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Comparative study on morphometric traits in Yalaga with Kenguri and Bannur sheep breeds of Karnataka

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Abstract
Carcass characteristics and pork quality from finished pigs fed enzyme supplemented palm kernel cake-based diets as replacement for maize was evaluated. Thirty finisher pigs with average initial weight of between 21.5kg - 23.17kg were assigned to five dietary treatments in a Completely Randomized Design which lasted for twelve weeks. The first dietary treatment (T1), which was the control, contained 0%PKC and without enzyme supplementation. The second treatment (T2) contained 40%PKC + enzyme. The third treatment (T3) contained 40%PKC but without enzyme. The fourth treatment (T4) contained 60%PKC + enzyme while the fifth treatment (T5) contained 60%PKC but without enzyme. There were significant ($P< 0.05$) differences in weight gain, average daily feed intake and feed conversion ratio. There were significant ($P< 0.05$) differences between the mean carcass characteristics of the experimental animals as a result of their different diets containing different levels of PKC (with or without enzyme supplementation) inclusion. There were also significant ($P< 0.05$) differences between the dressed weight percentages of the loin, the kidney and the heart. The dressed weight was higher ($P< 0.05$) for treatment 3 than other treatments while the loin was higher ($P< 0.05$) for treatments 3 and 2. There were also significant ($P< 0.05$) differences in the mean of the kidney and the heart. The results of the serum chemistry showed that there were no significant (P>0.05) differences between the Serum levels of total protein, cholesterol and the Urea of the experimental animals. However, there were Significant ($P< 0.05$) differences between the mean values of albumin and glucose. In conclusion, PKC inclusion of up to 60% did not have any deleterious effect on the serological and carcass characteristics as well as the general performance of finisher pigs. This study therefore provides useful information for farmers, nutritionists, researchers, research institutions and other stakeholders.

Keywords: Sheep, Yalaga, Bannur, Kenguri, Morphometric traits

Introduction
Sheep constitute a very important species of livestock in India, mainly on an account of their short gestation period, short inter lambing period, higher rate of prolificacy and the ease of marketing their products. They are considered to be very important due to their contribution to the economic development of people in rural zones. Indigenous breeds with qualities like heat tolerance, disease resistance, ability to survive and produce under stressful and low input conditions need to be conserved for future use. India has 42 well defined and recognised sheep breeds and many are non-descript *viz*. Yalaga (Dayanand, 2013) [4] and Mouli (Shashikant, 2014) [16] in Karnataka; Pattanam sheep (Ravimurgan *et al*., 2012) [14], Chevaadu sheep (Ravimurgan and Panneerselvam, 2013) [13, 15] and Kilakarsal sheep (Ravimurgan *et al*., 2013) [13 15] in Tamil Nadu. Yalaga sheep has the following body measurements as body weight 54.78±0.96kg, body height 86.29±0.49cm, body length 83.44±0.68cm and chest girth 92.32±0.77cm at an adult age group (Dayanand, 2013) [4]. It is essential to identify non-descript breeds which are efficient meat producer by comparing with other recognised mutton breeds of sheep. Hence, in the present study, attempts were made to measure morphometric traits of Yalaga sheep and to compare them with Kenguri and Bannur sheep of Karnataka.

Materials and Methods
The present study was conducted on 60 animals each of Yalaga, Bannur and Kenguri sheep which were brought for slaughter house to Karnataka Meat and Poultry Marketing Corporation

(KAMPCO) slaughter house, Bruhath Bengaluru Mahanagar Palike slaughter house, Bengaluru and also various mutton shops present in and around Bengaluru. The morphometric traits *viz*. body weight (BW), body length (BL), body height (BH) and chest girth (CG) were recorded from 60 male sheep belonging 6 to 9 month age group in each breed.

The BW (The fasted live weight, in kilograms) were recorded using a weighing scale and remaining three traits like BH (The height from the bottom of the front foot to the highest point of the shoulder between the withers, in centimetres), BL (The horizontal distance from the point of shoulder to the pin bone, in centimetres) and CG (The circumference of the body immediately behind the shoulder blades in a vertical plane, perpendicular to the long axis of the body, in centimetres) were recorded with a measuring tape after making the animal to stand squarely on an even ground.

The age of the animal was estimated from its dentition pattern and varied from 6 to 8 milk teeth. The mean differences between traits of the 3 breeds were tested using one-way analysis of variance (ANOVA) module of SAS.9.3

Results and Discussion

The mean values of morphometric traits along with their SE for 3 sheep breeds under study are presented in Table 1. Analysis of variance has revealed that Yalaga sheep had significantly ($p < 0.01$) higher BW, BL and BH than Bannur and for the same traits, it had non-significantly higher values than Kenguri. Interestingly Yalaga had a non-significantly wider CG than Bannur, but it was significantly wider than Kenguri.

Body weight in the present study was found to be higher in Yalaga (25.23 ± 0.54kg) than that of Kenguri and Bannur at 6 to 9 month of age. In Bannur, the BW of 19.90 ± 0.58kg was reported by our study. Compared to this values, lowered BW of 17.72 ± 2.94kg (Nagaraja *et al*., 1996) [11], 12.30 ± 0.06kg (Dikshit, 1981) and 11.30 ± 0.08kg (Urala, 1977) [17] have been recorded in Bannur sheep. In Kenguri, we have reported a BW of 24.40 ± 0.61kg and it was higher than 24.2kg BW reported by Kumar *et al*. (2013) [10], Deccani with 19.65 ± 0.70kg BW (Kulkarni and Deshpande, 1986) [9], Coimbatore with BW of 18.58 ± 0.23kg (Kandasamy *et al*., 2006) [8], Madras red with BW of 18.61 ± 0.02kg (Devendran *et al*., 2008) [5], Mecheri with BW of 17.90 ± 0.25kg (Jagatheesen *et al*., 2003) [7] and Vembur with 18.66 ± 0.26kg BW (Chandran, 1998) [2] were found to have lesser BW. While, the higher BW was reported as 27.64 ± 0.57kg in Munjal (Poonia, 2004) [12] and of 25.72 ± 0.25kg in Madgyal (Waghmode *et al*., 2008) [18] than Yalaga.

Yalaga sheep at 6-9 month age had a BL of 65.89 ± 0.79cm. In Bannur, Nagaraja *et al*. (1996) [11] had reported lower BL of 54.96 ± 3.97cm and 59.20 ± 3.94cm respectively at both 6 and 9 month age than that of present study. While, Yadav *et al*. (2013) had reported a BL of 68.3cm in Bannur sheep, which was longer than that of present findings. At 6-9 month age group, Muzaffarnagari was found to be longer in length (83.07 ± 1.35cm) than Yalaga (65.89 ± 0.79cm) sheep. However, Yalaga sheep was found to be longer than Coimbatore (58.5 ± 0.39cm; Kandasamy *et al*., 2006) [8], Mecheri (52.46 ± 0.19cm; Jagatheesan *et al*., 2003) [7]. In Kenguri sheep, Yadav *et al*. (2013) has found a higher BL of 74.7cm in ram than that we found in this study. BL of Kenguri sheep in present study was found lower than that of Bellary (70.2cm) and Bannur (68.3cm) and higher than that of

Hassan sheep (64.3cm) (Yadav *et al*., 2013).

Body height in the present investigation was found to be higher in Yalaga sheep (70.22 ± 0.78cm) than that of Bannur and Kenguri at 6-9 month age. Compared to Yalaga, Bannur with BH of 53.64 ± 0.20cm (Nagaraja *et al*., 1996) [11], Coimbatore with 57.69 ± 0.37cm BH (Kandasamy *et al*., 2006) [8], Mecheri with BH of 61.54 ± 0.29cm (Jagatheesan *et al*., 2003) [7] were found smaller. However, Yalaga was found to be smaller than Muzaffarnagari ram that had BH of 75.97 ± 0.86cm (Das and Hariprasad, 2007) [3]. In Bannur, Nagaraja *et al*. (1996) [11] has reported a BH of 51.32 ± 2.20cm at 6 month and of 53.64 ± 0.20cm at 9 month age, which was lower than that found in present work. Similarly, Yadav *et al*. (2013) have reported a BH of 54.30cm in Bannur sheep, which was lower than that reported in present study. In Kenguri sheep, Yadav *et al*. (2013) has recorded a BH of 72.6cm, which was higher than that of present report. Appannavar *et al*. (2012) has reported a BH of 64.86 ± 1.01cm in Kenguri rams, which was lower than present study.

In the present work, chest girth of Yalaga at 6 to 9 month age group was found to be significantly ($p < 0.01$) higher than that of Kenguri and non-significantly higher than that of Bannur. In Bannur, Nagaraja *et al*. (1996) [11] has found a CG of 61.17 ± 4.03cm at 6 month and of 66.09 ± 4.02cm at 9 month of age, which was lower than that of our results. Similarly, Yadav *et al*. (2013) have found a CG of 69.3cm in Bannur sheep, which was slightly lower than that reported by this study. In Kenguri sheep, Yadav *et al*. (2013) have reported a higher CG of 78.4cm than that of our results. The Yalaga sheep in our study had a wider CG than Bannur (69.09 ± 4.02cm; Nagaraja *et al*., 1996) [11], Coimbatore (64.39 ± 0.51cm; Kandasamy *et al*., 2006) [8] and Mecheri (64.5 ± 0.37cm; Jagatheesan *et al*., 2003) [7]. However, Muzaffarnagari sheep had a higher CG of 79.67 ± 0.02cm than that of Yalaga (Das and Hariprasad, 2007) [3].

Table 1: Descriptive statistics of the morphometric traits of Bannur, Kenguri and Yalaga breeds of sheep

Body measurements	Bannur	Kenguri	Yalaga
Body weight (kg)	19.90 ± 0.58[b]	24.40 ± 0.61[a]	25.23 ± 0.54[a]
Body length (cm)	63.13 ± 0.56[b]	65.84 ± 0.44[a]	65.89 ± 0.79[a]
Body height (cm)	60.40 ± 0.61[b]	68.51 ± 0.47[a]	70.22 ± 0.78[a]
Chest girth (cm)	69.61 ± 0.60[a]	66.76 ± 0.60[b]	70.44 ± 0.67[a]

Means with similar superscript differs non-significantly.
Means with dissimilar superscript differ significantly at $p < 0.01$

Conclusion

The present study was underpinned to find out the morphometric traits of Yalaga sheep and also to compare them with that of Kenguri and Bannur sheep. Analysis of variance revealed significantly ($p < 0.01$) higher value of BW, BL and BH in Yalaga sheep than Bannur and the CG was non-significantly higher in Yalaga compared to Bannur. Kenguri sheep had a non-significantly lower value of BW, BL and BH compared to Yalaga and its CG was significantly ($p < 0.01$) lower than Yalaga. From this study it is evident that Yalaga had a higher body measurements than the best known mutton breed Bannur. The study showed the good morphological traits in Yalaga compared to Kenguri and Bannur breed of sheep, which indicates its mutton production ability. Hence, it is better to advice farmers to rear Yalaga for mutton production and to benefit economically.

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