

## Three new *Periga* WALKER, 1855 from southeastern and southern Brazil (Lepidoptera: Saturniidae, Hemileucinae, Hemileucini)

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**Abstract:** Three new species of *Periga* WALKER, 1855 from southeastern and southern Brazil are described: *Periga tupa* sp. n. from São Paulo, *Periga guaraci* sp. n. from São Paulo and Paraná, and *Periga jaci* sp. n. from Santa Catarina. Dorsal and ventral views of male and female and male genitalia of all species are figured. They all belong to *circumstans* species-group. All male holotypes are deposited in Coll. Padre Jesus S. MOURE, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Paraná, Brazil.

**Keywords:** Distribution, taxonomy, new species, Neotropical.

### Drei neue *Periga* WALKER, 1855 von Südost- und Südbrasilien (Lepidoptera: Saturniidae, Hemileucinae, Hemileucini)

**Zusammenfassung:** Drei neue *Periga* WALKER, 1855 aus dem Südosten und Süden Brasiliens werden beschrieben: *Periga tupa* sp. n. von São Paulo, *Periga guaraci* sp. n. von São Paulo und Paraná und *Periga jaci* sp. n. von Santa Catarina. Dorsal- und Ventralansichten von männlichen und weiblichen Faltern sowie männliche Genitalien aller Arten werden abgebildet. Alle gehören zu *circumstans*-Artgruppe. Alle männlichen Holotypen sind in der coll. Padre Jesus S. MOURE, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Paraná, Brasilien, deponiert.

### Introduction

*Periga* WALKER, 1855 of the species-group of *Periga circumstans* WALKER, 1855, which is characterized by a bifid uncus (LEMAIRE 2002), has been shown to comprise a group of cryptic species. BRECHLIN & MEISTER (2013), MIELKE et al. (2013), and MIELKE & SIEWERT (2014) have added 26 species to *Periga* diversity for the above mentioned group in addition to the four species listed by LEMAIRES (2002), resulting in 30 species to date.

In the present article, three new species from southeastern and southern Brazil are described from the *Periga circumstans* group: *P. tupa* sp. n. from São Paulo, *P. guaraci* sp. n. from São Paulo and Paraná, and *P. jaci* sp. n. from Santa Catarina. They are compared to their close relatives: *P. campestre* C. MIELKE & SIEWERT, 2014, *P. drechseli* BRECHLIN & MEISTER, 2013, *P. foersteri* BRECHLIN & MEISTER, 2013, *P. fusca* BRECHLIN & MEISTER, 2013, *P. fuschbahiana* BRECHLIN & MEISTER, 2013, *P. fuschleopoldina* BRECHLIN & MEISTER, 2013, *P. inornata* BRECHLIN & MEISTER, 2013 and *P. paraleopoldina* BRECHLIN & MEISTER, 2013.

### Abbreviations

BC	Specimens with a mtDNA barcode, followed by ID number of BOLD or GenBank access number between brackets.
CEIOC	Entomological Collection of the Oswaldo CRUZ Institute, Rio de Janeiro, Rio de Janeiro, Brazil.
CGCM	Coll. Carlos G. C. MIELKE, Curitiba, Paraná, Brazil.
DZUP	Coll. Padre Jesus S. MOURE, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Paraná, Brazil.
FW	Forewing.
HT	Holotype.
HW	Hindwing.
PT	Paratype.

### *Periga tupa* sp. n.

Figs. 1a–b, 2a–b, 3a–b, 10a–d; 15.

**Holotype** ♂ with the following labels (separated by forward slashes): /Holotypus, *Periga tupa* C. MIELKE & SANTOS det. 2016/ Brasil – SP [São Paulo], 50 km N Miracatu, 460 m, Miracatu. 28.–29. I. 2006, C. MIELKE & T. DECAËNS leg./ DZ 33.229/ [ex] Col. C. MIELKE 19.523/ BC-CGCM [JX216330]/. Donated by the first author and deposited in DZUP. – Figs. 1a, 1b.

**Paratypes** (in total 4 ♂♂, 2 ♀♀), all Brazil, São Paulo: 1 ♂, 47 km NE Miracatu, 550 m, 5. IX. 2005, [O.] MIELKE & CASAGRANDE leg. (DZ 9.898 [BC-JX216390], DZUP); 1 ♀, same locality as the HT, 22.II.2007, T. DECAËNS leg. (CGCM 22.437 [BC-JX216305], CGCM); 3 ♂♂, 1 ♀, same data as the HT (CGCM 19.235 [BC-JX216332], CGCM 19.267, CGCM 19.491, CGCM 19.603 [BC-JX216331], CGCM).

**Etymology.** The name alludes to Tupã, known as the spirit of the thunder, creator of the sky, seas and earth, also vegetal and animal kingdoms. It comes from the Tupi-Guarani mythology, the native people who inhabited the type locality.

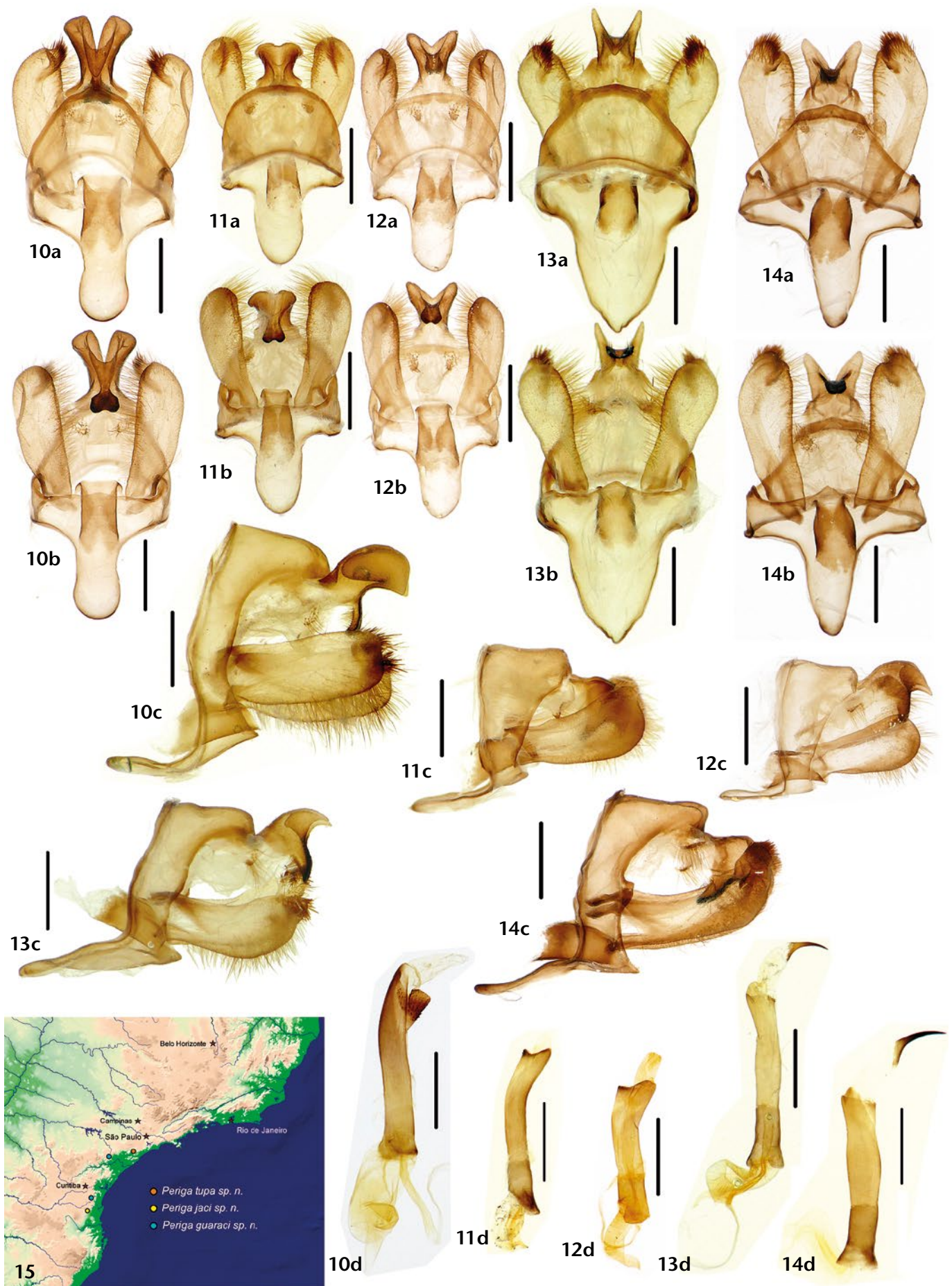
♂ (Figs. 1a, 1b, 2a, 2b). FW length 31–32 mm; wingspan 54–59 mm. Antenna (ca. 45 segments) bipectinate, last 10–12 segments with a ventral protuberance; rami light yellow with brown scales dorsally, pectination symmetrical and downcurved, arising from the base of the segment. Frons light brown. Labial palp dark carmine postero-dorsally, dark yellow ventrally. Thorax orange-brown dorsally, sometimes lighter, light brown to pale olivish-brown ventrally. Legs coloured as the thorax ventrally, femur I dark brown dorsally, tibia and tarsus carmine dorsally. FW elongated, apex acute and not sharpened, slightly pronounced, outer margin straight to slightly convex; dorsal ground colour concolorous with the thorax, sprinkled with dark grey dots throughout, without differentiation between ante-, median and postmedian areas, central portion of the median area slightly darker, submarginal band lighter and irregular





**Figs. 1–9:** New species of *Periga*. — Scale bars: 1 cm, i.e. approximately natural size. a = dorsal view, b = ventral view of the same specimen. — **Figs. 1–3:** *Periga tupa* sp. n. **Fig. 1:** HT ♂. **Fig. 2:** PT ♂ (CGCM 19.491). **Fig. 3:** PT ♀ (CGCM 22.437). — **Figs. 4–6:** *Periga jaci* sp. n. **Fig. 4:** HT ♂ **Fig. 5:** PT ♂ (CGCM 19.992). **Fig. 6:** PT ♀ (CGCM 19.784). — **Figs. 7–9:** *Periga guaraci* sp. n. **Fig. 7:** HT ♂. **Fig. 8:** PT ♂ (CGCM 30.296). **Fig. 9:** PT ♀ (DZ 22.355).





Figs. 10–14: ♂ genitalia of *Periga*. — Scale bars: 1 mm; pictures not exactly to the same scale. a = posterior view, b = anterior view, c = left lateral view, d = phallus left lateral view. — Figs. 10a–d: *Periga tupa* sp. n., HT. — Figs. 11a–d: *Periga jaci* sp. n., HT. — Figs. 12a–d: PT (CGCM 19.992). — Figs. 13a–d: *Periga guaraci* sp. n., HT. — Figs. 14a–d: PT (CGCM 30.296). — Fig. 15, map: Distribution of *Periga tupa* sp. n., *Periga jaci* sp. n. and *P. guaraci* sp. n. within southeastern and southern Brazil.

distally; ante- and postmedial lines light to dark grey, the latter preapical, straight, and bordered by white and/or light yellow scales proximally; discal spot variable, mostly reduced to two tiny white dots surrounded by dark grey, barely connected, a third dot sometimes present. HW coloured as the FW, anterior area lighter; ante- and postmedial lines grey to dark grey, wider than the FW lines; anal angle slightly pronounced. FW ventral side light brown with greyish shades, postmedial line preapical with a white patch proximally near the C vein, submarginal band darker distally. HW ventral side as the FW with one dark grey tiny discal dot, a second dot sometimes present, anal angle whitish-grey. Abdomen coloured as the thorax.

♂ **Genitalia** (Fig. 10a–d). Tegumen projected posteriorly; anterior projection of saccus tongue-shaped. Uncus prominently bifid ventrally with an enlarged anterior process well sclerotized apically. Valva simple, rectangular, slightly projected postero-dorsally inwardly curved, projection setose internally. Phallus with a bulbus ejaculatorius and vesica half and one third, respectively, as long as the sclerotized shaft which bears a well-marked patch of spicules ventrally. Vesica without cornutus.

♀ (Figs. 3a, 3b). FW length 40–42 mm; wingspan 70–72 mm. Antenna (ca. 48 segments) filiform, last 16–18 segments with a ventral protuberance; rami dark pale yellow. Frons brownish-grey. Labial palp pale yellow with brown and few carmine scales. Thorax as the frons, ventrally light greyish-brown. Legs coloured as the thorax, except contrasting brown tibia and tarsus. FW elongated, apex acute and falcate, outer margin convex; dorsal ground colour light brownish-grey, sprinkled with dark grey dots throughout, without differentiation between ante- and median areas, submarginal and marginal bands greyish-brown, the former with distal portion coloured as the thorax; ante- and postmedial lines light to dark grey, the latter almost apical; discal spot diffuse and coloured as the postmedial line. HW coloured as the FW. Ventral side of both wings same as the dorsal side but ground colour yellowish-grey; FW postmedial line preapical extending a darker grey patch towards the apex; HW with one tiny discal black dot, anal angle as in the ♂. Abdomen coloured as thorax.

### Diagnosis

*Periga tupa* sp. n. resembles some species of the *circumstans* species-group: *P. fusca*, *P. fuschahiana*, *P. fuscleopoldina*, and *P. campestre*. However, the spiculated patch on the distal portion of the sclerotized shaft is only shared with *P. fusca*, although it is better marked in *P. tupa* sp. n., while restricted to a narrow stripe in *P. fusca*. Additionally, *P. tupa* sp. n. has a longer ♂ forewing length (31–23 mm) than the unique ♂ specimen known of *P. fusca* (26 mm), a longer vesica, one third of the sclerotised shaft in the former and one-eighth in the latter, and a longer projection of the saccus, as wide as long in *P. fusca* and twice as long than wide in *P. tupa* sp. n.

### Ethology and geographical distribution

*P. tupa* sp. n. is known only from the southeastern region of São Paulo (Fig. 15). All material examined was attracted to UV lights. It is only sympatric to *P. circumstans*. According to the collecting date, it seems *P. tupa* sp. n. is bivoltine with one generation on late winter and one on mid-summer.

### *Periga jaci* sp. n.

Figs. 4a–b, 5a–b, 6a–b, 11a–d, 12a–d; 15.

**Holotype** ♂ with the following labels (separated by forward slashes): /Holotypus, *Periga jaci* C. MIELKE & SANTOS det. 2016/ Brasil - SC [Santa Catarina], Rio Natal, 550 m, São Bento do Sul, v. 2005, A[bilio] RANK leg./ DZ 33.179/ [ex] Col. C. MIELKE 19.944/ BC-CGCM [BC-JX216345]/. Donated by the first author and deposited in DZUP. – Figs. 4a, 4b.

**Paratypes** (in total 3 ♂♂, 1 ♀) with same data as the HT (CGCM 19.624, CGCM 19.976 [BC-JX216342], CGCM 19.992 [BC-HQ972119], CGCM 19.784 [BC-HQ972117], all in CGCM).

**Etymology.** As the previous species, the name alludes to Jaci, known as the Moon God, daughter of Tupã. It comes from the Tupi-Guarani mythology, the people who inhabited the type locality.

♂ (Figs. 4a, 4b, 5a, 5b). FW length 28–30 mm; wingspan 51–55 mm. Antenna (ca. 42–45 segments) bipectinate, last 8–10 segments with a ventral protuberance; rami pale yellow with scattered brown scales dorsally, pectination symmetrical and downcurved, arising from the base of the segment. Frons light yellowish-grey. Labial palp dark brown dorsally, dark yellow ventrally. Thorax pale yellow to pale brown with olivish-brown shades dorsally and ventrally. Legs coloured as the thorax, brown scales sometimes scattered, tarsus and tibia with few light carmine scales. FW elongated, apex acute and slightly pronounced, outer margin straight to slightly convex; dorsal ground colour as the thorax, sprinkled with brown dots throughout, without differentiation between ante-, median-, and postmedian areas, central portion of the median area sometimes darker, submarginal and marginal bands separated by irregular pale yellow scales, the former sometimes grey distally; ante- and postmedial lines dark brown, the latter preapical, straight, poorly bordered with pale yellow scales proximally; discal spot compound by two or three white dots surrounded by dark brown, barely connected. HW coloured as the FW, anterior area lighter; ante- and postmedial lines coloured as in the FW; anal angle indistinct or slightly pronounced. FW ventral side as the dorsal side but lighter, postmedial line preapical, submarginal band darker distally. HW ventral side coloured as the FW with or without two dark grey tiny discal dots, anal angle whitish-yellow. Abdomen coloured as the thorax.

♂ **Genitalia** (Fig. 11a–d, 12a–d). Tegumen slightly projected posteriorly; anterior projection of saccus tongue-shaped. Uncus bifid ventrally with an anterior process enlarged and well sclerotized apically. Valva simple, broader distally with postero-dorsal corner angled, slightly inward curving with a setose protuberance



internally, inner edge concave apically. Phallus with a bulbus ejaculatorius half as long as the sclerotized shaft, vesica reduced. Sclerotized shaft with the distal edge with reduced spines dorsally. Vesica without cornutus.

♀ (Figs. 6a, 6b). FW length: 40 mm; wingspan: 70 mm. Antenna (ca. 44 segments) filiform, last 11 segments with a ventral protuberance; rami pale yellow with brown scales dorsally. Frons pale yellow. Labial palp brown dorsally, dark yellow ventrally. Thorax light brownish-grey dorsally, lighter ventrally. Legs coloured as thorax ventrally with interspersed brown scales. FW elongated, apex acute, slightly pronounced, outer margin slightly convex; ante- and postmedial lines brown, the latter almost apical; ante- and postmedian areas as the thorax, median area lighter, submarginal band darker distally; discal spot with three white dots surrounded by brown, barely connected. HW with ante- and median areas lighter brownish-grey, postmedian area with darker submarginal band. Ventral side as for dorsal side, but lighter; lines dark brown, contrasting, FW postmedial line preapical; HW with one tiny discal black dot, anal angle light grey and slightly pronounced. Abdomen coloured as thorax.

### Diagnosis

*Periga jaci* sp. n. is distinguished from all other species by the ground colour of the ♂. The reduced spines of the distal portion of the sclerotized shaft is only shared with *P. fuscleopoldina*, but it differs from *P. jaci* sp. n. by the longer vesica, one third of the sclerotized shaft length in the former and one fifth to one tenth in the latter, and by the saccus shape which is triangular in the former. A cornutus is present in *P. fuscleopoldina*, absent in *P. jaci* sp. n.

### Remarks

*Periga jaci* sp. n. is a surprisingly variable species considering the ground colour. The angled postero-dorsal corner of the valve could be a good diagnostic character, but this feature is not mentioned for any of the species described by BRECHLIN & MEISTER (2013) and it is not visible in their figures.

### Ethology and geographical distribution

*Periga jaci* sp. n. is known only from the type locality (Fig. 15). All examined material was attracted to UV lights. It is sympatric to *P. circaustralis* BRECHLIN & MEISTER, 2013, *P. pulchra* C. MIELKE & BRECHLIN, 2013 and *P. foersteri*. The type series was collected in the autumn (May 2005) at a single site on the Atlantic slope where the dense ombrophilous forest is dominant. Since then, no other specimen has been found or identified.

### *Periga guaraci* sp. n.

Figs. 7a–b, 8a–b, 9a–b, 13a–d, 14a–d; 15.

**Holotype** ♂ with the following labels (separated by forward slashes): /Holotypus, *Periga guaraci* C. MIELKE & SANTOS det. 2016/ Brasil: PR [Paraná], Tijucas do Sul, BR376 km 655,

879 m, –25.835° –49.048°, 1.–3. vi. 2011, F. L. SANTOS leg./ DZ 22.485/ BC-DZ [JX216362]/. Deposited in DZUP. – Figs. 7a, 7b.

**Paratypes** (in total 10 ♂♂, 1 ♀), all **Brazil: São Paulo:** 1 ♂, Ribeirão Grande, Parque Estadual Intervales, 801 m, 10.–14. vii. 2013, W 48°25'1", S 24°16'24", E. JOERKE & C. MIELKE leg. (CGCM 30.296 [BC-CGCM 30296], in CEIOC). – **Paraná:** 2 ♂♂, same locality and collector as the HT, 3.–5. v. 2011 (DZ 22.435 [BC-JX216358], DZ 22.475 [BC-JX216361], both in DZUP); 3 ♂♂, same locality and collector as the HT, 1.–3. vi. 2011 (DZ 22.415 [BC-JX216356], DZ 22.535 [BC-JX216367], both in DZUP; CGCM 33.576, in CGCM); 5 ♂♂, 1 ♀, same locality and collector as the HT, 1.–3. vii. 2011, (DZ 22.355 [BC-JX216351], DZ 22.425 [BC-JX216357], DZ 22.445 [BC-JX216359], DZ 22.495 [BC-JX216363], DZ 22.525 [BC-JX216366], DZ 22.585 [BC-JX216371], all in DZUP).

**Etymology.** As with the previous species, the name alludes to Guaraci, known as the Sun God, son of Tupã. It comes from the Tupi-Guarani mythology, the people who inhabited the type locality.

♂ (Figs. 7a, 7b, 8a, 8b). FW length 28–30 mm, wingspan 54–57 mm. Antenna (ca. 48 segments) bipectinate, last 8–10 segments with a ventral protuberance; rami pale yellow, sometimes with interspersed brown scales dorsally, pectination symmetrical and downcurved, arising from the base of the segment. Frons pale yellow with brown scales. Labial palp dark brown dorsally, dark yellow ventrally. Thorax dull yellow to orangish-yellow dorsally, pale yellow ventrally. Legs coloured as thorax ventrally, foreleg brown dorsally, tibia and tarsus light carmine. FW slightly elongated, apex acute, slightly or not pronounced, outer margin convex; dorsal ground colour dull yellow to orangish-yellow, sprinkled with dark grey dots throughout, without differentiation between ante-, median-, and postmedian areas; submarginal and marginal bands separated, the former light grey to grey distally; ante- and postmedial lines light to dark grey, the latter almost apical, straight, bordered by light yellow and orange scales, proximally and distally respectively; discal cell prominently marked and contrasting by two or three dark grey dots with or without a white center, barely connected. HW coloured as the FW; ante- and postmedial lines coloured as in the FW; anal angle indistinct or slightly pronounced. FW ventral side pale yellow, postmedial line preapical, submarginal band darker distally. HW ventral side as the FW with one tiny dark grey discal dot, a second dot sometimes present. Abdomen coloured as the thorax.

♂ **Genitalia** (Fig. 13a–d, 14a–d). Tegumen projected posteriorly; anterior projection of saccus triangular to sub-triangular, posterior edge slightly projected mesally. Uncus bifid ventrally with an anterior process enlarged and well sclerotized apically. Valva simple, elongated with a setose postero-dorsal projection. Phallus with a bulbus ejaculatorius Z-shaped, longer than half of the aedeagus and vesica half as long as the sclerotized shaft. The latter straight with the distal portion bearing reduced spines ventrally. Vesica armed with a conspicuous and curved (eagle nail-like) cornutus from one third to one fourth as long as the sclerotized shaft length.

♀ (Figs. 9a, 9b). FW length 39 mm, wingspan 70 mm. Antenna (ca. 45 segments) filiform; rami dark yellow. Frons grey. Labial palp dark brown dorsally, dark yellow ventrally. Thorax pale brownish-grey, ventrally lighter. Legs coloured as the thorax, foreleg darker. FW elongated, apex acute, slightly falcate, outer margin convex; ante- and postmedial lines dark brown, the latter almost apical and bordered by pale yellow and orange, proximally and distally respectively; ante- and postmedial areas as for the thorax, submarginal band dark grey; distal margin of discal cell slightly marked by dark grey scales. HW with ante- and median areas lighter grey with yellow shades, postmedian area coloured as the thorax, submarginal band dark grey. Ventral side as dorsal side, but lighter; lines dark brown, strongly contrasting, foreline preapical.

### Diagnosis

From all species of the *circumstans* species-group, *P. guaraci* sp. n. mainly resembles *P. foersteri*, but also *P. drechseli*, *P. inornata* and *P. paraleopoldina* due to the convex outer margin of the wings giving a rounded appearance, the contrasting FW discal spot, and the non-pronounced anal angle of the HW. However, *P. guaraci* sp. n. differs from all these relatives by the presence of a pronounced cornutus on the vesica, absent in *P. foersteri* and *P. drechseli* and much reduced in *P. paraleopoldina* and *P. inornata*. The Z-shaped bulbus ejaculatorius could be a useful character, but it could not be compared to any of the species described by BRECHLIN & MEISTER (2013) as mentioned for the previous species.

### Remarks

In spite of two years systematic collecting efforts in the SE region of São Paulo, only one ♂ of the newly described species is known from that region. The ♂ genitalia shows some differences between this specimen and the population from the type locality: the longer bulbus ejaculatorius and vesica when compared to the sclerotized shaft length (Figs. 13d, 14d). Therefore, these characters may lead to a different taxon, depending on future examination of other available specimens. In the present article, this specimen is assigned to *P. guaraci* sp. n. due the diagnostic features within the *circumstans* species-group, stressing that these features vary exclusively in the length. When more material becomes available, its status should be reevaluated.

### Ethology and geographical distribution

*P. guaraci* sp. n. is known from two sites, one in the southeastern region of São Paulo and the other from the eastern region of Paraná (Fig. 15). All material examined was attracted to UV lights in late autumn and early winter. It is sympatric to *P. acuta* C. MIELKE & MEISTER, 2013, but not synchronic, *P. foersteri* in the type locality only and *P. circaustralis*.

### General remarks

As stated by MIELKE & SIEWERT (2014), descriptions by BRECHLIN & MEISTER (2013) are problematic due to the lack of details for many aspects of morphology, including the genitalia. Since the *circumstans* species-group has been demonstrated to be a cryptic group, the recognition of diagnostic features have been obscured by superficial descriptions.

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