

We found *C. inguinalis* consumes a large of ants; however, its diet consists of a large number of different prey, which is consistent with other investigations. Volumetrically, the most important prey are somewhat different than those represented in the diet other closely related species.

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DENDROBATIDAE and BUFO CONIFERUS. DEFENSE. Little is known of the taxonomic identity of predators on chemically defended species such as poison frogs of the family Dendrobatidae. Studies of predation on poison frogs have found marks thought to be attributable to ants (Saporito et al. 2007. *Copeia* 2007:1006–1011; Hegna et al. 2011. *Ann. Zool. Fennici* 48:29–38), and frogs are occasionally found missing digits, which could also be due to encounters with ants (pers. obs.). Here I describe an interaction of an army ant swarm (*Eciton hamatum*) on three species of poison frogs (*Dendrobates pumilio*, *D. auratus*, and *Phyllobates lugubris*) and on a toad (*Bufo coniferus*) on mainland Panama adjacent to the Bocas del Toro archipelago. Though *E. hamatum* predominantly feed on ants, bees, and wasps (Bartholomew et al. 1988. *Physiol. Zool.* 61:57–68), differences in their interaction with anuran species provides further evidence for the likelihood of an olfactory signal in the chemical defense of poison frogs.

At 1040 h on 27 Dec 2012 while sampling a polymorphic population of *D. pumilio* from the Aguacate Peninsula an army ant swarm entered the study area. Channels of ants quickly overtook the site and many invertebrates (crickets, katydids, and scorpions) emerged from the leaf litter and escaped. A blue subadult *D. pumilio* became completely surrounded by ants, and remained untouched perched on a leaf. Shortly thereafter three more blue adults and one brown adult were surrounded but also left untouched. Throughout the swarm a small margin (2–3 cm) was maintained between the ants and the frogs. Twenty-four minutes into the ant invasion an adult *D. auratus* perched on a large buttress was similarly approached and avoided as the ants climbed up the tree. Two additional blue and one brown *D. pumilio* were then observed to be surrounded by ants during which one male continued to produce an advertisement call. One hour into the swarm an adult *P. lugubris* and a second *D. auratus* were also surrounded and avoided by ants in a tree buttress, as was a second male *P. lugubris*, which vocalized nearby.

At no point in the column swarm did the ants come into direct contact with any of the three species of poison frogs present in the site; rather the ants maintained about a 2-cm margin from all frogs. In contrast, ants covered a toad (*Bufo coniferus*), which closed its eyes as its body was pressed flat against a tree.

Its eyes remained closed until there were gaps in the ant column when its eyes would open, then close again as more ants arrived.

Though this observation unfortunately does not add to our knowledge of specific poison frog predators, it does provide some insight into the possible disparity between results from clay model studies and actual predation. Saporito et al. (2007, *op. cit.*) note that some attack marks on their clay models appeared to be due to the incisors of what they hypothesize could be attributable to *Atta* spp., another group of ants encountered in high densities throughout the tropics. Additionally, the “buffer” distance observed from the frogs could be due to an olfactory component of the alkaloids possessed by these poison frogs which clay models would lack. Poison frog activity during the ant swarm did not appear to be inhibited by the presence of ants. Male vocal advertisements continued for two species during the swarm. At no point did individuals appear threatened by the presence of ants and initiate an escape. These observations further support previous studies mentioning alkaloid olfactory cues in the context of other arthropods, including spiders (*Cupiennius coccineus*; Szelistowski 1985. *Biotropica* 17[4]:345–346) and other predatory (“bullet”) ants (*Paraponera clavata*; Fritz et al. 1981 *Biotropica* 13:158–159).

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HYLA ARENICOLOR (Canyon Treefrog). **HABITAT USE.** Several species of treefrogs have been documented using tree cavities and avian nest boxes as refugia or hibernacula, including *Hyla chrysoscelis* (Ritke and Babb 1991. *Herpetol. Rev.* 22:5–8), *H. cinerea* (Redmer and Brandon 2005. *In* M. Lannoo [ed.], *Amphibian Declines: The Conservation Status of United States Species*, pp. 452–454. Univ. California Press, Berkeley, California), and *H. squirella* (McComb and Noble 1981. *Wildl. Soc. Bull.* 9:261–267). Treefrogs may use these structures to exploit favorable microclimates or diverse invertebrate food sources. Herein, we report two observations of related behavior in *H. arenicolor*, a treefrog that inhabits isolated mountain canyons in the southwestern USA. Unlike most other treefrogs, *H. arenicolor* is typically found on rock surfaces along stream courses and rarely climbs trees. On 18 June 2012 at 1121 h, we observed three adult *H. arenicolor* inside a Black Phoebe (*Sayornis nigricans*) nest in the Rincon Mountains east of Tucson, Arizona (32.26278°N, 110.62744°W, WGS84; elev. 1068 m; Fig. 1). The cup nest was constructed of mud and plant material and cemented to a vertical rock surface

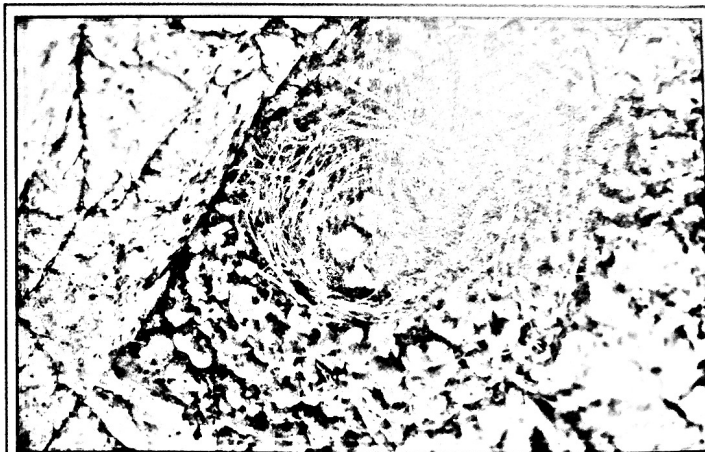


FIG. 1. Three adult *Hyla arenicolor* in a mud nest constructed by Black Phoebes (*Sayornis nigricans*) in southern Arizona, USA.