

Research Article

Quantitative traits analysis and kinship relationship of indigenous chicken of Sindh, Pakistan

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Abstract

The study was carried out to observe the morphological variation between quantitative traits and kinship association of indigenous chicken with the help of 60 mature male birds in 2024. For this purpose data was collected through direct observation of quantitative traits of parameters including head length, chest length right to left wing length, shank length, back length chest circumferences and neck circumferences. The findings of our revealed that major birds of local variety showed length of wing 51.2 cm, length of head 7.45 cm, length of chest, 12.85 cm, length of shank 27.4 cm, length of shank 11.3 cm, length of back 24.21 cm, neck circumferences 12.87 cm and chest circumferences 39.5 cm. It was concluded that local chicken of Chambar possess a variation of quantitative traits and findings were under the observation were varies from each other's. It is concluded that this study is primary tool for further studies to explore quantitative traits and breeding methods.

Keywords: Indigenous chicken; Pakistan; Performance; Quantitative traits; Sindh

Introduction

Backyard poultry birds play a key role to serve as food source for local community and improving national food security, particularly serve as major sources of animal protein from meat and egg. However, backyard chicken is not pure breed but can become important agriculture source of income [1]. Morphological measurement can also help breeding between indigenous birds in livestock sector [2]. These traits are characteristics could record by equipment and these traits influenced by number of pair of genes and also affected through environmental effects [3, 4]. Researcher reported that quantitative characteristics are mainly controlled by many pairs of gene and every one of them have a dominant, additive, epistatic and non-genetic such as environmental factor differentiate them [3]. It has been reported that variation cause by different factors such as genetic and environmental causes change in the animal body size and growth rate including body length, body weight, leg length of tibia, femur, pelvic bone, height, thigh length [2]. Rural poultry farming in free range management system in open areas serve as food sources for household family and income source to support their family [4-6]. This showed importance of poultry industry for more improving local backyard birds in Sindh through various genetic material and management methods. It has been reported that indigenous chicken has maximum capability to adopt different environment, less nutrition availability and management systems [7-9]. Present study was performed to observe morphological variation of quantitative traits and findings of kinship association of indigenous chicken of Chambar.

Materials and Methods

Present study was carried out on 60 indigenous male chicken with 12 to 15 month age were collected from six different villages

of Chambar including Bhatti village, Gulshan Laghari, Ibrahim colony, Zardari colony, Zaman Shah para and Quba masjid.

The analysis of quantitative traits of each bird was carried out according to the variables. The parameters including head length, chest length right to left wing length, shank length, back length chest circumferences and neck circumference.

The data was observed through the help of calipers and measuring tap for above mentioned parameters. The collected data was tabulated with the help of MS Excel program in order an average can be achieved than a kinship association ship.

Results and Discussion

In this study variation between quantitative characteristics was analysis depending upon the variables including head length, chest length right to left wing length, shank length, back length chest circumferences and neck circumferences, The variation between the findings affected by environment and genetic factors as reported by [10], that each part of body has variation among development and growth percentage mainly because of genetic and environment factors. In our study lowest length of wing was observed in Bhatti village 48.1 and longest was recorded in Shah Zaman Para 52.5 and overall average was observed 51.2 cm wing length which was collected from humeral bone to end of phalanges with the help of measuring tap [11-13]. The results revealed by [14] observing the wing length distance among the base of humerus bone. The variation might be due to type of breed, age, nutrition and management as well as maintenance of birds cause variation in results of each village in wing length.

Various management systems and environment variation cause variation between the wing lengths. Another study was conducted by [14, 15], that variation of environment effects and origin of breed are reason of variation between body weight, size

and length of indigenous backyard chicken. In our study lowest length of shank was recorded in Bhatti village 10.3 out of average 12.4 cm with longest shank length was recorded in 11.97 in Quba masjid village. It is natural fact that high amount of meat present in chest of bird as compared with other organ of the body, However the information about growth rate of sternum is key factor for consideration leanness of height of chicken [16]. The growth rate of bone is mainly affected by protein diet in livestock. It is proved that protein is major source of tissue formation in animal body [18]. Another researcher [17], reported that main part of chicken such as hip and spine are formed by many boney tissues also hard back structure support wing muscles attachment and movement during birds fight. In our study lowest head length was recorded 7.3 in Bhatti village and Shah zaman para with

average 7.45 centimeter, whereas shortest chest circumferences was recorded 11.67 with an average of 13.95 centimeter. The variation among the results might be due to management of farm, type of feeding and variety of birds, therefore difference between wing lengths in each village occurred. These statements are in agreement with [17], who stated that variation in environmental factors with management can affect the different parts of body and its size in controlled and free ranged chicken rearing system. Whereas variation among the body size of indigenous birds is due to genetic origin. In our study lowest neck circumferences was recorded in Bhatti village 37.51 with an average 40.87 centimeter, in similar way the difference between neck circumferences is due to environment and routine management of birds with feeding regime (Table 1).

Table 1. Average results for quantitative traits of indigenous chicken

| Variable (cm) | Village names | | | | | | |
|----------------------|----------------|-----------------|----------------|----------------|-----------------|-------------|-------|
| | Bhatti village | Gulshan Laghari | Ibrahim colony | Zardari colony | Zaman Shah para | Quba masjid | Total |
| Wing length | 48.1 | 52.3 | 51.11 | 50.7 | 52.5 | 50.5 | 51.2 |
| Shank length | 10.3 | 11.96 | 10.8 | 11.3 | 11.1 | 11.97 | 12.4 |
| Back length | 23.5 | 26.7 | 23.1 | 25.7 | 23.7 | 24.45 | 24.21 |
| Chest length | 27.1 | 26.3 | 27.7 | 28.5 | 28.7 | 27.9 | 12.85 |
| Head length | 7.3 | 8.1 | 7.7 | 7.5 | 7.3 | 6.91 | 7.45 |
| Neck circumferences | 37.51 | 39.7 | 40.5 | 39.3 | 40.5 | 40.9 | 40.87 |
| Chest circumferences | 11.67 | 13.3 | 12.1 | 14.7 | 12.3 | 14.9 | 13.95 |

Kinship relations

In both chart major visible variation is that chart B shown similar beak color yellow with dark eye color. While in A chart only dark eye color was observed similar. In chart B eye color and underneath similarities were found such as beak color, color of tail which was white and black and yellow color of shank. In lower part chart have similarities

such as yellow color beak, belly father color, wing shutter colors which were white and brown. Shank color was observed in chart B was yellow with color of body and feather and color of thighs were observed yellow which were similar with chart A. The findings of chart A showed similarity between color of beak, eye, shank, closer proximity to beak, neck feather, belly fur,

chest feather, thigh feather were all yellow color except eyes were dark. Similar results were revealed by [2, 3], who suggested similarities were observed for beak color, color of tail which was white and black and yellow color of shank. Another study was performed by [6], and suggested that their studies chart A and B were shown variation between the body color and feathers of birds. Similarly, In chart A similar color was found in eye, shank, body coat, pea comb shape, red

crown were in dark yellow color. The findings of chart A showed similarity between color of beak, eye, shank, closer proximity to beak, neck feather, belly fur, chest feather, thigh feather were all yellow color except eyes were dark. The color of shank was observed yellow in B chart with color of body and feather and color of thighs were observed yellow which were similar with chart A (Fig. 1).

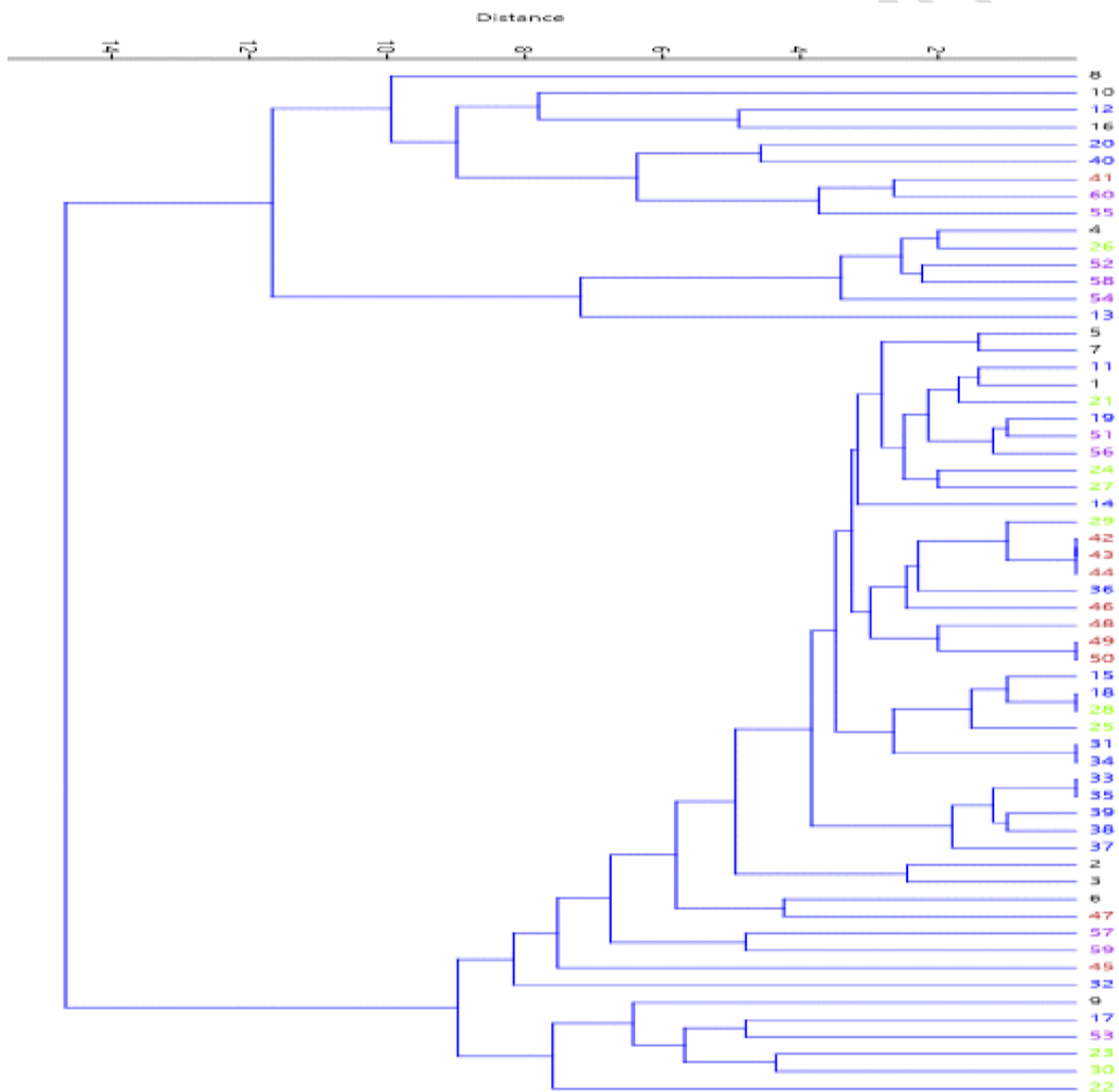


Figure 1. Kinship relations

Conclusion

It was concluded that during the time environment condition effect on the chicken body size and phenotypic characteristics that cause various changes- in its quantitative traits. Whereas in kinship relationship most distant relations and showing similarities in different parts coloration such as eye, shank, head, beak in domesticated birds.

Authors' contributions

Conducted the experiments: RR Kaleri, RA Mangi, N Rehman & A Jabbar, Conducted making design: RR Kaleri, GM Solangi, Z Lanjar, FA Khushk & I Ahmed, Collected and analyzed the data: RR Kaleri, MA Memon, H Janyar, T Saleem & IA Cheema.

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