

Abstract

The research was conducted to know the performance of different types of indigenous chicken of Bangladesh and study the diversity of the plumage color gene. A baseline survey was done to study the phenotypic parameters within three locations of the chickens. Types of the chickens were done based on plumage colour, comb type and body shape of the chickens: black white single round, black brown single round, spotted single cylindrical types were studied. For the diversity of plumage colour genes, *PMEL17* was considered; DNA was extracted from whole blood samples using FavorPrep™ blood genomic DNA extraction mini kit. The primer was selected and the PCR and agar gel electrophoresis were done following protocol FavorPrep™ and purified PCR products were sequenced by the Sanger sequencer. Sequence alignment, pair and multi alignment comparison of the *PMEL17* gene of the species were done with MEGA6 software. Higher egg production (12.5 ± 0.2 /clutch) was observed for brown single round type than other types of chickens and the average clutch size was 10.9 ± 0.81 in all locations. The highest live weight was obtained in black white pea round type chickens (1.6kg) than other types of chickens. The external and internal characteristics of egg were significantly differed between three locations among types. The designed sequence of *PMEL17* gene was revealed 99% homology with the sequence of *Gallus gallus* and *Gallus gallus domesticus*. In black brown type chicken, mutation was observed at 91bp nucleotide (G replaces A) and in black white type chicken it was observed in at 64bp positional nucleotide (C replaces T) that indicates the changes of the amino acid sequence leads to protein change and ultimately variation of the phenotype (plumage color) were expressed. The phylogenetic tree analysis, nucleotide sequences of *PMEL17* were closely related to *Gallus gallus* and *Gallus gallus domesticus*. The overall nucleotide frequency of *PMEL17* gene were A (16.91%), T/U (15.79%), C (40.69%), and G (26.62%) respectively. It was seen that various types of chicken phenotypes were found with the potential role of all possible mutations occurred due to the plumage color gene, *PMEL17*.

Keywords: Indigenous chicken, Characteristics, Plumage color gene, Mutation.