

Venezuelan Harlequin Frogs:

In The Face of Extinction?

by Prof. Enrique La Marca

Harlequin frogs (*Atelopus*) constitute a large genus of attractively coloured amphibians related to toads, with a central and south American distribution ranging from Costa Rica to Bolivia. In Venezuela we find seven species, all occupying mountainous regions in the Andes and the Caribbean coastal range.

Except for the most recently described, *A. tamaense*, reports suggest that their populations are declining, though their habitats do not appear to be being affected by direct human intervention. These declines seem to be related to the so-called biodiversity crisis. The disappearance of amphibians is a world-wide problem, as deduced by the many reports of declines, range reductions and extinctions coming from such diverse places as the Americas, Europe and Australia.

Many have been the hypotheses forwarded in the available literature to account for these declines. In general they fall into two categories: human impacts and natural causes. Examples of the first are habitat destruction or fragmentation, water and land chemical pollution, acid precipitation, introduction of exotic species, harvesting for human consumption and over collecting.

Natural causes include natural stochastic processes, increased ultraviolet radiation, pathogens, natural population fluctuations, floods and droughts, among others. Supporting evidence is, however, lacking for many of these causes.

Concerned about the population of the Venezuelan populations of harlequin frogs, in 1990 we carried out a nine month survey in the Venezuelan Andes. 34 field



Plates:

**Top: *Atelopus oxyrhynchus*.
Photo: Pascual Soriano.**

**Centre: *Atelopus mucubajiensis*.
Photo: E. La Marca.**

**Bottom: *Atelopus carbonerensis*.
Photo: Pascual Soriano.**



trips, involving more than 300 hours of search effort, failed to reveal but one specimen of *A. mucabajiensis* and two of *A. sorianoi*.

In 1994 we initiated a one year study involving weekly observations at streams where *A. mucabajiensis* was formerly abundant. To the present we have found just one adult specimen (found dead on the water surface) and seven tadpoles. The hundreds of specimens that lie in museum cabinets and the

former reports of numerous squashed individuals speak of the former abundance of this species.

The case of apparent decline is mirrored in other Venezuelan harlequin frogs, as follows.

Atelopus cruciger, a frog formerly abundant in the Venezuelan coastal range, has not been seen for at least a decade. It is the only member of the genus found outside the Venezuelan Andes and appears to be one of the most affected, even when its habitat is protected by law, although it appears not to be affected by direct human intervention. No explanation has been forwarded for the decline, but increasing drought seems to be involved.

The diminishing populations are of special concern since other Venezuelan harlequin frogs, all Andean, seem to be experiencing declines.



Plates:
Top: *Atelopus sorianoi*.
Photo: Pascual Soriano.

Centre: *Atelopus pinangoi*.
Photo: E. La Marca.

Bottom: Undescribed species of *Atelopus* from the Venezuelan Andes.
Photo: E. La Marca

The most endangered of the Andean species is likely to be *A. oxyrhynchus* and our last sighting of the species was in a cloud forest just north of the city of Merida in 1978, when dozens walked on the forest floor under the rain. Not a single specimen has been seen there since! Droughts during the breeding season over the last several years may have caused the disappearance of this population; occasional heavy rains may act as triggers for reproduction, but reproduction effort may be lost when immediate dry periods follow again.

Population declines have also been noticed for the brightly-coloured *A. carbonerensis*. The earliest comment on its former abundance comes from the field notes of M.A. Carriker, an ornithologist from the Museum of Zoology of the University of Michigan who, as early as 1922, noticed that the species was locally abundant. Later studies indicated that at least a hundred could be collected within an hour.

A study carried out in 1974 yielded 750 marked and released specimens, two of which were later recaptured by myself, indicating that the species may have a life span of over ten years. Recent searches do not span population turnover time, but suggest that fewer specimens are seen today (indeed so few as to think it may be endangered) in places where in the 1970's they were so common.

Atelopus pinangoi, according to local people, was formerly abundant near the small village of Pinango, but our searchings have revealed just a single population in an isolated cloud forest. Recolonization of former habitats by this species may now be impossible, due to forest destruction and the consequent habitat fragmentation and also because of the introduction of exotic fishes (trout) that probably prey on its larvae.

Another harlequin frog, the brightly-coloured *Atelopus soriano*, has not been seen for about five years. In the original description we alerted about the impact that forest destruction may have upon the survival of the species as the only known population is in a relictual patch of cloud forest.

The concrete causes for these declines are not known and we do not know whether they are atypical. Since population dynamics have not been studied in detail, or are poorly understood, we are in need of long-term data documenting natural fluctuations in order to state that the observed declines are not



Above: *Atelopus tamaense*.
Photo: Pascual Soriano.

unusual. It is, however, of great concern that the findings point to one fact: populations of Venezuelan harlequin frogs are diminishing in an alarming manner.

The least we can do is be alert as to the problem, to stimulate more studies to ascertain the magnitude of these declines and to recommend further protection of the species involved.

Suggested Reading:

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