

**WORLD AQUACULTURE SOCIETY**

**BOOK OF ABSTRACTS**



**Disney's Coronado Springs Resort**

**January 21-25, 2001**

**Lake Buena Vista, Florida**

**SELECTIVE BREEDING FOR STRESS TOLERANCE IN GILTHEAD SEABREAM *Sparus aurata***

Daniel Montero\*, Lidia Robaina, Lluís Tort, Juan M. Afonso, H. FernándezPalacios,  
Marisol Izquierdo

Instituto Canario de Ciencias Marinas  
P.O. Box 56. 35200  
Telde, Las Palmas  
Canary Islands, Spain

The overall aim of this study was to assess the feasibility of increasing the tolerance to stress by selective breeding of gilthead seabream (*Sparus aurata*), one of the most important marine fish species in Mediterranean aquaculture. Given what is known of the adverse effects of stress, an enhanced tolerance to stressful procedures was likely to improve the efficiency of growth, and reduce the incidence of disease, under aquaculture conditions. An improvement in the performance of broodstock in terms of fecundity, egg quality was also likely, and better tolerance to stress may also lead to improvements in post-slaughter flesh quality.

For that purpose, gilthead seabream broodstock were identified as high or low responder to stress, measuring monthly their plasma cortisol levels after 2 hours of confinement stress, during 6 months.

Once fish which display traits of consistent high or low responsiveness to stress were selected according to sex of each fish at the beginning of the spawning season. A total of 20 crosses of each selected group, High responder (HR), and Low responder (LR) were executed and the offsprings from these crosses obtained. The study of spawning quality from each cross during the whole spawning season showed that egg quality in terms of viability and hatching rates was significantly better for HR fish.

To achieve the effect of stress responsiveness on offspring growth, different on-growing experiments were conducted during 2 years, and results from those experiments showed that the type of response significantly influenced the Conversion Index of fish.

In order to test the stress responsiveness of the progeny, different experiments were conducted under acute and chronic stressful conditions. The results showed that following exposure to net chasing (acute stress) fish from HR families displayed a greater and more rapid elevation of plasma cortisol than fish from LR families. However, fish under confinement stress showed no significant differences of plasma cortisol concentration. Immunocompetence and flesh quality of the progeny were also measured, giving HR fish higher alternative complement pathway activity and great fillet mechanical resistance respectively.

There were no consistent divergence in responsiveness evident between the two selection lines and a low estimate of heritability of stress responsiveness (0.07) was obtained in contrast with data from rainbow trout (0.5). However, there were indications of differences between the two lines and these suggest that some divergence has been obtained following selection.