DEEP GENETIC DIVERGENCE AND RECENT RADIATIONS IN SAND GOBY
POMATOSCHISTUS MINUTUS ALONG EUROPEAN COASTS

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Understanding evolutionary patterns is more complex in marine compared to
continental species because marine species have high effective population sizes and
high levels of dispersal due to an apparent lack of barriers. Moreover,
phylogeographical breaks in the marine realm such as the Atlantic-Mediterranean
transition remain controversial. Therefore a new high-quality phylogeographic analysis
was realized for a marine demersal fish, the sand goby Pomatoschistus minutus
(Gobiidae, Teleostei). Sand gobies of 12 locations along the full European distribution
range were analyzed by sequencing a large fragment of the mitochondrial cytochrome
b gene.

The phylogenetic results show that P. minutus comprises two deep genealogical
lineages, the Mediterranean Sea Clade (MS-Clade) and the Atlantic Ocean Clade (AO-
Clade), that date back to the Early Pleistocene (1.6-0.8 MYA). Even though the sand
gooby occurs only in a few northern locations in the Mediterranean, the MS-Clade
contains the highest genetic diversity. The AO-Clade comprises two Evolutionary
Significant Units (ESU), one off the Western Iberian Peninsula and the other in the
marine systems of the North Atlantic (Bay of Biscay, North Sea, Irish Sea and Baltic
Sea). This is consistent with two separate palaeorefugia during the Pleistocene
glaciations: the Iberian Peninsula and the Bay of Biscay. Less haplotypes were shared
among the marine systems of the North Atlantic, indicating a low present-day gene
flow. The network analysis showed a recent radiation in each marine system, even in the
northern Baltic Sea where the recolonization of P. minutus occurred only 8000 years
ago. This phylogeographic pattern will be compared with putatively adaptive loci in
order to study the characteristics of local adaptation in the marine environment.