

CHARACTERIZATION OF WEST AFRICAN DWARF GOAT IN THREE LOCAL GOVERNMENTS IN ANAMBRA STATE

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ABSTRACT

This study was designed to investigate the pictorial evaluation of the colour differences and the extent of variation in the body characteristics and body weight of the West African Dwarf (WAD) goat in three Local Government Area (LGA) in Anambra State that aid faster growth of the animals. This study was carried out in Awka North, Awka South and Dunukofia local government Areas of Anambra State, Nigeria. A total of 98 matured WAD goats, comprising of 42 males and 56 females, were selected for the study. A total of 42 goats were recorded in Awka North LGA, 29 were recorded for Awka South LGA and 27 were recorded for Dunukofia LGA. Sick and pregnant animals were not included in the study. Animals were selected based on the phenotypic appraisal only. The Heart Girth (HG), Height at Withers (HW), Body Length (BL), Head Length (HL), Neck Length (NL), Ear Length (EL), Horn Length (HnL), Tail Length (TL) Abdominal circumference (AC) Rump length (RL) and Rump width (RW) were measured. Data collected were subjected to descriptive statistical analysis after calculating the body weight using Shaffeur's formular $(BL*HG*HG)/300$ and calculating the compact index 1, 2, and 3. Pictorial evaluation of variations in the coat colour was considered to check for possibilities of development of ecotypes in the various locations. Results of pictorial evaluation did not show any significant development of ecotypes as various coat colours were found in the three local governments. Results obtained showed that, age, sex and location had a significant effect ($p < 0.05$) on almost all of the body parameters considered. From the result obtained in this study, it can be concluded that there was no specific rise in ecotypes but there were notable variations in the coat colour, body weight and size of the animals in the local government areas.

Keywords: West African Dwarf (WAD) goat, Phenotypic Appraisal, Ecotype, Coat colour and Body weight.

INTRODUCTION

Shortage of animal protein in the diet of many Nigerians has remained a matter of serious concern to nutritionist and policy makers. This inadequate consumption of animal protein in Nigeria can be attributed to inadequate production potentials of the most common sources of meat which include poultry, goat, cattle, pig, sheep, rabbit and other livestock. Also, according to Ugwu and Nwagbo (1992) small ruminants are less prone to trypanosomiasis, knowing that about 60% of Nigeria lands are prone to Tse-tse fly which limits cattle production mainly to the Northern part of the country (1). Therefore, there is need to increase the supply of animal protein through meat consumption and this can be accomplished through efficient use of promising indigenous animals such as goat. Goat is one of the smallest domesticated ruminants which are managed for the production of milk, meat, wool and leather particularly in arid, semi-tropical or mountainous countries (2). Body weight is a very important characteristic in animal husbandry due to selection criteria and economical profit (3), particularly that animals have a balanced relationship between body weights and body measurements (4).

The diverse phenotypic variation observed in the breed WAD goat has been a source of concern to geneticists all over the country. This discovery necessitated a clarion call at the NIAS/ASSAN conference in 2017 at Ilorin for investigation of WAD goat in all regions of Nigeria to ascertain the extent of disparity in their phenotypic characteristics. Hence, this study characterized the WAD goat in order to note the degree of variations that have occurred in 3 different local governments in Anambra State.

MATERIALS AND METHODS

The study was carried out in Awka North, Awka South and Dunukofia local governments in Anambra state. Data was collected from the individual animals. The heart girth, height at withers, body length, head length, neck length, ear length, horn length, tail length, rump length, and rump width were taken from the animals. A total of 98 matured WAD goats were randomly selected using phenotypic parameters. These comprise of 56 females and 42 males.

Data was collected 2-3 times a week from each village in the local governments. It was done in the early hours of the day before most of the experimental animals were taken to the field to graze. The animals were restrained and calmed before measurements were taken. Data collection lasted for 3 months, February to April. All measurements were taken according to the method described and adopted by (5), (6) and (7). Other body measurements were taken using steel measuring tape. Descriptive statistical analysis was used for analyzing the data collected.

RESULTS AND DISCUSSION

The effect of sex on body weight and linear body measurement of goats at Amansea, Ebenebe, Ugbenu, Amawbia, Awka, Okpuno, Ifitedunu, Ukpoko and Umunachi is presented in Table 1. The sex and location of the animal had significant influence ($p < 0.05$) on the heart girth, wither height, head length, body length, neck length, abdominal circumference, rump length, rump width, compact index 2 and body weight in the various locations. Whereas, the ear length, horn length, tail length, compact index 1 and compact index 3 in the various locations are not affected by the sex and location of the animal ($p > 0.05$). The effect of compact index 2 in Ugbenu shows that the animals were suitable for meat production and they had good thoracic development. This is an important criterion for animals in terms of fitness and good respiratory system.

The highest degree of variation was recorded at Dunukofia. This may be due to the fact that the goats are raised for the purpose of sale. Their major interest is to have kids they can raise for sale, so they tend to cross them continuously with any available buck, leading to high degree of variations in their body characteristics.

The result obtained shows that the linear body measurements can be used to predict the body weight and growth rate and this corroborate with the findings of (8) and (9). The variation in weight between the goats at different locations could be explained by the different management systems, the differing times of months especially as this would influence the nutrition of the animals.

Also, sexual dimorphism in farm animals can be phenotypically expressed as differences in skeletal size and body mass and the results obtained from this study revealed that sex and location had effects on the body mass of WAD goats in the study area, with higher values recorded in males. This result is in line with the reports of (10), (11) and (5) who reported higher values for males over females' mammalian and goats.

The results of the effect of age on the linear body measurement of WAD goats in the locations is shown in Table 2. The Effect of age on the animal was highly significant ($p < 0.05$) on the heart girth, body length, head length, wither height, horn length, abdominal circumference, rump length, rump width and body weight of the linear body measurements of the WAD goats in the various locations, but the effect of age was not significant ($p > 0.05$) on the neck length, ear length, tail length, compact index1, compact index 2, and compact index 3. This variation of age in most of the body traits as they increase with increasing age is in consonance with the report of (12) in the WAD goat.

TABLE 1: Effect of Sex on Body Weight and Linear Body Measurements of Goats at Amansea, Ebenebe, Ugbenu, Amawbia, Awka, Okpuno, Ifitedunu, Ukpo and Umunachi

Parameters/ Villages		Amansea	Ebenebe	Ugbenu	Amawbia	Awka	Okpuno	Ifitedunu	Ukpo	Umunachi
	Sex	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Heart girth	MALE	57.88 ^a	56.73 ^a	56.73 ^a	64.60 ^a	67.57 ^a	60.96	67.95 ^a	58.53 ^a	58.42
	FEMALE	51.22 ^b	49.99 ^b	50.38 ^b	52.07 ^b	52.07 ^b	60.11	55.88 ^b	49.95 ^b	50.80
Wither height	MALE	40.58 ^a	40.37 ^a	40.32 ^a	43.19	42.56	40.57	45.55	40.60 ^a	40.65
	FEMALE	40.03 ^b	36.29 ^b	36.95 ^b	37.83	40.20	39.00	40.73	33.90 ^b	34.72
Head length	MALE	16.26	10.77	12.20	14.74	14.52	20.03 ^a	15.43	14.50	15.45
	FEMALE	12.36 ⁷	10.61	11.48	10.75	13.03	13.82 ^b	10.90	10.63	10.60
Body length	MALE	50.30	47.13	49.75 ^a	48.89 ^a	50.14 ^a	40.80	47.78	42.64 ^a	45.28 ^a
	FEMALE	43.40	41.22	42.30 ^b	40.38 ^b	37.85 ^b	42.25	40.53	35.53 ^b	36.56 ^b
Neck length	MALE	10.36	10.37	10.25	10.27	10.30	10.33	10.30	10.30 ^a	10.20
	FEMALE	10.23	10.27	10.28	10.30	10.15	10.30	10.27	10.10 ^b	10.10
Ear length	MALE	10.23	10.20	10.15	10.09	10.08	10.17	10.18	9.82	10.13
	FEMALE	10.12	10.12	10.13	10.03	10.13	10.15	10.13	9.50	9.80
Horn length	MALE	4.20	3.67	3.50	8.54	8.90	10.20	8.43	7.98 ^a	6.05
	FEMALE	2.80	2.40	2.67	8.35	6.50	7.70	8.07	4.00 ^b	2.60
Tail length	MALE	9.84	9.87	10.08	10.12	10.06	10.10	10.12	9.88	9.75
	FEMALE	9.87	10.17	10.17	10.13	9.75	10.13	10.03	9.17	9.60
Abdominal cir	MALE	67.71	71.12 ^a	67.73	79.47 ^a	76.71	68.58	79.38 ^a	72.14 ^a	69.80
	FEMALE	58.00	60.98 ^b	64.76	62.87 ^b	65.41	69.95	62.65 ^b	60.96 ^b	59.44
Rump length	MALE	16.28	13.90	15.50	12.03	14.40	10.77	15.40	20.10 ^a	20.13 ^a
	FEMALE	18.62	10.72	11.51	10.58	10.60	10.55	17.10	13.73 ^b	10.52 ^b
Rump width	MALE	28.26	30.23	30.40	29.96	34.36	33.67	35.60	40.36 ^a	42.55 ^a
	FEMALE	25.52	29.19	28.58	23.10	30.40	27.35	30.47	30.52 ^b	26.48 ^b
C.i 1	MALE	.57	.65	.62	.60	.69	.83	.75	.96	.95
	FEMALE	.67	.71	.67	.57	.813	.65	.75	.91	.74
C.i 2	MALE	1.12	1.21	1.12 ^b	1.33	1.35	1.49	1.44	1.39	1.43
	FEMALE	1.19	1.22	1.21 ^a	1.32	1.39	1.42	1.38	1.43	1.39
C.i 3	MALE	1.36	1.52	1.47	1.68	1.53	1.68	1.67	1.70	1.59
	FEMALE	1.45	1.51	1.48	1.56	1.73	1.66	1.55	1.74	220.85
Bwt	MALE	565.64 ^a	506.88 ^a	534.07 ^a	697.72 ^a	778.71 ^a	506.00	737.58 ^a	486.07 ^a	522.87
	FEMALE	380.94 ^b	345.37 ^b	360.68 ^b	366.99 ^b	346.15 ^b	522.00	422.54 ^b	298.54 ^b	326.81

^{ab}Means in the same column with different superscripts are significantly different (P<0.05)

Table 2: Effect of age on the linear body measurement of West African dwarf goats in the locations.

LINEAR BODY MEASUREMENTS	AGE	P-VALUE
Heart girth	3.47±0.98	0.001 ^b
Wither height	2.81±0.59	<0.001 ^b
Head length	1.45±0.56	0.010 ^b
Body length	3.59±0.80	<0.001 ^b
Neck length	0.03±0.02	0.248
Ear length	0.04±0.04	0.256
Horn length	1.33±0.45	0.004 ^b
Tail length	0.01±0.07	0.924
Abdominal circumference	4.55±1.21	<0.001 ^b
Rump length	1.79±0.65	0.007 ^b
Rump width	3.10±0.82	<0.001 ^b
Compact index 1	0.01±0.02	0.666
Compact index 2	0.03±0.03	0.235
Compact index 3	12.53±15.98	0.435
Body weight	91.51±24.32	<0.001 ^b

CONCLUSION AND RECOMMENDATION

The findings from this study would be very useful for phenotypic characterization of West African Dwarf (WAD) goats in the study area and could assist farmers and breeders when conducting management, selection and preservation programs. The pattern of relationship observed in this study indicates that for a breeder or stockman to have a fairly good knowledge of the live weight of WAD goat, measurement of the body will be useful. Such measurements would also aid in recognizing and describing the complex relationships that contribute to adaptation of WAD goat to various environmental conditions and its functional efficiency. Hence, it can be concluded from the study that there was no occurrence of a specific rise in ecotypes of West African dwarf goat in the various locations, but there were variations in the coat colour, body shape and size of the WAD goat.

I recommend that more researches should be carried out on WAD goat and proper measures should be taken to reduce the rate of variations occurring in this breed. Furthermore, Extension Agents should be allocated to rural areas to help enlighten them on how to take proper records, and the benefit of record keeping, to aid easy age identification of animals.

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