

Characterization of the "Native" goat

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Abstract

This paper describes some of the morphological characteristics of the Jamaican native or creole goat, which accounts for approximately 97% of the goat population (Ministry of Agriculture 1990). The Native goat, although smaller than the exotic breeds, is hardier and exhibits non - seasonal breeding characteristics, which has enabled it to survive under harsh conditions. Very little, however, is known about the genetic material within the local eco-type. Information on their origin, morphological characteristics, handling and production systems are presented. Data were collected on 1407 goats from 202 holdings in seven parishes. These included age, weight, heart girth, body length, height at withers and loin, scrotal circumference as well as qualitative characters such as sex, color, and the presence or absence of horns, wattles and beard. The paper is a final report on the characterization of the Jamaican "Native" goat and includes data from six parishes not reported in the preliminary work.

Introduction

The "Native" or Jamaican Creole goat accounts for approximately 97% of the goat population (Ministry of Agriculture Census 1990). In 1996, this population rose to 301,244 (Census of Agriculture, 1996, Statin.), an increase of 56% over the 193,000 recorded in 1990. The majority of these goats (277,355) were held in holdings of less than 5 ha. (Census of Agriculture 1996) and is comprised mainly of the native.

This indigenous goat has been noted to be a mixture of breeds (Jamaica Agricultural Society, 1901) whose origins traced back to 16th century introductions by the Spanish (the Criollo, mainly black or brown with white patches) and the Portuguese (the Charniquiero, brown or fawn with a black strip along the back, black face and belly) (Oliveira, 1984). This admixture of breeds has produced an eco-type, which has evolved mainly through natural selection and has become highly adapted to the agro-ecological conditions of the country.

The West Indian Creole, although resembling the South American Criollo, may have its origins in West Africa where it is quite similar to the non-dwarf types such as the Kano Brown of Northern Nigeria (Devendra and Burns, 1983).

Other introductions were made much later, in the 19th and 20th centuries, and included European breeds such as Angora, Anglo-Nubian, Toggenburg, Saanen, and Alpine (Fielding, 1994). More recently, 1996, the South African Boer was imported. These later breed introductions have been aimed mainly at improving the productivity of the Native through crossbreeding work. The local or native goat is generally smaller than the exotic breeds and has a lower growth rate and carcass weight but is hardier and demonstrates a tendency for non-seasonal breeding and multiple births. These latter characteristics make the Native goat a good source of material for the production of new breeds. The protection of this genetic resource is therefore an important task for goat breeders in Jamaica.

The aim of this study is to develop a profile of the Jamaican Creole goat based on its morphological characteristics. It also seeks to describe some of the productive systems under which these goats are reared. It is a final report on work previously done by the author, on the characterization of the Native goat.

Methodology

Goat farmers for the study were identified by the parish office of the Rural Agricultural Development Agency (RADA), livestock officers of the Ministry of Agriculture and farmers themselves. In all, data were collected on 1407 goats from 202 holdings in seven parishes (Kingston & St. Andrew, St. Thomas, Portland, St. Mary, St. Ann, Trelawny, and St. James). The preliminary work, previously reported, recorded data on 364 goats from the parishes of Westmoreland, St. Catherine, Clarendon, Manchester, and St. Mary. As before, care was taken to exclude all goats showing signs of Anglo-Nubian or Boer blood, such as drooping or pendulous ears and convex or Roman nose, from the study.

Each holding was identified on the questionnaire by the farmer's name and address. This as well as information on the husbandry system employed was entered on the questionnaire by the researchers. The use of housing for the goats was also recorded. Data collected on each goat included the following:

1. Sex
2. Age (in days)
3. Weight (Kg)
4. Heart Girth - the circumference of the chest measured over back, shoulder and foreflank.
5. Height at withers - the distance from the shoulder blades to the ground.
6. Height at loin.
7. Body length - the distance from the shoulder blades to the hip bone.
8. Length of neck.
9. Length of canon bone.
10. Coat color
11. Presence or absence of horns, beard and wattles.

The majority of farmers included in the study did not keep accurate records and so the stage of dental development was used to estimate the age of the animals.

Results and Discussion

Some quantitative characteristics of the "Native" goat are presented in **Tables 1** and **2** for males and females. Ten continuous morphological traits are used to describe the goats in four age groups. These range from kids less than 121 days to mature bucks and does over 720 days (2 years). Mean values and their standard errors are given. Of the ten variables measured for the males (Table 1) only one, scrotal circumference between the age groups 365-720 (21.12 cm) and >720 days (22.90 cm) showed no significant ($P>0.05$) difference. This suggests that there is no further scrotal development after two years (720 days) of age. For the females (Table 2), the only area of non – significance ($P>0.05$) was withers height between the age group less than 121 days and 121-330 days. This is probably due to the presence of outliers in the lower age group.

Table 1. Mean body measurements for male native goats at various ages

Age (days)	<121			121 - 130			365 - 720			>720		
Parameter	Mean	S.E.	n	Mean	S.E.	n	Mean	S.E.	n	Mean	S.E.	n
Body length (cm)	27.81	1.41	16	34.53	0.42	103	41.88	0.64	46	48.1	1.06	30
Heart girth (cm)	44.25	2.00	16	54.81	0.54	103	64.59	1.05	46	75.0	1.12	30
Neck length (cm)	9.50	0.62	16	13.17	0.24	102	15.55	0.50	32	16.96	0.77	25
Withers height (cm)	40.63	1.90	16	50.50	0.53	103	58.70	0.95	46	65.33	0.83	30
Loin height (cm)	41.44	1.86	16	50.70	0.50	102	58.88	1.05	32	65.16	0.83	25
Canon length (cm)	7.28	0.32	16	8.55	0.10	100	9.63	0.19	30	10.65	0.23	24
Weight (kg)	6.80	0.36	89	16.29	0.41	103	24.42	1.11	46	36.17	1.41	30
Rump length (cm)	6.66	0.31	16	8.58	0.20	102	10.36	0.42	32	11.72	0.35	25
Head length (cm)	11.56	0.54	16	14.42	0.16	102	17.14	0.47	32	19.96	0.38	25
Scrotal circ. (cm)	11.37	1.58	15	18.75	0.31	95	21.12	0.42	41	22.90	0.45	26

S,E. - Standard error n - number of observations.

Table 2. Mean body measurements for female native goats at various ages

Age (days)	<121			121 - 130			365 - 720			>720		
Parameter	Mean	S.E.	n	Mean	S.E.	n	Mean	S.E.	n	Mean	S.E.	n
Body length (cm)	30.93	0.67	41	35.76	0.33	140	40.52	0.25	204	45.55	0.17	654
Heart girth (cm)	46.80	1.01	41	55.69	0.55	140	63.13	0.38	204	71.08	0.27	654
Neck length (cm)	10.51	0.27	41	13.26	0.19	134	15.20	0.21	143	16.86	0.16	516
Withers height(cm)	53.15	10.46	41	50.72	0.40	140	56.45	0.31	204	60.69	0.20	654
Loin height (cm)	43.59	0.87	41	51.01	0.41	134	56.81	0.34	143	60.54	0.19	516
Canon length (cm)	7.63	0.18	41	8.66	0.92	134	9.59	0.08	139	10.07	0.05	478
Weight (kg)	7.70	0.33	136	16.23	0.38	143	22.52	0.36	204	31.96	0.30	652
Rump length (cm)	6.84	0.16	42	9.07	0.21	134	9.99	0.18	143	11.60	0.22	514
Head length (cm)	12.27	0.28	42	14.46	0.14	134	16.35	0.14	143	18.23	0.08	514

Table 3 Compares linear measurements for mature (>720 days) males and Females. There were no significant ($P>0.05$) differences found between the variables body length, neck, canon bone, and rump length for the sexes. The means for heart girth, height at withers and loin, body weight and length of head were significantly different ($P<0.05$) between males and females.

Table 3. Mean body measurements for native goats - males and females over two years

Age (days)	Males			Females		
Parameter	Mean	S.E.	n	Mean	S.E.	n
Body length (cm)	48.1	1.06	30	45.55	0.17	654
Heart girth (cm)	75.0	1.12	30	71.08	0.27	654
Neck length (cm)	16.96	0.77	25	16.86	0.16	516
Withers height (cm)	65.33	0.83	30	60.69	0.20	654
Loin height (cm)	65.16	0.83	25	60.54	0.19	516
Canon length (cm)	10.65	0.23	24	10.07	0.05	478
Weight (kg)	36.17	1.41	30	31.96	0.30	652
Rump length (cm)	11.72	0.35	25	11.60	0.22	514
Head length (cm)	19.96	0.38	25	18.23	0.08	514
Scrotal circ. (cm)	22.90	0.45	26	-	-	-

Qualitative variables measured for males and females are shown in **Table 4**. These include the frequency of horns, beard and wattles. Beards were present in 64% of males and 30% of females observed. The difference was significant ($P<0.001$). Only animals in the age groups above 120 days were included for this character to allow for beard development. The presence of horns was observed in 75% of males and 83% of females. This was found to be significant ($P<0.001$). Wattles occurred in only 12% of males and 11% of females studied and this was not significant ($P= 0.576$).

Table 4. Comparison of male and female native goats for presence of beard horns and wattles.

	Males		Females		
Character	Number	% of Total	Number	% of Total	P
Beard*	179	64	1000	30	$P<0.001$
Horns	267	75	1133	83	$P=0.001$
Wattles	265	12	1131	11	$P=0.576$

* animals more than 120 days of age

In attempting to characterize the "Native" goat a profile can be formed from the data in the above figures. Using this along with Devendra's (1970) classification of goats on the basis of height at withers (>65 cm for large breeds, 51-65 cm for small and 50 cm for dwarf) we can describe the Jamaican "Native" goat as a small type, having horns and beard with mean body measurements for mature males and females as shown in **Table 3**. The mean body weight of 31.96 Kg for mature females compares well with other small breeds such as the Katjang (30Kg), a meat breed of Java, Indonesia and the Moxoto (31

Kg), a meat breed of N.E. Brazil (Devendra et al, 1983). The mature males had mean body weight of 36.17 Kg (S.E. of 1.405) and heart girth of 75 cm (S.E. 1.124). The standard errors for these characters are large compared to the other characters, indicating greater variability. This is also seen in the females. It is interesting that these are the characters with strong positive correlation (Tandon, 1966, Galeon, 1951) and is indicative of the genetic diversity of the "Native" population. This suggests that body weight and heart girth can be improved through selection.

The survey also revealed that the "Native" goat has a wide range of coat colors. These range from solid black, brown and white to gray and roaning with various combinations in between. Some information on the husbandry systems to which these goats are exposed was also recorded. **Table 5** describes the distribution of the "Native" goat by the management system.

Table 5. Distribution of Native goats by system of management

Management System	No. Goats Surveyed	% of Total
Pasture grazing	299	21.57
Roadside grazing	816	58.87
Pasture + supplementary concentrate	76	5.48
Roadside + supplement	115	8.30
Zero grazing + supplement	24	1.73
Pasture + zero grazing + supplement	36	2.60
Pasture + roadside + supplement	20	1.44
Total	1386	100.00

The majority (58.9%) of all goats studied grazed on the roadside or "long pasture" because of the lack of land tenure, while only 21.6% had access to organized pastures for grazing. In terms of supplementary feeding 5.5% had access to pastures and concentrates and 8.3% combined concentrates with roadside grazing. **Table 6** describes the distribution by system of housing. Forty .four percent of the goats studied were housed at night while only 2% had full time housing, 32.6% were kept in a holding yard and 21.3% had no housing or proper holding area. This only serves to highlight the low input system that most "Native" goats are exposed to and the conditions under which they produce. Bhat (1981), in his studies concluded that indigenous breeds have adapted to the environment (climate, husbandry and health systems and generally low input level) and have been able to produce and reproduce where exotic breeds have had difficulties surviving and reproducing.

Table 6. Distribution of Native goats by housing system.

Housing System	Total goats surveyed	% of Total
Night Housing	536	44.08
Full time housing	25	2.06
No housing	259	21.30
Holding yard	396	32.57
Total	1216	100.00

Most breed improvement programmes in Jamaica today, which involve the "Native" goat, concentrate on crossbreeding with exotic breeds followed by continuous backcrossing with the hope of achieving a locally adapted purebred. In many instances there are no clear breeding plans and there is no system in place to facilitate selection within the population. The use of exotic breeds often require the provision of additional resources which are sometimes not consistently available e.g. concentrate feed, health care etc. due to high cost. Selection within the breed or population causes small cumulative changes in improvement to take place and this allows for commensurate changes in management (Wiener, 1994). This approach might prove to be more sustainable in the long run.

Conclusion

The "Native" goat although small in comparison to the exotic breeds have their place in contributing to the genetic pool because of their hardiness and ability to survive and produce under low input conditions. Steps need to be taken to ensure that as a genetic resource they are conserved. Further analyses of the data need to be done but due to time constraints and the heavy demand on the biometrician, it was not possible at this time.

Acknowledgments

The researchers wish to acknowledge the assistance given to us by the RADA and CARDI field officers as well as the Morant Yallahs Agricultural Development Project. We also thank the many farmers who participated in the exercise by allowing us to use their animals for the study.

Special thanks must be given to Mr. Michael Pryce, the Ministry of Agriculture's biometrician, who assisted greatly with the analysis of the data. Miss Brenda Smith of the Ministry's Library is also recognized for her help in making available the relevant literature for review.

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