
CONNELL MCCLUSKEY, Wilfrid Laurier University

A Study of Mimicry in Poison Arrow Frogs

In the Ecuadorean rainforest, there is an interesting case of mimicry among three species of frogs; one species (*E. parvulus*) is quite poisonous, one is slightly poisonous (*E. bilinguis*), and the other is non-poisonous (*A. zaparo*). The two poisonous species look similar (though not identical), and have overlapping habitats. Throughout the same geographical region, the non-poisonous frog species mimics the poisonous frogs, displaying colouring that is practically indistinguishable from whichever poisonous species happens to occupy the region. In the overlap zone, where both poisonous species are present, the non-poisonous species accurately mimics only one of the poisonous species (and therefore is an imperfect mimic for the other poisonous species).

One would expect the mimic to copy either the more abundant or more noxious of the two poisonous frogs. In this case, the more abundant poisonous frog is also the more noxious. Surprisingly, the mimic copies the less frequent and less poisonous species. It was previously hypothesized that the mechanism driving this unexpected result is differential generalization of learning among the predators. In particular, the more intensely negative the experience of capturing a poisonous frog, the more likely a predator is to avoid not just that species of frog, but also frogs that look similar. We have modelled this species interaction using a predator-prey system of ordinary differential equations, varying the degree to which the predators generalize their learned avoidance to include the imperfect mimics.

This is joint work with Jeff Orchard at the University of Waterloo.