QUANTITATIVE TRAITS OF INDIGENOUS BREEDS OF GOAT IN NIGERIA: A REVIEW

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ABSTRACT
The current study was aimed at reviewing some variation among quantitative traits of indigenous breeds of goat in Nigeria. Goat maintained a dominant position in producing quality product such as meat, milk, skin and hair in Nigeria. Goats constitute the largest group of small ruminant livestock in Nigeria totaling about 53.8 million and also constituting 6.2 percent of the World's goat population. The wide range of production environment in Nigeria requires an equally diverse range of genetic materials to enable substantial production. Developing breeding policies and strategies will aid in improving the genetic resources of the native breeds. Morphometric measurements are among the data needed in characterization and establishment of breed. There are about three (3) enlisted native breeds of goat indigenous to Nigeria namely: Red Sokoto, Sahel and West African Dwarf goat, which are widely distributed in the country, from desert to humid environment. A significant variations exist between the breeds in terms of body weight, body length, chest girth, wither height, horn length, tail length and other Important traits among the breed.
Key words: Breed, Quantitative traits, Genetic resources, morphometric and variation

INTRODUCTION
Livestock of different species fulfill different functions in the household economy and poor families often keep a diversity of species for this reason (Anderson, 2003). Domestic goats (*Capra hircus,* L.) are important and adaptable domesticated animals (Abdel Aziz, 2010). They provide a full range of useful products to humans including meat, milk, skin and hair. Tropical adaptation can be defined as an animal's ability to survive, grow and reproduce in the presence of endemic stressors of tropical environments (Prayaga *et al*. 2006). Quantitative genetics provides a powerful framework for studying phenotypic evolution and the evolution of adaptive genetic variation (McGuigan 2006). Maintenance of biodiversity is one of the most important current concerns of human kind, as wild species and domestic breeds and strains are disappearing at an alarming rate, and an increasing number of these require human intervention to guarantee their survival (Corrales *et al*. 2010).The diversity in gene pool and influence of varied climatic conditions have given rise to different local populations of goats which are repositories of unique genes that should be conserved for local and international future benefits (Adebambo, 2004). It is believed that various breed characteristics provide to some extent reasonable economic indicators. According to Groeneveld *et al*. (2010), identifying and understanding a unique genetic resource in a particular region and the development and proper use of the associated diversity is a global responsibility. Breed characterization has accordingly been recognized as the first approach to the sustainable use of animal genetic resource (Lanari *et al*., 2003). Domestic goat classifications have been based on varying criteria but four commonly used classification methods are: classification based on origin, utility, body size and shape. There exist about 570 breeds of goat all over the world out of which three are found in Nigeria (Aina, 2012). The Nigerian indigenous goats have been phenotypically classified into three distinct breeds. Primarily three indigenous breeds, the Sahel, Red Sokoto and West African Dwarf goats, dominate the meat-producing goat industry in Nigeria, these breeds have been classified as separate breeds according to phenotypic traits, origin, function, body size, length or height (Adu and Ngere, 1979; Ngere *et al.*, 1984).

Red Sokoto
The Red Sokoto is also known as Kano brown or maradi goat. The Red Sokoto is the predominant goat and accounts for about 70% of Nigeria's total goat population which has been estimated at 34.4

million (Ademosun, 1993, Osuhor *et al.*,1998). It is commonly found among the agro-pastoralists mainly within the sub-humid and semi-arid zones of the country (Akpa *et al.,* 2001a). Over 90% of Red Sokoto goats are managed by the pastoral Fulani (Taiwo *et al.,* 2005). The Red Sokoto goat was the source of 'Morocco leather' known in Europe from the medieval period onwards. The vast majority of this breed posses a dark brown coat, although very few may possess other coat colours as black, brown or white as a result of cross breeding (Ijomanta, 2012).

Sahel or Desert Goat

The "West African long legged, "Sahel- Fulani", the desert or Sahalian goat is found along the northern border of Nigeria, particularly Borno State. Mason (1988) uses "Sahel, which seems appropriate, as this race is distributed from Senegal to Sudan. This breed has thin appearance, narrow body and shallow chest. Both sexes are horned, about 70% with wattle, pendulous or semipendulous ears, the coat is white or dapple.

West African Dwarf

The West Africa Dwarf goats are widely distributed across the rainforest belt of southern Nigeria. They are short-legged and small bodied animals. They also present variable coat colours, ranging from black, brown, gray, pied, red and white, and sometimes combinations of these in a variety of patterns (Odubote, 1994; Mourad *et al.,* 2000; Ozoje and Mgbere, 2002). They are used almost exclusively for meat and skin production. The breed most useful peculiarities are its adaptation to the humid tropical environment and resistance to trypanosomiasis (Agyemang *et al.,* 1991).

Body Conformation Traits and Factors Affecting Them

Body Weight

According to Thiruvenkadan (2005), the knowledge of body weight of goats is important for a number of reasons; it is related to breeding (selection), feeding and health care. Body measurements are important for the prediction of live weight, carcass weight and determination of certain body conformation traits that can be taken into consideration in selecting animals for genetic improvement (Akpa *et al.,* 2006). Salako (2004) who reported that HG and BWT are environment – sensitive and therefore increase with age- Alphonsus, 2008 showed that live weight is the most important single predictor for many carcass traits and is the variable that is most important to hold constant in prediction equation which include other variables.

Some Factors Affecting Body Weight and Linear Body Measurements

Breed

The breed of the goat had significant effect on all the morphological variables. According to Sanni *et al.* (2018), the WAD goat breed had the lowest mean values for linear measurements and the highest BLI. Breed effect could be attributed to body weight differences (Alade *et al., (*2008). Gizaw *et al.* (2007) reported thatmorphological description is an essential component of breed characterization that can be used to physically identify, describe and recognize a breed.

Age

Ojedapo *et al* (2007) reported that age affected the least square means of body weight and some linear body measurements and the value obtained for all the measurements increased as the animals advanced in age. The age of goats can be assessed and the timing for different management practices can be pegged accurately to bring goats to a good and desired weight at maturity (Imasuen and Otoikhian, 2004).

Sex of Kids

Fajemilehin and Salako (2008) reported in their study that more female animals than males were available for screening and so observed that sex had an influence on body weight and body linear measurements. Giving the impression that sex is an important source of variation for body weight and body linear measurements at the two age groups (young and adult) of animals available for measurement. Al – Shorepy *et al.* (2002) found that sex effect was significant for all traits. Male kids were heavier and grow faster than female kids.

Heart Girth

Hearth girth measurement is considered because of its high heritability (Alade *et al.,* 2008), Isaac and Ibrahim, (2006) had in the result of their study that chest girth showed the highest correlation for both sexes, their report was an indication that chest girth succeeded in estimating body weight more than any of the other linear body measurement. Giving the impression that heart girth would give the best estimate for predicting live weight of Red Sokoto goats at 1-2 years of age.

Type of Birth

The type of birth such as single, twins or triplets born is known to have some influence on birth weight, body weight, and linear body measurements. Alshorepy *et al.*, (2002) found that singles were heavier than twins from birth weight, 30 days weight and weaning weight and grew faster from 30 to 90 days of age. The kids born as twins had lower birth weights and slower growth rate when compared with those born as single.

Table 1: Some of the measured characteristics traits of indigenous breeds of goat

PARAMETERS	RED SOKOTO	SAHEL	WAD	SOURCE
Body Weight(Kg)	18.09	22.91	14.39-18.93	Sanni *et a*l., 2018; Rotimi *et al*.,2017; Adamu *et al*., 2020a
Body Length	51.63	23.88	48.22-50.25	Adamu *et al*., 2020; Yakubu *et al*., 2010
Chest Girth	25.28	25.67	57.44-59.21	Rotimi *et al*.,2017; Adamu *et a*l., 2020b
Wither Height	61.07	24.55	37.66-41.39	Sanni *et al*., 2018; Adamu *et al*., 2020; Rotimi *et al*.,2017
Head Length			11.66-13.63	Rotimi *et al*.,2017;
Neck Length	24.15		12.33-15.18	Okpeku *et al*., 2011; Rotimi *et a*l.,2017;
Horn Length	13.07	14.18	4.94-7.09	Yakubu *et al*., 2010; Traore *et al*., 2008
Tail Length	13.52		6.67-8.40	Yakubu *et al*., 2010
Kidding Interval (Month)	6.9±0.70	10.6		Alphonsus *et al*., 2010; Mopaté *et al.*, 2014
Mating Weight (Kg)	20.4±0.43			Alphonsus *et al*., 2010
Kidding Weight(Kg)	24.7±0.39	20.3±3.5		Alphonsus *et al*., 2010; Youssouf *et al.*, 2014

Conclusion

In relation to the increase of human population which results in high demand of animal products such as meat, milk, skin and hair animal, genetic resources (AnGR) need to be conserved and improved. There is need for improvement in our indigenous breeds to produce above their standard and carter for the teeming population. Morphological differences exist among different breeds and goat populations worldwide and detailed characterization and breed inventories are important in the conservation of *caprine* genetic resources.

Recommendation

The observed morphological variations could serve as a surrogate for genetic variations of native breeds. Maintaining this polymorphism is pertinent if the goal is to continue to improve the performance of animals in response to their varying environmental conditions. Further research is necessary in various ecological zones in the country to provide a comprehensive study and data on the morphometric traits of small ruminant animals.

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