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Mitochondrial and microsatellite DNA analyses showed comparative genetic diversity between parent and offspring populations of Korean black rockfish in a hatchery facility

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ABSTRACT. The black rockfish, *Sebastes inermis* (Sebastidae), is an important commercial fishery resource in Korea. As a preliminary investigation into the effect of artificial reproduction in a hatchery facility, the genetic divergence between parent and offspring populations of black rockfish was accessed using 10 polymorphic nuclear microsatellite DNA loci and a mitochondrial (mt) control gene. All loci that were screened showed marked polymorphisms. mtDNA control region sequences were also highly variable. Of approximately 350 base pairs (bp) sequenced, 52 variable sites, comprising 56 base substitutions, were found among 233 individuals. Offspring populations showed less genetic variability than the parent population in terms of numbers of microsatellite alleles and mtDNA haplotypes, as well as mtDNA haplotype diversity. Statistical analysis of the fixation index (Φ_{ST} and F_{ST}) and analysis of molecular variance using both DNA markers showed significant genetic differences between the parent and offspring populations. These results suggest that random genetic

drift and/or inbreeding events, as well as artificial selection and founder effects, occurred when the offspring strain was reproduced in a hatchery facility despite thousands of males and females from different hatcheries being maintained for artificial reproduction. Therefore, it is necessary to improve current hatchery programs by monitoring genetic variation in both the broodstock and progeny and controlling inbreeding within stocks in commercial breeding facilities to maintain the production of high-quality black rockfish. This information will be useful for determining suitable guidelines for establishing and maintaining cultured stocks and the aquaculture industry of *S. inermis*.

Key words: Black rockfish; *Sebastes inermis*; Artificial reproduction; Genetic variability; Mitochondrial DNA; Microsatellite loci

