

Short communication

On *Herpele multiplicata* (Amphibia: Gymnophiona: Caeciliidae)

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Abstract.—The African caecilian genus *Herpele* contains two species, the relatively widespread *H. squalostoma* (Stutchbury, 1859) and the enigmatic *H. multiplicata* (Nieden, 1912). The holotype and only reported specimen of *H. multiplicata* is lost. Consequently, the species is known only from the type description and its taxonomic status has been questioned. We provide a translation of Nieden's (1912) description of *H. multiplicata* and use it to reconstruct features of its external morphology. We argue that Nieden's description is sufficient basis to recognise *H. multiplicata* as a distinct species referable to *Herpele*. A key to the species of *Herpele* is provided.

Key words.—caecilians, taxonomy, Cameroon, Africa.

The caecilian genus *Herpele* was established by Peters (1880) to receive the West African caeciliid *Caecilia squalostoma* Stutchbury, 1859. Since Taylor's (1968) monographic revision of the caecilians of the World, *Herpele* has been considered to include *H. squalostoma*, and a second species, *H. multiplicata* (e.g., Nussbaum & Wilkinson 1989). The latter was described by Nieden (1912) based on a single specimen from Cameroon, western Central Africa in the Museum für Naturkunde der Humboldt Universität zu Berlin (ZMB). Although there have been few studies of *H. squalostoma* (e.g., Taylor 1968; Perret 1982; Wilkinson 1992), the type species is well represented in museum collections, and in recent years has been available commercially through the pet trade. It has a wide distribution in West and western Central Africa (including Cameroon, Nigeria, Gabon and Congo), with some indication of regional differentiation in numbers of annuli (Taylor 1968). In contrast, there have been no reports of additional speci-

mens or studies of *H. multiplicata* since its brief description.

Taylor (1968) presumed the type of *H. multiplicata* lost or destroyed after it could not be found in the ZMB collection by himself and the curator Dr. Heinz Wermuth in 1961. Taylor (1968) presented Nieden's description in the original German. He remarked (p. 687) that "without information concerning the dentition, tongue, skull, the vent, and postanal annulation, one cannot be certain that the species is a member of the genus *Herpele*. Provided the type locality is correct it may well be a species of *Herpele*, but unless the type can be found or specimens having the few known characters of the type together with the characters of *Herpele*, the validity of the species and its generic placement will remain in doubt".

We recently made a thorough search of the caecilian collections of the ZMB and also failed to discover the missing holotype of *H. multiplicata*.

ta. It seems safe to assume that the holotype will remain unavailable for future study and that, until additional material is discovered, the only information we have on the species is that given in Nieden's (1912) original description. In contrast to Taylor (1968), we believe that Nieden's description provides sufficient information to be confident about the validity of the species and less doubtful over its generic placement.

Nieden's description of *H. multiplicata* is translated here as follows:

"The number of skin folds is notably higher than in *Herpele squalostoma*, there are 179 present; among them are only 5 shorter skin folds, namely, on the one hand, one each between the first and second and between the second and third "primary" folds behind the head, and on the other hand, on the posterior end of the body, the 12th, 14th, and 16th fold from the posterior are developed as shorter folds, confined to the back of the animal.

The tentacle is twice as far from the angle of the mouth than from the naris. Tail hardly distinguishable. Colouration dark brown, head lighter.

Length 239 mm, width only 4 mm (but the animal is strongly shrunken).

Locality: Mundame on Mungo in Cameroon, collected by CONRAU."

The African explorations of Gustav Conrau are well known and we see no reason to doubt that the type specimen is from western Central Africa. However, Taylor (1968: 686) gives the type locality as Victoria and this is repeated by Frost (1985) and Lawson (1993; see LeBreton 1999). Victoria (now Limbé, Cameroon) is a coastal town approximately 100 km from Mundame (4° 34' N 9° 31' E, 106 m asl), which lies inland on the Mungo River near Mbanga.

Victoria is the type locality (but see Lawson 2000) of the scolecomorphid caecilian *Crotaphatrema bornmuelleri* (Werner 1899), which was originally described as a species of *Herpele*, and we suspect that Taylor mistakenly associated *H. multiplicata* with the type locality of *H. bornmuelleri*.

Taylor (1968: 687) "presumed that the number of folds, 179, includes both primary and secondary annuli", and used only the total number of folds reported by Nieden to distinguish *H. multiplicata* and *H. squalostoma* in his key. However, although Nieden's account does not give separate figures for the number of primary and secondary annuli, it is sufficiently detailed for these to be inferred. From Nieden's description, it appears that his counts are of annular grooves (or folds), rather than of annuli, which are the sections of the body delimited by the grooves. It is clear that the two nuchal collars (delimited by what Nieden identified as first, second, and third primary folds - which are the first, second, and third nuchal grooves, respectively) each bear a dorsal transverse groove that Nieden included in his total count of annular grooves. It is also clear that the last eight primary annuli are subdivided by secondary annular grooves, of which the anteriormost three have the secondary grooves restricted to the dorsum (Fig. 1). Perret (1966) also gives the number of secondary annuli as eight. It is unclear what Nieden took to be the last annular groove, and the nature of any annulation that may have subdivided the hardly distinguishable tail. Assuming that the body ends in a small terminal cap, as in *H. squalostoma*, we infer that the type of *H. multiplicata* had 166 primary annuli, of which the last eight are divided by secondary annular grooves. This is the highest number of primary annuli reported for any West or western Central African caecilian. All other West and western Central African species are reported as having fewer than 130 primary annuli. It is also the highest number of primary annuli for any African caecilian with secondary

annuli. This makes us confident of the validity of the species.

Regarding the generic placement of *H. multiplicata*, it should be noted that Nieden's (1912) description formed part of a comprehensive monograph on the caecilians of Africa based both on the literature and on his examination of the collections in the ZMB. Nieden's (1912: 209) diagnosis of *Herpele* is translated here as "Skin with scales. Eyes hidden under bone. Tentacle globular, situated under and behind the naris. Two rows of teeth in the lower jaw. Squamosals and parietals connected." There is some uncertainty as to what extent Nieden was able to ascertain the condition of *H. multiplicata* with respect to these generic characters. In the same work, Nieden erroneously reports the presence of two tooth rows in the lower jaw as diagnostic for *Boulengerula*, suggesting that he may not have made careful examination of dentition (Wilkinson *et al.*, in press). Nieden's treatment of *Herpele* also included *Crotaphatrema bornmuelleri*, which lacks scales, and has only a single row of teeth in the lower jaw (e.g., Nussbaum, 1985). The only material of *C. bornmuelleri* is in the Naturhistorisches Museum, Vienna and was probably not seen by Nieden. The source of these errors was probably Werner's (1899) original account, and generic assignment, of *C. bornmuelleri*. Of the generic characters of *Herpele*, it seems highly unlikely that Nieden

would have failed to mention the position of the eye in *H. multiplicata* were it not hidden under bone.

Among West and western Central African caecilians, only species of *Crotaphatrema* and *Herpele* have the orbit covered with bone. Among other differences, *Herpele* is readily distinguished from *Crotaphatrema* by the presence of secondary annular grooves and by the absence of a distinctive, unsegmented terminal shield. We are confident that *H. squalostoma* and *H. multiplicata* share these distinguishing features. It follows that Nieden's generic placement of *H. multiplicata* was justified and that this remains the most plausible affinity for this enigmatic species.

In light of the reassessment presented here, we present a revised key to the species of *Herpele*:

- 1. More than 150 primary annuli.....
.....*Herpele multiplicata*
- Fewer than 135 primary annuli.....
.....*Herpele squalostoma*

The range of secondary annuli in *H. squalostoma* is reported to be 12 to 30 (Taylor 1968), and our point estimate for *H. multiplicata* is eight. Thus the two species may be further distinguished by their numbers of secondary annuli in at least some cases. Perret (1966: 299)

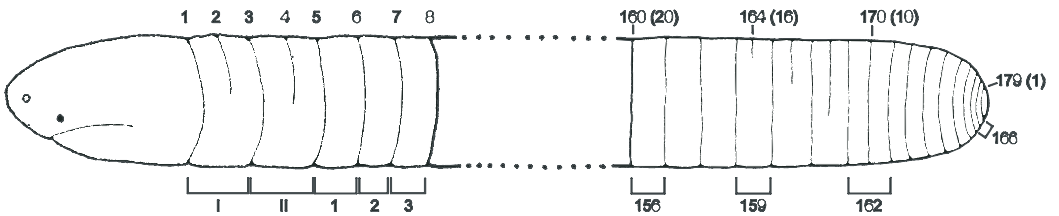


Figure 1. Reconstructed view of the holotype of *Herpele multiplicata* inferred from Nieden's (1912) original description. Numbering above corresponds to Nieden's counts of annular grooves. Numbers in brackets represent counts of grooves, passing forward from the terminus. Below is our numbering of the two nuchal collars (I and II, each bearing a dorsal transverse groove) and primary annuli (arabic numerals). Open circle represents the naris, closed circle marks the position of the tentacular aperture.

listed length:width ratios and included length and width in his key to caecilians of Cameroon (p. 296, where the width of *H. multiplicata* is given as 6-8 mm rather than the 4 mm described by Nieden), and it might be that *H. multiplicata* can also be distinguished from its congener by a more slender body.

Nothing is known of the biology of *H. multiplicata*, including its current conservation status, which must be considered 'data deficient'. While rediscovery of the holotype would be a significant breakthrough, fieldwork and new collections are fundamental to further understanding of this species.

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