

Characterization of Kodi Adu goats of Tamil Nadu, India

A.K.Thiruvenkadan^{*1}, R.Saravanan² and M.Chellapandian³

Department of Animal Genetics and Breeding
Veterinary College and Research Institute
Tamil Nadu Veterinary and Animal Sciences University
Namakkal-637002, Tamil Nadu, India

ABSTRACT

A detailed study on distribution and performance of Kodi Adu breed of goats were made in the 253 herds of co-operating farmers in the 36 selected villages in its breeding tract. The study revealed that the Kodi Adu goats were mainly distributed in Thoothukudi and Ramanathapuram districts of southern Tamil Nadu and were tall, long, lean and leggy animals with compact body. Based on body colour, they were classified into two colour varieties viz. Chem-Porai and Karum-Porai. The least-squares means for height at withers, body length, chest girth, horn length, ear length, face length and tail length of fully grown adult goats (full mouth), were 84.94 ± 0.49 , 77.56 ± 0.43 , 79.28 ± 0.48 , 16.16 ± 0.33 , 15.91 ± 0.24 , 17.79 ± 0.19 and 17.90 ± 0.25 cm respectively. The least-squares means for body weight at birth, three months, six months, nine months and 12 months of age were 2.81 ± 0.04 , 11.41 ± 0.16 , 14.70 ± 0.23 , 16.79 ± 0.3 and 22.95 ± 0.31 kg respectively. The statistical analysis revealed a highly significant effect ($P < 0.01$) of sex on body weight of Kodi Adu goats at different stages. The averages for age at first kidding and kidding intervals were 15.37 ± 0.08 and 7.67 ± 0.03 months respectively. Kodi Adu goats serve as the sole or subsidiary source of livelihood for a large number of small and marginal farmers and landless labourers in the breeding tract. The present population status explicitly does not warrant immediate conservation measures, however, initiation of Open Nucleus Breeding Scheme (ONBS) and forage and range development programmes should be made in its breeding tract for better productivity.

Key Words: Kodi Adu, Goat, Breed Characteristics, Production, Reproduction, India

INTRODUCTION

India is one of the 12-mega biodiversity centres of the world. It is well marked off from the rest of Asia by mountains and the sea, which gives the country a distinct

geographical entity. Goat is a multi-functional animal and plays a significant role in the economy and nutrition of landless, small and marginal farmers in India. In pastoral and agricultural subsistence societies, goats are kept as a source of additional income and as an insurance against natural calamities. They are distributed in extremes of climates i.e., from tropical desert, characterized by temperature extremes (i.e.

* Corresponding author Email ID:

drthirusiva@gmail.com

1 Professor, 2 Assistant Professor, 3 Professor and Head,
Department of Animal Nutrition, Veterinary College and
Research Institute, Tirunelveli, Tamil Nadu

., Thar desert) with insignificant rainfall and sparse vegetation to high altitude mountain areas up to 2,500 m above m.s.l such as the Himalayan region. Tamil Nadu state is endowed with three recognised breeds of goats viz. Kanni Adu, Kodi Adu and Salem Black (Acharya, 1982; Mariadas, 1996; Jain *et al.*, 2000; Thiruvankadan *et al.*, 2000a; Thiruvankadan and Karunanithi, 2006) and all belongs to meat type goats. Kodi Adu goats are distributed in southern coastal region of Tamil Nadu and are docile and hardy with faster growth rate and early maturity. Barring a few preliminary studies on Kodi Adu goats (Mariadas, 1996; Jain *et al.*, 2000; Report, 2002), information on the distribution, population status, morphological characteristics, economic traits and management practices of this breed in its natural ecological conditions are scanty. Hence, a detailed study on Kodi Adu goats in its breeding tract has been made.

MATERIALS AND METHODS

Survey on geographic and demographic distributions of Kodi Adu goats were made in Tirunelveli, Thoothukudi, Virudhunagar, Ramanathapuram, Sivagangai, Pudukkottai and Thanjavur districts of southern Tamil Nadu. Data on morphology as well as production and reproduction traits were collected in the 253 herds of co-operating farmers in the 36 selected villages in the breeding tract. The body measurements and body weight were made in 1526 animals of various age groups of both sexes. For analysis of body measurements and body weight, the kids were classified into birth, three, six, nine and 12 months and the adults were classified as 2-tooth, 4-tooth, 6-tooth and full mouth of age. Data on

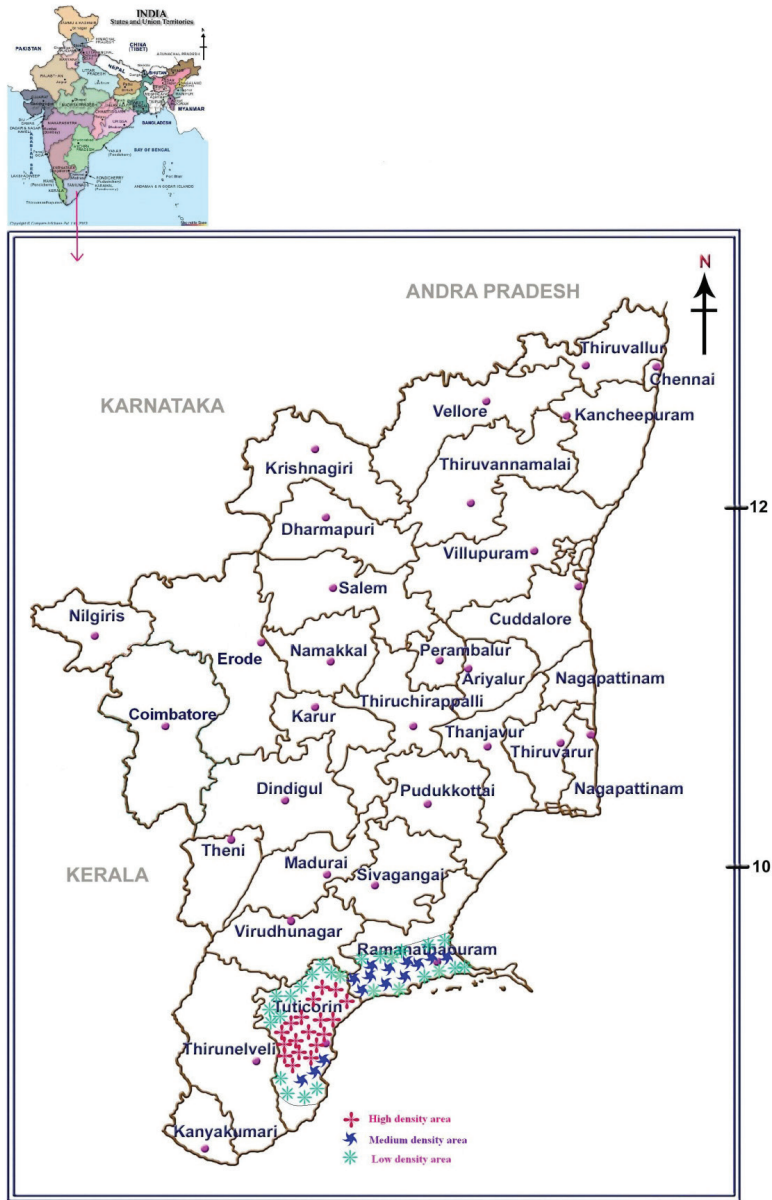
reproduction traits were collected from 317 males and 494 females. The reproduction traits of males viz. age at first mating and of females viz. age at first oestrus, age at first mating, age at first kidding, kidding interval, litter size, kidding percentage and life-time number of kidding were recorded from the yearlings and does present in the herd by observation and information provided by the herd owners. As the data were unequal and disproportionate in different subclasses, least-squares analysis (Harvey, 1990) was performed and Duncan's Multiple Range Test (DMRT) was applied (Kramer, 1957) whenever the effect was significant and the subclasses were more than two. The fixed effects considered for the study of metric traits were sex, colour variant (Chem-Porai and Karum-Porai) and location (Thoothukudi and Ramanathapuram districts).

RESULTS AND DISCUSSION

Origin, Habitat and Distribution

The survey revealed that the Kodi Adu goats were distributed in parts of Thoothukudi and Ramanathapuram districts of southern Tamil Nadu (Fig. 1). The total estimated Kodi Adu goat population was 1,67,104 numbers. The average herd size of Kodi Adu goats was 17.60 (range: 4 to 127), of which, there were 0.77 buck, 11.27 does and 5.56 kids. The percentage of farmers keeping Kodi Adu with a herd size of up to 10, 11 to 20, 21 to 30 and >30 were 9.91, 38.20, 34.89 and 17.00 per cent respectively. The overall male and female ratio at the age group of 0 to 3, 3 to 6 months and adults were 1: 1.57, 1:6.56 and 1:24.50 respectively.

Fig. 1. Breeding tract of Kodi Adu goats



Breed Characteristics

Morphology

Kodi Adu goats were tall, long, lean and leggy animals with compact body.

Based on body colour, Kodi Adu goats were mainly grouped into two colour varieties viz. Chem-Porai and Karum-Porai. Chem-Porai goats were white in colour with

varying extent of reddish brown colour and intensity (Fig. 2), whereas, Karum-Porai goats were white in colour with varying extent of splashes of black colour (Fig. 3). The percentage of Chem-Porai and Karum-Porai goats in the herds studied were 72.82 and 27.18 per cent respectively. The ears were medium-long, leaf-like and semi-pendulous. There was no typical horn pattern; but majority of them had their horns directed upward, backward and curved downward or upward and sharply at the tip. They had long, lean and straight legs squarely set under the body. The legs were covered with short hairs. The tail was thin, medium-long and curled upward. Udder was not well-developed; it was round and tightly attached to the belly with small conical teats placed laterally.

Fig. 2. Kodi Adu buck -Chem-Porai (predominance of reddish brown splashes)



Body measurements

The least-squares means (\pm SE) of height at withers, body length and chest girth of Kodi Adu kids and adults are presented in Tables 1 and 2. For fully grown adult goats (full mouth), the least-squares

means for height at withers, body length and chest girth were 84.94 ± 0.49 , 77.56 ± 0.43 and 79.28 ± 0.48 cm respectively. Least-squares analysis revealed that the colour of the kids had no significant effect on body weight at different stages of growth. Based on height at withers, goats are classified as large (>65 cm), small (51 to 65 cm) and dwarf (<50 cm) (Devendra and Burns, 1983). Accordingly, Kodi Adu can be grouped under a large breed category. On comparison, Kodi Adu goats were taller and longer than Kanni Adu and Salem Black goats of Tamil Nadu and Attappady Black goats of Kerala (Report, 2002; Stephen *et al.*, 2005; Thiruvankadan and Karunanithi, 2006). The chest girth observed in Kodi Adu goats was comparable with the values reported for Salem Black goats (Gopu *et al.*, 2008). In general, in kids and adults, height at withers was the highest followed by chest girth and body length. Similar pattern was also reported in Kanni Adu, Attappady Black and Salem Black goats (Gopu, 2002; Stephen *et al.*, 2005; Thiruvankadan and Karunanithi, 2006) of southern India.

Fig. 3. Kodi Adu doe-Chem-Porai (note the leaf like ears)



Table 1. Least-squares means (\pm SE) of height at withers, body length and chest girth (cm) of Kodi Adu kids

Effects	Birth	Three months	Six months	Nine months	12 months
Height at withers (cm)					
Overall	35.83 \pm 0.40 (140)	57.23 \pm 0.37 (175)	64.24 \pm 0.46 (175)	67.03 \pm 0.54 (127)	73.04 \pm 0.41 (163)
Sex		*	*		**
Male	35.92 \pm 0.48 (76)	57.84 \pm 0.51 ^b (80)	64.85 \pm 0.56 ^b (81)	67.21 \pm 0.68 (60)	73.92 \pm 0.53 ^b (54)
Female	35.73 \pm 0.56 (64)	56.63 \pm 0.46 ^a (95)	63.62 \pm 0.58 ^a (94)	66.84 \pm 0.75 (67)	72.16 \pm 0.47 ^a (109)
Colour					
Chem-Porai	35.87 \pm 0.40 (106)	57.13 \pm 0.42 (119)	64.41 \pm 0.49 (126)	66.78 \pm 0.63 (84)	73.37 \pm 0.39 (123)
Karum-Porai	35.79 \pm 0.68 (34)	57.34 \pm 0.57 (56)	64.06 \pm 0.68 (49)	66.53 \pm 0.82 (43)	72.72 \pm 0.62 (40)
Location		*	*		
Thoothukudi	36.42 \pm 0.45 (94)	57.61 \pm 0.38 ^b (130)	63.68 \pm 0.40 ^a (145)	67.01 \pm 0.57 (92)	72.71 \pm 0.36 (134)
Ramanathapuram	35.24 \pm 0.60 (46)	56.86 \pm 0.62 ^a (45)	64.79 \pm 0.81 ^b (30)	67.04 \pm 0.90 (35)	73.37 \pm 0.68 (29)
Body length (cm)					
Overall	30.81 \pm 0.44 (140)	51.27 \pm 0.35 (175)	58.98 \pm 0.47 (175)	59.79 \pm 0.55 (127)	65.68 \pm 0.45 (163)
Sex			**		*
Male	31.26 \pm 0.52 (76)	51.63 \pm 0.48 (80)	59.94 \pm 0.56 ^b (81)	60.42 \pm 0.76 (60)	66.37 \pm 0.59 ^b (54)
Female	30.35 \pm 0.61 (64)	50.90 \pm 0.43 (95)	58.01 \pm 0.59 ^a (94)	59.15 \pm 0.69 (67)	64.98 \pm 0.52 ^a (109)
Colour					
Chem-Porai	30.71 \pm 0.43 (106)	51.30 \pm 0.39 (119)	58.72 \pm 0.49 (126)	58.98 \pm 0.64 (84)	64.73 \pm 0.43 (123)
Karum-Porai	30.91 \pm 0.74 (34)	51.23 \pm 0.53 (56)	59.23 \pm 0.68 (49)	60.60 \pm 0.83 (43)	64.34 \pm 0.68 (40)
Location			**		
Thoothukudi	31.36 \pm 0.49 (94)	51.56 \pm 0.36 (130)	57.98 \pm 0.40 ^a (145)	60.41 \pm 0.58 (92)	65.01 \pm 0.40 (134)

Ramanathapuram	30.25 ± 0.66 (46)	50.97 ± 0.58 (45)	59.97 ± 0.81 ^b (30)	59.16 ± 0.91 (35)	66.34 ± 0.76 (29)
Chest girth (cm)					
Overall	30.91 ± 0.44 (140)	51.19 ± 0.34 (175)	58.58 ± 0.45 (175)	59.92 ± 0.53 (127)	65.94 ± 0.39 (163)
Sex			**	**	*
Male	30.94 ± 0.52 (76)	51.67 ± 0.47 (80)	59.36 ± 0.55 ^b (81)	60.64 ± 0.74 ^b (60)	66.58 ± 0.52 ^b (54)
Female	30.88 ± 0.61 (64)	50.71 ± 0.42 (95)	57.79 ± 0.57 ^a (94)	59.21 ± 0.67 ^a (67)	65.30 ± 0.45 ^a (109)
Colour					
Chem-Porai	30.82 ± 0.43 (106)	51.06 ± 0.38 (119)	58.32 ± 0.48 (126)	58.34 ± 0.62 (84)	65.05 ± 0.38 (123)
Karum-Porai	31.00 ± 0.74 (34)	51.32 ± 0.52 (56)	58.84 ± 0.67 (49)	61.50 ± 0.81 (43)	65.83 ± 0.60 (40)
Location					
Thoothukudi	31.39 ± 0.49 (94)	51.45 ± 0.35 (130)	57.95 ± 0.39 (145)	60.14 ± 0.57 (92)	65.52 ± 0.34 (134)
Ramanathapuram	30.43 ± 0.66 (46)	50.92 ± 0.57 (45)	59.21 ± 0.79 (30)	59.71 ± 0.89 (35)	66.36 ± 0.66 (29)

* Significant ($P < 0.05$); ** Highly significant ($P < 0.01$)

Figures in parentheses are number of observations

Table 2. Least-squares means (\pm SE) of height at withers, body length and chest girth (cm) of Kodi Adu adults

Effects	2-tooth	4-tooth	6-tooth	Full mouth	Overall
Height at withers (cm)					
Overall	76.41 ± 0.54 (154)	80.78 ± 0.76 (136)	81.38 ± 0.52 (181)	84.94 ± 0.49 (275)	80.45 ± 0.28 (746)
Sex		**	**	**	**
Male	76.88 ± 0.68 (63)	84.20 ± 1.03 ^b (48)	81.78 ± 0.74 ^b (62)	88.07 ± 0.74 ^b (63)	82.56 ± 0.39 ^b (236)
Female	75.95 ± 0.68 (91)	77.37 ± 0.85 ^a (88)	78.99 ± 0.59 ^a (119)	81.81 ± 0.49 ^a (212)	78.33 ± 0.32 ^a (510)
Colour					
Chem-Porai	76.33 ± 0.56 (109)	80.89 ± 0.76 (101)	81.01 ± 0.54 (133)	84.97 ± 0.51 (196)	80.74 ± 0.29 (539)

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Karum-Porai	76.50 ± 0.81 (45)	80.68 ± 1.16 (35)	80.45 ± 0.81 (48)	84.91 ± 0.69 (79)	80.15 ± 0.42 (207)
Location	**	*			*
Thoothukudi	75.50 ± 0.49 ^a (124)	79.99 ± 0.68 ^a (110)	79.59 ± 0.53 (136)	84.95 ± 0.46 (225)	79.97 ± 0.27 ^a (595)
Ramanathapuram	77.33 ± 0.94 ^b (30)	81.58 ± 1.28 ^b (26)	81.17 ± 0.83 (45)	84.94 ± 0.79 (50)	80.92 ± 0.47 ^b (151)
Body length (cm)					
Overall	68.88 ± 0.50 (154)	72.01 ± 0.41 (136)	72.34 ± 0.46 (181)	77.56 ± 0.43 (275)	72.63 ± 0.23 (746)
Sex	*	**	*	**	**
Male	69.72 ± 0.64 ^b (63)	72.67 ± 0.58 ^b (48)	74.94 ± 0.63 ^b (62)	79.83 ± 0.66 ^b (63)	74.20 ± 0.32 ^b (236)
Female	68.05 ± 0.64 ^a (91)	69.74 ± 0.52 ^a (88)	71.34 ± 0.46 ^a (119)	75.29 ± 0.43 ^a (212)	71.05 ± 0.26 ^a (510)
Colour					
Chem-Porai	68.81 ± 0.52 (109)	72.69 ± 0.46 (101)	72.43 ± 0.42 (133)	77.27 ± 0.45 (196)	72.82 ± 0.24 (539)
Karum-Porai	68.96 ± 0.75 (45)	71.04 ± 0.64 (35)	72.03 ± 0.70 (48)	77.85 ± 0.62 (79)	72.43 ± 0.34 (207)
Location					
Thoothukudi	68.27 ± 0.46 (124)	71.84 ± 0.41 (110)	71.86 ± 0.41 (136)	77.18 ± 0.41 (225)	72.27 ± 0.22 (595)
Ramanathapuram	69.50 ± 0.87 (30)	72.16 ± 0.65 (26)	72.84 ± 0.77 (45)	77.94 ± 0.71 (50)	72.98 ± 0.38 (151)
Chest girth (cm)					
Overall	69.61 ± 0.51 (154)	74.72 ± 0.48 (136)	74.74 ± 0.46 (181)	79.28 ± 0.48 (275)	74.49 ± 0.24 (746)
Sex		**	**	**	**
Male	69.73 ± 0.64 (63)	75.94 ± 0.65 ^b (48)	77.22 ± 0.65 ^b (62)	81.05 ± 0.72 ^b (63)	75.85 ± 0.34 ^b (236)
Female	69.49 ± 0.64 (91)	72.22 ± 0.53 ^a (88)	73.54 ± 0.52 ^a (119)	77.52 ± 0.47 ^a (212)	73.13 ± 0.28 ^a (510)
Colour					
Chem-Porai	69.38 ± 0.53 (109)	75.14 ± 0.48 (101)	75.23 ± 0.48 (133)	79.11 ± 0.5 (196)	74.65 ± 0.25 (539)
Karum-Porai	69.84 ± 0.76 (45)	73.94 ± 0.72 (35)	74.67 ± 0.73 (48)	79.45 ± 0.67 (79)	74.32 ± 0.37 (207)

Location		**			*
Thoothukudi	68.74 ± 0.46 (124)	73.34 ± 0.43 ^a (110)	74.58 ± 0.46 (136)	78.95 ± 0.44 (225)	73.62 ± 0.23 ^a (595)
Ramanathapuram	70.48 ± 0.88 (30)	76.10 ± 0.80 ^b (26)	75.95 ± 0.73 (45)	79.61 ± 0.77 (50)	75.35 ± 0.41 ^b (151)

* Significant (P < 0.05) ** Highly significant (P < 0.01) Figures in parentheses are number of observations

Production Performance

The least-squares means for body weight of Kodi Adu kids is presented in Table 3. Male kids weighed significantly (P < 0.01) higher than female kids at all the age groups, but the colour of the kids had no significant effect on body weight at different stages of growth. Location of the animals had significant influence (P < 0.05) on birth, six months and 12 months of age. On comparison, the body weight of Kodi Adu kids at different age groups were higher than those reported for Kanni Adu, Salem Black and Attappady Black goats (Report, 2002; Gopu, 2002; Stephen *et al.*, 2005). However, colour of the animal had no significant influence on body weight at different adult stages. The body weight

of Kodi Adu bucks and does observed at full mouth of age was comparable with the values reported for Kanni Adu goats (Report, 2002). However, higher than the values observed were also reported for Salem Black and Attappady Black goats (Stephen *et al.*, 2005; Thiruvankadan and Karunanithi, 2006).

There was no significant difference in dressing percentage and other carcass traits between males and females. The age of the animal had highly significant effect (P < 0.01) on all the carcass traits. The overall dressing percentage observed in Kodi Adu goats (46.69 ± 0.25 per cent) was lower than those reported for Kanni Adu (48.23 ± 0.002 per cent) goats (Report, 2002).

Table 3. Least-squares means (\pm SE) of body weight (kg) of Kodi Adu goats

Effects	Birth	Three months	Six months	Nine months	12 months	2-tooth	4-tooth	6-tooth	Full mouth
Overall	2.81 \pm 0.04 (140)	11.41 \pm 0.16 (175)	14.70 \pm 0.23 (175)	16.79 \pm 0.30 (127)	22.95 \pm 0.31 (163)	26.46 \pm 0.33 (154)	29.39 \pm 0.35 (136)	33.05 \pm 0.55 (181)	36.99 \pm 0.59 (275)
Sex	**	**	**	**	**	*	**	**	**
Male	2.89 \pm 0.04 ^b (76)	11.56 \pm 0.22 ^b (80)	15.18 \pm 0.27 ^b (81)	17.29 \pm 0.41 ^b (60)	23.63 \pm 0.36 ^b (54)	26.98 \pm 0.42 ^b (63)	31.92 \pm 0.47 ^b (48)	34.65 \pm 0.79 ^b (62)	40.58 \pm 0.89 ^b (63)
Female	2.72 \pm 0.05 ^a (64)	11.25 \pm 0.20 ^a (95)	14.22 \pm 0.29 ^a (94)	16.29 \pm 0.37 ^a (67)	22.47 \pm 0.41 ^a (109)	25.95 \pm 0.42 ^a (91)	26.85 \pm 0.39 ^a (88)	31.46 \pm 0.63 ^a (119)	33.39 \pm 0.59 ^a (212)
Colour									
Chem-Porai	2.83 \pm 0.04 (106)	11.35 \pm 0.18 (119)	14.87 \pm 0.24 (126)	16.85 \pm 0.35 (84)	23.32 \pm 0.3 (123)	26.47 \pm 0.34 (109)	29.93 \pm 0.34 (101)	33.73 \pm 0.58 (133)	37.66 \pm 0.62 (196)
Karum-Porai	2.78 \pm 0.06 (34)	11.47 \pm 0.25 (56)	14.53 \pm 0.34 (49)	17.02 \pm 0.45 (43)	22.58 \pm 0.48 (40)	26.46 \pm 0.49 (45)	28.84 \pm 0.53 (35)	32.38 \pm 0.87 (48)	36.31 \pm 0.84 (79)
Location	*	*	*	*	*	**	**	**	**
Thoothukudi	2.84 \pm 0.04 ^b (94)	11.34 \pm 0.16 (130)	14.29 \pm 0.20 ^a (145)	16.85 \pm 0.32 (92)	22.37 \pm 0.28 ^a (134)	25.44 \pm 0.30 ^a (124)	29.72 \pm 0.31 (110)	31.40 \pm 0.56 ^a (136)	37.81 \pm 0.55 (225)
Ramanathapuram	2.77 \pm 0.06 ^a (46)	11.47 \pm 0.27 (45)	15.11 \pm 0.40 ^b (30)	16.73 \pm 0.49 (35)	23.52 \pm 0.53 ^b (29)	27.49 \pm 0.57 ^b (30)	29.05 \pm 0.58 (26)	34.71 \pm 0.89 ^b (45)	36.16 \pm 0.96 (50)

* Significant ($P < 0.05$); ** Highly significant ($P < 0.01$). Figures in parentheses are number of observations

Reproduction performance

The reproduction performance of Kodi Adu goats is presented in Table 4. The average age at first mating observed in males and females was slightly higher than the reported values of 9.90 ± 0.20 and 9.38 ± 0.11 months respectively for Kanni Adu goats (Thiruvankadan *et al.*, 2000b). About 48 per cent of the does in the herds studied were reported to have kidded well before the eruption of the first pair of permanent incisors. The age at first kidding observed in Kodi Adu goats is comparable with the values reported for Kanni Adu (14.63 ± 0.11 months), Attappady Black (13.0 ± 2.6 days) and Salem Black goats (14.8 ± 0.20 months) (Report, 2002; Stephen *et al.*, 2005; Thiruvankadan and Karunanithi, 2006). The mean litter size observed in Kodi Adu goats was comparable to the value of 1.6 ± 0.03 reported for Salem Black goats of Tamil Nadu (Thiruvankadan and Karunanithi, 2006). Kodi Adu does showed non-seasonality of breeding and

exhibited oestrus throughout the year with peak in October, September and November months. The number of animals mated in each season coincides with rainfall and is in accordance with the results obtained in Kanni Adu, Attappady Black and Salem Black (Thiruvankadan, 2002; Stephen *et al.*, 2005; Thiruvankadan and Karunanithi, 2006).

Kodi Adu goats are important goat genetic resources in south-eastern coastal areas of Tamil Nadu and the study revealed that the present population status explicitly does not warrant immediate conservation measures. Since, the average herd size of Kodi Adu goats is small, initiation of Open Nucleus Breeding Scheme (ONBS) is essential for further genetic improvement of this breed. In addition, forage and range development programmes should be implemented by involving local stakeholders, particularly goat breeders for increased fodder availability to the goats.

Table 4. Least-squares means (\pm SE) of reproduction traits of Kodi Adu goats

Character	Overall	Variety		District	
		Chem-Porai	Karum-Porai	Thoothukudi	Ramanathapuram
Male					
Number of observations	317	217	100	249	68
Age at first mating (months)	11.17 \pm 0.11	11.15 \pm 0.12	11.19 \pm 0.17	11.20 \pm 0.10	11.15 \pm 0.19
Female					
Number of observations	494	336	158	356	138
Age at first mating (months)	10.33 \pm 0.08	10.49 \pm 0.09	10.16 \pm 0.13	10.21 \pm 0.08	10.45 \pm 0.13

Age at first kidding (months)	15.37 ± 0.08	15.45 ± 0.09	15.29 ± 0.13	15.12 ± 0.08	15.62 ± 0.13
Interval from kidding to conception (months)	2.80 ± 0.03	2.85 ± 0.03	2.75 ± 0.05	2.81 ± 0.03	2.79 ± 0.05
Kidding interval (months)	7.67 ± 0.03	7.68 ± 0.03	7.66 ± 0.04	7.67 ± 0.03	7.67 ± 0.04
Gestation length (days)	150.01 ± 0.17	150.02 ± 0.18	150.01 ± 0.26	150.30 ± 0.17	149.70 ± 0.27
Lifetime number of kidding	7.63 ± 0.05	7.84 ± 0.05	7.42 ± 0.08	7.65 ± 0.05	7.61 ± 0.08
Average litter size	1.63 ± 0.01	1.80 ± 0.01	1.66 ± 0.02	1.72 ± 0.01	1.73 ± 0.02
Kidding percentage (%)	152.70 ± 0.41	153.40 ± 0.45	152.01 ± 0.65	152.90 ± 0.43	152.60 ± 0.68

ACKNOWLEDGEMENTS

The first author thanks the International Foundation for Science, Sweden for the financial assistance provided to carry out the project.

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