

**SCINAX NASICUS, HYLA ALBOMARGINATA, HYLA BISCHOFFI AND PHYLLomedusa DISTINCTA (Tree frogs): AVIAN PREDATION.**

Two Brazilian species of birds, *Pitangus sulphuratus* (Tyrannidae) and *Trogon surrucura* (Trogonidae) are food-generalists, feeding on fruits, arthropods (mainly insects), and small vertebrates, including tadpoles (Eguiarte & Rio, 1985; D'Heursel & Haddad, 1999; Develey & Endrigo, 2004). Nestlings are frequently fed with insects by their parents (Lago-Paiva, 1996; Skutch, 1956). Although anurans are preyed upon by several species of birds (e.g., Remsen *et al.*, 1993; Master, 1998; 1999; Poulin *et al.*, 2001; Prado, 2003), these two bird species have never been reported to feed on post-metamorphic anurans. Therefore, we present data on four species of Brazilian hylids (Anura; Hylidae) that were preyed upon by these two species of birds during brooding. Observations were made in the Municipality of Corumbá, Mato Grosso do Sul, south-western Brazil (19°34'S, 57°00'W; 100 m) and in the Municipality of Guaramirim, Santa Catarina, southern Brazil (26°27'S; 49°00'W; 20 m). The male of the observed pair of *P. sulphuratus* (Great kiskadees) was observed capturing an adult *Scinax nasicus* that was

sheltering under a woody house during the day. After capturing the frog, the bird perched in a branch of tree where the nest was built. The anuran was killed by being beaten against the branch of the tree, and then offered to the nestlings. The pair of *T. surrucura* (Red-bellied trogon) was observed building nests in arboreal termitarias on five occasions between 2002 and 2004 (twice in 2002 and 2003, and once in 2004). The nest was approximately 30 m from the pond where several species of frogs breed, including *Hyla albomarginata*, *H. bischoffi*, and *Phyllomedusa distincta*. Both male and female were observed capturing adults of *H. albomarginata* ( $n = 6$ ), *H. bischoffi* ( $n = 1$ ), and *P. distincta* ( $n = 1$ ) (Figure 1A). After subjugation, the trogons were seen lacerating the tree frogs with their beak and claws (Figure 1B). After that, trogons moved to the nest and fed the nestlings on their final days of nest development. Nestlings were fed with tree frogs on all the five observed broodings. Although frogs are not the main food source of Neotropical birds (e.g., Remsen *et al.*, 1993), they may be frequently preyed due to their conspicuous abundance in nature (Duellman & Trued, 1994; Poulin *et al.*, 2001) and high energetic budget that can be offered to nestlings.

**Figure 1.** Adult *Trogon surrucura* (Red-bellied trogon) carrying an adult *Hyla albomarginata* (tree frog) (A) that was offered to its nestlings in the nest built in an arboreal termitaria (B) in the Municipality of Guaramirim, Santa Catarina, southern Brazil.



**ACKNOWLEDGEMENTS**

The authors are grateful to FAPESP, CAPES, Neotropical Grassland Conservancy, Idea Wild, and Fundação O Boticário de Proteção à Natureza for grants, scholarships, and logistic assistance with equipment.

REFERENCES

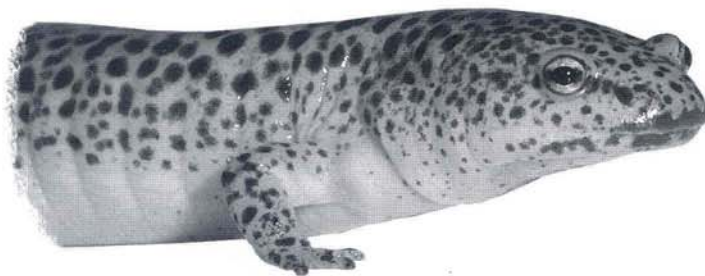
- Develey, P.F. & Endrigo, E. (2004). *Aves da Grande São Paulo: guia de campo*. Aves e Fotos Editora.
- D'Heursel, A. & Haddad, C. F. B. (1999). Unpalatability of *Hyla semilineata* tadpoles (Anura) to captive and free-ranging vertebrate predators. *Ethol. Ecol. Evol.* **11**, 339–348.
- Duellman, W.E. & Trueb, L. (1994). *Biology of Amphibians*. 2<sup>nd</sup> Ed. John Hopkins.
- Eguiarte, L.E. & Rio, C.M. (1985). Feeding habits of the Citreoline Trogon in a Tropical Deciduous Forest during the dry season. *The Auk* **102**, 872–874.
- Lago-Paiva, C. (1996). Cavity nesting by Great Kiskadees (*Pitangus sulphuratus*): adaptation or expression of ancestral behavior? *The Auk* **113**, 953–955.
- Master, T. L. (1998). *Dendrobates auratus* (Black-and-Green Poison Dart Frog). Predation. *Herpetol. Rev.* **29**, 164–165.
- Master, T. L. (1999). Predation by rufous motmot on black-and-green poison dart frog. *The Wilson Bull.* **111**, 439–440.
- Poulin, B., Lefebvre, G., Ibanez, R., Jaramillo, C., Hernandez, C. & Rand, A.S. (2001). Avian predation upon lizards and frogs in a Neotropical forest understory. *J. Trop. Ecol.* **17**, 21–40.
- Prado, C.P.A. (2003). *Leptodactylus chaquensis* (NCN), *Pseudis paradoxa* (Paradox Frog), and *Phrynohyas venulosa* (Veined Treefrog). Predation. *Herpetol. Rev.* **34**, 231–232.
- Remsen, J.V., Hyde, M.A. & Chapman, A. (1993). The diets of Neotropical trogons, momots, barbets and toucans. *The Condor* **95**, 178–192.
- Scott, S.N., Clegg, S.M., Blomberg, S.P., Kikkawa, J. & Owens, I.P.F. (2003). Morphological shifts in island-dwelling birds: the roles of generalist foraging and niche expansion. *Evolution* **57**, 2147–2156.
- Skutch, A. F. (1956). A nesting of the Collared Trogon. *The Auk* **73**, 354–366.

LUÍS FELIPE TOLEDO<sup>1\*</sup>, GERMANO WOEHLE Jr.<sup>2</sup>, ELZA NISHIMURA WOEHLE<sup>2</sup> and CYNTHIA P. A. PRADO<sup>1</sup>

<sup>1</sup> Departamento de Zoologia, Instituto de Biociências, Universidade Estadual Paulista, Rio Claro, Estado de São Paulo, Brazil, Caixa Postal 199, CEP 13506-970.

<sup>2</sup> Instituto Rã-Bugio para Conservação da Biodiversidade, Estrada Rio da Prata, 523, Caixa d'Água, Guarimirim, Santa Catarina, 89270-000.

\* Corresponding author: toledolf2@yahoo.com



Red salamander, *Pseudotriton ruber*. Illustration by Will Brown, produced from original photograph enhanced and manipulated using digital imaging software. [www.blueridgebiological.com](http://www.blueridgebiological.com)