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DOES EARLY GROWTH PLAY A ROLE IN THE SEX DETERMINATION OF EUROPEAN SEABASS *Dicentrarchus labrax*?

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European sea bass has a polygenic sex determinism with temperature influences, which remains hard to predict and manipulate. To investigate the interactions between early growth and sex determination, we studied West Mediterranean domesticated sea bass from a 50♂x10♀ full factorial cross, reared as a single batch at 15°C to promote female sex determination. Temperature was increased to 25°C from 70 to 119 days post-hatching (dph) to increase growth. Fish were individually tagged at 95 dph (575 mg) with microtags and were individually weighed at 95, 115, 136, 157, 200, 256 and 325 dph, and then sexed. Parentage was recovered with 12 microsatellites; 1134 fish had appropriate pedigree, sex and growth data. Multivariate sire models were run to investigate the links between growth and sex (considered a threshold trait with an underlying sex tendency). Heritability of sex tendency was 0.39 ± 0.12 on the underlying scale. The sex dimorphism of body weight in favour of females rose from +27% at 95 dph (BW_{95}) to +40–45% between 115 and 325 dph, and the sex dimorphism of DGC was maximal for DGC_{95-115} . If differential growth is seen as a consequence of phenotypic sex, growth should be corrected by a fixed sex effect. In this case, there was a positive, although not significant ($r_A = 0.18 \pm 0.12$) genetic correlation of sex tendency with DGC_{95-115} , while it never exceeded 0.05 later than 136 dph. The genetic correlation of BW with sex tendency regularly decreased from 0.45 ± 0.18 for BW_{95} to -0.20 ± 0.17 for BW_{325} . If differential growth is seen as a cause of phenotypic sex, no fixed sex effect should be modelled, which then led to a r_A of sex tendency with DGC decreasing from 0.60 ± 0.11 for DGC_{95-115} to 0.21 ± 0.15 for $DGC_{256-325}$, while the r_A of BW with sex tendency also decreased from 0.72 ± 0.10 for BW_{115} to 0.48 ± 0.14 for BW_{325} . In all cases, the genetic and environmental correlation of growth and sex tendency was maximal at the earlier stages, especially before the first reported signs of sex differentiation. This leads us to think that post-larval growth is, at least partially, a cause and not a consequence of sex determination in sea bass.

Keywords: Sex determination, quantitative genetics, growth

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