kallah, 2004). Amongst the browse plants 19.2% were considered decreaser plant which the animals ingest at will but two of the species had to be lopped to the livestock by herder. Other species 54% are browses that could be considered as increasers as they are used only on rear situations. Also upon critical situation 15.4% were occasionally browse while one was found to be rejected by livestock (*Detarium microcarpa* (Taura).Finding from this study revealed low growing forage resources constituted 49%, further fulfilling the savanna characteristics with the scattered 21% shrubs and 29% trees with provide feed to animals at one season or the other.

Conclusion and recommendation

Increasing human and animal population in their drive to satisfy their daily needs for wood, food and fodder, have continuously disturbed the floral composition of Zange grazing reserve. A total of 22 grass species, 9 legume and 13 forbs species were identified. Woody species identified included 19 shrubs and 26 Tree species. There 28 dominant forage species recorded during the survey other 61 contributed less than 0.6%. On relative proportion trees had highest with 27.65% then followed by grasses 23.40% It is recommended that evaluating of botanical composition should be carried out at a different time of the year in order to come up with more accurate information on effect of seasonal changes on the productivity of herbage. This will provide information necessary to determine the correct number of animals that could optimally be stocked on the grazing land and other information that may help in determining the suitability of the forages to grazing animals. The grazing land should be renovated with high yielding grasses and legumes and intentionally fertilized and not left alone with the accidental fertilization from the manure of farm animals which is not enough.

REFERENCES

Gefu, J.O. (2008). Challenges and Prospects of Pastoral and Livestock Production in Nigeria. In: Gefu, J.O; B.I Clement.; J.P. Alawa; B.Maisamari.(Eds). The future Transhumance in West and Central Africa: *Strategies, dynamics, conflicts and interventions.* Proceedings of the International Conference on the Future of Transhumance Pastoralism in West and Central Africa held in Abuja, Nigeria, November 21 – 25, 2006.

Hashimu, B. (2009). Livestock population and Forage Resources of Giron Masa Grazing Reserve in Kebbi State Nigeria. Unpublished MSc. Thesis, Submitted to the Department of Animal Science, Usmanu Danfodiyo University, Sokoto-Nigeria. 72pp.

Herlocker, M., B.Walker., and I. Noy-Meir. (1999). Opportunistic management for rangeland at equilibrium. *Journal of Range Management* **42**:266-274.

Kallah, M.S. (2004). Field Methods for Evaluating Primary Productivity of Pasture. In: Gefu, J.O. and Amodu, J.T.(eds). Forage Production and Management in Nigeria. A Training Manual. National Animal Production Research Institute, Shika, A.B.U., Zaria.

Kallah,M.S. and Muhammad, I.R (2012).Need for Establishment of Grazing Reserve and stock route Commission in Nigeria. A Position Paper to senate of Federal Republic of Nigeria At the public hearing of bill for an act for the Establishment, presentation and Control of national Grazing Reserve and stock Routes and the Creation of National Grazing Reserve Commission 2012 at Abuja 7 may 2012.

Muhammad, I. R., B. Abdullahi., A. K. Mohammed., R.J.Tanko., M.S. Kallah and J.P. Alawa. (2005). Influence of Irrigation Intervals on dry matter yields, Concentration of Crude Protein, Calcium and Phosphorus in *Lablab,Purpureum* and *Sorghum almum* fodder in the Sudan Savannah Zone of Nigeria In *Nigerian Journal of Animal Production.*. held in Kano, Nigeria, 2005 . (32) 1&2.pp 280-286.

Okereke, S. N., Samviri. S. T., K.Santhirasegaram (1985). The vegetation of Wawa/Zange grazing reserve and its utilization during wet season.A paper presented at a comference on grazing development, BASIRDA, Bauchi, Nigeria November, 1985