A MORPHOMETRIC STUDY OF THE CRANIOFACIAL REGION OF BASIC WHITE AND BASIC BROWN SAHEL GOAT ECOTYPES IN NIGERIA

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ABSTRACT

This study involved the measurements of some parameters in the craniofacial regions of the basically white and the basically brown Sahel goat ecotypes in Nigeria. The mean±SD weights of their heads were 1.13±0.45kg and 1.19±0.19kg respectively. The lengths ofrima oris were 11.19=1:1.09cm for the basic white and 10.80±0.75cm for the basic brown ecotype. The palpebral fissure lengths were asymmetrical in both ecotypes. Similar asymmetries were observed in the lengths of external nares of both ecotypes with the right being insignificantly longer than the left (2.59±0.30cm, 2.59±0.32cm for the white and 2.54±0.21cm, 2.58±0.20cm for the brown ecotypes). The basic white ecotypes had longer and pendulous external ears (15.86=1.79cm and 16.46±1.20cm) and wider orbital rim circumferences (10.76±1.76cm and 10.74±1.52cm) with significant differences ($p<0.05$) than the basic brown ecotypes with 15.25±0.94cm andl5.07±1.67cmlengths of external ears and 9.16±0.43cm and 9.12±0.44cm orbital rim circumferences respectively.
The findings here will help in the selection procedures of these ecotypes of goats on the farm for breeding purposes into pure-lines of the Sahel, Kano brown or Red Sokoto (Maradi) goat breeds. It will also provide information for the comparative anatomy of the basically white and the basically brown ecotypes with other breeds (Red Sokoto and Kano Brown) of goats.

Key words: Morphometric, Craniofacial parameters, Basic white, Basic brown, Sahel goat.

INTRODUCTION

The Sahel breed of goat found predominantly in the extreme north-eastern Nigeria is one of the major breeds of goat in the country (Kwari, *et* a/. 2004; Yahaya and Onwuka, 1996; Gall, 1996; Devendra and McLeroy, 1988). Although their population is not known, probably because of the nature of the owners being normads, they constitute a large proportion of goat population in Nigeria and are gaining popularity among the people of this region for meat and milk production (Gall, 1996; Zakari, *et al.* 1988). This breed is found to be tolerant to the extreme heat of the desert and the Sahelian areas and can easily adapt to such environmental conditions. The reason is due to the small size nature (43cm-45cm from withers), large surface area to body weight ratio, ability to conserve water, having limited subcutaneous fat cover as well as the nature of their coats. The descriptive anatomy of a structure or organ is very important in regional anatomy (Olopade and Onwuka, 2004, 2003, 2002; Gall, 1996; Pagot, 1992; Devendra and Mcleroy, 1982; Epstein, 1971; Devendra and Bums, 1970), as well as needs regular reviewing considering the dynamics of animal movements in the Sahelian ecosystem (Kwari *et al.,* 2004). This study was aimed at providing morphometric parameters in craniofacial region of the basic white and basic brown predominant Sahel ecotypes of goats.

MATERIAL AND METHOD

A total of 44 goats comprising 24 basically white and 20 basically brown Sahel goat ecotypes were used in this study. The animals were obtained from Maiduguri and its environs in north-eastern Nigeria. They were first selected at ante-mortem examination in the abattoir and the slaughter slabs. Those found clinically sound were aged using the dentition method and weighed before being slaughtered by the severing of the throats and the jugular vein and decapitation. Heads were collected and weighed in the laboratory using a "Salter highline III" measuring scale. A total of 8 parameters were measured on the head using a thread and meter rule (Fig. 1). The parameters measured are described below;

Weight of the animal (WOA).

Weight of the head (WOH).

Length ofrima oris (LRO): From the left lateral commissure of the mouth to
the right lateral commissure of the mouth. Lengths of both palpebral fissures (PFL): From the left lateral canthus of the eye to the median canthus and from the right lateral canthus of the eye to the median canthus.

Lengths of the external nares (LEN): From the left nasal fissure to the nasal septum and from the right nasal fissure to the nasal septum. Distance between the median canthi (DMC): From the left median canthus of the eye to the right median canthus. Ear lengths (AUR): From the base of the ear to its apex. Orbital circumferences (OBR): The eyeballs were enucleated and measurement was taken round the rim of the orbit. Distance between the mouth and the intercomual protuberance (DIC): From the philtrum to the intercomual protuberance. Distance between the mouth and the external occipital protuberance (DOC): From the philtrum to the external occipital protuberance.

RESULTS AND DISCUSSIONS

The comparative craniofacial study of the basic white and the basic brown Sahel goat ecotypes suggest a close morphological relationship with each other and the westward breeds (Kano brown and Red Sokoto) of goats in Nigeria. This is probably due to the fact that the brown ecotype must have evolved from a cross breeding between the Bomo white and the Kano brown or with the Red Sokoto (maradi) breeds. Both ecotypes were long legged and weighed 13.67±2.44kg and 16.29±3.18kg respectively with a significant difference ($p<0.05$) (Table 1). The body weights were found to below the ranges of the body weights of 18.00±0.00kg for Red Sokoto goats and those Sahel goats described by Olopade and Onwuka, (2003); Gall, (1996). However the basic white ecotypes had similar head weights (1.13±0.45kg) to the 1.19±0.19kg of the basic brown ecotype which is insignificant. This is also suggestive of the fact that the brown ecotype may have resulted from a cross breeding with Red Sokoto goat whose head weight is less(0.90±0.16kg), reported by Olopade and Onwuka, (2002). The length ofrima oris (LRO) of 11.19±1.09cm obtained in the basic white ecotype was higher than that obtained in the basic brown (10.80±0.75). The value is also greater than those
obtained from West African Dwarf goats with 9.93±1.75 reported by Olopade and Onwuka, (2004). This parameter also showed a significant difference in those basic white goats of age 2years and above (Table 3) and showed sex variation. The 10 palpebral fissure lengths showed insignificant difference between the ecotypes however slight asymmetries were observed in both ecotypes. Asymmetry was also evident in all paired parameters such as lengths of external nares, lengths of external ear and orbital rim circumferences. This was in agreement with reports of Sisson and Grossman, (1975); Olopade and Onwuka, (2004) that asymmetries may exist between paired organs. Although paired parameters exhibit close relationship to each other, the basic white ecotype had longer and pendulous external ears of 15.86±1.79cm and 16.46±1.20cm for the left and right ears respectively, than the brown ecotype (15.25±1.94 and 15.07±1.67 respectively). This is in agreement with the findings of Gall, (1996) and is consistent with 15.5cm reported by Kwari, (2001). The orbital rim circumferences of 10.76=1=1.76cm and 10.74±1.52cm in the white ecotype were significantly greater than the 9.16±0.43cm and 9.12±0.44cm obtained for the brown ecotype. However, the values obtained for the Basic White ecotypes were similar to 10.97±0.87cm and 10.87±0.84cm obtained for the left and right orbital circumferences of the West African Dwarf goats reported by Olopade and Onwuka, (2004). The orbital rim circumferences in both male and female basic white ecotypes were observed to have significant difference between the two ecotypes studied (Table 2). This is probably influenced by the sizes of their eye balls and periorbital fat deposits. The distance from the muzzle to the intercomual protuberance in both the White and Brown ecotypes were 18.70±1.85cm andl 8.50^:2.13cm, found within similar values. The distance between the muzzle and the external occipital protuberance were 27.51±1.91cm for the basic white and 27.65±1.52cm for the basic brown ecotypes and were significantly higher than those values obtained for the Red Sokoto (maradi) goats of23.99d=1.40cm reported by Olopade Onwuka, (2003). The information provided here will however aid in the identification and selection procedures of these ecotypes on the farm and may suggest their genetic inclination for breeding purposes. It will also add to the baseline information of the Sahel breed of goat in Nigeria.

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