

Notes about *Cibyra* WALKER, 1856 (third note), with description of three new species from southeastern and southern Brazil (Lepidoptera, Hepialidae)

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Abstract: Three species of *Cibyra* WALKER, 1856 from south-eastern and southern Brazil are described: *Cibyra endyra* sp. n. (from Minas Gerais and São Paulo states), *C. ykeyra* sp. n. (from Paraná and Santa Catarina states) and *C. ybyra* sp. n. (from Santa Catarina and Rio Grande do Sul states). Percentage differences of the partial COI mitochondrial gene sequences (DNA barcode) are presented for all species. All male holotypes are deposited in Col. Padre Jesus Santiago MOURE at Universidade Federal do Paraná, Curitiba, Brazil.

Keywords: morphology, Neotropical, taxonomy, DNA barcoding.

Anmerkungen zu *Cibyra* WALKER, 1856 (dritte Notiz), mit Beschreibung von drei neuen Arten aus dem südöstlichen und südlichen Brasilien (Lepidoptera, Hepialidae)

Zusammenfassung: Drei neue Arten von *Cibyra* WALKER, 1856 aus Südost- und Südbrasilien werden beschrieben: *C. endyra* sp. n. (von den Bundesstaaten Minas Gerais und São Paulo), *C. ykeyra* sp. n. (von Paraná und Santa Catarina) und *C. ybyra* sp. n. (von Santa Catarina und Rio Grande do Sul). Prozentuale Unterschiede des COI-„Barcodes“ der mitochondrialen Gensequenzen (mtDNA-Barcode) werden für alle Arten dargestellt. Alle männlichen Holotypen sind in der coll. Padre Jesus S. MOURE, Institut für Zoologie, Bundesuniversität Paraná, Curitiba, Paraná, Brasilien, hinterlegt.

Introduction

In the third note about *Cibyra* WALKER, 1856, three species from southeastern and southern Brazil are described as new, raising the number of species within the genus to 18. The terminology of the morphological structures follows MIELKE & CASAGRANDE (2013). Only the relevant and/or diagnostic characters of each species are mentioned.

Mitochondrial DNA was extracted for all taxa involved in this study and interpreted as explained in MIELKE & CASAGRANDE (2013).

Abbreviations used

Collections

NHMUK	The Natural History Museum (formerly British Museum (Natural History) = BMNH), London, U.K.
CEIOC	Entomological Collection of Oswaldo CRUZ Institute, Rio de Janeiro, Rio de Janeiro, Brazil.
CGCM	Collection Carlos G. C. MIELKE, Curitiba, Paraná, Brazil.
CLAM	Collection Alfred MOSER, Novo Hamburgo, Rio Grande do Sul, Brazil.
DZUP	Collection Padre Jesus S. MOURE, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Paraná, Brazil.
MZSP	Museu de Zoologia, Lepidoptera collection, Universidade de São Paulo, São Paulo, São Paulo, Brazil.

SMFL Senckenberg-Museum, Lepidoptera collection, Frankfurt am Main, Germany.

Further abbreviations

BC	Specimens with a mtDNA barcode, followed by GenBank access number [in square brackets].
FW	Forewing.
HT	Holotype.
HW	Hindwing.
PT	Paratype.

Systematic part

Cibyra endyra sp. n.

Figs. 1a, 1b, 2a, 2b, 14, 15, 16, 23, Text-Fig. 1.

Holotype ♂ with the following labels (separated by forward slashes): /Holotypus, *Cibyra endyra* C. MIELKE det. 2014/ 22. I. 2004, Pedra do Baú, São Bento do Sapucaí, 1800 m, SP, Brasil. PEREIRA leg./ CGCM 9.368/ DZ 15.573/ BC-CGCM [BC-JX215633]/. Donated by the author and deposited in DZUP. – Figs. 1a, 1b.

Paratypes (in total 4 ♂♂, 1 ♀): **Brazil.** – **Minas Gerais:** 1 ♂, Itamonte, Vargem Grande, 1830 m, 5.–10. III. 2011, C. MIELKE leg. (CGCM 24.361 [BC-JX215614]). 1 ♀, Virginia, Faz. dos Campos, 1500 m, 24. II. 1920, J. ZIKÁN leg. ([CEIOC] Z. 4.570). – **São Paulo:** 1 ♂, Salesópolis, Est. Biol. Boracéia, [800 m], 11.–15. II. 1956, TRAVASSOS & PEARSON leg. ([CEIOC] Z. 4730). 1 ♂, Campos do Jordão [*recte* Santo Antônio do Pinhal], Eugênio Lefèvre, 1200 m, 13.–15. II. 1953, L. TRAVASSOS & TRAVASSOS FILHO leg. (MZSP 14.400); 1 ♂, Campos do Jordão [*recte* Santo Antônio do Pinhal], Eugênio Lefèvre, 1200 m, 24. I. 1963, J. GUIMARÃES, MEDEIROS, L. SILVA, A. ROCHA & L. TRAVASSOS FILHO (MZSP 14.398)

Etymology. *Endyra* means “sister”, translated from the old Tupi language (native from America) due to its resemblance with the other two described species here.

♂ (Figs. 1a, 1b, 14). FW length: 16–22 mm; wingspan: 34–42 mm. Antenna with 25–28 segments. Epiphysis absent. Thorax dark orange dorsally, lighter ventrally. Legs coloured as the thorax. FW ground colour orangish-brown dorsally; baso-proximal, central patch, pre-marginal, and marginal bands compound by orangish-brown rounded spots; baso-central, baso-distal, post-discal, and submarginal bands brown; stigma oblique, bright light yellow partially surrounded by dark brown scales; the thin baso-central band sometimes with tiny spots coloured as the stigma. HW light orangish-brown to brown. Sternum VIII V-shaped (Fig. 14).

♂ **genitalia** (Figs. 15, 16). Postero-dorsal edge of the saccus bent mesally and projected posteriorly. Tergal lobes flattened, crab-claw shaped. Fultura inferior bilobed dorsally. Valvae finger like. Phallus everted with a distal bladder, compound mainly by three lobes, two downwards and one backward, without symmetrical pro-

cesses. The insertion of the ductus ejaculatorius may be developed into a fourth lobe (Fig. 16).

♀ (Figs. 2a, 2b). FW length: 31 mm, wingspan: 58 mm. Antennae bipectinate, but rami shorter than ♂♂, lacking the last segments. Thorax pale orangish-brown. FW with the same rounded spots as on the ♂♂, but much paler; postdiscal band distinct and reaching the inner margin; light transverse light-brown patch between R_5 and M_3 present. HW light orangish-brown.

Diagnosis

C. endyra sp. n. is recognized by the combination of the following characters: absence of epiphysis, projection and shape of the postero-dorsal edge of the saccus, and the phallus shape when everted. The postero-dorsal edge of the saccus bent seems to be unique within the genus.

Ethology and geographical distribution

The few records available are all from the summer and the recent collected specimens were attracted to UV lights at dusk. *C. endyra* sp. n. seems to be confined to the Mantiqueira Mountains (Fig. 23) at altitudes ranging from 800 to 1800 m. It is sympatric to *C. ochracea* C. MIELKE, 2014 and *C. ferruginosa* WALKER, 1856 in São Paulo state.

Cibyra ykeyra sp. n.

Figs. 3a, 3b, 4, 5, 6, 7a, 7b, 17, 18, 19, 23, Text-Fig. 1.

Holotype ♂ with the following labels (separated by forward slashes): /Holotypus, *Cibyra ykeyra* C. MIELKE det. 2014/ Brasil, SC, São Bento do Sul, Rio Vermelho, 700 m, 8. I. 2006, I. RANK leg./ CGCM 19.962 / DZ 15.534/ BC-CGCM [BC-JX215634]. Donated by the author and deposited in DZUP. — Figs. 3a, 3b.

Paratypes (in total 28 ♂♂, 1 ♀). All **Brazil**. — **Paraná**: 1 ♂, São José dos Pinhais, Estr. Castelhanos, 700 m, 10.–11. II. 1997, C. MIELKE & MIERS leg. (CGCM 6.307); 2 ♂♂, Tijucas do Sul, Vossoroca, 800 m, 20. XII. [19]87, C. MIELKE leg. (CGCM 6.239, 7.120); 1 ♂, Guaratuba, Pontal do Itararé, 900 m, 1. III. 2005, O. RANK leg. (CGCM 23.396 [BC-GU 661533]); 1 ♂, Guaratuba, Pontal do Itararé, 900 m, 8. II. 2001, C. MIELKE leg. (CGCM 22.764 [BC-GU 661542]). — **Santa Catarina**: 8 ♂♂, 1 ♀, same locality and collector as the holotype, 20. XII. 1995, 25. II. 2000, 15. I. 2001, 18.–25. II. 2001, 8. I. 2002, 8. I. 2003, 27. I. 2004, 12. II. 2004 (CGCM 2.072, 4.403, 5.088, 5.295, 6.181, 6.955, 13.759, 13.886 [BC-JX215629], 23.277); 4 ♂♂, same locality as the holotype, 700 m, 10. I. 2002, 21. I. 2009, 6. I. 2010, 2. XII. 2012, O. RANK leg. (CGCM 5.600, 25.196, 25.232 [SMFL], 26.954); 8 ♂♂, São Bento do Sul, Rio Natal, 550 m, 26. XII. 1995, 7. II. 1997, 7. I. 1998, 7. I. 2000, 18.–24. I. 2000, 28. I. 2001, 25. II. 2001, A. RANK leg. (CGCM 4.064, 4.602 [NHMUK], 5.280 [BC-JX215609], 5.552, 6.251, 6.326, 7.313 [BC-JX215631], 7.467); 2 ♂♂, São Bento do Sul, Rio Natal, 700 m, 24.–28. I. 2005, O. RANK leg. (CGCM 17.847, 18.023); 1 ♂, São Bento do Sul, Rio Natal, 200–500 m, 27. XI. 1994, I. RANK leg. (CGCM 7.156).

Etymology. *Ykeyra* means “oldest brother”, translated from the old Tupi language, as the previous species.

♂ (Figs. 3a, 3b, 4, 5, 6, 17). FW length: 17–29 mm; wingspan: 34–57 mm. Antenna with 27–30 segments. Epi-

physis absent. Thorax, legs, wing ornamentation, and abdomen as the previous species. However, most of the examined material (ca. 70%) shows the rounded spots suppressed, especially on the baso-proximal, baso-central, and postdiscal bands; the latter pronounced and reaching the inner margin. Two standardized phenotypes are presented without clear intermediate forms.

♂ **genitalia** (Figs. 18, 19). General apparatus as the previous species. Postero-dorsal edge of the saccus slightly curved, not bent, and projected posteriorly.

♀ (Figs. 7a, 7b). FW length: 32 mm; wingspan: 58 mm. Similar to the previous species.

Diagnosis

C. ykeyra sp. n. and *C. endyra* sp. n. seem to be closely related since their obvious similarity, however, the shape of the postero-dorsal edge of the saccus is distinct to determinate the species.

Ethology and geographical distribution

Flight activity follows the same pattern as mentioned above for the previous species. *C. ykeyra* sp. n. seems to be confined to the eastern part of the states Paraná and Santa Catarina (Fig. 23) at altitudes between 600 and 1000 m. It is sympatric and synchronic with *C. ochracea*, *C. meridionalis* C. MIELKE & CASAGRANDE, 2013, *C. monoargenteus* (VIETTE, 1951), and *C. tessellata* C. MIELKE, 2014 in several places in Paraná and Santa Catarina.

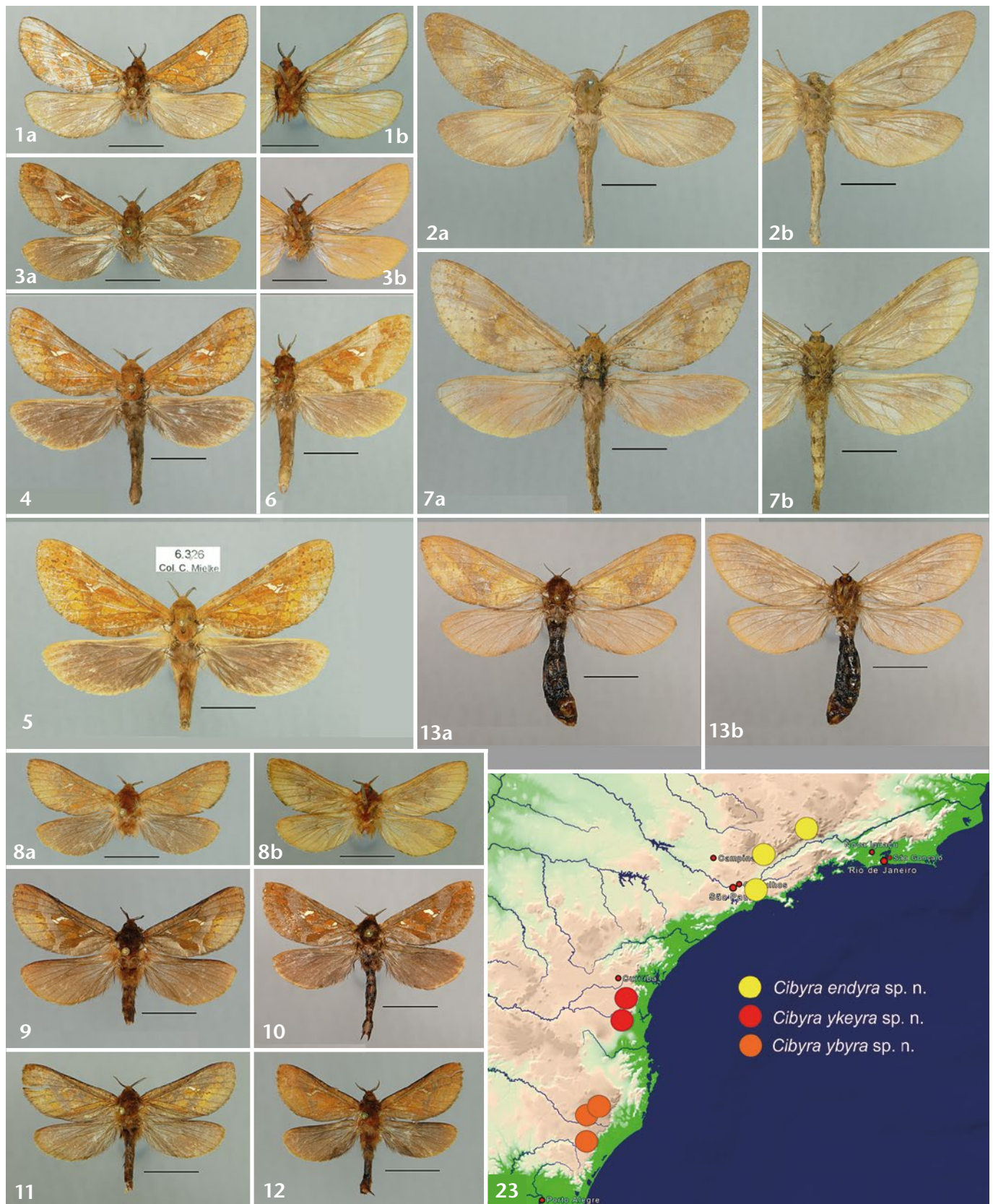
Cibyra ybyra sp. n.

Figs. 8a, 8b, 9, 10, 11, 12, 13a, 13b, 20, 21, 22, Text-Fig. 1.

Holotype ♂ with the following labels (separated by forward slashes): /Holotypus, *Cibyra ybyra* C. MIELKE det. 2014/ 18.–22. XII. 2000, Morro da Igreja, 1250 m, Urubici, SC, [Brazil], MIERS & C. MIELKE leg./ CGCM 6.850/ DZ 15.541/ BC-CGCM [BC-JX215585]. Donated by the author and deposited in DZUP. — Figs. 8a, 8b.

Paratypes, in total 25 ♂♂, 1 ♀. All **Brazil**. — **Santa Catarina**: 1 ♂, São Joaquim, 1400 m, 22.–24. I. 1983, V. O. BECKER leg. (CGCM 15.612); 4 ♂♂, same data as the holotype (CGCM 5.950 [BC-JX215588], 6.324, 7.175 [BC-JX215623], 7.485 [BC-JX215584]); 5 ♂♂, 1 ♀, same locality as the holotype, 1300 m, 26.–31. XII. 2008, 13.–19. II. 2009, C. MIELKE leg. (CGCM 22.605 [BC-JX215613], 22.893 [SMFL], 23.483 [BC-JX215616], 23.661 [BC-JX215615], 23.889 [BC-GU661552], 23.954 [BC-GU661553]); 1 ♂, same locality as the holotype, 27.–29. XII. 1997, MIERS & C. MIELKE leg. (CGCM 1.153); 2 ♂♂, Urubici, Alto Rio Canoas, 1160 m, 3. II. 2008, C. MIELKE leg. (CGCM 23.180, 23.409 [BC-GU661570]); 2 ♂♂, Urubici, Serra do Panelão, 1250 m, 12.–14. I. 1998, O. MIELKE leg. (CGCM 4.285, 5.397 [BC-JX215620]); 6 ♂♂, Urubici, Serra do Panelão, 1250 m, 30. XII. 1997, 14.–16. I. 1999, C. MIELKE leg. (CGCM 61, 407, 433 [NHMUK], 593, 676, 735); 1 ♂, Urubici, Serra do Panelão, 1300 m, 14.–17. II. 2007, A. MOSER leg. (CLAM). — **Rio Grande do Sul**: 3 ♂♂, Cambará do Sul, Estância Cambará, 1040 m, 1.–4. I. 2006, 24. II. 2006, C. MIELKE leg. (CGCM 22.818 [BC-JX215617], 23.348 [BC-GU661532], 23.364 [BC-GU661534]).

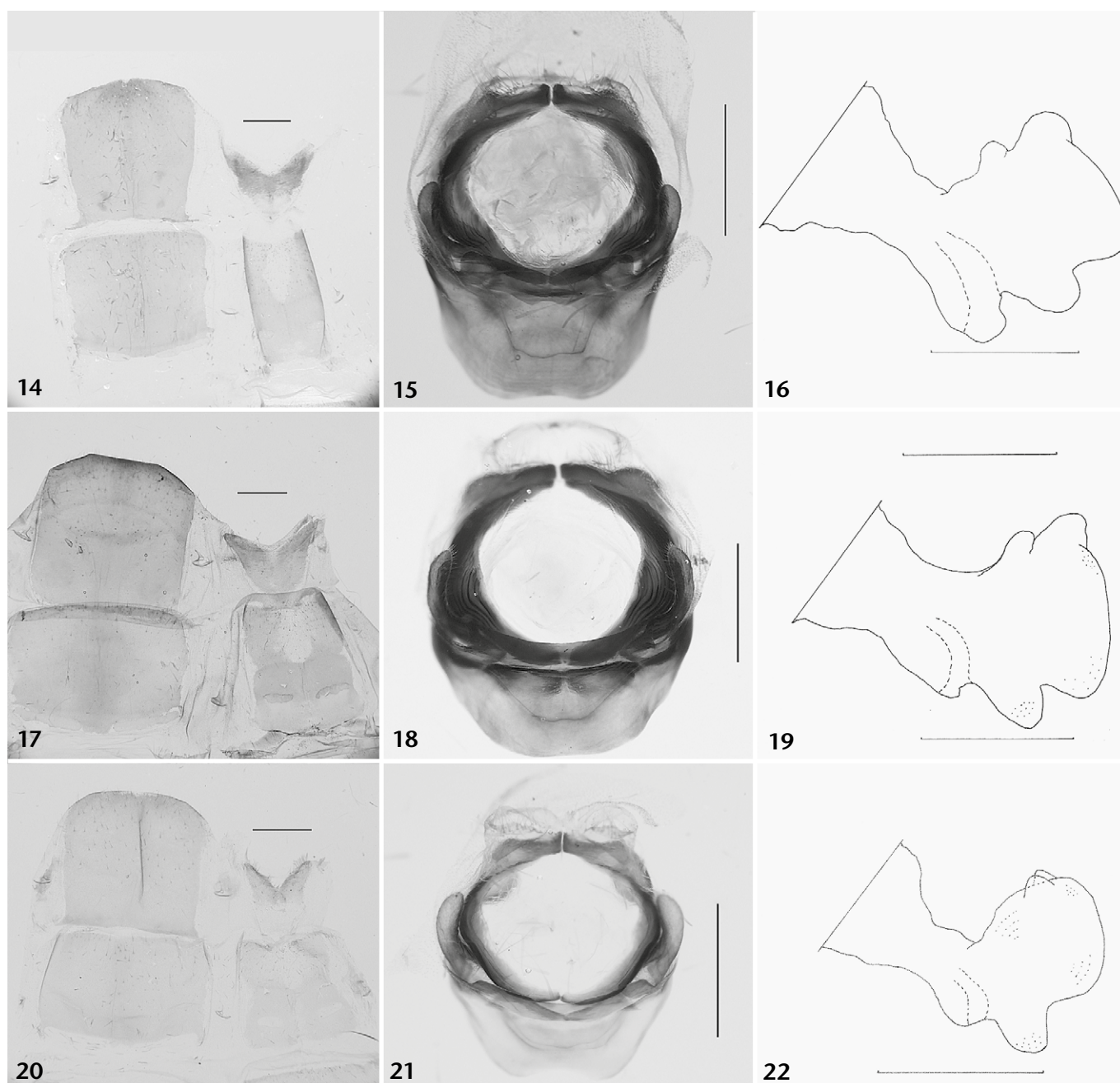
Etymology. *Ybyra*, as the previous species, means “youngest brother”, translated from the old Tupi language.



Figs. 1–2: *Cibyra endyra* sp. n. HT ♂ dorsal (1a), ventral (1b); PT ♀ dorsal (2a), ventral (2b). — **Figs. 3–7:** *Cibyra ykeyra* sp. n. HT ♂ dorsal (3a), ventral (3b); PT ♂ dorsal (4); PT ♂ dorsal (5); PT ♂ dorsal (6); PT ♀ dorsal (7a), ventral (7b). — **Figs. 8–13:** *Cibyra ybyra* sp. n. HT ♂ dorsal (8a), ventral (8b); PT ♂ dorsal (9); PT ♂ dorsal (10); PT ♂ dorsal (11); PT ♂ dorsal (12); PT ♀ dorsal (13a), ventral (13b). — **Fig. 23:** Distribution of *C. endyra* sp. n., *C. ykeyra* sp. n. and *C. ybyra* sp. n. in SE- and S- Brazil. — All specimens approximately to natural size; scale bars = 1 cm.

♂ (Figs. 8a, 8b, 9, 10, 11, 12, 20). FW length: 13–21 mm; wingspan: 26–42 mm. Antenna with 24–27 segments. Epiphysis present. Thorax, legs, wing ornamentation, and abdomen as the previous species, including the same two phenotypes.

♂ genitalia (Figs. 21, 22). General apparatus as the previous species, except by the tergal lobes pronounced and the postero-dorsal edge of the saccus slightly curved and slightly pronounced. Phallus everted with a rectangular distal bladder, compound by two lobes, the



Figs. 14–16: *Cibyra endyra* sp. n. HT ♂. 8th abdominal segment (14); HT ♂ genitalia: ventral view (15), phallus (everted) lateral view (16). — **Figs. 17–19:** *Cibyra ykeyra* sp. n. HT ♂. 8th abdominal segment (17); HT ♂ genitalia: ventral view (18), phallus (everted) lateral view (19). — **Figs. 20–22:** *Cibyra ybyra* sp. n. HT ♂. 8th abdominal segment (20); HT ♂ genitalia: ventral view (21), phallus (everted) lateral view (22). — Scale bars: 1 mm.

posterior bigger which bears two ear-like processes on each side postero-dorsally (Fig. 21).

♀ (Figs. 13a, 13b). FW length: 25 mm; wingspan: 49 mm. Antennae as the previous species with 24 segments. Thorax dark brown. Wing ornamentation as the previous species.

Diagnosis

C. ybyra sp. n. is similar to the previous species, but can be easily distinguished by the presence of an epiphysis and the slightly projection of the postero-dorsal edge of the saccus. The ear-like processes on the phallus when everted seems to be related to the one of *C. tessellata*, although the bladder shape is unique within the genus.

Ethology and geographical distribution

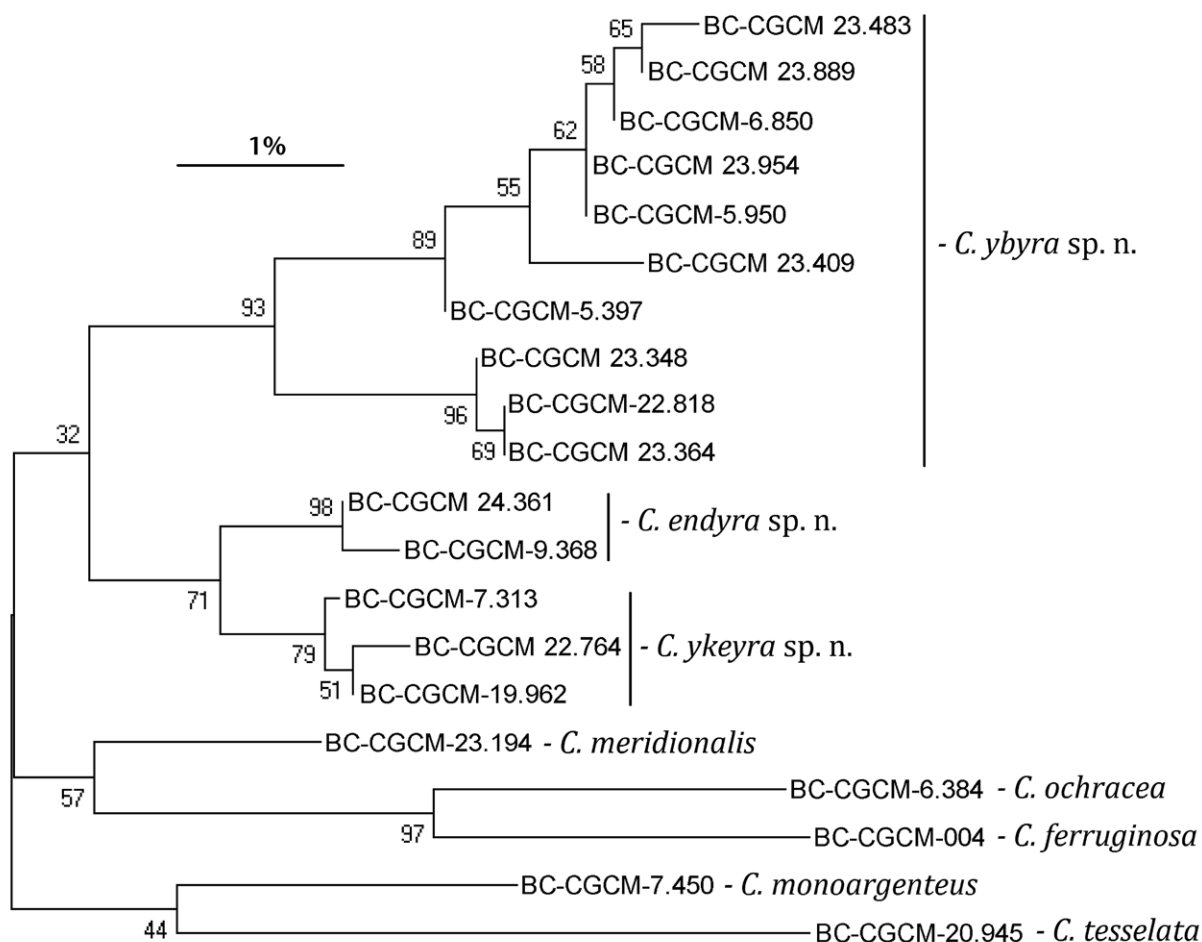
It follows the same pattern as mentioned for the two previous species. *C. ybyra* sp. n. seems to be confined to the Serra Geral of Santa Catarina and Rio Grande do Sul, on the southeastern part of former and on the north-eastern part of the latter (Fig. 20) at altitudes between 1000 and 1400 m. It is sympatric and synchronic with *C. meridionalis* and *C. monoargenteus*.

DNA analysis

In order to facilitate the comparison with other *Cibyra* species cited by C. MIELKE & CASAGRANDE (2013) and C. MIELKE (2014), their distances are transcribed in Table 1, and for building the tree, the same vouchers are used.

Table 1: Minimum p-distance (%) between DNA barcodes of the studied species. Maximum intraspecific variation is given in the diagonal (light grey; number of records within parentheses).

%	<i>C. meridionalis</i>	<i>C. ferruginosa</i>	<i>C. monoargenteus</i>	<i>C. tessellata</i>	<i>C. ochracea</i>	<i>C. endyra</i> sp. n.	<i>C. ykeyra</i> sp. n.	<i>C. ybyra</i> sp. n.
<i>C. meridionalis</i>	2,3 (36)							
<i>C. ferruginosa</i>	5,6	N/A (1)						
<i>C. monoargenteus</i>	3,9	4,4	0,5 (13)					
<i>C. tessellata</i>	6,6	6,9	6,0	0,0 (3)				
<i>C. ochracea</i>	4,7	5,0	6,6	6,9	1,5 (19)			
<i>C. endyra</i> sp. n.	3,3	5,2	4,4	5,3	5,7	0,3 (2)		
<i>C. ykeyra</i> sp. n.	3,7	4,7	3,6	5,3	5,3	1,5	0,2 (6)	
<i>C. ybyra</i> sp. n.	3,9	6,0	4,5	5,7	6,2	3,2	2,9	3,3 (14)

**Text-Fig. 1:** Unrooted bestscore ML tree for *C. meridionalis*, *C. ferruginosa*, *C. monoargenteus*, *C. tessellata*, *C. ochracea*, *C. endyra* sp. n., *C. ykeyra* sp. n. and *C. ybyra* sp. n.; bootstrap values are given at each node, and terminals are identified by their Sample-ID code referring to the records in the Barcode of Life Datasystems (BOLD).

Specimen and sequence data are stored in the Barcode of Life Data Systems (BOLD 2013, RATNASINGHAM & HEBERT 2007) in public projects and in GenBank with their code access cited for each specimen in the list of material examined.

The mitochondrial COI gene as well indicates that the taxa treated in the present publication are clearly separated as shown in the tree (Text-Fig. 1). The minimum interspecific distances and the maximum intraspecific

distances between DNA barcodes of the treated species are shown in Table 1.

Regarding internal relationships according to the phylogenetic hypothesis proposed here, *C. endyra* sp. n. is placed as a sister of *C. ykeyra* sp. n. supported by the same branch. *C. ybyra* sp. n. is on the same way placed as a sister group of the clade compound by the two previous species. These relations are corroborated by the morphology examined. Within *C. ybyra* sp. n., there are

two well defined barcode clusters with over 3% differences. Including these three specimens in the type series is the result of no evidence of any difference in the morphological characters observed.

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References

- BARCODE of life [or BOLD or BOLDSYSTEMS] (2013): Advancing species identification and discovery by providing an integrated environment for the assembly and application of DNA barcodes. Barcode of life data systems. — URL: www.barcoding-life.org or www.boldsystems.org (last accessed: 1. VIII. 2014).
- MIELKE, C. G. C. & CASAGRANDE, M. M. (2013): A new *Cibyra* WALKER, 1856 from southern Brazil (Lepidoptera, Hepialidae). — Nachrichten des Entomologischen Vereins Apollo, Frankfurt am Main, 34 (1/2): 73–86.
- (2014). Notes about *Cibyra* WALKER, 1856 (second note), with description of two new species from southeastern and southern Brazil (Lepidoptera, Hepialidae). — Nachrichten des Entomologischen Vereins Apollo, Frankfurt am Main, 34 (4): 213–217.
- RATNASINGHAM, S., & HEBERT, P. D. N. (2007): Barcoding. BOLD: The barcode of life data system (www.barcodinglife.org). — Molecular Ecology Notes, Hoboken, 7 (3): 355–364.

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