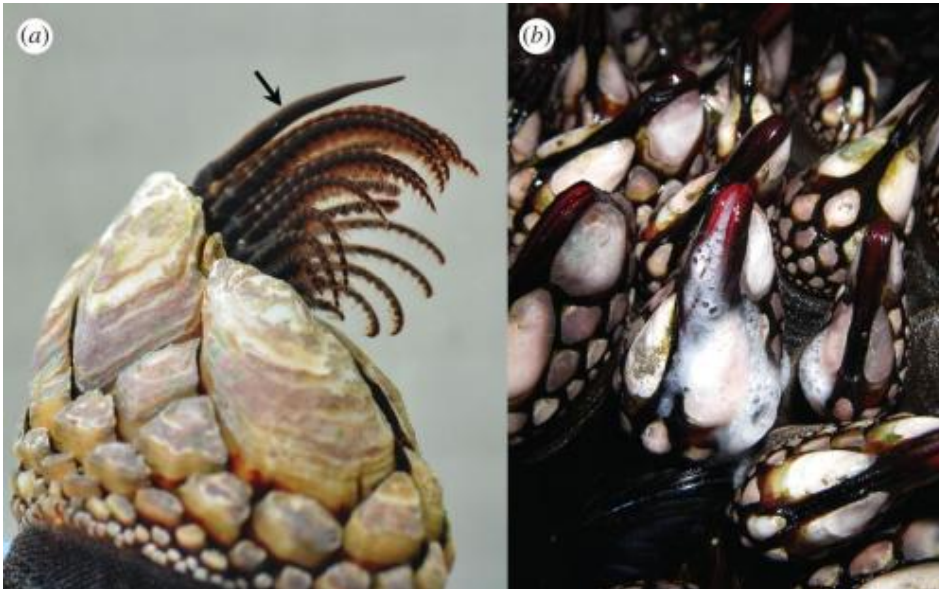


New research shows some barnacles mate via spermcasting



External body form and sperm leakage in the stalked barnacle *Pollicipes polymerus*. (a) Relaxed penis (arrow) and feeding legs of *P. polymerus* (soma wet mass = 0.785 g, rostro-carinal length = 19 mm) from a moderately wave-exposed shore near Bamfield, British Columbia, Canada. (b) *Pollicipes polymerus* leaking sperm in the field at low tide on Tatoosh Island, WA, USA. Credit: (c) [i]Proceedings of the Royal Society B[i], doi: 10.1098/rspb.2012.2919

(Phys.org)—A team of Canadian researchers has found that one species of barnacles mate by ejecting sperm into seawater while another catches it – a process known as spermcasting. Prior to this research, scientists had believed all barnacles either mated directly, or inseminated themselves. The team describes their research and results in a paper they've had published in *Proceedings of the Royal Society B*.

Barnacles have for some time enjoyed a reputation of having one of the longest penises, relative to body size, in the animal kingdom, with their appendages sometimes exceeding four times their body length. The reason for the long penis is to allow for mating while remaining glued to a rock. They simply reach from where they are to a nearby partner and do their business. Some barnacle species however, do not have such long penises which has puzzled scientists for some time. How do they mate? Some have suggested that they self mate – barnacles are hermaphrodites after all – while a small few have suggested that perhaps they do so by broadcasting their sperm in the water in which they live in the hope that another barnacle will catch it and become fertilized. Barnacles already have the equipment necessary to filter small particles from the water, though the belief has been that it's only to collect food.

In this new research, the team collected 37 intertidal gooseneck barnacle (*Pollicipes polymerus*) specimens that had already been fertilized and tested the DNA of their eggs. They found that 100 percent of them had been fertilized by some other barnacle and that 24 percent of them had resided near enough to other barnacles to have been fertilized directly, though that had not occurred. This meant that the only way sperm from one barnacle could have found its way to another was via transmission through the water, i.e. spermcasting.

This is the first instance of spermcasting ever documented for an aquatic arthropod and overturns, the team says, a century of beliefs regarding how barnacles reproduce. They note also that their observations cast doubt on whether barnacles self-fertilize at all in this species or others and raises questions about other aquatic organisms that are thought to self-fertilize as well.

More information: Something Darwin didn't know about barnacles: spermcast mating in a common stalked species, *Proceedings of the Royal Society B*, Published online January 16, 2013 [doi:](#)

[10.1098/rspb.2012.2919](#) **Abstract**

Most free-living barnacles are hermaphroditic, and eggs are presumed to be fertilized either by pseudo-copulation or self-fertilization. Although the common northeast Pacific intertidal gooseneck barnacle, *Pollicipes polymerus*, is believed only to cross-fertilize, some isolated individuals well outside penis range nonetheless bear fertilized eggs. They must therefore either self-fertilize or—contrary to all prior expectations about barnacle mating—obtain sperm from the water. To test these alternative hypotheses, we collected isolated individuals bearing egg masses, as well as isolated pairs where at least one parent carried egg masses. Using 16 single nucleotide polymorphism markers, we confirmed that a high percentage of eggs were fertilized with sperm captured from the water. Sperm capture occurred in 100 per cent of isolated individuals and, remarkably, even in 24 per cent of individuals that had an adjacent partner. Replicate subsamples of individual egg masses confirmed that eggs fertilized by captured sperm occurred throughout the egg mass. Sperm capture may therefore be a common supplement to pseudo-copulation in this species. These observations (i) overturn over a century of beliefs about what barnacles can (or cannot) do in terms of sperm transfer, (ii) raise doubts about prior claims of self-fertilization in barnacles, (iii) raise interesting questions about the capacity for sperm capture in other species (particularly those with short penises), and (iv) show, we believe for the first time, that spermcast mating can occur in an aquatic arthropod.

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