Equalization of Sperm Concentration of Caspian brown trout *Salmo trutta caspius* Male Breeders in Mixed Milt Fertilization and its Effect on Genetic Diversity of F_1 Progeny

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Abstract

Conservation of genetic diversity of juveniles used for restocking of natural populations requires serious attention in artificial breeding protocol of the Caspian brown trout *Salmo trutta caspius*. Unbalanced contribution of male and female breeders to progeny in present artificial breeding has resulted in the reduction of effective population size in breeders. Equalization of milt volume did not also result in balanced contribution of breeders. With regard to the possible effect of sperm concentration on contribution of breeders to production of progeny, effective population size in breeders and genetic diversity of progeny were determined in mixed milt fertilization of 6 male and 2 female breeders with equal sperm concentration and ova number. Parentage assignment was performed using exclusion method in FAP program by analyzing 9 microsatellite loci and choosing the 3 most polymorphic ones, Str 58, Str 73 and Str 591, in breeders. More than 91% of progeny were assigned to their parents. Effective population size was calculated as 5.24 (0.65) and the number of alleles and expected heterozygosity decreased in progeny (6.67 and 0.726 ± 0.011) compared to parents (7.33 and 0.808) significantly ($P<0.05$). In conclusion, equalization of sperm concentration of male breeders did not result in the balanced contribution of male breeders to ova fertilization and production of progeny in mixed milt fertilization of Caspian brown trout and genetic diversity of progeny remained significantly decreased.

Keywords: Artificial breeding, Effective population size, Parentage assignment, Sperm concentration, Microsatellite, Caspian brown trout, *Salmo trutta caspius*

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