

Searching SNPs Variants in Myod-1 and Myod-2 Genes Linked to Body Weight in Gilthead Seabream, *Sparus aurata* L.

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Abstract : Growth is a productive trait regulated by a large and complex gene network with very different effect. Some of them (candidate genes) have a higher effect and are excellent resources to search in them polymorphisms correlated with differences in growth rates. This study was focused on the identification of single nucleotide polymorphism (SNP) in MyoD-1 and MyoD-2 genes, members of the family of myogenic regulatory genes with a key role in the differentiation and development of muscular tissue (MFRs), and its evaluation as potential markers in genetic selection programs for growth in gilthead sea bream (*Sparus aurata*). Through a sequencing in 30 seabream (classified as unrelated by microsatellite markers) of 1.968bp in MyoD-1 gene [AF478568 .1] and 1.963bp in MyoD-2 gene [AF478569.1], three SNPs were identified in each gene (SaMyoD-1 D2100A (D indicate a deletion) SaMyoD-1 A2143G and SaMyoD-1 A2404G and SaMyoD-2_A785C, SaMyoD-2_C1982T and SaMyoD-2_A2031T). The relationships between SNPs and body weight were evaluated by SNP genotyping of 53 breeders from two broodstocks (A:18♀-9♂; B:16♀-10♂) and 389 offspring divided into two groups (slow- and fast-growth) with significant differences in growth at 18 months of development (A18Slow: N=107, A18Fast: N=103, B18Slow: N=92 and B18Fast: N=87) (Borrell et al., 2011). Haplotype and diplotype were reconstructed from genotype data by Phase 2.1 software. Differences among means of different diplotypes were calculated by one-way ANOVA followed by post-hoc Tukey test. Association analysis indicated that single SNP did not show significant effect on body weight. However, when the analysis is carried out considering haplotype data it was observed that the DGG haplotype of MyoD-1 gen and CCA haplotype of MyoD- 2gen were associated to with lower body weight. This haplotype combination always showed the lowest mean body weight ($P<0.05$) in three (A18Slow, A18Fast & B18Slow) of the four groups tested. Individuals with DGG haplotype of MyoD-1 gen have a 25,5% and those with CCA haplotype of MyoD- 2gen showed 14-18% less on mean body weight. Although further studies are need to validate the role of these 3 SNPs as marker for body weight, the polymorphism-trait association established in this work create promising expectations on the use of these variants as genetic tool for future gilthead seabream breeding programs.

Keywords : growth, MyoD-1 and MyoD-2 genes, selective breeding, SNP-haplotype

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