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A NEW SPECIES OF *CHIASMOCLEIS* MÉHELŸ, 1904 FROM BRAZILIAN AMAZONIA (AMPHIBIA, ANURA, MICROHYLIDAE) [1]

(With 6 figures)

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The genus *Chiasmocleis* Méhelÿ, 1904 is currently composed by 15 species, distributed in Panama and South America, north and east of the Andes. One species occurs in Panama, and five occur in northern South America, associated with the Amazon Forest; eight species occur in eastern Brazil, associated to the Atlantic Rain Forest, and three species inhabit the open areas ("cerrados") of central and southeastern Brazil and adjacent countries (CARAMASCHI & CRUZ, 1997; CRUZ, CARAMASCHI & IZECKSOHN, 1997; CRUZ, CARAMASCHI & FREIRE, 1999; FROST, 2000). The morphological heterogeneity encompassed in this nominal genus was commented by WALKER & DUELLMAN (1974). However, the validity of the several taxa within this genus, has not been assessed by a modern review (FROST, 1985).

Analysing some series of a small microhylid frog species from Brazilian Amazonia we found that, although these frogs posses a suite of characters distinct from other South American microhylids, they seem to be allied to the genus *Chiasmocleis*. In the artificial keys for microhylid genera of PARKER (1934) and CARVALHO (1954), which are mainly based on conditions of the pectoral girdle, the species keys out to *Chiasmocleis*. However, as pointed by WALKER & DUELLMAN (1974), as the several species presently referred to *Chiasmocleis* become more completely known with regard to the structure of the skull and vertebrae, it is possible that some regrouping will be necessary. In this paper this new species is described, and associated with that genus.

MATERIALS AND METHODS

Type-specimens are deposited in Museu Nacional, Rio de Janeiro, Brazil (MNRJ), Museu de Zoologia, Universidade de São Paulo, Brazil (MZUSP), and Jorge Jim Collection, Universidade Estadual Paulista, Campus de Botucatu, Brazil (JJ).

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Measurements, in millimeters (mm), are: SVL (snout-vent length); HL (head length); HW (head width); IND (internarial distance); END (eye to nostril distance); ED (eye diameter); UEW (upper eyelid width); IOD (interorbital distance); 3FD (third finger disk diameter); THL (thigh length); TL (tibia length); FL (foot length, measured from the tibio-tarsal articulation to the tip of fourth toe); 4TD (fourth toe disk diameter).

Chiasmocleis jimi sp.nov.
(Figs.1-6)

Holotype – BRAZIL, AMAZONAS, Municipality of Humaitá, Igarapé do Banheiro (07º31'S, 63º00'W), MNRJ 15459, an adult female with venter distended by eggs (Fig.1), C.M. Carvalho, A. Silva and L.M. da Silva cols., 03/I/1979.

Paratypes – BRAZIL, AMAZONAS: Municipality of Humaitá, Igarapé do Banheiro, JJ 6029, MNRJ 27259 and MNRJ 27260 (cleared and stained), gravid females, collected with the holotype. PARÁ: Parque Nacional da Amazônia, Uruá (04°36'S, 56°12'W), MNRJ 15460-15462, MZUSP 53981-53988 and MZUSP 53980 (cleared and stained), one gravid female and ten adult males, M.Rodrigues, 29/I-04/II/1979.

Fig.1- *Chiasmocleis jimi* sp.nov., holotype (MNRJ 15459), dorsal and ventral views.

Diagnosis – A small species of *Chiasmocleis* (18.6-20.4mm SVL in males, 20.6-23.0mm SVL in females), characterized by: (1) body ovoid; (2) snout rounded in dorsal and lateral views; (3) fingers free, slightly fringed; (4) tips of fingers III and IV swollen; (5) toes free, only slightly fringed; (6) first toe reduced, the tip not expanded; (7) other toes disked, disks not grooved; (8) in life, color of dorsum uniform reddish brown with minute irregular white dots, and venter cream, heavily grayish spotted.

Description - Size small; body ovoid; head triangular, broader than long; snout rounded in dorsal (Fig.2) and lateral profiles (Fig.3); snout short, nostrils not

protuberant, directed laterally; canthus rostralis indistinct, rounded; loreal region slightly concave; lips not flared; eye small, slightly projecting; upper eyelid about half of the interorbital distance; interorbital space flat, tympanum concealed; upper jaw projecting beyond lower, which has a truncate, trilobed, anterior margin; tongue large, ovoid, without a notch in its free posterior border; choanae large, widely separated. Arms slender, no tubercles or crests on forearm. Hand (Fig.4) with fingers free, slightly fringed; in order of size, I<II<IV<III; subarticular tubercles not well developed, single; supernumerary tubercles absent; palmar tubercle large, divided longitudinally; a well developed ovoid thenar tubercle at the base of the finger I; tip of fingers III and IV expanded, of I and II not expanded; finger disks not grooved. Legs long, robust; thigh length slightly smaller than tibia length; sum of thigh and tibia lengths approximately equals the SVL in males and is slightly smaller than SVL in females; knee and elbow separated when limbs are laid along the sides of the body; heels overlaps when flexed legs held at right angles to body; heel of adpressed leg exceed the axilla; knee and heel lacking tubercles; no tibial or tarsal ridges; an oval inner, but no outer, metatarsal tubercle. Foot (Fig.5) with toes free, only slightly fringed; in order of size, I<II<V<III<IV; subarticular tubercles not well developed, single; supernumerary tubercles absent; toe I reduced, the tip not expanded; other toes disked, disks not grooved; foot length approximately 70% of SVL in males, 60% in females.

Skin smooth above and beneath, lacking dermal spines, except in the anterior part of the gular region in males; anal opening not modified, no para-anal tubercle; no glands around anus or on posterior femur.

Pectoral girdle (Fig.6) with procoracoid cartilage and clavicle present, but reduced; clavicle entirely supported by the procoracoid cartilage, and reaching the coracoid on its distal third; omosternum absent; sternum broad, cartilaginous.

Color – In life, color of dorsum of body, arms and legs uniform reddish brown with minute irregular white dots; no light mid-dorsal stripe; ventrolateral region and venter cream, heavily grayish spotted; gular region grayish, with irregular white dots; no femoral light stripe. In preservative, dorsum of body, arms and legs uniform brown with minute irregular white dots; ventrolateral region dull white, heavily grayish spotted; venter dull white; gular region brownish, with irregular white dots.

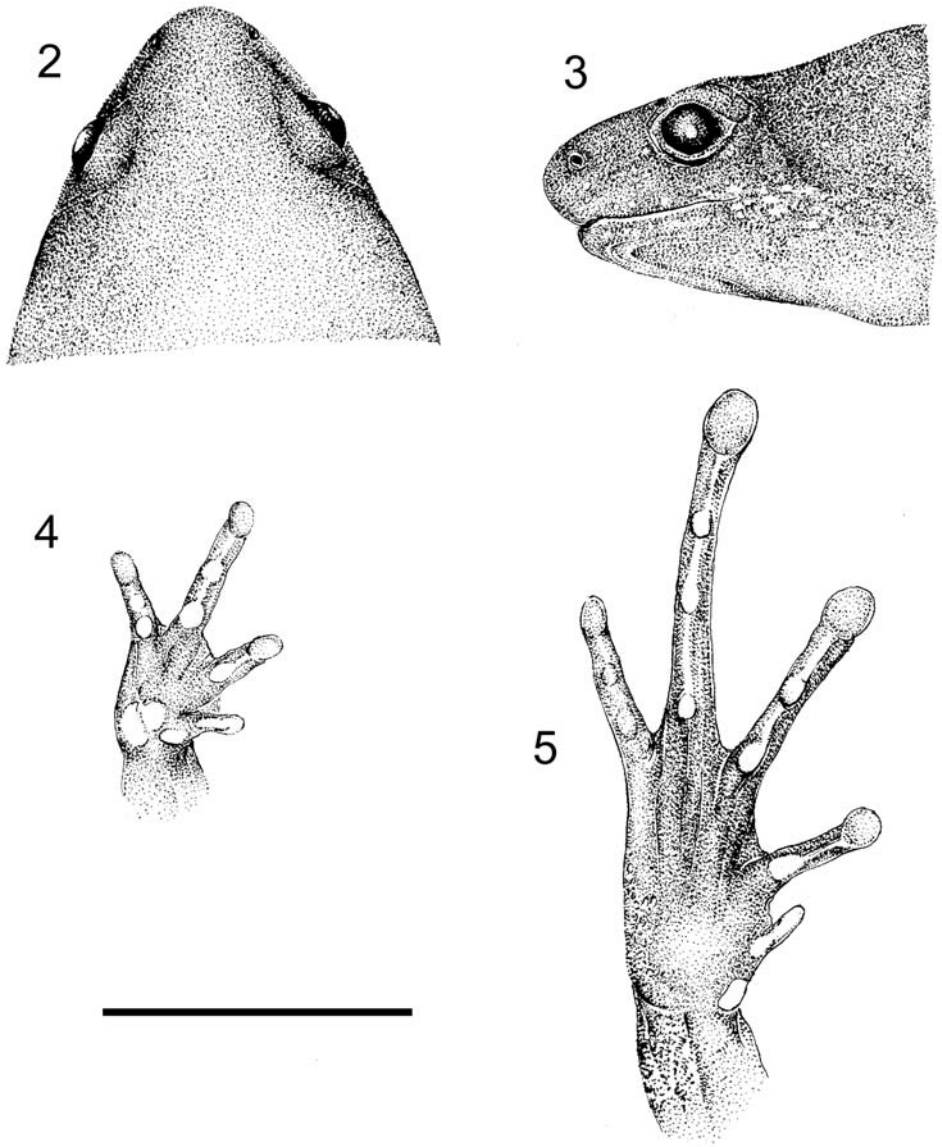
Measurements of holotype – SVL 20.6; HL 5.6; HW 6.3; IND 1.9; END 1.5; ED 1.8; IOD 2.3; 3FD 0.6; THL 9.0; TL 9.9; 4TD 1.2.

Variation – All specimens of the type-series agree very well in morphology and color. Females are slightly larger than males. Measurements are given in table 1.

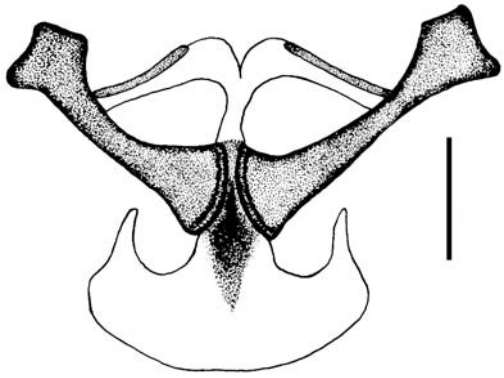
Etymology – The name of the species honors Dr. Jorge Jim, for his efforts and interest in the knowledge of Brazilian amphibians.

Remarks – The region of Humaitá, and more specifically the Igarapé do Banheiro, were succintly described by GOTTSBERGER (1978) and CARAMASCHI & JIM (1983). Humaitá is a small town on the left bank of the Madeira River, 51m above sea level. It is surrounded on the western side by the far-extending Puciari-

Humaitá savannas. To the north and south is the large dry or "terra firme" forests, frequently crossed by small rivers, regionally called "igarapés". Along these streams are the flooded areas with the "várzea" and "igapó" forests.



Chiasmocleis jimi sp.nov., holotype (MNRJ 15459): fig.2- dorsal view of head; fig.3- lateral view of head; fig.4- hand; fig.5- foot. Scale equals 5mm.



Chiasmocleis jimi sp.nov., paratype (MNRJ 27260): fig.6 - ventral view of pectoral girdle. Stippled structures are ossified; clean structures are cartilaginous. Scale equals 2mm.

TABLE 1

Measurements of *Chiasmocleis jimi* sp.nov.

Characters	♂ (n = 11)			♀ (n = 6)		
	Range	$\bar{x}$	SD	Range	$\bar{x}$	SD
SVL	18.6-20.4	19.2	0.60	20.6-24.7	22.3	1.50
HL	4.3-5.8	5.0	0.49	4.7-6.9	5.5	0.77
HW	6.5-7.2	6.8	0.26	6.1-7.7	6.7	0.56
IND	1.5-2.2	1.7	0.09	1.8-2.1	1.8	0.16
END	1.2-1.5	1.3	0.09	1.2-1.7	1.5	0.17
ED	1.6-1.8	1.7	0.06	1.6-1.0	1.8	0.12
UEW	0.9-1.1	1.0	0.05	1.0-1.4	1.2	0.14
IOD	1.9-2.8	2.3	0.26	1.9-2.6	2.3	0.26
3FD	0.5-0.6	0.5	0.04	0.5-0.6	0.6	0.05
THL	8.8-9.8	9.3	0.35	9.0-10.7	9.6	0.71
TL	9.4-10.3	9.8	0.33	9.9-11.5	10.7	0.60
FL	13.0-15.0	13.8	0.56	12.0-15.9	14.5	1.54
4TD	0.9-1.0	0.9	0.05	1.0-1.2	1.1	0.10

(n) number of specimens; ($\bar{x}$) mean; (SD) standard deviation

The Igarapé do Banheiro is a small tributary on the left bank of the Madeira River, 2km north of Humaitá. Like many other small rivers of the region, it drains the local savannas, and brings black water (SIOLI, 1975). During the dry season, when the water is at its lowest level, the stream is narrow, about 1-2m wide, and extensively surrounded by the "várzea" forest. At the rainy season, the white water (SIOLI, 1975) of the Madeira River invades the "igarapé" about 500-800m upstream from its mouth, and it is here that a sharp interface between the white Madeira and black "igarapé" waters occurs. At the highest water level, about 10-12m above the lowest, the Igarapé do Banheiro is about 100m wide, invading laterally the "várzea" forest, and it is bordered directly in both sides by the "terra firme" forest.

The vegetation of the "várzea" and "terra firme" forests in the area of the Igarapé do Banheiro seems to be reasonably undisturbed. Even at the highest water level, most of the tree crowns emerged 5-10m, and in many cases huge tree trunks rose 15-20m above the water surface.

On the soil of both "várzea" and "terra firme" forests is a thick leaf litter cover, where *Chiasmocleis jimi* sp.nov. were collected. At this same habitat were also obtained, in several opportunities, specimens of *Bufo* gr. *margaritifer* (Laurenti, 1768), *Epipedobates femoralis* (Boulenger, 1884), *Colostethus* sp., *Scinax garbei* (Miranda-Ribeiro, 1926), young *Phyllomedusa vaillanti* Boulenger, 1882, *Adenomera andreae* (Müller, 1923), and *Leptodactylus wagneri* (Peters, 1862).

There is no data on the microhabitat of the specimens of *Chiasmocleis jimi* sp.nov. collected at the Parque Nacional da Amazônia. However, this federal reserve situated on the left bank of the Tapajós River is largely covered by umid "terra firme" forest with trees to 50m high. This habitat is essentially the same found in the region of the Igarapé do Banheiro.

In the ovary and oviduct of one cleared and stained paratype of *Chiasmocleis jimi* sp.nov. (MNRJ 27260) were found several small pigmented eggs, which suggests aquatic spawning and development. The digestive tract contained fragments of termites and ants, and inorganic debris.

DISCUSSION

Five species of *Chiasmocleis* occur in northern South America, associated with the Amazon Forest: *C. anatipes* Walker & Duellman, 1974, *C. bassleri* Dunn, 1949, *C. hudsoni* Parker, 1940, C. *shudikarensis* Dunn, 1949, and *C. ventrimaculata* (Andersson, 1945). *Chiasmocleis jimi* sp.nov. is promptly distinguished from this species, and from all other species of the genus, by the tips of the fingers III and IV and of the toes II-V swollen (tips of all digits not expanded in the other species). Additionally, the new species differs from *C. anatipes* by the toes free, only slightly fringed (toes fully webbed in *C. anatipes*; WALKER & DUELLMAN, 1974; RODRÍGUEZ & DUELLMAN, 1994), and color of dorsum uniform reddish brown with minute irregular white dots, and venter cream, heavily grayish spotted (dorsum olive green to dull brown with green and/or gold metallic flecks, and venter white with bold brown mottling in *C. anatipes*; RODRÍGUEZ & DUELLMAN, 1994). The general color pattern separates *C. jimi* sp.nov. from *C. bassleri* (dorsum and flanks brown with a cream canthal and postorbital stripe; forearm and stripes on the anterior surfaces of thighs, pale orange; a large black spot in the groin; venter bluish white withlarge black spots; DUNN, 1949; RODRÍGUEZ & DUELLMAN, 1994), from *C. hudsoni* (dorsum purple brown with some fine lighter stipplings white forming an indefinite light zone from the tip of snout above canthus rostralis, along the edge of upper eyelid, and obliquely towards the flanks, where it becomes indistinct; flanks and limbs with large areas of light pink stippling; under surfaces white with brown stippling on gular region and brown reticulum on limbs; plantar suface of foot black; PARKER, 1940), from *C. shudikarensis* (dorsum dark gray with fine light flecking and a narrow light mid-dorsal line; an irregular black inguinal spot; throat gray with narrow white median line; belly and under surfaces of limbs cream with black spotting or mottling, increasing in amount posteriorly; DUNN, 1949), and from *C. ventrimaculata* (dorsum and flanks dark olive brown to dull gray with minute gold to bluish white flecks; venter pale yellowish white to white with large irregular dark brown to black spots; ANDERSSON, 1945; RODRÍGUEZ & DUELLMAN, 1994; DE LA RIVA *et al.*, 2000).

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ABSTRACT

Chiasmocleis jimi sp.nov., a small microhylid frog species (18.6-20.4mm SVL in males, 20.6-23.0mm SVL in females), is described from Brazilian Amazonia, and characterized by body ovoid; snout rounded in dorsal and lateral views; fingers free, slightly fringed; tips of fingers III and IV swollen, of first and second normal; toes free, only slightly fringed; first toe reduced, the tip not expanded, and other toes disked; disks not grooved; in life, color of dorsum uniform reddish brown with minute irregular white dots, and venter cream, heavily grayish spotted. The new species inhabits the thick leaf litter cover on the soil of the "várzea" and "terra firme" forests.

Key words: Amphibia; Anura; Microhylidae; *Chiasmocleis*; *Chiasmocleis jimi* sp.nov.; Taxonomy; Brazilian Amazonia.

RESUMO

NOVA ESPÉCIE DE *CHIASMOCLEIS* MÉHELŸ, 1904 DA AMAZÔNIA BRASILEIRA (AMPHIBIA, ANURA, MICROHYLIDAE)

Chiasmocleis jimi sp.nov., uma pequena espécie de anfíbio microhilídeo (18,6-20,4mm CRA em machos, 20,6-23,0mm CRA em fêmeas), é descrita da Amazônia Brasileira e caracterizada pelo corpo ovóide; focinho arredondado em vistas dorsal e lateral; dedos livres, ligeiramente fimbriados; extremidade dos dedos III e IV expandida em disco e dos dedos I e II normal; artelhos livres, ligeiramente fimbriados; artelho I reduzido, com extremidade não expandida; extremidade dos demais artelhos em disco; em vida, colorido do dorso uniformemente marrom avermelhado, com pontos brancos irregularmente distribuídos; ventre creme, fortemente manchado de cinza. A nova espécie habita a grossa camada de folhas mortas da serrapilheira de florestas de várzea e terra firme.

Palavras-chave: Amphibia; Anura; Microhylidae; *Chiasmocleis*; *Chiasmocleis jimi* sp.nov.; Taxonomia; Amazônia Brasileira.

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