



Coefficients of heritability for performance traits in an F2 layer x broiler reciprocal cross developed for QTL mapping in *Gallus gallus*

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Heritability is an important genetic parameter in the quantitative trait loci (QTL) mapping, because more QTL are found for traits with large heritability. However, little is known about this parameter in F2 populations developed for QTL mapping. Thus, this study aimed to estimate heritability coefficients for performance traits in an F2 broiler x layer reciprocal cross population developed for QTL mapping in *Gallus gallus* by the Embrapa Swine and Poultry National Research Center. The broiler line was selected for six generations to improve body weight, feed conversion, feed intake, carcass parts, viability, fertility, hatchability, and to reduce the occurrence of abdominal fat and metabolic diseases. The layer line was selected for eight generations for egg production, egg weight, feed conversion, sexual maturity, fertility, hatchability, egg quality, and reduced body weight. Reciprocal crosses between broiler male x layer female and layer male x broiler female were performed to obtain the F1 generation. Individuals (males and females) from the F1 generation were mated, avoiding related individuals, to produce the F2 generation. The F2 data file included performance records of 3823 animals, with 2063 coming from the mating of broiler males with layer females and 1760 from the reciprocal cross. The body weights at 1, 35 and 42 days of age, and the weight gain, feed intake and feed conversion from 35 to 41 days of age were measured. Heritability coefficients were estimated with animal model, using the REML method, in the VCE program. Fixed effects of sex (male and female), hatch (16 levels) and reciprocal cross (two levels) were included in the model. Variance components were estimated for random effects of dam and animal. Heritability estimates for weight gain (0.12), feed intake (0.12), and feed conversion (0.03) showed low values, while moderate magnitude coefficients were found for body weights at 35 (0.20) and 42 (0.22) days of age. Finally, the body weight at 1 day of age had large coefficient of heritability (0.47). The heritability coefficient is the ratio between the direct additive genetic and phenotypic variances. Variables with low heritability (weight gain, feed intake, and feed conversion) have strong environment influence. For these traits, the genetic improvement may require longer term than traits with moderate or high heritability (body weight at 1, 35 and 42 days of age). Moreover, the heritability in this study has another important information, because as this F2 is a population for QTL mapping purposes, one can expect a larger number of QTLs mapped to the body weights at different ages than for the feed intake, feed conversion and weight gain.

Keywords: poultry, heritability, performance, broilers

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