

Notes on the Palaearctic species of the genus *Polylepta* Winnertz (Diptera: Mycetophilidae) with a new synonymization

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Morphological differences between three Palaearctic species of *Polylepta* Winnertz — *P. borealis* Lundström, *P. guttiventris* (Zetterstedt) and *P. zonata* (Zetterstedt) — are discussed and detailed genital figures for males and females are given. *Polylepta meridionalis* Bechev, 1990 is shown to be a junior synonym of *Polylepta zonata* (Zetterstedt, 1852).

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1. Introduction

The genus *Polylepta* Winnertz, 1863 belongs to the tribe Schiophilini of the family Mycetophilidae. The genus is easily distinguished from the remaining genera by wing characteristics: the point of furcation of CuA is before the point of furcation of M, the base of M1 very weak and R5 is curved (Fig. 1). The only revision of *Polylepta* has been published by Bechev (1990). It includes four species from the Holarctic region: *P. borealis* Lundström, 1912, *P. guttiventris* (Zetterstedt, 1852), *P. meridionalis* Bechev, 1990 and *P. zonata* (Zetterstedt, 1852) occur in the Palaearctic subregion, and *P. borealis* and *P. guttiventris* occur also in the Nearctic subregion. Bechev (1990) excluded three species from the genus *Polylepta*, viz. *P. splendida* Winnertz, 1863, reported from the Palaearctic subregion by Matile (1988), *P. modesta* Van Duzee, 1928 and *P. nigella* Johannsen, 1910, reported from the Nearctic subregion by Laffoon (1965). Moreover, Bechev (1990) treats the Nearctic species *Polylepta obediens* Johannsen, 1910 as a junior synonym of *P. guttiventris*.

P. dubiosa Brunetti, 1912 has been recorded from the Oriental region (Colless & Liepa 1973), and the fossil species *P. filipes* Meunier, 1904 has been described by palaeontological records from Baltic amber (Evenhuis 1994). When studying the European material of *Polylepta*, several problems arose, which brought about a new revision of the Palaearctic species of the genus. The study is based on material collected in Italy, France, Czech Republic, Hungary, Bulgaria, Sweden, Finland and Estonia.

2. Methods and abbreviations

In each studied specimen, the genitalia were separated from the abdomen and heated in 15% KOH for maceration. The remaining chitinous parts were washed with distilled water and placed into glycerin. The genitalia were preserved as glycerin preparations. Stereo-microscope OLYMPUS SZ4045TR (6.7–240×) and microscope AY-12 (70–300×) were used. The morphological terminology follows Söli (1997).

Abbreviations of the institutions where the material is deposited: IZBE — Institute of Zoology and Botany, Esto-

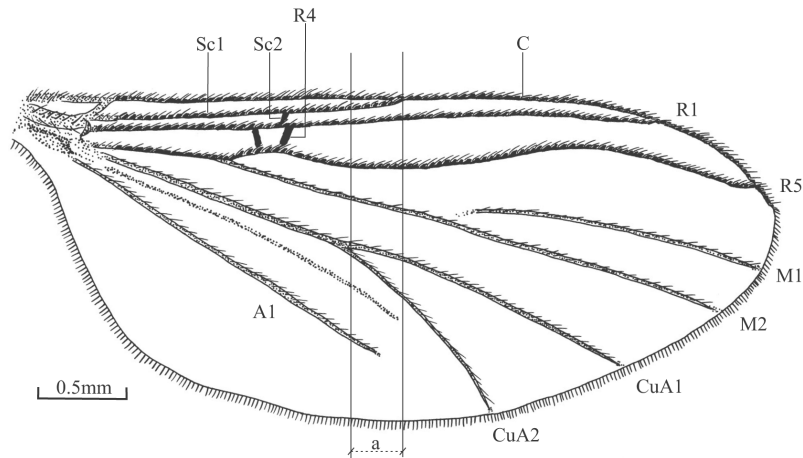


Fig. 1. Wing of *Polylepta borealis*. A — anal vein; C — costa; CuA1 and CuA2 — anterior branches of cubitus; M1 and M2 — branches of media; R1, R4 and R5 — branches of radius; Sc1 and Sc2 — branches of subcosta; a — measured distance between the point of furcation of CuA and the tip of Sc1.

nian Agricultural University (Tartu); DBPC — Dimitar Bechev personal collection (Plovdiv); MMBC — Moravian Museum (Brno); MNHN — Muséum National d'Histoire Naturelle (Paris); and NHRS — Swedish Museum of Natural History (Stockholm).

3. The species

***Polylepta borealis* Lundström** (Figs. 1, 2a–b, 3a–b)

Polylepta borealis Lundström, 1912: 13, figures 13–14.

Polylepta borealis Lundström, 1912: Bechev (1990): 180, figures 3–4; Chandler (1992): 118–119, figures 24–25; Zaitzev (1994): 175, plate 59, figure 4.

Diagnostic characters. Whole wing membrane with macro- and microtrichia. Point of furcation of CuA before the tip of Sc1. Male: abdomen entirely dark; third section of gonocoxite with two subapical teeth; gonocoxal lobe half as long as third section of gonocoxite and gonostylus with feather-like protuberances on dorsal area. Female: second cercus as long as first; eighth tergite with short bristles with length of about one fourth of length of first cercus.

Material studied. Sweden. 1 ♀, Grisslehamn, Upp., 8.VII.1935, Hedgren leg. [NHRS]. **Finland.** 1 ♂, Sotkamo, Arreniemi, 17.VII.1967, Mihályi leg.; 1 ♂, Oulanka Biol. Stat., 23.VII.1967, Mihályi leg.; 1 ♀, Lammi Biol. Stat., 7.VII.1967, Mihályi leg. [all in MNHN]. **Estonia.** 13 ♂♂,

Nigula Nature Reserve, 2.VII.1994, 3.VII.1994, 4.VII.1994, 3.VI.1995 and 4.VI.1995, Kurina leg.; 1 ♂, Aheru, 9.VII.1994, Kurina leg.; 1 ♂, Kiuma, 16.VIII.1995, Kurina leg.; 1 ♂, Jürikäla, 20.VIII.1995, Kurina leg.; 1 ♀, Lahemaa National Park, Revoja, 24.VI.1988, Kurina leg. [all in IZBE].

***Polylepta guttiventris* (Zetterstedt)** (Figs. 2c–d, 3c–d)

Sciophila guttiventris Zetterstedt, 1852: 4363.

Polylepta undulata Winnertz, 1863: 746; *Polylepta undulata* var. *major* Landrock, 1923: 168.

Polylepta guttiventris (Zetterstedt, 1852): Hutson *et al.* (1980): 48–49, figures 32, 35 and 194; Bechev (1990): 180, figures 1–2; Zaitzev (1994): 175–176, plate 59, figure 2; Söli (1997): figure 29.

Diagnostic characters. Microtrichia on wing membrane present only near veins. Abdomen with lighter to yellow lateral areas on fore margins of second to fifth tergites. Male: third section of gonocoxite apically gradually tapering; gonocoxal lobe completely with small setae and as long as third section of gonocoxite; gonostylus with feather-like protuberances on dorsal area. Female: second cercus as long as first; eighth tergite with strong bristles, about as long as first cercus.

Types. *Polylepta undulata* var. *major* Landrock, 1923 — Lectotype (studied): 1 ♀, Czech Republic, Bilowitz, 24.V. [no year noted],

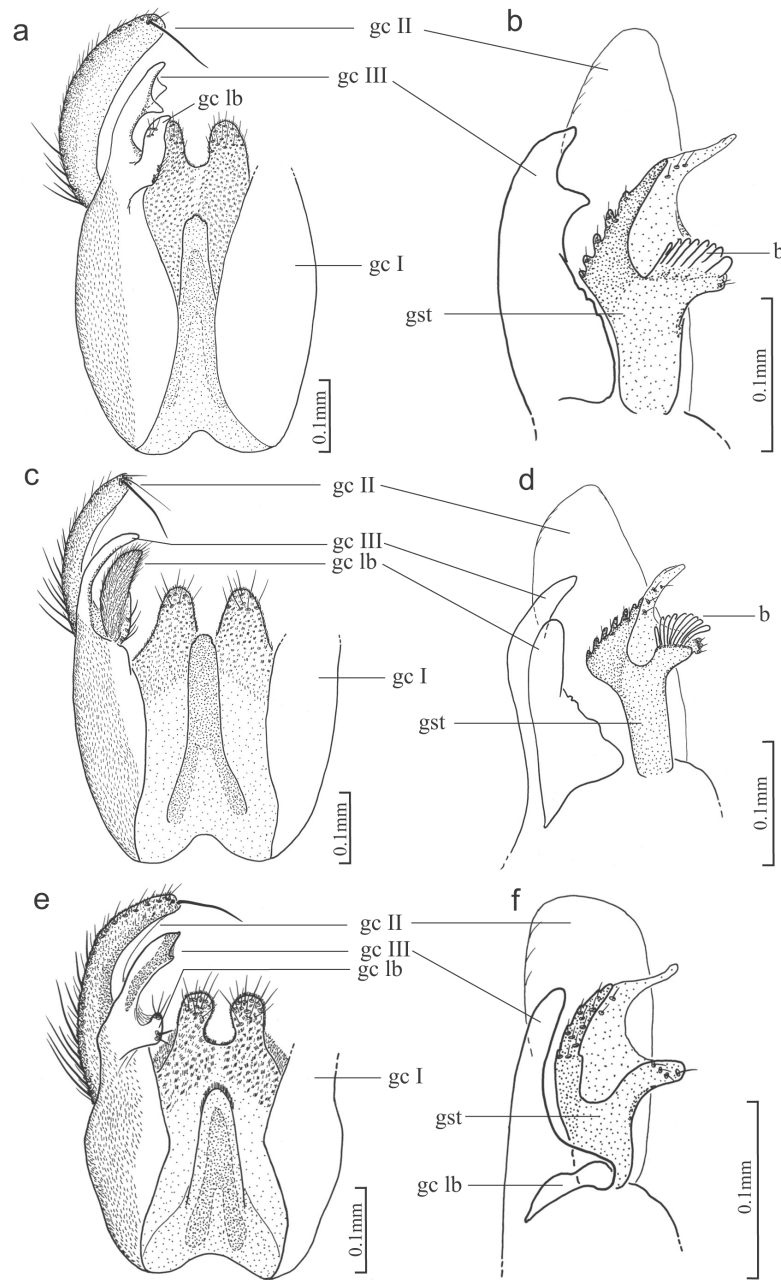


Fig. 2. Male genitalia of *Polylepta* species. — a. *P. borealis*, ventral view of hypogynium. — b. *P. borealis*, medial view of gonostylus. — c. *P. guttiventris*, ventral view of hypogynium. — d. *P. guttiventris*, medial view of gonostylus. — e. *P. zonata*, ventral view of hypogynium. — f. *P. zonata*, medial view of gonostylus. Abbreviations: gc I, II and III — gonocoxite sections; gc lb — gonocoxal lobe; gst — gonostylus; b — feather-like protuberances on dorsal area of gonostylus.

Landrock leg., Invent. No. 1697/Ent. [MMBC]. Paralectotypes (studied): 1 ♀, Czech Republic, Bilowitz, 15.V.1911, Landrock leg., Invent. No 1698/Ent.; 1 ♀, Czech Republic, Adamstal, 13.V.1911, Landrock leg., Invent. No 1700/Ent. [MMBC].

Material studied. **Italy.** 1 ♂, Aosta, Valnontey (alt. 1620–1750 m), 10.VII.1975, D. & L. Matile

leg.; 1 ♀, Aosta, Piano di Sylvenoire (alt. 1600–1650 m), 15.VII.1975, D. & L. Matile leg. [all in MNHN]. **France.** 1 ♂, forêt d’Othe (Yonne), 6.VI.1970, L. Matile & J. J. Menier leg.; 1 ♂, Col de Porte (Isère) (alt. 1300 m), 26.VI.1970, L. Matile leg.; 1 ♀, Isola 2000 (alt. 2000 m), 17.VII.1976, J. Clastrier leg. [all in MNHN]. **Czech Republic.** 1 ♂, Gersdorf, [no date and year noted], Landrock leg. [MMBC]. **Swe-**

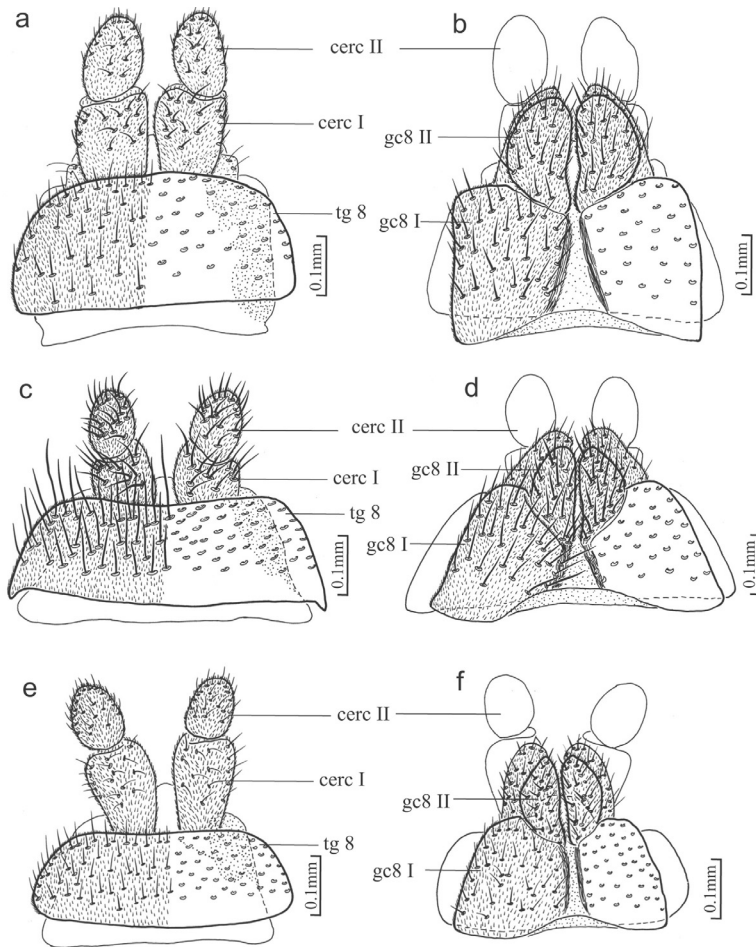


Fig. 3. Female terminalia of *Polylepta* species. — a. *P. borealis*, dorsal view. — b. *P. borealis*, ventral view. — c. *P. guttiventris*, dorsal view. — d. *P. guttiventris*, ventral view. — e. *P. zonata*, dorsal view. — f. *P. zonata*, ventral view. Abbreviations: cerc — cercus; tg — tergite; gc8 I and II — sections 1 and 2 of gonocoxite 8.

den. 1 ♂ 2 ♀♀, Värmdö, Upp., 5.VII.1925, Hedgren leg.; 1 ♂ 1 ♀, Grisslehamn, Upp., 11.VII. and 12.VII.1935, Hedgren leg. [all in NHRS]. **Finland.** 1 ♂, N. Esbo, Kolmperä, 4.VII.1967, Mihályi leg. [MNHN]. **Estonia.** 1 ♀, Oonga, 8.IX.1994, Kurina leg.; 1 ♂, Töstamaa, 3.IX.1994, Kurina leg.; 6 ♂♂, 1 ♀, Nigula Nature Reserve, 7.VIII.1990, 2.VII.1994, 3.VI.1995, 9.VII.1995, and 26.VII.1995, Kurina leg.; 3 ♂♂, Hargla, 7.VII.1994, Kurina leg.; 2 ♂♂, Aheru, 8.VII.1994, Kurina leg.; 1 ♂, Apja-Suurjärv, 8.VII.1994, Kurina leg.; 1 ♂, Taevaskoja, 12.VI.1994, Kurina leg.; 1 ♂, Kiuma, 16.VIII.1995, Kurina leg.; 1 ♂, Jürikäla, 20.VIII.1995, Kurina leg. [all in IZBE].

***Polylepta zonata* (Zetterstedt)** (Figs. 2e–f, 3e–f)

Sciophila zonata Zetterstedt, 1858: 4136.

Polylepta meridionalis Bechev, 1990: 182, figures 5–6, syn. nov.; Chandler (1998): 123.

Diagnostic characters. Whole wing membrane with macro- and microtrichia. Abdomen with pale to yellow lateral areas on anterior margins of second to fifth tergites. Male: third section of gonocoxite apically sharp, with a subapical low tooth; gonocoxal lobe about one third as long as third section of gonocoxite; gonostylus without feather-like protuberances on dorsal area but with a few normal setae. Female: second cercus about 1.5 times as long as first; the eighth tergite with short bristles, about one fifth to one fourth as long as first cercus.

On the basis of the material studied and on analysis of literature, *P. meridionalis* is identified as a junior synonym of *P. zonata* (see Discussion for more details).

Types. *Polylepta meridionalis* Bechev, 1990 — Paratype (studied): 1 ♂, Bulgaria, Slavjanka Mt., v. Goleshovo, 07.VI.1988, D. Bechev leg. [DBPC].

Material studied. **France.** 1 ♂ 1 ♀, Corsica, forest of Zonza (alt.750 m), 06. VI. 1972, L. Matile leg.; 1 ♂, Corsica, Bord de Ruisseau, Maouis de l'Ospedale, 7.VI.1972, L. Matile leg. [all in MNHN]. **Czech Republic.** 2 ♂♂, Bilowitz, 4.VI. [no year noted], Landrock leg.; 1 ♂, Adamstal, 27.V.1911, Landrock leg. [all in MMBC]. **Hungary.** 1 ♂, Köszeg, Velemi erdő, 11.VII.1960, Zsirko leg.; 1 ♀, Köszeg, Szabónegy, 6.VII.1960, Mihályi leg. [all in

MNHN]. **Sweden.** 1 ♂, Grisslehamn, Upp, 12.VII.1935, Hedgren leg; 1 ♀, Värmdö, Upp., 21.VI.1925, Hedgren leg. [all in NHRS].

4. Discussion

Three groups of specimens could clearly be distinguished in the European material. The speci-

Table 1. Morphological characteristics of three *Polylepta* Winnertz species.

| <i>P. borealis</i> | <i>P. guttiventris</i> | <i>P. zonata</i> |
|---|---|---|
| WING | | |
| whole wing membrane with macro- and microtrichia; the point of furcation of CuA always before the tip of Sc1, the distance between them 0.16–0.26 mm (Fig. 1) | microtrichia present only near veins; location of furcation point of CuA variable: before or below the ip of Sc1 (usually below in males and before in females) | whole wing membrane with macro- and microtrichia; location of furcation point of CuA variable: after or below the tip of Sc1 (in very few cases before) |
| ABDOMEN | | |
| males: entirely dark; females: sometimes undistinguishable lighter lateral areas present on tergites II–V | lighter to yellow lateral areas present on fore margins of tergites II–V of both sexes | |
| MALE GENITALIA | | |
| III section of gonocoxite (gc III) apically toothed (Fig. 2a–b) | apically uniformly narrowing (Fig. 2c–d) | apically truncated (Fig. 2e–f) |
| Gonocoxal lobe (gc lb) about half as long as gc III, with short bristles: 4–5 preapically and 5–6 basally (Fig. 2a) | about as long as gc III completely with small setae and with 4–5 bristles basally (Fig. 2c) | less than one third of length of gc III, with short bristles: 3 apically and 2 basally (Fig. 2e) |
| Gonostylus (gst) with feather-like protuberances on dorsal area (Fig. 2b, d) | | dorsal area without such kind of protuberances (Fig. 2f) |
| FEMALE TERMINALIA | | |
| Cerci | | |
| cercus II about as long as cercus I (Fig. 3a, c) | | cercus I about 1.5 times as long as cercus II (Fig. 3e) |
| VIII tergite | | |
| with short bristles (Fig. 3a) | with strong bristles of the length of cercus I (Fig. 3c) | with short bristles (Fig. 3e) |
| VIII gonocoxite | | |
| section I nearly quadrate, section II sinks into section I by one third of its length (Fig. 3b) | section I apically particularly tapering, section II sinks into the section I by half of its length (Fig. 3d) | section I apically slightly tapering, section II sinks into the section I by one third of its length (Fig. 3f) |

mens of the first group had the genital structure as given in Figs. 2a–b and 3a–b, the whole wing membrane covered with microtrichia, and the point of furcation in CuA always before the tip of Sc1. These are characteristics for *P. borealis*. The second group had the genital structure as given in Figs. 2c–d and 3c–d. Microtrichia on wing membrane were present only near veins, and the point of furcation in CuA, in relation to the tip of Sc1, was variable — characteristics of *P. guttiventris*. The third group was well distinguished by genital structure (Figs. 2e–f, 3e–f) and agreed with the description of *P. meridionalis*. However, based on wing characteristics, the group was variable (Table 1). Most of the material examined agreed with the description of *P. zonata* (Zetterstedt 1852, Bechev 1990). *P. zonata* has previously been known only from the Swedish type specimen with missing abdomen (Edwards 1925, Bechev 1990). Bechev (1990) suggested that *P. zonata* and *P. meridionalis* could be distinguished on the basis of wing characteristics, in particular of the level of the furcation point in CuA. However, as this detail varies considerably, these cannot be used to distinguish between these two species. Consequently, *P. meridionalis* should be considered as a junior synonym of *P. zonata* — a view also supported by D. Bechev (pers. comm.).

The details of gonostylus, which are specific and important for the identification of the species, have not been previously illustrated. Moreover, the differences on the structure of terminalia among females have not previously been discussed, although the female terminalia of *P. guttiventris* have been illustrated (figure 40 B–C in Sjøli [1997]). Differences between the species, especially in male and female genitalia with reference to the respective figures, are shown in Table 1.

P. guttiventris is a Holarctic species, widely distributed in Europe (Matile 1988), while *P. borealis* is a Holarctic boreo-alpine species (Chandler 1992). *P. zonata* is probably rare but widely distributed in Europe, so far recorded in France (Corsica), Czech Republic, Hungary, Bulgaria and Sweden. Reports concerning the biology exist only for *P. borealis* that is found from the folds of *Gyromitra esculenta* (Yakovlev 1994).

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