

## Geographic variation in the frog genus *Vanzolinius* (Anura: Leptodactylidae)

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**Abstract.**—*Vanzolinius discodactylus*, a forest-dwelling frog species of western Amazonia in South America, varies in characters of color pattern, morphology, and advertisement call. Analysis of this variation indicates that very local (site) differentiation results in mosaic patterns of differentiation, largely obfuscating larger geographic patterns. Comparison of available genetic estimates of differentiation for *V. discodactylus* are consistent with the morphologically and advertisement call-based conclusions. A previously studied forest-dwelling lizard and another forest-dwelling frog also demonstrate local differentiation patterns suggesting that the variation in *V. discodactylus* may represent a general pattern for forest-dwelling amphibians and reptiles in Amazonia.

During examination of specimens for a study of *Leptodactylus* species (Heyer 1994), several *Vanzolinius* specimens were encountered. Dr. Claude Gascon found *Vanzolinius* to be relatively common along the Rio Juruá in Brazil and used the species to test the riverine barrier hypothesis (Gascon et al. 1996). A cursory examination of these additional materials suggested that there was considerable variation, which might profitably be studied. The purpose of this paper is to analyze geographic variation in *Vanzolinius*.

### Materials and Methods

As many adults, larvae, and recordings of advertisement calls as possible were assembled from major museum collections (Appendix 1).

The sex of individuals was determined either by examination of vocal slits, or dissection to examine gonads. The following categories are used: adult male—vocal slits present; juvenile male—testes present, but vocal slits not broken through; adult female—oviduct folded at least in part; juvenile female—ovaries present, but oviduct

straight; juvenile—condition of gonads indeterminate (in some cases, gonads had been removed by previous workers).

Analyses differ depending on the type of data gathered for the characters examined. The following descriptions of characters are arranged by analytical groups.

*Color patterns and external morphological features of adult form individuals.*—These qualitative traits are categories recorded as either binary or multistate characters. For the latter, states were added to the series as they were encountered during the data-taking phase. The states within each series have no intended or implied relationships or transformation series. Intermediate conditions between states were recorded with the first letter of the state that most nearly approached the condition observed in the specimen examined.

Dorsal snout pattern: Three basic states were encountered: a relatively uniform dark pattern (Fig. 1A); a variegated pattern (Fig. 1B); and a uniform light pattern (Fig. 1C).

Light postorbital eye stripe: A series of symbols define the distinctiveness of the postorbital eye stripes: - [absent]; (+) [indistinct]; + [distinct]; +! [sharply defined].

