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# Study of Fatty Acid Synthase and Adiponectin SNPs in the Italian Duroc breed

R. Davoli<sup>1</sup>, S. Dall'Olio<sup>1</sup>, P. Zambonelli<sup>1</sup>, L. Buttazzoni<sup>2</sup>, V. Russo<sup>1</sup>

<sup>1</sup> Dipartimento di Protezione e Valorizzazione Agroalimentare. University of Bologna, Italy

<sup>2</sup> Associazione Nazionale Allevatori Suini. Italy

*Corresponding author:* Roberta Davoli. Dipartimento di Protezione e Valorizzazione Agroalimentare. Università di Bologna. Via F.lli Rosselli 107, 42100 Reggio Emilia, Italy - Tel. +39 0522 290507 - Fax: +39 0522 290523 - Email: roberta.davoli@unibo.it

## ABSTRACT

Fatty acid synthase (FASN) is a multifunctional enzyme that plays a central role in fatty acid biosynthesis catalysing the conversion of acetyl-CoA and malonyl-CoA into long-chain saturated fatty acids and has an important role in energy homeostasis. Pig FASN gene has been assigned to chromosome 12p1.5 and a T>C polymorphism in the fourth exon was found. Adiponectin (ADN) is a fat-derived hormone involved in insulin sensitivity, in lipid and glucose metabolism. In literature is reported that the gene was mapped on chromosome 13 at 53.6 cM, in a region containing QTL for intramuscular fat (IMF). In this gene several SNPs were identified and one of these polymorphisms (a G>A missense mutation within the 60<sup>th</sup> codon) determining the Val-Ile substitution in the protein, has been previously reported.

The aim of this work is to analyse the variability of polymorphisms of fatty acid synthase described by Munoz *et al.*, 2003 (Anim. Genet. 34:234) and adiponectin genes, candidates for meat and carcass quality, in Italian Duroc pigs. Up to now researches on these functional genes in this pig breed have not been performed.

In order to estimate allele frequencies, the FASN T>C polymorphism and the ADN G>A mutation were studied by PCR-RFLP in 134 and 257 Italian Duroc, respectively. At the FASN locus the allele frequency was 0.041 for T allele; at the ADN locus the frequency of the alleles A was 0.136. We investigated the effect of FASN and ADN polymorphisms on Estimated Breeding Values (EBVs) for single traits (average daily gain, feed to gain ratio, weight of lean cuts, ham weight, backfat thickness and visible intermuscular fat) and for selection indexes (Total Index and Terminal Index) estimated by ANAS. The analyses were performed using the GLM procedure of SAS System and a model with the genotype at FASN or ADN locus as fixed factor.

At the FASN locus only few pigs carried the T allele; therefore, we tried to perform the analysis comparing the pigs with both genotypes T/T plus C/T versus those genotyped C/C at this locus. The results didn't show any association of the polymorphism with the examined traits.

The same model was used for the ADN locus and the G/A genotyped pigs versus the G/G ones showed a significant higher estimated mean value for Total Index (P= 0.0114).

For both the analysed genes the obtained results should be verified on a larger sample even if the present findings could suggest a possible role of ADN on the traits included in Total Index in the Duroc breed.