



## Physical characteristics, productive and reproductive performance of Jalali pigeon at Sirajganj district

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### ABSTRACT

The present piece of research work was conducted to aim at the physical characteristics of Jalali pigeons. Twenty pairs of Jalali pigeons were reared in scavenging rural condition in Sirajganj Sadar, Pangasi and Kazipur upazila. Mean body length, wing span, shank length, bill length and head length of mature Jalali pigeon were 34.33±0.12, 64.75±0.18, 3.14±0.02, and 2.05±0.01 and 3.69±0.02 cm, respectively. Average body weight of Jalali pigeon at 3-days, 15- days, 1-month and 5-months of age were 33.69±0.49, 246.53±2.41, 316.06±1.25 and 344.80±2.96 g, respectively. The egg weight, egg length and width, hatching period, fledging period and interclutch period of Jalali pigeon were 16.29±0.08 g, 3.84±0.01 and 2.88±0.01 cm, 2.88±0.01, 18.25±0.09, 36.00±0.22 and 30.12±0.74 days, respectively. Morphometric correlation among body length, wing span, shank length and weight of mature Jalali pigeon ranged from 0.245 to 0.781. Morphometric correlation among body weights at 3-days, 15-days, 1- month and 5-months of age of Jalali pigeon ranged from 0.557 to 0.781. Morphometric correlation among egg weight, egg length and egg width of Jalali pigeon ranged from 0.000 to 0.833. The study revealed that there is possibility to improve the Jalali pigeon through proper selection program and other relevant breeding strategies which can increase the productivity of the pigeons. Hence, the present piece of study was undertaken to aim at the physical characteristics, productive and reproductive performances of Jalali pigeons and as a genetics resource, it is inevitably necessary for the Jalali pigeon to be conserved in Bangladesh.

## Introduction

Human being started rearing pigeons for about 10,000 years in most of the parts of the world (Levi, 1977; Bhowmik et al., 2014) Pigeons were domesticated first around 4500 B. C. from stock inhabiting by the Mediterranean Sea. Since then, about 150 varieties have already been developed such as meat, fashion and racing. Pigeons are characterized by stout body, short necks and thick and heavy plumage (Gifford, 1941; Parvez et al., 2016). The weather of Bangladesh and huge areas of crop field and housing premises are favorite for the rearing of pigeons (Bhowmik et al., 2014; Asaduzzaman et al., 2009). Pigeons are found in every town and city around the global atmosphere (Marques et al., 2007; Pavez et al., 2016). People of all religions and civilizations love pigeon very much (Bhowmik et al., 2014). Pigeons are mainly monogamous birds (Essam, 1997). They live side by side with human as a source of food, act as peon of carrying letter, hobby and experimental purposes (Sari et al., 2008; Parvez et al., 2016). 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 (Bhowmik et al., 2014).

Domestic pigeons have a gray body iridescent feather around their neck, abroad black band on their tail and salmon colored feet breeders have created color variations, like white, black or combination various colors (Parvez et al., 2016). Axelson and Messonnier, (2005) reported that a mature pigeon has a basic color of dull grey with white rump and two large wing bars. Parvez et al. (2016) found that body color and body shape of Giribuz, Owl, Shirajee and Homer pigeon (*Columba livia*) were white, yellow, white, red and elongated and round, round, elongated and curve and elongated and round, respectively. The color of shank and toe of Jalali pigeon obtained in this study was similar with those of (Zickefoose, 2012; Bhowmik et al., 2014). The highest mean mature body weight was found of Giribuz, Owl, Shirajee and Homer was 265.10, 301.80, 481.75 and 496.40 g, respectively (Parvez et al., 2016). Jalali pigeon is the most famous pigeon breed in Bangladesh. These pigeons are found in the Shrine of Shah Jalal (R) in Sylhet and some other districts of Bangladesh especially Moulivibazar, Hobigonj, Sirajgonj, Mymensingh etc. These pigeons are very crucial to all sorts of people from their religious aspects.

There is no prejudice of eating pigeon's meat. Pigeon meat is very tasty, palatable and soft, juiciness and CHO free. The physical characteristics

of Jalali pigeon is different to other pigeons which are too found in every district of Bangladesh in small and large scale. It is a matter of regret that these pigeons are reducing in Bangladesh day by day due to unrestricted killing; violation of bird killing law, destroy their nests, modern infrastructure construction, mechanical harvesting of crops, urbanization, reduces of crop residual parts in the field and hostile climatic conditions as well as global climate warming issue. Physical characterization of Jalali pigeon is very important on the point of views of prevention the valuable germplasm erosions in Bangladesh. No work has yet been done in detail to characterization the Jalali pigeon in Bangladesh and very few research data is available in the related field. Hence, the present piece of study was undertaken to aim at the physical characteristics, productive and reproductive performances of Jalali pigeons and their conservation in Bangladesh.

## Materials and methods

### Site selection

Three upazilas named Sirajganj Sadar, Pangasi and Kazipur which is about six, sixteen and thirty kilometer away from Sirajganj district town had been chosen and selected for this trial. The upazilas are mostly resource of poor farmers (small holder farmers) and 25% of them were landless but every family has some species of pigeons. The villages were well communicated from the district town. The farmers were really cooperative and much interested for this type of study. Constant visit and collection of data from farmer's level was easy and possible as better communication exists between the upazilas and district town. Enough crop fields were available in the study areas. Wheat crushed, mustard seed, lentil, sesame oil seed, maize crushed, paddy and common salt were fed to the pigeons by the comparatively better off farmers.

### Pigeons

Twenty farmers having a total 20 pairs of Jalali pigeons were taken for this study. Baseline data were collected having 20 pairs of different type of pigeons through direct interviewing with 20 farmers. The pigeons received as usual feed supplied by the farmers of that areas on the basis of availability of local areas. The selected Jalali pigeons had been set ring tagged (1-20) for identification. Details on the variations in ambient temperature and rainfall were recorded from district

meteorological station of Sirajganj district. Visits were made twice per month in the studied areas.

### Rearing and feeding system

The pigeons were reared in semi-intensive condition and nests were made for their shelter at night. Each pair of pigeon was kept in night separately. The size of each nest was 30 cm×60 cm×25 cm. The nests were made with bamboo and wood. The nest was placed at a standard height by strong support. The nests were cleaned every week for maintained hygienic body condition. 60-70 g feed required per day for each pair of pigeons. Pigeons were fed high quality diets and arsenic free water was supplied *ad libitum*. The supplied feed contained with high and low protein ingredients. The pigeons were practiced vaccine and de-worming regularly.

### Measurement of physical traits of pigeons

The lengths of body, bill, head, shank and wing span were measured with a slide calipers and measuring tape. Body weight of squab (g) was taken for all pairs at 3- days, 15- days, 1- month and 5- months of age. Squabs did not survive until 3- days. Body weights (kg) were measured with the help of an electronic balance in the morning before supplying feed. Eggs diameter were taken with the help of slide calipers.

### Statistical analysis

Since this study was data based type experiment. The data was not compiled in the design of experiment. Analysis was done mainly through tabular and descriptive statistics analysis such as percentages, mean, standard deviation, and standard errors (SE) etc were estimated with the help of Statistical package for Social Science (SPSS, 2008). A number of tables were prepared according to the objectives of the study.

### Results and Discussion

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 that of female counterparts in all physical measurement characteristics. The body length of Jalali pigeon of this study was comparable to those results reported by David et al. (2001) and Axelson and Messonnier (2005). Mayntz (2012) found that the wing span of rock pigeon was 63.5 cm which was almost similar to the findings of this study.

**Table 1:** Physical characteristics of mature Jalali pigeons

| Parameters        | Male            | Female          | Overall         | Level of Significance |
|-------------------|-----------------|-----------------|-----------------|-----------------------|
| Body length (cm)  | 36.18±0.10 (20) | 32.48±0.14 (20) | 34.33±0.12 (40) | **                    |
| Wing span (cm)    | 66.34±0.21 (20) | 63.15±0.15 (20) | 64.75±0.18 (40) | **                    |
| Shank length (cm) | 3.26±0.02 (20)  | 3.01±0.02 (20)  | 3.14±0.02 (40)  | **                    |
| Bill length (cm)  | 2.08±0.01 (20)  | 2.02±0.01 (20)  | 2.05±0.01 (40)  | **                    |
| Head length (cm)  | 3.78±0.02 (20)  | 3.59±0.01 (20)  | 3.69±0.02 (40)  | **                    |

\*\* (p<0.01)

**Table 2:** Productive characteristics of Jalali pigeon (Mean±SE)

| Parameters(g)                 | Male             | Female           | Overall          | Level of Significance |
|-------------------------------|------------------|------------------|------------------|-----------------------|
| Body weight at 3-day of age   | 38.21±0.37 (20)  | 29.16±0.60 (20)  | 33.69±0.49 4(40) | **                    |
| Body weight at 15-day of age  | 284.10±1.45 (20) | 208.96±3.37 (20) | 246.53±2.41 (40) | **                    |
| Body weight at 1-month of age | 332.15±1.12 (20) | 299.04±1.33 (20) | 316.06±1.25 (40) | **                    |
| Mature weight (5-month)       | 359.40±3.33 (20) | 330.19±2.59 (20) | 344.80±2.96 (40) | **                    |

\*\* (p<0.01)

The mean body weight of Jalali pigeon at 3-days, 15-days, 1- month and 5-months of age were shown in Table 2. Males were found significantly heavier body weight (p<0.01) than females in all age groups. Body weights of 3- days, 15- days, 1- month and mature weight (5-months) were found 33.69, 246.53, 316.06 and 344.80 g, respectively. Male weight was higher than that of female partner in all stages of ages of pigeons. Jalali pigeon can be selected at 15-days of age for body weight gain for better production performances. Darwati et al. (2010) reported that mean body weight of local pigeon on day old, 1st week, 2nd week, 3<sup>rd</sup> week, 4<sup>th</sup> week and 5<sup>th</sup> 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±44.43g, respectively. These findings were not agreed with the present study. 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, 237.20g and 165.00, 214.00, 244.70 g, respectively. Azad (2009) observed that live weight of Gola male and female pigeon were 304.10 and 257.50g, respectively. The body weight of pigeon varies according to the breed, nutrition, individuality character, adaptability, environment, skill and knowledge on rearing and better management practices in the studied areas. These findings were found higher than that of the findings of Bhowmik et al. (2014).

The egg weight, egg length and width, hatching period, fledging period and interclutch period of Jalali pigeon were given in Table 3. Egg weight, egg length, egg width, hatching period, fledging period and interclutch period were found 16.29±0.08 g, 3.84±0.01 and 2.88±0.01 cm and, 18.25±0.09, 36.00±0.22 and 30.12±0.74 days, respectively. Ibrahim and Sani (2010) reported that mean egg weight of street pigeons (*Columba livia*) was 14.46±0.11g which were lower than the present study. Darwati et al. (2010) found that egg weight ranged from 10.7 to 23.2g with a mean of 17.7±1.6 g which was higher than the present study. Robinson (2005) reported that the mean egg weight of domestic pigeon was 18.9 g which was higher than the present study. Sales and Janssens (2003) reported the mean egg weight of domestic pigeon was 21.4g which was higher than the present study. These differences could be affected due to genetic or nutritional effect, individual variation and sound management. Abd El-Azeem et al. (2007) reported that egg weight ranged from 13.78 to 17.38g in local Egyptian Baladi pigeon which were nearly 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 almost similar to the results of the present study. The hatching period of Jalali pigeon was found in the present study was in agreement with Saxena et al. (2008). The interclutch period of the present study was higher than the findings of Bhowmik et al. (2014).

**Table 3:** Reproductive characteristics of Jalali pigeon (Mean±SE)

| Parameters                | Overall         |
|---------------------------|-----------------|
| Egg weight (gm)           | 16.29±0.08 (40) |
| Egg length (cm)           | 3.84±0.01 (40)  |
| Egg width (cm)            | 2.88±0.01 (40)  |
| Hatching period (days)    | 18.25±0.09 (20) |
| Fledgling period (days)   | 36.00±0.22 (20) |
| Interclutch period (days) | 30.12±0.74 (20) |

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. The majority of the physical characteristics had favorable phenotypic correlations with each other. The positive and significant correlation between body weight with body length, wing span,

**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     | 0.650**     |           |              |             |             |               |
| Shank length  | 0.612**     | 0.595**   |              |             |             |               |
| Bill length   | 0.362*      | 0.245     | 0.290        |             |             |               |
| Head length   | 0.627**     | 0.382*    | 0.305        | 0.781**     |             |               |
| Mature weight | 0.731**     | 0.704**   | 0.681**      | 0.330       | 0.460*      |               |

\*\*<sub>2</sub>, p<0.01; \*<sub>1</sub>, 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-days          |         |         |         |         |
| 15-days         | 0.817** |         |         |         |
| 1-month         | 0.775** | 0.852** |         |         |
| 5-months        | 0.749** | 0.655** | 0.557** |         |

\*\* (p<0.01)

The phenotypic correlation among body weights at different ages of Jalali pigeon were presented 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-days and 1-month of age. These results were in accordance with the results of Bhowmik et al. (2014).

The phenotypic correlation among egg weight, egg length, egg width, hatching period, fledging period and interclutch period of Jalali pigeon were summarized in Table 6. Egg weight was significantly correlated with egg length and egg width. Egg length was significantly correlated with

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 physical correlations between body measurements were found positive and high which also reported by Mancha (2004). All of the productive characteristics had high phenotypic correlations with each other. If the positive physical correlations convert into positive genetic correlations as a result selection process for each trait will be improved the other as a correlated response (Muhiuddin, 1993; Bhowmik et al., 2014). These correlations were almost in accordance with the correlation of Bhowmik et al. (2014).

egg width. Ibrahim and Sani (2010) reported that mean egg weight of street pigeons (*Columba livia*) was 14.46±0.11 g which were lower than the present study. Darwati et al. (2010) found that egg weight ranged from 10.7 to 23.2 g with a mean of 17.7±1.6 g which is higher than the present study. Robinson (2005) noticed the mean egg weight of domestic pigeon was 18.9 g which was higher than the present study. Sales and Janssens (2003) reported the mean egg weight of domestic pigeon was 21.4 g which was higher than the present study. These differences could be due to genetic, environmental and nutritional effect. Abd El-Azeem et al. (2007) reported that egg weight ranged from 13.78 to 17.38 g in local Egyptian Baladi pigeon which were 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. Egg weight was significantly correlated with egg length, egg width. Egg length was significantly correlated with egg width.

**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         | 0.602**    |            |           |                 |                  |                    |
| Egg width          | 0.75414**  | 0.833**    |           |                 |                  |                    |
| Hatching period    | 0.062      | 0.140      | 0.115     |                 |                  |                    |
| Fledgling period   | 0.175      | 0.323      | 0.313     | 0.000           |                  |                    |
| Interclutch period | 0.044      | 0.25\69    | 0.124     | 0.110           | 0.190            |                    |

\*\* , p<0.01;

The color of body, bill, skin, shank, eye, eyelid, eggs, head feather color, shape of body, bill shape and eggs shape of Jalali pigeon were presented in Table 7. Zickefoose, (2012) found that adult pigeons have orange or reddish orange eyes which support the present study results. The body color of Jalali pigeon obtained in this study was in agreement with those of Axelson and Messonnier (2005). Axelson and Messonnier (2005) documented that a mature pigeon had a basic color of dull grey with white rump and two large wing bars. Parvez et al. (2016) found that body color and body shape of Giribuz, Owl, Shirajee and Homer pigeon (*Columba livia*) were white, yellow, white, red and elongated and round, round, elongated and curve and elongated and round, respectively. These findings were in accordance with the present study.

**Table 7:** Color and shape of different body parts of Jalali pigeon

| Parameters         | Observations                                  |
|--------------------|---|
| Body color         | Gray  |
| Shank color        | Red   |
| Bill color         | Gray with white cere                          |
| Eye color          | Black cornea encircled with orange color ring |
| Eyelid color       | Gray  |
| Skin color         | Pink  |
| Head feather color | Dark gray                                     |
| Egg color          | White   |
| Body shape         | Round   |
| Bill shape         | Curved  |
| Egg shape          | Oval  |

The color of shank and toe of Jalali pigeon obtained from this study were similar with those of Zickefoose, (2012) and Bhowmik et al. (2014). The

egg color and shape of Jalali pigeon were white and oval which was similar with the findings of Saxena et al. (2008) and Bhowmik et al. (2014).

## Conclusions

It is revealed that there is possibility to improve the Jalali pigeon through proper selection program and other relevant breeding strategies which can increase the productivity of the pigeons. 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 study would be done as an ample opportunity throughout the countrywide to emphasize the genetic characterization of the Jalali pigeon.

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