INFLUENCE OF QUALITATIVE TRAITS ON THE PERFORMANCE OF WEST AFRICAN DWARF GOATS

I.K. ODUBOTE

Department of Animal Science, Obafemi Awolowo University, Ile-ife, Osun State

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ABSTRACT

Data on coat colour pigmentation and incidence of wattle were combined with production records of 1407 West African dwarf goats to study their influence on litter traits and body weight. There was no significant ($P > 0.05$) difference among coat colours for litter size at birth and at weaning and birth weight. Basic white coloured goats were significantly ($P < 0.05$) heavier at weaning and one year of age than the basic brown and black goats. The trend was that the weight decreased with increased pigmentation. Presence or absence of wattle did not exert any influence on the traits studied except yearling body weight. Bilaterally wattled goats were lighter ($P < 0.01$) than unilaterally wattled and non wattled goats.

Key Words: Qualitative traits, Performance, WAD Goat

INTRODUCTION

Not much is known about the inheritance of qualitative traits and possible influence on production performance of livestock generally in Nigeria and perhaps Africa. Most of the efforts at improving performance have been concentrated on quantitative traits to the neglect of qualitative traits. It is a well known fact that cryptorchidism is linked with polledness in goats, so it is expected that the polled gene will affect reproductive performance.

The use of qualitative genes in poultry and sheep is now gaining wide applications and recognition years after being suggested by Adalsteinsson (1970, 1975); Akinokun (1974); Drymundsson and Adalsteinsson (1980) and Horst (1988). According to Horst (1988) this may offer a cheaper and indirect method of improving production performance of our indigenous livestock which developing countries

stand to gain from.

Casu *et al.* (1970) reported that ewes with wattles tended to have higher prolificacy and higher milk yield than those without. Shongjia *et al.* (1992) also reported that litter size and milk yield of wattled Saanen does were significantly ($P < 0.5$) higher than for non wattled does. The report of Osinowo *et al.* (1988) on the effects of coat colour and wattle on fertility and body weights in Yankasa sheep though not conclusive tended to be positive. However, Singh *et al.* (1970) reported significantly lower fertility in wattled Malpura and crossbred ewes.

This study was initiated to determine if coat colour and presence of wattle have any influence on litter size at birth and weaning, and on body weights at birth, weaning and one year of age.

MATERIALS AND METHODS

The data on which the present investigation is based were those collected at the Goat Unit of the Obafemi Awolowo University, Ile-Ife, Nigeria during the period 1982-1992. The management system has been reported by Odubote *et al.* (1992).

Overall, 1407 WAD goats were involved in the study. Data on the goat's external features (coat colour and presence of wattle) were obtained using the codes and methods laid down by FAO (1986). However, the coat colour was modified to include only basic colours. Hence black, white and brown basic colours were used in the study. Presence of wattle could either be bilateral or unilateral. These data were combined with litter traits and body weight records at birth, weaning and one year of age. The litter traits and body weight records were adjusted for effects of season and year of births and parity to obtain least square means. There has not been any previous artificial selection imposed on the flock for any trait.

Data Analyses

The effects of wattle and coat colour on litter size at birth and weaning, and on body weight at birth, weaning and one year of age were studied using one way analysis of variance, significant difference between means were determined using the Duncan's New Multiple Range Test (Steel and Torrie, 1980). The analysis of variance for wattle was conducted twice (present versus absent; and bilaterally present versus absent).

RESULTS AND DISCUSSION

Table 1 shows the results of the analysis for influence of coat colours. Only weaning weight and body weight at one year of age showed significant differences ($P < 0.05$). The basic white goats were heavier than the basic black for the two stages of growth. Osinowo *et al.* (1988) reported a tendency for weaning weight to increase with degree of colouration in Yankasa lambs. This is in contrast to the observation in this report. The trend was that weaning and yearling weights decreased with degree of colouration.

The absorption of heat is directly related to the degree of pigmentation. Thus, coloured animals are likely to be predisposed to higher heat load (Finch and Western, 1977). The excess heat load must be eliminated for the animal to be in a thermal balance state and this will involve energy which could have been channelled towards production. In addition, Alieu *et al.* (1987) noted that suppression of pigmentation (i.e. a reduction in tyrosine) led to an increase in wool growth rate. According to Pagot (1992), when heat loss is difficult, it induces thyroid activity in animals which leads to a reduction of heat production. Given that thyroid activity controls fetal and postnatal growth, it is not surprising to observe that animals of small stature are found in warm humid zones.

The drop in sample sizes at birth and weaning were due mainly to preweaning mortality. The number of birth weights did not equal the number of kids sampled because some of the kids were born dead or died shortly after

birth before their birth weights could be obtained. The dead animals (after birth) were however included in the litter size at birth hence the discrepancies in the sample sizes. Nonetheless there was no significant difference in the mortality recorded for the basic groups.

The coat type is thought to have effect on thermo-regulation while coat colour is likely to influence radiant heat loss (Osinowo *et al.* 1988). This points to the fact that coat type and colour may likely exert influence on body weight. Thus it could be concluded from these and other literature earlier cited that factors namely specie, breed, geographical and coat type do exert performance. It should also be noted that coat type being an adapted feature is necessary for survival.

Said *et al.* (1990), however, concluded from the study on Angora goats that selection for coat colour would not improve pre-weaning or post-weaning growth rates. The non significance of coat colour at birth may be due to the indistinct colour of the coat in kids. Adalsteinsson (1970) reported that the top dominant allele at the agouti locus in Icelandic Sheep, A^{wh} have considerable effect on ewe fertility. No significant influence of coat colour on fertility as depicted by litter size at birth was observed in this study.

Table 2 shows the least squares means for wattle effects. Only yearling weight showed significant ($P < 0.01$) effect with does having bilateral expression of wattle being lighter than does with unilateral expression and those without. It should be pointed out that the small sample size of the bilateral expression for wattle does not permit meaningful comparison with the other 2 classes.

The result obtained in this study for litter size at birth do not show any influence of wattle. Reports in the literature does not show any influence of wattle. Reports in the literature tend to link the wattle trait with reproductive traits such as higher prolificacy, higher milk yield (Casu *et al.*, 1970) higher litter size, fertility index, and conception rate (Osinowo *et al.*, 1988; Shongjia *et al.*, 1992). Singh *et al.* (1970),

however, reported significantly lower fertility in wattled ewes compared to ewes without; Influence of wattle on reproduction thus appears conflicting. It has, however, been suggested by Osinowo *et al.* (1988) that breed difference appear to modify the effect of wattle on fertility.

The essence of this study would be futile if the farmer's preference of prejudices for these traits are not taken into consideration. Thus it is suggested that farmers' flock should be studied for these traits.

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TRAITS ON THE PERFORMANCE OF WEST AFRICAN DWARF GOATS

Table 1 INFLUENCE OF COAT COLOUR ON CERTAIN TRAITS IN WAD GOAT

TRAITS	COAT COLOUR		
	BASIC WHITE	BASIC BROWN	BASIC BLACK
LITTER SIZE AT BIRTH (n)	2.07 (68)	2.02 (554)	1.96 (713)
Litter size at weaning (n)	1.69 (45)	1.71 (367)	1.71 (499)
Birth Weight (kg) (n)	1.3 (65)	1.25 (548)	1.26 (707)
Weaning Weight (kg) (n)	6.71 ^d (47)	6.55 ^{ab} (383)	6.28 ^b (505)
Yearling Weight (Kg) (n)	13.09 ^d (26)	12.50 ^{ab} (256)	11.92 ^b (303)
Prewaning mortality%	33.8	33.7	30.0

Means within row with same superscripts are not significantly different ($P < 0.05$).
Figures in parentheses refer to sample number.

TABLE 2 INFLUENCE OF THE INCIDENCE OF WATTLE ON CERTAIN TRAITS IN WAD GOAT

TRAITS	INCIDENCE OF WATTLE		
	PRESENT	BILATERAL	ABSENT
Litter size at birth (n)	1.97 (1059)	1.93 (88)	2.04 (348)
Litter Size at weaning (n)	1.71 (701)	1.65 (54)	1.68 (228)
Birth Weight (Kg) (n)	1.26 (1012)	1.20 (88)	1.25 (347)
Weaning Weight (Kg) (n)	6.42 (714)	6.20 (58)	6.35 (241)
Yearling Weight (Kg) (n)	12.27 ^a (455)	10.89 ^b (40)	12.09 ^b (144)

Means within row with different superscripts are significantly different ($P < 0.01$)