

# *Chthonerpeton onorei*, a new caecilian (Amphibia: Gymnophiona: Typhlonectidae) from Ecuador

by

**Ronald A. NUSSBAUM \***

With 3 figures

## ABSTRACT

*Chthonerpeton onorei* is described as a new species of the caecilian family Typhlonectidae based on two specimens collected in 1984 and 1985 at El Reventador, Napo Province, Ecuador by Dr. G. Onore. The species is characterized by having a high number of primary annuli (164) and vertebrae (173) in combination with the position of the tentacular aperture, which is nearly equidistant between the eye and nostril or slightly closer to the nostril. The discovery of *C. onorei* extends the range of the genus in South America by about 4,250 km in a northwesterly direction from southeastern Brazil and constitutes the first record of *Chthonerpeton* in Ecuador.

## INTRODUCTION

The caecilian family Typhlonectidae currently consists of four genera (*Chthonerpeton*, *Nectocaecilia*, *Potomotyphlus*, *Typhlonectes*) confined to tropical South America. Typhlonectids are among the most familiar of caecilians because species of *Typhlonectes* are frequently imported with tropical fish and sold in the pet trade as "sand eels" or "black eels". Typhlonectids are popularly thought of as the "aquatic caecilians", but this

---

\* Museum of Zoology and Department of Biology, The University of Michigan, Ann Arbor, Michigan 48109, USA.



viewpoint is justified only for species of *Potomotyphlus* and *Typhlonectes*. At least some species of *Chthonerpeton* are more terrestrial than aquatic (TANNER 1971), and *Nectocaecilia* have been collected in wet soil far from water. *Chthonerpeton* seems to have the fewest aquatic adaptations and appears to be transitional between the fully terrestrial caeciliids and the fully aquatic typhlonectids.

Studies in progress indicate that typhlonectid systematics is highly confused, both at the generic and specific levels. *Chthonerpeton* is, however, a distinctive genus that is not likely to be merged with other typhlonectid genera. Among the distinctive features of *Chthonerpeton* are the complete absence of fins, elongate oval or elliptical nares, tentacular groove not covered with bone, and position of the tentacular aperture between the eye and nostril, rather than very close behind the nostril as in the other typhlonectid genera. Until now, *Chthonerpeton* was thought to have a southeastern tropical distribution, the six species being restricted to southern Brazil, Uruguay, and northern Argentina. Two specimens of *Chthonerpeton* recently collected in northern Ecuador by Dr. G. Onore of Catholic University, Quito, constitute a significant northwesterly range extension for the genus and are members of a new species.

***Chthonerpeton onorei* n. sp.**

Figs 1-2

*Holotype*. — Museum d'Histoire naturelle, Genève (MHNG) 2251.06, a mature male collected during August, 1984 at El Reventador, 1500 m elevation, Napo Province, Ecuador by Dr. G. Onore.

*Paratype*. — MHNG 2251.07, same locality as holotype, collected during June, 1985 by Dr. G. Onore.

*Diagnosis*. — A slender species of *Chthonerpeton* that differs from the five species *braestrupi*, *corrugatum*, *erugatum*, *hellmichi*, and *indistinctum* in having far more primary annuli (164 versus 73-104) and vertebrae (173 versus 111 or fewer) and from the only other species of the genus, *viviparum*, in having the tentacular aperture equidistant between the eye and nostril or slightly closer to the nostril; the tentacular aperture is much closer to the eye in *viviparum*.

*Description of the holotype*. — Morphometric and meristic data are given in Table 1; body form slender, ratio of total length to body width 64.9; head small, the sides converging to a smoothly rounded snout; eyes distinct and dorsolaterally oriented; tentacular apertures barely visible from above as they are laterally oriented, each aperture located just below (touching) an imaginary line running from the eye to the external naris, slightly closer to naris than to eye and posterior to anterior margin of mouth; external nares laterally oriented, barely visible from above; narial openings small, not greatly larger than tentacular apertures, ovate with narrow end toward tentacle; mouth recessed, snout projecting 2.0 mm; teeth in continuous series with no group replacement pattern, monocuspid, relatively uniform in size except for the anterior dentary teeth which are enlarged; two distinct narial plugs anteriorly on the tongue, each about 1.0 mm in diameter; choanae 0.9 mm apart with small openings about 1.0 mm in diameter; choanal valves deeply recessed and difficult to observe; collars indistinct, perhaps because of wrinkling caused by preservation, collars fused middorsally, without transverse dorsal grooves; 164 primary annuli following the collars, primary annuli indistinct being fused middorsally throughout, last 23 primary annuli complete ventrally, no primary annuli



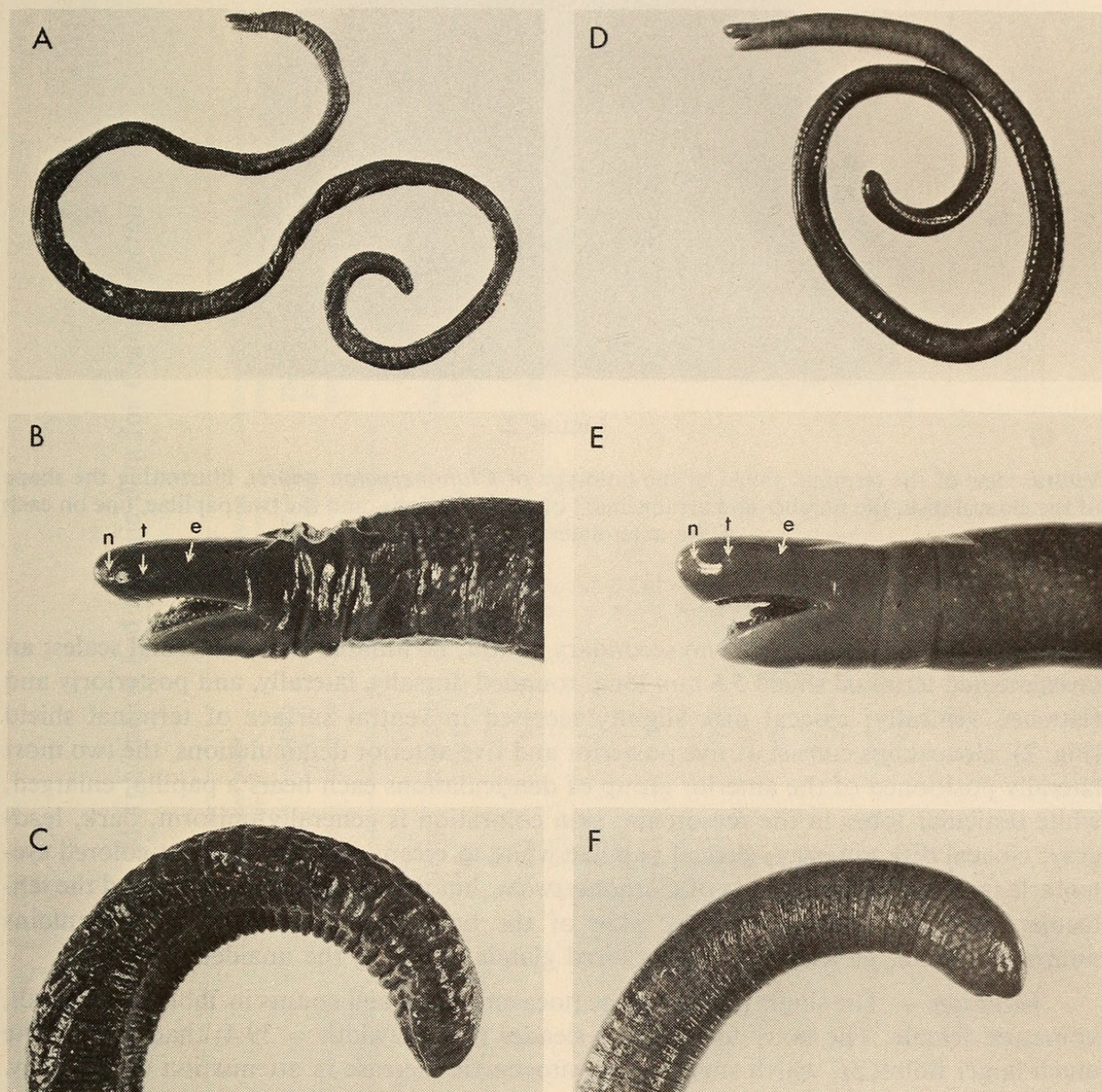


FIGURE 1.

Adult male holotype (A-C) and immature female paratopotype (D-F) of *Chthonerpeton onorei*. Measurements in Table 1. Body attenuation increases with size (age), as can be seen by comparing A to D. Lateral views of head and neck (B and E) illustrate relative positions of the eye (e), tentacular aperture (t), and external naris (n); elevated narial plugs on the tongue; enlarged anterior dentary teeth; and restriction of skin glands (white spots) to neck (first and second collars) and body. Lateral views of body termini illustrate age differences in the appearance of primary annuli, the shape of the terminal shield and differences in orientation of the cloacal disk.



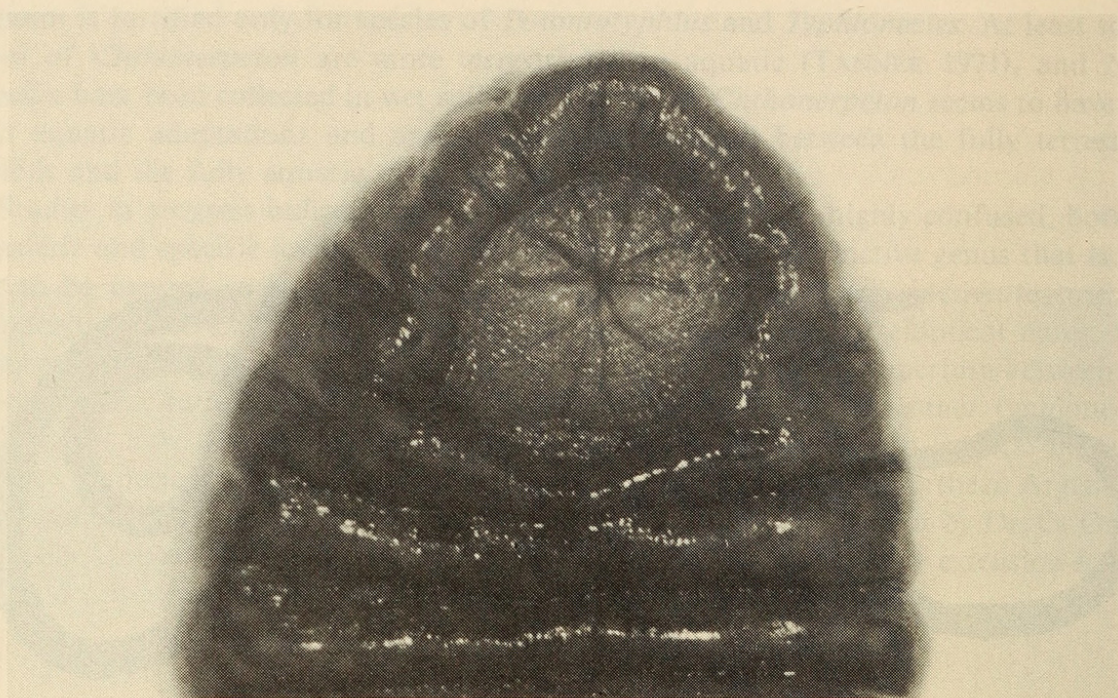


FIGURE 2.

Ventral view of the terminal shield of the holotype of *Chthonerpeton onorei*, illustrating the shape of the cloacal disk, the number and arrangement of denticulations, and the two papillae, one on each of the anterolateral denticulations.

interrupted by the cloacal disk; no secondary annuli; no annular nor subdermal scales; an unsegmented terminal shield 5.6 mm long, rounded dorsally, laterally, and posteriorly and flattened ventrally; cloacal disk slightly recessed in ventral surface of terminal shield (Fig. 2); cloacal lips consist of five posterior and five anterior denticulations, the two most laterally positioned of the anterior group of denticulations each bears a papilla; enlarged, white testicular lobes in the mesorchia; skin coloration is generally uniform, dark, lead-gray; cloacal disk tan-gray; cloacal papillae white to cream-colored; no light-colored eye-tentacle tract as in some species of *Chthonerpeton*, but there are light areas around the tentacular apertures, nares, and eyes; skin of the body, but not of the head, contains numerous, small, punctiform, light-colored glands visible to the unaided eye.

*Variation.* — The single paratopotype (measurements and counts in Table 1) is a small, immature female. The body form is less slender (length/width = 39.4) than that of the much larger holotype, which suggests an ontogenetic increase in attenuation of the body. The head shape is like that of the holotype, except there is a slight outward bulge at the tentacular apertures in dorsal view. The tentacular aperture lies just below, but touching an imaginary line from the eye to the external naris, as in the adult holotype. The tentacular aperture is relatively closer to the naris than to the eye compared to the holotype, a fact which suggests that the aperture finds its position early in ontogeny and that, afterwards, the snout region forward of the aperture grows (elongates) faster than the region between the eye and tentacular aperture. As in the holotype, the tentacular apertures lie posterior to the anterior margin of the recessed mouth. The snout projects 1.7 mm forward of the mouth. The nares are laterally oriented and very small, not larger or only slightly larger than the tentacular apertures, and are circular rather than oval as in the holotype. The teeth

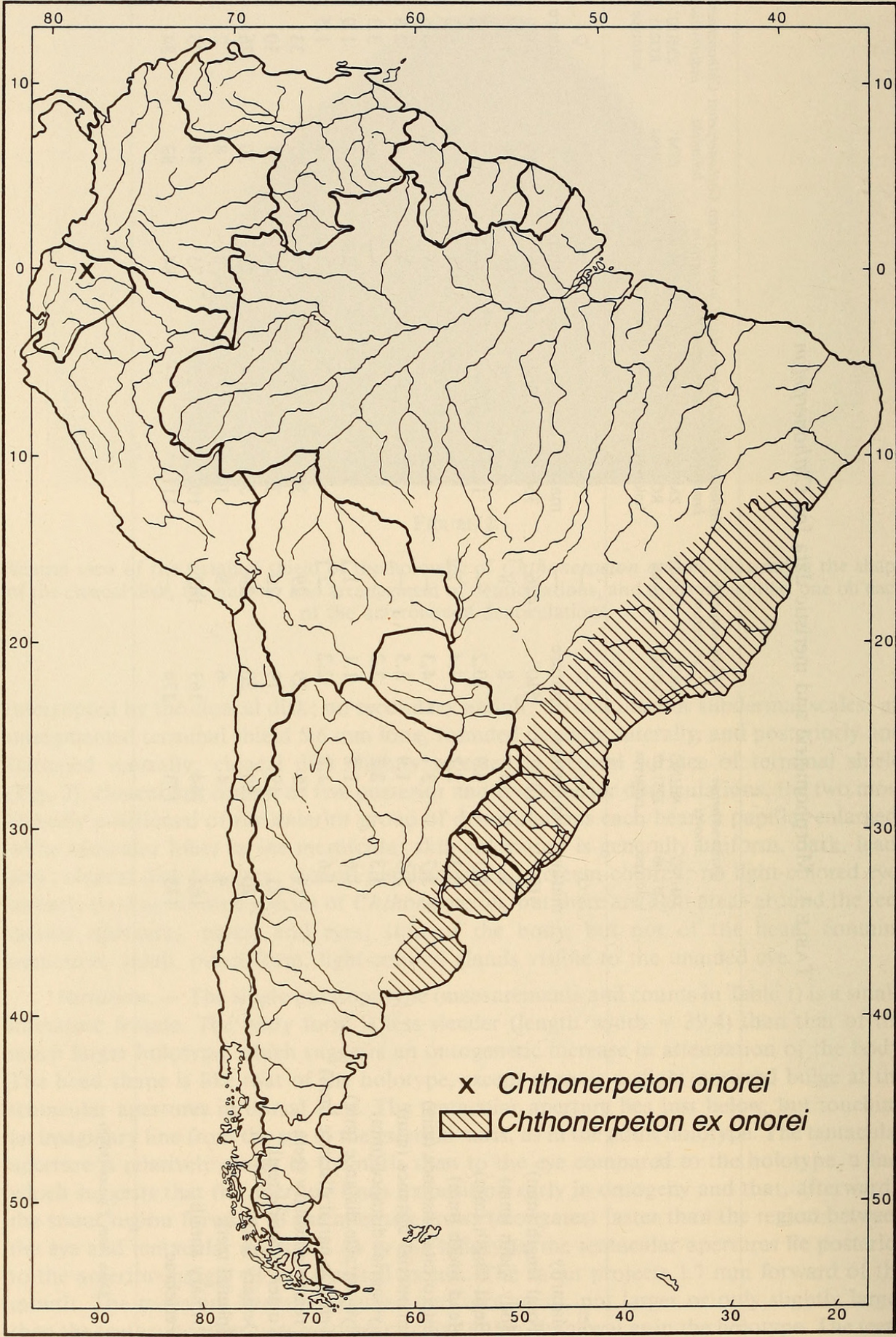


TABLE 1. Morphometric and meristic data for *Chthonerpeton*

	<i>Chthonerpeton onorei</i>		<i>Chthonerpeton viviparum</i>		<i>Chthonerpeton braestrupi</i>		<i>Chthonerpeton corrugatum</i>	<i>Chthonerpeton erugatum</i>	<i>Chthonerpeton hellmichi</i>	<i>Chthonerpeton indistinctum</i>
	MHNG 2251.06 holotype	MHNG 2251.07 paratype	MCZ 24593	FMNH <sup>1</sup> 84002	ZMUC RO234 holotype	ZMH <sup>1</sup> A00265 holotype	ZMUC RO238 holotype	ZSM <sup>1</sup> 1/1964 holotype	ZMUC RO235 lectotype	
Sex	♂	♀	♂	♂	♂	—	♂	♂	♀	
Maturity	mature	immature	mature	—	mature	—	mature	—	mature	
Total length (mm)	519	197	510	426	350	364	365	418	286	
Body width (mm)	8	5	8	8	9	16	15	18	12	
Head length (mm)	10.1	6.9	10.2	—	12.9	—	14.3	—	11.2	
Head width (mm)	6.3	5.2	7.4	7.2	9.6	11.0	11.5	12.0	8.3	
Interorbital distance (mm)	3.7	3.1	4.3	—	5.3	6.0	5.2	—	4.6	
Internarial distance (mm)	2.5	1.9	2.5	—	3.2	—	4.2	—	2.8	
Eye-narial distance (mm)	3.3	2.2	3.2	—	3.8	—	4.2	—	3.3	
Eye-tentacle distance (mm)	1.6	1.2	1.1	1.1	1.5	2.9	2.6	2.5	1.9	
Tentacle-narial distance (mm)	1.6	1.0	2.2	2.1	2.0	2.2	2.0	2.0	1.5	
Premax-maxillary teeth	19	16	29	29	35	39	28	37	33	
Vomeropalatine teeth	21	19	19	20	28	31	24	35	30	
Dentary teeth	20	20	20	24	30	28	20	30	26	
Splénial teeth	4	4	6	8	10	8	3	8	2	
Primary annuli	164	164	163	162	102	73	75	74	75	
Vertebrae	173	173	174	—	111	—	84	83	84	

<sup>1</sup> Data from TAYLOR (1968).







are arranged as in the holotype. The narial plugs are more prominent than in the holotype, being elevated and thrust forward slightly beyond the anterior margin of the tongue, obviously as a result of preservation. The two collars are more distinct compared to the holotype, neither having transverse dorsal grooves. The first collar is narrower (1.7 mm) than the second (2.0 mm). The second collar is fused to the first primary annulus midventrally. The primary annuli are more distinct than in the holotype, but all of them are incomplete middorsally. All of the primary annuli are complete ventrally. There are no secondary annuli, and no annular nor subdermal scales were detected. The body ends in a terminal shield 3.4 mm long. Unlike the holotype, the cloacal opening is not recessed, and the lips of the cloaca consist of only 9 somewhat irregular denticulations, which are not clearly arranged into an anterior and a posterior group. There are no cloacal papillae. The terminal shield is shaped like that of the holotype, except that the cloacal disk is oriented ventroposteriorly rather than ventrally. There are no annuli interrupted by the circular cloacal disk. The color is nearly uniform lead-gray except the margin of the lower jaw is a lighter tan-gray and the ventral surface of the anterior one-third of the body is mottled with tan-gray on a lead-gray background. The cloacal lips are cream, and there is a small cream-colored spot on the ventral surface just anterior of the cloacal disk. Like the holotype, the skin of the body including the collars contains numerous, white, punctiform glands, barely visible to the unaided eye. The skin of the head is free of glands.

*Etymology.* — *Chthonerpeton onorei* is named in honor of Dr. G. Onore in recognition of his contributions to the herpetology of Ecuador.

#### DISCUSSION

The genus *Chthonerpeton* apparently consists of two groups of species. The first group, or *indistinctum*-group, contains *C. braestrupi*, *C. corrugatum*, *C. erugatum*, *C. hellmichi*, and *C. indistinctum*. These five species, not all of which may be valid, are characterized by having relatively few vertebrae and primary annuli, stocky body form, wider heads, and superficial choanal valves. The second, or *viviparum*-group, consisting of *C. onorei* and *C. viviparum* has many vertebrae and primary annuli, slender body form, narrower heads, and deeply recessed choanal valves. These two groups appear to be monophyletic, but detailed anatomical studies are needed before the phylogenetic relationships within the genus can be confidently stated.

The geographical distributions of these two groups, while far from being completely known, suggest that *Chthonerpeton* evolved in the southern tropics of South America and that the *viviparum*-group has spread into the northwestern region of the Amazon Basin. The discovery of *C. onorei* in Ecuador constitutes a northwesterly range extension for the genus of about 4,250 km (Fig. 3). It seems unlikely that the genus is truly absent from the vast area between southeastern Brazil and Ecuador, and additional species of *Chthonerpeton* are likely to be discovered in this region.

---

FIGURE 3.

Distribution of *Chthonerpeton* in South America. The range of *Chthonerpeton* in southeastern Brazil, Uruguay, and northeastern Argentina is only an estimate based on few specimens.



## ACKNOWLEDGMENTS

I wish to thank the following individuals for the loan of specimens: Pere Alberch and Jose Rosado, Museum of Comparative Zoology, Harvard University (MCZ); Robert Inger, Field Museum, Chicago (FMNH); Jens Rasmussen, Zoologisk Museum, Copenhagen (ZMUC); and Volker Mahnert and Jean-Luc Perret, Muséum d'Histoire naturelle, Genève (MHNG). Mark Wilkinson read and improved the manuscript. The map was drawn by Margaret Van Bolt.

## LITERATURE CITED

- TANNER, K. 1971. Notizen zur Pflege und zum Verhalten einiger Blindwühlen (Amphibia: Gymnophiona). *Salamandra* 7 (3/4): 91-100.
- TAYLOR, E. H. 1968. The caecilians of the world. Univ. Kansas Press, Lawrence. i-xiv + 848 pp.





Nussbaum, Ronald A. 1986. "Chthonerpeton onorei, a new caecilian (Ampibia: Gymnophiona: Typhlonectidae) from Ecuador." *Revue suisse de zoologie* 93, 911–918. <https://doi.org/10.5962/bhl.part.79519>.

**View This Item Online:** <https://www.biodiversitylibrary.org/item/128116>

**DOI:** <https://doi.org/10.5962/bhl.part.79519>

**Permalink:** <https://www.biodiversitylibrary.org/partpdf/79519>

#### **Holding Institution**

Smithsonian Libraries and Archives

#### **Sponsored by**

Biodiversity Heritage Library

#### **Copyright & Reuse**

Copyright Status: In Copyright. Digitized with the permission of the rights holder.

Rights Holder: Muséum d'histoire naturelle - Ville de Genève

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://www.biodiversitylibrary.org/permissions/>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.