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***Polythore spaeteri*, spec. nov.**  
**from the Peruvian tropical rainforest (Panguana),**  
**with remarks on its ecology**

(Odonata, Zygoptera, Polythoridae)

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A new species of *Polythore* from the area of Panguana (Prov. Huanuco, Peru) is described and compared with species of the groups of *Polythore* (Bick & Bick 1985, 1986, 1990a, 1990b). The coloration of wings in males and females and the structure of the penis differ from all other species. The observation of males and females in tandem or copula can open some aspects into the aquatic biotopes of the larvae. Larvae of *Polythore* have not been described.

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## Introduction

Montgomery (1967) presented a list of Polythoridae species, an Odonata family with an exclusively Neotropical distribution, including 16 species of the genus *Polythore*. Later, a revision of the *picta*-group and the other species of this genus followed (Bick & Bick 1985, 1986, 1990a, 1990b) that revealed two additional species. Thus, the *picta*-group now comprises six species, including one new description, the major group of the remaining ones comprises ten species split up in five groups. The descriptions of *Polythore neopicta* (Bick & Bick, 1990) from the area of Tingo Maria (Peru) at the foot of the Andes, and *Polythore manua* (Bick & Bick, 1990) from Manu National Park (Dept. Madre de Dios, Peru) show, that the recording of species is still by far not nearly finished, and not only as far as that group is concerned.

Five species of the genus *Polythore* (*neopicta*, *lamerceda*, *ornata*, *victoria*, *manua*) are only known from Peru. These and further undescribed species

have been found in material of the museum in Lima (Peru) by L. Börzsöny, but until now, only other specimens collected by E.-G. Burmeister in 2000 could be worked. Field observations and the catching of a copulating pair has proved especially useful. Females proved to be relatively easily distinguishable from other species, a remarkable fact, because otherwise females are notoriously difficult to identify in this genus. The new species of the genus *Polythore*, recorded from the mouth area of the Rio Lullapichis and the Pachitea, a tributary of the river Ucayalli near the foot of the Andes (Peru) and described here, certainly is not closely related to the other species, because it shows some special characteristics.

The conspicuous larvae of this dragonfly family are not yet described from anyone of the species of the genus *Polythore*. Only larvae of the genus *Cora* in the family Polythoridae were described. The mating places and the timing of distribution on the waters, as well as emergence patterns, possibly indicate habitat and larval ecology.



Fig. 1. *Polythore spaeteri*, spec. nov., allotype female (top), holotype male (bottom) (photo M. Müller, ZSM).

*Polythore spaeteri*, spec. nov.

Figs 1-5

**Types.** Holotype: ♂, Peru, Panguana, Rio Llullapichis (Yuyapichis), rechter Nebenfluß des Rio Pachitea, 9° 37'S/74°56'W, 28.09.-06.10.2000, leg. Burmeister, ZSM (Zoologische Staatssammlung München). – Allotype: ♀, same data (ZSM, ♂ holotype and ♀ allotype collected in copula). – Paratypes 8♂, 3♀, same data: 6♂, 2♀ in ZSM (1♂ and 1♀ preserved in alcohol), 1♂, 1♀ in MSM (Museo de Historia Natural, Lima, Peru), 1♂, 1♀ in col. L. Börzsöny; 1♂ Panguana, Rio Llullapichis, 220 m, Nov.-Dec. 1987, leg. K. Voß (MSM).

**Etymology.** Named to honour a person for his sponsorship of biological investigations at the biological observation center of Panguana (Prov. Huanuco, Peru).

**Description**

**Male (holotype).**

Length of abdomen, excluding appendages, 41 mm, hind wing length 38 mm, maximal width 11.3 mm.

**Head.** Labrum yellowish to orange narrowly bordered by black, anterior border and midline black; postclypeus black with a minute pale spot on either side, distal membrane dark brown; vertex with 4 yellow to orange spots, which are rectangularly arranged, front edges also yellowish; Labium pale yellowish, mouthparts shiny black.

**Prothorax.** Dorsally and laterally largely black, shading into pale beneath; broad transverse orange to yellowish band on the middle lobe, medially interrupted.



Fig. 2. *Polythore spaeteri*, spec. nov., female (paratype) (photo M. Müller, ZSM).

**Pterothorax.** Black with 5 orange to yellowish stripes arranged in the typical manner described by Bick & Bick (1985) in *Polythore lamerceda*. Legs black, inner side of femora pale.

**Abdomen.** Black with lateral yellow markings on each side as described by Bick & Bick (1990) in *Polythore neopicta*. Ventral area of pterothorax and abdomen (basal segments) covered with bluish patterns like hoarfrost.

**Appendages** (Fig. 4). Black, length 2.05 mm, with a mid-length ventromedial process.

**Penis** (Fig. 3). Terminal segment (horns) length c. 0.16 mm, weakly divergent, flagella not totally visible, in paratypes long and 2-segmented.

**Wings.** Length of hind wing (hw) 38 mm, fore wing (fw) 42 mm, base to nodus fw 15.5/hw 14 mm, nodus to pterostigma along costal margin fw 19.5/hw 18.5 mm, Petiole fw 2.6/hw 3.0 mm. Pterostigma dark brown, fw 5.5/hw 4.8 mm along posterior border, surmounting left fw 20+(right fw 19)/left hw. 16+(right hw 16) cells. Antenodals fw 54 (54)/hw 37, the fw 16. (18.)/hw 12. (15.) thickened; post-nodals fw 69 (70)/hw 67. Basal space crossed by fw 16 (17)/hw 15 crossveins, the quadrangular by fw 8 (8)/hw 11 (11) crossveins. Membrane transparent amber, nearly uniform throughout somewhat light-

ened at base, wings at apex (ca 1/3 of the winglength) very diffusely darkened to brownish.

#### Female (allotype).

Length of abdomen, excluding appendages, 33 mm, hind wing 34 mm, fore wing 36 mm, maximal width 10.5. Head, prothorax, pterothorax colour patterns as in male holotype. Abdomen black with yellow-orange marks on each side. The yellow

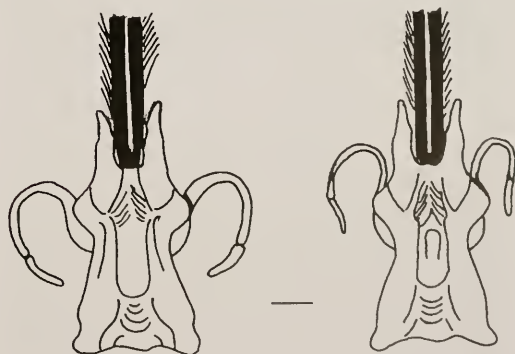


Fig. 3. Terminal segment of penis of *Polythore spaeteri*, spec. nov. under medially fused genital lobes, ventral view: holotype (left); paratype (right), scale bar = 0.1 mm.



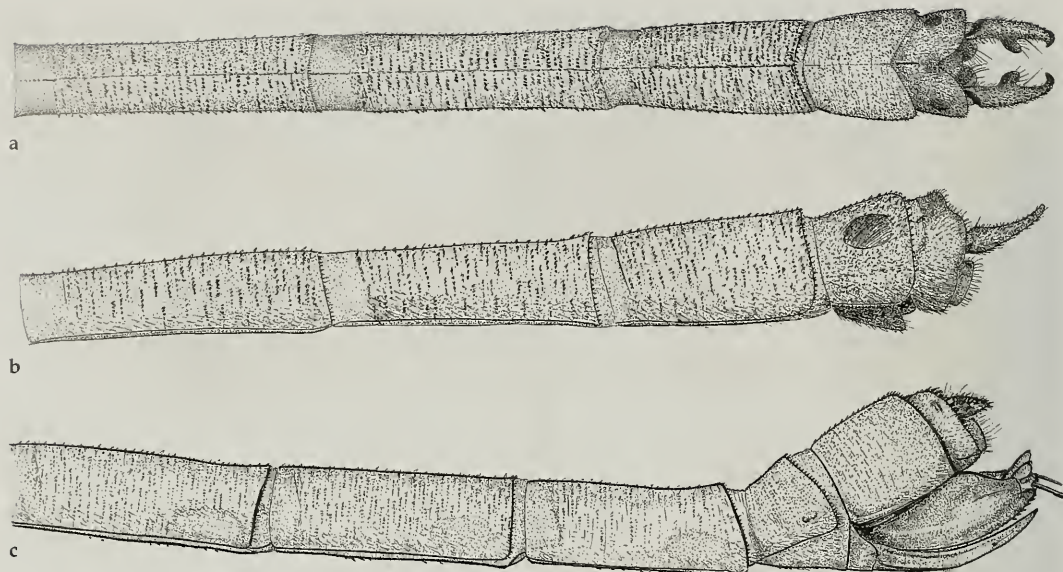


Fig. 4. *Polythore spaeteri*, spec. nov., last segments of abdomen: a. male (lateral view); b. male (dorsal view); c. female (lateral view) (figured by R. Kühbandner, ZSM).

marks all darker than in holotype, segment I with yellow area also more ventrally, segment V with spot and long thin yellow stripe extending over nearly the whole length.

Abdomen (Fig. 4.). Appendages black, gonapophysis distally brownish transparent.

Wings. Both wings basally and apically light transparent brown with a greenish-bronze metallic shine. In the area of the last third of wings (postnodal area about fw 21.0-26.5/hw 22.0-28.0 mm from base of wing) a band of dark brown is spread across the whole width (Fig. 2). This pattern is homogenous in colour and greenish metallic shine – especially from the underside and in living specimens (Fig. 4.), there is no shadow of this marking distally. In front of the dark band there is a small transparent area. Pterostigma chocolate brown, cells under pterostigma fw 15+/hw12+ (Fig. 2).

Variation. Body markings in all males and females generally similar. Essential differences only in the lateral pointed and stretched markings of abdominal segments I-V, of lateral stripes of pterothorax, and in basal yellowish area of femora. The wing bands in females are mostly located in the same area (venation: 26-28/44-47 postnodal veins). Penis horns variable in length by 0.15-0.16 mm. Wings of females differ in the width of the pale area proximal of the dark band in the distal area between nodus and pterostigma (Fig. 5). Immature colour patterns or different morphs especially in females are unknown.

## Diagnosis and discussion

The characteristics of the species of the genus *Polythore* have been explained by Fraser (1946, 1957) and Montgomery (1967). Most of them are characters of wing colouration and male secondary genitalia. The width, length ratio, position of the first visible thickened antenodals and the number of veins are very similar and often “obviously not useful in separating the species” (Bick & Bick 1985).

Species of *Polythore* are characterized by:

1. the overall black body colour with pale markings in both sexes;
2. the absence of inferior abdominal appendages in males;
3. males with uniformly black superior appendages each with a conspicuous process extending ventro-medially at mid length;
4. males with lateral flagella and terminal horns on the terminal segment of the penis;
5. females with dark, elongate, triangular mesostigmal lamina, pointed ventrally and rimmed on all sides by a different elevation.

Diagnosis of *Polythore spaeteri*, spec. nov. in comparison:

There are only two species with uniformly coloured wings in the male, *P. williamsoni* and *P. concinna*.

Male wings of *Polythore spaeteri* nearly uniform transparent amber, with the apical area diffusely

darkened to brown area. Apart from this darkening there are no markings such as lunules, etc. The base of the wings with lighter coloration like in other species. In *P. concinna* (McLachlan, 1881) there are amber wings and absolutely no other pattern, notably no apical darkening, in *P. williamsoni* (Foerster, 1903) the fore and hind wings are smoky gold with a very obscure pale lunule and a transparent basic area (Bick & Bick 1986).

Penis horns of *Polythore spaeteri* are nearly straight, divergent but less so than in *P. concinna*. In contrast to *P. concinna* the tips are rounded more like in *P. aurora* (Selys, 1879) or *P. boliviana* (McLachlan, 1878). The flagellum of *P. spaeteri* is long and roundly bent and clearly 2-segmented in contrast to *P. concinna*.

*Polythore concinna* is common in Ecuador, but three specimens are recorded from Peru, one male without locality date deposited in Paris, one male from Pasco: Chucharas leg. P. Martin in British Museum, another single male from Junin: Camino del Pichis, leg. W. T. M. Forbes, VII.1920 in Michigan Museum. Because in the subadult males of the new species the apical darkening may not have developed, it seems possible that these three Peruvian records belong to this new species. One male is recorded from Pasco, Qbda. Castilla, NW de Iscozacín, 345 m, 10°10'S, 75°15'W, 3.XI.86, P. Lozada (MSM), which belongs to the new species. There is a considerable gap between the distribution areas of *P. concinna* and *P. spaeteri*.

Female fore and hind wings are transparent light amber with a broad, dark brown transversal band midway between nodus and pterostigma. There is no shadow or lunule of other colour distally of this band. This clearly differs from all other species of the genus *Polythore* especially in comparison with the position of the wing band in *P. concinna* and *P. williamsoni*.

#### Habitat and distribution of *Polythore spaeteri*, spec. nov.

The new species of *Polythore* is recorded from the area of Panguana in the rainforest of Peru (Amazonia) near the basis of the Andes mountains at 250 m (Koepcke 1987). Directly north of the building at Panguana there is the Rio Llullapichis (Yuyapichis), flowing into the Rio Pachitea. In the northeast the Sira-Mountains rising up to 3000 m are a centre of endemic species. The area of Panguana is covered with primary rain forest typically with light undergrowth, in the south there exists a path through this protected area of 2 square kilometers. Imagines of *Polythore spaeteri*, spec. nov. have been collected near

small dry brooks (quebradas, flowing only during the wet season) or furrows without water. Only very small puddles existed in the dry season, which were muddy and warm, and at a level of 8-10 meters above the Rio Llullapichis. There is no direct drainage into the river. No specimens of *P. spaeteri* could be observed at the banks of the perennial small brooks of this area. With the beginning of a short rainy period on 5. October 2000, individuals of *P. spaeteri* could be observed in tandems and copula positions (Fig. 4). It seems that copulation and oviposition take place after a longer raining period when the brooks have been filled with water. This area has two rainy seasons per year with variable onset. No specimen of *Polythore* could be found during a visit in 1982 (6.-20. July) at the same localities. No other species of Polythoridae is reported from Panguana. The revisions and descriptions of species of Polythoridae by Bick & Bick (1985, 1986, 1990a, 1990b) include no information about copulation or oviposition. The larvae of *Polythore* species are unknown. Most records of imagines exist from short-term observations, only few were carried out all over the year, and the distribution areas reach from 100 to 2800 m (*P. concinna*). Aspects of territorial and reproductive behaviour of *Cora*, a genus related to *Polythore*, are given by Fraser & Herman (1993).

The larvae of Polythoridae are marked by ventral gills at the abdomen as in Euphaeidae. This may be a plesiomorphic character of the ancestral Odonata. This character allows the larvae to exist in aquatic biota with changing oxygen levels, especially due to alternating rain and dry seasons.

*Polythore spaeteri*, spec. nov. is recorded from the type locality and also known by one male from Pasco, Qbda. Castilla, NW de Iscozacín, 345 m, 10°10'S, 75°15'W, 3. XI. 86, leg. P. Lozada (MSM). This location is near Rio Palcazu which unites with Rio Pichis and both together form the Rio Pachitea. This single specimen is not included in the type series; it is much smaller, but otherwise indistinguishable from the same species.

#### Resumen

Se describe una nueva especie de *Polythore* del área de Panguana (Depto. de Huánuco, Perú), la cual se compara con los otros grupos de *Polythore* (Bick & Bick 1985, 1986, 1990a, 1990b). La coloración de las alas de machos y hembras y la estructura del pene se distinguen de todas las otras especies. Se pudo observar machos y hembras en tándem o cópula, lo que permite cierta información sobre algunos aspectos de los biotopos acuáticos colonizados por las larvas. Las larvas del género *Polythore* aún no han sido descritas hasta la fecha.





Fig. 5. *Polythore spaeteri*, spec. nov., male (holotype) and female (allotype) in copulation (photo E.-G. Burmeister).

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Fig. 6. Locality of *Polythore spaeteri*, spec. nov. (copula) in the rain forest of Panguana after first rain (photo E.-G. Burmeister).

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