

Bartlett Factor Scores in Multiple Linear Regression Equation as a Tool for Estimating Economic Traits in Broilers

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Abstract : In order to propose a simpler tool that eliminates the age-long problems associated with the traditional index method for selection of multiple traits in broilers, the Bartlett factor regression equation is being proposed as an alternative selection tool. 100 day-old chicks each of Arbor Acres (AA) and Annak (AN) broiler strains were obtained from two rival hatcheries in Ibadan Nigeria. These were raised in deep litter system in a 56-day feeding trial at the University of Ibadan Teaching and Research Farm, located in South-west Tropical Nigeria. The body weight and body dimensions were measured and recorded during the trial period. Eight (8) zoometric measurements namely live weight (g), abdominal circumference, abdominal length, breast width, leg length, height, wing length and thigh circumference (all in cm) were recorded randomly from 20 birds within strain, at a fixed time on the first day of the new week respectively with a 5-kg capacity Camry scale. These records were analyzed and compared using completely randomized design (CRD) of SPSS analytical software, with the means procedure, Factor Scores (FS) in stepwise Multiple Linear Regression (MLR) procedure for initial live weight equations. Bartlett Factor Score (BFS) analysis extracted 2 factors for each strain, termed Body-length and Thigh-meatiness Factors for AA, and; Breast Size and Height Factors for AN. These derived orthogonal factors assisted in deducing and comparing trait-combinations that best describe body conformation and Meatiness in experimental broilers. BFS procedure yielded different body conformational traits for the two strains, thus indicating the different economic traits and advantages of strains. These factors could be useful as selection criteria for improving desired economic traits. The final Bartlett Factor Regression equations for prediction of body weight were highly significant with $P < 0.0001$, R^2 of 0.92 and above, VIF of 1.00, and DW of 1.90 and 1.47 for Arbor Acres and Annak respectively. These FSR equations could be used as a simple and potent tool for selection during poultry flock improvement, it could also be used to estimate selection index of flocks in order to discriminate between strains, and evaluate consumer preference traits in broilers.

Keywords : alternative selection tool, Bartlett factor regression model, consumer preference trait, linear and body measurements, live body weight

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