



Full Length Research Article

**MORPHOMETRIC MEASUREMENTS, PRODUCTIVE AND REPRODUCTIVE PERFORMANCE OF
JALALI PIGEON**

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ABSTRACT

The experiment was conducted to characterize Jalali pigeon phenotypically. Fifteen pairs of Jalali pigeons were reared in scavenging condition. Mean body length, wing span, shank length, bill length and head length of mature Jalali pigeon were 33.28 ± 0.18 , 64.37 ± 0.20 , 3.08 ± 0.02 , 2.04 ± 0.01 and 3.66 ± 0.02 cm, respectively. Mean body weight of Jalali pigeon at 3-day, 15-day, 1-month and 5-month of age were 31.68 ± 1.08 , 225.53 ± 3.89 , 275.59 ± 1.48 and 324.79 ± 3.41 gm, respectively. The egg weight, egg length and width, hatching period, fledgling period and interclutch period of Jalali pigeon were 16.18 ± 0.08 gm, 3.75 ± 0.006 and 2.81 ± 0.005 cm, 18.00 ± 0.09 , 35.80 ± 0.22 and 32.33 ± 0.66 days, respectively. Phenotypic correlation among body length, wing span, shank length and weight of mature Jalali pigeon ranged from 0.247 to 0.791. Phenotypic correlation among body weights at 3-day, 15-day, 1-month and 5-month of age of Jalali pigeon ranged from 0.559 to 0.858. Phenotypic correlation among egg weight, egg length and egg width of Jalali pigeon ranged from 0.000 to 0.836. The result of this study may contribute to selection for improved performance, as well as conservation of the populations as a genetic resource.

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INTRODUCTION

Bangladesh has a long historical record of raising poultry under backyard system. 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). The people of all religions and civilizations love pigeon very much. Pigeons are mainly monogamous birds (Essam, 1997). Courtship display of pigeon is usually performed by the male, and shown by the fluffing of the breast feathers, dragging of the tail, cooing, and treading of the feet on the floor. If the female is receptive she will nod her head, after which billing follows. The male presents an open beak into which the female inserts hers. There is evidence that the male regurgitates into the beak of the female. Subsequently the female will crouch, elevate her wings and receive the male, and the pair-bond is formed (Whitman, 1919; Craig, 1918; Gifford, 1941). Present status of a livestock breed in terms

of breed characteristics is essential to formulate the conservation and improvement strategies for the breed. Mbap (1985) suggested that before attempting any genetic improvement, animals must first be characterized. The future utilization of genetic resource depends on breed characterization (FAO, 2010). In essence, phenotypic and molecular characterizations of Animal Genetic Resources are used to measure and describe genetic diversity in these resources as a basis for understanding them and utilizing them sustainably. Jalali pigeon is one of the most popular pigeon breed in Bangladesh. These pigeons are found in the Shrine of Shah Jalal (R) in Sylhet and some other districts of Bangladesh. The pigeon is also very important to all sorts of people from religious aspect. The phenotypic characteristics of Jalali pigeon is different from other pigeons that are also found in Bangladesh. But it is a matter of regret that these pigeons are declining in Bangladesh day by day due to unrestricted killing and adverse climatic condition. Phenotypic characterization of Jalali pigeon is important from the standpoint of prevention of this valuable germplasm erosion. In Bangladesh no work has yet been done to characterize Jalali pigeon. Considering the above facts and circumstances, the present study was conducted to

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Table 1. Mean±SE of Morphological Characteristics of Jalali Pigeon

Parameters	Male	Female	Overall	Level of Significance
Body length (cm)	34.18±0.10 (15)	32.38±0.14 (15)	33.28±0.18 (30)	**
Wing span (cm)	65.24±0.22 (15)	63.50±0.15 (15)	64.37±0.20 (30)	**
Shank length (cm)	3.16±0.02 (15)	2.99±0.02 (15)	3.08±0.02 (30)	**
Bill length (cm)	2.07±0.01 (15)	2.00±0.01 (15)	2.04±0.01 (30)	**
Head length (cm)	3.74±0.02 (15)	3.58±0.01 (15)	3.66±0.02 (30)	**

** , p<0.01; Figures in the parentheses indicate number of observations

Table 2. Mean±SE of Productive Characteristics of Jalali Pigeon

Parameters	Male	Female	Overall	Level of Significance
Body weight at 3-day of age (gm)	37.19±0.37 (15)	26.16±0.60 (15)	31.68±1.08 (30)	**
Body weight at 15-day of age (gm)	244.10±1.45 (15)	206.96±3.37 (15)	225.53±3.89 (30)	**
Body weight at 1-month of age (gm)	282.15±1.12 (15)	269.04±1.33 (15)	275.59±1.48 (30)	**
Mature weight (gm)	339.40±3.33 (15)	310.19±2.59 (15)	324.79±3.41 (30)	**

** , p<0.01; Figures in the parentheses indicate number of observations

study the phenotypic characteristics of Jalali pigeon and to conserve these pigeon in Bangladesh.

MATERIALS AND METHODS

The experiment was conducted in the Department of Genetics and Animal Breeding, Sylhet Agricultural University, Sylhet from June 2011 to February 2012. Fifteen pairs of Jalali pigeon were collected for conducting the experiment. They were reared in scavenging condition and nests were used as a night shelter for protection against predator. Each pair of pigeon was kept in nest separately. The size of each nest was 50 cm×30 cm×25 cm. Nest was made strong and was placed at a reasonable height using strong support. Construction materials used for pigeon house were wood and bamboo. The experimental birds were offered diets and water *ad libitum* with high and low protein level whereas the controls were fed on locally- available feed materials like crushed rice, grains and wheat etc. One pair of pigeon requires about 60-80 gm feed per day. The nests were cleaned periodically for maintaining good body condition of bird. Birds were clinically examined to check the body condition. Immediate veterinary assistance was given, if necessary.

The lengths of body, bill, head, shank and wing span were measured with slide calipers and measuring scale. The body weight of squab (gm) was measured for all pair at 3-day, 15-day, 1-month and 5-month of age. Squabs that did not survive until 3-day, 15-day, 1-month and 5-month of age were excluded from the analysis for respective weight traits. Body weights (kg) were measured with an electronic balance in the morning before the birds were fed. The diameters of egg were also measured with slide calipers. Birds were individually observed for phenotype expression. For each pair of pigeon under study, different record sheets with full details of each parameter were maintained. The data generated from this experiment were entered in Microsoft Excel worksheet, organized and processed for further analysis. Mean, Standard errors (SE) and correlations were estimated with the help of Statistical Package for Social Science (SPSS, 2008).

RESULTS

The mean body length, wing span, shank length, bill length and head length of mature Jalali pigeon were presented in

Table 1. Males were significantly higher (p<0.01) than their female counterparts in all body measurement parameters. The mean body weight of Jalali pigeon at 3-day, 15-day, 1-month and 5-month of age were shown in Table 2. Males were significantly heavier (p<0.01) than females in all age groups. The egg weight, egg length and width, hatching period, fledgling period and interclutch period of Jalali pigeon were given in Table 3. The phenotypic correlation among body length, wing span, shank length, bill length, head length and weight of mature Jalali pigeon were provided in Table 4.

Table 3. Mean±SE of Reproductive Characteristics of Jalali Pigeon

Parameters	Overall
Egg weight (gm)	16.18±0.08 (30)
Egg length (cm)	3.75±0.006 (30)
Egg width (cm)	2.81±0.005 (30)
Hatching period (days)	18.00±0.09 (15)
Fledgling period (days)	35.80±0.22 (15)
Interclutch period (days)	25.20±0.763 (15)

Figures in the parentheses indicate number of observations.

Table 4. Phenotypic Correlation among Body Length, Wing Span, Shank Length, Bill Length, Head Length and Weight of Mature Jalali Pigeon

Parameters	Body length	Wing span	Shank length	Bill length	Head length	Mature weight
Body length						
Wing span	0.750**					
Shank length	0.602**	0.596**				
Bill length	0.372*	0.247	0.291			
Head length	0.629**	0.385*	0.304	0.791**		
Mature weight	0.741**	0.708**	0.688**	0.330	0.460*	

** , p<0.01; * , p<0.05

Table 5. Phenotypic Correlation among Body Weights at Different Ages of Jalali Pigeon

Body weights at	3-day	15-day	1-month	5-month
3-day				
15-day	0.827**			
1-month	0.771**	0.858**		
5-month	0.759**	0.656**	0.559**	

** , p<0.01

Table 6. Phenotypic Correlation among Egg Weight, Egg Length, Hatching Period, Fledgling Period and Interclutch Period of Jalali Pigeon

Parameters	Egg weight	Egg length	Egg width	Hatching period	Fledgling period	Interclutch period
Egg weight						
Egg length	0.605**					
Egg width	0.754**	0.836**				
Hatching period	0.063	0.143	0.117			
Fledgling period	0.177	0.321	0.353	0.000		
Interclutch period	0.046	0.259	0.134	0.110	0.191	

** , p<0.01; * , p<0.05

The majority of the morphological characteristics had favorable phenotypic correlations with each other. The phenotypic correlation among body weights at different ages of Jalali pigeon were set out in Table 5. All of the productive characteristics had high phenotypic correlations with each other. The highest phenotypic correlation was observed between body weights at 15-day and 1-month of age. Jalali pigeon may be selected at 15-day of age for body weight. The phenotypic correlation among egg weight, egg length, egg width, hatching period, fledgling period and interclutch period of Jalali pigeon were summarized in Table 6. Egg weight was significantly correlated with egg length, egg width. Egg length was significantly correlated with egg width. The color of body, bill, skin, shank, toe, eye, eyelid, eggs, and head, neck, body, wing, tail and down feather, and shape of body, bill and eggs of Jalali pigeon were presented in Table 7.

Table 7. Color and Shape of Different Body Parts of Jalali Pigeon

Parameters	Observations
Bill color	Gray Black with white cere
Eye color	Black cornea encircled with orange color ring
Eyelid color	Gray
Skin color	Pink
Head feather color	Dark gray
Neck feather color	Dark blue gray with violet
Body feather color	Gray
Wing feather color	Pale gray with two black bands
Tail feather color	Gray with black tipped
Down feather color	White
Body color	Gray
Egg color	White
Shank color	Red
Toe color	Red with grayish black claw
Body shape	Round
Bill shape	Curve
Egg shape	Oval

DISCUSSION

The body length of Jalali pigeon obtained in this study was comparable to those results reported by David *et al.* (2001), Axelson and Messonnier (2005). Mayntz (2012) pointed out that the wing span of rock pigeon was 25 inch which supports the findings of this study. The body weight of pigeon varies according to the breed, nutrition and management. Darwati *et al.* (2010) reported that mean body weight of local pigeon on Day old, 1st week, 2nd week, 3rd week, 4th week and 5th week were 14.02±1.20, 74.05±1.50, 202.77±47.51, 256.16±8.24, 290.40±27.98 and 282.17±44.43 gm, respectively. The present findings for body weight are also in partial agreement with Islam (2010) and Azad (2009). Islam (2010) found that live weight of Jalali and Giribaz pigeon at 20, 25, 30 days of age were 181.30, 217.10, 237.20 gm and 165.00, 214.00, 244.70 gm,

respectively. Azad (2009) observed that live weight of Gola male and female pigeon were 304.10 and 257.50 gm, respectively. Ibrahim and Sani (2010) reported that mean egg weight of street pigeons (*Columba livia*) was 14.46±0.11 gm which are 10% lower than the present study. Darwati *et al.* (2010) found that egg weight ranged from 10.7 to 23.2 gm with a mean of 17.7±1.6 gm which is 9% higher than the present study. Robinson (2005) noticed the mean egg weight of domestic pigeon was 18.9 gm which is 17% higher than the present study. Sales and Janssens (2003) reported the mean egg weight of domestic pigeon was 21.4 gm which is 32% higher than the present study. These differences could be due to genetic or nutritional effect. Abd El-Azeem *et al.* (2007) reported that egg weight ranged from 13.78 to 17.38 gm in local Egyptian Baladi pigeon which are in agreement with the results of present study. Egg length and width of pigeon (*Columba livia*) were 3.68 and 2.85 cm, respectively (Saxena *et al.*, 2008) which strongly supports the results of the present study. The hatching period of Jalali pigeon obtained in this study were in agreement with Saxena *et al.* (2008) and Johnston (1992). The fledgling period of Jalali pigeon obtained in this study is close to the results reported by Johnston (1992).

The positive and significant correlation between body weight with body length, wing span, shank length and head length suggests that selection for any of these body parameters will cause direct improvement in body weight. Similar results have been reported by Mbap and Zakar (2000) and Okpeku *et al.* (2003). Many of the phenotypic correlations between body measurements were positive and high which also reported by Mancha (2004). All of the productive characteristics had high phenotypic correlations with each other. If the positive phenotypic correlations translate into positive genetic correlations thus, selection for one will improve the other as a correlated response (Muhiuddin, 1993). Egg weight was significantly correlated with egg length, egg width. Egg length was significantly correlated with egg width. Size of the hatching egg of broilers (and probably other chickens) influences body weight of chicks up to slaughter (Proudfoot and Hulan, 1981). Zickefoose (2012) found that adult pigeons have orange or reddish orange eyes which support these results. Similar results were also found by Johnston (1992) in adult Rock pigeon. The body color of Jalali pigeon obtained in this study is in agreement with those of Axelson and Messonnier (2005) and Johnston (1992). Axelson and Messonnier (2005) documented that a mature pigeon has a basic color of dull grey with white rump and two large wing bars. Johnston (1992) found that body color of Rock pigeon (*Columba livia*) were green, gray, purple or violet, sheen or iridescence. The color of shank and toe of Jalali pigeon obtained in this study are similar with those of Zickefoose

(2012) and Johnston (1992). The egg color and shape of Jalali pigeon were white and oval which are similar with the findings of Saxena *et al.* (2008), Khargharia *et al.* (2003) and Johnston (1992).

CONCLUSION

It is possible to improve the Jalali pigeon through selection and other relevant breeding strategies, thereby increasing the productivity of the birds. Therefore, as a genetics resource, it is inevitably necessary for the Jalali pigeon to be conserved. More information needs to be collected and assessed to prevent their possible extinction and to promote their utilization. Further country wide studies should emphasize the genetic characterization of these pigeon.

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