

**Genetics and genomics of *Ostrea edulis*: progress and prospects to contribute to the restoration of wild populations, sustainable aquaculture production and fisheries.**

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**Abstract**

Over the past 50 years, studies dedicated to population genetics of *Ostrea edulis* have aimed to document spatial and temporal differences and to identify major driving evolutionary forces, such as genetic drift, local adaptation or impact of stock translocations, while a second major area of research has been to identify stocks with higher resistance to bonamiosis, mass or family-based selective breeding and disease testing. The impact of this research on farmed and wild populations has remained limited until now, due to low or short-term investments and/or limited commercial interest. This is, however, changing. Recent efforts to counter the decline of this species in Europe, as illustrated by the engagement of the NORA community, have resulted in new initiatives and progress in breeding, genetics and genomics. This recent progress will be reviewed in the light of increasing demand for disease-free or disease-resistant seed to restore populations and reviving aquaculture production and fisheries. Concerns about effective population size of hatchery-propagated seed, genetic impact of transfer of wild seed between evolutionary significant units will be addressed in view of the potential gains and of emerging genome-based selective breeding programs.

**Key words:** population genetics, selective breeding, effective population size, genomics.