

## UNUSUAL SITES FOR TWO NEOTROPICAL TADPOLES

Little is known about the ecology of larvae of Neotropical frogs. Thus it is of interest to report the presence of tadpoles of two species in unusual sites.

*Hypopachus variolosus* (Cope).—A single tadpole was taken on 21 September 1973 from a hollow in a tree growing along a trail through riparian forest on the east side of the Río Higuerrón approximately 1.6 km SE Estación Experimental Enrique Jiménez Nuñez, Guanacaste Province, Costa Rica. This habitat, designated Tropical Dry Forest by Tosi (1969), was described briefly by Orians and Paulson (1969). The hollow is situated on the north side of a large tree (DBH ca. 1.6 m; estimated height ca. 20 m) between two buttresses. The lip of the hollow is 87 cm above ground, the maximum diameter of the opening about 80 cm. The hollow consists of two small and two large chambers descending from a common cavity and reaching a maximum depth of 40 cm. The hollow was nearly full and contained about 10 liters of water. Open water always was present in the hollow though leaves in various stages of decomposition occupied about 15 per cent of the volume, and a layer of granular detritus covered the bottom of each chamber. The water, brown from the rotting plant material, was 28.5 C (ambient, 29.5 C) at 10:00 am when the tadpole was collected. Although no other organisms were taken with the tadpole, mosquito larvae and damselfly naiads were observed in the hollow on several occasions.

The tadpole is in stage 40 (Gosner, 1960) and measures 33.7 mm total length (body, 12.1; tail, 21.6). It is essentially identical to the descriptions of *Hypopachus* tadpoles from México (Taylor, 1942). Minor differences include septa visible on posterior two-thirds of tail musculature; tail fins much deeper than illustrated; tail stripe much less distinct; and less scalloping on the margins of the labial flaps. A large series of tadpoles of *H. variolosus* from forest and pasture ponds in the same area show considerable variation in the intensity and distribution of pigmentation, especially on the tail, and in the degree of scalloping of the labial flaps.

We cannot explain the presence of this tadpole in the tree hollow. This species typically breeds in temporary puddles and ponds (pers. obs.). Tadpoles of this species were collected at the same time in a small forest pond 36.5 m north of the tree hollow and at other sites in the area.

*Dendrobates auratus* (Girard).—On 16 May 1971 a single tadpole of this species was taken from a bromeliad 20 to 25 m up in a tree near the Osa field station, Rincón de Osa, Puntarenas Province, Costa Rica. This area is designated by Tosi (1969) as Tropical Wet Forest. Other specimens were collected in the same area from tree hollows 1 and 2 m above ground and from depressions in tree roots and logs on the forest floor in August, 1967 and August, 1973. Savage (1968) reported a single tadpole of *D. auratus* from a bromeliad 3 m above the ground. Dunn (1941) reported seeing a male *D. auratus* carrying a tadpole disappear into a tree hole about 14 m above ground. As far as we know, this is the first report of the presence of *D. auratus* tadpoles high in the forest canopy. Generally, the adults of this species are terrestrial but apparently will move well above ground in search of suitable aquatic sites for their tadpoles. In this respect *D. auratus* appears to be much more arboreal than previously suspected.

The specimen is in stage 25 (Gosner, 1960) and measures 19.3 mm total length (body, 7.0; tail, 12.3). It compares well with the illustrations and descriptions presented by Breder

(1946) and Savage (1968) in most characteristics. However, in this specimen, as well as several others taken from the backs of male *D. auratus* or collected from various aquatic sites in the area, the first posterior tooth row (P-1) has a small medial gap about equal in width to two teeth. This P-1 gap also was noted by O'Day (1967). If previous descriptions of the tadpole are accurate and some individuals lack the gap, then the denticle formula for this species should read

$$\text{read } \frac{1}{1+1} \text{ or } \frac{1}{1+1} \frac{1}{3}$$

We thank David Bradford and Diana Welgmann for assistance to McDiarmid in the field and Ing. Eladio Carmona B. of the Costa Rican Ministry of Agriculture for arranging for Foster's use of the facilities at Estación Jiménez. A Faculty Release Time Award from the University of South Florida supported the field work of McDiarmid in 1971. Specimens will be deposited in the Museum of Natural History, Los Angeles County, California.

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