

# ON THE IDENTITY OF *PSEUDEXECHIA PARALLELA* (EDWARDS, 1925) (DIPTERA: MYCETOPHILIDAE) AND DESCRIPTION OF A NEW RELATED SPECIES FROM GREAT BRITAIN

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## ABSTRACT

*Pseudexechia parallela* (Edwards, 1925) is redescribed and illustrated. Based on study of types and new material *Pseudexechia parallela* (Edwards, 1925) is considered to be a senior synonym of *P. hamulata* (Lackschewitz, 1937) **syn. n.** *Pseudexechia parallela* is reported from Sweden, Kamtschatka, Russia and Minnesota, U.S.A. for the first time, thus expanding its known range from Europe to a wide Holarctic distribution. A new allied species, *Pseudexechia monica* **sp. n.**, is described and illustrated based on males from Wales in Great Britain.

## INTRODUCTION

The genus *Pseudexechia* Tuomikoski was established by Tuomikoski (1966) for a small group of closely related species segregated from *Exechia* Winnertz, characterised by the absence of discal bristles on the mesoscutum, ovate clypeus and distinctive features of the male terminalia such as the bud-like hypandrial lobe (Chandler, 1978). At present there are 22 known species associated in this genus from the Holarctic, the Oriental and the Afrotropical regions. However, several species await description and some that were described in other genera are yet to be formally transferred to *Pseudexechia*.

*Pseudexechia parallela* (Edwards, 1925) was described based on a single British female with a two-segmented cercus. Edwards (1925) considered it to be an easy task to associate it to the male based on key characters such as parallel branches of the cubital fork and a straight Rs vein. However, the association proved to be problematic as the wing venation of the holotype is apparently rather aberrant with respect to the narrow cubital fork. Consequently, Lackschewitz (1937) described a second very close species, *P. hamulata* (Lackschewitz, 1937), from Latvia without any notes on its relationship to *P. parallela*. Stackelberg (1948) subsequently associated and figured the male of *P. parallela* based on material from the Leningrad district of Russia. Burghel-Balacesco (1972) reported *P. parallela* from Romanian caves and was the first to notice that the narrow cubital fork was not a constant character. Chandler (1978) reviewed the known Holarctic species of *Pseudexechia* without adding any material or further description of *P. parallela*. *Pseudexechia parallela* was later incorrectly associated and figured by Krivosheina *et al.* (1986), whose figure represents another species of which the identity is yet to be confirmed. Zaitzev (2003) questioned the validity of *P. hamulata* as separate from *P. parallela*, referring to Chandler (1978). At present *P. parallela* is reported to be widespread in most of Europe while *P. hamulata* is known only to have a disjunct distribution in Estonia, Latvia and Denmark (Chandler, 2004).

No clear difference is apparent between the two species based on previously published illustrations. At most it seems that *P. hamulata* as figured by Lackschewitz (1937) has a sharper apicodorsal corner of the ventral branch of the gonostylus than

has *P. parallela* as figured by Stackelberg (1948). This character, however, is liable to great variation in dorsoventral view depending on the exposed angle of the ventral branch, and only the internal face of the gonostylus will reveal the true shape of this thin plate (not figured by Stackelberg 1948).

New material of *Pseudexechia* from Great Britain has revealed two closely related species of which one is more widespread and represented by both sexes. We consider this to be the true *P. parallela*, thus confirming the identity of its male. When compared with the holotype of *P. hamulata* we find the two to be identical. Hence, we consider *P. parallela* to be a senior synonym of *P. hamulata*. Unfortunately we have not been able to re-examine the material that was studied by Stackelberg (1948), but based on his figures we find it very likely that this material was correctly assigned to *P. parallela*. Other British specimens represent a new species, so far known only from Wales. A review of all Nordic species of *Pseudexechia* will be presented elsewhere (Kjærandsen in prep.).

#### MATERIAL AND METHODS

The following abbreviations are used for institutions in which specimens are deposited. Other specimens are in the private collection of P. J. Chandler.

BMNH – Natural History Museum, London, England.

FMNH – Finnish Museum of Natural History, Helsinki, Finland.

MZLU – Museum of Zoology, Lund, Sweden.

ZMHB – Museum für Naturkunde der Humboldt-Universität, Berlin, Germany.

The general terminology follows Söli (1997), the measurements and ratios follow Kjærandsen & Kurina (2004), and the terminology of the male gonostylus follows Kjærandsen (in press). In cases where a range of measurement is given, the figure following the range is the mean.

#### THE SPECIES

##### ***Pseudexechia parallela* (Edwards, 1925)**

(Fig. 1)

*Exechia parallela* Edwards, 1925: 596.

*Pseudexechia hamulata* (Lackschewitz, 1937), syn. n.

– Type material examined: Holotype (female) of *P. parallela*: **ENGLAND (U.K.)**: Newmarket, Cambs, 23 Sep 1888 (coll. G. H. Verrall) – SPM-005283 (BMNH, pinned with terminalia in balsam preparation mounted on pin); holotype (male) of *P. hamulata*: **LATVIA**: Paplacken, Kurl, 7 Oct 1934 (coll. P. Lackschewitz) – SPM-011949 (ZMHB, pinned with terminalia in balsam preparation mounted on pin).

– Other material examined: **ENGLAND (U.K.)**: (all NCC Wetland Survey, coll. A. Foster and D. Procter): Cambridgeshire, Chippenham Fen, 10–24 Aug 1988 – 2 males; Norfolk, 13 Jun–11 Jul 1988 – 5 males, 2 females (MZLU, 1 male, 1 female on slide); Reedham, 27 Jun–11 Jul 1988 – 1 male, 11 Jul–12 Aug 1988 – 1 male, 12 Aug–20 Sep 1988 – 2 males (MZLU, 1 male on slide), 26 Aug 1988 – 3 males; Brancaster, 1–15 Jul 1988 – 9 males (MZLU, 1 male pinned); Stallode Wash, 29 Jun–8 Jul 1988 – 1 male; Catfield, 29 Sep–12 Oct 1988 – 1 male, 12 Oct 1988 – 1 male; Middle Harling, 26 Jun–17 Jul 1988 – 1 male; Wendling, 14–24 Sep 1988 – 1 male; Old Buckenham Fen, 28 Jun–12 Jul 1988 – 1 male; Thompson Common, 1988 – 1 male; Suffolk, Walberswick, 14–29 Aug 1988 – 4 males; **WALES** (all NCC Peatland Survey, coll.

Holmes, Boyce & Reed): Anglesey, Cors Erddreiniog, 27 Jul 1988 – 2 males; Cors Bodeilio, *Molinia* / *Myrica* bog and *Phragmites* bed, 28 Jun 1988 – 1 female, 26 Jul 1988 – 1 female, 5 Oct 1988 – 1 male; Rhos-y-Gad, calcareous flush fen, 27 Jul 1988 – 1 male, 1 female; West Glamorgan, Fairwood Common, *Juncus* flush, 4 Oct 1989 – 1 female; Pant-y-Sais, among *Carex acutiformis* and in *Molinia* bog, 5 Oct 1989 – 2 males, 1 female; **SWEDEN**: SK, Håckeberga Nature Reserve, 29 Sep 1988 (coll. L. Huggert) – 3 males (MZLU, two on slide); **ESTONIA**: Tõrva, Helme Cave [old refuge cave in sandstone, about 50 m deep], 5801'00"N, 02553'00"E, 19 Jan 1996 (coll. O. Kurina) – 2 males (MZLU, on slides); **RUSSIA**: Kamtschatka, Bolscherjetsk, 1 Jul 1917 (coll. Y. Wuorentaus) – 1 male (FMNH, pinned with cleared terminalia in glycerine); **USA**: Minnesota, Cook co., Hovland N. J., Min. F. S., 14 Jul 1968 (coll. E. F. Cook) – 1 male (MZLU, on slide).

Diagnostic characters: *P. parallela* forms together with *P. monica* sp. n. a group (also including an undescribed Oriental species) of small *Pseudexechia* species with dark brown mesoscutum bearing fused thoracic stripes, and with reduced size of the gonostylus relative to the gonocoxite (normally protruding less than a fifth gonocoxal length beyond its apex depending on orientation of gonostylus). The latter character also applies to *P. aurivernica* Chandler 1978 but that has distinct thoracic stripes. It can be separated from *P. monica* by unique characters in the male terminalia, including the ventral branch of gonostylus that is apicodorsally pointed, the hypandrial lobe being concave with a small, slightly diverging split apically, and the hypoproct forming a long, only slightly down-curved cylindrical process. *Pseudexechia parallela* is so far the only known species of *Pseudexechia* where the female has a two-segmented cercus (females of a second species not yet associated with males is known from Sweden, but this has distinct thoracic stripes so is not considered to be *P. monica*).

### Description

Male ( $n=6$ , except where otherwise stated). Total length 3.7–4.8, 4.3 mm. Wing length 2.56–3.2, 2.82 mm, or 2.98–3.38,  $3.21 \times$  as long as profemur. Mesoscutum length 0.66–0.82, 0.75 mm, or 0.25–0.28,  $0.26 \times$  as long as wing.

Coloration (dry, pinned specimens,  $n=42$ ). Head brown, grey dusted. Antenna with scape, pedicel and first flagellomere yellowish brown, otherwise darker brown. Palpus brownish yellow. Thorax with mesoscutum mostly dark brown and grey dusted on disc without separate stripes, leaving only the side margins and humeral areas yellowish. Dark coloration continued onto disc of scutellum. Pleura yellowish brown. Legs yellow, including tibial spurs. Wing yellowish, with costa and radial veins slightly darker. Abdomen with tergites mostly dark brown dorsally, but tergites 1–5 with yellow lateral markings, more or less triangular on 2–5 and broadest on hind margins. Tergite 6 all brown. Sternites and genitalia brownish yellow.

Head. Round, width / length to frontal tubercle 1.4–1.48, 1.44. Antenna 1.34–1.66, 1.51 mm long. First flagellomere 1.67–2.04, 1.85 times as long as second flagellomere. Second flagellomere 1.29–1.94, 1.66 times as long as wide. Two ocelli present, touching compound eyes. Clypeus ovate, length/width 1.1–1.28, 1.18. Antepenultimate segment of maxillary palp 0.10–0.11, 0.10 mm long, palpomere ratios 1: 1.11–1.44, 1.3: 1.83–2.62, 2.42.

Thorax. Proepisternum with one strong and one smaller bristle. Mesoscutum with some strong front-marginal, prealar and postalar bristles, otherwise covered with small dark, decumbent setae. Scutellum with one pair of strong bristles.

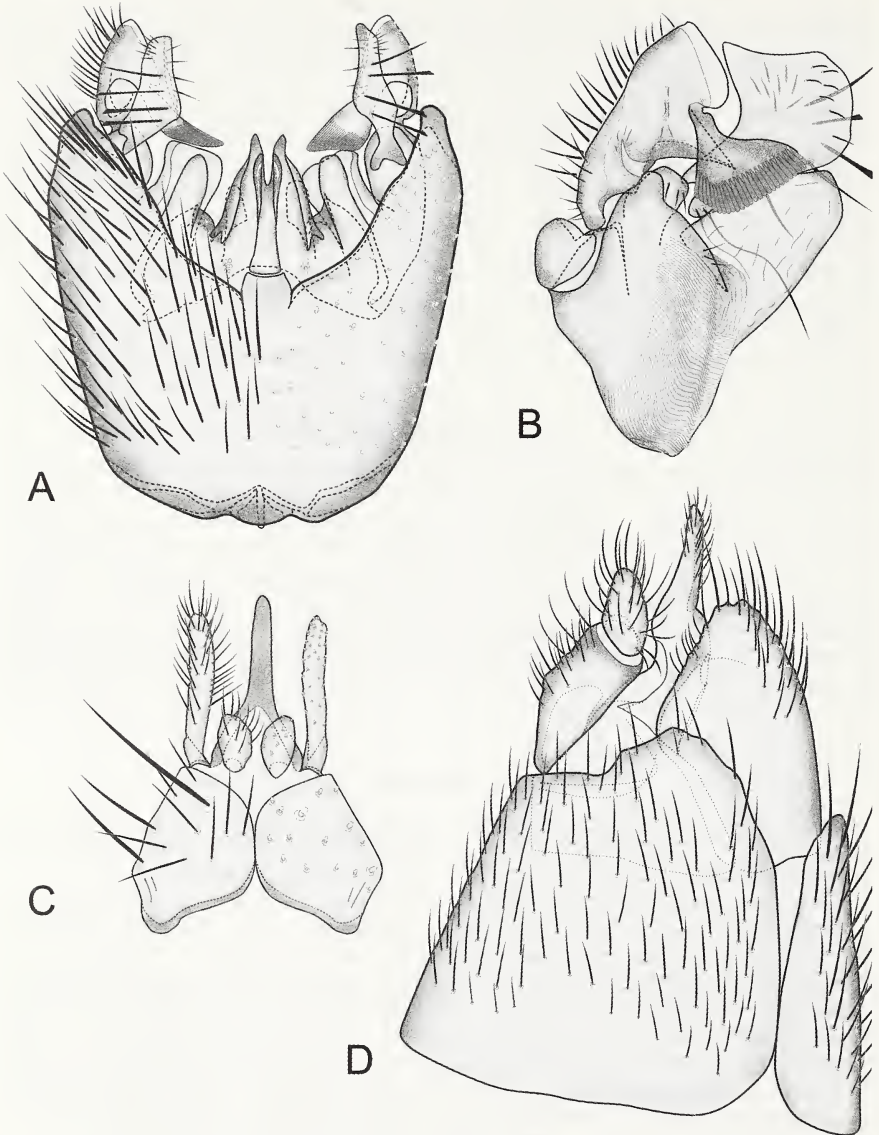


Fig. 1. Terminalia of *Pseudexechia parallela* (Edwards, 1925). **A.** Male terminalia, ventral view; **B.** Internal face of gonostylus, enlarged; **C.** Male tergite 9, cerci and hypoproct, dorsal view; **D.** Female terminalia, lateral view.

Wings. Costa and  $R_5$  with setae both dorsally and ventrally, stem of R and  $R_1$  with dorsal setae only, except a few (0–15, 7) ventral setae apically on  $R_1$ . Rs, ta, tb, M and Cu without setae. Wing length to length of  $R_1$  2.2–2.4, 2.32.  $R_5$  nearly straight, wing length to length of  $R_5$  1.73–1.77, 1.75. Length of ta to length of M-petiole 0.89–

1.11, 1. Cu-fork short, fork length ratio (A/B) 0.76–0.8, 0.78. Fork width ratios (C/D and E/F) 1.14–1.28, 1.21 and 0.8–1.2, 0.98. M-ratios 0.58–0.63, 0.6 and 0.64–0.7, 0.66. CuA-ratios 1.35–1.53, 1.45 and 1.81–2.11, 1.99. Cubital fork width (F) to length of CuA<sub>1</sub> 0.33–0.41, 0.36. CuP vague, ratio of length to length of wing 0.41–0.49, 0.45. A<sub>1</sub> distinct, ratio of length to length of wing 0.34–0.38, 0.36.

Legs. Leg ratios given for fore, mid and hind leg: LR 1.11–1.17, 1.14: 0.81–0.86, 0.84: 0.63–0.68, 0.65; SV 1.61–1.69, 1.65: 2.04–2.15, 2.08: 2.52–2.68, 2.61; BV 1.51–1.65, 1.57: 1.87–2.05, 1.94 (*n* = 5): 2.76–3.1, 2.98; TR 1.53–1.67, 1.58: 1.58–1.74, 1.67: 1.85–2.07, 1.96.

Terminalia. Tergite 9 (Fig. 1C) medially divided into semicircular plates, with setae of variable size. Cercus long, slender, 6–7, 6.4 as long as wide in dorsal view. A second small ovate, setose lobe present medial to cercus (this lobe of questionable origin but possibly resulting by separation from a bilobed cercus as found in other related genera). Gonocoxite (Fig. 1A) open dorsally and moderately incised ventrally, without medial suture. Hypandrial lobe concave, apically with a small, slightly diverging split. Hypoproct well developed, apically prominent, forming a long, only slightly down-curved cylindrical process, reaching beyond apex of cercus, ventrally forming rectangular recess, apparently fused with small conical aedeagal apparatus. Gonocoxal apodeme long, moderately sclerotised, apically broadened with two condyles. Accessory copulatory appendages hyaline and difficult to interpret. Gonostylus (Fig. 1B) with five branches. Dorsal branch with strong setae on lateral face, apically truncated to whitish, smooth cushion, devoid of setae. Dorsointernal branch wide, nearly symmetrically fan shaped, with 23–24 lamellae. Medial branch reduced or absent. Ventral branch forming thin plate, apically widened, subcircular, apicodorsally prolonged into acute angled pointed corner; basally with one very long and one shorter seta, apicolateral face with 2–4 strong, fan-tipped setae and group of small regular setae; apicointernal face with some small setae. Internal branch forms a large, subrectangular pouch, partly striated, ventroapically with a few strong setae. Anterior branch present as large hyaline cushion, devoid of setae.

Female (*n* = 1). Total length 4.4 mm. Wing length 2.84 mm, or 3.23 × as long as profemur. Mesoscutum length 0.8 mm, or 0.28 × as long as wing.

Coloration (*n* = 5). As for male except more extensive yellow markings on abdomen, yellow lateral triangles also on tergite 6, tergite 7 and ovipositor entirely yellow.

Head. Round, width / length to frontal tubercle 1.45. Antenna 1.4 mm long. First flagellomere 1.67 times as long as second flagellomere. Second flagellomere 1.67 times as long as wide. Two ocelli present, touching compound eyes. Clypeus ovate, length/width 1.14. Antepenultimate segment of maxillary palp 0.12 mm long, palpomere ratios 1: 1.18: 2.1.

Thorax. As for male.

Wings. Setation as for male, R<sub>1</sub> with 8 setae apically. Wing length to length of R<sub>1</sub> 2.29. R<sub>5</sub> nearly straight, wing length to length of R<sub>5</sub> 1.67. Length of ta to length of M-petiole 1.11. Fork length ratio (A/B) 0.74. Fork width ratios (C/D and E/F) 1.28 and 1. M-ratios 0.58 and 0.63. CuA-ratios 1.56 and 2.19. Cubital fork width (F) to length of CuA<sub>1</sub> 0.38. CuP vague, length to length of wing 0.48. A<sub>1</sub> length to length of wing 0.35.

Legs. Leg ratios given for fore, mid and hind leg: LR 1.14: 0.87: 0.67; SV 1.64: 2.03: 2.56; BV 1.56: 1.99: 2.96; TR 1.61: 1.79: 2.03.

Terminalia (Fig. 1D). Tergite 7 with straight margin apicodorsally, apicolateral margin slightly produced, evenly convex. Cercus two-segmented, scattered with small setae; apical segment ovate, twice as long as wide in lateral view. Gonapophysis 8

broad, with slightly truncated apex, with gradually stronger setae towards apex. Postgenital plate stout, bluntly tapered, apically sclerotized and with numerous small setae.

Variation. The narrow cubital fork in the holotype, described as having parallel branches, is considered to be aberrant. The measured specimens all have distinctly divergent branches, but the cubital fork width (F) to length of  $CuA_1$  ratio is rather variable [0.33–0.41, 0.36 ( $n=7$ )], i.e. up to 24% wider in the specimen with the widest cubital fork compared to the specimen with the narrowest cubital fork. Some variation in the apicodorsal prolongation of the ventral branch of the male gonostylus is also notable, but considered to be within the species limits.

Distribution. Recorded from Sweden, Kamtschatka, Russia and Minnesota, U.S.A. for the first time, thus expanding its known range from most of Europe (see Chandler, 2004) to a wide Holarctic distribution. The British sites are a wide range of wetland habitats and the new material was obtained by water trapping in two major wetland surveys carried out by the former Nature Conservancy Council. It has not been found during other extensive collecting of Mycetophilidae in the British Isles in recent years but a single male was recorded from County Kerry in Ireland (Chandler *et al.*, 2000; Falk & Chandler, 2005).

### *Pseudexechia monica* sp. n.

(Fig. 2)

– Type material: Holotype male: **GREAT BRITAIN (U.K.):** WALES, Anglesey, Cors Erddreiniog, 27 July 1988, NCC Peatland Survey, water trap 9, rank *Schoenus* flushes, coll. Holmes, Boyce & Reed (deposited in National Museums of Scotland, Edinburgh).

Paratypes: **GREAT BRITAIN (U.K.):** WALES, same data as holotype – 1 male; Anglesey, Cors Erddreiniog, NCC Peatland Survey (water trap 11), 27 July 1988 (coll. Holmes, Boyce & Reed) – 1 male (MZLU, on slide); Anglesey, Cors Bodeilio, NCC Peatland Survey (water trap 1 – *Phragmites* bed), 26 July 1988 (coll. Holmes, Boyce & Reed) – 3 males (MZLU, 1 male on slide); Anglesey, Cors Bodeilio, Mar 1990 (coll. A, Godfrey) – 1 male.

Etymology: The name is an adjective referring to the origin of the type material from the Isle of Anglesey, known in Latin as Mona.

Diagnostic characters: *P. monica* forms together with *P. parallela* a group of small *Pseudexechia* species with dark brown mesoscutum bearing fused thoracic stripes and with reduced size of the gonostylus relative to the gonocoxite. It can be separated from *P. parallela* by unique characters in the male terminalia, including the ventral branch of the gonostylus being angled and club shaped, the hypandrial lobe being large subrectangular, elaborate and with a large diverging split apically, and the hypoproct forming a shorter, strongly downcurved cylindrical process. It shares the shape of the ventral branch of the gonostylus with *P. aurivernica* but can easily be separated from this larger species by fused thoracic stripes and other details of the male terminalia such as shape of the hypandrial lobe and the widened apex of the dorsal branch of the gonostylus.

### Description

Male ( $n=2$ , except where otherwise stated). Total length 3.9–3.9 mm. Wing length 2.58–2.6 mm, or 2.89–3 × as long as profemur. Mesoscutum length 0.7–0.74 mm, or 0.27–0.28 × as long as wing.

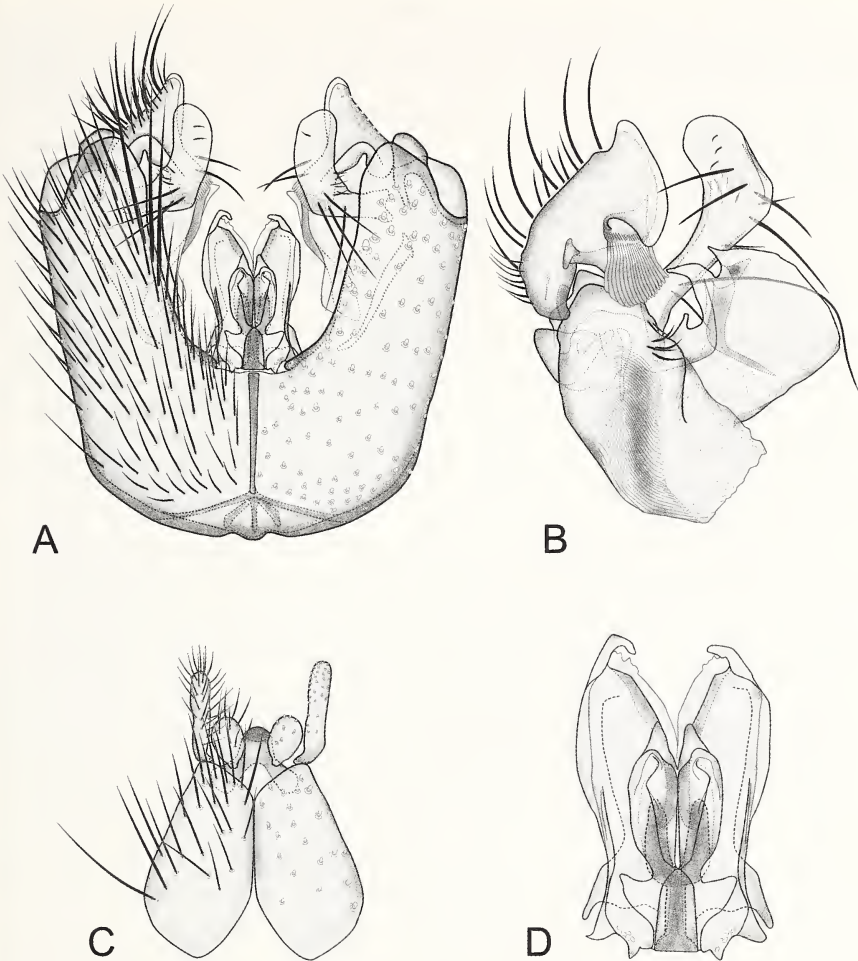


Fig. 2. Male terminalia of *Pseudexechia monica* sp. n. **A.** Terminalia, ventral view; **B.** Internal face of gonostylus, enlarged; **C.** Tergite 9, cerci and hypoproct, dorsal view; **D.** Hypandrial lobe, ventral view, enlarged.

Coloration ( $n = 7$ ). Head brown. Antenna with scape, pedicel and first flagellomere yellowish brown, otherwise darker brown. Palpus brownish yellow. Thorax with mesoscutum mostly dark brown with grey dusting, with only the side margins and humeral areas yellowish. Dark coloration continued onto disc of scutellum. Pleura yellowish brown. Legs yellow, including tibial spurs. Wing yellowish, with costa and radial veins slightly darker. Abdomen with tergites mostly brown, but tergites 1–5 usually with yellow lateral markings, more or less triangular on 2–5 and broadest on hind margins but usually more restricted in extent than in *P. parallela*. Tergite 6 all brown. Sternites and genitalia brownish yellow.

– Head. Round, width/length to frontal tubercle 1.31–1.36. Antenna 1.44–1.62 mm long. First flagellomere 1.87–2.03 times as long as second flagellomere. Second flagellomere 1.72–1.88 times as long as wide. Two ocelli present, touching compound eyes. Clypeus ovate, length/width 1.25–1.28. Antepenultimate segment 0.1–0.11 mm long, palpomere ratios 1: 1.32–1.44: 2.16–2.34.

– Thorax. Proepisternum with one strong and one smaller bristle. Mesoscutum with some strong front-marginal, prealar and postalar bristles, otherwise covered with small dark, decumbent setae. Scutellum with one pair of strong bristles.

– Wings. Costa and  $R_5$  with setae both dorsally and ventrally, stem of R and  $R_1$  with dorsal seta only, except a few (2–10) ventral setae apically on  $R_1$ . Crossvein ta with one seta ventrally. Rs, tb, M and Cu without setae. Wing length to length of  $R_1$  2.26–2.32.  $R_5$  nearly straight, wing length to length of  $R_5$  1.7–1.71. Length of ta to length of M-petiole 1.29–1.36. Cu-fork short, fork length ratio (A/B) 0.69–0.72. Fork width ratios (C/D and E/F) 1.15–1.22 and 1.08–1.19. M-ratios 0.54–0.56 and 0.59–0.61. CuA-ratios 1.63–1.69 and 2.2–2.36. Cubital fork width (F) to length of  $CuA_1$  0.33–0.35. CuP vague, ratio of length to length of wing 0.48–0.5.  $A_1$  distinct, ratio of length to length of wing 0.33.

– Legs. Leg ratios given for fore, mid and hind leg: LR 1.15–1.16: 0.87–0.91: 0.65–0.66; SV 1.6–1.65: 1.97–2.02: 2.58–2.63; BV 1.53: 1.87–1.88: 2.67–2.76; TR 1.54–1.61: 1.66–1.68: 1.78–1.84.

– Terminalia. Tergite 9 (Fig. 2C) medially divided into semicircular plates, with setae of variable size. Cercus long, slender, 4.67–6.18 as long as wide in dorsal view. A second small ovate, setose lobe present medial to cercus (of uncertain origin as indicated under *P. parallela*). Gonocoxite (Fig. 2A) open dorsally and deeply incised ventrally, with medial suture. Hypandrial lobe (Fig. 2D) large, subrectangular, elaborately folded, apically with a large diverging split. Hypoproct well developed, apically less prominent forming distinctly down-curved cylindrical process, not reaching beyond apex of cercus, ventrally forming rectangular recess, apparently fused with small conical aedeagal apparatus. Gonocoxal apodeme long, moderately sclerotized, apically broadened with two condyles. Accessory copulatory appendages hyaline and difficult to interpret. Gonostylus (Fig. 2B) with five branches. Dorsal branch with strong setae on lateral face, apically truncated and strongly widened to whitish, smooth cushion, devoid of setae. Dorsointernal branch narrowly fan shaped, with 17 large lamellae. Medial branch reduced or absent. Ventral branch forming thin plate, apically angled club shaped; basally with one very long and one shorter seta, apicolateral face with 3 regular, strong setae and group of small setae; apicointernal face with two strong and a few small setae. Internal branch forms a large, subrectangular pouch, partly striated, ventroapically with a few strong setae. Anterior branch present as large hyaline cushion, devoid of setae, apical rim sclerotized, with three tapered projections.

Female unknown.

– Distribution. Known only from Wales in Great Britain.

#### ACKNOWLEDGEMENTS

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All standing orders are being passed to Apollo Books and henceforward all matters relating to sales of this work, including orders for published volumes, should be referred to them. Apollo Books will continue to use Harley Books' distributors and therefore British orders will be despatched from the UK.