Old beliefs on barnacle sex scraped away

Canadian scientists latch on to new 'spermcasting' theory

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Postmedia News

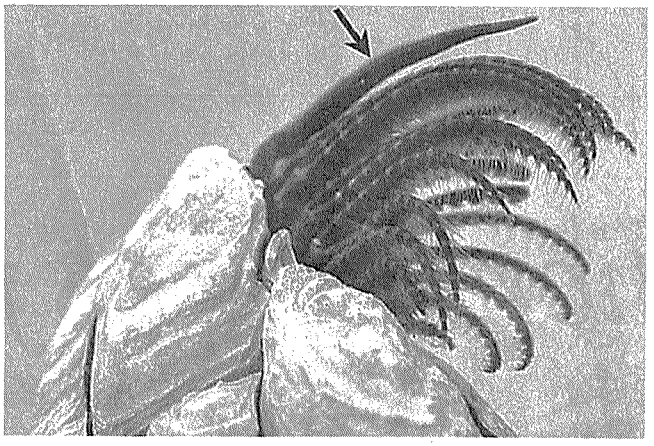
Canadian scientists have upended more than a century of assumptions about the reproductive powers of barnacles after discovering that the Pacific gooseneck species — which inhabits wave-pounded sites along the British Columbia coast — can send its sperm through sea water to impregnate a mate.

The finding would have surprised the most famous 19th-century scientist, Charles Darwin, who specialized in the study of barnacles before publishing his bombshell theory of evolution in 1859 — On The Origin of Species — and was fascinated by the shelled, shrimp-like critters' stunningly long penises, which can extend up to eight times the length of their bodies.

Since barnacles are typically attached to rocks or other objects, it was always assumed the animals' super-sized penises were crucial to reaching mates to engage in reproductive activity.

But what a team of University of Alberta researchers learned from a series of experiments with barnacles gathered from the western shore of Vancouver Island was that the Pacific goosenecks can even fertilize another member of the species that's well beyond the reach of their already impressive reproductive organs (which are modest in barnacle terms — slightly smaller than their bodies).

This "spermcasting" ability — as it's called in a study published this week in the Proceedings of the Royal Society B and cheekily titled Something Darwin didn't know about barnacles: spermcast mating in a common stalked species — appears to constitute a third method of producing offspring for these B.C. barnacles.



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The penis of a Pacific gooseneck barnacle is shown here. It can impregnate a mate by sending sperm through sea water.

The species, Pollicipes polymerus, can copulate in the traditional manner that adult humans would readily understand, but it's also thought to be able to self-fertilize because of hermaphroditic features that allow individual barnacles to produce both sperm and eggs.

However, the U of A team's discovery that the barnacles are successfully spermcasting to reproduce means conventional copulation may be much less prevalent than previously believed and that self-fertilization may not be occurring after all.

"In fairness, these barnacles do copulate — and it's quite dramatic, and that's one of the most famous things about these organisms: they have these very large penises that can reach long distances to mate," University of Alberta scientist Richard Palmer told Postmedia News.

"They clearly have them for some reason, so the assumption always was that, well, if they have large penises, the reason they still have them is because they must have them in order to mate."

The alternative possibility — that free-floating sperm could impregnate another barnacle "outside of penis range," as the study puts it — first occurred to Palmer and co-author Christopher Neufeld, a former U of A researcher who now teaches at Quest University in Squamish, B.C., when they saw a gooey substance floating amid a Pacific barnacle colony on the Olympic Peninsula in Washington State.

Barnacle experts — including the most renowned of all, Darwin — had never tested for such a phenomenon.

"The problem is that a certain set of beliefs become entrenched because people think they're true, so nobody bothers to look," said Palmer, who is also affiliated with the B.C.'s Bamfield Marine Sciences Centre.

To investigate their hunch, Palmer and Neufeld — along with fellow U of A researchers Marjan Barazandeh, Corey Davis and David Coltman — created a laboratory colony with barnacles from the B.C. coast, carefully regulating interactions between individuals and then conducting DNA tests on offspring to determine their parentage.

The results made clear that individuals that never came into contact were producing baby barnacles together.