

## **Ptychopteridae — a family of flies (Diptera) new to the Neotropical Region and description of a new species**

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### **Abstract**

A new species of *Ptychoptera* Meigen (Diptera: Ptychopteridae) is described from cloud forest in southern Mexico, representing the first definitive record of the family in the Neotropical Region.

**Key words:** Ptychopteridae, new species, biogeography

### **Introduction**

Field work during 2003 in cloud forest of the Sierra Madre, a mountain range in the Chiapas Province of southern Mexico, revealed a new species of *Ptychoptera* Meigen (Diptera: Ptychopteridae). This work was conducted as part of a joint program involving entomologists from Mexico, Spain, and Scotland, who were studying the ecology and biodiversity of scarabaeoid Coleoptera and various families of Diptera. The Ptychopteridae were not previously known from the Neotropical Region (Papavero 1967). The family occurs in the Palaearctic (30 species), Nearctic (12 species), Afrotropical (9 species), and Oriental (15 species) regions of the world and has been well defined morphologically by Alexander (1981). The only summary at the family level, on a world scale, is given by Alexander (1927). The putative existence of an undescribed species of Ptychopteridae from southern South America (Alexander 1920, 1927) has been traced to two sources mentioning the family. The first of these refers to the genus *Ptychoptera* occurring in Argentina (Weyenbergh in Napp 1876) as part of a general listing of that country's natural resources. The second is by Osten-Sacken (1878) who reported that there

are two specimens of *Bittacomorpha clavipes* (Fabricius) in the museum in Vienna labelled as being from Brazil, but who stated also that the record needed to be verified. No further account seems to have appeared to elaborate on these claims (Papavero 1967). The presence of the family in the Neotropical Region is established here by the discovery of adults of *Ptychoptera* from cloud forest habitat in the Chiapas Province of southeastern Mexico. The nearest known populations of *Ptychoptera* species are in the Nearctic Region in New Mexico and northern Florida (Alexander 1965). In the Nearctic Region, there are essentially two epicentres of distribution, one along the eastern seaboard, represented by two species that occur from Florida through Quebec, and the other in western North America, with eight described species spread along the Rocky Mountain Range.

The Ptychopteridae are divided into two subfamilies, the Ptychopterinae and Bittacomorphinae, the former being monogeneric. The family is distinguished by a combination of the following characters, which are present in the new species described here: 1 anal vein, no ocelli, long 5-jointed palps with terminal joint longest, a pre-haltere, and a 4-branched radius. Bittacomorphines are distinguished by having 2 medial veins, whereas ptychopterines have 3 medials. The former are known as phantom craneflies and, as the name suggests, have a superficial resemblance to *Bittacus*, a genus in the Mecoptera. The genus *Ptychoptera* is characterised in the adults by a smooth, shiny, and generally black integument. Because of these characters, together with wings that are often banded, the adults resemble large fungus gnats (Mycetophilidae). The antenna is noticeably longer in the males, with 13 flagellomeres, and the long legs have prominent, hairy tibial spurs. The morphological features are recounted in detail by Alexander (1927), and the new species here described falls within the genus as there defined. The examples described here from southern Mexico were recognisable in the field as *Ptychoptera*. They resemble other members of the genus from around the world in terms of size, general colouration, and behaviour.

### **Genus *Ptychoptera* Meigen**

#### ***Ptychoptera alexanderi* Hancock sp. nov.**

**Diagnosis.** This species of *Ptychoptera* shares the general morphological characters of other known species but exhibits a unique combination of a number of features. The most obvious is the slender male antennae being nearly the same length as the body. This is achieved by the basal flagellomere being twice the length of each of the three or four following flagellomeres, which are about 10 times as long as wide. By comparison, the Nearctic species have these same flagellomeres only two to three times their own width. The clypeus of both sexes is swollen. As in the majority of western Nearctic species, this new species has cross vein r-m meeting  $R_4 + R_5$ , whereas in the two eastern species, *P. quadrifasciata* Say and *P. osceola* Alexander, r-m meets  $R_5$  before the fork. The wing is

strongly patterned with three dark curved bands and a short apical band that marks the upper internal edge of the apical patch. The central pair of bands is curved in opposing directions, having the effect of leaving an almost circular clear area in the middle of the wing centred over the base of the radial cells. There is no pigmentation proximally in the basal cells. Macrotrichia are extensive in all the radial cells (Fig. 1). A marked pattern on the dorsum is provided by a blackish outline to the deep mesonotal suture continued around the dorsal edge to above the wing base, giving a strong blackish W-shaped mark to the dorsum against a paler yellowish brown background. The black shiny anepimeron contrasting with the other pleurae is marked. There is no obvious pruinosity on the thorax; many other species of *Ptychoptera* have silvery patterns changing with different viewing angles. There is no auxiliary copulatory organ on the third (visible) abdominal sternite, as in some Palaearctic species. In the male, the extreme length of the lateral arms of the ninth tergite, extending nearly the same distance as the gonostyles is noticeable. Another notable difference in the male genitalia of the Nearctic species *P. quadrifasciata* and *P. osceola* is the enlarged ninth sternite that accommodates the large spherical sperm pump. This character is not so strongly developed in *P. alexanderi* **sp. nov.**

**Holotype male.** Body length 8.0 mm, wing 8.8 mm, antenna 7.0 mm. **Head:** vertex shining black; occipital region and face brown; clypeus convex and same shade of brown as are palp, scape, pedicel, and basal flagellomere plus extreme base of second flagellomere, remainder of antenna brownish-black; 1<sup>st</sup> flagellomere twice length of succeeding flagellomere. Antennae of male elongated, nearly equal to body length. **Thorax:** shining and mainly yellowish-brown. Blackish in prescutellar area of dorsum, more obviously so when viewed from behind; black border to dorsal suture, joining anteriorly with broader black lateral markings that originate above wing base; poorly defined medial stripe visible within suture when viewed anteriorly. Anepimeron distinctly black, contrasting with remaining yellow pleurae. Halteres yellow in basal quarter, otherwise black. Scutellum yellow; mediotergite black. Mid and hind coxae with ill-defined darker streaks of brown; femora yellowish-brown except for narrow apical ring; remaining leg segments brownish-black. Wing with partial black bands and apically darkened; typical wing fold rather obvious, extending from base of anal vein to bend in second cubital (Fig. 1). **Abdomen:** shiny blackish-brown; laterobasal half of tergite 2, basal 3<sup>rd</sup> of tergite 3, and laterobasal corner of tergite 4 yellowish; sternites yellow. Genitalia with greatly extended lateral arms to tergite 9, as long as gonostyli (Fig. 2). Caudal margin of ninth sternite bearing clasper-like structure that protrudes dorsally (Fig. 3).

**Female.** body length 8.0 mm, wing 9.0 mm, antennae 2.5 mm. General appearance same as male except for short antennae and abdomen more broadly yellowish about base of tergites 3, 4, and 5; downcurved cerci totally yellow. Lighter wing markings may be due to specimen being recently emerged when collected, but degree of change from teneral condition to full pigmentation is unknown (Fig. 4).

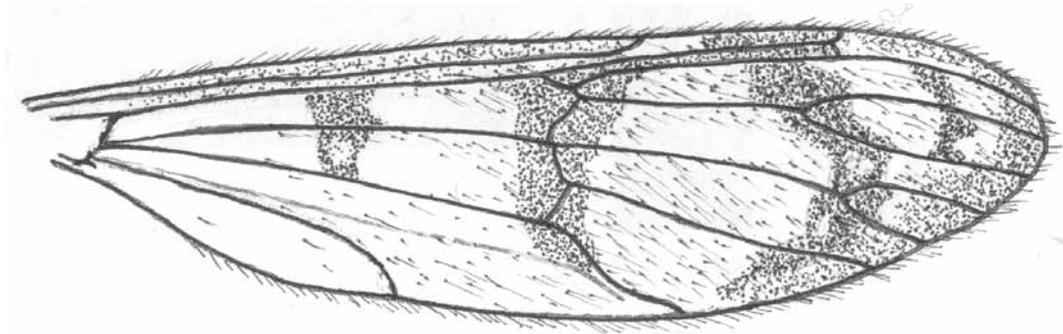


FIGURE 1. Wing of *Ptychoptera alexanderi* sp. nov.

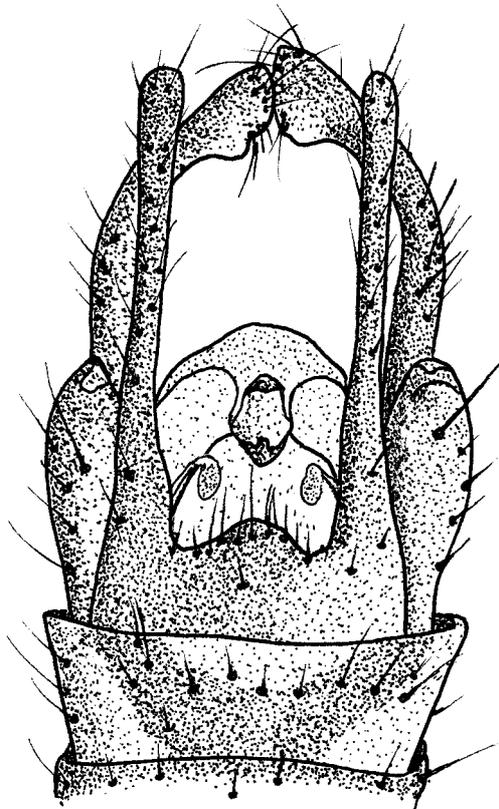
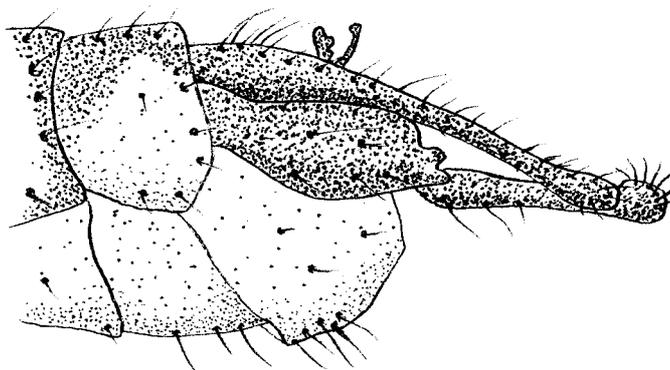
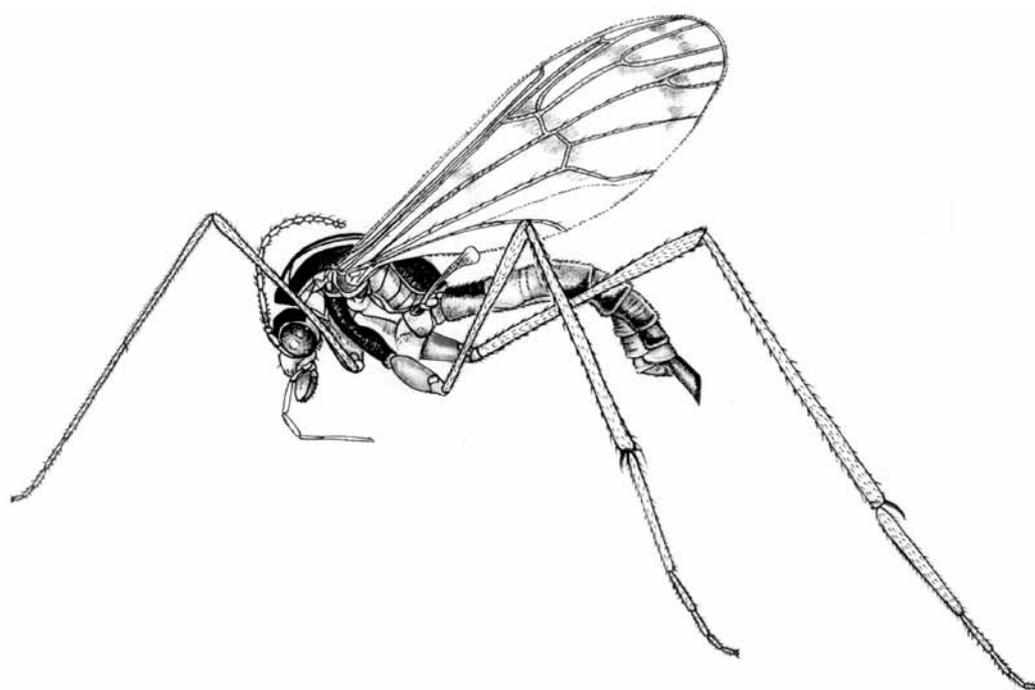


FIGURE 2. Male genitalia (dorsal) of *Ptychoptera alexanderi* sp. nov.

**Material examined.** Holotype male: MEXICO, Chiapas, Sierra Madre Mountains, El Triunfo (Biosfera Reserva): 1900-2000m, 5°39'26"N 92°48'32"W, E.G. Hancock, collected by sweeping, 30.vii.2003, (holotype male deposited in the Hunterian Museum (Zoology), Glasgow, Scotland bearing registration number GLAHM: 127118. Paratype: female: same data (also deposited in Hunterian Museum (Zoology), registration number GLAHM: 127119). Both specimens were micropinned in the field and are staged on a polythene foam strip.



**FIGURE 3.** Male genitalia (lateral, left side) of *Ptychoptera alexanderi* **sp. nov.**



**FIGURE 4.** Habitus of female *Ptychoptera alexanderi* **sp. nov.** The overall appearance is lighter than in the male, partly due to being teneral when collected.

**Etymology.** *Ptychoptera alexanderi* **sp. nov.** is named in memory of Charles Paul Alexander (1889-1982), the much admired and prolific New World nematoceran systematist, who included this family in his research.

**Biology.** The adults of *Ptychoptera alexanderi* **sp. nov.** were swept from fairly rank streamside vegetation, where the stream margin comprised coarse sand grading to mud. Adult ptychopterids are generally found near running water or in marshy areas, and rest in dense waterside vegetation (Stubbs 1993). The larvae are associated with saturated mud or

soils near water (Brindle 1962). They are considerably elongated caudally, presenting a superficial resemblance to the long-tailed larvae of the Eristalinae (Syrphidae). To cope with respiration after pupation, the right thoracic breathing horn is greatly elongated, up to twice the length of the pupa, whereas the other horn is atrophied. These and other observations (Alexander 1920, 1981; Brindle 1962; Hodkinson 1973; Stubbs 1993) support the idea that this new species was found in a typical situation and probably was breeding in the stream margins near where the adults were found. Notwithstanding these conditions, no other specimens could be collected despite considerable effort.

### Discussion

Chiapas contains the northernmost expression of Neotropical forests on the Pacific side of Mexico. These forests extend farther north on the opposite gulf side of the country, although this side is mainly lowland and coastal swamp forest. These northern limits of tropical forests are connected via the land bridge of Central America to those in South America and are generally continuous or nearly so during the present geological period (Colinvaux 1996). The extent to which *Ptychoptera alexanderi* **sp. nov.** represents a more diversified fauna of ptychopterids within these forests is unknown but is probably unlikely, as the family is characteristic of cooler, usually temperate or higher altitude areas of the world (Alexander 1927). The presence of ptychopterids in the Neotropics might be explained by southern extensions of Nearctic forests present historically in upland tropical areas such as the Sierras, which provided continuity of habitat between the Nearctic Rocky Mountains and the Andes. A number of insect lineages are known that have diversified Nearctic faunas, with occasional representatives in tropical uplands but that have not, apparently, invaded lowland tropical forests, such as the syrphids *Callicera*, *Xylota*, *Milesia*, and *Chrysotoxum* (Thompson 1997, 1999).

The East Coast species *P. quadrifasciata* and *P. osceola* have patterned wings but the pigmented areas are located mainly over cross veins and, although the basal cells are pigmented proximally, the wing tip is clear. In *P. alexanderi* **sp. nov.**, the wing apex is infuscated and bordered internally by a short, darker band in cells  $r_1$  and  $r_2$  (Fig. 1). Colour characters are not always a reliable means of ascertaining affinities. Colonisation of the Neotropics possibly took place from northern Florida, although there is a geologically older barrier of intervening ocean and tropical environment to negotiate compared with the geographical continuity provided by the mountain chain in western North America. An analysis of all Holarctic species may be revealing with respect to the origin of this newly discovered Neotropical taxon. The genus has not been subjected to any detailed study on this scale.

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