Bothrops atrox in captivity, change isotopic composition in tissues collected from different environments of the eastern Amazon

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Introduction

Due to its aggressiveness *Bothrops atrox* is considered one of the most feared snakes in South America and in the eastern Amazon, being responsible for the largest number of snakebites in the region. However, there are few information about the ecology and natural history of this specie, a sympatric snake of the Amazon region, where it is widely distributed. They are generalists that are easily found in the rainy months in areas near water bodies and in seasonally flooded. In the dry season, when preys are less available, these animals are difficult to find.

Objectives

Our main objective was to investigate the feeding ecology of *B. atrox* in different landscapes of the Amazon region: upland forest, savanna, and pasture. Our investigation was conducted through the lens of carbon and nitrogen isotopic composition of snake scales, faeces and preys samples

Methods

Selection of the Sampled areas

The forest area was located in the FLONA-Tapajós, near the city of Santarém, and the forest was classified as *terra-firme* forest. The Amazon savanna (mixture of C3 and C4 plants) was located near the city of Alter-do-Chão. The two pastures were mainly composed by grasses of the genus *Brachiaria*, a C4 forage African grass genus introduced in Brazil.

Figure 1: Study area: *terra-firme* forest.

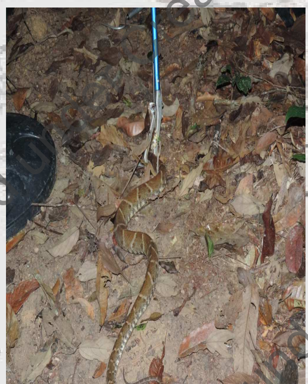

Figure 2: Capture the *B.atrox* in the forest floor.

2. Savanna.

Figure 3: Study area: closed savanna

3. Agricultural land (pasture)

Figure 4: Study area: border pasture-forest.

Figure 5: collection of samples in the bioterium

Methods of collection:

1. Interception traps and fall ("pit-fall traps with drift fence").
2. Active visual search time limited.
3. Casual ncounter.

Isotopic analysis and statistics

The analyzes were performed by mass spectrometry, where the analytical error was 0.3 ‰ to carbon and 0.4 ‰ for nitrogen. The classical δ notation was used in this study. A one-way ANOVA was used to test for differences between landscapes.

Results and Discussion

Comparing the average δ^{13}C values of scales and faeces with the average δ^{13}C values of the putative preys (Figs. 6 and 7), it is clear that in every landscape the energy source for *B. atrox* is composed by a mixture of C_3 and C_4 plants. Although the average δ^{13}C value of specimens of the forest is lower than in values of specimens of the pasture and savanna, this difference was not statistically significant. This lack of difference between specimens of forest, and savanna and pasture is somewhat surprising because it was expected that specimens of the forest would have a higher proportion of C_3 carbon in relation to specimens of the savanna and pasture. The δ^{13}C values of scales and faeces were similar, on the other hand, the δ^{15}N of faeces were significantly lower than the δ^{15}N of scales,

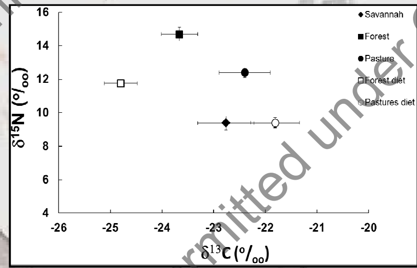

Figure 6: δ^{13}C vs. δ^{15}N of scales samples of *B. atrox* and putative preys. Symbols represent the average values and bars one standard-deviation.

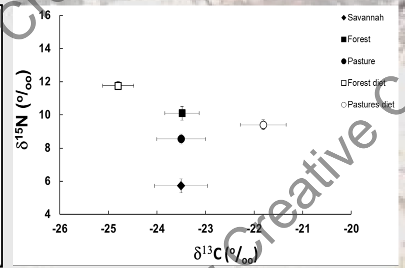

Figure 7: δ^{13}C vs. δ^{15}N of faeces samples of *B. atrox* and putative preys. Symbols represent the average values and bars one standard-deviation.

and even lower than the δ^{15}N values of the forest and savanna putative preys (Figure 7). Considering the δ^{15}N values of scales, the difference between the δ^{15}N of the snake and the diet (trophic fractionation) was similar to specimens of the pasture and the forest (approximately 3 ‰). At the same time, the δ^{15}N values of specimens of the forest were significantly higher than the pasture and savanna (Fig. 8). The difference between the δ^{15}N values of the preys found in the forest and in the pasture was approximately 2.5 ‰ that specimens of the forest and pasture are feeding in the same trophic level.

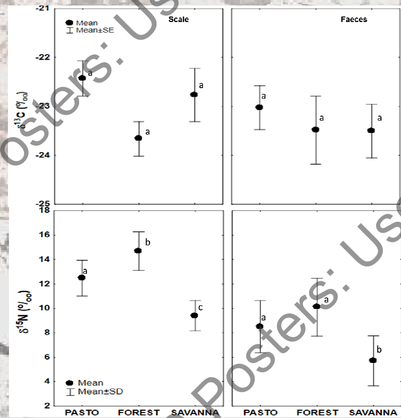

Figure 8: Averages δ^{13}C and δ^{15}N values of scales and faeces samples of *B. atrox* collected in pasture (PASTO), forest and savannas areas of the Amazon region.

Conclusion

This is an on-going project, more specimens and prey items were sampled, but were not analyzed yet. However, so far the most striking finding was the lack of difference between the δ^{13}C values of specimens of the forest, and specimens of the savanna and pasture. An interesting task for the future is to investigate from where specimens of the forest or their preys are acquiring C_4 carbon, that is typical from the savanna and pasture areas.