



A Redescription of the Hemipenis of *Hydromorphus concolor* (Colubridae) with Comments on Its Tribal Allocation

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- TAYLOR, E. H. 1920. Philippine turtles. Philippine J. Sci. 16:130-133.
- . 1944. Present location of certain herpetological and other type specimens. Univ. Kansas Sci. Bull. 30, Pt. 1, no. 11:160.
- WERMUTH, H., AND R. MERTENS. 1961. Schildkroeten, Krokodile, Brueckenechsen. Gustav Fischer Verlag, Jena, German Democratic Republic.

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A REDESCRIPTION OF THE HEMIPENIS OF *HYDROMORPHUS CONCOLOR* (COLUMBRIDAE) WITH COMMENTS ON ITS TRIBAL ALLOCATION.—Hemipenes have long been recognized as providing useful information for snake systematists and the importance of hemipenes as systematic characters has been re-emphasized repeatedly (Cope, 1893, 1895; Dunn, 1928; Dowling and Savage, 1960; Dowling, 1967; Jenner and Dowling, 1985; Branch, 1986), even if with caution (Inger and Marx, 1962).

Jenner (1981) attempted to categorize the Xenodontinae (*sensu* Dowling and Duellman, 1978) at the tribal level based on geographic distribution and hemipenial morphology, but she was unable to place *Hydromorphus* (with three nominal species) because no adequate description of its hemipenes was available. The only published description of *Hydromorphus concolor* (Villa, 1970), a retracted organ, is incomplete. In the described specimen, Villa (loc. cit.) suggested that the sulcus bifurcated near the base of the penis, at the level of the first or second subcaudal. However, on a partially everted organ from another specimen examined later, he noted that the sulcus seemed to remain single into the capitulum. I quote his assessment of the sulcus condition: "Whether or not it bifurcates beyond this point I could not ascertain."

Here I present a redescription of the hemipenis of *H. concolor* following the terminology of Dowling and Savage (1960), as modified by Myers (1974) and Myers and Campbell (1981). Additionally, I comment on the uncertain tribal affinities of *Hydromorphus*.

Eight individuals of *H. concolor* with everted hemipenes were examined and the most fully

everted specimen (CRE 3014) was used for the following description (Fig. 1). The organ is 11 subcaudals long, moderately bilobed and fully capitate; capitulum calyculate distally and spinose proximally; reduced papillate micro-ornamentation on calyces; four basal hooks; large accessory spines cover the central portion of the organ between the capitulum and the basal hooks; sulcus bifurcates within the capitulum (unicapitate) and is centrolineal.

The asulcate side has a single row of large spines just below the capitular groove which increase in size towards the lateral sides of the organ. A central groove is present from the base of the capitulum to the mid-portion of the stalk. This groove is lined on both sides by three spines which decrease in size towards the middle of the stalk. The basal region is nude except for scattered spinules and two of the basal hooks.

Minor variation occurs in the numbers and the arrangements of spines on the stalk and in the sulcus bifurcation point. In all organs the sulcus bifurcates well within the capitulum (Fig. 1) except in a single individual (CRE 9000). In this specimen the sulcus bifurcates just inside the base of the capitulum.

Dunn (1939) described the hemipenis of mainland *Tretanorhinus* and suggested that *Tretanorhinus* may be closely related to *Hydromorphus* based on the marked similarity in dentition and hemipenial morphology. Dunn's description is as follows: "... hemipenis single or slightly bilobed; calyculate area capitate; sulcus forks within the calyculate area; four basal hooks; between hooks and calyculate area about four cross rows (about 10 longitudinal rows) of rather uniform smaller spines." This description is remarkably similar to the *Hydromorphus* hemipenis, but I examined *T. variabilis* (a West Indian species) and found it to be distinctly different: a single lobe; fully capitate; entire capitulum calyculate with well developed spinulate micro-ornamentation and a large groove forming a naked pocket on the asulcate side of the capitulum (see p. 112a.2 in Dowling and Duellman, 1978 for an illustration). These differences do not suggest a close relationship (i.e., sister group status) between *Tretanorhinus* and *Hydromorphus*, but neither do these differences discount the possibility of a close relationship. However, Dunn (1939) also recognized similarities among *Rhadinaea*, *Coniophanes*, *Trimetopon*, *Ninia*, *Amastridium* and *Tretanorhinus*, all of which (except *Amastridium*) are placed in the Dipsadini (*sensu* Jenner, 1981, 1983).

Jenner defined the tribe Dipsadini by the pos-

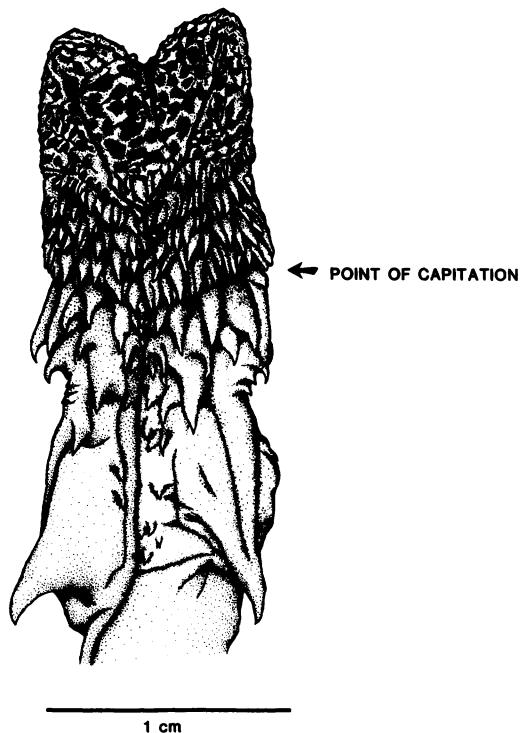


Fig. 1. Sulcate site of left hemipenis of *Hydromorphus concolor* (CRE 3014, SVL = 430 mm). Scale: 10 cm = 1 cm.

session of a fully capitate hemipenis with proximal spines and a forked sulcus, and a geographic distribution centered in Central America. If we follow these explicitly phenetic criteria, it seems clear that *Hydromorphus* is part of the dipsadine radiation because it possesses both the hemipenial characters (Fig. 1) and the distributional character (Fig. 2). However, Cadle (1984) found little unity in Jenner's Dipsadini (i.e., not monophyletic) and could not place *Tretanorhinus* in any lineage (*Hydromorphus* was not included in his study). My own preliminary cladistic analysis of xenodontines based exclusively on hemipenis characters suggests that the Dipsadini (sensu Jenner, 1981, 1983) is not monophyletic with respect to the other Neotropical xenodontine tribes. The uncertainty of Jenner's Dipsadini as monophyletic, and the inconclusiveness of Cadle's (1984) work regarding *Hydromorphus*, makes the systematic placement of *Hydromorphus* subjective at this time.

Material examined.—*Hydromorphus concolor*: Costa Rica: S bank Jorco, S base of Fila Cedral, Ignacio de Acosta, Depto. San Jose (CRE 3014); Caribbean coast NW of Puerto Limon, Depto. Limon (CRE 9000); University of Costa Rica campus, San Pedro, Depto. San Jose (CRE 1542); 6 km NE Rio Naranjo, Bijagua, Depto. Puntarenas (CRE 3679); 4 km ESE Monteverde, Finca

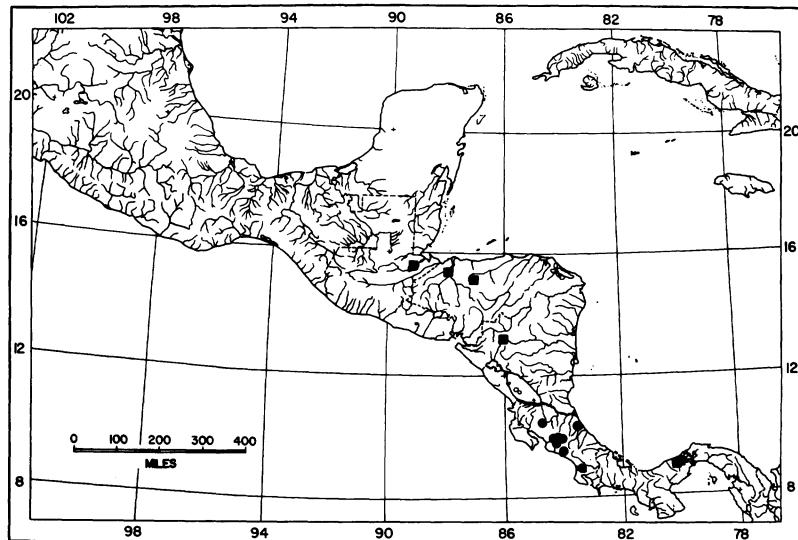


Fig. 2. Geographic distribution of *Hydromorphus*. Dots represent specimens examined in this study and squares represent other known collection localities.

Penas Blancas, Depto. Alajuela (CRE 4611); N bank Rio Grande de Terraba, 1.5 km SW Quebrada Drori or Disciplina, Depto. Puntarenas (UCR 7440); Barrio Monte Rey, San Pedro, Depto. San Jose (UCR 6330); SW San Jose at base of N slope of Fila Cedral, Escazu, Depto. San Jose (UCR 9229). *Tretanorhinus variabilis*: Grand Cayman: 1 mile NE Georgetown (ASFS 16231).

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LITERATURE CITED

- BRANCH, W. R. 1986. Hemipenial morphology of African snakes: A taxonomic review. *J. Herpetol.* 20(3):285–299.
- CADLE, J. E. 1984. Molecular systematics of Neotropical xenodontine snakes: I. South American xenodontines. *Herpetologica* 41(1):8–20.
- COPE, E. D. 1893. Prodromus of a new system of the non-venomous snakes. *Amer. Natur.* 1893:477–483.
- . 1895. The classification of the Ophidia. *Trans. American Phil. Soc. (N.S.)* 28(art. 3):186–219.
- DOWLING, H.G. 1967. Hemipenes and other characters in colubrid classification. *Herpetologica* 23(2): 138–142.
- , AND W. E. DUELLMAN. 1978. Systematic herpetology: a synopsis of families and higher categories. HISS Publications, New York, New York.
- , AND J. M. SAVAGE. 1960. A guide to the snake hemipenis: a survey of basic structure and systematic characters. *Zoologica* 45(2):17–28.
- DUNN, E. R. 1928. A tentative key and arrangement of the American genera of Colubridae. *Bull. Antivenin Inst. America* 2(1):18–24.
- . 1939. Mainland forms of the snake genus *Tretanorhinus*. *Copeia* 1939(4):212–217.
- INGER, R. F., AND H. MARX. 1962. Variation of hemipenis and cloaca in the colubrid snake *Calamaria lumbricoidea*. *Syst. Zool.* (11)1:32–38.
- JENNER, J. V. 1981. A zoogeographic study and the taxonomy of the xenodontine colubrid snakes. Unpubl. Ph.D. thesis, New York University, New York City, New York.
- . 1983. Allocation of genera (Tab. X). In: Biochemical evaluation of colubrid snake taxonomy. H. G. Dowling, R. Highton, G. C. Maha and L. R. Maxon (eds.). *J. Zool. (London)* 201:309–329.
- , AND H. G. DOWLING. 1985. Taxonomy of American xenodontine snakes: the tribe *Pseudoboini*. *Herpetologica* 41(7):161–172.
- MYERS, C. W. 1974. The systematics of *Rhadinaea* (Colubridae), a genus of New World snakes. *Bull. Amer. Mus. Nat. Hist.* 153(1):1–262.
- , AND J. A. CAMPBELL. 1981. A new genus and species of colubrid snake from the Sierra Madre del Sur of Guerrero, Mexico. *Amer. Mus. Novit.* 2708:1–20.
- VILLA, J. 1970. The snake *Hydromorphus* in Nicaragua, with a description of its hemipenis. *Carib. J. Sci.* 10(3–4):119–121.
- BRIAN I. CROTHER, *Texas Memorial Museum, 2400 Trinity St., Austin, Texas 78705*. Accepted 22 April 1988.
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- Copeia*, 1989(1), pp. 229–231
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- IDENTITY OF A SUPPOSED SOUTH AMERICAN MICROHYLID FROG, *CTENOPHRYNE MARMORATA*.—Ahl (1935) described *Ctenophryne marmorata* from two specimens in the ZMB for which there are no data as to locality or collector. Ahl's reasons for assigning the species to the hitherto monotypic genus *Ctenophryne* are not stated, but the absence of clavicles and procoracoids, the concealed tympana and vertical pupils in the new species, are features shared with *C. geayi* Mocquard 1904, and may have influenced his decision. Reasoning from the supposed congenericity, Ahl assumed that the locality for his new species differed little from that for *C. geayi*, known at the time only from its type locality in Colombia.
- The date of publication of *C. marmorata* was unfortunate in that it followed closely upon the appearance of Parker's (1934) monograph of the Microhylidae. Thus, the new species did not receive the critical review it might had it come to Parker's attention in time, and Ahl evidently did not have Parker's work at hand when preparing his description. Indeed, the species virtually vanished from the literature as soon as described. I find only two mentions subsequent to the original description: Dunn (1949) called it "a very dubious form" and suggested that it "might well be a form of *Glyphoglossus* or of *Uporedon* of southeast Asia." Gorham (1974) included it, with question, in the synonymy of *C. geayi*.
- Apparently until now no herpetologist has