

Potential effects of stock enhancement with hatchery-reared seed on genetic diversity and effective population size

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ABSTRACT

The present study investigated the genetic efficiency of enhancing populations of wild scallops using hatchery-produced seed scallops. Scallops from the Isle of Man (IOM), Irish Sea, and from a scallop hatchery were genotyped using 15 microsatellite markers. Hatchery scallops had equivalent heterozygosity to wild scallops, but rare alleles were likely to be lost in hatchery scallops as represented by lower allelic richness. The effective number of breeders (N_b) of the hatchery scallops was estimated at 32.4 (95% CI: 24.4–44.9). The confidence intervals for the estimates of N_b for the IOM included infinity. When N_b becomes large the genetic signal is weak compared with the sampling noise; therefore, while we can be confident that the N_b of IOM scallops is larger than that of the hatchery, the precise difference is uncertain. Simulations showed it is possible, in some scenarios, that stock enhancement with hatchery seed can lead to an increase in the wild population's effective size; however, in the majority of scenarios a decrease in the effective size of the wild population is more likely. A precautionary approach to stock enhancement with hatchery seed is advised.

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