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Research Paper

Optimization of Slaughter Weight of Black Bengal Goat from Four Agro-climatic Zones in the State of West Bengal

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ABSTRACT

The aim of this study was to optimize market slaughter weight of Black Bengal goats reared under extensive managerial practices by the farmers. For this, both male and female goats of different age groups from four different agro-climatic zones were selected and different carcass quality traits and yields of different cut-up parts were determined. Results indicated that sex had direct influence ($p<0.05$) on pre-slaughter weight, empty carcass weight, hot and cold carcass weight and also on dressing percentages. Similar trends were also observed for different primal cuts. Variation of agro-climatic zones had little influence ($p>0.05$) on all these parameters.However, age had direct influence on improvement of carcass yields and yields of different primal cuts, since with the increment of age, dressing percentagesand proportionate weights of all the primal cuts were increased. In conclusion, sex and agro-climatic zones showed only little effect on improvement of carcass quality traits, but age has significant influence on increase of carcass yield especially dressing percentage and hot or cold carcass weight. So, slaughtering of 9 months and above age groups of goats may be appropriate for both economy and quality point of view.

Keywords : *Black Bengal goat, Slaughter weight, Agro climatic zone, West Bengal*

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INTRODUCTION

In India, the goat is a traditional occupation of small and marginal farmers as well as landless labourers not only in plains, semiarid and arid region but also in mountainous area of the country. This species is predominantly reared under extensive range management on commodity grassland, employing self or family labour under low-input and low-output (LIPLOP) system of production management. The goat farmers belongs to weaker segment of the society with little potential for capital investment, hence, in vogue production system with little or marginal input and sustainable output is appropriate technology for them. Thus, goats undoubtedly serve as a staple source of red meat to humans (Webb *et al.* 2005), especially in developing country like India.

Goat is mostly reared for meat, hair, and sometimes indirectly for skin. But, till last decade, goat husbandry practices mainly relayed on meat production but kids mortality, consumer exploitation kid for meat (3-6 months age group) than meat from older animals, and sometimes even mispresentation of slaughter animals by dishonest butchers (selling of meat from young and older animals together) further catalyzes the situation that leads to potential revenue losses to our livestock owners. Slaughtering of goat at their optimum age may result not only higher yield of meat, but also skins of desirable size that increases the return. Judicial utilization of this meat in development of consumer oriented value added meat products may further sustain the demand and effective marketing option to earn reasonable return by the farmers, processors and persons processing ofdifferent products.With this aim the exploitation of goats is advocated to meet the increasing demands for meat consumption (Babiker *et al.* 1990) and to ensure food security.

But it is now marketer's nightmare to improve quality of goat meat since it is affected more by genetic and environmental factors (Goetsch *et al.* 2011) than nutrition. The effects of breed, age, sex, and nutritional factors on growth, carcass, and meat quality have been reviewed by many researchers (McMillin and Brock 2005, Webb *et al.* 2005, Casey and Webb 2010, Goetsch *et al.* 2011) without given sufficient background information for the role of genetic and environmental factors. Indeed, native goats are characterized by notable genetic variation in morphological and production characteristics (Shrestha and Fahmy 2005), and also there is a growing tendency in many countries to improve more prolific breeds to increase

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performance in terms of quality and meat yields. Likewise, Black Bengal goat is very popular in West Bengal due its prolific characteristics and meat quality. Black Bengal goat meat has unique flavour and also better skin and fur quality (Chowdhury and Faruque, 2004). Unfortunately very little works have been done on carcass quality traits and also on different cut-up parts for optimatization of slaughter weight to sustain consumer's demand for goat meat and also to improvefarmer'sincome. So, this study is carried out to explore effect of sex, age and agro-climatic conditions on carcass quality traits and meat yield of Black Bengal goat.

MATERIALS AND METHODS

***Experimental design*:** India has been divided into 15 agro-climatic regions, which are further subdivided into zones on the basis of soil, topography, climate and cropping pattern But on the basis of landform, hydrology, soil combinations and climatic conditions (rainfall, temperature, humidity & altitude), West Bengal is broadly divided into six agro-climatic zones, in which four zones namely-Teesta Alluvial, Gangetic Alluvial, Coastal Saline and Undulating Red and Lateritic were selected under this study. The Hilly region was not considered due to smaller population size, language diversity of the local farmers and geographically poor accessibility. The Vindya Alluvial zone was not also taken into consideration as because the climatic condition & soil characters are more or less similar with Gangetic Alluvial zone.

The animals were raised under extensive range management system where animals were left loose to graze over large areas of marginal lands, road side and near the canals where tender grasses were available. At evening the goats were supplied with kitchen wastes such as rice gruel, rice washed water etc.

***Determination of carcass quality traits*:** The study was conducted from the period of January, 2014 to June, 2014. Goats of corresponding male and female groups were slaughtered as per standard method after attaining their age of 3 months and above. The goats of different age groups were selected from each region after getting birth history from the farmers of respective regions. Data were collected from goat at 0-3, 3-6, 6-9 and 9-12 months and above age groups, and that were compared following standard statistical protocol. A total 10 male goats and 10 female goats of each group were considered for data collection.

Different carcass quality traits like pre-slaughter live weight, empty carcass weight, hot carcass weight, cold carcass weight and weight of different cut-up parts were undertaken at four different agro-climatic zones. The weight of the goat carcass and different body portions were taken with the help of digital weighing balance. Hot carcass weight was determined immediately slaughter process is over while cold carcass weight calculated after 1 hour 30 min of slaughter. Dressing percentage was estimated by the following formula –

$$\text{Dressing \%} = \frac{\text{Hot carcass weight}}{\text{Live animal weight}} \times 100$$

***Procedure for making cut-up parts*:** The cut-up parts of goat carcasses were performed as per BIS standard (Sahoo *et al*. 2011) where whole carcass is divided in to fore saddle (neck, shoulder, rack, breast and fore shank) and hind saddle- (loin, leg and flank). The goat carcass also split into right and left sides.The weight of each primal cut was taken using a digital weighing balance separately to estimate their proportionate contribution to the cold carcass weight and express as percentage. For neck, the carcasses were cut at last cervical and 1st thoracic vertebrae where it blends with shoulders. Chuck and bracelet were separated by saw perpendicular to the spine in between 5th and 6th rib portion. The bracelet was split into double hotel rack and plates or breast by measuring 4'' from rib eye muscle from loin and chuck end and sawing in straight line between these two points while for separating shank and brisket from shoulder first locate a point at juncture of first rib and anterior extremity of breast bone and the sawed parallel to spine. The fore shank was separated by a cut containing fore shank bone.

For hind saddle, to separate leg and loin first locate anterior tip of hip bone and sawed perpendicular to back that followed just between the last two lumbar vertebrae. Then cut out kidney and trim lumber fat to the maximum to half inches depth and measured four inches from the rib eye on the both ends and cut off flank in a straight line.

***Statistical analysis*:** Experimental data generated were analysed statistically using standard software package as mentioned by Snedecor and Chochran (1980). Means of experimental data relating to effect of sex and four agro-climatic zones on carcass quality traits at different ages were evaluated by two-way ANOVA, homogeneity test and Duncan's Multiple Range Test for comparing means to find the effects between male and female goat meat, between agro-climatic zones and their interactions. The statistical significance was expressed at $P < 0.05$.

RESULTS AND DISCUSSION

***Pre-slaughter and empty live weight*:** The effects of sex on pre-slaughter live weight of Black Bengal goat from different age

groups are presented in Table 1. There was non-significant effects ($p>0.05$) of sex on pre-slaughter live weight amongst the goats from both the sexes; although the pre-slaughter weight of male goats remains always little higher than its female counterparts. The pre-slaughter weight of both the sexes increased with the age and revealed a highly significant ($p<0.01$) effect. Similarly, when compared amongst the zones, it has been observed that there was a very significant difference ($p<0.01$) between all the means of pre-slaughter live weight from all age groups, but it was significantly lowest ($p<0.05$) at 3-6 months & 6-9 months in Terai-Teesta Alluvial Zone and in Red & Lateritic Zone at 9 month & above, when compared within age groups. The pre-slaughter weight from all the zones increased with the age and it revealed a highly significant ($p<0.01$) effect. This may due to differences in feed intake by the goat sincefeed conversion ratio is related to feed intake and assimilation and thereby carcass weight of goat. When compared within the age groups very significant difference ($p<0.01$) between all the means of pre-slaughter live weight from all the age groups had been revealed. Like pre-slaughter live weight values for empty live weight from both the sexes showed similar trends, and as expected effect of agro-climatic zones showed highly significant difference ($p<0.01$) with advancement of age, amongst the means of empty live weight from all the zones. Means of empty live weight zone wise do not differ significantly ($p>0.05$) when compared within themselves. Lower values of empty live weight were observed in Red & Lateritic Zone from 6-9 months group and onwards.

Table 1: Effect of sex and agro-climatic zones on pre-slaughter live weight (kg) and empty live weight of Black Bengal goat

Parameters	Age in Months			
	0-3	3-6	6-9	9 & above
	Pre-slaughter live weight (Kg)			
	5.28 ± 0.07^{Ax}	7.52 ± 0.27^{Bx}	10.12 ± 0.14^{Cx}	11.41 ± 0.08^{Dx}
Female	5.12 ± 0.15^{Ax}	7.38 ± 0.11^{Bx}	9.93 ± 0.12^{Cx}	11.05 ± 0.13^{Dx}
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	5.17 ± 0.23^{Ax}	7.21 ± 0.45^{By}	9.90 ± 0.34^{Cy}	11.24 ± 0.33^{Dy}
Gangetic Alluvial Zone	5.28 ± 0.13^{Ax}	7.60 ± 0.27^{Bx}	9.99 ± 0.27^{Cy}	11.36 ± 0.29^{Dy}
Coastal saline Zone	5.25 ± 0.26^{Ax}	7.51 ± 0.27^{Bx}	10.21 ± 0.34^{Cx}	11.74 ± 0.28^{Dx}
Red & Lateritic Zone	5.10 ± 0.65^{Ax}	7.48 ± 0.38^{Bx}	9.62 ± 0.46^{Cz}	10.58 ± 0.19^{Dz}
	Empty live weight (Kg)			
Sex				
Male	4.18 ± 0.05^{Ax}	5.94 ± 0.12^{Bx}	8.06 ± 0.16^{Cx}	9.11 ± 0.11^{Dx}
Female	4.06 ± 0.09^{Ax}	5.78 ± 0.07^{Bx}	7.89 ± 0.22^{Cx}	9.02 ± 0.27^{Dx}
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	4.15 ± 0.28^{Ax}	5.96 ± 0.38^{Bx}	8.25 ± 0.34^{Cy}	9.17 ± 0.28^{Dx}
Gangetic Alluvial Zone	4.23 ± 0.25^{Ax}	5.74 ± 0.37^{Bx}	8.12 ± 0.51^{Cx}	9.01 ± 0.17^{Dx}
Coastal saline Zone	4.25 ± 0.35^{Ax}	5.84 ± 0.46^{Bx}	8.18 ± 0.38^{Cx}	9.18 ± 0.22^{Dx}
Red & Lateritic Zone	4.18 ± 0.28^{Ax}	5.88 ± 0.64^{Bx}	7.89 ± 0.19^{Cy}	8.88 ± 0.31^{Dx}

*Means bearing different superscripts (A, B, C) within a row and column (x, y, z etc.) differ significantly ($p<0.05$).

Hot and cold carcass weight (HCW/CCW): Non-significant effect ($p>0.05$) was observed for the differences in sex on HCW although the scores from male goats remained always slight higher than its female counterparts (Table 2). All the values irrespective of sex increased very significantly ($p<0.01$) with the advancement of age. Similar observation also noticed due to variation of agro-climatic zones. But all the values irrespective of zones grew very significantly ($p<0.01$) with the advancement of age, except after 9 months, where the LOS was at 5%. As expected CCW also showed nearly similar trend

Table 2: Effect of sex and agro-climatic zones on hot and cold carcass weight

Parameters	Age in Months			
	0-3	3-6	6-9	9 & above
Hot carcass weight (Kg)				
Sex				
Male	2.61±0.12^{A}	3.56±0.12^{B}	4.63±0.15^{C}	5.04±0.08^{D}
Female	2.53±0.11^{A}	3.46±0.11^{B}	4.52±0.05^{C}	4.87±0.17^{D}
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	2.54±0.38^{A}	3.39±0.34^{B}	4.53 ±0.28^{C}	4.97±0.22^{d}
Gangetic Alluvial Zone	2.60±0.37^{A}	3.55±0.51^{B}	4.55±0.17^{C}	5.01±0.52^{d}
Coastal saline Zone	2.58±0.46^{A}	3.48±0.38^{B}	4.67±0.22^{C}	5.32±0.41^{d}
Red & Lateritic Zone	2.51±0.64^{A}	3.50±0.19^{B}	4.36±0.31^{C}	4.87±0.37^{d}
Cold carcass weight (Kg)				
Sex				
Male	2.51±0.12^{A}	3.42±0.12^{B}	4.43±0.15^{C}	4.82±0.08^{D}
Female	2.47±0.11^{A}	3.31±0.11^{B}	4.32±0.05^{C}	4.71±0.17^{D}
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	2.43±0.38^{A}	3.27±0.34^{B}	4.34 ±0.28^{C}	4.76±0.22^{D}
Gangetic Alluvial Zone	2.49±0.37^{A}	3.44±0.51^{B}	4.40±0.17^{C}	4.81±0.52^{D}
Coastal saline Zone	2.46±0.46^{A}	3.36±0.38^{B}	4.42±0.22^{C}	5.02±0.41^{D}
Red & Lateritic Zone	2.39±0.64^{A}	3.34±0.19^{B}	4.18±0.31^{C}	4.87±0.37^{D}

*Means bearing different superscripts (A, B, C) within a row and column (x, y, z etc.) differ significantly ($p<0.05$).

Table 3: Effect of sex and agro-climatic zones on dressing percentage

Parameters	Age in Months			
	0-3	3-6	6-9	9 & above
Sex				
Male	43.53±2.27^{a}	45.47±2.16^{ab}	46.21±2.11^{bc}	47.68±2.18^{c}
Female	42.21±1.31^{a}	44.31±1.18^{ab}	45.18±2.09^{bc}	46.44±2.34^{c}
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	41.37±1.42^{ab}	42.23±1.33^{ab}	44.45±2.17^{b}	46.22±2.21^{c}
Gangetic Alluvial Zone	42.11±1.74^{ab}	43.26±2.41^{ab}	45.12±2.11^{b}	46.89±2.13^{c}
Coastal saline Zone	41.92±1.93^{ab}	42.87±2.19^{ab}	44.97±2.25^{b}	46.42±1.69^{c}
Red & Lateritic Zone	42.33±1.57^{ab}	43.26±2.16^{ab}	45.89±2.32^{b}	46.29±2.07^{c}

*Means bearing different superscripts (A, B, C) within a row and column (x, y, z etc.) differ significantly ($p<0.05$).

to that of HCW since for determination CCW it was chilled and then weighed again (Table 2). But weight loss of cold carcasses was significantly ($P<0.05$) lower in kids. Such variation could be due to greater surface area of adult goat contributed more chilling and evaporativelosses.Similar finding was reported by Alkass *et al.* (2014) for the goat carcasses (Gokceada Goat kids) from Iraq.

***Dressing percentage*:** The effects of sex and agro-climatic zones on mean 'dressing percentage' of Black Bengal Goat from different age groups are presented in Table 3. Neither sex nor

Table 4: Effect of sex, age and agro-climatic zones on yield of Fore Saddle (Neck, Shoulder and Rack)

Parameters	Age in Months			
	0-3	3-6	6-9	9 & above
	Neck			
Sex				
Male	0.27±0.07[a]	0.31±0.12[b]	0.42±0.11[c]	0.64±0.18[d]
Female	0.24±0.06[a]	0.31±0.18[b]	0.41±0.09[c]	0.60±0.05[d]
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	0.27±0.05[a]	0.32±0.08[ab]	0.42±0.07[b]	0.62±0.11[c]
Gangetic Alluvial Zone	0.29±0.04[a]	0.31±0.07[a]	0.46±0.12[b]	0.61±0.11[c]
Coastal saline Zone	0.28±0.03[a]	0.33±0.09[a]	0.41±0.02[b]	0.64±0.07[c]
Red & Lateritic Zone	0.29±0.06[a]	0.31±0.11[a]	0.45±0.06[b]	0.60±0.13[c]
	Shoulder			
Sex				
Male	0.64±0.08[a]	0.78±0.11[b]	1.12±0.05[c]	1.24±0.11[d]
Female	0.59±0.07[a]	0.76±0.08[b]	1.01±0.08[c]	1.22±0.08[d]
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	0.64±0.05[a]	0.85±0.06[b]	1.24±0.06[c]	1.56±0.15[d]
Gangetic Alluvial Zone	0.69±0.08[a]	0.88±0.07[b]	1.33±0.09[c]	1.65±0.06[d]
Coastal saline Zone	0.68±0.05[a]	0.92±0.05[b]	1.31±0.11[c]	1.61±0.17[d]
Red & Lateritic Zone	0.71±0.05[a]	0.91±0.11[b]	1.29±0.05[c]	1.71±0.11[d]
	Rack			
	0.85±0.07[a]	0.96±0.04[b]	1.32±0.07[c]	1.56±0.05[d]
Female	0.78±0.11[a]	0.92±0.12[b]	1.28±0.09[c]	1.52±0.08[d]
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	0.84±0.06[a]	0.95±0.08[b]	1.34±0.16[c]	1.66±0.11[d]
Gangetic Alluvial Zone	0.89±0.08[a]	0.98±0.03[b]	1.33±0.08[c]	1.69±0.09[d]
Coastal saline Zone	0.81±0.07[a]	0.91±0.15[b]	1.31±0.12[c]	1.68±0.12[d]
Red & Lateritic Zone	0.88±0.03[a]	0.93±0.11[b]	1.39±0.15[c]	1.71±0.13[d]

*Means bearing different superscripts (a, b, c) within a row and column (x, y, z etc.) differ significantly ($p<0.05$).

agro-climatic zones showed any significant effect on dressing percentage though carcasses from male animals exhibited higher dressing percentages and also these values were increased with the increase of age of animal irrespective of agro-climatic zones. This indicated meat yield from higher age group (9 months and above) of animal was more which is more economical than young (0 – 3 months) ones. Dressed carcass and edible portions were collectively considered as total edible portion. The dressing percentage observed in this study is similar to the value of 41.48% to 43.73% reported by Abedin *et al.* (2005), Moniruzzaman *et al.* (2002) and Das *et al.* (2001). However, a lower dressing percent of Black Bengal goats (38.61) was also been reported by Singh and Khan (1989). Further, Chowdhury and Faruque (2004) reported dressing percent of Black Bengal goat between 181 and 365 days of age was 46.4%.The variation in dressing percentage of Black

Table 5: Effect of sex, age and agro-climatic zones on yield of Fore Saddle (Breast and Fore shank)

Parameters	Age in Months			
	0-3	3-6	6-9	9 & above
		Breast		
Sex				
Male	0.63±0.03[a]	0.78±0.04[b]	1.21±0.03[c]	1.54±0.05[d]
Female	0.58±0.08[a]	0.72±0.12[b]	1.18±0.11[c]	1.51±0.08[d]
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	0.64±0.06[a]	0.75±0.08[a]	1.28±0.16[b]	1.76±0.11[c]
Gangetic Alluvial Zone	0.59±0.08[a]	0.78±0.03[a]	1.32±0.08[b]	1.79±0.09[c]
Coastal saline Zone	0.61±0.07[a]	0.81±0.15[a]	1.33±0.12[b]	1.68±0.12[c]
Red & Lateritic Zone	0.58±0.03[ab]	0.73±0.11[b]	1.35±0.15[c]	1.81±0.13[d]
		Fore Shank		
Sex				
Male	0.73±0.03[a]	0.81±0.04[b]	1.25±0.03[c]	1.64±0.05[d]
Female	0.68±0.08[a]	0.78±0.12[b]	1.19±0.11[c]	1.52±0.08[d]
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	0.61±0.11[a]	0.95±0.09[b]	1.48±0.16[c]	1.76±0.11[d]
Gangetic Alluvial Zone	0.59±0.08[a]	0.88±0.07[b]	1.36±0.08[c]	1.78±0.09[d]
Coastal saline Zone	0.65±0.09[a]	0.87±0.12[b]	1.38±0.12[c]	1.78±0.12[d]
Red & Lateritic Zone	0.68±0.02[a]	0.93±0.11[b]	1.41±0.15[c]	1.82±0.11[d]

*Means bearing different superscripts (a, b, c) within a row and column (x, y, z etc.) differ significantly ($p<0.05$).

Bengal goats observed by different investigators might be due to variation in age, body condition and nutritional regime of the slaughtered animals.

***Cut-up parts*:** The effect of age, sex and zones on mean of cut up parts (Fore saddle)are presented in Table 4 and 5. It has been observed that values for cut-up parts with respect to variation of sex (male/female)was little affected($p>0.05$). The scores from male goats remained always slight higher than its female counterparts.The effect of agro-climatic zones on mean Neck wt.were also differed non-significantly, however due to increase of age of values increased irrespective of zones except between 0-3 month and 3-6 months. Similar findings were also noted when calculated for shoulder and rack weight and increment of weight was highest ($p<0.01$) at 6-9 months group irrespective of sex and agro-climatic zones.In both the sex breast weightincreased significantly ($p<0.01$) after 3-6 months group and thereafter, but non-significant differences were observed ($p>0.05$) amongst the means of Breast wt. from all the zones. All the values irrespective of zones grew slightly with the advancement of age but this increment was not significant ($p>0.05$) up to 0-3 months age group, although thereafter the values differ significantly ($p<0.05$) with the 3-6 months group and afterwards. The Fore Shank wt. increased significantly ($p<0.01$) at 3-6 months group and thereafter for animals from all zones.

Hind Saddle: The effects of sex, age and agro-climatic zone on cut-up parts yield of hind saddle are presented in Table6. Non-significant differences ($p>0.05$) amongst the means of all the three cuts from both the sexes were observed. The values from male goats remain always slight higher than its female counterparts. All the values irrespective of sex grew significantly ($p<0.05$) with the advancement of age but this increment became very significant ($p<0.01$) after 3-6 months group and thereafter. Since there were no other published data on the effect of sex, age and these agro-climatic zones, so data generated in this study cannot be directly or indirectly compared.

Table 6: Effect of sex, age and agro-climatic zones on yield of Hind Saddle (Loin, Leg and Flank)

Parameters	Age in Months			
	0-3	3-6	6-9	9 & above
		Loin		
Sex				
Male	0.63±0.05[a]	0.74±0.07[b]	1.35±0.09[c]	1.74±0.06[d]
Female	0.58±0.07[a]	0.71±0.11[b]	1.29±0.05[c]	1.67±0.08[d]
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	0.64±0.11[a]	0.81±0.09[b]	1.54±0.16[c]	1.79±0.11[d]
Gangetic Alluvial Zone	0.67±0.08[a]	0.83±0.07[b]	1.48±0.08[c]	1.85±0.09[d]
Coastal saline Zone	0.68±0.09[a]	0.85±0.12[b]	1.47±0.12[c]	1.78±0.12[d]
Red & Lateritic Zone	0.62±0.02[a]	0.79±0.11[b]	1.51±0.15[c]	1.82±0.11[d]
		Leg		
Sex				
Male	0.67±0.09[a]	0.79±0.06[a]	1.44±0.12[b]	1.95±0.16[c]
Female	0.62±0.05[a]	0.75±0.08[a]	1.38±0.15[b]	1.86±0.06[c]
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	0.63±0.11[a]	0.85±0.09[b]	1.44±0.16[c]	1.78±0.11[d]
Gangetic Alluvial Zone	0.65±0.08[a]	0.88±0.07[b]	1.46±0.08[c]	1.85±0.09[d]
Coastal saline Zone	0.63±0.09[a]	0.89±0.12[b]	1.47±0.12[c]	1.88±0.12[d]
Red & Lateritic Zone	0.69±0.02[a]	0.83±0.11[b]	1.51±0.15[c]	1.81±0.11[d]
		Flank		
	0.47±0.09[a]	0.68±0.06[b]	1.54±0.12[C]	1.75±0.16[d]
Female	0.42±0.05[a]	0.61±0.08[b]	1.46±0.15[C]	1.66±0.06[d]
Agro-climatic Zones				
Terai-Teesta Alluvial Zone	0.66±0.11[a]	0.86±0.09[b]	1.46±0.16[c]	1.88±0.11[d]
Gangetic Alluvial Zone	0.61±0.08[a]	0.83±0.07[b]	1.42±0.08[c]	1.89±0.09[d]
Coastal saline Zone	0.59±0.09[a]	0.88±0.12[b]	1.52±0.12[c]	1.86±0.12[d]
Red & Lateritic Zone	0.65±0.02[a]	0.86±0.11[b]	1.55±0.15[c]	1.84±0.11[d]

*Means bearing different superscripts (a, b, c) within a row and column (x, y, z etc.) differ significantly ($p<0.05$).

CONCLUSION

It has been observed that sex and age had direct influence on dressing percentage, hot and cold carcass weights, proportion of cut-up parts etc since values for these parameters were grater in male animals than there counterpart female. But agro-climatic conditions had little or no effect on all these parameters.Thus, slaughtering of 9 months and above age groups of goats may be appropriate for both economy and quality point of view.

REFERENCES

Abedin SMA, Alam MR and Faruque MO (2005) Comparative carcass characteristics of ruminant species in Bangladesh. J Ban Agric Univ.3 (2): 243-249.

Alkass JE, OrayKAD and Abdulla, MA (2014)Studies on growth, carcass traits and body composition of goats raised either in intensive or pasture conditions (1-growth performance and carcass traits). J Biol Agric Healthcare 4: 46 -54.

BabikerSA, El-KhiderIA and ShafieSA (1990) Chemical composition and quality attributes of goat meat and lamb. Meat Sci. 28:273–277.

Casey NH and Webb EC(2010) Managing goat production for meat quality. Small Rumin Res. 89:218–244.

Chowdhury SA and Faruque S (2004) Meat production characteristics of Black Bengal goat. Asian Australian J Ani Sci 17(6): 848-856.

Das S, Husain SS, Hoque MA and Amin MR (2001) Association between body measurement and carcass characteristics of goats. Ban J Ani Sci 30(1-2): 85-91.

Goetsch AL, MerkelRC and Gipson TA(2011) Factors affecting goat meat production and quality. Small Rumin Res 101:173–181.

McMillin KW and Brock AP(2005) Production practices and processing for value-added goat meat. J Ani Sci 83:(E-suppl.) E57–E68.

Moniruzzaman M, Hashem MA, Akhter S and Hossain M. (2002) 'Effect of different feeding systems on carcass and non carcass parameters of Black Bengal goats. Asian Australian J Ani Sci 15(1):61-65.

Sahoo J, Chatli MK and Biswas AK (2011).Preparation of different meat cuts. In: Laboratory Manual on Meat and meat products (including poultry products technology), COVS, GADVASU, Ludhiana. pp. 5 – 10.

Shrestha JNB and Fahmy MH(2005) Breeding goats for meat production: A review 1. Genetic resources, management and breed evaluation. Small RuminRes 58:93–106.

Singh DK and Khan AA (1989) Annual progress report. AICRP on goat for meat production. (Chotanagpur Unit) Birsa Agricultural College, Ranchi , Bihar.

Snedecor GW and Cochran GW (1980) Statistical methods. 6 th Ed. New Delhi: Oxford and IBH; 1980. pp 45-83.

Webb EC, CaseyNH and SimelaL (2005). Goat meat quality. Small RuminRes 60:153–166.