Ability to capture large prey may be origin of army ants' cooperative behavior

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Scientific insights come at the darnedest times. Animal behaviorist Sean O'Donnell was having an afternoon cup of coffee when a giant earthworm exploded out of the leaf litter covering the jungle floor in an Ecuadorean nature preserve. The worm, later measured at nearly 16 inches long, was pursued by a column of hundreds of raiding army ants that quickly paralyzed or killed it.

Above: A front view of the army ant Cheliomyrmex, showing its fearsome jaw and teeth. Michael Kaspari, U of Oklahoma

That sighting, and another involving what turned out to be the same species of army ant feeding on the carcass of a snake, has led O'Donnell of the University of Washington and several colleagues to offer a new theory on the origin of cooperative hunting behavior in army ants, which are among the most socially complex animals known.

Writing in the current issue of the journal *Biotropica*, O'Donnell and biologists Michael Kaspari of the University of Oklahoma and John Lattke of Universidad Central de Venezuela, propose that mass cooperative food foraging, a key element in the behavior of army ants, may have begun as a way to subdue large prey.

The species that O'Donnell observed is called Cheliomyrmex andicola and it lives mainly underground in New World tropical rainforests. It had been previously identified, but little was known about its behavior or prey until the two chance encounters at the Tiputini Biodiversity Station, an ecological preserve in eastern Ecuador.

The ants are brick red in color and their size would be considered medium or large when compared to most common ant species found in United States. What makes Cheliomyrmex such a fearsome predator is that its workers have claw-shaped jaws that are armed with long, spine-like teeth. These teeth may serve to help Cheliomyrmex workers attach themselves to their prey's skin during attack

O'Donnell, who was bitten and stung when he collected Cheliomyrmex specimens, said the ants' stings were particularly painful and itchy, comparable to the stings of fire ants. He and his colleagues believe the venom in a Cheliomyrmex sting is toxic and/or paralytic, considering how quickly the giant earthworm became immobile after being attacked.

The researchers said the species is apparently unique among New World army ants in removing and consuming vertebrate flesh, based on the

observation of the ants feeding on the dead snake. They noted that raiding parties of other New World army ants occasionally sting and kill small vertebrates such as lizards, snakes and birds, but do usually not consume them. Other New World army ants prey heavily on insects and other invertebrates.

O'Donnell said Cheliomyrmex is related to Old World driver ants in Africa, which also have large-toothed jaws and feed on large-bodied prey. The ancestor of Cheliomyrmex may have split from Old World army ants as long as 105 million years ago, at around the time when Africa and South America separated during the breakup of the giant continent Gondwana.

"Cheliomyrmex may be telling us that cooperative hunting of large prey is an evolutionary predecessor of going after smaller prey," said O'Donnell. "Typically, army ants follow a lifestyle of attacking other social insect colonies. But Cheliomyrmex is not following this lifestyle."

The discovery of Cheliomyrmex 's predation was part of a larger project to sample the number of army ant species and their activity at four New World tropical rainforest sites in Costa Rica, Panama, Venezuela and Ecuador. The research was funded by the National Geographic Society.

Source: University of Washington