

*Original Research***Effect of Season on Carcass Characteristics of Indigenous Chicken Reared in Free Range Scavenging System of Assam****Rafiqul Islam^{*1}, Niranjana Kalita², Deben Sapkota³, Joga Dev Mahanta³, Kula Prasad Kalita³ and Jakir Hussain⁴**

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Abstract

Altogether 160 numbers of indigenous chickens of 7 to 10 months of age (5 cocks and 5 hens were randomly selected from each district in each season) were slaughtered by standard procedure collected from four districts viz. Sivasagar, Dhubri, Nagaon and Sonitpur districts of Assam during pre-monsoon, monsoon, post-monsoon and winter seasons to determine the carcass traits. The pre-slaughter live weight (g), per cent dressed yield, giblet yield, head yield, wing yield, drumstick yield, thigh yield, breast yield and back yield were determined in different seasons and sexes. The overall mean dressed yield (%) of cock during pre-monsoon, monsoon, post-monsoon and winter seasons recorded as 64.60 ± 0.30 , 65.19 ± 0.33 , 64.49 ± 0.33 and 65.05 ± 0.31 respectively. The corresponding mean values in hen recorded during pre-monsoon, monsoon, post-monsoon and winter as 65.17 ± 0.26 , 64.81 ± 0.22 , 64.50 ± 0.24 and 64.81 ± 0.18 per cent respectively. The giblet yields (%) both in cock and hen were significantly ($P \leq 0.05$) higher during monsoon season than post-monsoon and winter seasons, however the mean values were comparable between pre-monsoon and monsoon season. The corresponding values were also comparable between post-monsoon and winter season. Season did not influence pre-slaughter live weight (g), dressed yield (%) and thigh yield (%) in indigenous chicken of Assam. However, giblet yield, head yield, wing yield, drumstick yield, breast yield and back yield per cent were varied significantly ($P \leq 0.05$) in different seasons.

Key words: Carcass Traits, Drumstick Yield, Giblet Yield, Indigenous Chicken, Season**How to cite:** Islam, R., Kalita, N., Sapkota, D., Mahanta, J. D., Kalita, K. P., & Hussain, J. (2019). Effect of Season on Carcass Characteristics of Indigenous Chicken Reared in Free Range Scavenging System of Assam. *International Journal of Livestock Research*, 9(11), 183-190. doi: 10.5455/ijlr.20190911032607

Introduction

Assam has a poultry population of 27.22 million and contributes 3.73 per cent of country's poultry population (BAHS, 2016). The total egg production in Assam is 3466 lakh, out of which 33.05 lakhs (95.35%) is contributed by our indigenous chicken. So, backyard chicken has significant contribution to egg and meat production Assam's economy, despite their poor production potential. To curb the menace of malnutrition in rural Assam, backyard poultry farming can be one of the best options in rural condition. It is also indicated that the rural people of Assam have been rearing poultry for many reasons like to generate income, for home consumption and for socio-cultural reasons. The nutritional status of scavenging chickens under backyard system varies with seasons, climatic conditions and locality (Rashid *et al.*, 2004; Goromela *et al.*, 2008 and Mekonnen *et al.*, 2010). There is a little or no information on influence of season on carcass characteristics of indigenous chicken; hence, the present study was undertaken to determine the carcass characteristics in different seasons in Assam.

Materials and Methods

The study was conducted in four districts viz. Sivasagar, Dhubri, Nagaon and Sonitpur districts in Brahmaputra Valley of Assam during pre-monsoon (March-May), monsoon (June-September), post-monsoon (October-November) and winter (December-February) seasons from August, 2017 to July, 2018. Ten numbers of indigenous chickens (five numbers of birds from each sex) were collected from each district and season as follows:

Table 1: Selection of birds in different seasons

District/Season	Pre-monsoon	Monsoon	Post-monsoon	Winter	Total
Sivasagar	10 (5+5)	10 (5+5)	10 (5+5)	10 (5+5)	40
Dhubri	10 (5+5)	10 (5+5)	10 (5+5)	10 (5+5)	40
Nagaon	10 (5+5)	10 (5+5)	10 (5+5)	10 (5+5)	40
Sonitpur	10 (5+5)	10 (5+5)	10 (5+5)	10 (5+5)	40
Total	40	40	40	40	160

Thus, a total of 160 numbers of indigenous chickens of 7 to 10 months of age were utilized for the study. The live weights of the birds recorded with digital weighing balance and then slaughtered as per standard methods. The birds were scalded, de-feathered and studied for carcass characteristics after singeing, washing and evisceration. The weights of different organs and cut up parts *viz.* were also recorded with digital weighing balance after cutting the organs as per standard procedures.

- Pre-slaughter live weight
- The live weight of bird before killing was recorded as slaughter live weight (g).
- Dressed yield

The dressed yield of the carcass was determined as per ISI Standard. The dressed yield of the carcass was recorded after removing blood, feather, shank, oil gland, head and viscera and expressed as percentage

$$\text{Dressed yield (\%)} = \frac{\text{Carcass weight (g) excluding blood, feather, shank, oil gland, head and viscera}}{\text{Slaughter live weight (g)}} \times 100$$

Giblet Yield

The weight of heart, liver and gizzard were recorded as giblet yield (g) and expressed as percentage of live weight as follows:

$$\text{Giblet yield (\%)} = \frac{\text{Weight of heart, liver and gizzard (g)}}{\text{Slaughter live weight (g)}} \times 100$$

Cut up parts

The weight of individual cut up part and expressed as percentage of live weight as follows:

$$\text{Cut up parts weight (\%)} = \frac{\text{Weight of individual cut-up parts} \times 100}{\text{Dressed weight}}$$

The data so collected were tabulated and analyzed by standard statistical methods (Snedecor and Cochran, 1994).

Results and Discussion

Pre-Slaughter Live Weight

The overall mean pre-slaughter live weight of indigenous cock during pre-monsoon, monsoon, post-monsoon and winter seasons recorded as 999.46±25.15, 973.17±20.31, 981.37±14.10 and 977.87±16.34 g and in hen as 804.48±21.20, 793.36±18.77, 779.58±16.01 and 790.83±12.59g respectively as presented in the Table 2. The values recorded in males and females were numerically differed from each other among different seasons; however, there was no significant difference in weights between seasons. The present results were comparable with the findings of Chutia (2010), who reported the overall mean pre-slaughter live weight in adult males as 815.84±12.55 and 803.39±13.84g respectively among non-tribal and tribal communities of Dhemaji district of Assam. However, Sheikh (2014) recorded comparatively higher pre-slaughter live weight (1136.10±42.11g) in indigenous chicken under backyard system. The lower mean values in the present study might be due to difference in age of the birds and their management system in the study areas.

Dressed Yield

The overall mean dressed yield (%) of indigenous cock during pre-monsoon, monsoon, post-monsoon and winter seasons recorded as 64.60±0.30, 65.19±0.33, 64.49±0.33 and 65.05±0.31 respectively (Table 2). The

corresponding mean values in indigenous hen recorded during pre-monsoon, monsoon, post-monsoon and winter as 65.17 ± 0.26 , 64.81 ± 0.22 , 64.50 ± 0.24 and 64.81 ± 0.18 per cent respectively. The values were slightly differed from each other among different seasons; however, there was no significant ($P \leq 0.05$) difference in mean values among different seasons. Similar results were also reported by Chutia (2010) as 65.35 ± 0.28 and 64.74 ± 0.35 per cent respectively for non-tribal and tribal communities in indigenous male chicken. The dressed yields recorded in the present study were lower than the values reported by Iqbal *et al.* (2009) as 70.11 per cent in indigenous Kashmiri cock and Sheikh (2014) as 71.33 ± 0.35 per cent in indigenous chicken under backyard system, which might be attribute to differences in pre-slaughter live weights, nutrition and methods of processing as indicated by other workers (Das *et al.*, 2004). The results found in hen were corroborated the findings of Gawande (2006), Iqbal *et al.* (2009) and Chutia (2010), who recorded the values as 65.84 ± 0.84 , 63.80 and 65.30 ± 0.29 per cent respectively in indigenous female chicken of Assam and Kashmir.

Table 2: Mean yield of different carcass traits of indigenous chicken in different seasons

Parameters	Sex	Pre-monsoon	Monsoon	Post-monsoon	Winter	P-value
Pre-slaughter live weight (g)	Male	999.46±25.15	973.17±20.31	981.37±14.10	977.87±16.34	0.8063
	Female	804.48±21.20	793.36±18.77	779.58±16.01	790.83±12.59	0.8005
Dressed yield (%)	Male	64.60±0.30	65.19±0.33	64.49±0.33	65.05±0.31	0.3653
	Female	65.17±0.26	64.81±0.22	64.50±0.24	64.81±0.18	0.2179
Giblet yield (%)	Male	6.10±0.06 ^a	6.15±0.04 ^a	5.97±0.06 ^b	5.98±0.04 ^b	0.0031
	Female	6.12±0.04 ^a	6.14±0.05 ^a	5.98±0.04 ^b	5.92±0.04 ^b	0.0003
Head yield (%)	Male	3.22±0.07 ^a	3.16±0.05 ^b	3.20±0.05 ^a	3.10±0.06 ^c	1.7376
	Female	2.91±0.10 ^a	3.17±0.05 ^b	3.20±0.05 ^b	3.11±0.06 ^c	1.1200
Neck yield (%)	Male	4.91±0.03	4.91±0.03	4.95±0.03	4.90±0.03	0.4312
	Female	4.91±0.02	4.93±0.03	4.94±0.02	4.91±0.02	0.3474
Wing yield (%)	Male	9.38±0.06	9.33±0.05	9.42±0.05	9.33±0.04	0.5149
	Female	9.12±0.11 ^a	9.38±0.04 ^b	9.42±0.03 ^b	9.36±0.02 ^b	6.1900
Drumstick yield (%)	Male	7.11±0.04	7.02±0.03	7.09±0.05	7.04±0.03	0.3578
	Female	6.82±0.11 ^a	7.04±0.02 ^b	7.07±0.02 ^b	7.06±0.02 ^b	1.2600
Thigh yield (%)	Male	7.44±0.04	7.38±0.03	7.42±0.04	7.39±0.04	0.5794
	Female	7.46±0.06	7.41±0.03	7.42±0.02	7.42±0.02	0.8310
Breast yield (%)	Male	20.89±0.10	20.75±0.10	20.99±0.11	20.81±0.10	0.3890
	Female	21.70±0.37 ^a	20.85±0.07 ^b	20.10±0.07 ^b	20.88±0.06 ^b	4.9000
Back yield (%)	Male	16.54±0.08	16.42±0.08	16.61±0.09	16.47±0.09	0.4201
	Female	16.82±0.12 ^a	16.51±0.06 ^b	16.60±0.06 ^b	16.55±0.03 ^b	0.0005

Mean bearing common superscripts within a row do not differ significantly ($P \leq 0.05$)

Giblet Yield

The overall mean giblet yields in cock recorded as 6.10 ± 0.06 , 6.15 ± 0.04 , 5.97 ± 0.06 and 5.98 ± 0.04 per cent and in hen as 6.12 ± 0.04 , 6.14 ± 0.05 , 5.98 ± 0.04 and 5.92 ± 0.04 per cent respectively during pre-monsoon, monsoon, post-monsoon and winter season as depicted in the Table 2. The giblet yields (%) both in cock and hen were significantly ($P \leq 0.05$) higher during monsoon season than post-monsoon and winter seasons, however the mean values were comparable between pre-monsoon and monsoon season. The corresponding values were also comparable between post-monsoon and winter season. The higher giblet yields during monsoon season might be due to increased metabolic activities in an effort to make up for the reduced availability of protein (Iqbal *et al.*, 2009) as free ranged chicken consumed most of the non-conventional feeds such as insects, worms, snails, earthworms, larvae etc. during monsoon season. Chutia (2010) recorded the mean giblet yield in cock as 6.65 ± 0.06 and 6.56 ± 0.05 per cent and in hen as 6.60 ± 0.06 and 6.53 ± 0.06 per cent among non-tribal and tribal communities respectively in Dhemaji district of Assam. Similarly, Kalita *et al.* (2011) also reported the overall mean giblet yield as 6.45 ± 0.06 per cent in indigenous chicken under intensive system. However, Goromela *et al.* (2008) reported comparatively higher liver, heart and gizzard weights during dry season than rainy season.

Head Yield

The results revealed that the overall mean head yields in indigenous cock recorded as 3.22 ± 0.07 , 3.16 ± 0.05 , 3.20 ± 0.05 and 3.10 ± 0.06 per cent and in hen as 2.91 ± 0.10 , 3.17 ± 0.05 , 3.20 ± 0.05 and 3.11 ± 0.06 per cent during pre-monsoon, monsoon, post-monsoon and winter season as respectively and were significantly ($P \leq 0.05$) varied in different seasons. The values recorded in cock was significantly ($P \leq 0.05$) higher during pre-monsoon than monsoon and winter seasons but it was comparable with post-monsoon season. In hen, the values were significantly ($P \leq 0.05$) higher during post-monsoon than pre-monsoon and winter season. However, the values recorded in post-monsoon were comparable with monsoon season. The present findings were in accordance with the findings of Yadav *et al.* (2009), who reported that the average head weight and head yield as 54.2 ± 1.53 g and 2.70 per cent respectively at 16 weeks of age under backyard system. Similarly, Iqbal *et al.* (2009) reported the head yield as 2.63 ± 0.07 per cent of live weight in Kashmiri indigenous chicken.

Neck Yield

The overall mean yield of neck in males recorded as 4.91 ± 0.03 , 4.91 ± 0.03 , 4.95 ± 0.03 and 4.90 ± 0.03 per cent and in females as 4.91 ± 0.02 , 4.93 ± 0.03 , 4.94 ± 0.02 and 4.91 ± 0.02 per cent respectively during pre-monsoon, monsoon, post-monsoon and winter seasons as evident in the Table 2. The mean values recorded both in males and females were numerically differed from each other, however there was no statistical

difference among the values in different seasons. Iqbal *et al.*, also recorded the neck yield (%) in indigenous Kashmiri hen as 4.42 ± 0.11 and in cock as 5.70 ± 0.06 .

Wing Yield

The overall mean wings yields in indigenous males recorded as 9.38 ± 0.06 , 9.33 ± 0.05 , 9.42 ± 0.05 and 9.33 ± 0.04 per cent and in females as 9.12 ± 0.11 , 9.38 ± 0.04 , 9.42 ± 0.03 and 9.36 ± 0.02 per cent respectively during pre-monsoon, monsoon, post-monsoon and winter seasons. The values recorded in males were numerically higher in post-monsoon than other seasons but they did not differ significantly ($P \leq 0.05$) in different seasons, however in females; the wing yields were significantly higher in post-monsoon than pre-monsoon season. The corresponding values recorded in post-monsoon were also comparable to monsoon and winter seasons in hen. The higher mean values recorded in post-monsoon season both in males and females might be attributed to better nutrition during the post-monsoon season (harvesting season). The results of the present study were comparable with the findings of Sheikh and Chatterjee (2009), who reported wings yield as 8.11 ± 0.13 per cent in local birds. Contrary to the present findings, Iqbal *et al.* (2009) and Sheikh (2014) reported the lower wings yield as 6.68 ± 0.18 and 6.85 ± 0.07 per cent respectively in Kashmiri and Assamese indigenous chicken.

Drumsticks Yield

The overall mean drumsticks yield in indigenous cock recorded during pre-monsoon, monsoon, post-monsoon and winter season as 7.11 ± 0.04 , 7.02 ± 0.03 , 7.09 ± 0.05 and 7.04 ± 0.03 per cent and in hen as 6.82 ± 0.11 , 7.04 ± 0.02 , 7.07 ± 0.02 and 7.06 ± 0.02 per cent respectively. In cock, the mean values were comparatively higher during post-monsoon than other seasons, but the values did not differ significantly ($P \leq 0.05$) in different seasons. However, in hen drumstick yields were significantly ($P \leq 0.05$) higher during post-monsoon than pre-monsoon season. The corresponding values recorded in post-monsoon were also comparable to monsoon and winter seasons in hen. The higher drumstick yields (%) recorded in post-monsoon season both in males and females might be attributed to abundance availability of scavenged feeds such as cereals, grains etc. during the post-monsoon season (harvesting season). Higher values of drumstick yield were reported by Sheikh and Chatterjee (2009) as 10.08 ± 0.13 per cent and Iqbal *et al.* (2009) 10.19 ± 0.08 , which might be due to genetic makeup, size of the bird and agro-climatic condition. The mean values in females were in close proximity with Iqbal *et al.* (2009), who found per cent drumsticks yield in hen as 7.84 ± 0.20 in Kashmiri indigenous chicken.

Thigh Yield

The overall mean yield of thighs in males recorded as 7.44 ± 0.04 , 7.38 ± 0.03 , 7.42 ± 0.04 and 7.39 ± 0.04 per cent and in females as 7.46 ± 0.06 , 7.41 ± 0.03 , 7.42 ± 0.02 and 7.42 ± 0.02 per cent respectively during pre-

monsoon, monsoon, post-monsoon and winter seasons as evident in the Table 2. The mean values recorded both in males and females were numerically differed from each other, however there was no statistical difference among the values in different seasons. The present findings were in accordance with the results of Raphulu *et al.* (2015), who reported that season did not affect significantly on thigh yields. The present results were comparable with the findings of Yadav *et al.* (2009), who reported the thigh yield as 9.46 per cent. However, much higher values were reported by several earlier workers (Iqbal *et al.*, 2009; Sheikh and Chatterjee, 2009 and Sheikh, 2014). The lower value in the present study might be due to lower pre-slaughter live weight, genetic makeup, poor management and faulty processing of birds.

Breast Yield

The overall mean breast yields in indigenous male recorded during pre-monsoon, monsoon, post-monsoon and winter season as 20.89 ± 0.10 , 20.75 ± 0.10 , 20.99 ± 0.11 and 20.81 ± 0.10 per cent and in hen as 21.70 ± 0.37 , 20.85 ± 0.07 , 20.10 ± 0.07 and 20.88 ± 0.06 per cent respectively as depicted in Table 2. It was evident that the mean values were not significantly ($P \leq 0.05$) differed in different seasons in males; however, in females breast yields were significantly ($P \leq 0.05$) higher during pre-monsoon season than other seasons. The mean values recorded in monsoon, post-monsoon and winter seasons were comparable to each other. The comparatively higher mean values found both in males and females might be due to higher consumption of protein rich kitchen wastes in pre-monsoon season. The present results were in good agreement with the findings of Iqbal *et al.* (2009) and Raphulu *et al.* (2015), who reported breast yield as 20.10 ± 0.30 and 20.07 per cent respectively in Kashmiri local male and Venda indigenous chicken of South Africa. However, comparatively lower mean values were reported by Sheikh (2014) as 16.83 ± 0.11 percent in indigenous chicken of Assam.

Back Yield

The overall mean per cent of back yield in males recorded during pre-monsoon, monsoon, post-monsoon and winter as 16.54 ± 0.08 , 16.42 ± 0.08 , 16.61 ± 0.09 and 16.47 ± 0.09 per cent and in females as 16.82 ± 0.12 , 16.51 ± 0.06 , 16.60 ± 0.06 and 16.55 ± 0.03 per cent respectively. Although the values were numerically differed from each other, there was no significant ($P \leq 0.05$) difference of values in different seasons. The present results were also comparable with the findings of Sheikh and Chatterjee (2009) as 15.71 ± 0.13 and 15.81 ± 0.16 per cent in Vanaraja and local chicken respectively and Sheikh (2014) as 15.47 ± 0.40 per cent in indigenous chicken of Assam. The mean value found in pre-monsoon season was significantly ($P \leq 0.05$) higher than the other seasons, which might be due to better nutrition. In contrary to the present findings, Iqbal *et al.* (2009) found the back yield in hen as 12.52 ± 0.35 per cent in Kashmiri local chicken. However, Raphulu *et al.* (2015) found that back yield was not influenced by season.

Conclusion

Hence it may be concluded that season did not influence pre-slaughter live weight (g), dressed yield (%), neck yield (%) and thigh yield (%) in indigenous chicken of Assam. However, giblet yield, head yield, wing yield, drumstick yield, breast yield and back yield per cent were varied significantly in different seasons. Therefore, supplementary feeding of protein rich feeds may improve their production potential, which in turn may result in better carcass traits.

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