PHENOTYPIC CHARACTERIZATION OF JAFFNA LOCAL SHEEP, AN INDIGENOUS LIVESTOCK BREED OF SRI LANKA

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Introduction

Jaffna Local Sheep (JLS) is an indigenous livestock breed of Sri Lanka. Over generations of natural and selective breeding, they have become highly adapted to the prevailing local conditions. Such indigenous breeds generally exhibit higher prolificacy and resistance to prevalent infectious diseases, compared to imported temperate breeds. These breeds are an important component of the animal genetic diversity of Sri Lanka. Increased genetic diversity allows for greater response to selection and faster adaptation to changes in climate, production systems, market demands and regulations. Livestock diversity also contributes to diversity of diets and hence improved nutrition among the human population. However, it is well accepted that, in developing countries like Sri Lanka, genetic diversity is potentially threatened by a variety of influences such as (i) use of exotic germplasm, (ii) changes in production systems, (iii) changes in producer preference because of socio-economic factors (emphasis on a single productive trait), and (iv) a range of natural and man-made disasters like the civil-war, the north and east of Sri Lanka experienced.

Jaffna Local Sheep has been recognized as a 'non-descriptive' breed that has not been sufficiently characterized, and an endangered breed that needs to be conserved. Proper characterization allows a breed to be accurately identified and to be incorporated into appropriate production systems and national livestock breeding programs. Germplasm conservation allows production of disease resistant, high yielding animals through cross-breeding and even re-establishment of the breed in the event of extinction. However, to-date, efforts for phenotypic/genotypic characterization or genetic conservation of the breed have not been made. Therefore, the Department of Farm Animal Production and Health of the Faculty of Veterinary Medicine and Animal Science and the Department of Animal Production and Health of the Ministry of Livestock and rural community Development collaboratively launched a program to characterize and conserve this breed for future generations.

Methodology

The study was carried out following recommendations of the Food and Agriculture Organization of the United Nations (FAO) for phenotypic characterization of indigenous animals. First, nine JLS farmers in Chavakachcheri were given a questionnaire and personally interviewed to understand the socio-economic characteristics of JLS farming. Then, qualitative (sex, age group, coat colour pattern, skin pigmentation, and presence of horns and wattles) and quantitative (body weight, body length, withers height, chest

girth, chest depth, shoulder width, rump length, rump width, head length, head width, chin circumference, horn length, ear length, tail length, hair length, scrotal circumference and scrotal length) traits were characterized in 107 animals (N = 98 females and N = 09 males) randomly selected from four farms. Further, blood samples were collected from 67 randomly selected animals (N = 59 females and N = 08 males) *via* jugular venipuncture to characterize haematological parameters of JLS. Statistical analysis of data was carried out using Analysis of Variance (ANOVA) and Chi-squared test (Minitab 14 Statistical Software, Minitab, Inc.).

Results and Discussion

Among the farms surveyed, herd size ranged from 30-700. A semi-intensive management system is practiced where animals are sent out grazing during the daytime and housed in makeshift paddocks at night. Paddocks are typically situated on agricultural lands where the JLS farmer gets paid ~Rs. 1000 per night for fertilizing the land with sheep manure. During the '*maha*' rainy season, this area gets flooded and the sheep are transported to higher grounds. Sheep survive completely on roughage and water found during daytime grazing. Healthcare interventions are also minimal, however, JLS survive and reproduce approximately three times every two years. Sheep are primarily reared for lamb and a well-grown animal is sold for Rs. 6,000 – 7,500. Seven out of nine farmers interviewed inherited the JLS farms from their father. Sheep are managed mainly using family labour and rarely using paid labour (Rs. 10,000/month/person). Given the minimal inputs, JLS farming in the Jaffna peninsula can be considered a highly profitable livestock business model.

Sheep were categorized as < 1-year-old (N = 35 females, N = 07 males); 1–2 years old (N = 31 females, N = 02 males) and > 2 years old (N = 32 females) based on their dentition patterns (FAO, 2012). All JLS females were polled; however, males were either horned (N = 03) or polled (N = 06). The coat colour was predominantly white with black spots (N = 64), brown spots (N = 37), or black and brown spots (N = 06). A pair of wattles was observed in the anterior-ventral neck region of some sheep. Occurrence of wattles was more common in males than in females ($P < 0.05$; N = 12 females, N = 4 males). Ears could be categorized as long (N = 51), medium-sized (N = 43) or short (N = 16) based on visual inspection. However, ear length was not associated with body size (e.g. with withers height, body length, body weight etc.; $P > 0.1$) suggesting that it may be related to 'parental' sheep breeds whose cross breeding gave rise to JLS decades ago.

The following mean measurements were obtained (Table 01): in 98 females and 09 males, body weight =23.2±0.5 kg. Additionally, scrotal circumference (mean =23.7±0.9 cm) and length (mean =11.6±0.7 cm) were recorded in males.

Hematological parameters obtained for JLS were as follows: *(i)* packed cell volume; mean = 29.8, range = 20.5 – 36.5%, *(ii)* red blood cell count; mean = 8.8 x 10^6/mL, range = 3.2 – 13.8 x 10^6/mL, and *(iii)* white blood cell count; mean = 6.6 x 10^3/mL, range = 0.6 – 12.9 x 10^3/mL. These values were similar to values reported for other tropical sheep breeds.

Table 1. Linear body measurements of 98 females and 09 males

No	Measurement	Mean (cm)	SD (cm)
01.	withers height	63.9	0.5
02.	body length	56.3	0.5
03.	chest girth	70.8	0.5
04.	chest depth	31.4	0.3
05.	shoulder width	12.9	0.2
06.	hip circumference	71.7	0.6
07.	rump width	12.4	0.1
08.	head length	15.5	0.3
09.	head width	10.8	0.1
10.	chin circumference	11.1	0.2
11.	tail length	10.2	0.2
12.	pelvic width	13.5	0.1
13.	long ears	13.6	0.3
14.	medium ears	8.7	0.3
15.	short ears	3.2	0.4
16.	hair length	2.0	0.1

Means of body measurements, Standard Deviation (SD).

Conclusions and Recommendations

According to the findings, JLS rearing is a profitable business model well adapted to prevailing local conditions in the peninsula. Based on phenotypic characterization, JLS can be described as a short-haired, medium-sized sheep with a black and/or brown spotted white coat. Males are horned or polled while all females are polled. Other notable observations include a sex-related predilection for wattles, and presence of ears of different lengths. These findings can be used to incorporate the breed in suitable livestock production and breeding programs at national and international arenas.

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