Nig. J. Anim. Prod. 2003, 30(2):253-258

Types and frequency of udder shapes and abnormalities in West African Dwarf and Red Sokoto goats

O.A. Amao*, O.A. Osinowo[1], C.A.M. Lakpini[2], M.A. Dipeolu[1], S.S. Abiola[1], and C.F.I Onwuka[1]

1 College of Animal Science and Livestock Production, University of Agriculture, Abeokuta, Nigeria.
2 National Animal Production Research Institute (NAPRI), Ahamdu Bello University, Shika-Zaria, Nigeria.
**Department of Animal Production and Health, Ladoke Akintola University of Technology, P.M.B 4000, Ogbomosho, Nigeria.*

Abstract

A total of 423 goats comprising 246 West African Dwarf and 177 Red Sokoto (RS) goats were involved in a study to determine and classify udder shapes and abnormalities in the two breeds of goats. Udder shapes found in WAD goats were funnel (0.4%), cylindrical (45.9) and bowl (53.7%). Teat shapes were funnel, bottle and cylindrical, averaging 49.6, 0.4 and 5.0% respectively. Udder abnormalities included presence of supernumerary teats (24.0%), asymmetrical udder (0.4%) and pendulous udder(0.4%). In RS goats, udder shapes were funnel (9.0%), round (1.7%), cylindrical (44.1%) and bowl (45.2%) while teat shapes were funnel, balloon, bottle and cylindrical; averaging 50.9, 2.3, 17.5 and 29.4% respectively. Udder abnormalities were: presence of supernumerary teats (10.0%), asymmetrical udder (5.7%) and pendulous udder (10.2%). The study showed that udder and teat shapes were similar in both breeds except that round udder and balloon teats were absent in WAD goats. Bowl shaped udders and cylindrical teats predominated in both abnormality. Presence of supernumerary teats constituted the major udder abnormality in WAD goat while incidence of asymmetrical and pendulous udders was higher in RS goats.

Keywords: Udder shapes, West African Dwarf goats, Red Sokoto goats

Introduction

In temperate countries where most of the ruminant species possess great milk yield potentials, attention has been paid to a variety of factors affecting milk production including udder characteristics. In Nigeria only cow seems to command the attention of researchers as well as farmers with regards to milk production. This is partly because Nigeria's small ruminant stocks have low milk yield potentials; and partly there is general lack of understanding of the nutritional advantage of goat milk on the part of the populace. However, sufficient avenues have not been explored in an effort to improve the dairy potential of indigenous goat breeds.

Udder characteristics have been widely studied in the temperate cows, sheep and goats (Horak and Gerza, 1969; Labussiere, 1988 and Gupta *et al.*, 1991). However, there is dearth of information on udder characteristics of indigenous ruminant stock especially goats in Nigeria. Nigeria's goat population estimated at over 32.5 million (FDLPCS, 1991) provides an impetus to a nascent interest in the study of udder traits for screening indigenous goat population for milk production.

Udder and teat shapes form an important determinant of milk yield and ease of milking in dairy animals. In cows udder shapes were classified as bowl, round, pendulous, trough and pear shapes (Singh *et al.*, 1993) and bowl, round and irregular (Prajapati *et al.*, 1995). Teat shapes were classified as cylindrical, bottle, funnel and pear-shaped (Prajapati *et al.*, 1995), balloon and non-balloon shapes (Singh *et al.*, 1993). In goats, Montaldo and Martinez-Lozano (1993) categorised udder shapes as globular and non-globular; while teat shapes were funnel, cylindrical, bottle and balloon. Information on udder shapes and abnormalities are lacking in West African Dwarf (WAD) and Red Sokoto (RS) goats. Knowledge about the udder shapes and abnormalities could be useful in screening of indigenous goat population for milk production. Hence, the objective of this study was to classify udder shapes and abnormalities and determine their frequencies in WAD and RS goats.

Materials and Methods

Animals and study area

The data used for this write-up was extracted from a research conducted at the University of Agriculture, Abeokuta. The 246 West African Dwarf does involved were located in Ogbomosho North and South Local Government Areas, Oyo State; and Abeokuta in Odeda Local Government Area, Ogun State, Nigeria. The 177 Red Sokoto does used were located in National Animal Production Research Institute (NAPRI) Shika-Zaria, and two neighbouring villages, Giwa Local Government Area, Kaduna State, Nigeria. Both on-farm and on-station animals were used for the study.

Ogbomosho lies approximately 600m above sea level and falls within longitude 4° 15'E and latitude 8° 07'N. the mean annual temperature is 26.2° while the mean annual rainfall is 1247mm. The town is situated within the derived savanna region (Akinbola, 1998).

Abeokuta area has a prevailing tropical climate. It receives a mean annual rainfall of about 1,037 mm. Mean ambient temperature ranges from 28°C in December to 36°C in February with a year average of 34°C. The vegetation is an interphase between the tropical rain forest and derived savanna (Ogun Osun River Basin Development Authority, 1995).

Shika is located on latitude 11° 12' and longitude 7°33'E, the altitude of the area is 600 m above the sea level. It has annual rainfall of about 1100 – 1200 mm (Osuhor *et al.*, 1997).

Data collection

Udder shapes, udder abnormalities, teat shapes, teat-end shapes and teat placements were determined by visual appraisal and scored according to the method of *de la* Funta *et al.*(1996). Animals aged 1 year and above were used. Age of the animals was determined by dentition (Sastry and Thomas, 1980).

Statistical analysis

Data for each breed were subjected to descriptive analysis appropriate for frequency distribution using Systat Computer Package (Systat, 1992).

Results

The results of this investigation are presented in Tables 1 to 4.

West African Dwarf Goat

Table 1 shows the frequency distribution of udder shapes and abnormalities in WAD goats. Udder abnormalities were supernumerary teats, asymmetrical and pendulous udders. Presence of supernumerary teats was the major abnormality observed in WAD goats while asymmetrical and pendulous udders were minimal (0.4% each). Normal udders were 75.5%.

Udder shapes were funnel, cylindrical and bowl. Bowl shaped udder was predominant while funnel shaped was least. Teat shapes were funnel, bottle and cylindrical with funnel and cylindrical shapes predominating (Table 2). Teat placement was either oblique or vertical. Obliquely placed teats were more prevalent. Teat-end was either pointed or blunt with blunt-end teats predominating.

Table 1 *Frequency distribution of udder shapes and abnormalities in West African Dwarf goats.*

Trait	No of obs.	Percent (%)
Udder abnormality		
1. Supernumerary teat	59	24.0
2. Asymmetrical udder	1	0.4
3.Pendulous udder	1	0.4
Normal udder	185	75.2
Total	246	100
Udder shape		
1. Funnel	1	0.4
2. Cylindrical	113	45.9
3. Bowl	132	53.7
Total	246	100

Table 2 *Frequency distribution of teat shapes, teat placement and teat-end shape in West African Dwarf goats*

Trait	No of obs.	Percent (%)
Teat shape		
1. Funnel	122	49.6
2. Bottle	1	0.4
3.Cylindrical	123	50.0
Total	246	100
Teat placement		
1. Oblique	166	67.5
2. Vertical	80	32.5
Total	246	100
Teat-end shape		
1. Pointed/sharp	28	11.4
2. Blunt/round	218	88.6
Total	246	100

Red Sokoto Goats

Table 3 shows the frequency distribution of udder shapes and abnormalities in Red Sokoto goats. Udder abnormalities were presence of supernumerary teats, asymmetrical and pendulous udders. Supernumerary teats and pendulous udders were the most frequent. Udder asymmetry was also high. Normal udder was 73.5%.

Four types of udders shapes were observed in Red Sokoto goats namely funnel, round, cylindrical and bowl. Bowl and cylindrical udders were most abundant. Round shaped udder was least.

Teat shapes included funnel, balloon, bottle and cylindrical with funnel predominating (Table 4). Balloon shaped teats were not common. Obliquely placed teats were more frequent compared to vertically placed teats. Blunt teat-end was also more frequent when compared with the pointed counterparts.

Table 3 *Frequency distribution of udder shapes and abnormalities in Red Sokoto goats.*

Trait	No of obs.	Percent (%)
Udder abnormality		
1. Supernumerary teat	19	10.7
2. Asymmetrical udder	10	5.7
3.Pendulous udder	18	10.2
Normal udder	130	73.5
Total	177	100
Udder shape		
1. Funnel	16	9.0
2. Round	3	1.7
3.Cylindrical	78	44.1
4. Bowl	80	45.2
Total	177	100

Table 4 *Frequency distribution of teat shapes, teat placement and teat-end shape in Red Sokoto goats*

Trait	No of obs.	Percent (%)
Teat shape		
1. Funnel	90	50.9
2. Balloon	4	2.3
3. Bottle	31	17.5
4.Cylindrical	52	29.4
Total	177	100
Teat placement		
1. Oblique	111	62.7
2. Vertical	66	37.3
Total	177	100
Teat-end shape		
1. Pointed/sharp	7	3.9
2. Blunt/round	170	96.1
Total	177	100

Discussion

West African Dwarf Goats

From present study, udder shapes observed in WAD goats were similar to those earlier reported for cows (Singh *et al.*, 1993 and Parajapti *et al.*, 1995). They were however different from round, egg-shaped and flat reported for goats (Horak, 1971) and globular and non-globular shaped udders reported by Monataldo and Martinez-Lozano (1993). Bowl shaped udder was the most frequent 53.7% followed by the cylindrical shaped udder (45.9%). Horak (1971) has earlier reported that round shaped udder predominated (72.6%) in Saanen goats. This implies that goats udder, although comprising two glands, could have some resemblance to cow udder. The observation in the study also showed that udder shapes in goats could vary from breed to breed considering the earlier reports (Horak, 1971).

The presence of supernumerary teats observed in WAD goats supports the observation of Osuagwuh(1985). Supernumerary teats occurred in 24.0% of the total WAD does sampled in this study. It has been stated (Osuagwuh, 1985) that supernumerary teat does not affect milk yield of the animal nor does it prevent kids from suckling. However, it presents problems when found on abnormally large teats in which case the kids suckle it instead of the abnormally large teats but it does not deliver milk for the kids, hence the kids may die of starvation. According to Frandson (1986), supernumerary teat in the ewes do not appear to have separated gland tissue as is frequently found in the cow.

Cases of asymmetric and pendulous udders were negligible (0.4%) each in WAD goats. Probably their heritabilities are low in this breed of goat. This is an advantage in favour of Wad goats which makes it a potential breed for investigation towards dairy goat development in Nigeria.

Teat shapes found on WAD goats in the present study are similar to those reported by Horak (1979) and confirm the observation of Montaldo and Martinez-Lozano (1993). In WAD goats cylindrical shaped teats were the most common. However, funnel shaped teats were reported to predominate in Saanen goat (Horak,1971). Genetic difference could be responsible for the variation.

Red Sokoto Goats

Udder shapes observed in RS goats in the current study were different from those reported by Horak (1971) and Montaldo and Martinez-Lazano (1993). From this study bowl shaped udder was predominant (44.2%) and closely followed by cylindrical shaped udder (44.1%). This disagrees with the report of Horak (1971) that round shaped udder predominated in Saanen goats. They were however similar to those observed for WAD goats in the present study. This implies that WAD and RS goats, although two different breeds, could have some degree of similarity in udder characteristics.

Udder abnormalities found in RS were supernumerary teats (10.7%), udder asymmetry (5.7%) and pendulous udder (10.2%). Horak (1971) reported a lower percent (2.0%) for pendulous udder in Saanen goats. This implies that the percentage of pendulous udder in RS goats is very high. This could be harmful for dairy development. Shelton (1978) was of the opinion that tendency for pendulous udders may be a limiting factors for dairy goats in range pastures with thorny brush. The implication is that goats with pendulous udders will have difficulty grazing on pastures, as they are prone to injuries on udders while foraging. Udder asymmetry is another critical case observed in high proportion in RS goats (5.7%). A situation where only one side of the udder is healthy and functional is not economically desirable for milk production. It also has implication for the survival of kids in case of twin or multiple births. However, the case of supernumerary teats was lower (10.7%) compared to what was observed on WAD goats (24%). Probably the heritability of supernumerary teats was lower in RS than in WAD goats. Teat shapes – funnel, balloon bottle and cylindrical, found on RS goats were similar to those reported by Horak (1971) and Montaldo and Martinez-Lazano (1993). They were also similar to those observed on WAD goats in the present study. Cylindrical shaped teats predominate in RS goats. This disagreed with the observation of Horak (1971) for Saanen goats. The difference could be attributed to their genetic variations.

Conclusively, this study showed that udder and teat shapes were similar in both WAD and RS goats except that round udder and balloon teat were not found in WAD goats. Bowl shaped udders and cylindrical teats were predominant in both breeds. Considering the high incidence of asymmetrical and pendulous udders in RS goats, it would be necessary to find a means of eliminating the abnormalities from the indigenous stock. The udder traits studied here could then be related to milk yield for screening indigenous goat breeds for milk production.

References

Akinbola, G. 1998. Housing conditions and health: A case study of Ogbomoso, Nigeria. (An undergraduate project – unpublished) Urban and Regional Planning Department, LAUTECH, Ogbomoso, Nigeria. Pp 47 –55.

de la **Fuente,L.T., Fernandez,G. and San Primitivo,F. 1996** A linear evaluation system for udder traits of dairy ewes. *Livestock Prod. Sci* 45: 171 – 178.

FDLPCS. 1991. Nigerian National Livestock Survey. Resource Inventory Management Ltd. (RIM), Abuja, Nigeria. Pp 287.

Frandson, R.D 1986. Anatomy of the mammary glands. In Anatomy and phgysiology of farm animals. 4th Edition, published by Lea and Febiger, Philadephia. Pp 464 – 470.

Gupta,R., Singh,R.P and Tomar,S.S. 1991. Udders and teat measurement of purebred Agenln cows and Latvian Brown cows with 25 – 75% Agenln inheritance. *Anim. Breeding Abstr.* 60: 629.

Horak,F. and Gerza,J. 1969. Morphological udder characteristics in goats. *Dairy Sci. Abstr.* 32:738.

Labussiere,J. 1988. Review of physiological and anatomical factors influencing the milking ability of ewes and the organization for milking. *Livestock prod. Sci.* 18:253 – 274.

Montaldo,N. and Martinez-Lozano,F.J. 1993. Phenotypic relationship between udder and milking characteristics, milk production and California mastitis test in goats. *Small Rumin. Res.* 12:329 – 337.

Ogun Osun River Basin Development Authority, Department of Agrometerology. 1995.

Osuagwuh,A.I.A. 1985. Incidence and control of prewcaning mortality and abortion in small ruminants. In: Small Ruminant Production in Nigeria: Proceeding of National Conference on Small Ruminant Production held at Zaria, Nigeria. October 6 – 10, 1985. pp 239 – 252.

Osuhor,C.U., Osinowo,O.A., Nwagu,B.I., Dennar,F.O. and Abdullahi-adee. 1997. Factors affecting age at first lambing in Yankasa ewes. *Animal reproduction Science* (ELSEVIER) 47:205 – 209.

Prajapati, K.B., Singh,D.V., Patel, J.P. and Patel, J.B. 1995. Dimensions of various types of udder and teat and milk yield in Kankrej cows. *Indian J. Dairy Sci.* 48 (ii) 654 – 656.

Sastry,S.R. and Thomas,C.K. 1980. Dentition in farm animals management. Vicas Publ. House, PVT Ltd. India pp. 39 – 45.

Shelton,M. 1978. Reproduction and breeding of goats. *J. Dairy Sci.* 61: 994.

Singh, R.P., Gupa,R. and Tomar,S.S. 1993. Udders shapes and their relationship with milk production in crossbred cows. *Indian J. Dairy Sci.*: 46 (7) 288 – 291.

Systat. 1992. Systat computer package, version 5.0. Systat Inc. Evanston, IL USA. 1990 – 1992.

(Received 15 November 1999;Accepted 23 May 2001)