

琉球大学学術リポジトリ

Relationships between the degree of resistance to toad toxins and the sizes of adrenal glands and hearts in toad-eating snakes

メタデータ	言語: 出版者: 琉球大学21世紀COEプログラム 公開日: 2009-04-16 キーワード (Ja): キーワード (En): 作成者: Kideta, Noriko, Ota, Hidetoshi メールアドレス: 所属:
URL	http://hdl.handle.net/20.500.12000/9854

PS-28 **Relationships between the degree of resistance to toad toxins and the sizes of adrenal glands and hearts in toad-eating snakes**

Noriko Kidera and Hidetoshi Ota

Tropical Biosphere Research Center, University of the Ryukyus

A toxic prey and its predator often provide an ideal model system to investigate organismal diversification through evolutionary interaction between different species. The bufonid toads possess lethal toxins as one of their defensive strategies. Although some potential predators simply avoid this toxic prey, a few predators can feed them owing to the ability to conquer or avoid the toxins. In the case of amphibian-eating snakes, some species prefer the bufonid toads and swallow them whole, i.e., without eliminating their toxic portions. The detailed detoxification mechanisms in such bufophagous snakes have not been clarified until now, but it is known that some toad-eating snakes from North America possess distinctly large adrenal glands. This suggests that the enlargement of this organ is more or less related to the snakes' tolerance of toad toxins. Validity of this idea needs verification on the basis of other groups of snakes that include both toad-eating species and species eating amphibians other than toads. East Asian snakes of the genus *Dinodon*, *D. rufozonatum rufozonatum*, *D. r. walli* and *D. semicarinatum*, form a monophyletic group and are known to prey on amphibians besides other vertebrates. The extents of resistance of these snakes to the toad toxins were quantified in our own previous study. In this study, we examined the weights of adrenal glands and a heart relative to body weight, and examined the relationships between the values and the relative resistances of these snakes. Relative size of a heart was also considered, because the principal toxins of toads are cardiotoxic. The relationships were also examined for two natricine snakes, of which one, *Rhabdophis tigrinus tigrinus*, is bufophagous and the other, *Amphiesma pryeri*, not. In both *Dinodon* and the Natricinae, toad-eating snakes with high resistance possessed relatively larger adrenal glands and hearts, except for *D. r. walli*, in which the adrenal glands in a population currently sympatric with and preying on the toads showed smaller relative sizes of these organs. Our results largely supported the idea that the enlargement of adrenal glands and hearts in snakes are related to their resistances to the toad toxins. The results also suggest that the resistance to toad toxins depends not only on the adrenal gland and heart sizes, but also on some of the physiological functions as well.