

## Genetic structure of Roach (*Rutilus caspicus*) populations in the southeast parts of Caspian Sea using microsatellite loci

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### Abstract

Caspian roach, *Rutilus caspicus*, is regarded as one of the native valuable species in Caspian Sea. The roach stocks have declined considerably during recent years. Restocking of this fish is done by releasing the hatchery produced larvae into the nature. In the present study, genetic structure of hatchery (wild and cultured groups) and natural populations (Gharesou River, Gorgan bay and Gomishan wetland) was assessed using ten microsatellite loci. All the loci showed polymorphism in all the studied samples. The mean numbers of observed alleles were obtained 10 and 10.7 for hatchery and natural populations, respectively. Also, the mean values of observed and expected heterozygosity in hatchery populations ( $H_o$ : 0.63 and  $H_e$ : 0.823) were slightly lower than that of natural populations ( $H_o$ : 0.7 and  $H_e$ : 0.853) ( $p > 0.05$ ). In investigation of populations in terms of deviation from Hardy-Weinberg equilibrium, 32 cases from 50 tests showed significant deviation from equilibrium, mainly due to the observed heterozygosity deficiency. In this regard, high heterozygosity deficiency and significant inbreeding coefficient ( $p \leq 0.002$ ) were observed in some of investigated loci; hereof the presence of null alleles can be regarded as one of the main reasons. The mean values of  $F_{st}$  and  $R_{st}$ , as the indices of genetic differentiation, were obtained 0.022 and 0.049, respectively, so that the highest and the lowest values of differentiation were observed among the cultured samples of hatchery and Gorgan bay and samples of Gharesou and Gomishan. Also, the highest genetic distance and the lowest genetic similarity were observed between the cultured samples of hatchery and Gorgan bay. According to the results, it could be stated that despite some problems such as pollution, overfishing as well as restocking by releasing hatchery-produced larva, the genetic diversity of Caspian roach is maintained at desired level. However, the low decrease observed in genetic diversity parameters in hatchery populations shouldn't be ignored since some problems such as inbreeding and genetic purity may occur over the time.

**Keywords:** Population, Caspian Sea, Microsatellite, Genetic structure, Roach.