

THE MADAGASCAN FROG *PLETHODANTOHYLA INGUINALIS* EATS SCORPIONS

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The Madagascan microhylid frog *Plethodontohyla inguinalis* Boulenger, 1882 is recorded for the first time as a predator of the scorpion *Grosphus madagascariensis*. Other instances of predation by anurans on scorpions are cited, and it is suggested that large terrestrial amphibians may be effective agents in the control of scorpion populations worldwide.

INTRODUCTION

An exhaustive list of the predators of scorpions was prepared by Polis *et al.* (1981). Predation on scorpions was later analysed by McCormick & Polis (1990). These authors established that approximately 150 taxa, mainly composed of vertebrates, prey on scorpions. They gave the percentages of predators of scorpions represented in each group of vertebrates. These include birds (37%), lizards (34%), mammals (18%), frogs and toads (6%) and snakes (5%). Of predators listed by Polis *et al.* (1981), only seven species of anuran amphibians were cited. [These are: *Bufo cognatus*, *B. compactilis*, *B. terrestris americanus* and *Scaphiopus couchii* in the U.S.A.; *B. melanostictus* in Singapore; *B. regularis* and *B. adspersus* in South Africa.] *B. regularis* is actually widespread throughout most of Africa except for the North West, and could therefore be an important agent in the regulation of scorpion populations over a large area.

In a more recent paper, Lourenco & Cuellar (1995a) identified a new amphibian predator of scorpions, the large terrestrial South American frog *Leptodactylus pentadactylus* (family Leptodactylidae). This was the first record of this species preying on scorpions, and the first instance of predation by Anura reported from South America. Moreover, this species may feed extensively on scorpions and specifically on *Tityus bastosi* Lourenco, since the four cases observed all involved this species. In this note we identify a new amphibian predator of scorpions, the terrestrial Madagascan frog *Plethodontohyla inguinalis* Boulenger, 1882. This is the first record of preying on scorpions in the family Microhylidae and is also the first instance reported from Madagascar of anurans preying on scorpions.

The initial observation was made by F.G., who examined the stomach contents of a male *Plethodontohyla inguinalis* deposited in the Zoologisches Forschungsinstitut und Museum Koenig (ZFMK 14646). This specimen had been collected at Niagarakely, eastern Madagascar (Fig. 1). Its stomach contained two scorpions as well as fragments of leaves, almost certainly from the forest floor, a few unidentified beetles and a stick-

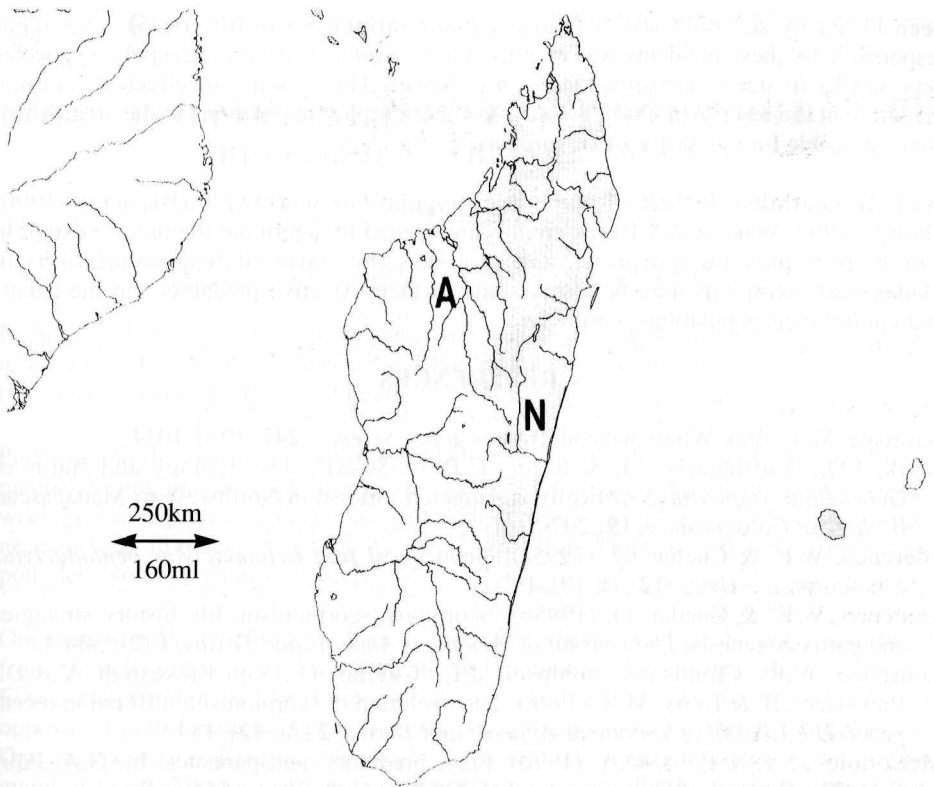


Fig 1.
 Map of Madagascar, showing localities mentioned in the text
 A: Réserve naturelle intégrale de l'Ankarafantsika
 N: Niagarakely

insect. The scorpions were forwarded to W.R.L., who identified them as *Grosphus madagascariensis* (Gervais), one of the species most common in Madagascar. The specimen of *P. inguinalis* averaged about 100 mm in snout-vent length, while the two scorpions were both adults, one male and one female, ranging from 45 to 50 mm in length. It is possible that the scorpions were mating when captured by the frog.

This new record of predation on scorpions by frogs is of interest not only because it is the first case involving a Madagascan frog but, secondly because it shows that large terrestrial frogs may be active predators of scorpions and effective means of controlling their populations.

Several species of scorpions are extremely venomous and pose important health problems as a result of the fact that they live in close proximity to human beings in several regions of the world (Lourenco & Cuellar, 1995b; Lourenco *et al.*, 1996). This situation is not so common in Madagascar, but due to human activities in that country other problems arise. A biological programme of reproduction and reimplantation has been created by the Jersey Wildlife Trust for the endangered species of tortoise *Geochelone yniphora* (Juvik *et al.*, 1980-81), in the area of the 'Réserve naturelle intégrale de l'Ankarafantsika' (Fig. 1). However, young tortoises in the reserve have

been killed by scorpion stings (Razanarimamilafiniarivo in litt, 1995). The agent responsible by these incidents was identified as *Grosphus bistriatus* Kraepelin, a species very similar in size to *Grosphus madagascariensis*. The presence of effective scorpion predators in the reserve might help to control the scorpion populations in the area, which are responsible for the deaths of *G. yniphora*.

With the alarming decline of amphibian populations worldwide (Barinaga, 1990; Phillips, 1990; Wake *et al.*, 1991), studies are needed to determine the precise extent to which frogs prey on scorpions, and to assess the status of frog populations in Madagascar. Scorpions may be losing some of their effective predators and the agents that control their populations worldwide.

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