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STUDIES ON CARCASS CHARACTERISTICS AND CUT UP YIELDS OF BACKYARD CHICKEN VARIETIES

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ABSTRACT
The present investigation was carried out to study carcass characteristics and cut up yields in backyard varieties of chicken. Six different varieties namely CARI Shyama, Vanaraja, Kalinga Brown, Black Rock, Caribro Dhanraja and Kuroiler used in Chhattisgarh for backyard poultry were studied. The overall mean dressing percentage were recorded as 77.48 ± 1.19, 79.27 ± 1.13, 79.12 ± 0.58, 79.23 ± 0.5 and 79.90 ± 0.59 per cent for CARI Shyama, Vanaraja, Kalinga Brown, Black Rock, Caribro Dhanraja and Kuroiler, respectively. The overall mean values observed for giblet weight percentage were 4.92 ± 0.01, 4.97 ± 0.10, 5.65 ± 0.20, 5.08 ± 0.06, 4.96 ± 0.11 and 4.89 ± 0.16 % for aforesaid varieties respectively. Breast weight percentage was found to be significantly higher in females compared to males of same age group ($P<0.05$). However, other carcass traits were not affected by sex of the birds. The proportion of bled weight, dressed weight, leg weight, breast weight and blood loss were significantly ($P<0.05$) influenced by age of the poultry birds. The results indicated that certain carcass traits of improved varieties of backyard chickens are affected by variety, sex and age of the birds.

INTRODUCTION

In India, backyard poultry farming plays significant role for the livelihood of many rural families particularly the rural women. Under Indian conditions, there is a huge gap between demand and availability of poultry feeds in general and energy feeds in particular and cost of the feed accounts about 65 to 70% for broiler production and is a major factor which affects the production cost. (Pathak *et al.*, 2015; Srivastva *et al.*, 2013). In the backyard scheme, low input technology birds of coloured strain are supplied to the farmers of the state on subsidized rates in order to improve livelihood of rural household's by generation of additional income of rural and tribal folks. Under traditional practice of backyard poultry production, the desi varieties chicken of low production potential are commonly used (Niranjan *et al.*, 2008).. Thus, the backyard poultry production is less economical under the present scenario. The meat from native fowls has significantly higher amino acids (arginine and lysine) than meat from exotic birds and is widely preferred because of their plumage colour, pigmentation taste juiciness and suitability for special dishes and often fetches higher prices. Several high yielding germplasm suitable for backyard production have been developed by different agencies in India. These birds have different combination of native and exotic germplasm. Phenotypically these birds look like desi birds or original native breed from which they developed with 2 to 3 times increased rate of growth and production. Out of all these varieties the commonly used in Chhattisgarh state for backyard poultry farming are namely CARI Shyama, Vanaraja, Kalinga brown, Black Rock, Caribro Dhanraja and Kuroiler. In the present scenario, the success of broiler meat production is positively related to the improvement in growth and carcass yield particularly lean carcass yield (Mussa *et al.*, 2006). Fat tended to accumulate differently in different carcass parts and patterns of accumulation varies with species, variety, sex and age (Hocquett *et al.*, 2010). Similarly, the proportion of different cuts also shows considerable variation. Therefore, it is customary to study all these aspects in backyard poultry varieties. Quality of meat also influences the market demand due to consumers' awareness about health. There are several factors which determine the quality of meat. Once the meat is cooked and served the aroma, tenderness, juiciness and flavour must meet the expectations. Meat tenderness depends upon breeds within species, types within a variety, gender and age. The pH value of meat provides evidence as to how long it will keep and technical processing characteristics. The pH of meat influences factors such as colour and ability to retain water. Lower pH results in to increased drip losses in a consumer's package will negatively affect the appearance and thereby the purchase intent, pH also impacts eating quality characteristics such as juiciness, tenderness and taste. Nutritional value of meat can be accessed on the basis of parameters such as contents of dry matter, protein, lipid, ash and cholesterol. The demand for chicken meat containing low cholesterol has been increased in the market because of consumer's consciousness for health (Manohar *et al.*, 2005).

With this background, the present study was undertaken to

have an insight into the variation in carcass characteristics of six backyard chicken varieties.

MATERIALS AND METHODS

The experiment was carried out at College of Veterinary Science and A.H., Anjora, Durg to study growth, carcass characteristics in improved varieties of Chicken. The experimental birds (chicken) of six varieties which were being used to promote backyard poultry in the Chhattisgarh State were brought from Government Poultry Farm Bilaspur (C.G.). Day old 100 chicks of each variety, thus a total of 600 chicks of six different varieties namely CARI Shyama, Vanaraja, Caribro Dhanraja, Black Rock, Kuroiler, Kalinga Brown were procured for the experiment. All chicks under the experiment were provided standard and identical management and feeding conditions. All experimental birds were given similar treatment vaccinations etc. as per the standards. 3 males and 3 female birds of each variety were randomly selected for slaughter at the end of 8th, 9th and 10th week to study the carcass characteristics and cut up yields.

Slaughtering procedure

The birds were allowed to fast for overnight of 16 hours. However, drinking water was provided *ad-libidum* during fasting. All birds were weighted prior to slaughter and dressed following the procedure described by Kotulla *et al.* (1960). All the measurements were expressed in per cent in relation to live weight.

Carcass characteristics

1. Bled weight: weight of carcass after bleeding.
2. Dressed weight: weight of carcass after defeathering.
3. Eviscerated weight: weight of carcass after evisceration.
4. Giblet weight: weight of liver, heart and gizzard together.
5. Cut-up parts.

Cut-up parts

Three carcasses from each group were utilized for determination of various cuts as per the procedure described by Khanna and Panda (1983).

Breast: weight of breast cut.

Leg: weight of both thigh and drumsticks.

Back with neck: weight of back and neck together.

Wings: weight of both wings.

The above cuts were weighed separately and per cent yields were computed in relation to eviscerated weight. All the measurements on the carcass as well as in the live birds were taken to the nearest of 0.5g accuracy.

Derived carcass traits

From traits measured above the following parameters were computed as derived traits.

$$\text{Eviscerated weight} = \frac{\text{Eviscerated wt.}}{\text{Live wt.}} \times 100$$

$$\%\ \text{Giblet weight} = \frac{\text{Giblet wt.}}{\text{Live wt.}} \times 100$$

$$\%\ \text{Total meat yield (dressing\%)} = \frac{\text{Eviscerated wt.} + \text{Giblet wt.}}{\text{Live wt.}} \times 100$$

$$\%\ \text{Blood loss} = \frac{\text{Live wt.} - \text{Bled wt.}}{\text{Live wt.}} \times 100$$

$$\%\ \text{Feather loss} = \frac{\text{Bled wt.} - \text{Defeathered wt.}}{\text{Live wt.}} \times 100$$

$$\%\ \text{Eviscerated weight} = \frac{\text{Dressed wt.} - (\text{Eviscerated wt.} + \text{Giblet wt.})}{\text{Dressed wt.}} \times 100$$

$$\%\ \text{Total processing loss} = \frac{\%\ \text{blood loss} + \%\ \text{feather loss}}{\%\ \text{evisceration loss}} \times 100$$

Statistical analysis

The different parameters of carcass characteristics among the different improved varieties of backyard chickens were compared by one-way analysis of variance. The results are presented as mean ± error. The pair wise differences of means between the groups were compared by suitable post-hoc test and considered as significant if P£0.05. The analyses were carried out using Statistical Package for the Social Sciences (SPSS).

RESULTS AND DISCUSSION

Carcass characteristics

The details of different characteristics like live weight, bled weight, dressed weight, eviscerated weight and giblet weight are presented in Table 1. The perusal of the table indicates that the variety and age of the slaughtered birds influenced significantly ($P < 0.01$) on some carcass characteristics studied, whereas the sex had no significant influence on these parameters. Similar to the findings of the present investigation De Marchi *et al.* (2005) also revealed variety and age had significant effect. However, contrary to this significantly ($P < 0.05$) higher eviscerated weight and dressing percentage were observed in males as compared to females by Kaur *et al.* (2006).

Live weight

The increase in live weight of slaughtered birds with advancement of age can be simply attributed to the phenomenon of growth. Contrary to present findings significantly higher live weight for males as compared to females has been reported by Kaur *et al.* (2006) which could possibly be due to the fact that the birds were genetically different (Commercial broilers) from those used in present study (backyard varieties). Out of the randomly selected birds for slaughter highest average live weight was observed for Vanaraja followed by Black Rock, CARI Shyama, Kuroiler, Caribro Dhanraja and Kalinga Brown.

Bled weight percentage

Bled weight percentage is significantly ($P < 0.01$) influenced by age but no significant influence of variety and sex was observed on this trait. The comparison of mean values between different age groups revealed that mean values for bled weight percentage at 8 weeks of age were significantly

($P<0.05$) higher as compared to 9 and 10 weeks. No significant difference in between the mean values of 9 and 10 weeks age could be recorded but the trend showed that bled weight percentage decreased as age advanced. The bled weight percent ranged from 96.56% to 97.25%, which indicates least variation of this trait. In this study, the bled weight was compared in terms of percentage of the live weight and the blood loss per cent increased with increasing age of the bird. Similar findings have been reported by Kesarwani (1987) in guinea fowl. Amongst the six varieties studied the highest blood loss was observed with Black Rock followed by Kalinga Brown, Vanaraja, CARI Shyama, Caribro Dhanraja and Kuroiler.

Dressing percentage

Variety, age and sex had no influence on dressing percentage. The overall mean dressing percentage was recorded as 77.48 ± 1.16, 79.27 ± 1.13, 79.21 ± 1.70, 79.12 ± 0.58, 79.23 ± 0.5 and 79.90 ± 0.59 per cent for CARI Shyama, Vanaraja, Kalinga Brown, Black Rock, Caribro Dhanraja and Kuroiler, respectively. The dressing percentages for improved varieties were superior to those reported by Pragati *et al*. (2007) and Panda *et al*. (2008) for commercial broiler and Krishibro variety. However, similar findings reported by Gupta *et al*. (2000) in Aseel chicken. This indicated that broiler type varieties had lower dressing percentage which could be attributed to larger size of digestive system resulted in more weight of offals whereas backyard varieties being dual type having superior dressing percentage. In the present study, though influence of sex or age was not recorded, the trends obtained indicated that dressing percentage reduced as the age advanced from 8 to 10 week. The trends also indicated superior dressing percentage for males (79.497 ± 0.82) than females (78.574 ± 0.82). The highest dressing percentage was observed with Kalinga Brown followed by Kuroiler, Caribro Dhanraja, Vanaraja, Black Rock and CARI Shyama

Eviscerated weight percentage

There was no significant effect of variety, sex or age on eviscerated weight percentage of the carcasses. The mean values for eviscerated weight percentage were recorded as 72.56 ± 1.19, 74.30 ± 1.10, 73.57 ± 0.65, 74.04 ± 0.59, 74.27 ± 0.57 and 74.01 ± 0.55 per cent, respectively for CARI Shyama, Vanaraja, Kalinga Brown, Black Rock, Caribro Dhanraja and Kuroiler, respectively. However, the values were higher as compared to those reported by Khan *et al*. (2003) in white and coloured broiler line. This difference may be attributed to genetic variation amongst different varieties and sexes. Like all other carcass characteristics, eviscerated weight in males was superior value as compared to female (74.39 vs. 73.52 per cent). The average for 8, 9 and 10 weeks were found to be 74.515 ± 0.576, 74.093 ± 0.576 and 73.263 ± 0.546 per cent, respectively which failed to show either increasing or decreasing trend. Out of the six varieties studied in the present investigation the highest eviscerated weight percentage was observed for Vanaraja followed by Caribro Dhanraja, Black Rock, Kuroiler, Kalinga Brown and CARI Shyama.

Giblet weight percentage

In the present investigation it was found that the variety significantly ($P<0.01$) influenced the giblet percentage. The mean differences revealed that the giblet weight percentage of Kalinga Brown variety were significantly ($P<0.05$) higher as compared to all other varieties studied in the present investigation. The overall mean values observed for giblet weight percentage were 4.92 ± 0.01, 4.97 ± 0.10, 5.65 ± 0.20, 5.08 ± 0.06, 4.96 ± 0.11 and 4.89 ± 0.16 per cent for CARI Shyama, Vanaraja, Kalinga Brown, Black Rock, Caribro Dhanraja and Kuroiler , respectively. These values are in close agreement with those reported by Khan *et al*. (2003) in necked neck broiler varieties. Though sex of birds did not affect giblet weight percent, the males had higher value than females and the values were 5.107 ± 0.074 and 5.050 ± 0.074 per cent, respectively. The results of the mean comparison showed that there were significant ($P<0.05$) differences between ages. The mean value for 9th week was found significantly ($P<0.05$) lowest as compared to 8th and 10th week. Amongst the varieties studied the highest giblet weight percentage was observed with Kalinga Brown followed by Black Rock, Vanaraja, Caribro Dhanraja, CARI Shyama and Kuroiler.

Cut-up yields

The mean values for different cut-up yields are presented in Table 2. In this study, it was observed that only proportion of breast was significantly ($P<0.01$) influenced by variety sex and age. The effects were statistically insignificant for leg, wing and back with neck proportions. These findings are in agreement with Kaur *et al*. (2006). However, they reported sex differences to be significant only for breast drumsticks and giblets in broilers.

Leg weight percentage

The results revealed that there was significant ($P<0.05$) difference between the mean values of leg proportion of 8 and 9 weeks of age as compared to 10 weeks of age. The trends showed that leg proportion increased as the age advanced. Though the mean differences were not significant but males had higher leg weight proportion (21.551 ± 0.041 per cent) than females (20.601 ± 0.419 per cent). The highest leg weight proportion was observed for Vanaraja followed by Black Rock, Caribro Dhanraja, Kalinga Brown, Kuroiler and CARI Shyama. Lower leg weight proportion in females as compared to males has been reported by many workers (Rondelli *et al*., 2003; Kaur *et al*., 2006; Ojedapo *et al*., 2008). Gupta *et al*. (2000) reported much higher proportion for leg weight percentage. The variation might be attributed to different varieties of birds studies by different authors.

Breast weight percentage

Significantly ($P<0.05$) higher values for breast proportion were recorded for 9 and 10 weeks of age as compared to 8 weeks of age. The mean values for breast proportion 8, 9 and 10 weeks were observed to be 15.141 ± 0.233, 16.099 ± 0.223 and 15.578 ± 0.233 per cent, respectively. In the present study it was observed that the females had significantly ($P<0.05$) higher breast weight proportion (16.276 ± 0.19) as compared to males. The highest breast proportion was observed with CARI Shyama followed by Black Rock, Vanaraja, Kuroiler, Caribro Dhanraja and Kalinga Brown. Out of the 6 varieties studied in the present investigation Kalinga Brown had the lowest and Kuroiler had the highest breast proportion. The differences were found to be statistically significant

Table 1: Carcass characteristics (Mean ± SE) in improved varieties of chicken

Traits	Age in weeks	CARI Shyama	Vanaraja	Kalinga Brown	Black Rock	CaribroDhanraja	Kuroiler
Live wt.	8	1051.33 ± 33.39	1165.50 ± 22.12	685.33 ± 10.00	1104.50 ± 33.02	1061.66 ± 20.69	1097.17 ± 52.39
	9	1160.50 ± 23.02	1271.33 ± 26.43	800.17 ± 18.72	1291.83 ± 17.13	1161.50 ± 72.86	1150.83 ± 11.80
	10	1464.00 ± 46.41	1532.17 ± 53.56	1161.17 ± 186.65	1435.83 ± 16.50	1269.33 ± 92.00	1323.83 ± 82.20
	Total	$1225.28^{bcd} \pm 46.53$	$1323.00^{d} \pm 42.36$	$882.22^{a} \pm 76.66$	$1277.39^{cd} \pm 35.28$	$1164.67^{b} \pm 42.61$	$1190.61^{bc} \pm 38.67$
Bled wt. %	8	97.61 ± 0.43	97.48 ± 0.45	96.52 ± 0.43	97.64 ± 0.57	97.39 ± 0.26	97.86 ± 0.31
	9	97.02 ± 0.19	96.76 ± 0.27	97.41 ± 0.43	96.17 ± 0.37	96.85 ± 0.58	97.01 ± 0.39
	10	96.44 ± 0.26	96.33 ± 0.36	96.60 ± 0.31	95.88 ± 0.23	97.00 ± 0.60	96.88 ± 0.56
	Total	97.02 ± 0.21	96.85 ± 0.23	96.84 ± 0.23	96.56 ± 0.29	97.08 ± 0.28	97.25 ± 0.26
Dressed wt. %	8	77.25 ± 2.54	81.96 ± 2.56	78.98 ± 1.20	78.16 ± 1.49	79.65 ± 0.71	82.60 ± 0.51
	9	78.97 ± 1.56.	79.35 ± 0.73	78.71 ± 0.68	80.67 ± 0.68	77.85 ± 1.37	78.89 ± 0.74
	10	76.21 ± 2.05	76.49 ± 1.74	79.97 ± 1.70	78.52 ± 0.24	80.18 ± 0.62	78.22 ± 0.72
	Total	77.48 ± 1.16	79.27 ± 1.13	79.21 ± 1.70	79.12 ± 0.58	79.23 ± 0.57	79.90 ± 0.59
Eviscerated wt. %	8	71.95 ± 2.53	76.68 ± 2.55	73.72 ± 1.20	72.89 ± 1.48	74.38 ± 0.71	77.46 ± 0.44
	9	74.20 ± 1.53	74.57 ± 0.66	72.91 ± 0.68	75.66 ± 0.67	72.97 ± 1.34	74.25 ± 0.64
	10	71.53 ± 2.19	71.64 ± 1.66	74.08 ± 1.51	73.56 ± 0.17	75.46 ± 0.66	73.30 ± 0.77
	Total	72.56 ± 1.19	74.30 ± 1.10	73.57 ± 0.65	74.04 ± 0.59	74.27 ± 0.57	74.01 ± 0.55
Giblet wt. %	8	5.29 ± 0.01	5.28 ± 0.01	5.25 ± 0.02	5.27 ± 0.01	5.27 ± 0.02	5.14 ± 0.19
	9	4.77 ± 0.10	4.79 ± 0.12	5.80 ± 0.32	5.01 ± 0.09	4.88 ± 0.21	4.63 ± 0.40
	10	4.67 ± 0.21	4.84 ± 0.25	5.89 ± 0.50	4.96 ± 0.13	4.73 ± 0.20	4.91 ± 0.20
	Total	$4.92^{a} \pm 0.10$	$4.97^{a} \pm 0.10$	$5.65^{b} \pm 0.20$	$5.08^{a} \pm 0.06$	$4.96^{a} \pm 0.11$	$4.89^{a} \pm 0.16$

Mean superscripted by different letters differed significantly ($p < 0.05$) from each other in a row

Table 2: Cut-up yields (Mean ± SE) in improved varieties of chicken

Traits	Age in weeks	CARI Shyama	Vanaraja	Kalinga Brown	Black Rock	Caribro Dhanraja	Kuroiler
Leg weight %	8	27.58 ± 0.44	27.53 ± 0.89	27.17 ± 0.50	27.95 ± 0.53	27.73 ± 0.49	26.83 ± 0.47
	9	27.74 ± 0.57	28.49 ± 0.24	28.31 ± 0.43	27.91 ± 1.36	28.25 ± 0.55	28.68 ± 0.33
	10	28.14 ± 1.13	37.00 ± 7.84	28.54 ± 0.50	29.07 ± 0.19	29.13 ± 0.28	27.96 ± 0.62
	Total	27.82 ± 0.42	31.01 ± 2.68	28.01 ± 0.30	28.31 ± 0.48	28.37 ± 0.29	27.83 ± 0.32
Breast weight %	8	21.98 ± 0.37	20.37 ± 0.86	16.62 ± 0.64	21.23 ± 0.70	20.86 ± 0.98	21.01 ± 0.66
	9	22.72 ± 0.78	21.59 ± 0.40	21.64 ± 1.80	21.56 ± 0.67	21.12 ± 0.90	21.83 ± 0.48
	10	22.18 ± 0.54	22.20 ± 0.57	18.51 ± 1.11	22.19 ± 0.64	19.74 ± 0.98	22.99 ± 0.98
	Total	$22.29^{c} \pm 0.33$	$21.39^{bc} \pm 0.39$	$18.93^{a} \pm 0.86$	$21.66^{bc} \pm 0.38$	$20.58^{b} \pm 0.54$	$21.94^{c} \pm 0.45$
Wing weight %	8	12.45 ± 0.27	11.88 ± 0.45	13.79 ± 1.19	13.40 ± 0.35	12.46 ± 0.19	13.17 ± 0.22
	9	14.95 ± 2.14	12.91 ± 0.26	13.48 ± .20	12.27 ± 0.24	13.23 ± 0.21	12.69 ± 0.23
	10	11.24 ± 0.23	12.74 ± 0.39	13.37 ± 0.37	12.32 ± 0.28	12.95 ± 0.25	12.50 ± 0.22
	Total	12.88 ± 0.78	12.51 ± 0.23	13.55 ± 0.40	12.67 ± 0.20	12.88 ± 0.14	12.79 ± 0.14
Back with neck wt%	8	26.63 ± 1.41	27.56 ± 1.41	38.95 ± 10.21	27.62 ± 1.13	26.84 ± 0.55	27.20 ± 0.35
	9	25.44 ± 0.45	25.92 ± 0.45	25.95 ± 0.64	26.75 ± 0.48	26.09 ± 0.46	25.77 ± 0.50
	10	26.99 ± 0.45	25.15 ± 0.45	25.53 ± 3.07	25.55 ± 0.53	27.03 ± 0.43	26.08 ± 0.39
	Total	26.35 ± 0.54	26.21 ± 0.54	30.14 ± 3.67	26.64 ± 0.47	26.65 ± 0.28	26.35 ± 0.27

Mean superscripted by different letters differed significantly ($p < 0.05$) from each other in a row

Table 3: Slaughter losses (Mean ± SE) of improved varieties of chicken

Traits	Age in weeks	CARI Shyama	Vanaraja	Kalinga Brown	Black Rock	CaribroDhanraja	Kuroiler
Blood loss%	8	2.39 ± 0.43	2.52 ± 0.45	3.48 ± 0.43	2.36 ± 0.57	2.61 ± 0.26	2.14 ± 0.31
	9	2.98 ± 0.19	3.24 ± 0.27	2.59 ± 0.42	3.83 ± 0.30	3.15 ± 0.57	2.98 ± 0.39
	10	3.56 ± 0.26	3.67 ± 0.36	3.40 ± 0.41	4.12 ± 0.22	3.00 ± 0.59	3.12 ± 0.56
	Total	2.98 ± 0.20	3.14 ± 0.23	3.15 ± 0.23	3.44 ± 0.28	2.92 ± 0.28	2.75 ± 0.26
Feather loss %	8	11.76 ± 2.90	8.32 ± 1.36	7.39 ± 0.59	7.30 ± 0.41	9.30 ± 0.96	6.78 ± 0.85
	9	8.10 ± 0.43	7.68 ± 0.45	7.62 ± 0.67	6.56 ± 0.79	9.77 ± 1.64	7.47 ± 0.36
	10	9.44 ± 1.38	10.20 ± 2.20	9.72 ± 2.18	6.95 ± 0.37	6.21 ± 1.04	7.94 ± 0.20
	Total	9.76 b ± 1.08	8.73 ab ± 0.86	8.24 ab ± 0.78	6.94 a ± 0.31	8.43 ab ± 0.78	7.40 a ± 0.31
Evisceration loss%	8	16.49 ± 0.17	14.29 ± 1.86	17.51 ± 1.32	19.46 ± 1.64	15.74 ± 1.27	15.05 ± 0.48
	9	16.79 ± 1.58	16.53 ± 0.51	18.97 ± 0.75	15.79 ± 0.59	16.46 ± 1.00	17.28 ± 0.54
	10	18.17 ± 1.59	17.15 ± 0.51	14.98 ± 0.95	17.54 ± 0.12	17.02 ± 0.70	17.81 ± 0.60
	Total	17.15 ± 0.72	15.99 ± 0.69	17.15 ± 0.69	17.59 ± 0.66	16.41 ± 0.57	16.72 ± 0.41
Total % loss	8	30.65 ± 3.16	25.14 ± 3.03	28.39 ± 1.39	29.12 ± 1.64	27.66 ± 0.81	23.99 ± 0.54
	9	27.87 ± 1.72	27.45 ± 0.75	29.16 ± 0.77	26.19 ± 0.79	29.38 ± 1.68	27.74 ± 0.76
	10	31.17 ± 2.69	31.02 ± 2.10	28.10 ± 1.77	28.61 ± 0.21	26.24 ± 0.82	28.87 ± 0.92
	Total	29.89 ± 1.45	27.87 ± 1.32	28.55 ± 0.75	27.97 ± 0.65	27.76 ± 0.71	26.87 ± 0.65

Mean superscripted by different letters differed significantly ($p < 0.05$) from each other in a row

($P<0.05$). Previous studies cited higher breast proportion in females as compared to males (Rondelli *et al.*, 2003; Kaur *et al.*, 2006; Ojedapo *et al.*, 2008).

Wing weight percentage

The mean wing weight per cent between ages showed that the average of 8 and 9 weeks were significantly ($P<0.05$) higher as compared to 10th week. This indicated that the wing per cent reduced with advancement of age. The sex differences were not significant but trend indicated that females (9.398 ± 0.159 per cent) averaged higher than the males (9.642 ± 0.155 per cent). However, sufficient data are not available to support these findings. Amongst the varieties, highest wing weight was observed with Kalinga Brown followed by Caribro Dhanraja, CARI Shyama, Kuroiler, Black Rock and Vanaraja. The mean values were 13.55 ± 0.40, 12.88 ± 0.40, 12.88 ± 0.78, 12.79 ± 0.14, 12.67 ± 0.20, 12.51 ± 0.23 per cent, respectively. The results are more or less comparable with Kaur *et al*. (2006).

Back with neck weight percentage

The mean differences for back with neck percentage were not significant between varieties, sexes and age groups. However, males were observed to have lower proportion for back with neck weight percentage (26.576 ± 0.082 per cent) as compared to females (27.543 ± 0.082 per cent). Amongst the varieties studied Kalinga Brown had the highest weight for back with neck percentage followed by Caribro Dhanraja, CARI Shyama, Kuroiler, Vanaraja and Black Rock. The overall mean values obtained for different varieties were 26.35 ± 0.54, 26.21 ± 0.54, 30.14 ± 3.67, 26.64 ± 0.47, 26.65 ± 0.28, 26.35 ± 0.27 per cent, for CARI Shyama, Vanaraja, Kalinga Brown, Black Rock, Caribro Dhanraja and Kuroiler, respectively. The values obtained in the present study are much closer to that reported by Khan *et al*. (2003). However, lower proportion have been reported by Pragati *et al*. (2007) which may be the reflection of lower dressing percentage obtained by them in their experiment.

Slaughter losses

The mean slaughter losses of different varieties of backyard chickens are presented in Table 3. The blood loss increased significantly ($P<0.01$) with increasing age of the birds. There was significant ($P<0.01$) difference of mean values of blood loss at 8 weeks compared to 9 and 10 weeks of age. Moreover, the mean difference between 9 and 10 weeks was statistically insignificant but an increasing trend was observed from 8 to 10 weeks of age. The increase in blood loss may be attributed to increased live weight with the advancement of age. The feather loss, evisceration loss and total loss percentages were not found influenced by either of the factors studied. However, feather loss, evisceration loss and total loss are higher in females than males though the differences were statistically not significant. The total loss also increased with the age from 8 to 10 weeks of age. This might be due to the fact that the birds were not matured at the time of slaughter and the body proportions and organs might be in different stages of growth. The overall mean for total loss was observed to be highest in Kalinga Brown followed by Caribro Dhanraja, CARI Shyama, Kuroiler, Vanaraja and Black Rock. The findings reported by Kaur *et al*. (2006) indicated that males were superior to females in body weight and carcass traits at 7 week of age in broiler chicken. It indirectly supports the findings of the present investigation because the higher values of carcass yield must be the reflection of lower slaughter losses in their experiment. In the present investigation also lower losses in males compared to females have been noted.

Conflict of interest

The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in this manuscript.

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REFERENCES

De Marchi, M., Cassandro, M., Lunardi, E., Baldan, G. and Siegel, P. B. 2005. Carcass characteristics and qualitative meat traits of the Padovana variety of chicken. *International J. Poult. Sci.* **4(4):** 232-238.

Gupta, R. K., Singh, M., Singh, U. and Gurung, B. S. 2000. Feed efficiency and carcass characteristics of Aseel chickens. *Indian J. Anim. Sci.* **70(11):** 1170-1171.

Kaur, T., Trehan, P. K., Singh, B. and Bajwa, I. S. 2006. Estimates of genetic parameters for three prime cut up parts in broilers. *Indian J. Poult. Sci.* **41(3):** 289-293.

Khan, A. A., Chaudhary, D., Singh, B. P. and Singh, R. P. 2003. Effect of Naked neck gene on slaughter traits, cut- up part and meat composition of white and coloured broiler lines. *Indian J. Poult. Sci.* **38(1):** 74-77.

Khanna, N. and Panda, P. C. 1983. Per cent yield of cut of parts of poultry. *Avian Res.* **67(2):** 48-51.

Kotula, A. W., Thomson, J. E. and Kinner, J. A. 1960. Weight increase during chilling of broilers as influenced by method of opening the abdominal cavity during evisceration. *Poult. Sci.* **39:** 226-227.

Mussa, H., Chen, G. H., Cheng, J. H., Li, B. C. and Mekki, D. M. 2008. Study on carcass characteristics of chicken breeds raised under the intensive condition. *Inernational J. Poult. Sci.* **5(6):** 530-533.

Niranjan, M., Sharma, R. P., Rajkumar, U., Reddy, B. L. N., Chatterjee, R. N. and Battachariya, T. K. 2008. Comparative evaluation of production performance improved chicken varieties for backyard farming. *Inernational J. Poult. Sci.* **7(11):** 1128-1131.

Ojedapo, L. O., Akinokun, O., Adedeji, T. A., Olayeni, T. A., Ameen, S. A. and Amao, S. R. 2008. Effect of strain and sex on carcass characteristics of three commercial broilers reared in deep litter system in the derived savannah area of Nigeria. *World J. Agric. Sci.* **4(4):** 487-491.

Panda, A. K., Ramarao, S. V., Raju, M. V. L. N. and Reddy, B. L. N. 2008. Growth, immune response and carcass characteristics of broiler chickens (Krishibro) to concentrations of dietary energy maintained at constant ME: CP ratio. *Indian J. Anim. Sci.* **78(8):** 878-881.

Pathak, R., Ali, N., Kumar, S. and Chauhan, H. R. 2015. Evaluation of growth performance of broiler (cobb-400) under different composition of diets. *The Bioscan.* **10(4):** 1465-1468.

Pragati, H., Kondaiah, N., Saikia, P., Mandal, A. B., Anjaneyulu, A. S. R. and Singh, P. R. 2007. A comparative study on meat yield and product quality of commercial broiler chicken of three live weight groups. *Indian J. Poult. Sci.* **42:** 53-57.

Manohar G. R., Mani, K. and Vishanathan, K. 2005. Carcass yields and meat cholesterol as influenced by stocking density and system of rearing in commercial broilers. *Indian J. Poult. Sci.* **40(5):** 255-258.

Rondelli, S., Martinez, O. and Garcia, P. T. 2003. Sex effect on productive parameters, carcass and body fat composition of two commercial broiler lines. *Rev. Bras. Cienc. Avic.* **5(3):** 169-173.

Srivastva, S.B., Niwas, R., Singh, D.P. and Bisen, B. 2013. Impact of herbal based diets on production efficiency of broiler. *The Bioscan.* **8(1):** 119-122.