ISSN 0189-0514
J. Anim. Prod. Res. (2018) 30(1):269-272

National Animal Production Research Institute
Ahmadu Bello University
P.M.B 1096, Shika-Zaria,
Kaduna State, Nigeria.
Email:japr@napri.gov.ng Url:journals.napri.gov.ng

ESTIMATION OF LIVE BODY WEIGHT FROM CHEST GIRTH MEASUREMENT AND BODY CONDITION SCORES IN SAVANNAH BROWN GOATS IN ZARIA

[1]Hussaini, M., [2]Ayo, J. O., [1]Abdulrahman, M., [1]Ibrahim, M. A., [1]Wunti, Z. M., [1]Umar, I., M., [1]Salisu, M. D., [1]Hassan, R., [1]Abdullahi, M. and [1]Samuel, F. U.

[1]National Animal Production Research Institute, Ahmadu Bello University, Zaria, Nigeria
[2]Department of Veterinary Physiology, Faculty of Veterinary Medicine, A.B.U, Zaria, Nigeria

ABSTRACT

The study was conducted at Kwangila sheep and goat market, Zaria, Nigeria in order to develop predictive equations for the determination of live body weight from chest girth and body condition scores in Savannah Brown goats. Data were collected on 49 goats, aged between 1 to 3years. 42 were males and 7 were females. The mean values for body weight were 18.57 ± 2.18 kg, 14.0 ± 0.60 kg and 14.86 ± 0.64 kg for males, females and overall (males and females), respectively. Mean values for chest girth were 66.10 ± 2.10 cm, 58.50 ± 0.85 cm and 59.61 ± 0.86 cm for females, males and overall (males and females), respectively. Body condition scores were 3.0 ± 0.22, 2.7 ± 0.08 and 2.78 ± 0.08 for females, males and overall (males and females), respectively. Body weight was significantly ($p < 0.05$) correlated with chest girth ($r = 0.795$) and body condition scores ($r = 0.579$), which indicated strong relationship between these variables. Live body weights were regressed on chest girth and body condition scores, which appeared to be significantly good, especially with the chest girth. The high and positive correlations between body weight and chest girth established in this study provide information that may be useful in the early selection of Savannah Brown goats for genetic improvement schemes. In conclusion, there were direct correlations between body weight, chest girth and body condition scores in Savannah Brown goats.

Key words: Live Body weight, Chest girth, Body condition scores, Goats.

INTRODUCTION

Farmers do not routinely weigh their animals to assess the need of providing supplementation. Weighing as a method for assessing the condition of animals is labour intensive and costly for the farmers ((Nsoso *et al*. 2003). The knowledge of an animal's live weight, especially in extensive production systems, is very important both in market and breeding aspects. Such fundamental information is often unavailable to limited resource producers working with animals under field conditions due to unavailability of portable weighing scales. Therefore decision-making and such husbandry techniques like animal medication are based on questionable subjective estimates of body weight (Raji *et al*. 2008). Thus, there is need for a method that will be fast, cheap and easy to use for small-scale resource poor farmers. It therefore, becomes essential to determine the weight of animals from easily measurable parameters such as chest girth and body condition scores.

MATERIALS AND METHODS

This study was carried out at Kwangila Sheep and Goat market, along Kano road, Sabon-gari, Zaria, Kaduna state, Nigeria located on latitude 11˚2'N, longitude 7˚33'E and on altitude of 610m above sea level. Zaria is within the northern guinea savannah zone and has a sub-humid tropical climate (Mohammed *et al*, 2007). The investigation involved forty nine (49) Savannah Brown goats of both sexes, consisting of seven (7) females and forty two (42) males, aged between 1 to 3 years. The goats were raised under semi-intensive and extensive management systems in and around Sabon-gari Local Government Area. The goats were transported to the market, Zaria, for sale from different locations within Sabon-gari Local Government Area of Kaduna State,

Nigeria. Body weight was measured using a commercial weighing scale (Hana®, Made in China), as previously done in Red Sokoto goats by Hassan and Ciroma (1991). Chest girth measurement was determined as the circumference of the chest, using the tailor's tape measure as described by Herrera *et al.* (1996). Body condition scores were evaluated as described by Aumount *et al*. (1994) and Thompson and Meyer (2002), subjectively using the 5- point scale; ranging from 1 = Very thin, 2 = Thin, 3 = Good Condition, 4 = Fat and 5 = Obese, as described in the body condition scoring table below (Table 1). The animals were visually assessed followed by palpation of the rib cage, lumbar vertebral area between the back of the ribs and the front of the pelvic bones. The data collected were classified on the basis of sex; that is, males and females. Mean ± SEM were calculated for the body weight, chest girth and body condition scores. The relationships between body weight, chest girth and body condition scores were determined by Pearson's correlation analysis using SPSS (version 20). Multiple regression analyses were fitted to calculate the prediction equations for body weight from the body measurement variables as reported by Heinrichs *et al*. (2007). Values of $P < 0.05$ were considered significant.

RESULTS AND DISCUSSION

A descriptive statistics of body weight, chest girth and body condition scores in Savannah Brown goats is shown in Table 2. Mean values for body weight were 18.57 ± 2.18 kg, 14.0 ± 0.60 kg and 14.86 ± 0.64 kg for females, males and overall (males and females), respectively. Mean values for chest girth were 66.10 ± 2.10 cm, 58.50 ± 0.85 cm and 59.61 ± 0.86 cm for females, males and overall (males and females), respectively. Body condition scores were 3.0 ± 0.22, 2.7 ± 0.08 and 2.78 ± 0.08 for females, males and overall (males and females), respectively. Table 3 shows that a significant ($P < 0.01$) correlation coefficient ($r = 0.795$).was obtained between body weight and chest girth; and body weight and body condition scores ($r = 0.579$), indicating strong relationship or degree, of association between these variables. Nsoso *et al*. (2003) reported similar correlation coefficients of ($r = 0.60$) between body weight and body condition scores; and also Cam *et al*. (2010) reported similar correlation coefficient ($r = 0.846$) between body weight and chest girth while working with Karayaka sheep in Turkey. Significant ($P < 0.05$) differences were found between male and female goats with regards to body weight and chest girth. During the present investigation, female goats were found to be heavier ($P < 0.05$) and bigger in terms of chest girth than their male goats. This is in contrast to the findings of Khan *et al*. (2006), who showed that males were heavier ($P < 0.05$) and bigger ($P < 00S$) in terms of chest girth.

Considering the fact that the investigation was carried out in the dry season, it was apparent that season may greatly affect the performance of the animals with regards to zootechnical parameters of body weight, body condition scores and chest girth, as similar incidence has been reported (Nsoso *et al*., 2003). According to Nsoso *et al*. (2003), the body condition scores in goats during wet seasons are significantly higher than those of the dry season. Cisse *et al*. (2002) also reported this phenomenon, where goats lose body condition in the dry season and gain it during the wet season. As demonstrated by Luginbuhl *et al*. (2002) and Rae (2002), the body condition scores may be used as a management tool in farm animals, since it is so sensitive to seasonal changes. However, the results of the present studies indicate that the goats were in thin to slightly above average score, using the 5-point scale of Thompson and Meyer (2002). According to the authors and Luginbuhl *et al*. (2002), such body condition scores are generally ideal for production. Hence, farmers should be assured that their use as a management tool will lead to more productive goats, which are neither fat (Body Condition Score of 4- 5) nor emaciated or very thin (Body Condition Score of 1). Over-fat does are susceptible to pregnancy toxaemia, while emaciated does are extremely weak and may be near death within a very short period (Luginbuhi *et al*., 2002). Both situations often lead to loss in production (Nsoso *et al*., 2003).

The prediction equations for live body weight based on chest girth and body condition scores are illustrated in Table 4, which is significantly good, and the estimated body weights from the correlated parametres are shown in Table 5. Nsoso *et al*. (2003) reported similar good prediction equations for live weight based on chest girth during the wet season and in the dry season with semi-intensive management, and observed that it was very poor during the dry season under extensive management. This general finding is consistent with those of Mayaka *et al*. (1995), Benyi (1997) and Badi *et al*. (2002), who reported predominantly high coefficient of determination (r = 0.80 to 0.99) in different breeds of goats. In agreement with these authors, estimating body weight from heart (chest) girth is appropriate and practical in rural areas, where resources are poor and weighing scale is lacking.

CONCLUSION

In conclusion, there were positive and significant correlations between live body weight, chest girth and body condition scores in Savannah Brown goats. The Live body weight was more correlated with the chest girth than the body condition scores. The chest girth is therefore the best parameter for predicting live body weight in savannah brown goats

REFERENCES

Aumont, G., Poisot, F., Saminadin, G., Borel, H. and Alendr, H. (1994). Body condition score and adipose cell size determination for in-vivo assessment of body composition and post-mortem predicators of carcass components of Creole goats. *Small Ruminant Research*, 15 (10): 295-297.

Badi, A. M. I., Fissehaye, N. and Rattan. P. J. S. (2002). Estimation of live body weight in Eritrean goat from heart girth and height at withers. *Indian Journal of Animal Sciences*, 72 (10): 893-895.

Benyi, K. (1997). Estimation of live weight from chest girth in pure and cross bred West African goats. *Tropical Animal Health and Production*, 29: 124-128.

Cam, M. A., Olfaz, M. and Soydan, E. (2010). Body measurements reflect body weights and carcass yields in Karayaka sheep. *Asian Journal of Animal and Veterinary Advances*, 5: 120-127.

Cisse, M., M'Baye, M., Sane, I., Correa, A. and N'Diaye, 1. (2002). Seasonal changes in body condition of the Sanegalese Sahel goats: relationship to reproductive performance. Ministry of Agriculture, Senegal, http://www.fao.org/wairdocs/ilri.htm, accessed in June 01, 2010, 10: 00 am.

Hassan, A. and Ciroma, A. (1991). Body weight measurement relationship in Nigerian Red Sokoto goats. Department of Animal Science, Usmanu Danfodiyo University, Sokoto, Nigeria. www.fao.org/wairdocs/lLRl/X55208/520bid.htm. Accessed on 5th June, 2010, 11: 00 am.

Heinrichs, A. J., Erb, H. N., Rojers, G. W., Cooper, J. B. and Jones, C. M. (2007). Variability in Holstein heifer heart girth measurements and comparison of prediction equations for live weight. *Preventive Veterinary Medicine*, 78: 333- 338.

Herrera, M., Rodero, E., Gutierrez, M. J., Pena, F. and Rodero, J. M. (1996). Application of multifactorial determinant analysis in the morphostructural differentiation of Andalusian caprine breeds. *Small Ruminant Research*, 22: 39-47.

Khan, H., Muhammad, F.,Nawaz, G., Rahimulla and Zubair, M. (2006). Relationship of body weight with linear body measurements in goats. *Journal of agricultural and Biological Science*, 11 (3):51-3, 2006

Luginbuhl, J. M. L., Poore, M. H. and Mueller, J. P. (2002). Managing body condition: A key to successful management.

http://www.cals.ncsu.edu/anSCI/extension/animal/meatgoat/MB-BCS.htmGefu, Accessed on 5th June, 2010, 11: 00 am.

Mayaka, T. B., Tchoumboue, J., Manjeli, Y. and Teguia, A. (1995). Estimation of live body weight in West African Dwarf goats from heart girth measurement. *Tropical Animal Health and Production*, 28: 126-128.

Mohammed, A. K., Sackey, A. K. B., Tekdek, L. B. and Gefu, J. O. (2007). The effects of season, ambient temperature and sex on Rectal Temperature, Pulse and Respiratory rates for the Adult One-humped Camel (*Camelus dromedarius)* in Shika-Zaria, Nigeria. *MedWe-ll Journal of Animal and Veterinary Advances*, 6 (4): 536-538.

Nsoso, B. S. J., Aganga, A. A., Moganetsi, B. P. and Tshwenyane, S. O. (2003). Body weight, body condition score and heart girth in indigenous Tswana goats during dry and wet seasons in Southeast Botswana. *Livestock Research for Rural Development*, 15: 4-11.

Olatunj-Akioye, A.O. and Adeyemo, O.K. (2009). Live weight and chest girth correlation in commercial sheep and goat herds in southwestern Nigeria. *International Journal of morphology*, 27 (1):49-52, 2009.

Rae, D. O. (2002). Managing for profit: Nutritional priorities- Cow age and Body condition. http://gnv.ifas.ufl.edu/~animal/short95/rae.htm, Accessed on l2th June, 2010, 10: 00 am.

Raji, A. O., lgwebuike, J. U. and Aiiyu, J. (2008). Testicular biometry and its relationship with body weight of indigenous goats in the semi-arid region of Nigeria. *Journal of Agricultural and Biological Sciences*, 3 (4): 6-9.

Thompson, J. M. and Meyer, H. (2002). Body condition scoring of sheep. http://www.orst.edu/dept/animalsciences/bcs.htm, Accessed on 15th June, 2010, 12: 30 am.