

When young are more conspicuous than adults: a case in frogs

One frog species, *Clinotarsus alticola*, described in 1870 was well known by its tadpole that bears remarkable characteristics (a relative large size, several large pairs of glands whose the most conspicuous lies behind the eyes, patches of glands at the base of the ventral and dorsal fins and a coloured ocellus at the base of the tail; Fig. 1). This tadpole has been reported and described from different remote localities by different authors who stressed on the morphological variability of the tadpoles from different populations.



Fig. 1. A tadpole of *Clinotarsus alticola* in stage 36 from an area nearby the type locality in Northeastern India.

The collection of this tadpole from a site close to the type locality (that is the place from where a species is described) in Meghalaya Province, Northeastern India allowed an accurate description of the latter with modern standards and comparison with tadpoles from another location (Phang Nga Province, Peninsular Thailand). The tadpoles of these two populations showed very striking differences (in size, colouration, number of caudal ocelli, number of rows of denticles around the mouth, and the presence of two larval morphs during development in the typical *Clinotarsus alticola*). Furthermore the comparison of a short fragment of a mitochondrial gene showed enough differentiation between the two populations and brought additional support to ascertain that the Thai population is a new, undescribed species. This species was then formally described as *Clinotarsus penelope* based on its tadpole (Fig. 2).

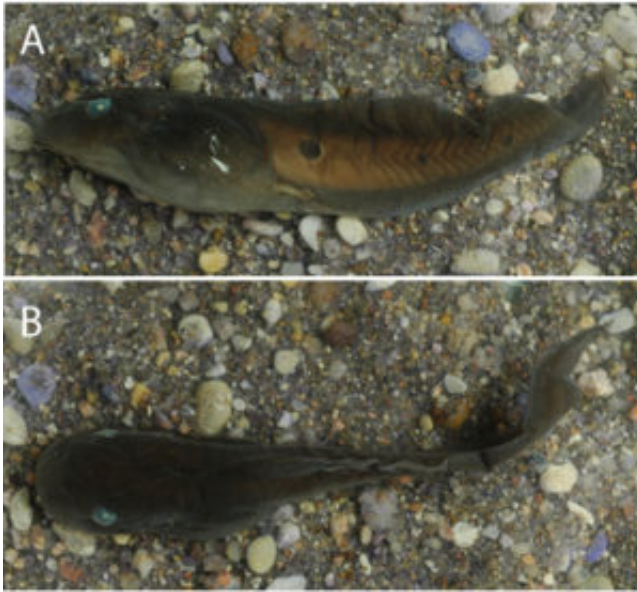


Fig. 2. The holotype of *Clinotarsus penelope* in stage 36 from Phang Nga Province, Thailand.

Usually, the description of new animal species are based on adults, often on males as they bear conspicuous (in the birds for instance) or additional (secondary sexual) characters in frogs among many others. On the other hand tadpoles of closely related species are most often very similar and quite impossible to distinguish as such. Due to the very conspicuous characters of the tadpoles of these two species, which allow easily to distinguish them a tadpole specimen was chosen as holotype for the description of the new species. The holotype is a specimen that will bear the name of the species (also called name-bearing type), as a representative of this species but that is not intended to bear all the characteristics of the species. Although this choice is not conventional it is “legal” in the sense of the International Code of Zoological Nomenclature. The fact that adult specimens have not been unambiguously identified motivated our choice for a larval holotype.

However, descriptions of new species based on tadpole specimens can have a potential detrimental effect on the frog taxonomy. We then propose a list of requirements that must be achieved when a tadpole is proposed as holotype:

- the tadpoles of the species at stake should be conspicuous in the field and found in sufficiently large number;
- the tadpoles of the species at stake should bear specific conspicuous diagnostic characters easy to observe;
- the holotype should be in an appropriate developmental stage (not too young or at metamorphosis);

- a DNA sequence of a widely used gene marker must be provide to ensure unambiguous link with adult specimens;
- the tadpoles of close species (the other species of the genus) should be known and available for comparison.

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Publication

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

Grosjean S, Bordoloi S, Chuaynkern Y, Chakravarty P, Ohler A
Zootaxa. 2015 Dec 18