



Mediterranean MPA provides fish larvae for neighbouring areas

New research has found evidence that a small Marine Protected Area (MPA) in the Mediterranean has the potential to deliver larvae of some fish species to surrounding, non-protected areas. This is one of few studies to investigate this desired role of MPAs and its design could be used to evaluate current and future MPAs elsewhere.

As its name suggests, the overall goal of a Marine Protected Area (MPA) is to conserve an area's natural environment, ecosystems and any cultural or historical resources. As part of this, MPAs aim to provide favourable conditions for fish to spawn, but also to export larvae to surrounding unprotected areas in order to strengthen fish populations outside the MPA. For some commercial species, this can provide fisheries with increased stock. Although importance has been placed on larval production and export in the design of MPAs, very little research has been done to evaluate and predict this desired impact.

The study, conducted under the BIOMEX¹ and EMPAFISH² projects, focused on a small MPA in the north-western Mediterranean around the Medes Islands. This MPA has a 'no-take zone' at its centre, where all forms of exploitation are prohibited, including fishing. The researchers assessed the distribution of fish larvae within the MPA and its surrounding waters, and investigated any links to environmental conditions, such as depth of water, temperature, salinity and habitat type (sand, rock or sea-grass). They sampled fish larvae during two four-week periods in spring and summer, focusing on the distribution of larvae living in rocky habitats, as the adults of these are most likely to be protected by the MPA.

The results revealed the importance of depth and habitat type in the location and numbers of fish larvae. Temperature was also influential, in that the distribution of species was different in spring and summer periods. The effect of depth varied depending on the species: for example, increased depth had a negative impact on the larvae of shore fish species that spawned on the sea floor, whereas depth had a positive impact for open sea species that spawn between the surface and the floor.

The study indicated that for fish that restrict their spawning to coastal areas, such as the *Tripterygion tripteronotus* (blenny) and *Scorpaena porcus* (black scorpionfish), the distance of the spawning area to the MPA had a significant influence over larval distribution at certain times. For these fish there were a greater number of larvae at spawning areas closer than 1000 metres to the MPA, suggesting a positive effect of the MPA on production and retention of larvae.

Results provided evidence of larval export for three commercial fishes: *Epinephelus marginatus* (dusky grouper), *Pagellus erythrinus* (common pandora) and *S. porcus* whose spawning area is in the 'no-take zone' of the MPA. For *S. porcus*, there were high numbers of larvae both within the MPA and at a distance, suggesting that both retention and export is occurring, although possibly at different times.

The proposed method could be used to explore the ability of MPAs to encourage larval production and larval export both for monitoring current MPAs and evaluating future ones. However, a comprehensive assessment would require more detailed analysis of the eventual fate of the exported larvae.

1. BIOMEX (Assessment of BIOMass EXport from marine protected areas and its impacts on fisheries in the western Mediterranean Sea) was supported by the European Commission under the Fifth Framework Programme. See: http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_RC�=6124329
2. EMPAFISH (Marine Protected Areas as tools for Fisheries management and conservation) was supported by the European Commission under the Sixth Framework Programme. See: www.um.es/empafish/

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