Biometric Study of Bunaji Cattle Reared in Plateau and Nasarawa State of the North Central Nigeria.

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Abstract

Six primary biometric traits: Body length (BL), Face length (FL), Tail length (TL), Height at withers (HW), Ear length (EL) and Horn length (HL) were taken from a total of Two hundred (200) Bunaji cattle of both sexes of equal number (100 cattle) in Nasarawa and (100 cattle) in Plateau State of North Central Nigeria. The cattle used were between the ages ranged of 2-3 years. The age of the cattle was estimated by counting the number of permanent incisors that had erupted on the lower jaw of the mouth following the standard procedure.

The result of the standard deviation and coefficient of variation of biometric traits of Bunaji cattle reared in Plateau and Nasarawa State are Body length (121.27, 3.08), Face length (47.80, 4.96), Tail length (85.80, 8.38), Height at withers (125.47, 2.79), Ear length (20.40, 6.08), Horn length (21.47, 4.61) Plateau State] and Body length (118.47, 4.12), Face length (41.40, 5.43), Tail length (94.93, 11.48), Height at withers (115.53, 5.89), Ear length (22.20, 8.69), Horn length (19.33, 14.17) Nasarawa State] respectively. It was observed that all the biometric traits measured were significant (P < 0.05) for the two locations except the ear length which was not significant (p < 0.05). The result of body length, face length, height at withers and horn length of Bunaji cattle reared in Plateau State was superior (p < 0.05) to those of Nasarawa State. Although the result of the tail length of Bunaji cattle reared in Nasarawa State was observed to be higher (p < 0.05) than those reared in Plateau State Nigeria while the result of ear length of the two location was not significantly (p < 0.05) different. The result so obtained in this present study on biometric traits can be exploited for selection and breeding programme in Bunaji cattle.

Keywords: Biometric study; Bunaji cattle; Plateau; Nasarawa; Nigeria

Biometric Study of Bunaji Cattle Reared in Plateau and Nasarawa State of the North Central Nigeria.

384

Introduction

Linear body measurements have been used to evaluate growth performance and characterize breeds of farm animals (Ogungbayi., *et al*. 2003). In addition, the selection of body measurements which have strong genetic correlation with body weight could be a useful selection aid because of the opportunity of indirect selection for weight (Magnabosco., et al. 2002). This is especially important when scales are not available, a relatively common condition among Nigerian herdsmen. Apart from this, linear body measurements enable the breeder to understand the interrelationship between the body parameters. This is useful in predicting the genetic changes that could result from selecting one of the variables on another.

Cattle are multi-functional animals that played significant roles in the economy and nutrition of large and marginal farmers in Nigeria. Cattle rearing is an enterprise that had been practiced by a large section of the population in rural areas. Cattle can efficiently survive on available shrubs and leaves from trees in harsh environment of low fertility lands where no other crop can be grown. Apart from providing meat, cattle plays a vital roles by providing milk, fibre, hair, manure and a major source of income especially for rural people.

Additionally, cattle's' are useful in carrying out other functions such as being slaughtered for funerals and as source of security to farmers (Nsoso., *et al*. 2003). Tropical cattle yet to be improved with regard to production performance parameters for higher meat yields under stressful tropical conditions such as low quality nutrient feed, a tropical climate, diseases and parasites. Proper measure of traits on farm and on station is often very difficult. This is as a result of unavailability of weighing scale especially in the rural areas where most of the animals are located (Adeyinka and Mohammed, 2006). It is virtually not possible to get correct measurement of this vital trait (Adeyinka and Mohammed, 2006).

The body weight of cattle is important for a number of reasons, it related to breeding (selection), feeding and health care. However this fundamental knowledge is often unavailable to those working with cattle in the small scale-farming sector, due to unavailability of scales. Hence, farmers have to rely on questionable estimates of the body weight of their cattle, leading to inaccuracies in decision-making and husbandry. Therefore the present study evaluate the biometric study of Bunaji cattle reared in Plateau and Nasarawa State of North Central Nigeria.

Materials and Methods

Study location

This study was carried out in Nasarawa and Plateau State, on the North Central Nigeria. Nasarawa State falls within the Guinea Savanna agro ecological zone, and is found between latitudes 7º52 N and 8º56 N and longitudes 7º25 E and 9º37 E respectively. It has two distinct seasons. The wet season lasts from about the beginning of May and ends in October. The dry season is experienced between November and April. Annual rainfall figures range from 1100 to 2000 mm. The mean monthly temperatures in the State range between 20 and 34ºC, with the hottest months being March/April and the coolest months being December/January (Lyam, 2000).

Plateau State is located in Nigeria's middle belt with an area of 26,899 km^2, the State has an estimated population of about three million people. It is located between Latitude 08° 24'N and Longitude 08°32' and 10°38' E. The altitude ranges from around 1,200m (about 4000 feet) to a peak of 1,829m above sea level. The state is situated in the tropical zone of Nigeria with an average temperature of between 13 and 22°C. Harmattan winds cause the coldest weather between December and February. The warmest temperatures usually occur in the dry season months of March and April. The mean annual rainfall varies between 131.75cm (52 inches) in the southern part to 146 cm (57 inches) on the Plateau (NIMET, 2017). The highest rainfall is recorded during the wet season months of July and August respectively.

Biometric Study of Bunaji Cattle Reared in Plateau and Nasarawa State of the North Central Nigeria.

385

Experimental animals and Data collection

Data were obtained from a total of Two hundred (200) Bunaji cattle of both sexes of equal number (100 cattle) in Nasarawa and (100 cattle) in Plateau State of North Central Nigeria. The cattle were selected in their breeding tracts in a certain herds in Lafia, Nasarawa State and Bokkos in Plateau State, North central Nigeria. The cattle used were between the age ranged of 2-3 years. The age of the cattle was estimated by counting the number of permanent incisors that had erupted on the lower jaw of the mouth as described by Matika., *et al.* (1992).

Parameters measured

Six primary biometric traits: Body length (BL) was measured as the distance between the points of shoulder to the pin bone, Face length (FL) was measured as the distance between the muzzle base and the fore head, Tail length (TL) was taken as the distance from the base of the tail (point of attachment to the body) to the tip of the tail, Height at withers (HW) was taken as the vertical distance from the ground while the animal was standing on a fixed position to the highest point of the mane or withers, Ear length (EL) was measured as the distance from the base of the ear to the tip of the ear and Horn length (HL) was taken as the distance from the tip of the horn to the point of curvature where it joined the skin on the head using a flexible tape as adopted by Faith., *et al.* (2016) and Yakubu (2005)

Statistical analysis

Two-tailed, two-sample t-test was used to compare the means of biometric traits (BL, FL, TL, HW, EL, HL) of the two locations (Nasarawa and Plateau State) using SPSS version 22 statistical package.

Result and Discussion

Result

The result of standard deviation and coefficient of variation was presented in table 1 for the two locations. The result of the standard deviation and coefficient of variation for biometric traits of Bunaji cattle reared in Plateau and Nasarawa State are Body length (121.27, 3.08), Face length (47.80, 4.96), Tail length (85.80, 8.38), Height at withers (125.47, 2.79), Ear length (20.40, 6.08), Horn length (21.47, 4.61) Plateau State] and Body length (118.47, 4.12), Face length (41.40, 5.43), Tail length (94.93, 11.48), Height at withers (115.53, 5.89), Ear length (22.20, 8.69), Horn length (19.33, 14.17) Nasarawa State] respectively. The result of the biometric traits of Bunaji cattle of the two locations (Nasarawa and Plateau State) was presented in table 1.

Traits	Plateau Mean ± SE	SD	CV	Nasarawa Mean ± SE	SD	CV
Body Weight	261.30 ± 4.77[a]	18.46	7.06	237.10 ± 8.05[b]	31.16	13.14
Body length	121.27 ± 0.96[a]	3.73	3.08	118.47 ± 1.26[b]	4.88	4.12
Face length	47.80 ± 0.61[a]	2.37	4.96	41.40 ± 0.84[b]	2.25	5.43
Tail length	85.80 ±1.85[b]	7.19	8.38	94.93 ± 2.82[a]	10.90	11.48
Height at withers	125.47 ± 6.90[a]	3.50	2.79	115.53 ± 1.76[b]	6.81	5.89
Ear length	20.40 ±0.32[a]	1.24	6.08	22.20 ± 1.00[a]	1.93	8.69
Horn length	21.47 ±0.26[a]	0.99	4.61	19.33 ± 0.71[b]	2.74	14.17

[ab]Means on the same rows bearing different superscripts are significantly ($p < 0.05$) different.

SE- Standard error of mean, SD- Standard deviation, CV- Coefficient of variation.

Table 1: *Body Weight and Biometric Characteristics of Bunaji Cattle reared in Plateau and Nasarawa State of the North Central Nigeria.*

From the result, it was observed that all the biometric traits measured were significant ($P < 0.05$) for the two locations except the ear length which was not significant ($p < 0.05$). The result of the body weight, body length, face length, height at withers and horn length of Bunaji cattle reared in Plateau State was superior ($p < 0.05$) to those of Nasarawa State. Although the result of the tail length of Bunaji cattle reared in Nasarawa State was observed to be higher ($p < 0.05$) than those reared in Plateau State Nigeria. The result of ear length of the two location was not significantly ($p < 0.05$) different.

Discussion

There are variations in body dimensions of farm animals according to breed type and one of the ways of differentiating breeds is to evaluate their morph structural characteristics (Metta., *et al.* 2004). Biometric measurements have been used by many authors to assess several characteristics of animals including morph structural characteristics which can be used to showcase breed differences; this is because linear body measurements are important data sources in terms of reflecting the breed standards (Yakubu., *et al.* 2010). Body measurements are also important in giving information about the morphological structure and development ability of animals, (Pesmen., *et al.* 2008).

The high coefficient of variations of some biometric measurements in the cattle reared at both Plateau and Na-sarawa State could be as a result of the influence of the environment. The significant difference ($p < 0.05$) of Body length of the Bunaji cattle reared in the two locations of this studies are in line with the report to those of Suda-nese Kenana (Aamir., *et al.* 2010) and Red Chittagong (Bhuiyan, 2007) cattle respectively.

The result of Face length, Tail length, Height at withers and Horn length of this study were in agreement with that of Kenana cattle as reported by Aamir., *et al.* (2010). The body length estimates for this present study (121.27-118.47cm) were however higher than the range of 99-105cm reported for north Bengal Gray cattle in Bangladesh (Bhuiyan, 2007). However, values reported for linear body measurement in this study also agreed with the work of Udeh., *et al.* (2011) and further established genetic differences as a source of variation in linear body measurement work.

Conclusion

The result of this findings on body length, face length, height at withers and horn length of Bunaji cattle reared in Plateau State was superior ($p < 0.05$) to those of Nasarawa State. Although the result of the tail length of Bunaji cattle reared in Nasarawa State was observed to be higher ($p < 0.05$) than those reared in Plateau State Nigeria. The result of ear length of the two location was not signifi-cantly ($p < 0.05$) different. The present findings would aid field assessment, management and conservation which can be exploited for selection and breeding programme in Bunaji cattle population.

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