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# When young are more conspicuous than adults: a new ranid species (Anura: Ranidae) revealed by its tadpole

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## Abstract

Tadpoles of *Clinotarsus alticola* collected nearby the type locality in Assam, India are barcoded and described. A detailed morphological and morphometrical description of the specimens, along with a study of the anatomy of the buccal cavity are provided. A comparison of these tadpoles with "*Clinotarsus alticola*" tadpoles from peninsular Thailand and of the genetic variation of a fragment of their mtDNA 16S gene led us to assign the population of peninsular Thailand to a new species, *Clinotarsus penelope* sp. n. The holotype of the new species is chosen among the tadpole series as no adult could be found in the type locality. Presumed conspecific adults of nearby localities are morphologically described and compared to barcoded adults of *Clinotarsus alticola*, waiting for further molecular confirmation. The tadpole of the new species differs from that of *C. alticola* by a much greater size at comparative stages (e.g., 77.7 mm vs. 53.3 mm in stage 36, respectively), a black coloration (vs. a yellow-olive tinge), several ocelli on the tail muscle (vs. only one), a rounded snout (vs. a more pointed snout) and a different Keratodont Row Formula (KRF; nine keratodonts rows maximum on both labia in *C. penelope* vs. eight maximum in *C. alticola*). A discussion about the choice of the holotype, the assignment of adult specimens and the future confirmation of this assignment are provided, as well as a comparison with older descriptions of "*Clinotarsus alticola*" sensu lato tadpoles and with *Clinotarsus curtipes* tadpoles from Karnataka, India. The lectotype of *Clinotarsus alticola* is redescribed.

**Key words:** *Clinotarsus alticola*, Ranidae, tadpole, holotype, India, Thailand

## Introduction

One of the Principles that govern the International Code of Zoological Nomenclature (Anonymous 1999) is the Principle of Typification that means that the allocation of scientific names to taxa is based on the use of types. The name-bearing specimen, or onomatophore, represents the linkage between the world of scientific names and the world of natural beings (Dubois & Ohler 1996). In groups with complex life-cycle, comprising several phases of different morphologies, such as holometabola insects or anuran amphibians, the holotype is virtually always chosen among adult specimens. In the particular case of anuran amphibians, this is often an adult male. Indeed, most of the time, the morphological differences between adults allow discrimination of new species, with the exception of cryptic species which are mostly revealed by molecular studies. Although tadpoles are increasingly included in the original descriptions, they remain frequently omitted, mostly due to the difficulty to get a reliable identification. However tadpoles are conspicuous in the field, easy to catch, found in large numbers and they spend a long period in the aquatic habitat, whereas adult frogs quickly leave the site after reproduction. Furthermore, beside difficulty in identification, tadpoles of closely related species are often very difficult to identify because they have very few, overlapping, characters. On the contrary, the tadpoles described here display more morphological differences than the adults, hence providing evidences for the description of a new species. This discovery of new

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