Genomics advances for boosting aquaculture breeding programs in Spain

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PII: S0044-8486(16)30325-8
DOI: doi: 10.1016/j.aquaculture.2016.06.021
Reference: AQUA 632196

To appear in: *Aquaculture*

Received date: 27 January 2016
Revised date: 14 June 2016
Accepted date: 15 June 2016

Please cite this article as: Martínez, Paulino, Genomics advances for boosting aquaculture breeding programs in Spain, *Aquaculture* (2016), doi: 10.1016/j.aquaculture.2016.06.021

Genomics advances for boosting aquaculture breeding programs in Spain

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Keywords: History, Genetics, Genomic resources, Breeding programs, Spain

Summary

Spain is among the main seafood consumer countries in the world and an important aquaculture industry has been developed to satisfy its demands. Rearing facilities of aquatic species exist in Spain since Roman times, and in the Middle Age more sophisticated hatcheries were developed in Monasteries and Abbeys for freshwater species. Galicia (NW Spain) is the main productive region due to the special characteristics of its coasts. Different fish and mollusk species are produced in intensive or semi-extensive systems in this region. The leader species of Spanish aquaculture is the Mediterranean mussel (*Mytillus galloprovincialis*), and within fish, sea bream (*Sparus aurata*), sea bass (*Dicentrarchus labrax*), rainbow trout (*Oncorhynchus mykiss*) and turbot (*Scopthalmus maximus*). Breeding programs started in the 90's in turbot, currently in the fifth generation of selection, and more recently in sea bass and sea bream. Microsatellite traceability tools have been developed to assist breeding programs and to estimate heritabilities for potential selective traits in fish and, to a minor extent, in mollusks. Genomic resources and tools arrive to Spanish aquaculture through flatfish (turbot and Senegalese sole, *Solea senegalensis*) and later, this know-how has been transferred to other fish and mollusk species. The first transcriptomic databases, microarrays and genetic maps were developed in turbot and Senegalese sole. The last main achievement has been the whole assembling of turbot genome, which is being used as reference for new genotyping (RAD-seq) and gene expression (RNA-seq) methodologies. It is time to apply the huge amount of information accumulated in broad multidisciplinary research consortia to boost production to a higher level in collaboration with industry.