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How minimizing the footprint of the aquaculture and fisheries on the ecosystem?

French-Japanese Symposium, Ifremer, Sète, France, 1-3 September 2010

Can genetic improvement in aquaculture reduce the impact on fisheries? The case of European sea bass (*Dicentrarchus labrax*) fed on a totally plant-ingredient based diet

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Abstract

In recent years, the increase of aquaculture production has led to changes in feed composition with an increasing substitution of fish meal (FM) and fish oil (FO) with terrestrial plant products. During the same period, selective breeding procedures have been developed with a recent focus on genetic variability for the ability to grow on plant-ingredients based diets. Genetic parameters were estimated in a context of extremely contrasted diets in European sea bass. 784 individually tagged fish from 328 families were reared in a common garden design and DNA sampled for parentage assignment using microsatellites. At 192 g, they were distributed into 4 tanks, two fed on a diet (diet M) based on FM and FO, and two fed on a FM and FO-free diet (diet PB). Body weight, length, and lipid content of the fillet were recorded at 850 days post-fertilization. Traits were analyzed with a restricted maximum likelihood (ASREML) methodology. Analyses of data show that: (i) there was no difference for weight, length, and fillet lipid content among diets ($P=0.06$), (ii) family ranking for these 3 traits was not consistent among diets (genetic correlations between 0.51 and 0.87), (iii) heritability estimates (PB: 0.37 ± 0.18 ; M: 0.47 ± 0.24). Our results clearly point out that exploitation of such variability could (i) modify the genetic gain in current selection programs and (ii) be used to select fish adapted to novel FM and FO free feeds