

# Female fish like males who sing

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Male and female (common goby) in the nest. Credit: The University of Gothenburg

Noisier seas seem to hamper fish reproduction. A new doctoral thesis from the University of Gothenburg shows that noise pollution impedes reproduction in sand and common gobies, both of which are important

food sources for juvenile cod.

Underwater [noise](#) is invisible. It is also inaudible above the surface. It travels almost five times faster than in air, and also over much longer distances.

'We can record the noise of boats that are far out of sight, and the sound is basically unchanged. It can be likened to living in Gothenburg and hearing the sound of all the cars driving around in Stockholm. That would be very noisy and would probably not be permitted, since it would be considered a health hazard. However, this does not apply to our seas, since there are no clear noise regulations for that environment,' says Eva-Lotta Blom, author of the [doctoral thesis](#), which explores how [underwater noise](#) affects reproduction in sand and common gobies (*Pomatoschistus minutus* and *Pomatoschistus microps*, respectively).

## **Increasing Noise Pollution in the Seas**

The discovery that fish communicate with sounds is relatively new, and it remains unclear how and why the sounds are used and how they are interpreted by the receivers.

But in order for a male sand or common goby to be able to reproduce, it seems to be necessary for him to make himself heard.

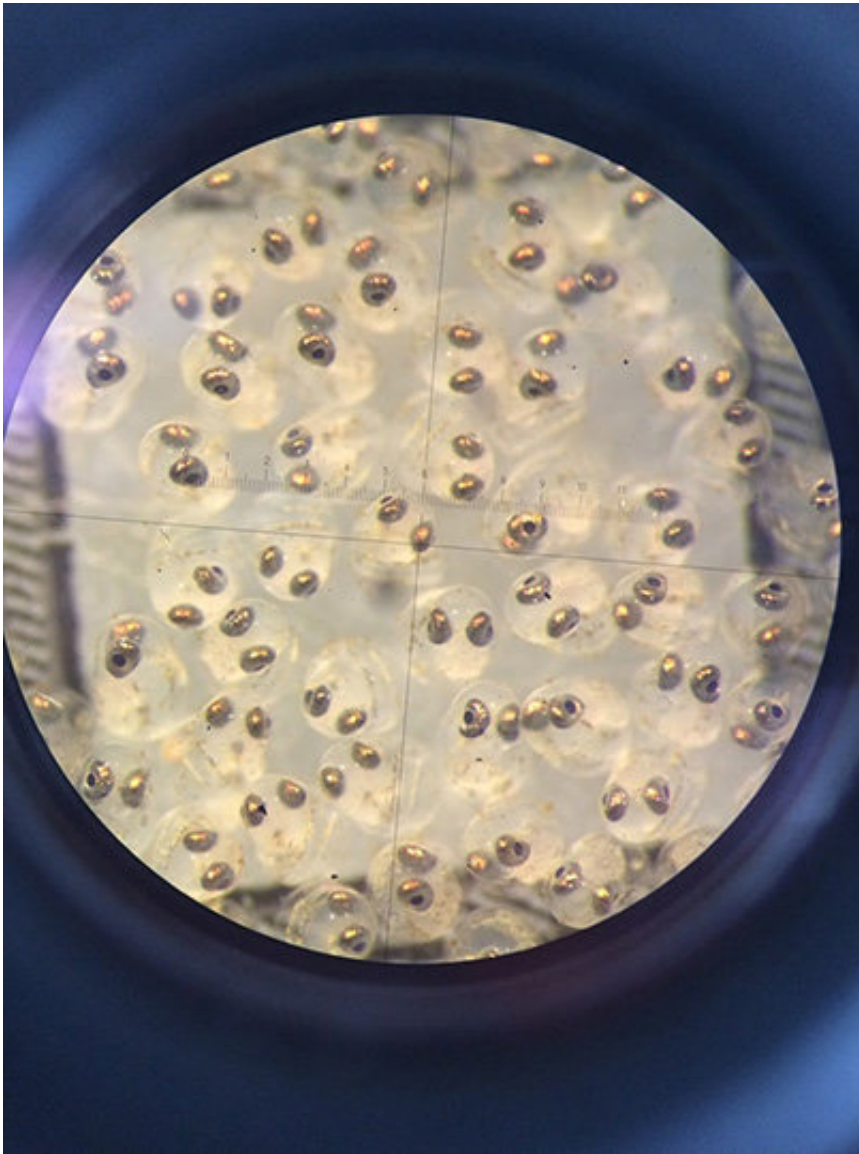
'So against the background of the rapidly growing use of leisure boats and other sources of noise in the marine environment, it is important to understand how fish are affected by noise.'

## **Males Attract Females by Singing**

Sand and common gobies live in shallow waters along the entire Swedish

coastline. Both species are fairly small (4-9 cm) and constitute an important food source for cod.

During its slightly more than 1-year long lifespan, the male will nest in an empty clamshell or in a hole he has dug. Then he will try to attract females to join him by showing off what he has to offer.



Credit: University of Gothenburg

'If a female comes over to inspect his nest, the male is able to produce a sound that is critical to the female's decision of whether or not to mate with him. The sand goby sounds like a purring cat while the smaller common goby sounds more like an intense woodpecker.'

## **Females Choose Good Singers**

If the female decides that the male is a suitable candidate for mating after listening to his singing, she will spawn in his nest. Then she will leave the male to take care of the eggs by himself until they hatch. This means that females will only select males who sing. Something in the male's singing seems to determine whether or not she will select him as a partner.

'The sound may contain some type of information, but if this is the case, we have no idea what the information might mean. What we do know, however, is that the singing is critical to the male's reproductive success.'

But what happens if the female cannot hear the male's singing because of too much noise in the water? To examine the possible negative effect of underwater noise, the fish were exposed to a sound source in their aquarium. The transmitted sound was in the same frequency range as the [sound](#) of a leisure boat.

'So we created a realistic scenario for the fish. Then we let two females and one male interact freely for 12 hours and looked at what happened. What we found was remarkable.'

## **Noise Interfered with Reproduction**

The researchers found that fish that interacted in a noise environment hardly mated at all. And if they did, it took them much longer than fish

that interacted in a silent aquarium.

In addition, half of the eggs in the noisy aquariums died before hatching. And if they did hatch, it took longer than the eggs in the silent environment.

'The studies also show that when you do experiments involving [fish](#), the environment needs to be as quiet as possible, or else the results may be affected by noise. If some aquariums in a study have been more exposed to noise than others, this has to be taken into account when assessing the findings,' says Blom.

**More information:** [gupea.ub.gu.se/handle/2077/52614](https://gupea.ub.gu.se/handle/2077/52614)

Provided by University of Gothenburg

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