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Polythore koepckei spec. nov. from the Sira Mountains in Peru with remarks on related species

(Odonata, Zygoptera, Polythoridae)

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Polythore koepckei spec. nov. is described from the mountains of Cerros del Sira, Huanuco Department, Peru and compared to its nearest relatives. It differs from *Polythore spaeteri* Burmeister & Börzsöny, 2003 in penis structure and in having brownish apical spots not only in forewings, but also in hindwings. Although the type localities of the two species are only some fifty kilometers away from each other, they occur at different elevations, *P. spaeteri* is known from lowland locations at 250–350 m above see level, but *P. koepckei* from levels at 800 m and above.

Polythore koepckei spec. nov. de los Cerros del Sira en el Perú, con observaciones sobre especies relacionadas (Odonata, Zygoptera, Polythoridae).

Polythore koepckei spec. nov. es descrita de la montaña Cerros del Sira, Departamento de Huánuco, Perú, y comparada con las especies más cercanas. Difiere de *Polythore spaeteri* Burmeister & Börzsöny, 2003 en la estructura del pene y en que tiene manchas apicales parduscas no sólo en las alas ateriores sino tambien en las alas de posteriores. Aunque las localidades típicas de las dos especies se encuentran a una distancia de solamente 50 km, habitan en alturas diferentes. *P. spaeteri* es conocida de elevaciones bajas de 250 a 350 msnm, mientras que *P. koepckei* vive en niveles a partir de los 800 metros.

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Introduction

The strictly neotropical genus *Polythore* shows a remarkable concentration of species in Peru. Out of the currently recognized 19 species six species are known so far only from there (Hoffmann et al. 2009). An additional new species from Peru is described here.

Taxonomy

Polythore koepckei spec. nov.

Material examined. All specimens are from the "Sira Gebirge", Department Huanuco in Peru (label in German), collected by Dr. Joachim Hoffmann from Hamburg during an Austrian-Peruvian Expedition at the western slopes of Cerro del Sira between the base camp at an elevation of 800 and higher up near "Laguna" at ca. 1300 m. Available are approximate coordinates for the later as 9°26' S 74°45' W (Wallnöfer, 1998). Holotype ♂: forest near camp, 28.12.1987, in MSM (Museo de Historia Natural de la Universidad Nacional Mayor San Marcos, Lima, Peru). – Paratypes: 1♂ near camp, 24.10.1987, in MSM; 1♂ near camp at ca. 800 m, 12.11.1987, in MSM; 1♂ near camp ca. 800 m, 04.03.1988, in ZSM (Zoologische Staatssammlung München); 1♂, forest near camp, 28.12.1987, in coll. L. Börzsöny.

Etymology. Named in honour of the late Professor Dr. Hans-Wilhelm Koepcke of Hamburg, among others, founder of the Biological Station Panguana which by

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Fig. 1. *Polythore koepckei*, paratype.

now serves for already four decades the research in tropical rainforest, and where nearby the new species was collected.

Description

Male (holotype). Length of abdomen, excluding appendages 41.7 mm, hind wing length 36 mm, maximal width 9.5 mm. Cerci ca. 1.8 mm long. Length of forewing (fw) 39 mm, hindwing (hw) 36 mm, maximum width of hw 9.5 mm. In fw the distance between base and nodus 14.7 mm, between nodus and pterostigma 19.5 mm. Width of brownish apical spot, from the somewhat diffuse proximal border to wing apex approximately 15 mm in fw, 14 mm in hw.

Head. Overall colour black with some pale markings. Labrum orange, narrowly bordered with black, anterior border and a midline black. Postclypeus black with minute pale spots on each side. Vertex with four orange spots arranged as vertices of a rectangle. Labium pale yellowish, mouthparts shiny black.

Prothorax dorsally and laterally largely black, shading into pale yellowish beneath, with a broad transverse orange band on the middle lobe, interrupted medially.

Pterothorax largely black with five orange stripes arranged in the pattern typical for all species of the genus. Legs black, inner side of femora pale.

Abdomen black with minute pale yellowish markings laterally on the first three segments, a larger spot anteriorly followed by a small line.

Cerci black, with a ventromedial process at mid-length, shaped as in other species of the genus.

Penis (genital ligula) terminal segment shown in Fig. 2A. The penis horns (terminology according to Bick & Bick, 1985) of *P. koepckei* are shorter, stouter and not diverging, while those of *P. spaeteri* (Fig. 2B) are longer, more slender and slightly diverging. Length of horns 0.6 mm. Flagellum two segmented in both species.

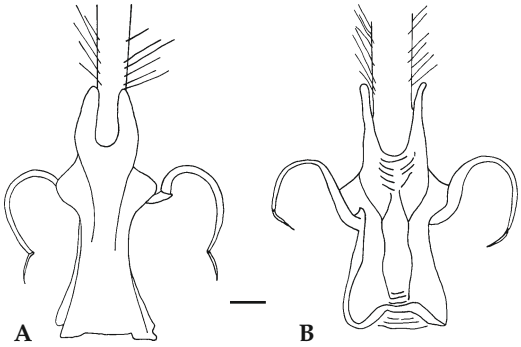

Fig. 2. Terminal segment of penis, ventral view. **A.** *Polythore koepckei*; **B.** *P. spaeteri*, paratypes.

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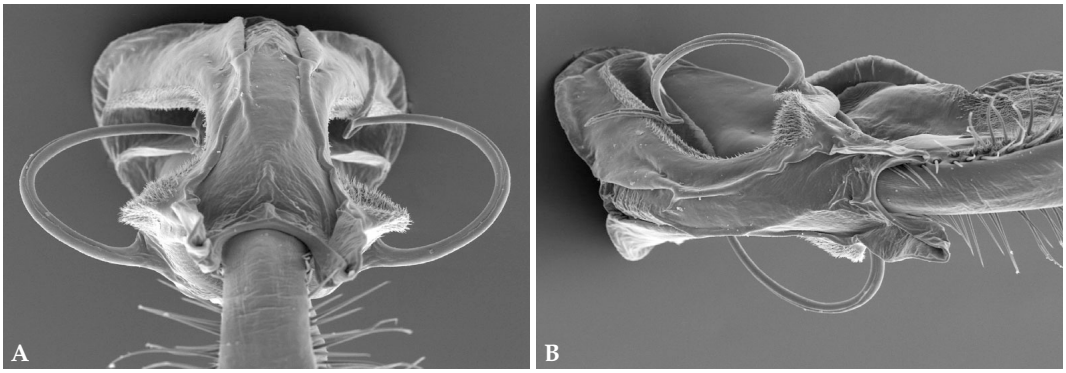

Fig. 3A,B. Terminal segment of penis, *Polythore koepckei*, paratypes.

Wings. Ground colour brilliant transparent amber, same as known from *P. concinna* and *spaeteri* (Fig. 1). All wing tips with dark brownish apical spots. Pterostigma dark brown with black border. Antenodal crossveins 47 and 51 in fw, 37 in hw; the 12th antenodal thickened in fw, the 11th or the 12th in hw. Postnodals 67 in fw, 65 in hw; 16–17 crossveins below the pterostigma; 13–15 crossveins in the basal space; crossveins in the discoidal cells are 6 and 7 in the forewings, 8 and 10 in the hindwings. There are 20–21 cells in hw between A3 and wing margin.

Paratype males differ from the holotype only in size and density of venation.

Abdomen, excluding appendages 39–43.3 mm, fw 35–39.8 mm, hw 33.0–37.7 mm, maximum width of hw 9.0–10.5 mm, ratio length to width in hw 3.57–3.79, fw 2.0–3.0 mm longer than hw. Length of apical spots from proximal border to tip 10–15 mm in fw, 9–14 mm in hw; length of apical spots relative to wing length 0.28–0.38 of fw, 0.23–0.39 of hw. Antenodal crossveins 42–51 in fw, 29–37 in hw. Postnodal crossveins 57–65. Number of crossveins below pterostigma 12–21, crossveins in discoidal cell 6–10, in basal space 11–15. Cells between A3 and wing margin in hw 17–21.

Female and larva unknown.

Diagnosis and discussion

In a recent revision Bick & Bick (1985, 1986, 1990) have shown that species differentiation in this genus depends on wing colour pattern and penis morphology, especially shape and length of penis horns.

The new species shares with *P. concinna* and *P. spaeteri* a typical transparent amber ground colour of the wing membrane, not found in any other species of the genus. While there are no other markings in the wings of *P. concinna*, there are brown apical spots in the other species: *P. spaeteri* has apical spots only in the forewings, *P. koepckei* has spots in both fore and hindwings.

There are clear differences in the genital structures, too. While in *P. concinna* "The horns are not only long and slender, but also diverge conspicuously to form a V-shaped space between" (Bick 1986: p. 271 and fig. 30), the two other species have horns more shorter and stouter, with apices rounded, at most only slightly diverging in *P. spaeteri*, and not at all in *P. koepckei*. The space between the horns is rather U-shaped as in most other species of the genus. Flagella are one-segmented in *P. concinna*, and two-segmented in the other two species.

Apparently there are some slight differences in venation as well. The density of the antenodal crossveins, measured as the distance from base to node divided by the number of crossveins is 0.317 (0.304–0.333) for *P. koepckei*, 0.281 (0.228–0.319) for *P. spaeteri* and 0.255 for the only male available of *P. concinna*.

Relative position of the single thickened antenodal crossvein (Ax) is also different, viz. distance from base to Ax divided by distance from base to nodus is 0.279–0.296 for *koepckei*, and 0.300–0.339 for *spaeteri*, 0.280 for the single male of *P. concinna*.

There seem to be well defined differences in the distribution of these species. Both, *spaeteri* and *koepckei* are known so far from the respective type localities only, which are only some fifty kilometers away from each other, but at different elevations. Panguana for *P. spaeteri* at 200 m, *P. koepckei* at 800–1300 m in the mountains of Sira. For *P. concinna* Bick (1986) records that it is "common in Ecuador at 400–2819 m, does not seem to extend into the rain forest at lower elevations".

Bick & Bick (1986) divided the genus into several species groups. Accordingly an additional group could be defined for *spaeteri* and *koepckei*. However,

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as long as intrageneric relationships are not clear it seems preferable to leave these two species near *P. concinna*, albeit inclusion in that group seems to be based on wing colour only.

Bick and Bick's (1986) key for the determination of males may be extended provisionally by replacing couplets 1 and 2 as follows:

1 Wing colour mainly a transparent amber. 2

1' Wing colour smoky gold throughout. .... *williamsoni*

1" Wing not as above. 3

2 Wings throughout amber without brown apical spots, penis horns distinctly divergent, tips acute, flagella 1-segmented. ..... *concinna*

2' Forewings with brown apical spots, penis horns nearly parallel, tips rounded, flagella 2-segmented. ..... *spaeteri*

2" Both wings with brown apical spots, penis horns parallel, tips rounded, flagella 2-segmented. .... *koepckei*

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