

A Rare Accident

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Introduction

"I've only seen *B. b. smaragdinus* cases on the western side of S. America so this is specially valuable" (David Warrell, personal communication, 2007)

Three venomous snake species of the Brazilian Atlantic rainforest are endangered. These are *Lachesis muta rhombeata* (the Atlantic bushmaster), *Bothrops pirajai* and *Bothriopsis bilineata* (if you follow Campbell and Lamar [2004], or *Bothrops bilineatus* if you follow Wüster et al. [2002]). *Bothriopsis bilineata* is also found in the Amazon Basin and apparently not under a major threat over there. Coastal populations of these three species face a dire future due to the ever-increasing anthropic pressure in the form of habitat destruction. It's rare to find data about accidents they may inflict on humans.

Isolated populations of these three species are found only within stretches of primary or old secondary forest along the east (Atlantic) Brazilian coast, and since there is usually no communication between these pieces of land, genetic exchange becomes the major issue for these groups of animals. Recently the federal agencies Instituto Brasileiro de Florestas, IBF and IBAMA developed the program "Corredores Ecologicos" or "eco-corridors," to make possible a connection (a green highway) between the many "protected" Atlantic rainforests. In this program, and in effective environment protection lies the future of these (and many other) species.

Baby chimps inherit genetic fear of snakes for survival; we are all apes and everywhere, besides what's genetically inherited, humans learn from childhood to fear (and later on to kill) all snakes. The green ones share a better reputation around here (Brazil) and are usually left alone, but for the sake of accuracy and prevention we must affirm that the truth is that two of these "green snakes" may cause severe and even life threatening accidents in Brazil: the opistholyphous genus *Philodryas* being one of them, and the genus *Bothriopsis*, the subject of this short communication, the other.

Also for the sake of truth, prevention and accuracy we must affirm that all instances of "aggressiveness" in snakes are reactive responses: "Snakes really want nothing to do with us and do not go on the hunt for people to bite since they can sense that we are too large for prey, saving the precious venom to subdue the meal and to help its digestion" (Matt Etterbeck, in the "Snake-man" Newsletter, Sept. 2007).

Case Report

This is first accident I've seen involving *Bothriopsis bilineata*. Some nurses working in our hospital for the last 30 years did not recall another accident like this nor have they seen the animal before. Experts like Cardoso (Butantan) in major

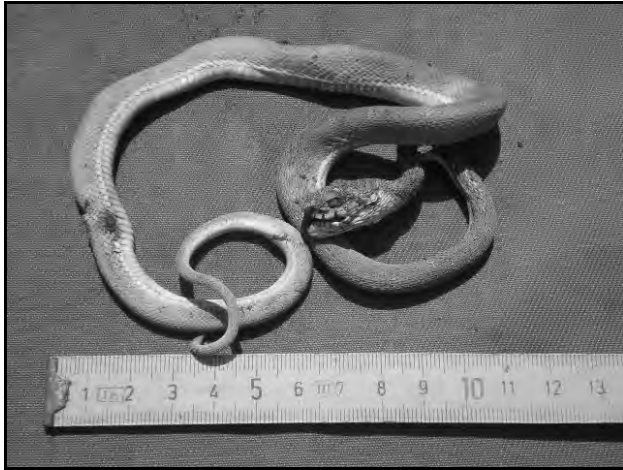
works like *Animais peçonhentos no Brasil* have no data about these intoxications. In Amazonian countries of the north-northwestern portion of South America, accidents with this forest-pitviper seem to be less rare (Smalligan et al., 2004).

I received the patient, JRAG, a male farmworker, 26 years old, 70 kilos of weight, 1 hour and 50 minutes after a bite that occurred in "Mata Grande" (around Itacaré Bahia, Brazil), on a Sunday, 2 September 2007, 6:00 A.M. He brought the animal along. Upon admission: intense local pain and a burning sensation, "hot" edema from bite site (left index finger) until medium third of left forearm. Normal blood pressure, but pulse at 100 bpm + due to pain and anxiety.

Since I considered the animal "a teen" and took the case as mild, also because of the quick antivenom administration and no use of a tourniquet, I proceeded with 4 IV vials of anti-bothropic (Butantan) anivenom while cleaning wound site with chlorohexidine 4%. There were no signs of any allergic reactions. The edema progressed for the first 12 hours and got stable after that, reaching the biceps muscle of the left arm (again, hot edema). It's well known that the antivenom does not immediately control swelling and pain.

When I say hot edema I mean it. Manuals refer to *Bothrops* accidents as causing "cold" edema. What I saw in this specific





case was that the burning sensation was for real, the entire left arm was much hotter than the rest of the body, as observed in some infected wound sites. I chose to use no “prophylactic antibiotics” believing that what I was observing was obviously direct action of the poison, for no infection would progress as fast as that.

No biochemistry was available at the moment of the treatment. Sites of shots (pain relief) and venopuncture were not bleeding abnormally and that speaks for coagulation time at least close to normal within two hours of the administration of the antivenom, which is also unusual, for CT restoration usually takes at least six hours to occur after treatment of bites inflicted by the genus *Bothrops*. After 20 hours in the hospital pain started to ease without medication. The patient was allowed ambulatorial follow-up 36 hrs after admission, showing no systemic or local signs and symptoms, and was discharged taking Nimesulide 100 mgs BID. Seventy-two hours after his leaving the hospital, we can affirm that there will be no complications (necrosis, infection) and that JRAG will soon be back to work.

Discussion

I've had the opportunity to rescue and remove to reserves two other *Bothriopsis bilineata* in the last seven years. They may reach a meter in length and inject four times more venom than the individual in this in this case report did. Although there is no LD₅₀ available for the species, I can certainly affirm that the intoxication should be taken as a medical emergency, especially if it takes longer than six hours for the patient to reach the hospital, and/or if a tourniquet was placed. In a recent publication in the CHS *Bulletin* (The enigma of the North Margin of the Amazon River) we've cited works that demonstrated that as far as the *Bothrops* genus is concerned, the size of the animal is the main prognostic factor in the accidents: bigger animal = more venom injected = more damage. It was a surprise to see a small animal like this do such damage (extensive hot edema and pain), something that, in our experience, a same size (sympatric) *Bothrops leucurus* would not do. Others have also been surprized by the power this poorly studied envenomation: 1) “Published allegations of extreme toxicity for this species [*B. bilineata*] require substan-



Lines on the patient's arm indicate the progress of the edema 2, 4 and 12 hrs after the bite.

tiation” (Campbell and Lamar, 2004) ; 2) Theakston (personal communication, 2007) reports “severe local envenoming and incoagulable blood” in his own accident in 1998.

In vitro, the venom presents high enzymatic activities for the proteases kallikrein, thrombin and plasmin and was able to induce neutrophil recruitment into peritoneal cavities of mice 4 hours after injection. Shortly stated, the venom induces a pronounced inflammatory reaction, with leukocyte recruitment, edema formation and hemorrhage, which parallels to a high proteolytic activity also detected (Porto et al., 2007). The species displays high arboreality rates (100% of the time during daylight in captivity) and birds are part of the diet. What we may be seeing here is another evolutionary trait so that the stricken bird does not go too far into the wet forest (getting lost forever), the same rationale used to understand why *Bothrops insularis* has a much more powerful venom than continental *Bothrops* species. *Bothrops insularis* is only found in Queimada Grande Island, São Paulo, Brazil, and its diet is mainly birds that may fall off the steep rocky cliffs into the ocean if not instantly killed after the bite.

Ancestral memories have rural workers terrified about this snake around here, and one of the reasons for this is the possibility of accidents in the face and neck because of the arboreality we've mentioned above. In *cacau* (cacao) plantations amidst the forest, they pay closest attention to the ground (bushmaster) and tree tops, where the *ouricana* or *pingo de ouro* (“gold drops” because of yellow paraventral spots) or *surucucu de ouricana* (all referring to *Bothriopsis*) may be taking her daytime nap, under a perfect pale green (yellow belly) camouflage.

Conclusion

All those within the Amazon or Atlantic rainforests should be ready to face the medical emergencies of snakebites inflicted by bushmasters (*Lachesis*), “jararacas” (*Bothrops*, *Bothriopsis*), coral snakes (*Micrurus*) if you handle them, and rattlesnakes in Roraima and Marajó (Amazon) and in coastal biomes (*restinga*) of the Atlantic rainforest in Piauí state (Freitas and Silva, 2005).

The usual advice to watch where you step, must in these areas include an additional warning to keep the entire body away from high vegetation, especially along creeks (wide tracks/trails are a must). Attention should also be exercised on the occasion of picking fruits and collecting samples from trees. I interviewed one farmworker who reports to have been saved by his hat after a *pingo-de-ouro* strike towards his fore-

head in a cacao plantation. The strike in the case reported here happened 40–50 cm above ground level, when JRAG was pulling a tapioca root out of the ground.

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Conservation Concerns for Maryland's Tiger Salamanders: Corrections and New Information

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What's with these state endangered species? An account of the demise of the tiger salamander in Maryland outlining neglect of that state's DNR appeared in the December issue of the *Bulletin of the Chicago Herpetological Society* (Lee, 2006).

In that account I reported that the last population of tiger salamanders, *Ambystoma tigrinum*, appeared to have disappeared from a site that was owned and managed by Maryland DNR. This site was purchased by The Nature Conservancy specifically to protect this species and was later sold to the state of Maryland with the stipulation that this salamander be managed in perpetuity. The one viable breeding pond was not managed and over time silted in, the pH and water depth changed, surrounding vegetation shaded the pond, and bluegills were introduced. Despite warnings of alarm from people familiar with the needs of the salamanders and a documented decline the state refused to take action or to listen to advise from local private sector herpetologists.

An agency boasting that everything they do is based on the best available science failed to maintain a robust viable popula-

tion under their stewardship. An agency with a forestry division, wetland specialists, wetland restoration teams, a legal mandate to protect state endangered species and a state herpetologist was unable to oversee the wellbeing of a creature on lands they own and manage.

What follows is an update.

The Tale Continues

Lee (2006) was a rambling account of my frustrations regarding the inadequate management of an amphibian of state conservation concern—the eastern tiger salamander. Several months later the Maryland Herpetological Society reprinted this article (Lee, 2007) and allowed me to add a number of additional facts that had surfaced since, and in many cases as a result of, the original piece published in the *Bulletin of Chicago Herpetological Society*.

The article was widely circulated through various conservation organizations and within various agencies. The staff overseeing the well fare of Maryland's endangered fauna was