Tool use in an invertebrate: The coconut-carrying octopus

December 14 2009

Scientists once thought of tool use as a defining feature of humans. That's until examples of tool use came in from other primates, along with birds and an array of other mammals. Now, a report in the December 14th issue of *Current Biology* adds an octopus to the growing list of tool users.

The veined octopus under study manages a behavioral trick that the researchers call stilt walking. In it, the soft-bodied octopus spreads itself over stacked, upright coconut shell "bowls," makes its eight arms rigid, and raises the whole assembly to amble on eight "stilts" across the seafloor. The only benefit to the octopus's ungainly maneuver is to use the shells later as a shelter or lair, and that's what makes it wholly different from a hermit crab using the discarded shell of a snail.

"There is a fundamental difference between picking up a nearby object and putting it over your head as protection versus collecting, arranging, transporting (awkwardly), and assembling portable armor as required," said Mark Norman of the Museum Victoria in Australia.

Julian Finn, also of the Museum Victoria, said the initial discovery was completely serendipitous.

"While I have observed and videoed octopuses hiding in shells many times, I never expected to find an octopus that stacks multiple coconut shells and jogs across the seafloor carrying them," he said.

In recalling the first time that he saw this behavior, Finn added, "I could tell that the octopus, busy manipulating coconut shells, was up to something, but I never expected it would pick up the stacked shells and run away. It was an extremely comical sight—I have never laughed so hard underwater."

After 500 diver hours spent "under the sea," the researchers observed the behavior of 20 veined octopuses. On four occasions, individuals traveled over considerable distances—up to 20 meters—while carrying stacked coconut shell halves beneath their body.

"Ultimately, the collection and use of objects by animals is likely to form a continuum stretching from insects to primates, with the definition of tools providing a perpetual opportunity for debate," the researchers concluded. "However, the discovery of this octopus tiptoeing across the sea floor with its prized coconut shells suggests that even marine invertebrates engage in behaviors that we once thought the preserve of humans."

Source: Cell Press (news : web)