

Genetic Analysis of the fatty acid profile in Meagre (*Argyrosomus regius*)

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Summary

Meagre (*Argyrosomus regius*) is one of the potential species for diversification of European aquaculture, with an annual production of over 44,000 tons. It has good characteristics like its fast growth rate with a low feed conversion rate and a low-fat fillet. Several advances have been achieved in different areas, but little progress has been made in the genetic improvement of the species. The aim of the present study was to estimate genetic parameters for fatty acid (FA) profile in fillet meagre to be considered in the establishment of a selective breeding program. For carrying this experiment out, 633 fish were raised in two different housing system, in sea cages (255 fish) or in a continental tank (378 fish). When they reached the harvest size, fish were slaughtered by immersion in ice cold water, then growth traits, fillet fat content (measured by Fish Fat Meter device (FFM) and Near Infrared spectroscopy, (NIR)) and FA profile were analysed. Fish reared in cage showed a higher body weight (BW), total length (TL) and percentage of fillet fat than fish reared in tank, and a positive effect of the BW on fillet fat percentage was notable. Regarding the FA profile, meagre fillet presented a 30.8, 35.4 and 33.4 % of SFA, MUFA and PUFA on average and respectively, with a low ratio n6/ n3 (1.54), meaning that is a very healthy food. The main fatty acids found in the fillet were the C16:0 (19%) within the SFA, C18:1n9t (21%) in MUFA and DHA (13.5%) in PUFA. In the FA profile, medium heritabilities (from 0.15 to 0.31) were found for most of the fatty acids, being lower (from 0.10 to 0.15) for C18:1n9t, C20:1, C22:1 and C18:2n6t. All summations (SFA, MUFA, PUFA, UFA/SFA and n6/ n3), showed medium heritabilities. Phenotypic correlations between fillet fat FFM and growth traits were positive and low (0.28 ± 0.08 for BW and 0.26 ± 0.06 for TL), genetic correlations were also low but not accurately estimated. Phenotypic correlation between fillet fat FFM and NIR was medium-low (0.40 ± 0.10). Fillet fat FFM showed a positive phenotypic and genetic correlation with C20:0; C20:1 and C22:1; and negative medium correlation regarding C18:2n6c, DHA and PUFA. This result is related to the fact that when the fattening level of a fish increases, most of that fat is deposited in the muscles, in the form of triglycerides, to be an energy reserve, while the phospholipids of the membranes, where PUFA are located, they are diluted. Breeding programs in meagre usually include growth as the first criterion in the selection process of the fish. However, other quality traits, such as fillet fat content and its FA profile should be considered, because selection for growth can lead to increased fillet fat with lower PUFA fatty acid content, they are very important traits for the consumer, from a nutritional point of view and the benefits for the health.

Keywords: Correlations; Fat; FFM (Fish Fat Meter); Heritability; Monounsaturated; polyunsaturated; Saturated.