Hermit crabs found to use vibration to ward off would-be shell evictors

April 3 2019, by Bob Yirka

Assessing homeowner strength via vibration. Two individuals of the highly social terrestrial hermit crab (Coenobita compressus) engage in a property conflict, with the individual below making vibrations as the individual above tries to evict it from. Credit: *Biology Letters* (2019). DOI: 10.1098/rsbl.2018.0819

A pair of researchers with Dartmouth College has found that Pacific hermit crabs use vibration to ward off other crabs trying to steal their shells. In their paper published in the journal *Biology Letters*, Louise Roberts and Mark Laidre describe their study of hermit crabs attempting to protect their shells and what they found.

Hermit crabs are unique among crustaceans—they have soft abdomens that are not protected by a naturally grown shell. To protect themselves, hermit crabs have to take possession of the shell made by another mollusk. From there on, they carry the shell around and hide from predators inside of it. But because they do not grow the shell themselves, hermit crabs must obtain new shells periodically as they outgrow the ones they have. The process by which they obtain a new shell generally involves either finding one that is uninhabited or taking one away from another hermit crab. In places where empty shells are scarce, competition for shells can become intense. In this new effort, the researchers have found one of the ways hermit crabs ward off the advances of would-be shell thieves—by using vibration.

Noting that hermit crabs sometimes vibrate their shells, the researchers designed experiments to find out why. They consisted of grabbing one of the empty shells off the beach and affixing a device inside of it that made the shell vibrate. They then placed the shell on a beach where hermit crabs resided and waited for a hermit crab to wander by to check it out. The vibration device was connected to a wire that ran along the beach for several yards to where the researchers were waiting hidden behind an umbrella. When a crab approached the shell, they had the option of doing nothing, applying gentle vibration or applying strong vibration.

The researchers report that when the shell vibrated very strongly, a shell-seeking crab would immediately climb down and run away. When feeling just a small vibration, however, the crab tried to turn the shell

over, the first move when attempting to evict a current tenant. The crabs did the same thing when encountering no vibration. The researchers claim these findings suggest hermit crabs have learned to vibrate as a means of warding off interlopers.

More information: Louise Roberts et al. Get off my back: vibrational assessment of homeowner strength, *Biology Letters* (2019). DOI: 10.1098/rsbl.2018.0819

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