

First evidence of ocean acidification's impact on reproductive behavior in wild fish

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Nesting male ocellated wrasse (*Symphodus ocellatus*) collecting algal fragments to build its nest. Credit: Natascia Tamburello/University of Palermo

Ocean acidification could have a major impact on the reproductive behaviour of fish living in affected waters, a new study shows.

Research conducted close to volcanic vents off the coast of Southern Italy demonstrated marked reproductive differences in species of ocellated wrasse (*Symphodus ocellatus*).

Key mating behaviours such as dominant male courtship and nest defence did not differ between sites with ambient versus elevated CO₂ concentrations. Dominant males, however, did experience significantly lower rates of pair spawning at elevated CO₂ levels, but a sizeable increase in their mating success.

Scientists say that while previous research has shown fish exhibit impaired sensory function and altered behaviour at high levels of [ocean acidification](#), this study - conducted using cameras at nest sites followed by paternity tests in laboratories - provides the first evidence of the effects of ocean acidification on the [reproductive behaviour](#) of fish in the wild.

Professor Marco Milazzo, of the University of Palermo, said: "Given the importance of fish for food security and ecosystem stability, these results highlight the need for further targeted research into the effects of rising CO₂ levels on their reproduction."

Symphodus ocellatus is a widespread wrasse in the rocky subtidal of the Mediterranean Sea with an annual breeding season lasting from late April to July. It comprises three types of male - dominants (who build nests, court females and provide defence), satellites (who cooperate with dominant males and help with courting), and sneakers (who hover around nests and try to join the females during spawning).

Film footage captured for this study, published in *Royal Society*

Proceedings B, demonstrated that dominant male pair spawning was reduced by almost two thirds in areas of high CO₂ concentrations compared to ambient sites, with the time spent courting also significantly decreased. However, genetic testing showed dominant male parentage increased from 38% in ambient areas to more than 58% in areas of high concentration.

Professor Jason Hall-Spencer, of Plymouth University, said: "We had predicted that [dominant males](#) would lose out due to increased competition, but our genetic paternity tests showed that they did not. In fact they fertilized more of the eggs than the other types of males and it was the sneaky males that lost out. Even though the sneakers produced more sperm and spawned on the eggs more often, they did not end up fertilizing more eggs."

More information: Ocean acidification affects fish spawning but not paternity at CO₂ seeps, *Proceedings of the Royal Society B*, [rspb.royalsocietypublishing.org1098/rspb.2016.1021](https://royalsocietypublishing.org/doi/10.1098/rspb.2016.1021)

Provided by University of Plymouth

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