GENETIC PARAMETERS FOR THE OPERCULUM AND JAWS DEFORMITIES IN LARVAE OF GITLHEAD SEABREAM, *Sparus aurata*

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Skeletal deformities are a major problem of product quality in finfish aquaculture. Their development is often attributed to the environmental conditions. Existing studies on the genetic basis of skeletal deformities usually record these traits at advanced developmental stages, ignoring the fact that the majority of the skeletal deformities originate during the first ontogenetic period. In the present study, we focused on this period and recorded deformities of the operculum and the jaws. A broodstock consisted of 64 males and 63 females were mass spawned for 4 consecutive days. At the age of 39 days post hatching (dph), a random sample was taken from each tank for phenotyping and genotyping. A subsample of 1,400 larvae was stained for bone and cartilage and phenotyped following a novel approach of staining which did not inhibited the subsequent genotyping process. Gill-cover deformities mainly concerned alterations of the operculum bone in the form of inside folding, atrophy or/and over-ossification. Macroscopically, these alterations resulted to a 10-50% size reduction of the gill cover. Gill-cover deformities were classified into five intensity levels by means of a semi-quantitative scale. Jaw deformities were quantified semi-quantitatively, either with a macro-scale (external morphology) or with a micro-scale (individual anatomical elements) (four levels of intensity for both scales). All deformities were recorded bilaterally. Genotyping was done with a multiplex of nine microsatellites resulting in 95.8% of unambiguously assigned offspring using the exclusion method. Heritability and correlations estimates on the observed scale were estimated by REML using a multi-trait animal model including tanks as fixed effects. The heritability estimates for the operculum traits were very low and insignificant (0.02±0.02). The heritability estimates for the jaw deformities traits was 0.12±0.04 for the macro-scale and ranged from 0.05±0.05 to 0.22±0.06 for the micro-scale. The heritabilities on the liability scale were higher ranging from 0.10 to 0.78. The phenotypic and genetic correlations of the jaw deformity traits with total length were negative, low to moderate and of similar magnitude. The phenotypic and genetic correlations among the jaw traits were in most cases positive, moderate to high and of similar magnitude.

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