

BOLETIM DO MUSEU NACIONAL

NOVA SÉRIE
RIO DE JANEIRO - BRASIL

ISSN 0080-312X

ZOOLOGIA

Nº 524

18 DE DEZEMBRO DE 2006

A NEW SPECIES OF *PHYLLOMEDUSA* WAGLER, 1830 FROM THE STATE OF MINAS GERAIS, BRAZIL (AMPHIBIA, ANURA, HYLIDAE) ¹

(With 5 figures)

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ABSTRACT: A new species of *Phyllomedusa* belonging to the *P. hypochondrialis* species group is described from Lagoa Seca (20°25'S, 43°29'W, 1600m above sea level), Parque Estadual do Itacolomi, Municipality of Ouro Preto, State of Minas Gerais, Brazil. *Phyllomedusa itacolomi* sp.nov. is characterized by the medium size for the group (SVL 37.8-42.6mm in males, 41.3-46.1mm in females), a reticulate stripe on the upper lip, a pattern of red-orange cells encircled by deep purple color on the concealed surfaces of flanks and limbs, a short green stripe on the distal third of the upper surface of thighs, a reticulate pattern on the border of eyelids, the absence of a whitish stripe along the lateral part of body and on the posterior surface of tibia, and by having the ventral surfaces of body and limbs whitish with a clear gray reticulation.

Key words: Amphibia. Anura. Phyllomedusinae. *Phyllomedusa itacolomi* sp.nov. Taxonomy.

RESUMO: Uma nova espécie de *Phyllomedusa* Wagler, 1830 do Estado de Minas Gerais, Brasil (Amphibia, Anura, Hylidae).

Uma nova espécie de *Phyllomedusa* pertencente ao grupo de *P. hypochondrialis* é descrita da Lagoa Seca (20°25'S, 43°29'W, 1600m de altitude), Parque Estadual do Itacolomi, Município de Ouro Preto, Estado de Minas Gerais, Brasil. *Phyllomedusa itacolomi* sp.nov. é caracterizada pelo porte médio para o grupo (CRA 37,8-42,6mm em machos, 41,3-46,1mm em fêmeas), uma estreita faixa reticulada no lábio superior, um padrão de células vermelho-alaranjado contornadas por cor roxo escuro nas superfícies ocultas dos flancos e membros, uma curta faixa verde no terço distal da superfície superior das coxas, um padrão reticulado na borda das pálpebras, a ausência de uma faixa esbranquiçada ao longo dos flancos e superfície posterior da tibia e superfície ventral do corpo e membros esbranquiçados com reticulado cinza claro.

Palavras-chave: Amphibia. Anura. Phyllomedusinae. *Phyllomedusa itacolomi* sp.nov. Taxonomia.

¹ Submitted on September 05, 2006. Accepted on December 06, 2006.

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INTRODUCTION

The genus *Phyllomedusa* is currently composed by 28 valid species, most of them distributed among four species groups: *P. burmeisteri* group (*sensu* B. LUTZ, 1950; POMBAL & HADDAD, 1992), *P. hypochondrialis* group (*sensu* BOKERMANN, 1965), *P. buckleyi* group (*sensu* CANNATELLA, 1980), *P. perinesos* group (*sensu* CANNATELLA, 1982), and *P. tarsiis* group (*sensu* DE LA RIVA, 1999). The *P. hypochondrialis* species group was redefined by CARAMASCHI (2006) based on external characters, osteology and larvae, and it was considered to be composed by nine species: *P. ayeaye* (B. Lutz, 1966), *P. azurea* Cope, 1862, *P. centralis* Bokermann, 1965, *P. hypochondrialis* (Daudin, 1801), *P. megacephala* (Miranda-Ribeiro, 1926), *P. nordestina* Caramaschi, 2006, *P. oreades* Brandão, 2002, *P. palliata* Peters, 1873, and *P. rohdei* Mertens, 1926.

In this paper, a new species of the *P. hypochondrialis* species group is described from the State of Minas Gerais, Brazil.

MATERIAL AND METHODS

Examined specimens are housed in the Museu Nacional, Rio de Janeiro, RJ, Brazil (MNRJ), Museu de História Natural João Moojen de Oliveira, Viçosa, MG, Brazil (MZUFV), and Museu de Ciências Naturais, Pontifícia Universidade Católica de Minas Gerais, Belo Horizonte, MG, Brazil (MCNAM). Comparative specimens are referred in CARAMASCHI (2006).

Abbreviations of the measurements (in 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); TD (tympanum diameter); THL (thigh length); TL (tibia length); FL (tarsus-foot length).

RESULTS

Phyllomedusa itacolomi sp.nov.

Holotype - BRAZIL - MINAS GERAIS: Lagoa Seca (20°25'S, 43°29'W, 1600m above sea level), Parque Estadual do Itacolomi, Municipality of Ouro Preto, MNRJ 34650, adult ♂ (Fig.1), collected by U.Caramaschi and coll., 28/XI/2003.

Paratypes - All collected at the type-locality: MNRJ 34651-34657, six ♂ and one ♀, collected with the holotype; MNRJ 30602, ♂, collected by A.S.Guimarães Neto and coll., 12-13/XII/2002; MNRJ 34662-24663, ♂, collected by A.S.Guimarães Neto and J.B.Isaac Jr., 29/X/2001; MZUFV 4298, ♀, collected by A.S.Guimarães Neto and R.N.Feio, 22/X/2001; MZUFV 4775, ♀, collected by A.S.Guimarães Neto and coll., 11/XI/2001; MZUFV 4776, ♀, collected by A.S.Guimarães Neto, R.C.Costa, and A.L.Silveira, 06/XII/2001; MZUFV 4777, ♂, collected by A.S.Guimarães Neto and R.N.Feio, 01/XI/2001; MCNAM 7807, ♂, collected by A.S.Guimarães Neto and L.B.Nascimento, XII/2001; MCNAM 7811, ♀, collected by A.S.Guimarães Neto, XII/2001.



Fig.1- *Phyllomedusa itacolomi* sp.nov., holotype (MNRJ 34650, SVL 42.6mm).

Referred specimens – BRAZIL, MINAS GERAIS: Ouro Branco (20°31'S, 43°42'W), MZUFV 6586-6587, collected by R.N.Feio and V.A.São Pedro, 09-10/XI/2005.

Diagnosis - A species belonging to the *P. hypochondrialis* group, characterized by: (1) size medium for the group (SVL 37.8-42.6mm in males, 41.3-46.1mm in females); (2) a reticulate stripe on the upper lip; (3) pattern of red-orange cells encircled by deep purple color on the concealed surfaces of flanks and limbs; (4) a short green stripe on the distal third of the upper surface of thighs; (5) a reticulate pattern on the border of eyelids; (6) absence of a whitish stripe along the lateral part of body and on posterior surface of tibia; (7) ventral surfaces of body and limbs whitish with a light gray reticulation.

Comparisons with other species - *Phyllomedusa itacolomi* sp.nov. is related to the reticulate forms of the *P. hypochondrialis* species group, *P. ayeaye* and *P. oreades*. It is distinguished from *P. ayeaye* by the reticulate pattern on the upper lip and on the borders of eyelids less conspicuous and by the ventral surfaces with light gray reticulations (reticulate pattern on the upper lip and on the border of eyelids very conspicuous and ventral surfaces with black reticulations in *P. ayeaye*), as well as by the cells of concealed surfaces of flanks and limbs large, less defined (small, well defined in *P. ayeaye*). Differs from *P. oreades* by the smaller tympanum and larger finger disks. From *P. megacephala*, by the presence of a reticulate pattern on the upper lip and on the border of eyelids and a reticulate gray pattern on ventral surfaces (reticulate pattern absent in *P. megacephala*), and by the cells on concealed surfaces better defined (poorly defined in *P. megacephala*). Additionally, *P. itacolomi* sp.nov. differs from *P. azurea*, *P. centralis*, *P. hypochondrialis*, and *P. nordestina* by the pattern of red-orange cells encircled by deep purple color on the concealed surfaces of flanks and limbs and by the reticulate pattern on the upper lip, border of eyelids, and ventral surfaces (pattern of black bars or stripes on red-orange bottom and absence of reticulations in those species). It differs from *P. rohdei* and *P. palliata* by the absence of a whitish stripe along the lateral part of body with a pattern of purplish stains and stripes poorly defined on a red-orange bottom (present in *P. rohdei*) or a pattern of small black longitudinal stripes (present in *P. palliata*).

Description - Robust build; head wider than long, head width contained about three times in the SVL; snout truncate in dorsal view (Fig.2), slightly obtuse in profile (Fig.3); nostrils small, subcanthal, located on small elevations, directed laterally, near the tip of snout; internarial distance larger than eye-to-nostril distance and upper eyelid width, but smaller than the eye diameter and interorbital space; the tympanum diameter about $\frac{2}{3}$ of internarial distance; canthus rostralis distinct, rounded; loreal region vertical, slightly concave; lips not flared, upper lip poorly visible from above; eyes large, slightly protuberant; interorbital space flat; cephalic crests absent; tympanum small, vertically elliptical; tympanum diameter approximately equals half of the eye diameter; a weak supratympanic fold present; parotoid glands and vocal sac indistinct; tongue large, pyriform, entire, covering almost entire bucal floor, extensively free and not notched behind; vomerian teeth absent; choanae small, largely separated.

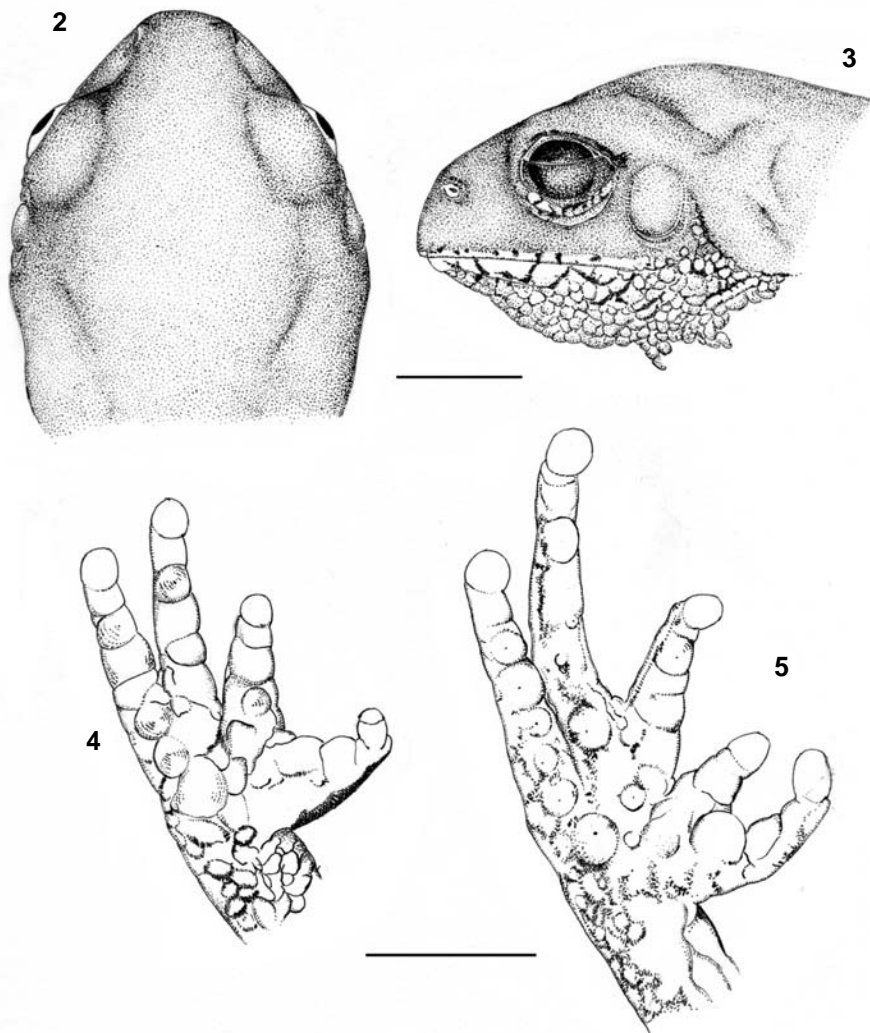
Arms robust; forearms slightly hypertrophied, without crests. Hand (Fig.4) with palmar tubercle small, approximately circular; thenar tubercle large, ovoid; fingers slender, not webbed nor fringed, with apical disks poorly developed, globose, smaller than the tympanum diameter; finger I enlarged at the base, in opposition to the other fingers; nuptial pad of horny asperities evident in males, dorsally visible on the finger I; subarticular and supernumerary tubercles single, large, round.

Legs short, moderately robust; thigh length slightly longer than tibia length and both smaller than tarsus-foot length; sum of thigh and tibia lengths about 80% of SVL; heel reaches the tympanum when the leg is addressed to body; heels touch when flexioned legs are in right angle to body; calcar appendix and tarsal fold absent; metatarsal tubercles indistinct. Foot (Fig.5) with slender toes, not webbed nor fringed, with apical disks poorly developed, globose, smaller than the tympanum diameter; toes I and II in opposition to the others; subarticular and supernumerary tubercles single, large, round. Dorsal skin smooth; gular region and ventral surfaces of body and limbs rugose; anal region moderately glandulose; cloacal opening not modified.

Color - In life, dorsum of head, body, and loreal region, green; border of upper lip and eyelids with a white stripe with black marks, resulting in a reticulate aspect. The dorsal green color ends abruptly in the dorsolateral region, sharply delimiting the flanks and the ventral surface of body. Flanks red-orange with purple vermiculations; inguinal region with a conspicuous pattern of red-orange cells encircled by deep purple color. Anterior and posterior surfaces of arms with a pattern of red-orange cells encircled by deep purple color; dorsal surface with a green stripe on its distal third; ventral surface yellow-orange. Anterior surface of forearm with yellow-orange cells on a purple bottom; dorsal surface green, which is the continuation of the stripe of the same color on the arm, running over the elbow, all forearm, and external half of dorsum of hand; fingers yellow with purple reticulations; dorsolateral surface with a gray stripe with white tubercles; ventral surface of forearm and palm of hand, yellow-orange. Anterior and posterior surfaces of thighs with well defined red-orange cells on a deep purple bottom; dorsal surface with a green stripe on the distal third, and this color covers the knee, continues on the dorsal surface of tibia, covers the heel, runs on the posterior dorsolateral surface of tarsus and foot, to the base of toes IV and V; ventral surface of thigh yellow-orange. Anterior and ventral surfaces of tibia, anterior surface of tarsus,

foot, and toes I, II, and III with well defined red-orange cells on deep purple bottom; ventral surface of tarsus and foot dark gray with irregular yellow-orange stains. Gular region, chest, and belly yellow-orange; border of mandible reticulate. Anal region gray, superiorly delimited by a white line. Iris silver with thin black reticulations.

In preservative, the green areas become greenish-blue and the red-orange and yellow-orange parts become cream or whitish; purple areas turn black.



Phyllomedusa itacolomi sp. nov., holotype (MNRJ 34650): fig.2- dorsal view of head; fig.3- lateral view of head; fig.4- hand; fig.5- foot. Scale bar = 5mm.

Measurements of the holotype - SVL 42.6; HL 12.3; HW 13.5; IND 3.4; END 3.2; ED 4.3; UEW 3.0; IOD 4.0; TD 2.4; THL 17.2; TL 16.4; FL 26.0.

Variation - Examined specimens are congruent among them respecting the morphological characters and color. Males are slightly smaller than females. Range, mean, and standard deviation of measurements of males and females are in table 1.

TABLE 1. Range, mean, and standard-deviation (SD) of the measurements of *Phyllomedusa itacolomi* sp.nov.

CHARACTERS	♂ (n = 10)			♀ (n = 4)		
	RANGE	MEAN	SD	RANGE	MEAN	SD
SVL	37.8-42.6	40.2	1.52	41.3-46.1	44.3	1.80
HL	10.5-12.8	11.3	0.56	11.4-13.1	12.3	0.58
HW	12.3-13.5	12.9	0.37	13.3-15.0	14.1	0.69
IND	3.4-3.9	3.6	0.18	3.7-3.9	3.8	0.09
END	2.7-3.2	2.9	0.17	2.7-3.2	2.9	0.19
ED	4.0-4.6	4.3	0.18	4.0-4.6	4.4	0.21
UEW	2.7-3.2	3.0	0.22	2.8-3.5	3.3	0.27
IOD	3.8-4.8	4.2	0.29	4.0-4.8	4.4	0.32
TD	2.1-2.6	2.3	0.16	2.3-3.0	2.7	0.33
THL	14.5-17.5	16.4	0.86	17.0-18.2	17.7	0.45
TL	14.7-16.4	15.6	0.51	15.4-17.5	16.7	0.78
FL	23.8-26.0	24.8	0.75	25.9-27.2	26.6	0.46

(n) number of specimens.

Geographical distribution - The new species is known from two localities associated to the southern part of the Espinhaço mountain range complex, locally called Serra do Itacolomi and Serra de Ouro Branco.

Habitat and habits - The habitat of *Phyllomedusa itacolomi* sp.nov. is essentially the same described for *Physalaemus erythros* by CARAMASCHI *et al.* (2003). The specimens were collected in an ephemeral pond at approximately 1600m above sea level. This pond consists of a rain-flooded depression of approximately 800m² located in a “campo rupestre” patch (a kind of altitude rocky field; see RIZZINI, 1979 for definition), with bushes and small trees on a sandy soil predominantly covered with grasses. Some scattered massifs of quartzitic rocks emerge in the field. The sparse bushes and small trees emerging from the continuous herbaceous layer are typical elements also found in other regions of “campos rupestres,” such as Velloziaceae, Orchidaceae, Bromeliaceae, and Eryocaulaceae (mainly *Paepalanthus*), and isolated Melastomataceae. The perimeter of the flooded area is densely covered by Juncaceae (mainly *Juncus* cf. *microcephalus*), Cyperaceae, and grasses, leaving

only a small central portion of open water. It is a typical ephemeral pond in an open area. During the dry months (April-September), the pond becomes totally dry with peats and lichens covering the exposed areas between grasses. The regional climate is the CwB type (Köppen), that is, wet temperate with dry winters and hot and rainy summers. The annual rain mean ranges 1450-1900mm (PEDRALLI *et al.*, 2001). The site, despite of its location within a conservation area, bears anthropogenic pressures including sporadic visitations by horses. Moreover, eventually the area is accidentally burned.

Phyllomedusa itacolomi sp.nov. was collected during the rainy season, between October and December, when the pond was totally full and a small rivulet drained the excess of water. The specimens were collected on the bushes around the pond and along the rivulet, approximately 0.5 to 2.0m above the water. The call is composed by low, short, isolated notes, as common for the species of the *P. hypochondrialis* species group (pers. obs.). Two different escape strategies were observed: one, which is shared with the species of the *P. hypochondrialis* group and other phyllomedusine frogs, is to fall from the branch where it was calling to the ground, where the frog stays motionless and in defensive posture among the grasses; and the other, firstly observed in a phyllomedusine frog, when it actively tried to escape, as fast as possible, walking on the branches in search of high and potentially inaccessible places for the predator (in this case, the observer).

Etymology - The specific name, a noun in apposition, is given after the type locality. "*Itacolomi*" is derived from the native Tupi language "*ita*" (rock) and "*curumin*" (children), meaning "rock with children" or alternatively "children of the rock", in allusion to a peculiar rock structure found in the region.

DISCUSSION

Among the species of the *Phyllomedusa hypochondrialis* group, four species are associated to different mountain ranges in Brazil: *P. ayeaye* is known only from Morro do Ferro, in Poços de Caldas, State of Minas Gerais, its type locality; *P. centralis* occurs also only at its type locality, in the Chapada dos Guimarães, State of Mato Grosso; *P. megacephala* is restricted to the Serra do Cipó, belonging to the Espinhaço mountain range in the State of Minas Gerais; and *P. oreades* is found in highlands of the State of Goiás and Distrito Federal, above 900m in altitude (CARAMASCHI, 2006). *Phyllomedusa itacolomi* sp.nov. is the second species of the group associated to the Espinhaço mountain range, but it occurs in a different complex, the Serra do Itacolomi and the Serra de Ouro Branco.

The highlands of the Serra do Cipó and of the Serras do Itacolomi and Ouro Branco are covered by the peculiar open vegetation occurring above 1000m in altitude known as "campos rupestres" (see HEYER, 1999 for zoogeographical comments). *Phyllomedusa megacephala* and *P. itacolomi* sp.nov. follow the pattern presented by the endemic species of the *Physalaemus deimaticus* species group (NASCIMENTO *et al.*, 2005) in the Espinhaço mountain range, where *P. deimaticus* is associated to the Serra do Cipó and *P. erythros* to the Serra do Itacolomi (CARAMASCHI *et al.*, 2003). It apparently suggests a shared evolutionary history, but *P. rupestris*, the third species of the *P. deimaticus* group, occurs in the Serra do Ibitipoca (part of the Mantiqueira mountain range) where, in spite of extensive capture efforts, no species of the *Phyllomedusa hypochondrialis* group was obtained.

ACKNOWLEDGEMENTS

We thank A.S.Guimarães Neto, H.Niemeyer, A.M.G.Cruz, J.B.Isaac, J.P.Pombal Jr., and L.B.Nascimento for the help in the field work. P.R.Nascimento for the line works. We thank the Instituto Estadual de Florestas de Minas Gerais and the Director of the Parque Estadual do Itacolomi, Alberto V.M.Mattos, for permission to collect in this conservation area.

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