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Carcass Characteristics of Indigenous, Vanaraja and Crossbred Chicken under Different Systems of Rearing

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ABSTRACT

An experiment was carried on 1200 no. of chicks out of which 600 numbers (200 each of Indigenous, Vanaraja and Crossbred) were reared under intensive system. Remaining 600 numbers (200 each of Indigenous, Vanaraja and Crossbred) were distributed among 30 beneficiaries for backyard system of rearing. At the age of 40 weeks, 10 birds (5 male and 5 female) from each group reared under intensive and backyard system were randomly picked up for carcass trait study. The overall mean pre-slaughter live weight was found to be significantly ($p \leq 0.05$) higher in Vanaraja (2421.60±100.61g) than those of Crossbred (2042.75±78.48 g) and Indigenous (1249.10±41.44 g) chickens. Significantly ($p \leq 0.05$) higher overall mean pre-slaughter live weight was recorded under intensive (2034.87±109.11g) compared to those under backyard (1774.10±106.04 g) system of rearing. The overall mean dressed yields were recorded as 71.33±0.35, 72.62±0.35 and 71.55 ±0.25 %, for Indigenous, Vanaraja and Crossbred chicken respectively, which differed significantly ($p \leq 0.05$) among the chicken types. Significantly ($p \leq 0.05$) higher overall mean dressed yield was recorded under intensive (72.43±0.23%) compared to those under backyard (71.31±0.30%) rearing systems. Significantly ($p \leq 0.05$) higher overall mean giblet yield was recorded under backyard (5.23±0.15 %) than under intensive (4.61±0.09 %) systems of rearing. The mean yield (%) of thigh, breast, back, drumstick, wings and neck of different types of chicken under intensive and backyard systems of rearing differed significantly ($p \leq 0.05$). Except neck yield all the cut up parts were significantly ($p \leq 0.05$) higher under intensive system than backyard system.

Keywords Indigenous, Vanaraja, Crossbred, Carcass traits, Intensive, Backyard.

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INTRODUCTION

Poultry industry witnessed a major success story in India during the last few decades. An increase in per

capita availability of one egg or 50 g of poultry meat will create an additional 20-25 thousand jobs has been estimated (Sridharan and Saravanan 2013). The poultry meat is much cheaper for consumers, compared to other meat product which has relatively better acceptability across regions and religions (Manning and Baines 2004). The market demand for poultry meat and eggs in the North- eastern states including Assam is very high because of the food habits of people and their likeness for non-vegetarian food.

In the recent years there is an increasing trend in consumer and farmer preference to native chickens due to the better taste and flavor of meat and eggs and higher disease resistance (Wattanachant *et al.* 2004, Cheng *et al.* 2008) besides fetching higher price (Umaya 2014). Owing to their relatively low fat and cholesterol contents than other meat, chicken meat is considered as a healthy animal food (Jaturasitha *et al.* 2008). Moreover, chicken continues to be the cheapest among all types of meat consumed worldwide (Jung *et al.* 2011). Local chickens may be regarded as "Credit Card" to the rural women that instantly available for sale or barter (Hossen 2010). The commercial poultry industry leads to the disappearance of less productive local breeds. However, in the recent years native chickens are getting attention in various countries. This is because of unique hardiness of the breeds, their ability to thrive under adverse climatic conditions and the desirable taste and flavor of eggs and meat.

Backyard poultry requiring hardly any infrastructure set-up is a potent tool for upliftment of the poorest of the poor. Besides income generation, rural backyard poultry provides high quality nutrition supplementation in the form of valuable animal protein and empowers rural women. Moreover, rural people prefer the color and hardiness of the local birds in comparisons to the white colored, commercially produced broilers and a higher price is paid for rural chickens and eggs (Kumaresan *et al.* 2006). There is a need to take up specific rural poultry production programs to meet the requirements of the rural consumers while constituting a source of subsistence income by taking up improved variety bird units ranging from 20 to 30 birds per family in their backyards. The present study was conducted to evaluate the carcass characteristics of different types of rural poultry under intensive and backyard systems of rearing.

MATERIALS AND METHODS

The present study was conducted in the experimental poultry shed under the project AICRP on poultry breeding, Department of Poultry Science, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati 781022 for intensive system and in Bijoynagar area of Kamrup district for backyard system. A total 1200 no. of chicks out of which 600 numbers (200 each of Indigenous, Vanaraja and Crossbred) were reared under intensive system. Remaining 600 numbers (200 each of Indigenous, Vanaraja and Crossbred) were distributed among 30 beneficiaries for backyard system of rearing. At the age of 40 weeks, 10 birds (5 male and 5 female) from each group reared under intensive and backyard system were randomly picked up for carcass trait study. Before slaughter pre-slaughter live weight was recorded. The birds were then slaughtered by halal method after 12 hr of fasting and processed as per standard procedure. The birds were bled for two minutes and defeathered. The different carcass traits like dressed weight, eviscerated weight and weight of giblets (heart, liver, gizzard) was recorded for each carcass and expressed as percent pre-slaughter live weight. The yield of various cut-up parts were also recorded and expressed as percent of dressed weight. The weight (g) of the individual carcass after removal of the blood, feathers, oil gland, head, shanks and viscera but giblet was retained with the carcass and recorded as dressed carcass weight and expressed in percent of pre-slaughter live weight.

After dressing, the dressed carcass without giblet was recorded as eviscerated weight and expressed as percentage of pre-slaughter live weight. The data collected were analyzed as per the method of Snedecor and Cochran (2004).

RESULTS AND DISCUSSION

The overall pooled mean pre-slaughter live weight (g), dressed yield (%), eviscerated yield (%) and giblet yield (%) of different types of chicken under intensive and backyard systems of rearing is presented

Table 1. Overall pooled carcass characteristics of different types chicken under intensive and backyard systems of rearing. Rows bearing at least one common superscript did not differ significantly (p≤0.05).

Traits	Types of chicken			Rearing systems	
	Indigenous	Vanaraja	Crossbred	Intensive	Backyard
Pre slaughter live weight (g)	1249.10[a] ±41.44	2421.60[b] ±100.61	2042.75[c] ±78.48	2034.87[a] ±109.11	1774.10[b] ±106.04
Dressed yield (%)	71.33[a]±0.35	72.62[b]±0.35	71.55[a]±0.25	72.43[a]±0.23	71.31[b]±0.30
Eviscerated yield (%)	66.68 [a]±0.41	68.19[b]±0.42	67.18[ab]±0.33	67.01[a]±0.35	67.69a±0.23
Giblet yield (%)	5.20 [a]±0.12	4.85[b]±0.14	4.71[b]±0.12	4.61[a]±0.09	5.23[b]±0.15

in Table 1. The overall mean pre-slaughter live weight was found to be significantly (p≤0.05) higher in Vanaraja (2421.60±100.61g) than those of Crossbred (2042.75±78.48 g) and Indigenous (1249.10±41.44 g) chickens. Similar results were reported by Kalita *et al.* (2011a) , Gonmei (2012) who recorded significantly (p≤0.05) higher values of pre-slaughter live weight in Vanaraja than Indigenous chicken. Pathak (2013) also reported significantly (p≤0.05) higher values of pre-slaughter live weight in Crossbred (PB2 × Indigenous) than Indigenous chicken.

The higher pre-slaughter live weight in Vanaraja and Crossbred than Indigenous chicken may be due to better growth rate resulting in better live weight of the chicken. The results of the present study were comparable with Roy *et al*. (2003) in Miri bird, Debata *et al.* (2012) in Vanaraja birds, Gonmei (2012) in Indigenous chicken and Kumar *et al.* (2012) in Vanaraja bird. Significantly (p≤0.05) higher overall mean pre-slaughter live weight was recorded under intensive (2034.87±109.11g) compared to those under backyard (1774.10±106.04 g) system of rearing. This might be due to better feeding, care and management under intensive system than under backyard system. Doley (2009) also reported significantly (p≤0.05) higher values of pre-slaughter live weight under intensive system than under extensive system in Indigenous chicken.

The overall mean dressed yields were recorded as 71.33±0.35, 72.62±0.35 and 71.55±0.25 %, for Indigenous, Vanaraja and Crossbred chicken respectively, which differed significantly (p≤0.05) among the chicken types. Significantly (p≤0.05) higher overall mean dressed yield was recorded under intensive (72.43±0.23 %) compared to those under backyard (71.31±0.30 %) rearing systems.

The dressed yields recorded in the present study were lower than the values reported by Roy *et al.* (2003) as 74.38 ±1.51 % in Miri bird, Sheikh and Chatterjee (2009) as 78.79 ± 0.16 and 78.06 ± 0.33 %, for Vanaraja and local birds respectively, which could be due to differences in pre-slaughter body weights, nutrition and methods of processing as indicated by other workers (Mondal *et al.* 2003, Das *et al.* 2004). However, comparable results were reported by Doley *et al.* (2009) in Indigenous chicken, Iqbal *et al*. (2009) in Indigenous chicken of Kashmir, Mondal and Kakati (2010) in Vanaraja, Kashmir commercial layer and local birds. Arora *et al.* (2011) in Aseel Peela and cross between Aseel Peela and Kadaknath birds and Debata *et al.* (2012) in Vanaraja bird.

The overall mean eviscerated yields were recorded to be significantly (p≤0.05) higher in Vanaraja (68.19±0.42%) followed by Crossbred (67.18±0.33%) and Indigenous (66.68±0.41%) chicken although rearing system had no significant effect on the overall mean eviscerated yield. The eviscerated yield recorded in the present study were higher than the values reported by Murugan (2001) in cockerels, Yadav and Khan (2011) in backyard chicken at 16 weeks of age, Padhi *et al.* (2012) in male line Vanaraja, Vanaraja and control broiler at 8 weeks of age

and higher values by Gonmei (2012) in indigenous and Vanaraja chicken for male and female. This could be due to differences in pre-slaughter body weights, nutrition and methods of processing as indicated by other workers (Mondal *et al.* 2003, Das *et al.* 2004). The higher eviscerated yield might be due to higher pre-slaughter live weight of Vanaraja bird. Similar results were reported by Roy *et al.* (2003) in Miri bird, Sheikh *et al.* (2004) in Vanaraja male and female birds, Sheikh and Chatterjee (2009) in Vanaraja and local birds.

Significantly ($p \leq 0.05$) higher overall giblet yield was recorded in Indigenous (5.20±0.12%) followed by Vanaraja (4.85±0.14%) and Crossbred (4.71±0.12%) chicken. Significantly ($p \leq 0.05$) higher overall mean giblet yield was recorded under backyard (5.23±0.15 %) than under intensive (4.61±0.09%) systems of rearing. The higher yield of giblet under backyard system might be due to the fact that birds had to digest more fibrous feed as result more activity of gizzard causing hypertrophy of gizzard.

In agreement with the present findings, Roy *et al.* (2003) recorded similar yield of heart, gizzard and liver of Miri bird. Doley (2009) reported significantly higher giblet yield under extensive than under intensive systems of rearing. The giblet yields recorded by Pathak *et al.* (2009) in Vanaraja males and females, Sheikh and Chatterjee (2009) in Vanaraja and local birds, Kalita *et al.* (2012) in male, female and combined sex of Vanaraja birds and Kumar *et al.* (2012) in Vanaraja male and female birds were also within the range of the present study.

The mean yield (%) of thigh, breast, back, drumstick, wings and neck of different types of chicken under intensive and backyard systems of rearing is presented in Table 2. The overall mean value of thigh and back were recorded as 9.92±0.14 and 15.47±0.40, 11.98±0.22 and 17.57±0.15, 11.93±0.17 and 15.68±0.18%, respectively for Indigenous, Vanaraja and Crossbred chicken, which differed significantly ($p \leq 0.05$) among the chicken types. The overall mean yield of thigh was recorded as 11.19±0.22 and 16.26±0.27, 11.36±0.23 and 16.21±0.28 % under intensive and backyard systems of rearing differed non significantly.

The overall mean yields of breast and drumstick were recorded as 16.83±0.11 and 9.46±0.23, 17.61±0.23 and 10.33±0.29, 17.21±0.15 and 9.74±0.26% respectively for Indigenous, Vanaraja and Crossbred chicken. The overall mean yields of breast were recorded as 16.93±0.27 and 10.19±0.18, 17.51±0.13 and 9.50±0.24% under intensive and backyard systems of rearing. Significant ($p \leq 0.05$) effect among the chicken types and rearing systems were exists.

The overall mean yield of wings and neck were recorded as 6.85±0.07 and 4.97±0.08, 8.03±0.06 and 4.28±0.06, 7.49±0.12 and 4.31±0.12%, respectively for Indigenous, Vanaraja and Crossbred chicken, which differed significantly ($p \leq 0.05$) among the chicken types. The overall mean yield of wings and neck was under intensive system (7.70±0.11 and 4.28±0.08) and backyard system (7.21±0.13 and 4.76±0.08%) was significantly ($p \leq 0.05$) different. The higher neck yield in backyard birds might be due to more activity of neck for scavenging action.

The overall mean yield of neck were recorded as 4.97±0.08, 4.28±0.06 and 4.31±0.12%, respectively

Table 2. Overall pooled cut-up parts of different types of chicken under intensive and backyard systems of rearing. Rows bearing at least one common superscript did not differ significantly ($p \leq 0.05$).

Traits	Types of chicken			Rearing systems	
	Indigenous	Vanaraja	Crossbred	Intensive	Backyard
Thigh (%)	9.92^{a}±0.14	11.98^{b}±0.22	11.93^{b}±0.17	11.19^{a}±0.22	11.36^{a}± 0.23
Breast (%)	16.83^{a}±0.11	17.61^{b}±0.23	17.21^{ab}±0.15	16.93^{a}±0.27	17.51^{b}± 0.13
Back (%)	15.47^{a}±0.40	17.57^{b}±0.15	15.68^{a}±0.18	16.26^{a}±0.27	16.21^{a}± 0.28
Drumstick(%)	9.46^{a}±0.23	10.33^{b}±0.29	9.74^{ab}±0.26	10.19^{a}±0.18	9.50^{b} ±0.24
Wings (%)	6.85^{a}±0.07	8.03^{b}±0.06	7.49^{c}±0.12	7.70^{a}±0.11	7.21b±0.13
Neck (%)	4.97^{a}±0.08	4.28^{b}±0.06	4.31^{b}±0.12	4.28^{a}±0.08	4.76^{b}±0.08

for Indigenous, Vanaraja and Crossbred chicken, which differed significantly ($p \leq 0.05$) among the chicken types. The overall mean yield of neck was recorded as 4.28±0.08 and 4.76±0.08% under intensive and backyard systems of rearing. Rearing systems had significant ($p \leq 0.05$) effect on overall neck values.

Significantly ($p \leq 0.05$) higher overall mean yields of thigh, breast, back, drumstick and wings were recorded for Vanaraja followed by Crossbred and Indigenous chicken. However, the mean yield of neck was found significantly ($p \leq 0.05$) higher in Indigenous followed by Crossbred and Vanaraja chicken. Significantly ($p \leq 0.05$) higher mean yield of breast, drumstick, wings and neck were recorded under intensive system than under backyard system. Similar values were reported by Sheikh *et al.* (2004) in Vanaraja chicken for different cut up parts and Sheikh and Chatterjee (2009) in Vanaraja and local birds for different cut up parts.

However, in contrary to the present findings, higher values were reported by Roy *et al.* (2003) in Miri birds, Pathak *et al.* (2009) in Vanaraja birds, Arora *et al.* (2011) in KN (Kadaknath), AP (Aseel Peela) and APKN (cross between AP and KN) birds and Kumar *et al.* (2012) in Vanaraja birds. The variation could be due to differences in pre- slaughter body weights, nutrition and methods of processing as indicated by other workers (Mondal *et al.* 2003 , Das *et al.* 2004). The higher values recorded under intensive system could be due to better nutrition and care and management credited to more live weight, which ultimately yielded higher cut–up parts under intensive system than under backyard system.

CONCLUSION

From the present study it could be concluded that carcass yield was better under intensive system than under backyard system of rearing. However, the yield of neck and giblet yield was more under backyard system than intensive system of rearing.

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