Effects of age and live weight on meat yield characteristics of Giribaz squab

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ABSTRACT

A total of 60 Giribaz squabs of different ages (25-35 days) were purchased, slaughtered and allowed to bleed properly. After dissection the parts of squab were weighed separately and recorded. It was found that dressing percentage, total meat, breast meat, dark meat, wing meat, thigh meat, drumstick meat, total bone, wing bone, thigh bone, drumstick bone and the ratio of breast and dark meat (breast: dark meat) were 53.88, 18.97, 10.45, 8.54, 4.05, 2.41, 2.08, 10.41, 3.72 0.76, 0.88, and 1.22%, respectively. The average length of neck, wing bone, thigh bone, drumstick bone, elementary tract and shank were 5.62, 8.67, 3.37, 5.05, 84.03, and 2.85cm, respectively. On the other hand, the average weight of head, neck, heart, liver, gizzard, spleen, abdominal fat, back, skin and shank were 4.94, 1.79, 1.09, 3.14, 2.20, 0.10, 0.80, 3.31, 9.49, and 1.84%, respectively. Dressing percentage, total meat, breast meat, dark meat were linearly increased ($P<0.01$) and gizzard and liver weight were linearly decreased ($P<0.01$) with the increase of age and live weight. Ratio of breast and dark meat, total bone, drumstick bone, head, neck, elementary tract length, back and shank weight did not maintain ($P>0.05$) any relation with the increase of age and live weight. Despite smaller in size (229.50g), the dressing percentage of squab was fairly higher (53.88%) and relative ratio of breast and dark meat usually higher (1.22), because the growth of pectoral muscle (flying muscle) appeared to be very fast growing in early life of squab. Further study is needed among different breeds and varieties of pigeon available in Bangladesh for better performance.

Keywords: Age, Giribaz squab, Live weight, Meat yield

INTRODUCTION

Pigeons are reared in Bangladesh from the time immemorial. The weather and vast areas of crop field along with housing premises of Bangladesh are suitable for pigeon farming. Mankind has practiced pigeon keeping for about 10,000 years in almost every part of the world (Levi, 1977). Pigeon is the first bird species to have been treated by humans (Johnston and Janiga, 1995).

The term squab is probably of Scandinavian origin; the Swedish word skvabb means ‘loose, fat flesh’ (Merriam-Webster's Collegiate Dictionary, 2009). People of all religions like squab meat. Squab meat is very lean, easily digestible and rich in proteins, minerals and vitamins. It is also used as tasty, delicate and fancy meat (Aliza, 2005; Jane, 2005; Richard, 2006; Morgan, 2006). Pigeons are used for meat production, ornamentals, sports and experimental animals (Rahman and Khatun, 1999). Chinese people consider the meat of pigeons as having medicinal value and squab is a part of celebratory banquets for holiday such as Chinese New Year (Hsiung et al., 2005). Egyptians raised pigeon for food (Levi, 1972). Pigeons were popular in Romans, France and England as a means of livelihood to produce squab (Goodwin, 1967).

In Bangladesh, livestock plays an important role in the agricultural economy. The current contribution of livestock sub-sector to overall GDP is about 2.73% (Draft Sixth Five Year Plan, 2010). About 78% of the total egg production and 86% of the meat production of the country come from scavenging poultry and the rest from farm poultry (Alam, 1995).

Giribaz is one of the oldest pigeon in Indo-Bangladesh subcontinent. Giribaz is slightly larger than dove, short beak, small head without comb and usually clean legged. There are small and of diverse colours, they have strange motions, turning themselves backwards over their heads and show like footballs in the air. Pigeon which flew so high in the air that they were lost to view but returned to their house without separating. The colour of Giribaz is black, blues etc with white head, white flights and white tail. Giribaz pigeons are available now a days in old Dhaka, Gingira and Rajshahi. Among the farmers 50% liked Gola, 37.5% Giribaz, 5% Siraji, 5% Serting and 5% Mayouri/Locca breed of pigeon (Islam, 2010).

In developing countries like Bangladesh, pigeons are reared under semi scavenging system mainly for squab production. The quantity of feed supplied to semi scavenging pigeon from 32.5-42.5g/day, with an average of 38.1g/day (Islam, 2010). Balance ration is one of the fundamental requirements to successful pigeon farming. Optimum nutrition promotes proper growth, production and disease resistance (Levi, 1977). Considering the above facts and circumstances, the present study was designed to know the effects of age and live weight on meat yield of Giribaz squab.

MATERIALS AND METHODS

Study area and time

The study was conducted at Sylhet, Bangladesh. Sylhet district in Bangladesh (24.8917°N 91.8833°E) with an area of 3490.40 sq. km is bounded by the Khasia-Jainta hills of India on the north, Maulvibazar district on the south, Kachhar and Karimganj districts of India on the east, Sunamganj and Habiganj districts on the west. The climate of Sylhet is humid subtropical with a predominantly hot and humid in summer and a relatively cold winter. Annual maximum temperature is 33.2°C and minimum is 13.6°C; annual rainfall 3334 mm (BGD MSN Weather, 2009). The duration of the study was 12 months; from January to December, 2013.

Collection, slaughter and dissection of squab

A total of 60 Giribaz squabs of different ages 25-35 days were purchased in afternoon 5.00-6.00 pm from the farmers premises at Sylhet. After purchase they were starved for about 8-10 hours prior to slaughtering. In the day, squabs were individually weighed and slaughtered. They were allowed to bleed properly for 2-3 minutes. Each slaughtered squab was scaled and eviscerated. Afterwards, they were dissected following the procedure of Jones (1984). All organs or parts of the dissected squabs were weighed separately and recorded.

Dressing percentage

Records were kept on weight of carcass, head, breast meat, wing meat, wing bone, heart, gizzard, heart, liver, spleen, abdominal fat, back, thigh meat, thigh bone, drumstick meat, drumstick bone, dressed skin, shank and the length of neck, wing bone, drumstick bone, thigh bone and alimentary tract. Dressing percentage of the squab was determined by dividing the carcass weight with its live weight, multiplied by 100 and expressed as percentage. Weight of dark meat as calculated by summation of different meat weight (weight of thigh meat + drumstick meat + wing meat). Breast and dark meat ratio (Breast: Dark meat) calculated as

breast meat weight divided by dark meat weight. Weight of total bone is calculated by summation of different bone weight (weight of neck weight + wing bone + vertebral column weight + thigh bone + drumstick bone).

Statistical analysis of data

All meat yield characteristics were regressed on age and live weight to have the effects of age (x) and live weight (y) on the meat yield of squab (y= a+bx). SPSS (Statistical Procedures for Social Sciences, SPSS-16, 2007) statistical package was used to analyze the data.

RESULTS AND DISCUSSION

Effect of age on meat yield of squab

Table 1 shows that average age at slaughter and live weight were 29.40 days and 229.50g. Average value of dressing percentage, total meat, breast meat, dark meat, wing meat, thigh meat, drumstick meat, total bone, wing bone, thigh bone, drumstick bone and the ratio of breast and dark meat (breast: dark meat) were 53.88, 18.97, 10.45, 8.54, 4.05, 2.41, 2.08, 10.41, 3.72 0.76, 0.88, and 1.22%, respectively. The average length of neck, wing bone, thigh bone, drumstick bone, elementary tract and shank were 5.62, 8.67, 3.37, 5.05, 84.03, and 2.85cm, respectively. On the other hand, the average weight of head, neck, heart, liver, gizzard, spleen, abdominal fat, back, skin and shank were 4.94, 1.79, 1.09, 3.14, 2.20, 0.10, 0.80, 3.31, 9.49, and 1.84%, respectively. Average value of dressing percentage, total meat, breast meat, dark meat, wing meat, thigh meat, drumstick meat, wing bone, thigh bone, neck length, thigh bone length, skin weight, and shank length were increased ($P<0.01$) linearly with the increase of age. Wing bone length and drumstick bone length were also increased ($P<0.05$) linearly with the increase of age. Liver and gizzard weight were linearly declined ($P<0.01$) for the increase of age. Total bone, drumstick bone, head, neck, heart, spleen, abdominal fat, elementary tract length, back, shank weight, and breast and dark meat ratio (breast: dark meat) did not maintain ($P>0.05$) any relation with age of squab.

Average live weight of Giribaz squab was 229.50g which was similar with the findings of Islam (2010) for Giribaz squab, Azad (2009) for Gola squab and Asaduzzaman (2008). Age at slaughter in this study was 29.40 days and it was similar to the previous reported as by Kabir (2013), Islam (2010), Azad (2009), Asaduzzaman (2008), Bolla (2007), Blechman (2006) and Bokhari (2002) ranging from 20-35 days. The dressing percentage of Giribaz squab obtained in this study was 53.88% and it was similar with Islam (2010) for Giribaz squab and much lower than that reported by Omojola et al. (2012), Ibrahim and Bashrat (2009) and Bokhari (2002). Similarly, Bolla (2007) and Hollander (1948) found dressing percentage from 74% to 75% for King squab, which was much higher than that obtained in the current study. Such a difference could have arisen for the difference of breeds, ages and slaughter weights. The dressing percentage increases with increased live weight in all poultry species (Howlider and Rose, 1989). So, it is assumed that heavier breeds (King, Runt, Carneau and Homer giant) could produce higher dressing percentage. The average value of thigh meat, drumstick meat, total bone, thigh bone, drumstick bone, head, neck, heart, liver, gizzard, spleen, abdominal fat, and shank weight were similar with the findings of Islam (2010) in case of Giribaz squab. The average value of length of neck, wing bone, thigh bone, drumstick bone and shank, and the average value of breast and dark meat ratio (breast: dark meat) were similar with the findings of Islam (2010) in case of Giribaz squab.

Table 1: Regression of meat yield characteristics (y) on the age (x) of the squab

Variable (% of live weight)	**Mean**	**Constant ± SE**	**Slop ± SE**
Live weight (g)	229.50		
Age (Days)	29.40		
Dressing percentage (%)	53.88	12.11±6.91	1.421±0.234**
Total meat (%)	18.97	8.18±1.73	0.367±0.059**
Breast meat (%)	10.45	4.03±1.35	0.218±±0.046**
Dark meat (%)	8.52	4.14±0.65	0.149±0.022**
Wing meat (%)	4.03	3.14±0.28	0.03±0.01**
Thigh meat (%)	2.41	-0.37±0.44	0.095±0.015**
Drumstick meat (%)	2.08	1.37±0.22	0.024±0.008**
Breast: Dark meat	1.22	1.10±0.15	0.004±0.005NS
Total bone (%)	8.66	7.84±0.84	0.028±0.029NS
Wing bone (%)	3.71	2.50±0.25	0.041±0.009**
Thigh bone (%)	0.76	0.15±0.14	0.021±0.005**
Drumstick bone (%)	0.88	1.01±0.13	-0.005±0.005NS
Neck (%)	1.79	1.40±0.34	0.013±0.012NS
Back (%)	3.31	4.17±0.78	-0.029±0.027NS
Neck length (cm)	5.62	2.63±0.49	0.102±0.017**
Wing bone length(cm)	8.67	6.92±0.64	0.059±0.022*
Thigh bone length (cm)	3.37	1.16±0.32	0.075±0.011**
Drumstick bone length (cm)	5.05	3.92±0.51	0.038±0.017*
Elementary tract length (cm)	84.03	82.40±11.96	0.055±0.406NS
Shank length (cm)	2.85	2.37±0.14	0.017±0.005**
Head (%)	4.94	4.43±0.59	0.017±0.002NS
Heart (%)	1.09	0.704±0.19	0.013±0.007NS
Gizzard (%)	2.13	4.34±0.28	-0.075±0.009**
Liver (%)	3.59	7.79±0.31	-0.14±0.01**
Spleen (%)	0.10	0.19±0.04	-0.003±0.002NS
Abdominal fat (%)	0.80	0.76±0.27	0.001±0.009NS
Skin (%)	9.49	5.82±1.21	0.125±0.041**
Shank (%)	1.84	1.17±0.40	0.023±0.014NS

(NS, P>0.05; *, P<0.05; **, P<0.01)

Heart, liver and shank percentage obtained in this study was similar with the findings of Hollander (1948) in King breed. Pigeons are flying birds therefore; higher breast muscles (flight muscle) deposited in pigeon may be for their physiological need to fly. Early development of breast muscles and therefore, increased breast meat with the advancement of age was also observed Islam (2010) for Giribaz squab, Azad (2009) for Gola squab and Bokhari (2002). It could be due to quick ability to fly at younger age. Such a physiological need for flying may be related to quicker breast muscle deposition in pigeon. Total meat, breast meat and wing meat weight and the length of thigh bone and shank were increased ($P<0.01$) linearly with the increase of age which was inaccordance with the findings of Azad (2009) for Gola squab. Neck length and wing bone weight were increased ($P<0.01$) almost linearly with the advance of age and was similar with the findings of Islam (2010) for Giribaz squab. Lack of relationship of age with head, heart, spleen, abdominal fat, elementary tract length, total bone, drumstick bone and shank weight agreed with Azad (2009). No significant differences ($P>0.05$) were found in heart, spleen, total bone and drumstick bone which was similar with the findings of Islam (2010) in case of Gola, Giribaz and Jalali squab and it indicate that growth of those variables may be heterogeneous. Decreased percentage of liver and gizzard weight with advancement of age perhaps imply that those components are very early maturing and was similar with the findings of Islam (2010) for Giribaz squab, Azad (2009) for Gola squab and Bokhari (2002).

Effect of live weight on meat yield of squab

Table 2 shows that dressing percentage, total meat, breast meat, dark meat, neck length, wing bone, heart, thigh meat and thigh bone length increased ($P<0.01$) linearly with increased live weight. Wing meat, thigh bone and shank length were increased ($P<0.05$) linearly with the increase of live weight. Gizzard and liver weight were declined ($P<0.01$) linearly with the increasing of live weight because this organs are developed earlier than later stage. Total bone, wing bone length, drumstick meat, drumstick bone, drumstick bone length, elementary tract length, head, neck, spleen, abdominal fat, back, skin and shank weight and the ratio of breast and dark meat (breast: dark meat) did not show any relationship ($P>0.05$) with the increase of live weight. Live weight in squabs is of considerable importance because it affects price paid for squab and may influence consumer appeal for dressed squab. It is evident from regression of meat yield of squab on live weight that the patterns of growth of different components are variables. Live weight has tremendous effect on dressing percentage, total meat and breast meat because muscle is deposited in mid age of squab and other organs are developed earlier than later stage. Therefore, most of nutrients are used for muscle growth.

Dressing percentage, total meat, breast meat and length of thigh bone increased ($P<0.01$) with the increase of live weight which was similar with the findings of Azad (2009) for Gola squab. Drumstick meat, total bone, spleen, abdominal fat and skin did not maintain any relation ($P>0.05$) with increased live weight which was similar with the findings of Azad (2009) for Gola squab and which indicate that growth of those variables develop earlier. Decreased percentage of gizzard and liver weight with live weight was similar with the findings of Azad (2009) for Gola squab and it may be for the difference in the pattern of growth of pigeon with live weight. Those organs grow at lighter weight such a pattern of growth components similar with the findings of Bokhari (2002).

Table 2: Regression of meat yield characteristics (y) on the live weight (x) of squab

Variable (% of live weight)	Constant ± SE	Slop ± SE
Dressing percentage (%)	-0.89±10.98	0.239±0.048**
Total meat (%)	3.79±2.57	0.066±0.011**
Breast meat (%)	0.63±1.84	0.043±0.008**
Dark meat (%)	3.16±1.12	0.023±0.005**
Wing meat (%)	3.05±0.43	0.004±0.002*
Thigh meat (%)	-1.27±0.71	0.016±0.003**
Drumstick meat (%)	1.37±0.35	0.003±0.002NS
Breast: Dark meat	0.82±0.20	0.002±0.001NS
Total bone (%)	8.42±1.23	0.001±0.005NS
Wing bone (%)	2.42±0.43	0.006±0.002**
Thigh bone (%)	0.10±0.24	0.003±0.001*
Drumstick bone (%)	0.95±0.20	0±0.001NS
Neck (%)	1.42±0.50	0.002±0.002NS
Back (%)	4.94±1.10	-0.007±0.005NS
Neck length (cm)	0.95±0.62	0.02±0.003**
Wing bone length (cm)	7.004±0.99	0.007±0.004NS
Thigh bone length (cm)	0.75±0.58	0.011±0.003**
Drumstick bone length (cm)	3.63±0.75	0.006±0.003NS
Elementary tract length (cm)	94.63±17.07	-0.046±0.074NS
Shank length (cm)	2.31±0.21	0.002±0.001*
Head (%)	4.12±0.84	0.004±0.004NS
Heart (%)	0.27±0.26	0.004±0.001**
Gizzard (%)	5.19±0.43	-0.013±0.002**
Liver (%)	8.96±0.69	-0.023±0.003**
Spleen (%)	0.22±0.06	0±0NS
Abdominal fat (%)	0.61±0.38	0.001±0.002NS
Skin (%)	6.09±1.89	0.015±0.008NS
Shank (%)	1.46±0.61	0.002±0.002NS

(NS, P>0.05; *, P<0.05; **, P<0.01)

CONCLUSION

Despite smaller in size, the dressing percentage was fairly higher and relative ratio of breast and dark meat (Breast: Dark meat) usually higher because the growth of pectoral muscle (flying muscle) appeared to be very fast growing in early life of squab. Further study is needed for meat yield investigation of squab among different breeds and varieties of pigeon available in Bangladesh for better performance. A survey on pigeon population and their economic feasibility in Bangladesh should be done.

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