



# Press Release

## Why do some fish eat their own eggs?

**University of Tübingen researchers investigate individual personality of the Common Goby to explain brood cannibalism**

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Many animals go to great lengths to ensure the survival of their offspring - yet some species actually eat some or all of their babies. Nor is there always an obvious explanation - like a food shortage - for such filial cannibalism. Martin Vallon and Dr. Katja Heubel of Tübingen's Institute of Evolution and Ecology have now investigated personality differences between individuals which may play a role in species which practice filial cannibalism. They observed the Common Goby - a marine fish of up to 6cm in length - to see how male individuals behave towards their eggs. The results of their study, published in *Ecology and Evolution*, suggest that under the same conditions, more generally active individuals ate more of their eggs. In a second study published in *Behavioral Ecology and Sociobiology*, Vallon and Heubel show that, faced with a mixed brood of freshly-laid and more developed eggs, Common Goby males preferred the younger, less valuable eggs.

Once the female of the Common Goby (*Pomatoschistus microps*) has laid the eggs, only the male looks after them. Sometimes he guards several clutches by different females, cleans the nest, and fans oxygen towards the eggs to improve their supply. Yet scientists have repeatedly observed males eating some of the carefully-provided for eggs. Filial cannibalism often occurs in fish species in which males care for the eggs or young. Earlier studies sought to find out what external factors influenced the timing and the extent of the phenomenon. "Various hypotheses predict that the seemingly paradoxical cannibalism serves to get rid of damaged eggs or that reducing the number of eggs means that the remaining ones are better supplied with oxygen," says Katja Heubel, "and that the male may do it to compensate for his own lack of food and energy." She says the results were ambiguous. "Researchers usually assumed that all fish act similarly under the same conditions. In our study, we aimed to challenge that."

The Tübingen researchers compared individual male Common Gobies' behavior while the fish were caring for their eggs and while they were not. "Individuals with a high general level of activity were much more likely to cannibalize the brood," Katja Heubel reports. The researchers hypothesize that cannibalism is part of a behavioral syndrome - a kind of spill-over response which the male cannot control or fine-tune. "However, a generally active animal may have advantages in other situations, so that this personality trait has been able to maintain itself in the evolution," Heubel explains.

The second study indicates that filial cannibalism in the Common Goby is not completely uncontrolled in all aspects. The younger eggs, which are more frequently eaten, are of less reproductive value than the older, more developed eggs in which the male has already invested more time and effort. And theoretically, every additional day to maturity is a day in which some developmental problem could occur. That means the older eggs have better chances of reaching the stage of independent hatchlings. And - on the other side of the slate - the younger eggs are more nourishing for the adult male. "The males don't just gobble the eggs up at random," says Heubel. It appears that this filial cannibalism - on the face of it, destructive and counterproductive - is a part of an adaptive behavior.



Common Goby male (*Pomatoschistus microps*)  
Photo: Martin Vallon



Common Goby males don't always look after their eggs. Sometimes they eat them. Photo: Martin Vallon

### **Publications:**

Martin Vallon, Christina Grom, Nadine Kalb, Dennis Sprenger, Nils Anthes, Kai Lindström and Katja U. Heubel: You eat what you are: personality-dependent filial cannibalism in a fish with paternal care. *Ecology and Evolution*, DOI: 10.1002/ece3.1966

Martin Vallon and Katja U. Heubel: Old but gold: males preferentially cannibalize young eggs. *Behavioral Ecology and Sociobiology*, DOI 10.1007/s00265-016-2074-6

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