

Phenotypic and genetic components for growth, morphology, and flesh quality traits of meagre (*Argyrosomus regius*) reared in tank and sea cage with different stock density

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Summary

Meagre is an emergent species in aquaculture, due to its fast growth rate, low feed conversion ratio and high quality of the product. Advances in its management, reproduction, and feeding have been achieved but breeding programs have not been developed yet. For this reason, this study aims to provide information about the genetic variation for growth (body weight “BW” and total length “TL”), morphology traits (standard length “SL”, caudal peduncle height “CPH”, equidistance fish height C “FHC”) and flesh chemical composition (moisture, protein, fat and collagen) to be included in a selective breeding program. In addition, for carrying this experiment out, 633 fish were raised in two different housing system, sea cage with low density (255 fish, with a stock density of 10.6 kg/m³) and tank with high density (378 fish, with a stock density of 15 kg/m³), were studied. When they reached the harvest size at 549 days post hatching, fish were slaughtered by immersion in ice cold water, then growth, morphology and flesh chemical composition traits were analysed. The fish in the tank showed worse growth performance, on the other hand, the fish reared in cage showed higher BW, TL, SL, CPH, FHC and fillet fat percentage than fish reared in tank. Heritabilities for growth traits (0.42 for BW and 0.38 for TL) and morphology traits (0.32, 0.19, 0.39 and 0.16 for SL, CPH, FHC and SL/FHC, respectively), and for fillet fat percentage (0.30) were medium, revealing those traits as a possible selection criterion in a breeding program. Phenotypic correlations between growth and morphology traits were positive and high in all the cases, except for the SL/FHC ratio, which were low and negative. Genetic correlations between growth traits (BW and TL) and morphology traits (SL, CPH, and FHC) were positive and very high for all the possible combinations, except for the SL/FHC ratio, which were negative with BW and null with TL but estimated with high standard errors. Image analysis to describe fish morphology could replace growth measurements in a breeding program, since the amount of information obtained is very high and objective. Growth traits showed medium positive phenotypic correlations with fat, negative and medium with moisture and low with protein, and almost null with collagen. Genetic correlations between growth traits (BW and TL) and flesh composition were estimated with low accuracy and thus interpreting them safely becomes difficult. An increase in fillet fat percentage could be expected with the selection process for growth fish due to the

medium and positive phenotypic correlation between fillet fat percentage and growth and morphology traits.

Keywords: Meagre (Argyrosomus regius); Infrared Spectroscopy (NIR); Moisture; Lipid content; Protein; Collagen; Heritabilities; Correlations.