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RESEARCH PAPER

Review of two Tonnoir moth fly species, overlooked for a century (Diptera: Psychodidae: Psychodinae)

Jan JEŽEK¹⁾, Jozef OBOŇA^{2,*}, Patrick GROOTAERT³⁾, Koen LOCK³⁾, Peter MANKO²⁾ & Wouter DEKONINCK³⁾

¹⁾Department of Entomology, National Museum, Cirkusová 1740, CZ-193 00, Praha 9 - Horní Počernice, Czech Republic;
e-mail: jan.jezek@o2active.cz

²⁾Department of Ecology, Faculty of Humanities and Natural Sciences, University of Prešov, 17. novembra 1, SK-081 16 Prešov, Slovakia;
e-mails: jozef.obona@unipo.sk, peter.manko@unipo.sk

³⁾Royal Belgian Institute of Natural Sciences, Rue Vautier 29, 1000 Brussels, Belgium; e-mails: pgrootaert@yahoo.co.uk,
KoenLock@hotmail.com, wouter.dekoninck@naturalsciences.be

* corresponding author

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Abstract. A lectotype (male) and paralectotypes (male, female) of *Pneumia vittata* (Tonnoir, 1919) comb. nov. (= *Pericoma crispis* Freeman, 1953 syn. nov.) from Belgium are designated. The species is redescribed and illustrated, and a differential diagnosis is given. The former designation of a holotype, paratypes and paratypoids by Jung is invalid because it was not published. In addition, a problem with *Tonnoiriella obtusa* (Tonnoir, 1919) comb. nov. (= *Tonnoiriella anchoriformis* Salamanna, 1975 syn. nov.) from Belgium is resolved. A female specimen is designated as a lectotype, but only the dissected wings from this specimen are in condition suitable for redescription. There is additional non-type material collected later by Tonnoir; this material, including 3 females and 1 male, was the basis for redescription, illustrations and differential diagnosis. The unpublished male lectotype designated by Jung is invalid. Two species are added to the last checklist of Psychodidae from Belgium, raising the total number to 94.

Key words. Diptera, Psychodidae, Psychodinae, *Pneumia*, *Tonnoiriella*, lectotype, paralectotype, new synonymy, Belgium, Palaearctic Region

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Introduction

JEŽEK et al. (2018) commented in the checklist of Belgian Psychodidae that the taxonomic status of *Pericoma obtusa* Tonnoir, 1919 and *Pericoma vittata* Tonnoir, 1919 is uncertain and would need to be addressed in a subsequent treatment. A single male syntype of *P. vittata* was lost in the past, and only one pinned specimen of the three female syntypes remains available. This creates a significant risk if the specimen is to be dissected. Specimens originally studied by Tonnoir, including some which were not published, are deposited in the Royal Belgian Institute of Natural Sciences. In this study, we designated a lectotype (male) and paralectotypes (male, female) of *Pneumia vittata* (Tonnoir, 1919) comb. nov. (= *Pericoma crispis* Freeman, 1953, syn. nov.), and the species is redescribed. In addition, a problem with *Tonnoiriella obtusa* (Tonnoir, 1919) comb. nov. (=

Tonnoiriella anchoriformis Salamanna, 1975, syn. nov.) is resolved. The additional non-type material collected later by Tonnoir is described.

The generic position of *Pneumia* Enderlein 1935 was accounted by OMELKOVÁ & JEŽEK (2012a); the genus currently comprises 57 species in the Palaearctic Region. One new species was added by JEŽEK & OBOŇA (2020) from Bulgaria. However, *P. crispis* Freeman, 1953 must be changed to *P. vittata* in the mentioned list now. A catalogue of the world species of the genus *Tonnoiriella* Vaillant, 1982 published by JEŽEK (1999) lists 18 species from the Palaearctic Region and four from the Afrotropical Region. WAGNER & ANDERSEN (2007) described one additional species from Tanzania, and JEŽEK & OBOŇA (2016) a new species from Madagascar. However, *T. anchoriformis* Salamanna, 1975 must be changed to *T. obtusa* in the mentioned catalogue now.



Material and methods

This work is based on material housed in the Royal Belgian Institute of Natural Sciences (RBINS). Two groups of specimens were examined: slides prepared previously by Jung and Tonnoir's pinned material. The latter specimens were boiled and macerated in lye, washed in water and transferred to alcohol, subsequently cleared in chloralphenol, treated in xylol and mounted on glass slides in Canada balsam. Observations were made using Carl Zeiss Jena (Germany) and Reichert (Austria) microscopes, with a mirror arm used as a drawing aid. Line drawings of morphological characters were arranged using a calligraphic pen with black India ink. Drawings were edited in CorelDRAW X6 and Corel PHOTO-PAINT X6 graphic software.

Taxonomy

Pneumia vittata (Tonnoir, 1919) comb. nov.

(Figs 1–14)

Pericoma vittata Tonnoir, 1919b: 136.

Pericoma vittata: WAGNER (1990): 65 (as doubtful species).

Pericoma crispi Freeman, 1953: 69, **syn. nov.**

Pericoma crispi: KREK (1970: 98 etc.); KREK (1972: 89 etc.); KREK (1973: 63 etc.); SZABÓ (1983: 70); VAILLANT (1964: 67); WITHERS (1989: 27); WITHERS & O'CONNOR (1992: 65).

Satchelliella crispi: FRANZ (1989: 111); JEŽEK & HALGOŠ (1987: 31); KREK (1979: 1807); KREK (1982: 156); KREK (1985: 162); KREK (1990: 8); KREK (1999: 310); KREK et al. (1976: 29 etc.); MUČIBABIĆ et al. (1984: 61 etc.); NIESIOŁOWSKI & WAGNER (1991: 87); VAILLANT (1979: 260); WAGNER (1999: 72).

Pneumia crispi: JEŽEK (2002: 111); JEŽEK (2003: 131); JEŽEK (2006a: 35); JEŽEK (2006b: 179); JEŽEK et al. (2008: 142); JEŽEK et al. (2017: 122); JEŽEK & GOUTNER (1995: 124); JEŽEK & HÁJEK (2007: 268); JEŽEK & OMEJKOVÁ (2012: 784); KROČA & JEŽEK (2015: 44); OBOŇA & JEŽEK (2014: 237); OMEJKOVÁ & JEŽEK (2012a: 4); OMEJKOVÁ & JEŽEK (2012b: 522); OMEJKOVÁ et al. (2008: 295).

Pericoma hungarica Szabó, 1960a: 167 (syn. by CASPERS & WAGNER 1980).

Pericoma hungarica: ROZKOŠNÝ (1971: 136); SZABÓ (1960b: 211).

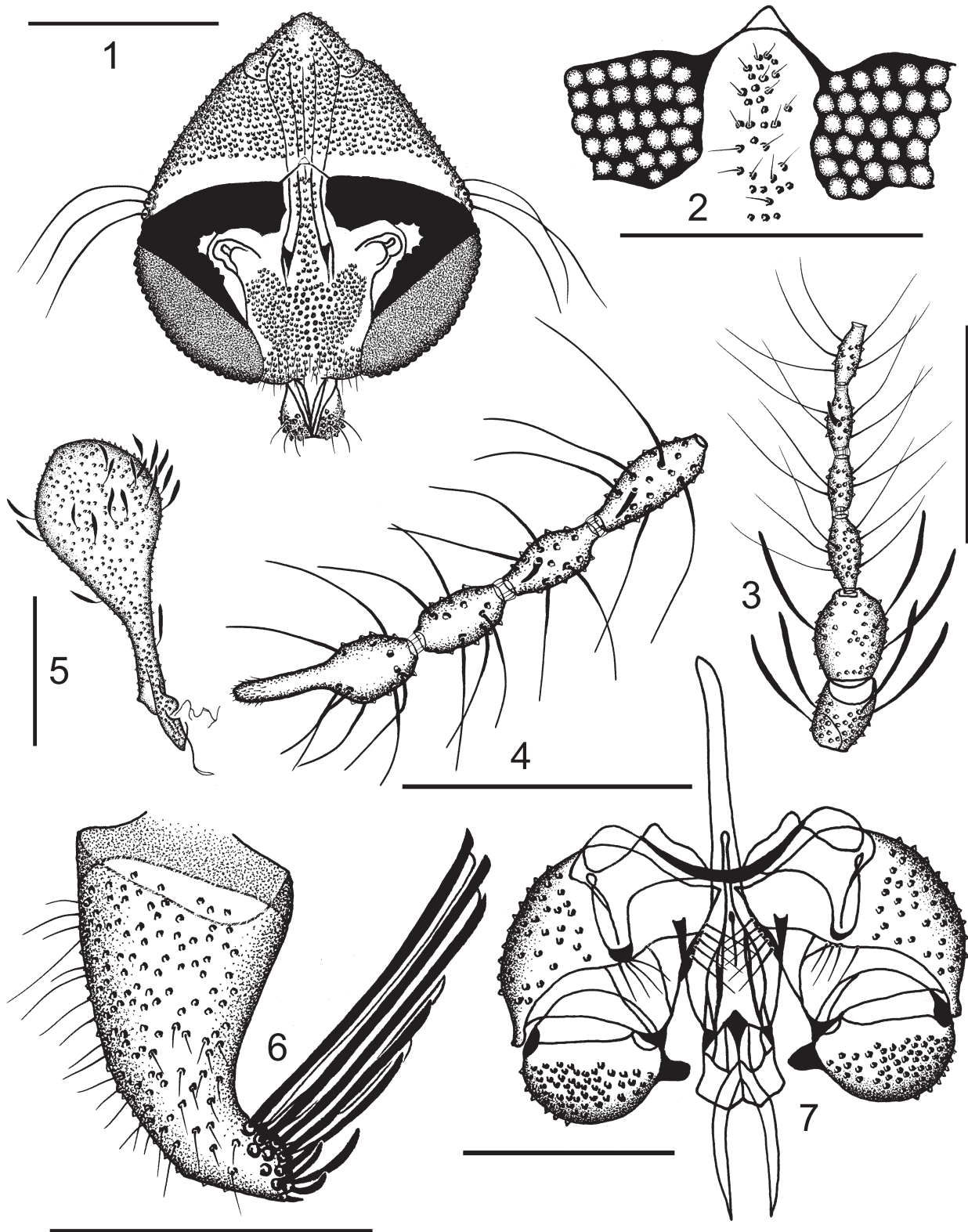
Type material examined. *Pericoma vittata*. LECTOTYPE (here designated by J. Ježek: *Pneumia vittata* (Tonnoir), lectotype): ♂ [2 slides of one specimen provided with red labels; RBINS]: 'B027: *Pericoma vittata* Tonnoir, ♂, holotype (orange label); **Belgium**: Buzenol, Vallée de Claireau (Province of Luxembourg), 31.vii.1919, A. L. Tonnoir leg., H. F. Jung det.' [2 microslides, dissected aedeagal complex and remainder of abdomen]; 'B027: *Pericoma vittata* Tonnoir, ♂, type (violet label); same; cf. Bull. Ann. Soc. Ent. Belg. 59 (1919): 136' [cover slide 22×22 mm; head, thorax with two wings and legs (all parts from a pinned specimen) dissected by J. Ježek].

PARALECTOTYPES (here designated by J. Ježek and all provided by red labels: *Pneumia vittata* (Tonnoir), paralectotype): 1 ♂ [3 slides of one specimen; RBINS]: 'B028: *Pericoma vittata* Tonnoir, ♂, paratypoid (orange label); **Belgium**, Buzenol, Vallée de Claireau, 31.vii.1919, A. L. Tonnoir leg., H. F. Jung det.' [cover slide 18×18 mm, dissected whole abdomen including aedeagal complex]; 'B028: *Pericoma vittata* Tonnoir, ♂; same' [cover slide 18×18 mm, dissected head and one wing]; 'B028: *Pericoma vittata* Tonnoir, ♂, paratype (orange label); same; cf. Bull. Ann. Soc. Ent. Belg. 59(1919): 136' [cover slide 22×22 mm, dissected thorax with one wing (legs incomplete) – from a pinned specimen (by Ježek)].

1 ♀, [2 slides of one specimen; RBINS]: 'B029: *Pericoma vittata* Tonnoir, ♀, paratypoid (orange label); **Belgium**, Buzenol, Vallée de Claireau, 31.vii.1919, A. L. Tonnoir leg., H. F. Jung det.' [2 microslides, ♀: one with dissected ovipositor, subgenital plate and genital chamber, and another with remainder of abdomen]; 'B029: *Pericoma vittata* Tonnoir, ♀, paratype (orange label); same; cf. Bull. Ann. Soc. Ent. Belg. 59 (1919):

136'; [cover slide 22×22 mm; thoracic sclerites, wings and incomplete legs (from a pinned part of the specimen) dissected by J. Ježek].

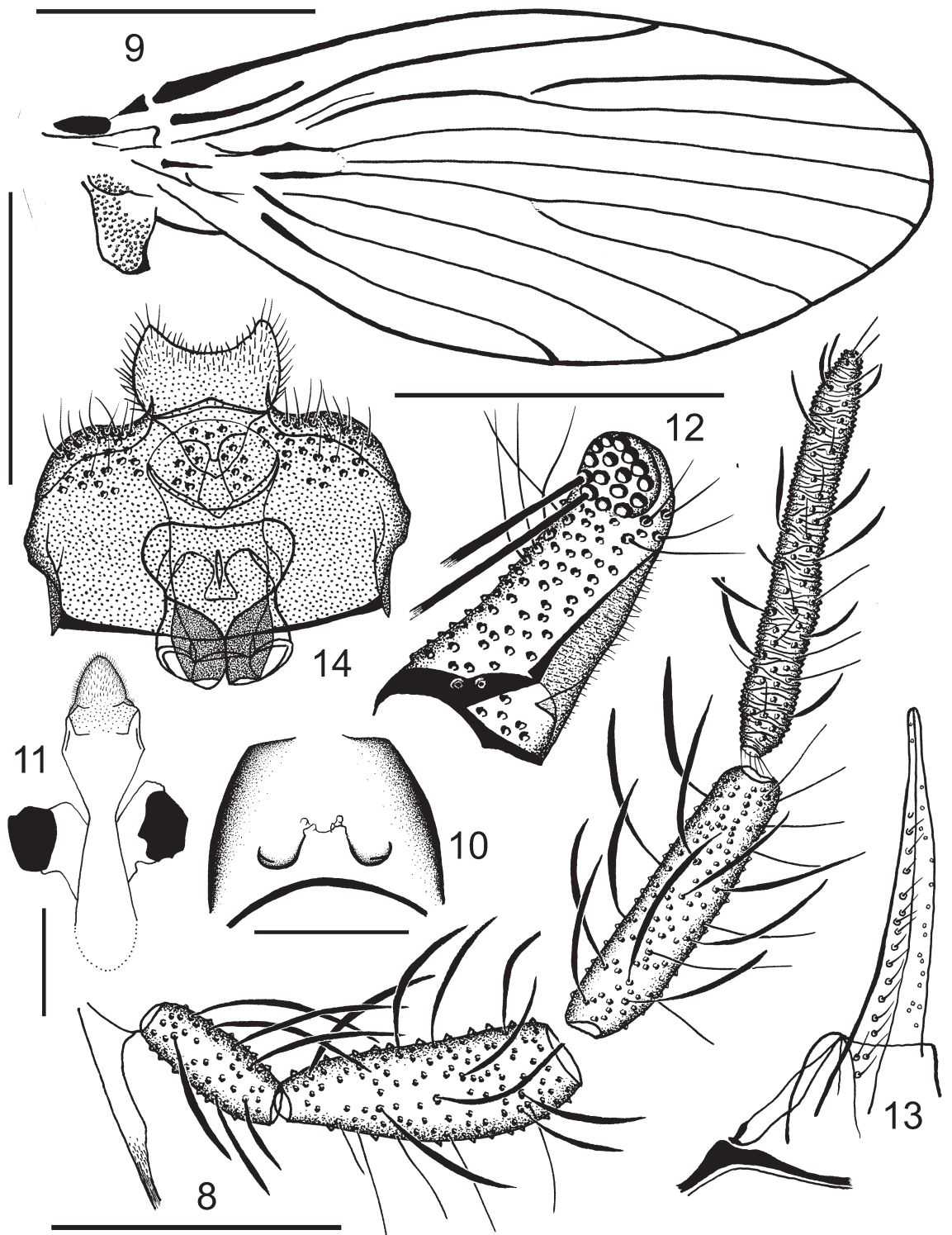
Redescription. *Male*. Head pyriform, flattened antero-posteriorly, vertex conspicuously elevated (Fig. 1), in spite of small elliptical bald spot apically, uniformly set with numerous setae alveoli, with horizontal border of setae above upper apices of eyes, which are slightly convex on both sides. Three conspicuous supraocular bristles present above dorsal margins of eyes on both extreme sides of head, which are stout and long, extending slightly beyond half of cibarium. Eyes separated, folded in lower apices, eye bridge with five to six facet rows, divided irregularly by width of 5–6 facet diameters (Fig. 2). Interocular suture inverted, U-shaped, not well sclerotized and doubled by triangular, barely transparent small ligament on top. Ratio of distance of both apices of eyes (tangential points) to minimum width of frons approximately 4.5 : 1. Frontoclypeus (Fig. 1) with large, three-lobed central scar patch that has hemispherical basis (central alveoli are a little enlarged), medial, regularly narrow lobe, prolonged almost to interocular suture (Fig. 1), with small concave lateral lobes. Antennae (Figs 3, 4) 16-partite and covered with minute setae. Scape cask-shaped, and pedicel ovoid, 1.2 times as long as scape. Both parts covered with long narrow scales, 1.4 times as long as 1st flagellomere. Flagellomeres mostly spindle-shaped, with long setae (longer than parts bearing them). Last two antennomeres anomalous, of which one is barrel-shaped and terminator has stout apiculus (digit) as long as basal, almost ovoid, part of the antennomere. Sensory filaments (ascoids) needle-shaped (Figs 3, 4), paired, upright, rather short, less than half as long again as flagellomeres bearing them. Length ratios of maxillary palps 1 : 1.9 : 1.9 : 2.5 and last segment annulate (Fig. 8). Ratio of maximum length of cibarium (Fig. 1) to length of epipharynx 2.3 : 1. Wing (Fig. 9) ovate, 2.4 times as long as wide, with hardly convex posterior margin (lectotype wing length 3.1, paralectotype 3.1 mm). Wing membrane generally clear. Strengthened veins: Sc, R₁ (start a little weakened), R₂, R₂₊₃ (short linear streak running parallel to R₁), basal cell, CuA₁ basally, CuA₂ basally and distally. Radial and medial forks (both incomplete) are in line with ending of CuA₂, R₅ ends conspicuously beyond wing apex. Halteres (Fig. 5) stick-shaped, covered with many small scales; ratio of maximum length of halteres to their maximum width 2.7 : 1. Legs incomplete (destroyed during preparation of dry material). Ejaculatory apodeme of aedeagal complex narrow (Fig. 7) and straight, a little bent proximally, bifurcated distally. Spatula shortly bilobed, sides rounded, with shallow medial cleft. Aedeagal complex with three sclerotized corners proximally (dorsal view) and two external lamellae connected by shorts-shaped border distally. Internal aedeagal duct elongatedly forked as in tuning-fork (Freeman's term, compare FREEMAN 1953: p. 69, Fig. 1b). Gonocoxites (Fig. 7) thick and short, with length hardly half of that of aedeagal complex (including ejaculatory apodeme). Gonostyli (Fig. 7) hemispherical, with lateral protuberance that is short, little thumb-shaped and conspicuously sclerotized. Aedeagal complex overlaid by narrow hypandrium that is a little widened medially.



Figs 1–7. *Pneumia vittata* (Tonnoir, 1919) comb. nov., male. 1 – head, frontal view; 2 – detail of frons; 3 – basal antennomeres; 4 – terminal antennomeres; 5 – haltere, lateral view; 6 – epandrial lobe, lateral view; 7 – aedeagal complex and gonopods, dorsal view. Scale bars: 1–3, 5–7 = 0.2 mm; 4 = 0.1 mm.

Epandrium (Figs 10, 11) not quadrilateral as usually, however, narrowed distally, bare. Basal paired apertures oval, sclerotized only basally, connected by inconspicuous and irregular fold. Remainders of ventral epandrial sclerite (Fig. 11) wing-shaped, with irregular very sclerotized conspicuous patches on both sides. Epiproct featureless

and sinuous, hypoproct large, almost tongue-shaped or triangular and caudal top is rounded, haired, both parts with microsetae (Fig. 11). Epandrial lobes (Figs 6, 12) approximately as long as epandrium (1 : 1.1, see slides B027, B028), cylindrical in dorsal view, three times wider at base than at top in lateral view, arched distally (C-shaped),



Figs 8–14. *Pneumia vittata* (Tonnoir, 1919) comb. nov., male and female (13–14). 8 – maxilla and palpus maxillaris; 9 – wing; 10 – epandrium, dorsal view; 11 – hypoproct and epiproct, dorsal view, dissected; 12 – epandrial lobe, dorsal view; 13 – cercus, lateral view; 14 – subgenital plate and genital chamber, dorsal view. Scale bars: 9 = 1 mm; 8, 10, 12, 13 = 0.2 mm; 11 = 0.1 mm; 14 = 0.3 mm.

haired, with approximately 16 retinaculi subapically, which are arranged in circular field. Retinacula frayed terminally, gradually shortening towards top of epandrial lobes.

Female. Head with eyes separated, folded in lower apices, eye bridge with five facet rows, ratio of width of frons to eye bridge approximately 1 : 1.1 (B029). Interocular

suture inverted, U-shaped, not well sclerotized, without ligament on top. Three conspicuous supraocular bristles present above dorsal margins of eyes on both extreme sides of head. Otherwise, including wings (paralectotype wing length 3.1 mm), as in male. Ovipositor (Fig. 13), three times as long as last abdominal tergite (see B029),

both cerci pointed and setose (two parallel lines of short setae and microsetae). Subgenital plate (Fig. 14) U-shaped distally (bilobed), with deep caudal concavity (compare FREEMAN 1953: p. 69, Fig. 1f), haired and with widened basis in horizontal axis to almost oblong sclerite, narrowed proximally, which is almost bare (in spite of numerous microsetae). Some setae found caudally on both conspicuously sclerotized and folded sides of subgenital plate, as well as approximately V-shaped setose patch in middle. Internal structures of subgenital plate are complicated and characteristic (Fig. 14), as is genital chamber.

Differential diagnosis. *Pneumia vittata* has unique paired parallel long corners (in comparison with other Palaearctic *Pneumia*). *Pneumia vittata* is similar to *P. mutua* (Eaton, 1893), which has CuA_2 with many conspicuous setae (almost on the entire vein) – see JUNG (1956: p. 228, Fig. 53); the aedeagal complex has conspicuous characteristic corners on both sides distally (same, Fig. 54); gonostyli have a broad basis and then are gradually tapering to the tip, not very sclerotized (same, Fig. 54). The female subgenital plate has a very shallow cleft distally (same, Fig. 55). On the other hand, *P. vittata* has CuA_2 bare (Fig. 9); aedeagal complex is deeply forked resembling tuning-fork and gonostyli are hemispherical, with a lateral protuberance that is a little thumb-shaped and conspicuously sclerotized (Fig. 7). The female subgenital plate has a deep caudal concavity (Fig. 14).

Distribution. A west Palaearctic species recorded in Austria, Belgium, Bosnia and Herzegovina, Czech Republic, France, Germany, Greece, Great Britain, Hungary, Ireland, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia (WAGNER 2018).

Remarks. The material of four males and one female of *Pericoma vittata* from the type locality (Buzenol, Province of Luxembourg, Belgium) was published by TONNOIR (1919b) without figures, but two males were lost. Slides deposited in the Royal Belgian Institute of Natural Sciences marked as B027 (2), B028 (3) and B029 (2), complemented by parts of flies from pinned specimens (by Ježek), all dated adequately as quoted in the original paper, were studied here: the designated lectotype (2 slides) and paralectotypes (5 slides incl. female). The former holotype designation by Jung (as well as paratypes and paratypoids – see a list of the type material above) is invalid since it was not published.

Tonnoiriella obtusa (Tonnoir, 1919) comb. nov.

(Figs 15–24)

Pericoma obtusa Tonnoir, 1919a: 10.

Pericoma obtusa: WAGNER (1990: 65) (as doubtful species).

Tonnoiriella anchoriformis Salamanna, 1975a: 208, **syn. nov.**

Tonnoiriella anchoriformis: JEŽEK (1999: 17); SALAMANNA (1975b: 87);

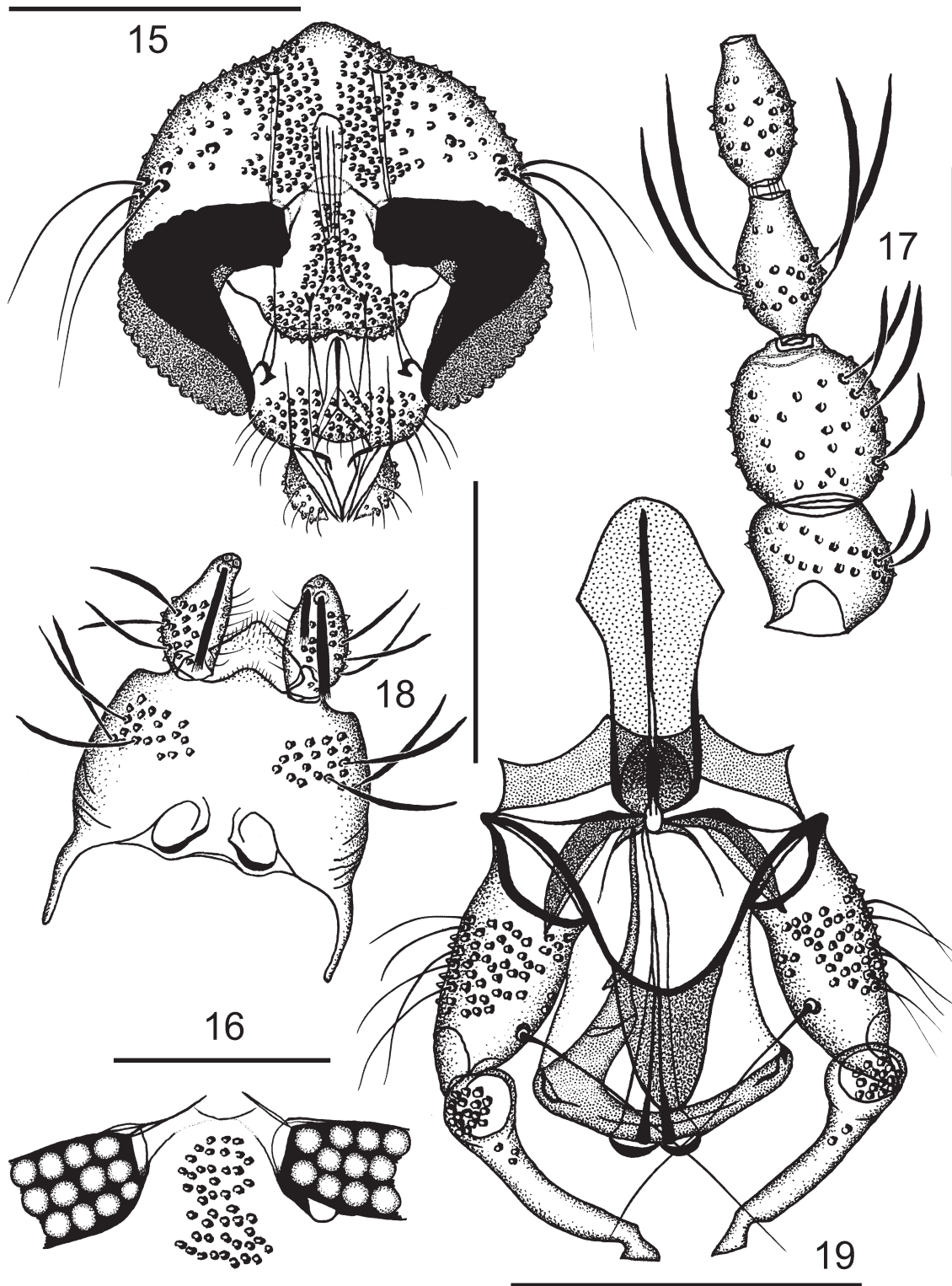
SALAMANNA (1983: 191); WITHERS (2002: 116);

Tonnoiriella disneyi Withers, 1997: 61 (syn. by JEŽEK 1999).

Type material examined. *Pericoma obtusa*: LECTOTYPE (here designated by J. Ježek – *Tonnoiriella obtusa* (Tonnoir) – lectotype, red label): ♀ [single slide of one specimen, RBINS]: ‘*Pericoma obtusa* Tonnoir, ♀, white label Type (in red letters), Collect. & déterm. A. Tonnoir, Genval (Belgium), 3 Jul. 1917 [Sic!] (3.vii.1917)’ [on cover slide 22×22 mm, two characteristic maculated wings dissected by J. Ježek, the rest of body was destroyed from a pinned specimen].

Additional non-type material: 8 slides of *Tonnoiriella obtusa* (Tonnoir), all J. Ježek det., (2 ♂♂ and 6 ♀♀). ♀ [2 slides of the same specimen, RBINS]: ‘B006: *Pericoma obtusa* Tonnoir, ♀, Genval, 28 Juin 1921 [Sic!] (28.vi.1921), A. L. Tonnoir leg., H. F. Jung det.’ [cover slide 18×18 mm, a dissected head, abdomen incl. genitalia and one wing]; ‘B006: *Pericoma obtusa* Tonnoir, ♀, same, R. M. H. N. Belg. 10.638’ [cover slide 22×22 mm, a part of pinned thorax with incomplete legs, one wing (by Ježek)]; ♀ [2 slides of the same specimen, RBINS]: ‘007: *Pericoma obtusa* Tonnoir, ♀, Genval, 28 Juin 1921 [Sic!] (28.vi.1921), A. L. Tonnoir leg. and det., H. F. Jung det.’ [cover slide 18×18 mm, a dissected head, abdomen incl. genitalia and one wing]; ‘007: *Pericoma obtusa* Tonnoir, ♀, same, R. M. H. N. Belg. (RBINS) 10.638’ [cover slide 22×22 mm, deformed thorax with one leg (by Ježek)]; ♀ [2 slides of the same specimen, RBINS]: ‘*Pericoma obtusa* Tonnoir, ♀, Genval, 28 Juin 1921 [Sic!] (28.vi.1921), A. L. Tonnoir leg. and det., R. M. H. N. Belg. (RBINS) 10.638’ [cover slide 22×22 mm, dissected head, thorax (legs complete) and genitalia (by Ježek)]; *Pericoma obtusa* Tonnoir, ♀, same [cover slide 22×22 mm, dissected one wing (by Ježek)]; ♂ [2 slides of the same specimen, RBINS]: ‘B005: *Pericoma obtusa* Tonnoir, ♂, lectotypus (orange label), Genval, 28 Juin 1921 [Sic!] (28.vi.1921), A. L. Tonnoir leg., det. and H. F. Jung det.’ [cover slide 18×18 mm, a dissected head, abdomen incl. genitalia and a part of thorax with haltere and one wing]; ‘B005: *Pericoma obtusa* Tonnoir, ♂, lectotypus (white label), same, R. M. H. N. Belg. (RBINS) 10.638’ [cover slide 22×22 mm, one wing (by Ježek)].

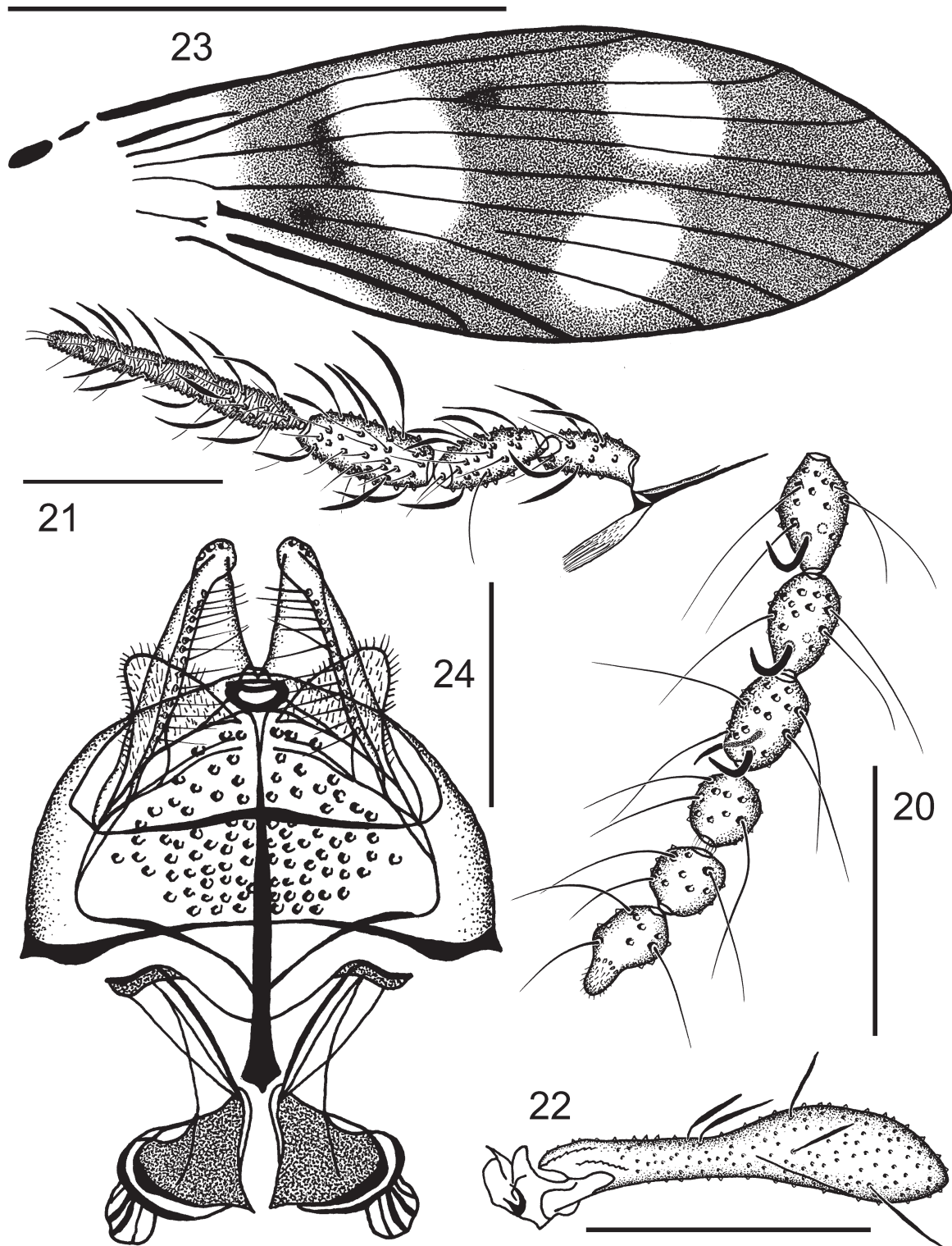
Redescription. Male. Head almost rounded in frontal view (Fig. 15), flattened antero-posteriorly, vertex a little elevated, without cornicula, insertions of five supraocular bristles on both dorsal margins of eyes spaced irregularly, not in one line, conspicuous, enlarged, extending to half of cibarium. Scars of seta alveoli on vertex near vertical axis are closely spaced in two stripes approximately as wide as frons, clearly divided by median scar-free band, dorsally enlarged. Rest of upper half of head is covered with sporadic setae alveoli. Horizontal border of setae above upper apices of eyes is convex on both sides. Eyes separated (frons 1.3 times as wide as eye bridge), folded in lower apices. Eye bridge composed of three facet rows (Fig. 16), interocular suture incomplete. Ratio of distance of both apices of eyes (tangential points) to minimum width of frons approximately 2.3 : 1. Frontoclypeus (Fig. 15) has large, three-lobed central scar patch of seta alveoli, with two concave lateral lobes and medial lobe that is widened at the basis and prolonged almost to interocular suture. Number of antennomeres is 16 (Figs 17, 20), all covered with microtrichiae. Scape is almost spherical, pedicel is ovoid, 1.2 times as long as scape. Both parts are covered with long narrow scales. Flagellomeres mostly spindle-shaped, with long setae (longer than parts bearing them). Last four antennomeres anomalous, of which the first is barrel-shaped and the three following are spherical. Apiculus (digit) of terminator represents third of basal part of the antennomere. Sensory filaments (ascoids) needle-shaped (Fig. 20), paired, bent, a little shorter than flagellomeres bearing them. Length ratios of maxillary palps 1 : 1.2 : 1.3 : 2.7, last segment annulate (Fig. 21). Ratio of maximum length of cibarium (Fig. 15) to length of epipharynx approximately 2.0 : 1. Wing (Fig. 23) lancet-shaped, 2.9 times as long as wide, without enlarged posterior margin (wing length 1.9 mm). Wings smoky brown, heavily spotted: pale pattern broken into three oval areas (veins are inconspicuously weakened there), in contrast to some dark spots: radial fork, start of R_{1+2} connected with beginning of R_3 and base of M_3 . Conspicuously strengthened veins: Sc, CuA_1 and



Figs 15–19. *Tonnoiriella obtusa* (Tonnoir, 1919) comb. nov., male. 15 – head, frontal view; 16 – detail of frons; 17 – basal antennomeres; 18 – epandrium and epandrial lobes, dorsal view; 19 – aedeagal complex and gonopods, dorsal view. Scale bars: 16, 17 = 0.1 mm; 15, 18, 19 = 0.2 mm.

CuA₂. Radial fork complete in contrast to medial one. R₅ ends beyond wing apex. Halteres (Fig. 22) stick-shaped, elongatedly ovoid knob and stem bear many small narrow scales; ratio of maximum length of halteres to their maximum width 5.5 : 1. Legs incomplete (destroyed during preparation of dry material). Ejaculatory apodeme of aedeagal complex straight in dorsal view (Fig. 19), parallel-sided

distally, rounded proximally, with distinct lateral obtuse corners subapically. Apodeme compressed dorso-ventrally, terminating anteriorly in sclerotized axial rim and spherical chamber distally. Aedeagal complex asymmetrical (Fig. 19), smooth basally, distal part with boomerang or sickle-shaped strong paramere, shortly hooked (pointed) at end. Internal aedeagal duct formed by two diverging



Figs 20–24. *Tonnoiriella obtusa* (Tonnoir, 1919) comb. nov., male and female (24). 20 – terminal antennomeres; 21 – maxilla and palpus maxillaris; 22 – haltere, lateral view; 23 – wing; 24 – cerci, subgenital plate and genital chamber, dorsal view. Scale bars: 23 = 1 mm; 20, 21, 24 = 0.1 mm; 22 = 0.2 mm.

lamellae that are rounded distally, approximately as long as paramere (compare e.g. SALAMANNA 1975a, p. 210, Fig. 4f). Gonocoxites (Fig. 19) almost cylindrical (as long as gonostyli), with stout seta on inner side distally. Gonocoxal apodemes form narrow horizontal sclerite with four pointed protuberances proximally. Gonostyli (Fig. 19) appreciably narrower than gonocoxites, cut distally (as hoof), with

characteristic subapical notch. Aedegal complex overlaid by narrow hypandrium with prominent medially thickened, almost triangular (or tongue-shaped) protuberance. Epandrium (Fig. 18) approximately rectangular, however, narrowed distally, almost bare in contrast to narrow irregular scar patch of scale alveoli on both sides posteriorly. Basal paired apertures oval, conspicuously sclerotized

only basally. Reminders of ventral epandrial sclerite (Fig. 18) were not detected. Epiproct lobular, hypoproct larger, almost tongue-shaped, with rounded caudal top, both parts haired (Fig. 18). Epandrial lobes (Fig. 18) shorter than epandrium, approximately 1.4 : 1 (compare slide B005), hardly cylindrical in dorsal view, a little widened at base, arched distally (C-shaped), with long narrow scales. Three retinacula frayed on the top, a little shorter than length of epandrial lobes and arranged subapically.

Female. Head with eyes that are separated more than in male, folded in lower apices, eye bridge has also three facet rows, however, ratio of width of frons to eye bridge is approximately 2 : 1 (B006). Interocular suture interrupted, with poorly sclerotized narrow ligament between both parts. Supraocular bristles spaced in one line, with conspicuous scar alveoli (5–6). Otherwise, including wings (wing length of lectotype 2.1 mm, rest of slides 1.8–2.1 mm), as in the male. Ovipositor (B006, B007, Fig. 24) composed of two conical cerci with broad basis, which is gradually narrowed towards end and rounded on top, as long as maximum span of genital chamber (see B006, B007). Conspicuous line of 14–16 setae on axial longitudinal rib (edge). Subgenital plate (Fig. 24) V-shaped distally (bilobed), with deep caudal concavity, haired (compare e.g. SALAMANNA 1975a: p. 210, Fig. 4i). Both lobes divergent and a little arched. Basis of subgenital plate widened in horizontal axis, hemispherical and setose (in contrast to naked side margins). Genital chamber bilobed anteriorly, posteriorly with complicated structures inside, with additional rounded small corrugated protuberances on both sides.

Differential diagnosis. Males of *T. obtusa* are similar to those of *T. holmi* Wagner, 1993 collected from Germany, which have a triangular hypandrium with rather concave sides and a symmetrical aedeagal complex (WAGNER 1993, p. 413, Fig. 22). The female of *T. holmi* is unknown. *T. obtusa* has a tongue-shaped hypandrium with rather convex sides and the aedeagal complex is asymmetrical (Fig. 19). The subgenital plate of the female (Fig. 24) is V-shaped distally (bilobed), with declined and arched lobuli and a deep caudal concavity.

Distribution. Currently recorded in Belgium, Great Britain and Italy (WAGNER 2018).

Remarks. TONNOIR (1919: p. 11) used for the description three females from Belgium, Province of Brabant Wallon, Genval; no illustrations were included. Unfortunately, only one female from the syntype series remains in the Royal Belgian Institute of Natural Sciences: Type, Genval, 3.Juil.1917 [Sic!] (3.vii.1917). While this specimen is suitable for lectotype designation, only the characteristic wings could be used for a slide preparation. In the original paper, the year of the samples was not mentioned and Jung designated lectotypes (not published) on the basis of the additional males and females from the same locality identified by Tonnoir as *Pericoma obtusa*: Genval, 28. Juni 1921 [Sic!] (28.vi.1921) (B005–007 slides; parallel three slides from the rest of dissected pinned specimens (sometimes with a loss of miniature parts) were prepared by J. Ježek). The lectotype designation by Jung is invalid (not published) and Tonnoir's males of *Pericoma obtusa*

(identified by him) collected two years later are described and illustrated here.

Discussion

An updated checklist of the Psychodidae of Belgium (JEŽEK et al. 2018) included 92 species. This number is here increased to 94 species. The validity of *Pericoma spherica* Tonnoir, 1920 (Virton, Province of Luxembourg, Belgium) still remains unresolved: a single published male syntype was lost (W. Dekoninck, pers. comm.) in the past, and of the three published females, only one pinned female is still deposited in the Royal Belgian Institute of Natural Sciences. Fresh alcohol material of the mentioned species would be badly needed for a conclusive study in the future.

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References

- CASPERS N. & WAGNER R. 1980: Emergenz-Untersuchungen an einem Mittelgebirgsbach bei Bonn. II. Psychodiden – Emergenz 1976/1977. *Archiv für Hydrobiologie* **88**(1): 73–95.
- FRANZ H. 1989: Familie Psychodidae. Pp. 108–114. In: FRANZ H. (ed.) *Die Nordost-Alpen im Spiegel ihrer Landtierwelt*. Universitätsverlag Innsbruck, 413 pp.
- FREEMAN P. 1953: Two new species of Psychodidae (Diptera Nematocera) from Britain. *Proceedings of the Royal Entomological Society of London B* **22**: 69–71.
- JEŽEK J. 1999: Rare and new Palaearctic Tonnoiriella species (Diptera, Psychodidae). *Časopis Národního Muzea, Řada Přírodovědná* **168**: 7–18.
- JEŽEK J. 2002: The first account of Slovenian moth flies (Psychodidae, Diptera). *Časopis Národního Muzea, Řada Přírodovědná* **171**: 89–116.
- JEŽEK J. 2003: New faunistic data and check list of non Phlebotomine moth flies (Diptera, Psychodidae) from the Czech and Slovak Republics. *Časopis Národního Muzea, Řada Přírodovědná* **172**: 121–132.
- JEŽEK J. 2006a: New faunistic records of moth flies (Insecta, Diptera, Psychodidae) from Slovakia. *Entomofauna Carpathica* **18**: 34–36.
- JEŽEK J. 2006b: Psychodidae (Diptera) of the Jeseníky Protected Landscape Area and its environs with descriptions of two new *Berdeniella* species from the Czech Republic. *Acta Entomologica Musei Nationalis Pragae* **46**: 151–192.
- JEŽEK J., CHVOJKA P., MANKO P. & OBOŇA J. 2017: Faunistic and bibliographical inventory of moth flies from Ukraine (Diptera, Psychodidae). *ZooKeys* **693**: 109–128.
- JEŽEK J. & GOUTNER V. 1995: Psychodidae (Diptera) of Greece. *Acta Musei Nationalis Pragae, Series B, Historia Naturalis* **50** [1994]: 107–124.

- JEŽEK J., GROOTAERT P., LOCK K., MANKO P. & OBOŇA J. 2018: Moth flies (Diptera: Psychodidae) from the Belgian transition of the Atlantic to the Central European faunal zones. *Biodiversity and Environment* **10**(2): 5–17.
- JEŽEK J. & HÁJEK J. 2007: Psychodidae (Diptera) of the Orlické hory Protected Landscape Area and neighbouring areas with descriptions of two new species from the Czech Republic. *Acta Entomologica Musei Nationalis Pragae* **47**: 237–285.
- JEŽEK J. & HALGOŠ J. 1987: Psychodidae. Pp. 29–32. In: JEŽEK J. (ed.): Enumeratio Insectorum Bohemoslovakiae. Check list of Czechoslovak Insects II (Diptera). *Acta Faunistica Entomologica Musei Nationalis Pragae* **18**: 1–341.
- JEŽEK J. & OBOŇA J. 2016: Descriptions of two new species of Afrotropical Psychodidae (Diptera). *Zootaxa* **4144**(4): 515–528.
- JEŽEK J. & OBOŇA J. 2020: *Pneumia mladeni* sp. nov. (Diptera: Psychodidae: Psychodinae) from Bulgaria. *Klapalekiana* **55**: 199–205.
- JEŽEK J. & OMELKOVÁ M. 2012: Moth flies (Diptera: Psychodidae) of the Bílé Karpaty Protected Landscape Area and Biosphere Reserve (Czech Republic). *Acta Musei Moraviae, Scientiae Biologicae* **96**(2) [2011]: 763–802.
- JEŽEK J., VONIČKA P. & PREISLER J. 2008: Koutulovití (Diptera: Psychodidae) Jizerských hor a Frýdlantska. [Psychodidae (Diptera) of the Jizerské hory Mts and Frýdlant region (northern Bohemia, Czech Republic)]. *Sborník Severočeského Muzea, Přírodní Vědy* **26**: 129–151 (in Czech, English summary).
- JUNG H. F. 1956: Beiträge zur Biologie, Morphologie und Systematik der Europäischen Psychodiden (Diptera). *Deutsche Entomologische Zeitschrift* **3**: 97–257.
- KREK S. 1970: Fauna Psychodidae (Diptera) u području planina Maglič, Volujak i Zelengora. [The fauna of the Psychodidae (Diptera) in the area of the Maglič, Volujak and Zelengora mountains]. *Glasnik Zemaljskog Muzeja Bosne i Hercegovine u Sarajevu* **9**: 93–106 (in Croatian).
- KREK S. 1972: Neki faktori distribucije Psychodidae (Diptera). [Some Distribution Factors of Psychodidae (Diptera)]. *Godišnjak Biološkog Instituta Univerziteta u Sarajevu* **25**: 83–106 (in Bosnian).
- KREK S. 1973: Ekološka klasifikacija i cenotički odnosi Psychodidae u tekućicama jugoistočne Bosne. [Ecological classification and cenotic relations of Psychodidae in fluids of southeastern Bosnia]. *Godišnjak Biološkog Instituta Univerziteta u Sarajevu* **26**: 57–95 (in Bosnian).
- KREK S. 1979: Naselje Psychodidae (Diptera) rijeke Krivaje. [The Psychodidae (Diptera) of the Krivaya River]. *Drugi Kongres Ekologa Jugoslavije, Zagreb, Poseban Otisak* **2**: 1803–1811 (in Croatian).
- KREK S. 1982: Psychodidae (Diptera) Sjeverne Makedonije. [Psychodidae (Diptera) of Northern Macedonia]. *Glasnik Zemaljskog Muzeja Bosne i Hercegovine u Sarajevu, N. S., Prirodne Nauke* **21**: 147–161 (in Croatian).
- KREK S. 1985: Die Psychodiden-Fauna der SR Serbien. *Proceedings on the Fauna of SR Serbia* **3**: 149–182.
- KREK S. 1990: Genus Satchelliella (Psychodinae, Psychodidae) u Jugoslaviji [Genus Satchelliella (Psychodinae, Psychodidae) in Yugoslavia]. *Godišnjak Biološkog Instituta Univerziteta u Sarajevu* **25**: 93–106 (in Croatian).
- KREK S. 1999: *Psychodidae (Diptera Insecta) Balkanskog Poluotoka*. [Psychodidae (Diptera Insecta) of the Balkan Peninsula]. Federacija Bosne i Hercegovine, Ministarstvo Obrazovanja, Nauke, Kulture i Sporta, Studentska Štamparija Univerziteta Sarajevo, Sarajevo, 417 pp (in Croatian).
- KREK S., KAČANSKI D. & TANASIJEVIĆ M. 1976: Biocenološka analiza naselja insekata (Ephemeroptera, Plecoptera, Simuliidae) u Psychodidae sliva rijeke Sutjeske. [Biocenological analysis of insect settlements (Ephemeroptera, Plecoptera, Simuliidae and Psychodidae) of the Sutjeska River basin]. *Godišnjak Biološkog Instituta Univerziteta u Sarajevu* **29**: 23–54 (in Bosnian).
- KROČA J. & JEŽEK J. 2015: Moth flies (Diptera: Psychodidae) of the Moravskoslezské Beskydy Mts and the Podbeskydská pahorkatina Upland, Czech Republic. *Acta Musei Silesiae, Scientiae Naturales* **64**: 27–50.
- MUČIBABIĆ S., KAČANSKI D., KREK S., LAKUŠIĆ R., MARINKOVIĆ-GOSPODNETIĆ M., SPAHIĆ M., TANASIJEVIĆ M. & VUKOVIĆ T. 1984: Ekosistem rijeke Stavnje. [The Stavnje River ecosystem]. *Zbornik Radova Povodom Jubileja Akademika Aleksandra Trumića, anUBiH Odjeljenje Tehničkih Nauka* **77**(9): 49–70 (in Bosnian).
- NIESIOŁOWSKI S. & WAGNER R. 1991: Psychodidae. Pp. 86–87. In: RAZOWSKI J. (ed.): *Checklist of Animals of Poland*. Vol. 2. Wydawnictwo Polskiej Akademii Nauk, Wrocław, Warszawa, Kraków, 342 pp.
- OBOŇA J. & JEŽEK J. 2014: Prodrómus of moth flies (Diptera: Psychodidae) from Slovakia. *Acta Musei Silesiae, Scientiae Naturales* **63**: 193–251.
- OMELKOVÁ M. & JEŽEK J. 2012a: Two new species of *Pneumia Enderlein* (Diptera, Psychodidae, Psychodinae) from the Palaearctic region. *Zootaxa* **3180**: 1–18.
- OMELKOVÁ M. & JEŽEK J. 2012b: A new species of the genus *Trichomyia* (Diptera: Psychodidae) and new faunistic data on non-phlebotomine moth flies from the Podyjí NP and its surroundings (Czech Republic). *Acta Entomologica Musei Nationalis Pragae* **52**: 505–533.
- OMELKOVÁ M., JEŽEK J., STARÝ J., ROHÁČEK J. & HOLINKA J. 2008: Dvoukřídlí (Diptera). [True flies (Diptera)]. Pp. 294–305. In: JONGEPIEROVÁ I. (ed.), *Louky Bílých Karpat*. [Grasslands of the White Carpathian Mountains]. ZO ČSOP Bílé Karpaty, Veselí nad Moravou, Czech Republic, 461 pp (in Czech).
- ROZKOŠNÝ R. 1971: To the knowledge of Psychodidae (Diptera) in Czechoslovakia. *Scripta Facultatis Scientiarum Naturalium Universitatis Purkynianae Brunensis, Biologia, Series 2* **1**: 133–144.
- SALAMANNA G. 1975a: Psychodidae Psychodinae della Puglia e della Basilicata con descrizione di due nuove specie. *Entomologica* **11**: 193–214.
- SALAMANNA G. 1975b: Psychodinae della Calabria con descrizione di due specie nuove (Diptera Nematocera Psychodidae). *Bollettino dei Musei e degli Istituti Biologici dell'Università di Genova* **43**: 75–94.
- SALAMANNA G. 1983: Psicodidi delle collezioni del Museo civico di Storia naturale di Milano (Diptera Nematocera). *Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano* **124**: 177–192.
- SZABÓ J. 1960a: Neue Pericoma-Arten aus dem Karpatenbecken (Diptera, Psychodidae). *Acta Zoologica Academiae Scientiarum Hungaricae* **6**: 167–176.
- SZABÓ J. 1960b: Les Psychodides (Diptera, Nematocera) des Bassins-Carpathiques I. *Acta Universitatis Debreceniensis* **6**(2): 205–216.
- SZABÓ J. 1983: 10. család: Psychodidae – Lepkeszúnyogok. Pp. 1–78. In: SZABÓ J. & DELYNÉ DRASKOVITS Á. (eds): *Magyarország Állatvilága. Vol. 14*. [The Fauna of Hungary. Vol. 14.] Akadémiai Kiadó, Budapest, 88 pp (in Hungarian).
- TONNOIR A. L. 1919a: Contribution a l'étude des Psychodidae de Belgique. Note préliminaire. *Annales de la Société Entomologique de Belgique* **59**: 8–17.
- TONNOIR A. L. 1919b: Contribution a l'étude des Psychodidae de Belgique. Deuxième note. *Annales de la Société Entomologique de Belgique* **59**: 136–140.
- TONNOIR A. L. 1920: Contribution a l'étude des Psychodidae de Belgique. Troisième note *Annales de la Société Entomologique de Belgique* **60**: 180–187.
- VAILLANT F. 1964: Nouvelle contribution à l'étude des Psychodidae (Diptera) de la France. *Travaux du Laboratoire d'Hydrobiologie et de Pisciculture de l'Université de Grenoble* **56**: 61–76.
- VAILLANT F. 1971–1983: 9d Psychodidae – Psychodinae (not finished). In: LINDNER E. (ed.): *Die Fliegen der palaearktischen Region, Stuttgart*. Vol. **320**(1979), pp. 239–270.
- WAGNER R. 1990: Family Psychodidae. Pp. 11–65. In: SOÓSA. (ed.): *Catalogue of Palaearctic Diptera. Vol. 2. Psychodidae – Chironomidae*. Akadémiai Kiadó, Budapest, 499 pp.
- WAGNER R. 1993: Einige neue europäische Psychodiden (Diptera, Nematocera, Psychodidae). *Entomofauna* **14**(24): 401–416.
- WAGNER R. 1999: Psychodidae. Pp. 70–73. In: SCHUMANN H., BÄHRMANN R. & STARK A. (eds): *Checkliste der Dipteren Deutschlands. Entomofauna Germanica* **2**: 1–354.
- WAGNER R. 2018: Fauna Europaea: Psychodidae. In: DE JONG H. (ed.): *Fauna Europaea: Diptera Nematocera*. Fauna Europaea

- version 2014. Available on: <https://fauna-eu.org> (accessed 2 October 2019).
- WAGNER R. & ANDERSEN T. 2007: Psychodidae (Diptera: Nematocera) from the West Usambara Mountains, Tanzania. Pp. 287–307. In: ANDERSEN T. (ed.): *Contributions to the Systematics and Ecology of Aquatic Diptera – A tribute to Ole A. Saether*. The Caddis Press, Columbus.
- WITHERS P. 1989: Moth flies (Diptera: Psychodidae). *Dipterists Digest* **4**: 1–83.
- WITHERS P. 1997: *Tonnoiriella disneyi* sp. n. and *Threticus balkaneoalpinus*, new to Britain. *Dipterists Digest, Second Series* **4**: 61–64.
- WITHERS P. 2002: Thirty-nine species of Diptera new to Ireland, including a species of Psychodidae new to the British Isles. *Dipterists Digest* **9**: 113–119.
- WITHERS P. & O'CONNOR J. P. 1992: A preliminary account of the Irish species of moth fly (Diptera: Psychodidae). *Proceedings of the Royal Irish Academy* **92(5)**: 61–77.