

# UNRAVELING THE ASSOCIATIONS OF *SOST* GENE WITH PRODUCTION TRAITS IN AN F2 CHICKEN RESOURCE POPULATION

Petry, B.<sup>1,2,3</sup>; Zanella, R.<sup>1,4</sup>; Ibelli, A.M.G.<sup>1</sup>; Fornari, M.B.<sup>1,5</sup>; Pandolfi, J.R.C.<sup>1</sup>; Cantão, M.E.<sup>1</sup>; Coutinho, L.L.<sup>6</sup>; Peixoto, J.O.<sup>1</sup>, Ledur, M.C.<sup>1</sup>

<sup>1</sup>Embrapa Suínos e Aves, Concórdia, SC, Brasil; <sup>2</sup>PIBIC/CNPq fellow – Embrapa Suínos e Aves; <sup>3</sup> Universidade do Oeste de Santa Catarina, Joaçaba, SC, Brasil; <sup>4</sup> BJT/CNPq fellow; <sup>5</sup>Universidade Federal do Paraná, Curitiba, PR, Brasil; <sup>6</sup>Escola Superior de Agricultura Luiz de Queiroz (ESALQ) – USP, Piracicaba, SP, Brasil

bruuna\_petry@yahoo.com.br

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In the last decades, Brazil has become the world's leading exporter of poultry meat and its third-largest producer. This success within the chicken industry was due to the better understanding of the animal requirements and genetic improvement. Molecular techniques have helped to identify genes associated with important traits and to unravel their mechanisms of action, which can speed up the genomic selection process. Sclerostin gene (*SOST*) (NC\_006114.3) is located on chicken chromosome 27 (GGA27), and it has been associated with bone-related traits in other animal species including humans, being suggestive of an important functional candidate gene in chickens. Therefore, the objective of this study was to identify SNPs in the *SOST* gene in chickens and to test their association with important economic traits. A region spanning 1,221 bp on *SOST* was sequenced using 15 animals (10 from a paternal broiler line TT and 5 from a layer line CC). Sequences were analyzed using Phred/Phrap/Consed/Polyphred software for SNPs identification. Twelve SNPs were identified, 10 located in intron 2 and two SNPs in the exon 3. From those SNPs, six of them were not previously described in the dbSNP database. The SNP g.A3291178G (intron 2) was selected for genotyping 835 chickens from the Embrapa F2 Chicken Recourse Population using PCR-RFLP and the *BsaAI* restriction enzyme. The genotypic frequency of this SNP was 1.8% for GG, 33.05% for AG and 65.15% for AA genotypes, accepting the hypothesis that this marker is in HWE in this F2 population ( $p > 0.07$ ). Performance, carcass, fatness, organs and chemical composition traits were evaluated in the F2 population in a total of 48 traits. Associations of the *SOST* SNP were tested for all those traits using QxPak software v4.0. A mixed model including the fixed effects of sex, hatch and SNP, and the infinitesimal and residual random effects was used. The additive and additive + dominance effects of the SNP were tested, including its interaction with sex. The models with the best fit to the data were the additive and the additive within sex. The additive effect of the *SOST* SNP was significant for liver weight and heart percentage ( $p < 0.05$ ). When the additive effect of this SNP was tested within sex, an interaction was observed for wings weight and feet weight, being significant only in males. Those results indicate that *SOST* gene might be associated with locomotor limbs in males. Ongoing studies are being conducted to test the association of *SOST* gene with bone-related traits in this F2 population. Financial support: Embrapa/PRODETAB