

# A new species of *Caecilia* Linnaeus, 1758 (Amphibia: Gymnophiona: Caeciliidae) from French Guiana

## Uma nova espécie de *Caecilia* Linnaeus, 1758 (Amphibia: Gymnophiona: Caeciliidae) da Guiana Francesa

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**Abstract:** We describe a new species of the genus *Caecilia* from French Guiana. The new species differs from most species of the genus in the numbers of primary and secondary grooves. Color pattern, body shape, presence of subdermal scales, and number of teeth separate *Caecilia museugoeldi* sp. nov. from the other species of the genus. This new taxon is the first of the genus described in 33 years.

**Keywords:** South America. Amazon. Taxonomy. Caecilian.

**Resumo:** Descrevemos uma nova espécie do gênero *Caecilia* da Guiana Francesa. A nova espécie difere da maioria das espécies do gênero no número de sulcos primários e secundários. Padrão de cor, forma do corpo, presença de escamas subdermárias e número de dentes separam *Caecilia museugoeldi* sp. nov. das outras espécies do gênero. Este novo táxon é o primeiro do gênero descrito em 33 anos.

**Palavras-chave:** América do Sul. Amazônia. Taxonomia. Cecília.

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MACIEL, A. O. & M. S. HOOGMOED, 2018. A new species of *Caecilia* Linnaeus, 1758 (Amphibia: Gymnophiona: Caeciliidae) from French Guiana. **Boletim do Museu Paraense Emílio Goeldi. Ciências Naturais** 13(1): 13-18.

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Recebido em 18/10/2017

Aprovado em 13/04/2018

Responsabilidade editorial: Fernando da Silva Carvalho Filho



## INTRODUCTION

*Caecilia* Linnaeus, 1758 is the most diverse genus among Neotropical caecilians, with 33 species recognized to date (Wilkinson *et al.*, 2011), distributed from Panamá in Central America to central Bolivia in the South America, where most species occur in the Amazon basin (Taylor, 1968; Wake, 1985; Lynch, 1999; Maciel & Hoogmoed, 2011).

The previously most recent species of *Caecilia* formally named was *Caecilia marcusii* Wake, 1985, originally from the Amazonian lowlands in Bolivia, subsequently found also in Brazil (Maciel & Hoogmoed, 2011). We here describe and name a new species of *Caecilia* from French Guiana, the first species of that genus to be described in the 21st century.

## MATERIAL AND METHODS

Morphometric data were taken using a dial caliper to the nearest 0.1 mm, except total length, which was measured with a ruler, to the nearest 1.0 mm. Sex was determined by the direct examination of gonads. We examined specimens of *Caecilia gracilis* Shaw, 1802, *C. marcusii* Wake, 1985 and *C. tentaculata* Linnaeus, 1758 [same specimens mentioned in the Appendix of Maciel & Hoogmoed (2011)]. Comparisons with the other known species of *Caecilia* were based on literature data (Taylor, 1968, 1972, 1973; Taylor & Peters, 1974; Savage & Wake, 2001).

The abbreviation for the holotype institution is: BYU—Monte L. Bean Life Science Museum, Brigham Young University, Provo, Utah, USA.

## RESULTS

### TAXONOMY

#### *Caecilia museugoeldi* sp. nov.

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Holotype (Figures 1 and 2; Table 1): BYU 48677, mature male, from near Camp Patawa, West of Kaw, on the road to Kaw (N 4.54465°, W 52.15258°; 177 m), district of Régina, French Guiana, collected by Brice P. Noonan and Jack Sites, on May 25, 2006; at night.

#### Diagnosis

*Caecilia museugoeldi* sp. nov. differs from *C. attenuata* Taylor, 1968, *C. caribea* Dunn, 1942, *C. corpulenta* Taylor, 1968, *C. crassisquama* Taylor, 1968, *C. degenerata* Dunn, 1942, *C. inca* Taylor, 1973, *C. occidentalis* Taylor, 1968, *C. orientalis* Taylor, 1968, *C. pachynema* Günther, 1859, and *C. subdermalis* Taylor, 1968 in having secondary



Figure 1. Holotype of *Caecilia museugoeldi* sp. nov. in life. Left, dorsal view of the body. Right, ventral view of the body. Photos: Riley Nelson (BYU).





Figure 2. Above, holotype of *Caecilia museugoeldi* sp. nov. (BYU 48677). Below, holotype of *Caecilia flavopunctata*. Photo cordially provided by Mercedes Salazar (Universidad Central de Venezuela - UCV, Venezuela). Black bar represents 10 mm.

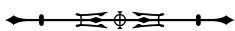
grooves (absent in the species mentioned). It differs from *C. abitaguae* Dunn, 1942, *C. albiventris* Daudin, 1803, *C. dunni* Hershkovitz, 1938, *C. guntheri* Dunn, 1942, *C. isthmica* Cope, 1877, *C. leucocephala* Taylor, 1968, *C. mertensi* Taylor, 1973, *C. pressula* Taylor, 1968, *C. tentaculata* and *C. volvani* Taylor, 1969 in having a higher number of primary annuli ( $> 147$ ). It differs from *C. antioquiaensis* Taylor, 1968, *C. armata* Dunn, 1942, *C. bokermanni* Taylor, 1968, *C. disossea* Taylor, 1968, *C. gracilis*, *C. nigricans* Boulenger, 1902, *C. subterminalis*

Table 1. Morphometric and meristic data (in mm) for the holotype of *Caecilia museugoeldi* sp. nov.

<i>Caecilia museugoeldi</i> sp. nov.	
Total length	548
Head width at jaw articulation	8.5
Head length	11.3
Head height at corner of the mouth	6
Height at mid-body	7.9
Width at mid-body	8.4
Width at the vent level	6.1
Distance between the eyes	5.4
Distance eye to tentacle	4.5
Distance eye to corner of mouth	4.3
Distance eye to margin of mouth	1.6
Intertentacular distance	3.5
Distance tentacle to nostril	1.2
Distance tentacle to corner of mouth	7.5
Distance tentacle to margin of mouth	1.1
Internarial distance	2.3
Distance nostril to margin of mouth	2.5
Snout projecting beyond mouth	2.4
Primary annuli (complete primaries)	152 (15)
Secondary grooves (complete secondaries)	26 (4)
Annular grooves interrupted by vent	3
Premaxillary-maxillary teeth	12
Vomeropalatine teeth	17
Dentary teeth	14
Splenial	3

Taylor, 1968, *C. tenuissima* Taylor, 1973, and *C. thompsoni* Boulenger, 1902 in having fewer primary annuli ( $< 157$ ). It differs from *Caecilia perdita* Taylor, 1968 in having fewer secondary grooves ( $< 64$ ).

The number of primary and secondary grooves of the new species falls within the variation of *C. marcusii* and that of *C. subnigricans* Dunn, 1942, but *C. museugoeldi* sp. nov. differs from *C. marcusii* in having subdermal scales [absent in *C. marcusii* (see Maciel & Hoogmoed, 2011)], and in having at most one row of dermal scales per fold



[up to four rows of scales per fold in *C. marcusii* (Maciel & Hoogmoed, 2011)]. It differs from *C. subnigricans* in having a different color pattern [*C. museugoeldii* sp. nov. has the flanks and venter distinctly lighter than the dorsum of the body, whereas *C. subnigricans* has the head lighter than the body, and can present a lateral yellow stripe from the neck along three-fourth of the length of the body (Taylor, 1968)], in having a lower number of teeth in two series [premaxillary-maxillary, and vomeropalatine are 12, and 17, respectively in *C. museugoeldii* sp. nov., versus at most 17, and 23 in *C. subnigricans* (Taylor, 1968)], although the type of our new species is larger than the two known specimens of *C. subnigricans*; and also differs in having subdermal scales [absent in *C. subnigricans* (Taylor, 1972)].

Finally, *C. museugoeldii* sp. nov. has a number of primary and secondary grooves very similar to that of *C. flavopunctata* Roze & Solano, 1963, but differs from that species in having a different color pattern [*C. museugoeldii* sp. nov. has the flanks and venter distinctly lighter than the dorsum of the body, versus a dorsal and ventral surface of approximately the same color with a distinctly lighter lateral stripe along the body in *Caecilia flavopunctata* (Figure 2)], in the scale inception on the body (dermal scales begin in the 60<sup>th</sup> primary groove in the new species, versus beginning in the 35<sup>th</sup> primary groove in *C. flavopunctata*), and in having a lower number of teeth in three series (premaxillary-maxillary, vomeropalatine, and dentary are 12, 17, and 14 respectively in *C. museugoeldii* sp. nov., versus 21, 19, and 26 in *C. flavopunctata*). Further, the body of *C. museugoeldii* sp. nov. is more slender than that of *C. flavopunctata* [ratio between total length and width at midbody 65 in the new species, versus 37 in *C. flavopunctata* (see Taylor, 1968)].

#### Description of the holotype

An adult male, total length 548 mm, which is 65 times body width. Head slightly narrower than body. Margin of upper jaw convex in lateral view. Snout rounded in dorsal, ventral and lateral views. Nostrils dorsolateral, oval, visible from above and not from below, further

from the margin of the mouth than the eyes (distance between nostril and margin of mouth = 2.5 mm; distance between eye and margin of mouth = 1.6 mm). Eyes small (diameter 0.2 mm), covered by a translucent epidermis, visible in lateral and dorsal view of head, as close to the corner of the mouth as to the nostrils.

Tentacular openings circular, slightly elevated above skin, positioned below the nostrils, closer to the margin of the mouth than to the nostrils, not visible from above. First nuchal groove discernible, but with interruptions dorsally; second and third nuchal grooves distinct dorsally, laterally, and ventrally. The first nuchal collar is shorter (3.2 mm) than the second (4.6 mm). Single dorsal transverse groove present on each collar, slightly larger in the first. Body subcylindrical. Width along body varies slightly, narrower close to the vent region. Primary annuli 152. Primary annular grooves completely encircling the body, but almost indistinct dorsally and ventrally near midbody, and three are interrupted by the vent. Small terminal cap present posterior to vent. Secondary grooves 26; four secondary grooves complete. Vent small and circular, with 11 denticulations: five on anterior and six on posterior margin. Dermal scales begin to appear in the 60<sup>th</sup> primary groove on the flanks, where only few ovate scales are present (0.4 x 0.3 mm); they begin to appear also dorsally on the body at the 72<sup>th</sup> primary groove, in a single row of ovate scales (e.g., 0.6 x 0.4 mm); larger but still in a single row of scales at 100<sup>th</sup> primary groove (e.g., 1.6 x 0.6) not present ventrally. At the 142<sup>th</sup> primary groove the dermal scales are present also ventrally in a single row of larger and more trapezoidal scales (e.g., 2.6 x 2.2 mm). Subdermal scales irregularly distributed along entire body, in the connective tissue (e.g., 0.5 x 0.4 mm between 82<sup>th</sup> and 83<sup>th</sup> primary grooves; Figure 3).

Choanae approximately 1.7 mm apart and 1 mm in diameter. Tongue fully attached to mandibular mucosa, dark grey, narial plugs present. Teeth in all series monosuspicious, pointed and recurved. Premaxillary-maxillary teeth 12; vomeropalatine teeth 17, dentary teeth 14; inner mandibular teeth (splenials) 3.



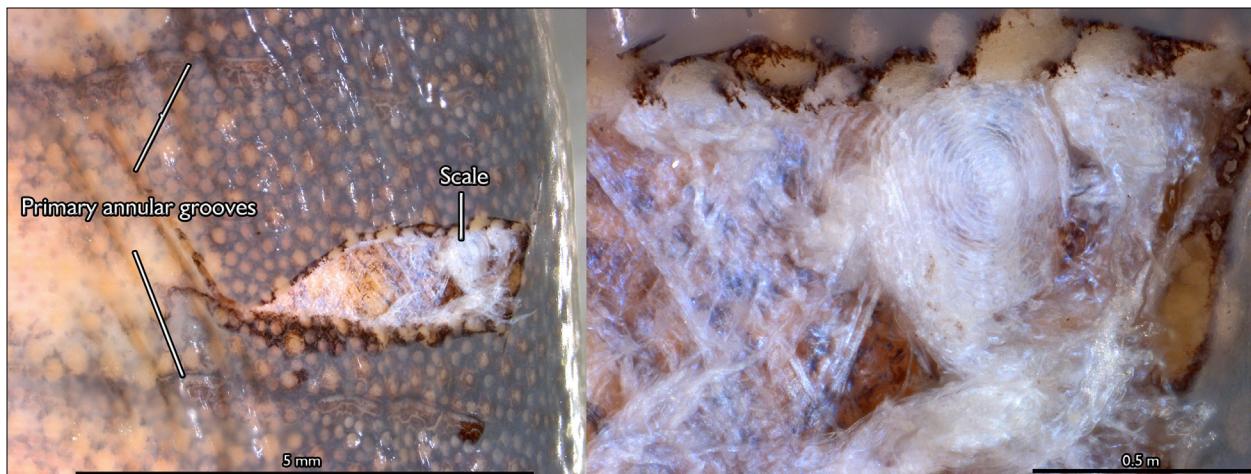


Figure 3. Scale in the connective tissue of the holotype of *Caecilia museugoeldi* sp. nov. Left, skin incision between the 82th and the 83th primary annular grooves. Right, a scale in the connective tissue. Photos: Níthomas Feitosa (MPEG).

In life the holotype has the head and the dorsum of the body dark grey (Figure 1). Venter and flanks are white, distinctly paler than the dorsum along the entire body (Figure 1). Dark grey color of the dorsum extends laterally and ventrally in primary grooves. Mandible and part of the head less pigmented. A greyish blotch posterior to the vent.

In preservative the grey parts become slightly lighter and the whitish becomes cream.

#### Geographic distribution

The species is, so far, known only from the type locality (Figure 4) in eastern coastal French Guiana.

#### Ecological observations

In the same area where the specimen was collected, two other species of Gymnophiona were obtained as well, viz., *Caecilia tentaculata* and *Rhinatremma bivittatum* (Guerin-Menéville, 1838). All specimens were found crossing the road through rainforest at night.

#### Etymology

The name of the species is in honor of the Museu Paraense Emílio Goeldi, Belém, Pará, Brazil and is a noun in apposition. The Museu Goeldi is an institution

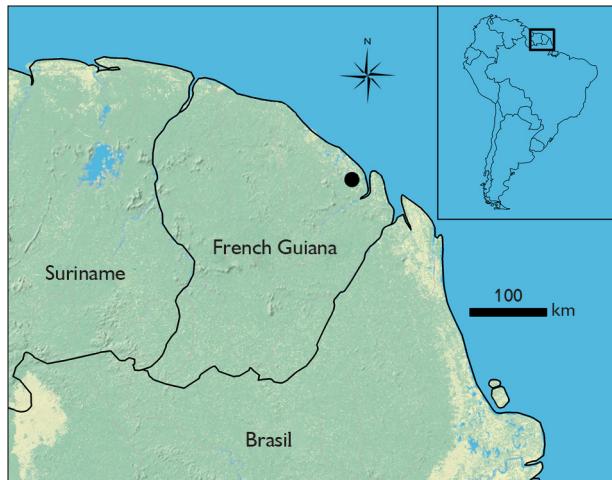


Figure 4. Map of eastern Guiana Shield. Type locality of *Caecilia museugoeldi* sp. nov. indicated by black dot.

which was established 151 years ago and is the oldest scientific institution in Brazilian Amazonia, which has steadily promoted studies of biodiversity, zoology, botany, archeology, geology, paleontology, hydrology, anthropology, ethnology, podology and linguistics of the area. Despite its important role in obtaining and dispersing knowledge about the biodiversity of the Amazonian basin in its broadest sense, the museum has recently been confronted with serious budgetary problems that should



be solved for the long term in an acceptable way by the ministry that is responsible for the museum.

## DISCUSSION

The systematics of the genus *Caecilia* is one of the major challenges to be solved in the Neotropical region; many species are known by a few specimens only, some with uncertain provenance. Although we have only one specimen of our new species, the characters which we have examined support the description of a new species of *Caecilia*. We readily differentiated *Caecilia museugoeldi* sp. nov. from 30 of the 33 known species of the genus by distinct differences in the number of primary and secondary grooves, which are reliable characters traditionally used in the taxonomy of caecilians (Taylor, 1968, 1973; Savage & Wake, 2001; Nussbaum & Wilkinson, 1989). Three species, *Caecilia flavopunctata*, *C. marcusii* and *C. subnigricans* are more similar in annulation to *Caecilia museugoeldi* sp. nov. than all other congeners. However, *C. marcusii* (from Bolivia and Southern Amazonia in Brazil) and *C. subnigricans* (known from Colombia and northern Venezuela) have a markedly different color pattern than *Caecilia museugoeldi*, moreover they do not have traces of scales in the connective tissue (subdermal scales) which are present in *Caecilia museugoeldi*. *Caecilia flavopunctata* is known only from the type locality in northern Venezuela, and has a strongly different color pattern, a different scale inception on the body, lower number of teeth, and it has a remarkably thicker body than the new species.

## ACKNOWLEDGEMENTS

We thank Jack Sites (BYU) for the loan of the specimen here described, Brice P. Noonan (University of Mississippi) for providing field data, Riley Nelson (BYU) for providing the

photos of the live specimen, Mercedes Salazar (Universidad Central de Venezuela, Museu de Biología) for providing the photo of the holotype of *Caecilia flavopunctata*, and two anonymous reviewers made helpful suggestions on the manuscript. AOM is supported financially by the *Programa de Capacitação Institucional* (MPEG/MCTI) grant number 313162/2016-6.

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