Evaluation of West African dwarf goat for some qualitative traits in Southwestern Nigeria

JO Adebayo and CA Chineke*

Department of Animal Production and Health, Federal University of Technology, Akure Nigeria.

Accepted 1 August, 2009

Two hundred West African Dwarf (WAD) goats aged 1 to 6 years were examined during a ten months period, from October 2003 to July 2004 in randomly selected locations within Southwestern zone of Nigeria. Qualitative traits namely coat colour, polled trait, presence or absence of teat, wattle and beard were examined and described in all the experimental animals. Black colour observed in 54% of the animals predominated while brown and mixed colours accounted for 16 and 30% of all the animals respectively. All goats studied irrespective of sex were horned. The goats had a pair of teat each except eight goats with supernumerary teats. Possession of beard was common in all bucks observed, but 8.5% of the females had beard. About 36.5% of all the WAD goats examined possessed wattle. The phenotypic frequency of wattle and beard in WAD population was 0.37 and 0.21 respectively.

Key words: West African dwarf (WAD) goat, qualitative traits, management, frequencies.

INTRODUCTION

Goats are generally dual purpose animals yielding milk and meat. However, the West African Dwarf (WAD) or short-legged goats are not milk animals. They are raised solely for their much valued meat or the chevon considered being of superior quality compared to that of other standard goats. They contribute substantially to meat production and hence to the economy of West Africa. In 15 countries of the West humid zone, 38 percent of about 38 million goats are considered to belong to the WAD (Gall, 1994). They have the ability to live under the most diverse conditions of natural habitat and flexible integration into dissimilar socio-economic situation. This adaptability is due to certain definite physiological characteristics, which include ability to acclimatize, feed uptake and digestive capacity, fertility and diverse tolerance. However, the WAD goats have not been fully characterized for qualitative traits, notably coat type and colour, presence of wattle, horn, beard and supernumerary teats. It is desirable to carry out a study of the inventory and characterization of the WAD goats with a view to achieving conservation and preservation of the genetic resource in this period of indiscriminate cross breeding. The present study was carried out mainly to evaluate some qualitative traits of WAD goats in Southwestern Nigeria.

MATERIALS AND METHODS

The study area

The study was carried out in six towns within four states (Ekiti, Ondo, Osun, Oyo), all located in the humid zone of South-western Nigeria. The towns include Igbara Odo (7°22′N, 5°10′E) and Ogotun Ekiti (7°24′N, 5°12′E) in Ekiti State; Akure (7°15′N, 5°15′E) in Ondo State, Ejigbo (7°50′N, 4°17′E) and Ede (7°40′N, 4°24′E) in Osun State; and Ibadan (7°22′N, 3°8′E) in Oyo State. The study areas are characterized by heavy rainfall between March and October followed by a dry season from November to February. They are largely made up of rainforest with rainfall ranging between 1200 and 1350 mm annually. A warm humid climate prevails with relative humidity between 70 and 90% and temperature ranging between 27 and 32°C most periods of the year.

Experimental animals

Two hundred WAD goats consisting of 32 bucks and 168 does aged between 1 to 6 years were selected randomly from the six towns in the Southwestern Nigeria.

The management of experimental animals

The management system in the selected areas of study was mainly...
Table 1. Incidence of qualitative traits in WAD goat in selected locations in Southwestern Nigeria.

<table>
<thead>
<tr>
<th>Traits</th>
<th>Total number of animal examined</th>
<th>Class</th>
<th>Number of animal that possessed the trait</th>
<th>Percentage of animal that possessed the trait</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coat colour</td>
<td>200</td>
<td>Black</td>
<td>108</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown</td>
<td>32</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixed</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Polled trait</td>
<td>200</td>
<td>Horned</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Polled</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Teat in does</td>
<td>168</td>
<td>Normal</td>
<td>160</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Supernumerary</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Wattle</td>
<td>200</td>
<td>Present</td>
<td>73</td>
<td>36.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Absent</td>
<td>127</td>
<td>63.5</td>
</tr>
<tr>
<td>Beard in all animals</td>
<td>200</td>
<td>Present</td>
<td>42</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Absent</td>
<td>15.8</td>
<td>79</td>
</tr>
<tr>
<td>Beard in bucks</td>
<td>32</td>
<td>Present</td>
<td>26</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Absent</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Beard in does</td>
<td>168</td>
<td>Present</td>
<td>16</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Absent</td>
<td>15</td>
<td>10.5</td>
</tr>
</tbody>
</table>

Phenotypic frequency

The phenotypic frequencies were computed by direct count method. The number of individuals carrying the structure was divided by the total number of individuals sampled as follows:

(a) Phenotypic frequency for wattle = \( \frac{\text{No. of individual having wattles}}{\text{Total No. of individual sampled}} \) \times 100

(b) Phenotypic frequency for beard = \( \frac{\text{No. of individual having beard}}{\text{Total No. of individual sampled}} \) \times 100

Genotypic/allelic frequency

As the genetic characters are defined by two alleles related by dominance, the genotypic frequencies were determined assuming the population to be genetically at Hardy-Weinberg equilibrium and that phenotypically single- wattle individual are allelically double-wattle (Rodero et al., 1996).

RESULTS AND DISCUSSION

Table 1 shows the incidence of qualitative traits in WAD goats as observed in this study. The coat colour was very variable and included black, brown, white, pied, mixed colour and in the same manner some animals were specked or with patches. The patterns of pigmentation were very irregular and in general, coat colours were grouped into three basic groups namely black, brown and mixed in the proportions of 54, 16 and 30% respectively.

The entire WAD goats examined in this study were horned irrespective of sex. The horns curl outwards and backwards in bucks, while they were sharp, upward and pointing backward in the does.

About 36.5% of all the WAD goats examined possessed wattle. The colour of the wattle was usually the predominant coat colour. Ninety-five percent of all the does studied had a pair of teat each while supernumerary teats were observed in only eight of them. Beard was exhibited by eighty-two percent of the bucks in this study.
and few does (8.3% of the does) were also observed to exhibit the trait.

Table 2 presents phenotypic and genotypic frequencies of wattle and beard in the population studied. Out of 200 adult WAD goats sampled, wattles were absent in 127 (63.5%) while 73 (36.5%) individual possessed the structure. The phenotypic and genotypic frequencies of wattles in the population were therefore 0.365 and 0.133 respectively. Beard was absent in 158 (79%) out of 200 adult WAD goats sampled while 42 (21%) individual possessed the structure. The phenotypic and genotypic frequencies of beard in the population were therefore 0.210 and 0.044 respectively.

The large variation in coat colours observed in this study is indicative of the fact that WAD goats in Southwestern Nigeria are yet to undergo ample and conscious selection efforts towards the improvement of coat colour, unlike in developed countries of the world, where different breeds of goats are known for their peculiar pattern of pigmentation. The irregular pattern of pigmentation observed in this study had been reported by some workers (Ryder, 1980; Osinowo et al., 1988; Odubote, 1994). The predominant black colour observed in this study may be an adaptation to the humid tropics in contrast to the brown and white colours predominantly found in the Red Sokoto and Sahel goats respectively of the arid Sahel zones. In the same manner, the black coat colour may predispose the goat to high heat load, high metabolic rate and increased thyroid activity as reported by Odubote (1994).

Over 63% of all animals examined in this study did not possess wattles. The expression of this trait could be termed to be occasional as reported by Wilson (1991). However, this observation was contrary to the report of Odubote (1994). He noted that the expression of wattles was a common phenomenon in the flock of goats. Although, the function of the wattles was not yet fully understood, it was suggested that it might be involved in heat regulation (body metabolism) as an adaptive feature (Odubote, 1994).

All the WAD goats examined were horned irrespective of the sex. This was similar to the observations of Mason (1984), Wilson (1991) and Odubote (1994). In the same manner, the polled goat that was not observed in this study suggested that the gene for polledness in some breeds of goat was associated with a form of intersexuality and cryptorchidism as reported by Legates and Warwick (1979).

The expression of beard trait among the bucks was predominant in this study because it is a secondary sexual characteristic under male hormonal control. Also, few does that were reported to exhibit this trait show that they possess threshold levels of androgenic hormone. Nonetheless, the beard in does had been reported to be sparse or scattered just as it is in young bucks (Odubote, 1994).

The normal number of teats observed among all does in this study was two but the low incidence of supernumerary teats might be due to mutation. The phenotypic frequencies of 0.05 reported for wattles in the WAD of Cameroonian sheep (FAO, 1991) is different from the phenotypic frequency of 0.365 reported for WAD in this study. The phenotypic frequency of 0.045 in WAD sheep and 0.823 in Yankasa sheep population had been reported (Salako, 2003). The genotypic frequency of 0.133 obtained in the study was lower than 0.63 recorded by Odubote (1994) for wattle from a single flock of WAD goats under a controlled breeding programme.

The quantitative evaluations are necessary in studying indigenous population particularly when qualitative traits have been speculated to be correlated to economic traits. Besides, the mode of inheritance of these traits should be investigated further with emphasis on modifier genes using breeding records.

REFERENCES
