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HEADLINE SCIENCE: A Toxic Tale

Poisonous frogs from two different continents acquire their toxins the same way – by eating poisonous ants.

The toxic frogs of Panama and Madagascar may look different from one another (Panama's *Dendrobates pumilio* sports stunning red robes while Madagascar's *Mantella* frogs flaunt flashy oranges and greens), but their brightly colored bodies send the same message to potential predators: Stay away – I'm poisonous. Frogs from both countries secrete toxic chemicals called alkaloids from their skin, which often prove deadly and distasteful to predators. Research over the past several decades has shown that Panama's poisonous hoppers acquire their alkaloids by eating ants, but the poison source for Madagascar frogs remained unknown. Now, Academy entomologist Brian Fisher and Cornell chemist Valerie Clark, together with colleagues from the United States and Madagascar, have found that Madagascar's *Mantella* frogs also acquire their toxins from ants. Like their counterparts in Panama, they have evolved a way to ingest the poisonous ants without harming themselves.

The ants that supply the poison to the frogs in Panama and Madagascar are not closely related to one another, but they contain many of the same poisonous alkaloids. Thus, even though the frogs in Madagascar and Panama live nearly half a world apart from one another, they share 13 identical poisonous compounds. This, Fisher notes, is a beautiful example of convergent evolution – similar



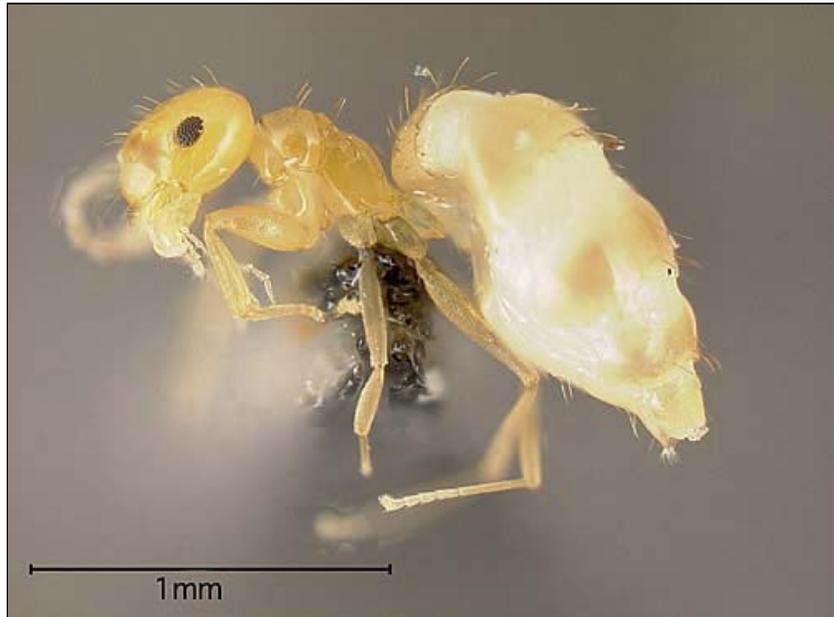
Dendrobates pumilio: Panama's *Dendrobates pumilio*, also known as the Strawberry dart frog, acquires toxins for its poisonous skin secretions by eating ants, including *Brachymyrmex longicornis*. Photo: Dong Lin, California Academy of Sciences.



Mantella: This poisonous frog from Madagascar, *Mantella baroni*, also acquires its

evolutionary pressures in two different parts of the world have led unrelated frogs to find and sequester the same poisonous alkaloids in the same way.

toxins through its diet. One of the primary contributors is an ant that is endemic to Madagascar, *Anochetus grandidieri*. Photo: Valerie C. Clark.



Brachymyrmex longicornis: Poisonous *Brachymyrmex longicornis* ants probably acquire their toxins from either poisonous plants or tiny mites. Photo: John Longino.



Anochetus grandidieri: Fisher and Clark found *Anochetus grandidieri* ants in the stomachs of several *Mantella* frogs. Photo: April Nobile, California Academy of Sciences.

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