

**PERUVIOGOMPHUS BELLEI SPEC. NOV.  
FROM THE AMAZONIAN REGION OF BRAZIL  
(ANISOPTERA: GOMPHIDAE)**

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The new sp. is described and illustrated (holotype ♂: Brazil, Amazonas, Tefé, I-1958, A.L. Carvalho leg., deposited in collection A.B.M. Machado). By its size, colour and structure of the anal appendages, *P. bellei* sp. n. is closest to *P. moyobambus* Klots, 1944, but it can be separated mainly by the presence of a well-developed expansion on abdominal segment 8. It differs from the other 2 congeners by the presence of a denticulated area in the mid-part of the inner hindwing margin. The significance of this character for gomphid taxonomy is discussed.

**INTRODUCTION**

Created by KLOTS (1944), the genus *Peruviogomphus* contains two species, *P. moyobambus* KLOTS, 1944 and *P. pearsoni* BELLE, 1979a. The higher classification of *Peruviogomphus* is a matter of controversy. Placed by ST. QUENTIN (1973), BELLE (1979b) and DAVIES (1981) in the Epigomphinae, the genus was removed to the Lindeniinae by CARLE (1986). More recently it was, placed in the Gomphoidinae by BELLE (1996) who established for it the tribe Peruviogomphini (BELLE, 1996). Specimens of *Peruviogomphus* are extremely rare in collections. Since 1944, when the genus was created, only 3 specimens have been recorded: the holotypes of *P. moyobambus* and *P. pearsoni*, respectively from Peru and Ecuador, and a female from Serra do Navio, Brazil, in my collection. The latter remains unnamed although studied by myself, ST. QUENTIN (1973) and BELLE (1996). We describe and illustrate now *P. bellei* sp. n., based on a single male from Tefé, Brazil.

*PERUVIOGOMPHUS BELLEI* SP. NOV.

Figures 1-5

**Material.** — **Holotype** ♂: Brazil, state of Amazonas, Tefé, I-1962, A.L. Carvalho leg.; deposited in A.B.M. Machado collection, Belo Horizonte.

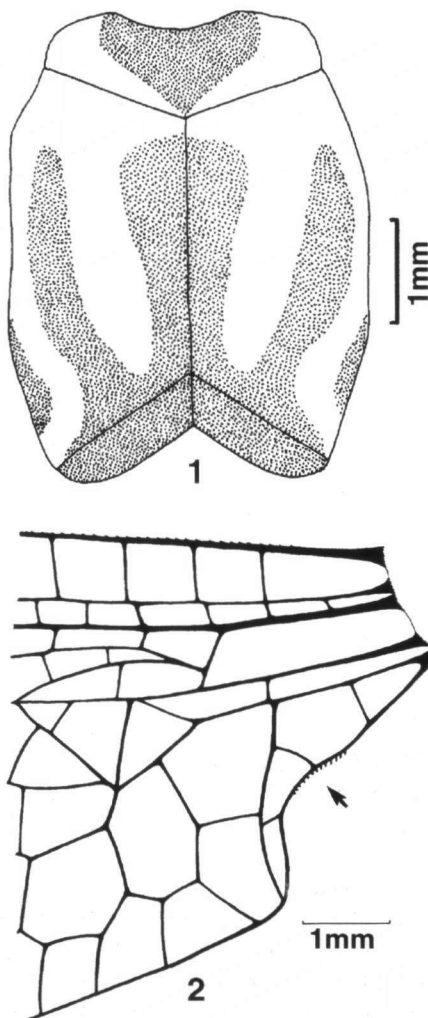
**Etymology.** — The new species is dedicated to the memory of my late friend Dr Jean Belle in recognition for his enormous contribution to the knowledge of neotropical Gomphidae.

**MALE (holotype):** **Head.** — Rear of the head brown with no spines. Rest of head olive except for the lateral part of the labrum, the genae and the base of mandibles that are yellowish. A prominent ridge on frons and a transverse ridge slightly dilated behind each lateral ocellus are present. Occipital crest ridged.

**Thorax.** — Prothorax largely olive brown, darker at the margin of the posterior lobe. Pterothorax — Mesoepisternum with the dark and pale areas about equal in size (Fig. 1). Mesoepimeron and metapleura pale.

**Legs** (anterior pair missing): femora brownish-yellow, the longest spines on the outer anterior margin of third femora about a quarter the diameter of femur; tibiae brownish yellow ventrally, darker dorsally; tarsi and claws black. Spines on the outer anterior row of third tibiae and tarsi slightly modified.

**Wings** hyaline. Pterostigma yellowish brown. Venation black. Antenodals in forewing (FW) 17; in hindwing (HW) 12-13. Postnodals in FW and HW 10-11. Discoidal field in FW starting with two rows of cells for a distance of 1-2 cells followed by a single row of cells. That of HW with two cells against triangle followed by one row. Basal subcostal cross-vein present. Anal area with one row of cells in FW, and two rows in HW. Sec-



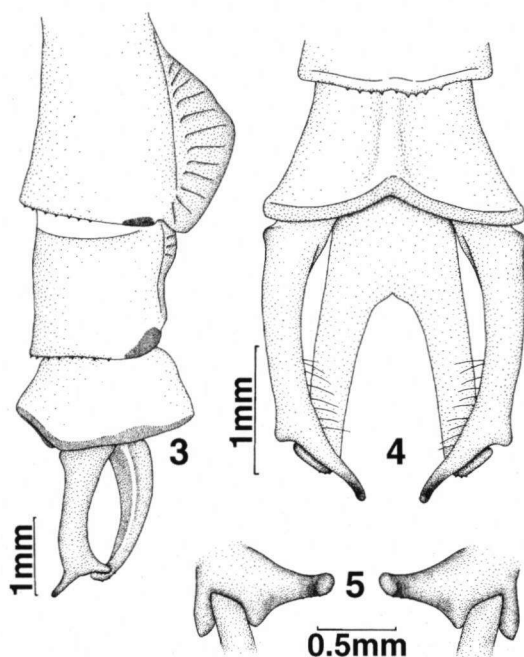
Figs 1-2. *Peruviogomphus bellei* sp. n., holotype ♂: (1) diagram of colour pattern of pterothoracic dorsum; — (2) base of hindwing (the arrow points to the denticulated area).

ond reinforced antenodal in FW 6th; in HW 5th. One cubito-anal crossvein in FW and HW. Triangles in FW free, in HW free or crossed (Fig. 2). Supratrangles crossed in both wings. Four paranal and 2 post-anal cells (Fig. 2). Pterostigma surmounting  $2\frac{1}{3}$  cells in both FW and HW. Anal triangle with 4 cells (Fig. 2). Mid-part of the inner HW margin with small denticles situated close together (Fig. 2).

**A b d o m e n.** — Segments 1-2 laterally yellowish, dorsally brown with yellow spot on 2. Segments 3-6 laterally brown, dorsally dark; 7-10 dorsally reddish brown. A middorsal yellow line on 3-7 and a yellow rectangular lateral spot on the anterior third of 4-7. Appendages dark brown.

**Structural characters.** — Accessory genitalia similar to that of *P. moyobambus* as illustrated by KLOTS (1944). Segments 8-9 with lateral dilatations (Fig. 3), that of segment 8 large, the one of 9 very small. Superior anal appendages tapering into a long fine-tipped process (Figs 3-4), directed inward and upward. At its distal  $\frac{1}{4}$  the appendages have a ventro-lateral process (Figs 3-4). Inferior appendage reaching to a level distal to the ventro-lateral process (Figs 3-4), visible in dorsal view (Fig. 4) with 3 small teeth at the apex. In posterior view (Fig. 5) the superior appendages show a small tubercle. The tip of the inferior appendage fits between this tubercle and the ventro-lateral process (Fig. 5).

**M e a s u r e m e n t s** (in mm). — Abdomen 31.4; hindwings 25.3; costal side of pterostigma 3.0.



Figs 3-5. *Peruviogomphus bellei* sp. n., holotype ♂: (3) last abdominal segments with the anal appendages, lateral view; — (4) tenth abdominal segment and anal appendages, dorsal view; — (5) distal parts of anal appendages, posterior view.

## DISCUSSION

The main characters separating the three known species of *Peruviogomphus* are shown in Table I. By its size and structure of the anal appendages *P. bellei* sp. n. is closer to *P. moyobambus*. However, it can be readily distinguished from it by the presence of lateral expansions on the eighth and ninth abdominal segments. A unique character of *P. bellei* is the presence of a denticulated area at the inner margin of the hindwings. An area

Table I  
Main characters separating the known species of *Peruviogomphus*

Characters	<i>P. bellei</i>	<i>P. moyobambus</i>	<i>P. pearsoni</i>
Pterothoracic dorsum	With two pale stripes	With one pale stripe	With one pale stripe
Metapleura	Pale with no distinct stripe	Pale with no distinct stripe	Dark brown with 3 distinct pale stripes
Lateral expansion on abdominal segment 8	Present	Absent	Present
Apex of the inferior anal appendage	Reaching to a level distal to the ventro-lateral process of the superior appendages and visible in dorsal view	Reaching to a level slightly proximal to the ventro-lateral process of the superior appendages and not visible in dorsal view	Reaching to a level much proximal to the ventro-lateral process of the superior appendage and not visible in dorsal view
Apex of the superior appendages	Tapering into a long fine-tipped process directed upwards and medially	Tapering into a long fine-tipped process directed upwards and medially	Blunt - tipped and directed medially
Postanal cells in HW	2	3	3
Cells in anal triangle	4	3	3
Anal area in HW	With two rows of cells	With 3 rows of cells	With 3 rows of cells
Mid-part of the inner margin of HW	Denticulated	Not denticulated	Not denticulated
Length of abdomen	31.4	33	36
Length of HW	25.3	24.5	28

like that was looked for in 93 gomphid species in my collection belonging to 24 genera as follows. *Agriogomphus* (2 species), *Aphylla* (9), *Archaeogomphus* (4), *Cacoides* (1), *Ceratogomphus* (1), *Crenigomphus* (1), *Davidius* (1), *Desmogomphus* (1), *Diaphlebia* (2), *Epigomphus* (2), *Erpetogomphus* (2), *Gomphidia* (1), *Gomphoides* (1), *Gomphus* (6), *Ictinogomphus* (2), *Melanocacus* (1), *Neogomphus* (1), *Neurogomphus* (1), *Paragomphus* (1), *Peruviogomphus* (1), *Phyllogomphoids* (12), *Phyllocycla* (15), *Progomphus* (20), and *Zonophora* (5). It was shown that the pattern of denticulation of the inner hindwing margin is uniform in the same species and variable among the species, thus being a specific character that, as far as I know, had not yet been used in gomphid taxonomy. In 55% of the species examined there are no denticles or only a few scattered throughout. Denticles could not be found also in an undescribed cretaceous gomphid wing. Groups of close together denticles restricted to the margin near the anal angle were found in all species examined of *Crenogomphus*, *Ictinogomphus* and *Zonophora*. In all species of *Gomphus*, *Epigomphus* and *Diaphlebia* the denticles occurred only in the posterior half of the inner wing margin and were more separated from one another than those now described in *Peruviogomphus*. In 1 species of *Aphylla* and 2 of *Phyllocycla* they occurred immediately anterior to the tornal cell. A pattern as now described

for *P. bellei* in which the denticles are restricted to the mid-part of the inner margin was found only in the *Desmogomphus* and *Progomphus* where it occurred in all species examined, except *P. auropictus* and *P. perithemoides*. The functional significance of these denticulated areas is unknown but they could perhaps be related to the mating process. *P. bellei* is slightly smaller than the undetermined female from Serra do Navio, Amapá, in my collection studied by ST. QUENTIN(1973) and BELLE (1996). It differs from it also by having well marked mesepisternal stripes which are lacking in the female from Serra do Navio. This female most probably belongs to a fourth species of *Peruviogomphus* that will remain unnamed until more material from Amapá is found. The finding of a third species of the remarkable genus *Peruviogomphus* corroborates the view of BELLE (1979) about the uniqueness of the genus, for which he created the tribe Peruviogomphini.

#### ACKNOWLEDGEMENT

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