

Inbreeding evidence in a traditional channel catfish (*Ictalurus punctatus*) hatchery in Mexico

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Abstract:

Background: Channel catfish are one of the most important aquaculture species raised for food purposes in Mexico. Two temporal samples were obtained from the largest channel catfish breeding hatchery in Mexico to identify changes in genetic diversity and inbreeding that are promoted by traditional hatchery management. Results: The genetic parameter analysis of 11 microsatellite loci showed no significant change in genetic diversity ($p > 0.05$). However, a significant heterozygosity deficiency was detected ($p < 0.001$), and genetic structure analysis indicated moderate differentiation between the temporally divided populations ($F_{ST} = 0.08$). A moderate level of inbreeding and a slight increase of the inbreeding coefficient from 0.23 to 0.27 were the result of traditional hatchery practices. To achieve an effective population size, the temporal approach resulted in a limited number of breeders to maintain genetic variability. Conclusions: Although no significant change in genetic diversity parameters was found, the heterozygote deficiency and low effective number of breeders suggest that there is a risk for increased inbreeding. Thus, we propose the need for controlled reproductive management and the establishment of genetic programs in hatcheries. Molecular tools can provide valuable information to facilitate the achievement of these goals.