



Estimating the genetic parameters for liver fat traits in broiler lines divergently selected for abdominal fat

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ABSTRACT. Intensive selection of broilers for improved growth rate is known to exert a negative effect on broiler health, such as an increase in body fat (and its related diseases). Excessive fat deposition in the liver can cause fatty liver hemorrhagic syndrome (FLHS); in addition, traits associated with liver fat have also been associated with FLHS. This study explored the genetic relationships among liver fat-related traits. Data was collected from 462 birds derived from 16th generation Northeast Agricultural University broiler lines divergently selected for abdominal fat content. The body weight at 7 weeks of age (BW7), abdominal fat weight (AFW), abdominal fat percentage, liver fat percentage (LFP), liver weight, and liver percentage were measured. The heritability of these traits and the phenotypic and genetic correlations were estimated, using the restricted maximum likelihood (REML) and Gibbs sampling

(GS) methods. The REML and GS methods yielded similar heritability estimates for LFP (0.36 and 0.37, respectively). BW7 showed a high positive genetic correlation with AFW ($r_{A(\text{REML})} = 0.74$ and $r_{A(\text{GS})} = 0.80$), and a moderate positive genetic correlation with LFP ($r_{A(\text{REML})} = 0.27$ and $r_{A(\text{GS})} = 0.39$). Positive genetic correlations were also observed between AFW and LFP ($r_{A(\text{REML})} = 0.35$ and $r_{A(\text{GS})} = 0.36$). These results suggested that selection for growth may increase the AFW and LFP in broilers. LFP is directly related to FLHS; therefore, selection for broiler growth rate may increase the incidence of FLHS.

Key words: Broiler; Liver fat trait; Heritability; Genetic correlation; Restricted maximum likelihood; Gibbs sampling