

Abstract book

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– understanding transitions in the Baltic Sea

Panmixia within the Baltic Sea: high genetic connectivity between epilithic and free-living marine macroalga *Fucus vesiculosus*

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Marine populations with low genetic diversity are at greater risk of being affected by changing environmental conditions and anthropogenic pressures, particularly those within ecologically and geographically marginal environments. Poor population connectivity can further elicit harmful effects in response to these detrimental pressures.

As a foundation species, *Fucus vesiculosus* provides critical habitat for a multitude of fauna and flora, alongside important ecosystem functions and services. Despite the integral nature of this macroalga within the species-impoverished Baltic Sea, both historical and ongoing population declines have been documented throughout much of its distribution. Thus it is imperative to improve our understanding of the genetic resources represented by the species.

We used multi-locus barcode sequencing to investigate the genetic diversity, population structure and connectivity of *F. vesiculosus* within the Baltic Sea; with specific focus on the two lifestyles: epilithic and free-living.

For the first time using genetic techniques, we confirm that the Baltic Sea free-living *Fucus* can be designated as *F. vesiculosus*. The two lifestyles represent similar genetic resources, with high connectivity and little genetic differentiation.

We demonstrate a pattern of barrierless gene flow in much of the Baltic Sea though areas of restricted gene flow do occur. Consequently the Baltic Sea *F. vesiculosus* population is generally panmictic with sporadic localised areas of isolation. The overall genetic diversity is low with geographic extremes to the north and south displaying fixed populations, whilst central populations demonstrate greater genetic diversity. Unique genetic resources are present within the Baltic Sea, indicating that it is a source of important genetic variation for the species.

Fucus vesiculosus has broad dispersal capabilities suggesting a potential resilience of natural populations to changing conditions. This also poses favourable outcomes for future restorative measures. Overall *F. vesiculosus* populations within the Baltic Sea show potential for adaptation to changing conditions due to high connectivity and areas of unique genetic diversity.