

MINING FOR POLYMORPHISMS IN THE CALB GENE AND ITS ASSOCIATIONS WITH PERFORMANCE AND CARCASS TRAITS IN A PATERNAL BROILER LINE

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Genetic selection applied to produce a faster growing chicken are generating negative effects on the locomotor and metabolic functions, causing huge economic losses to the poultry producer and industry. The calbindin gene (*CALB*) is a calcium binding protein located on chicken chromosome 2 (GGA2). This gene is stimulated by vitamin D in the duodenum, and is involved with bone ossification and calcium metabolism in chickens, being an important functional candidate gene for broiler production traits. The objective of this study was to identify polymorphisms in the *CALB* gene and to test their associations with performance and carcass traits in a paternal broiler line (named TT) developed by Embrapa Swine and Poultry National Research Center. DNA was extracted from blood using a standard protocol with DNAzol®. DNA quality and quantity were measured using Nanodrop spectrophotometer. A region of the *CALB* gene spanning 858bp was sequenced in 15 chickens: 10 from a paternal broiler line TT and 5 from a layer line CC. Sequences were analyzed using Phred/Phrap/Consed/Polyphred softwares and 16 novel SNPs were identified in the intron 6. The most informative SNP (*CALB_A787G*) was chosen for genotyping 1396 TT chickens using PCR-RFLP with the enzyme *MspI*. Out of those animals, 34.8% had the genotype AA, 16.8% GG and 48.4% AG, accepting the hypothesis that the alleles are in HWE in this population ($p>0.07$). QxPak v4.0 program was used to test the association of this SNP with 28 traits: eight performance and twenty carcass traits, including their weights and yields. A mixed model including the fixed effects of sex, hatch and SNP, and the infinitesimal and residual random effects was used. The additive effect of the SNP was tested, including its interaction with sex. The additive effect within sex was the model that better explained the phenotypic differences observed. Associations between *CALB_A787G* SNP and body weight at 21 days, weights of carcass, back, drumettes, wings, thighs and whole legs, and carcass yield were found only in males ($p<0.05$). These results indicate that *CALB_A787G* SNP could be a potential marker to be used in genetic selection to improve growth and carcass traits in male chickens, particularly to increase the thighs and whole legs weights, which are considered premium cuts in the market. For these traits, the additive effects of the *CALB* SNP were 6.2g and 8.5g, respectively. Financial support: CNPq process n° 481755/2007-1 and Embrapa project n° 02.10.10.06.00300-04