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Female *D. pumilio* have been seen carrying tadpoles in leaf litter (Eaton 1941, Kitasako 1967), and the tadpoles are known to occur in water-filled bromeliads (Savage 1968). This note reports an observation of the Central American frog *Dendrobates pumilio* Schmidt (Dendrobatidae) carrying a tadpole up a tree and into a bromeliad.

On 3 August 1978 (1100 hrs.), *D. pumilio* with a single, wriggling tadpole on its back (fig. 1), climbed a tall rubber tree (*Hevea brasiliensis* Muell. Arg.) in an old (6 yr) planting of cacao (*Theobroma cacao* L.) at Finca El Uno, near La Virgen (220 m), Heredia Province, Costa Rica. Many of the *Hevea* trees were laden with large bromeliads (crown diameter 0.20-0.75 m, N=15) generally 8-16 m above ground. The frog was climbing the tree, from an elevation of about 0.5 m. Within a few minutes after discovery, the tadpole shifted to the adult's right side. The frog eventually disappeared into a thick mass of plant material about 2 meters

FIGURE 1. Left: *Dendrobates pumilio* carrying a tadpole up a *Hevea brasiliensis*, 3 August 1978, near La Virgen, Heredia Province, Costa Rica. Right: the *D. pumilio* entered the large bromeliad to the left, about 12 m from the ground and beneath sparse canopy.

up the trunk, only to emerge about 10 minutes later with the tadpole still attached. The frog's journey ended an hour later when it reached a cluster of three large bromeliads (crown diameter 0.5 meters) at about 12 meters above the ground (fig. 1) and disappeared into one of the bromeliads, presumably with the tadpole still attached. During its journey, the frog remained on the shaded side, presumably to avoid desiccation in direct sunlight. Movement was not continuous, but was interrupted by at least 12 brief (2-4 min) periods of inactivity. The trunks of other *Hevea* trees in the immediate vicinity were briefly examined for *D. pumilio*, but none were seen. Throughout the morning and early afternoon, the calls of five scattered males were heard in the area, and four individuals were seen (0700-1030 hrs) in the leaf litter without intentional searching.

Although the actual deposition of the tadpole was not witnessed, this observation suggests that *D. pumilio* carried a tadpole up the tree to deposit it into a large bromeliad for tadpole development, for Starrett (1960) and Kitasako (1967) mention that tadpoles of *D. pumilio* are found in bromeliads. As cited in Kitasako (1967), Norman G. Scott observed a female *D. pumilio* backing into the water in a bromeliad (Los Diamantes, Costa Rica), although it was not determined if a tadpole was being deposited or being picked up. Savage (1968) found tadpoles of *D. pumilio* in a bromeliad about three meters from the ground in the cacao plantation at La Lola, near Limon, Costa Rica. Kitasako (1967) observed a gravid female of *D. pumilio* carrying a single tadpole in the leaf litter of cacao at Finca La Selva, although it is known that in other dendrobatids males carry several tadpoles at one time (Eaton 1941, Stebbins and Hendrickson 1959, Savage 1968).

Accumulations of stagnant rain water in leaf litter, cacao pods, and bromeliads harbor fungi, algae, and a variety of minute insect larvae, mostly *Diptera* (Culicidae and Ceratopogonidae), that could be eaten by *D. pumilio* tadpoles. High mortality of eggs and tadpoles in ground litter might be the selection pressures that result in adult frogs transporting tadpoles considerable distances above the ground. If reproductive rates of *D. pumilio* are generally low and tadpole survival in bromeliads is high, such arboreal behavior would be highly adaptive. In some species of *Dendrobates* fecundity is low, while energy allocation for courtship, parental care, and searching for oviposition sites is high (Crump 1974). The proximal mechanisms resulting in tadpole-carrying individuals of *D. pumilio* successfully locating bromeliads suitable for tadpole development remain unknown. But given the scattered distributions of bromeliads in *Hevea* trees, once a suitable tree is discovered by such a frog, it might make repeated trips to the same bromeliads, transporting and depositing one tadpole at a time.

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