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## Poison frogs less toxic when habitat degraded mongabay.com October 2, 2006

A new study suggests habitat degradation may put some frogs at greater risk of predation by reducing their toxicity.

Studying Mantella poison frogs on the island of Madagascar, a team of researchers led by Valerie C. Clark, a chemistry PhD student at Cornell University who earlier this year published a paper describing the origin of frog toxins as being the insects upon which they feed, found that frogs collected from intact forests "consistently have a greater diversity of insect-derived toxins accumulated in their skin than do frogs from disturbed and fragmented forests."



Mantella baroni in Ranomafana National Park.  
Photo by Valerie C. Clark.

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Clark says the research lends support to the idea that frogs could serve as a proxy for the overall health of an ecosystem.

"Frogs have been recognized as environmental indicators much akin to canaries in a coal mine," said Clark, lead author of the paper published in the October issue of *Journal of Chemical Ecology*. "Our research suggests that Malagasy poison frogs might also provide a measure for biological diversity."

"Poison frogs obtain their defensive skin alkaloids from their insect prey, and thus their alkaloid mixture reflects the local diversity of creatures they eat," she explained. "The study shows variation in alkaloid-toxin content of individual frogs to be greater among frogs collected in different places, and more importantly, frog individuals collected from a pristine forest consistently have a greater diversity of insect-derived toxins accumulated in their skin than do frogs from disturbed and fragmented forests. Since all the alkaloid chemicals that the frogs obtain from their diet vary so much in toxicity, the frogs with greater skin-alkaloid-diversity are more likely to be well defended against predators."

Clark and her colleagues also showed that a device for harvesting toxin samples from poison frogs, the nonlethal transcutaneous amphibian stimulator ("TAS"), is effective for collecting samples without harming local frog populations, an important finding given that frogs, especially in the forests of Madagascar, are increasingly endangered due to habitat loss and the emergence of a deadly fungal disease.

"The major cause of decline in frogs is the chytrid fungus, and it remains unknown whether any of the toxins sequestered from arthropods might protect poison frogs against this deadly fungus," Clark told mongabay.com. "There is much research still needed to fully understand poison frog ecology."

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### CONTENTS

<a href="#">Madagascar</a>	<a href="#">History</a>	<a href="#">About</a>
<a href="#">Wildlife</a>	<a href="#">Educational</a>	<a href="#">Contact</a>
<a href="#">Conservation</a>	<a href="#">Maps</a>	<a href="#">Mongabay</a>
<a href="#">Pictures</a>	<a href="#">In French</a>	<a href="#">Rainforests</a>

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