



E-ISSN: 2320-7078

P-ISSN: 2349-6800

[www.entomoljournal.com](http://www.entomoljournal.com)

JEZS 2020; 8(4): 413-415

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Received: 10-05-2020

Accepted: 12-06-2020

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## Population status of Kilakarsal sheep of Tamil Nadu, India

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**Abstract**

Kilakarsal sheep are found in the Tirunelveli districts of Tamil Nadu. A survey was carried out to collect information on breed characteristics, distribution areas, population status, disease prevalence, and production and reproduction performances of Kilakarsal. Animals of this breed have dark tan coat dorsally with black colouration in the ventral region especially in the under belly and inner side of legs. A black colour is also noticed above the eyelids on either side and along the lower jaw. The sheep is predominantly distributed in Manur Panchayat Union areas in Tirunelveli taluk, Palayamkottai Panchayat Union areas in Palayamkottai taluk of Tirunelveli district. The overall birth weight, 3-month, 6-month, 9-month and 12-month body weight were  $2.72 \pm 0.06$ ,  $9.47 \pm 0.31$ ,  $12.56 \pm 0.32$ ,  $14.39 \pm 0.36$  and  $19.90 \pm 0.51$  kg, respectively in nucleus flocks. The age at first mating for male was  $628.06 \pm 15.81$  days. On an average, the females were found to conceive  $8.17 \pm 0.06$  times in their life span. Survey found that number of sheep has been decreased to <1000 and few breeding rams are available in the farmers' field. Sustained efforts are needed for providing incentives and quality breeding rams to the farmers. This will create farmers' interest in rearing this breed and ensure *ex situ* conservation.

**Keywords:** Breed characteristics, conservation, kilakarsal, sheep, population, Tamil Nadu

**Introduction**

Kilakarsal is a registered breed of sheep native to southern districts of Tamil Nadu (INDIA\_SHEEP\_1800\_KILAKARSAL\_14024) [11]. The breed is hardy, heat resistant and has the capacity to utilize coarse feed materials efficiently, the traits that are beneficial in drought prone areas. Animals of this breed are medium sized with compact body conformation and reared for meat purpose. The distinct breed characters include dark tan coat dorsally and black colour ventrally in the belly and inner side of legs [12]. Conservation of biodiversity has been a global issue and conservation of animal genetic resources is a subject of great importance [8]. Of late, Kilakarsal is indiscriminately crossing with rams of other breeds in its home tract and this may threaten its population. Keeping this in view the present study was carried out to estimate the population status of Kilakarsal sheep in its natural breeding tract. This will help the policy makers to take action for conserving this valuable germplasm.

**Materials and Methods**

A survey was carried out to collect information on distribution areas, breed characteristics, population status, production and reproduction performances of Kilakarsal sheep using a questionnaires as a part of National Bureau of Animal Genetic Resources project entitled "In-situ conservation of Kilakarsal sheep under Network Project on Animal Genetic Resources" at Veterinary College and Research Institute, Tirunelveli, Tamil Nadu (India). The systematic field based survey was started during 2019 with collection of information from 53 villages of five revenue blocks comprising Tirunelveli and Thoothukudi districts of Tamil Nadu. The data related to body weight of different age groups and reproductive performance of the sheep was recorded from farmers' field and Livestock Farm Complex, Veterinary College and Research Institute, Tirunelveli and District Livestock Farm, Tirunelveli for assessing the production potential. Socio-economic status of the farmers and disease prevalence of the sheep were also studied. The data was analysed by mixed model least square maximum likelihood programme [6].

**Results and discussion****Origin and distribution**

Based on the information obtained during discussions with elderly members of sheep breeders in the breeding tract, Kilakarsal sheep appears to be known since more than five to six hundred

years. The animals of this breed are predominantly distributed in Manur Panchayat Union areas in Tirunelveli taluk, Palayamkottai Panchayat Union areas in Palayamkottai taluk of Tirunelveli District. This sheep breed is also found in quantifiable number at Ottapidaram Panchayat Union areas of Thoothukudi District (adjoining areas of Tirunelveli district). Earlier Kilakarsal sheep was distributed in Ramanathapuram, Madurai and some part of Tirunelveli districts of Tamil Nadu reported by [5]. This might be due to shrinkage in breeding tract of this breed.

### Breed characteristics

Animals of this breed have dark tan coat dorsally with black colouration in the ventral region especially in the under belly and inner side of legs. A black colour is also noticed above the eyelids on either side and along the lower jaw. Rams have well developed twisted horns (Fig 1) and the ewes are polled (Fig 2). Horns are grey, flat and length that range from 13 to 32 cm depending on the age. Ears are medium in length (10 to 12 cm) and semi pendulous in nature. Short tail (6-8 cm) tapering towards the free end and is having small sized udder, its presence could clearly be noticed without handling the ewes, only during lactation period. Teats are small and directed slightly outward. Some females have two wattles, each 3-4 cm length.

The colour and other morphological characters of Kilakarsal sheep were distinct from other southern Tamil Nadu sheep breeds viz., Vembur and Ramnad White. Vembur is medium to large sized sheep and the coat is white in colour with irregular tan to red or black patches all over the body [3]. The coat colour of Ramnad White sheep is predominantly milky white in nature. Black rings around the eyes and mouth are typical characteristics of this breed [13].



Fig 1: Kilakarsal Rams



Fig 2: Kilakarsal ewes with lambs

### Population status

During the project period (2008-2013), 89 Kilakarsal rams were supplied to the farmers and by the efforts taken; the

population of Kilakarsal sheep has gone up to 2428 consisting of 52 rams, 2201 ewes, 84 ram lambs and 81 ewe lambs. After closure of the project, the population again decreased drastically due to rams sold by the farmers because of the reducing population, the farmers with small Kilakarsal flocks commenced inbreeding. They preferred continuous selection and started using the same ram for breeding. This prevents further variation among the sheep.

A feedback survey in 2019 found a miserable and shocking fact, that the total of 2428 has been decreased to <1000 and only few breeding rams are available in the farmers' flocks. Moreover the Kilakarsal females are continuously bred with the chevaadu males by the farmers due to the lack of elite Kilakarsal males. This makes the genetic makeup of the available Kilakarsal sheep similar to chevaadu. The estimated population of Kilakarsal sheep in this study was lower than that of [1]. He presented the population of Kilakarsal breed in the form of total sheep population of Kilakarsal distribution area as 0.207million adult males and 0.981million adult females on the basis of 1977 census.

### Production and Reproduction performances

The production performances of Kilakarsal sheep maintained both nucleus and field flocks are furnished in Table 1 and 2. The overall birth weight, 3-month, 6-month, 9-month and 12-month body weight were  $2.72 \pm 0.06$ ,  $9.47 \pm 0.31$ ,  $12.56 \pm 0.32$ ,  $14.39 \pm 0.36$  and  $19.90 \pm 0.51$  kg, respectively in nucleus flocks. The corresponding values in field flocks were  $2.61 \pm 0.05$ ,  $8.35 \pm 0.26$ ,  $12.36 \pm 0.52$ ,  $14.16 \pm 0.51$  and  $18.07 \pm 0.33$ , respectively. Males were significantly  $P < 0.01$  heavier than female at 3, 6, 9 and 12 months of age and it might be due to differences in physiology of two sexes. These findings were in agreement with those reported by [4]. The sex-wise means for body weights at birth, 3, 6, 9 and 12 months of Kilakarsal sheep were lower than Madras Red sheep [2] but comparable in Chevaadu sheep [10].

The average age at first mating in males is  $628.06 \pm 15.81$  days. In female, age at first breeding, age at first oestrus, oestrus cycle duration, age at first lambing, gestation period, lambing interval and service period are  $552.80 \pm 12.54$  days,  $430.50 \pm 12.02$  days,  $16.78 \pm 0.32$  days, was  $708.87 \pm 12.88$  days,  $151.31 \pm 0.27$  days,  $318.84 \pm 10.18$  days and  $170.42 \pm 9.80$  days, respectively. The tugging per cent and lambing per cent were  $89.25 \pm 3.85$  and  $86.32 \pm 5.07$ , respectively. The average litter size was one and the life time number of lambing is found to be  $8.17 \pm 0.06$ . The age at first lambing in the present study for Kilakarsal sheep (18.4 months) was similar to that for Mecheri [7].

### Disease prevalence

Kilakarsal sheep were reported to be affected by blue tongue, enterotaxaemia, *peste des petis ruminants* and anthrax in the breeding tract. Vaccinations for blue tongue disease and enterotaxaemia were done and its adoption was nearly 90 per cent. The annual mean mortality rates were five per cent and two per cent respectively for lambs and adults. The mortality was higher in rainy season, especially in lambs between 0 and 3 months of age. The major causes of mortality were coccidiosis and liver flukes respectively in lambs and adults.

### Socio-economic status of Kilakarsal sheep farmers

The socio-economic status of Kilakarsal sheep farmers is given in Table 3. Mainly Konar (Yadhava) and Pallar (Scheduled Caste) are the communities/castes who maintained the Kilakarsal sheep flocks. The overall average annual income of the Kilakarsal sheep owners was Rs. 78,342

(Range: Rs. 25,000 – 1,50,000) with the mean flock size of 52. Majority of the Kilakarsal sheep farmers were marginal farmers (61.25%) followed by small (22.5%) and landless (12.5%) while 3.75% farmers were belonged to medium farmers category. Similar status was reported from Andhra

Pradesh [9]. The annual average number of lambs sold per flock size of 52 was  $32.7 \pm 1.84$  and manure sold was  $2.85 \pm 0.55$  tones. The average numbers of adult sheep disposed per annum was found to be  $8.12 \pm 0.22$  per flock size of 52.

**Table 1:** Growth performance of Kilakarsal sheep - Nucleus flock

	Birth	3 months	6 months	9 months	12 months
Sex	*	**	**	**	**
Male	2.77±0.06 (22)	9.91±0.63 (15)	12.76±0.37 (10)	14.62±0.88 (9)	20.65±0.70 (13)
Female	2.68±0.05 (28)	9.22±0.33 (27)	12.46±0.36 (19)	14.28±0.34 (18)	17.92±0.60 (17)
Total	2.72±0.06 (50)	9.47±0.31 (42)	12.56±0.32 (29)	14.39±0.36 (27)	19.90±0.51 (30)

\*Significant ( $P<0.05$ ) \*\* highly significant ( $P<0.01$ ); figures in parenthesis are the number of observations

**Table 2:** Growth performance of Kilakarsal sheep - Field flock

	Birth	3 months	6 months	9 months	12 months
Sex	*	**	**	**	**
Male	2.69±0.06 (261)	8.53±0.46 (124)	12.85±0.60 (55)	14.72±0.90 (30)	19.60±0.86 (18)
Female	2.55±0.05 (299)	8.24±0.33 (195)	12.18±0.49 (170)	14.03±0.65 (147)	19.83±0.48 (122)
Total	2.61±0.05 (560)	8.35±0.26 (319)	12.36±0.52 (225)	14.16±0.51 (177)	18.07±0.33 (140)

\*Significant ( $P<0.05$ ) \*\* highly significant ( $P<0.01$ ); figures in parenthesis are the number of observations

**Table 3:** Socio-economic status of Kilakarsal sheep farmers (N=80)

Characters	Average/percentage
<b>Family</b>	
Family size	5.42 ± 0.18 (2-8)
Male	3.32 ± 0.14 (1-5)
Female	2.14 ± 0.10 (0-5)
<b>Land holding</b>	
Irrigated land (acres)	1.39 ± 0.19 (0.5-5)
Un- irrigated land (acres)	2.22 ± 0.18 (0.4-7)
Landless	12.5
Marginal<2.5 acres	61.25
Small>2.5 to 5 acres	22.5
Medium>5 to 20 acres	3.75
<b>Grazing</b>	
Distance travelled (km)	8 (5-10)
Out time	10:00
In time	7:00
<b>Income and Expenditure</b>	
Annual income (Rs.)	78,342 (25000-150000)
Expenditure (Rs.)	3624
<b>Sale (Flock size – 52)</b>	
Lamb	32.7 ± 1.84
Adult	8.12 ± 0.22
Manure (ton)	2.85 ± 0.55

## Conclusion

Considering the small population size of this sheep breed in the state, the information collected from this study will be immensely useful in conservation of this indigenous genetic resource. The performance of these animals can be improved further by selecting the superior rams from the farmers' flocks and distributing them in the field for propagating the breed. Sustained efforts are needed for providing incentives and quality breeding rams to the farmers. This will create farmers' interest in rearing this breed and ensure *ex situ* conservation.

## Acknowledgements

The authors are thankful to the Indian Council of Agricultural Research, New Delhi and National Bureau of Animal Genetic Resources, Karnal, Haryana for providing the financial assistance to conduct the study.

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