



## Management and physical features of migratory Pulikulam cattle of Tamil Nadu

P K SINGH<sup>1</sup>, R K PUNDIR<sup>2</sup>, P KUMARASAMY<sup>3</sup> and P VIVEKANANDAN<sup>4</sup>

National Bureau of Animal Genetic Resources, Karnal, Haryana 132 001 India

Received: 26 November 2011; Accepted: 25 April 2012

**Key words:** Biometry, Penning, Population status, Pulikulam, Vaaram

The south Indian cattle breeds are characterized by elegant long horns with grey coat colour, which generally include Amritmahal and Hallikar breeds of Karnataka, Kangayam and Bargur of Tamil Nadu and Khillar of Maharashtra. However, there are many other breeds available in the region under specific managemental conditions, of these one is the Pulikulam, which is maintained as big migratory herds in the Madurai area of Tamil Nadu. This breed is famous for *Jellicut* and bullocks are used for all kind of agricultural operations and rural transport. In the present study an attempt was made to characterize Pulikulam cattle through systematic survey.

The survey was undertaken to cover 22 big herds of Pulikulam cattle belonging to 79 farmers/herders in the Madurai, Virudhunagar and Sivagangai districts of Tamil Nadu. Information on various aspects of management practices followed by the herders was collected by interviewing them on a pre-designed questionnaire developed for the purpose. The morpho-metric measurements, viz. face length (FL), ear length (EL), horn length (HL), body length (BL), height at withers (height), chest girth (CG), paunch girth (PG), tail length without switch (TL) and tail length with switch (TLS) were recorded on 204 animals belonging to different age and sex groups. Production and reproduction performance traits were obtained by interviewing their owners. The physical characters were also recorded on 204 animals on a pre-designed questionnaire. The reproduction and production traits (age at first calving, daily milk yield, lactation period, inter-calving period and number of inseminations per conception) were recorded on 50 lactating cows. The data collected from the study were compiled and analyzed by using standard statistical procedures.

*Origin, geographical distribution and native environment of the breed:* As informed by the herders of the area, the origin of the Pulikulam cattle is Pulikulam village of

Sivagangai district of Tamil Nadu. The breed was included in the books authored by Gunn (1909), Littlewood (1936) and Pattabhiraman (1962). The synonyms of the breed are Palingu madu, Nattu madu, Manimadu, Kilakad, Kilakattumadu and Jallikattumadu. The animals of Pulikulam cattle are maintained as migratory herds in Madurai, Sivagangai and Virudhunagar districts of Tamil Nadu (Fig. 1).

The breeding tract of Pulikulam cattle lies between 9°30' and 10°30'N latitude and between 77°47' and 78°49'E longitude. The climate of the region is semi-arid tropical and has higher mean temperature and low degree of relative humidity. The temperature generally ranges from 20°C to 37°C during hottest months i.e. April to June. The annual rainfall in the area is generally more than 800 mm. The soil of the area is red or black cotton soil.

*Population status:* The population of Pulikulam cattle was about 50,000, of which 20,000 were breeding females. These animals are distributed in more than 200 herds of about 50 villages of Madurai, Virudhunagar and Sivagangai districts of Tamil Nadu. This is in agreement of the report of Kanakraj and Kathiresan (2006). The number of herds per village varied from 1 to 24. The herd size of the Pulikulam cattle varied from 30 to 500 with an average of 225, which was reported to be decreasing during last 2–3 decades mainly due to shrinkage in grazing land.

*General management practices in rearing of Pulikulam cattle:* The Pulikulam cattle are mainly maintained by the Konar and Thevar communities in Sivagangai and Madurai districts. These communities are keeping these herds as traditional business of their families. The animals were reared as big herds and for economic reasons and minimize the manpower requirement, these herds (100–150) were further pooled to form more big herds of 250 to 1 000 animals. The animals of herds belonging to different owners were branded differently by hot iron rod, based on the brand marks they identify their animals even if mixed with other herds while grazing. Animals were able to respond for the owner's voice when they want to separate their animals from the mixed herd. Even ferocious bulls were amenable for the owner's voice when they want to control them. The Pulikulam cattle

Present address: <sup>1</sup>, <sup>2</sup>Principal Scientist (pksinghmathura@gmail.com, pundirrk@sify.com). <sup>3</sup>Professor and Head, Department of Bioinformatics, Madras Veterinary College, Chennai (pksamy2000@gmail.com). <sup>4</sup>Director, Sustainable-agriculture and Environmental Voluntary Action (SEVA), 45, TPM Nagar, Virattipathu, Madurai- 625 010 (vivekseva@dataone.in).



Fig. 1. Geographical distribution of Pulikulam cattle

were maintained in open area throughout the year. Generally the herds were put in the agriculture field of any farmers for penning or in any open area nearby village. Even the calving took place in the open field. *Penning* is a practice in which the animals were kept in the agricultural land of farmers @ ₹400 to ₹ 500/night for the herd of about 400–500 animals, thereby getting about Re 1/animal/night. The penning charges were slightly variable as per the demand of it. The penning duration was generally 6 PM to 9 AM of next day i.e. for 14–15 h. When there was no demand for penning, the herds were kept in any wasteland area where the dung was collected, dried and sold in the market. The option of penning was available to the farmers for about 200 days in a year. *Vaaram* is system of management followed by the owners of Pulikulam herds. The animals were given to the herders for looking after. The herders charged about ₹ 50/adult animal/annum. The male calves born in the herd were sold and money was equally shared by herders and the owners whereas, the female calves were sole property of the owner. In case of death of animal (s) due to some reasons other than accidents, the owners were duly informed but no compensatory money was to be given to the owners by the herders. The herders followed different routes of migration depending on demand of penning and availability of feed (grazing) and water. The migration generally started in the month of June and animals

were brought back by January on different routes of about 200 km distance. The migratory animals covered the migratory routes through Virudhunagar, Madurai and Sivagangai districts of Tamil Nadu.

The animals were kept under zero or very low input system of management. The animals were sent for grazing in forest or harvested agricultural fields from the morning till evening. The forest area were good source of feeding of Pulikulam cattle but in the last 1–2 decades, there has been restriction on forest grazing which is a major problem for the Pulikulam owners. The grazing hours were generally 9.00 AM to 6.00 PM during which the herds covered 5–6 km distance. Any supplementary feeding to the animals was rarely observed in the herds; however, the bullocks, used for agricultural purposes, were offered dry and green fodder by the farmers. The calves up to 3 months of age were not allowed to go for grazing and kept solely on dam's milk. The feeding of the calves was directly from the teats. The farmers allowed the calves to suckle the colostrum. The placenta was removed in its natural course without human intervention. The practices like de-worming and de-horning were not observed in the management of Pulikulam calves.

The breeding method opted by farmers is natural mating. About 10 to 25 bulls were available in the herds depending on the size of herds (Fig. 2). The young males started their first service at the age of 3.0–3.5 years of age and used for breeding up to the age of 10 years. The bulls were selected on the basis of their physique and conformation. The strong legs, attractive horns and presence of whorls on the back near hump (*Rasa suzhi*) or on forehead (*Nethi suzhi*) were the bases of selection of bulls for breeding purposes. Some of the bulls in some herds were reported to be winner in *Jellicut*.

The diseases like BQ, FMD, HS, ephemeral fever and coccidiosis were found prevalent in the area. The regular vaccination was not done against these diseases in Pulikulam herds. Herbal treatments were generally given to the animals however, in some herds the de-worming and some allopathic medicines were also given. Castor oil was used on the lesions of FMD, the calves affected with this disease were fed with banana leaves by some of the herders. In spite of poor prophylactic measures for communicable and parasitic diseases, animals were found to be in good health and less incidences of diseases.

*Physical characteristics:* The animals of the Pulikulam



Figs 2–3. 2. Pulikulam bull. 3. Pulikulam cow

resembled with Kangayam cattle breed but smaller in size. The animals were strong and active with compact body and short legs. Cows were white or grayish white in colour in majority of animals (Fig. 3) and bulls were either black or blackish grey (Fig. 2). The calves were also grey but sometimes dark grey, black and red calves were also seen. Face was moderate in length (41.32 cm in cows and 42.94 cm in bullocks), muzzle was black in majority of animals but sometimes carrot, forehead was fairly broader and concave. Neck was short and stout. Horns were generally wide-spread (in some cases tips were closer), long, thick at bottom and pointed at tips, orientation was outward, upward, backward and inward ending with pointed tips with varying sizes, smaller but thicker in bulls as compared to cows. The horn was generally grey/blackish. In case of cows hump was small to moderate but in bulls it was fairly developed. Colour of eyelid and hooves was generally black. Dewlap was small to medium and the body of animals was compact, and cylindrical in shape. Back was broader but short and slightly high at croups. The ears were short, erect and horizontal in orientation. The tail was broader at base and tapered towards the end. It was long with large tuft of hair, black in colour. Naval flap was small. Udder was small and teats were cylindrical with pointed tips. Milk veins were not prominent. Basic temperament of animals was found to be furious.

**Morpho-metric measurements:** The body length, chest girth, height at withers, paunch girth, face length, tail length with and with out switch, horn length and ear length were measured in 5 age sex groups (Table 1). The biometry of Pulikulam cows reported by Kanakraj and Kathiresan (2006) are in agreement with the present findings except the chest girth, which was slightly lesser (132.5 cm) than the present study. The biometry, viz. height, body length, chest girth, ear length and horn length of Kangayam cattle (139.8, 144.9, 175.9, 20.3 and 55.3 cm, respectively for bullock and 124.9, 131.2, 156.8, 19.3 and 45.14 cm, respectively for cows; Kandasamy and Panneerselvam, 1997) are higher than the biometry recorded in the present study for Pulikulam cattle

except the ear length. The biometry reported for Bargur, another cattle breed of Tamil Nadu, by Pundir *et al.* (2009) was comparable to the results of the present study for Pulikulam cattle but body length of Pulikulam was higher than Bargur cattle (99.7 and 109.2 cm, for adult males and females, respectively). Therefore, on the basis of physical and morpho-metric traits and geographical distribution, it can be inferred that the Kangayam, Pulikulam and Bargur cattle are 3 different cattle breeds of the Tamil Nadu.

**Performance:** The age at sexual maturity in males was about 3.0 to 3.5 years and age at first calving of cows was between 4 and 4.5 years of age. The average body weight of adult bull and cow was about 300 kg and 225 kg, respectively. The proportion of cows in second or third lactations was higher in most of the herds, however, on an average 8–10 calving in a life span of 20 years were found in the herds. The cows in the herd showed good reproductive health and repeat breeding was to the extent of maximum 3%. The communities rearing the breed did not sell the milk, however, milking was done in 10% of cows just fulfill the requirements of herders' family. The average daily milk yield of cows was 1.5 kg with a range of 0.5 to 3.0 kg. The lactation length varied from 9 months to 15 months depending upon sex of calves, less in male calves and more in female calves. The inter-calving period followed by birth of a female calves was reported to be 2 years and followed by the birth of male calves, it was reported to be about 1.5 years. This was due to the fact that male calves were sold at the age of 6–12 months of age whereas, female calves were retained in the herd.

**Unique qualities and utility of the breed:** The animals can well survive on grazing and in the open housing system for all kinds of weathers. The animals are contributing significantly in the organic farming of coconut, grapes, banana and many spices crops of the area. The animals are more resistant to communicable and parasitic diseases as compared to crossbreds in that area under hot and humid climate. The animals of this breed are playing a significant role in the rural livelihood of Pulikulam herders. The bullocks

Table 1. Biometry of Pulikulam cattle (in cm)

| Parameters | Age/sex groups |                 |                                   |                                       |                            |
|------------|----------------|-----------------|-----------------------------------|---------------------------------------|----------------------------|
|            | Cows (N=60)    | Bullocks (N=35) | Heifers (1-3 years of age) (N=26) | Young males (1-3 years of age) (N=23) | Calves below 1 year (N=60) |
| Height     | 112.27±0.79    | 117.26±1.02     | 94.77±1.67                        | 88.57±1.90                            | 68.98±1.54                 |
| BL         | 114.53±0.69    | 119.17±0.98     | 101.00±1.41                       | 93.04±1.74                            | 75.63±1.49                 |
| CG         | 139.20±1.10    | 149.69±1.61     | 114.81±1.80                       | 108.78±2.46                           | 80.93±2.24                 |
| PG         | 155.53±1.31    | 155.86±1.47     | 125.08±3.15                       | 115.74±3.09                           | 82.88±2.75                 |
| HL         | 37.22±1.21     | 34.34±2.21      | 11.52±1.62                        | 9.22±0.82                             | 4.53±0.53                  |
| EL         | 19.00±0.64     | 22.23±0.52      | 18.25±0.62                        | 18.37±0.43                            | 16.05±0.42                 |
| FL         | 41.32±0.35     | 42.94±0.48      | 36.04±0.71                        | 34.09±0.79                            | 24.14±0.68                 |
| TL         | 70.33±0.74     | 75.43±1.33      | 61.83±1.44                        | 57.39±1.68                            | 45.92±1.25                 |
| TLS        | 86.15±1.10     | 95.03±1.92      | 74.38±1.94                        | 71.95±2.40                            | 48.61±2.14                 |

N is number of observations.

of this breed are active and well suited to agricultural operations in the area and also used for cart pulling. The manure produced by the dung and urine of animals provides the farmers a good input of organic farming. The income of farmers is through sale of bullocks, penning and manure. The breed is also famous for the local game called *Jellicut*, meaning an ornament of leaves, during Pongal festival in Tamil Nadu. In this event, the horn of the bull is decorated with vividly coloured cloth and sometimes even ornaments. The cloth or ornaments in the cloth is firmly tied round the horn of bull and it is set free. Many persons attack on the bull to untie the cloth, bull becomes excited and fights. The bull is controlled and thrown down before the cloth is untied. There are chances that person may get severe injury or even die but the event is very popular.

Keeping in view the declining population status of the Pulikulam cattle, there is a need to take up sustainable measures for the improvement and conservation of this breed. This cattle population should be registered and included in the recognized list of cattle breeds. A nucleus herd may be established for production of bull calves and studies on the qualities of the breed specially the disease resistance tolerance of hot and humid climatic conditions in open housing system may be initiated. Awareness among the farmers may be created for taking milk from all the cows and sell the milk to generate income. This will make the breed more profitable. Shrinkage in grazing land area and unavailability of adequate drinking water are major constraints which are adversely affecting the population status of the breed. These problems should be well addressed by the Forest and Animal Husbandry departments of Tamil Nadu government. A breed society may also be established for protecting the interest of the owners of this breed.

### SUMMARY

The Pulikulam cattle are maintained as migratory herds in Madurai, Sivagangai and Virudhunagar districts of Tamil Nadu. This cattle population is famous for a local game *Jellicut*. The population has not been included in the list of

recognized cattle breeds of India, though documented by the state government in its gazettes for the last 100 years. The population of Pulikulam cattle in the breeding tract was expected to be more than 50,000. The Pulikulam cattle are strong and active with compact body and short legs. The cows are generally grey/white in coat colour; the bulls are dark grey. Biometry included 9 different body measurements in different age and sex groups. The average age at first calving was 4 to 4.5 years with a calving interval of 1.5 to 2 years. On an average the bulls start mating at the age of 3.0 to 3.5 years and used for breeding up to 10 years of the age. The life span of the animals was around 20 years with life time number of calving of 8–10. Milking was done only in 10–15% lactating cows in a herd to meet out the requirement of herdsmen and their families. It was observed that the average daily milk yield of Pulikulam cow was ranging from 0.5 to 3.0 kg. Animals of this breed are playing a significant role in the rural livelihood of communities rearing them for draught and organic agricultural production especially of spices. This cattle population should be registered and included in the recognized list of cattle breeds.

### REFERENCES

- Gunn W D. 1909. *Cattle of Southern India*. Vol. III, pp. 41–43. Bulleting No.60, Published by Department of Agriculture, Veterinary Department, Madras.
- Kanakraj P and Kathiresan D. 2006. 'Study on the physical and productive characteristics of Pulikulam breed of cattle and Katchaikatty sheep'. Final Report of the project submitted to SEVA, Madurai.
- Kandasamy N and Panneerselvam, S. 1997. A survey on Kangayam cattle. Final report submitted to ICAR by Department of Animal Genetics, Veterinary College and Research Institute, Namakkal (Tamil Nadu).
- Littlewood R W. 1936. *Livestock of Southern India*. pp. 95–99. Published by Government of Madras.
- Pattabhiraman D. 1962. *Breeds of Cattle in Tamil Nadu*. Published by Department of Animal Husbandry, Madras. 20–24.
- Pundir R K, Kathiravan P, Singh P K, and Manikhandan V A. 2009. Bargur cattle: status, characteristics and performance. *Indian Journal of Animal Sciences* 79: 681–85.