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The female postabdomen of five species of *Trixoscelis* RONDANI 1856 (Diptera: Trixoscelididae)

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ABSTRACT. Morphology of female postabdominal part, including spermathecae, of five *Trixoscelis* species is described. Among analyzed characters the shape of sternite VII and VIII as well as the shape of spermathecae are useful in females identification to the species level.

KEY WORDS: Diptera, Trixoscelididae, *Trixoscelis*, female postabdomen, spermathecae

INTRODUCTION

Females of the species of the genus *Trixoscelis* RONDANI are still very poor recognized, based on postabdominal characters, and only few diagnostic characters of the genus, based on female specimens, were mentioned to date. Just few of the female postabdominal characters of the unique or newly described Palaearctic species were quoted in the taxonomic works (HACKMAN 1971; HENNIG 1958; SOÓS 1977). It is known that the tergite and sternite VII are fused, forming a ring, in females of the Palaearctic species of the genus *Trixoscelis* (SOÓS 1977; PAPP 1998) and that there are present three well sclerotized spermathecae. Recently, in the revision of the Nearctic species of the genus *Trixoscelis* (FOSTER & MATHIS 2011), some species were redescribed or newly discovered and few diagnostic characters basing on female terminalia were given. The authors (*ibid*.) indicated that tergite VII and sternite VII are often strongly fused to form a ring (as noted by GRIFFITHS 1972), however, this character is not well established in some of the Nearctic species. Currently, many of the Old World species of the *Trixoscelis* can be identified only by male characters (CARLES-TOLRA 2001; HACKMAN 1970; WOŹNICA 2000, 2007, 2009).

The taxonomy of European sun flies has been highly neglected for the past 25 years. In a first attempt of separation of the females of the European species, it has been seen that requires a deeper and more detailed study. This paper is a small step towards some resolution. Studies presented here were based on available female specimens, i.e. from the author's

collection. As a result, new diagnostic characters and a key to identification of five *Trixoscelis* species known from Europe were given.

METHODS AND MATERIALS

The descriptive terminology for external and internal structures follows that published in the Contribution to the Manual of Palaearctic Diptera (PAPP 1998). Because analyzed specimens are small, study and figure required use of dissecting and composite microscopes. Details of female terminalia were made in the lateral view using light microscope, and documented using digital camera and computer techniques. Two female specimens of each species were sorted out to compare the diagnostic characters. Dissections of female terminalia and descriptions were performed using the standard method in the Diptera studies. Tweezers were used to remove abdomens, which were cold macerated in a 10 percent solution of sodium hydroxide for ca 24 - 36 hours. Cleared structures were rinsed in distilled water and then transferred to glycerin for observation.

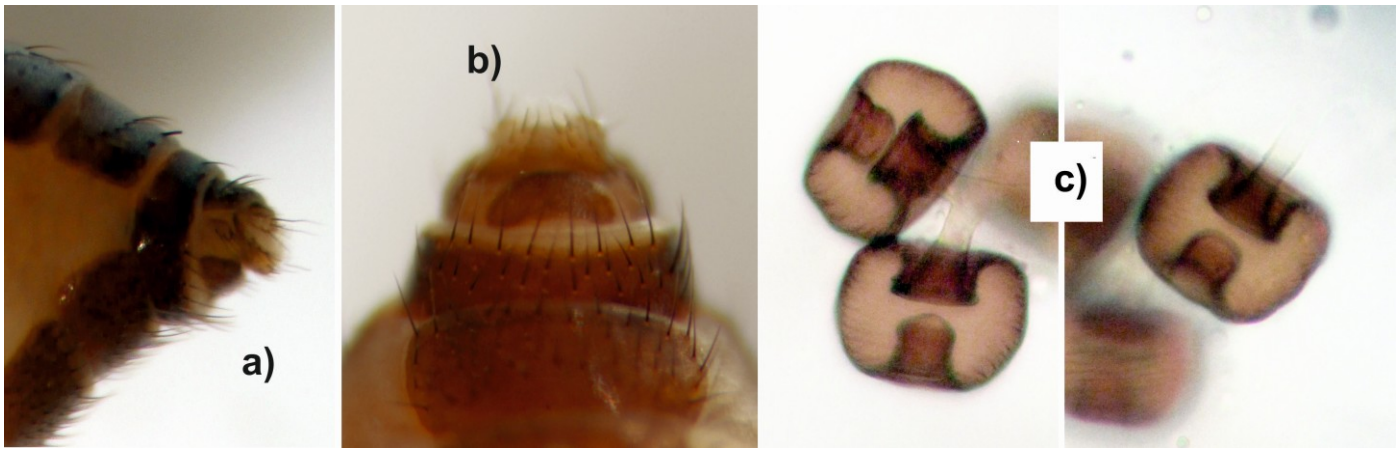
RESULTS

1. *Trixoscelis canescens* (LOEW, 1865)

MATERIAL EXAMINED.

Czech Republic: 1♂,1♀, Podyji NP., Steppe, 1,5 km SW of Havraniky, 350 m MT 2001, 26.06.-24.07 leg. BARTAK, KUBIK; *ibidem*, 1♀, 27.05-7.06.2001 leg. BARTAK, KUBIK.
Poland: 1♀, Białołęka Dworska, 22.07.1981, leg. J.T. NOWAKOWSKI.
Switzerland: 2♀♀, Visp VS, 9-11.08.1993, leg. G. BÄCHLI.

Remarks: as was noticed by CARLES-TOLRA (2001) the sternite VII is not desclerotized posteromedially and the sternite VIII is slightly concave anteriorly and convex posteriorly (Figs 1a-b). All spermathecae are similar in shape with well sclerotized head (Fig. 1c).



1.

2. Fig. 1. *T. canescens* (♀): a–b) postabdominal part, a - in lateral view; b – in ventral view; c – spermathecae.

2. *Trixoscelis frontalis* (FALLÉN, 1823)

MATERIAL EXAMINED.
Italy: 1♂,2♀♀, Schmelz, 24.08.–01.09. 2005, leg. CH. LANGE & J. ZIEGLER.
Poland: 1♀, Wrocław Leśnica, 11.08.1984, leg. T. ZATWARNICKI.
Switzerland: 1♂1F, Leuk VS, 27-29.07.1993, leg. G. BÄCHLI; *ibidem*, 1♀, 23.08.-2.09.1977, leg. G. BÄCHLI.

Besides this species was removed from the Nearctic species list, all data concerning the details of female postabdomen of *T. frontalis* based on Nearctic specimens are invalid (FOSTER & MATHIS 2011). Hitherto no data on the female postabdomen of the corectly recognized *T. frontalis* basing on European specimens were published. It should be noted that HACKMAN (1970) was not able to separate the females of the newly described *T. similis* from *T. frontalis* specimens.

Remarks: Sternite VII thin and slightly concave posteriorly (Figs 2a-b). Sternite VIII convex posteriorly, forming a semicircular area and not longer than sternite VII. Spermathecae discoid as in fig. 2c.

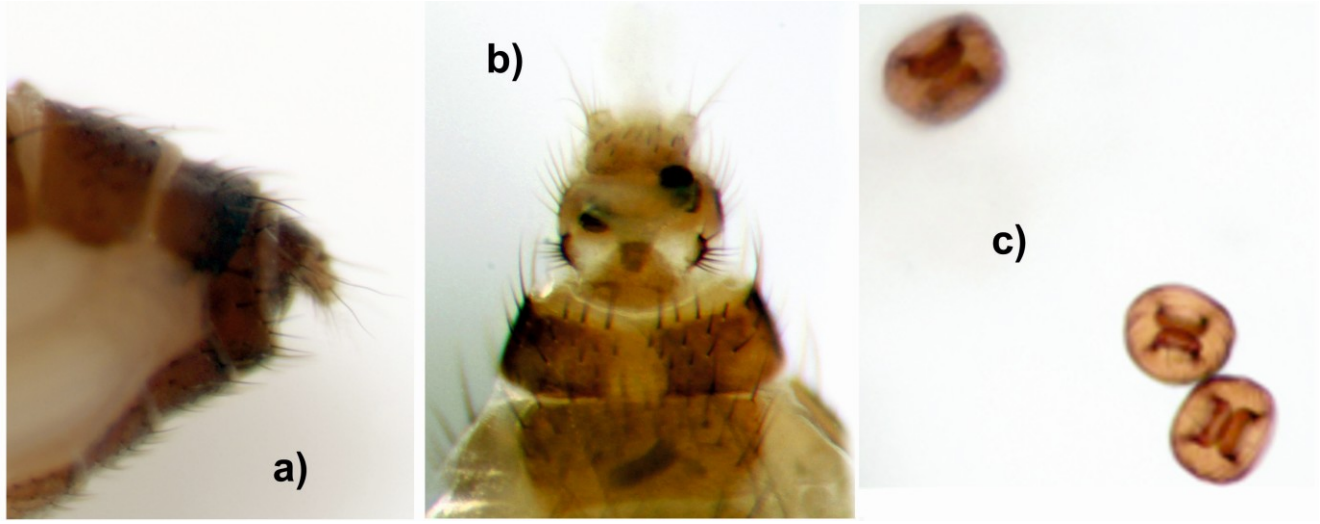


Fig.2. *Trixoscelis frontalis* (♀): a–b) postabdominal part, a - in lateral view; b – in ventral view; c – spermathecae.

3. *Trixoscelis marginella* (FALLÉN, 1823)

MATERIAL EXAMINED.
Italy: 1♀, Schmelz, 04-13.VII. 2005, leg. CH. LANGE & J. ZIEGLER.
Poland: 1♂,1♀, 27.06.1994, Pustynia Błędowska near Olkusz, leg. A. PALACZYK
Switzerland: 1♀, Pfynwald VS, 26-28.07.1993, leg. G. BÄCHLI.

HENNIG (1958) was the first author who figured and described the female postabdomen of *T. marginella* and noted three cone-like spermathecae.

Remarks: sternite VII broad, with parallel edges and fused to a ring with tergite VII (Fig. 3a-b). Sternite VIII regularly elongated. Spermathecae well sclerotized and cone-like, densely covered with small triangular spines (Fig. 3c).

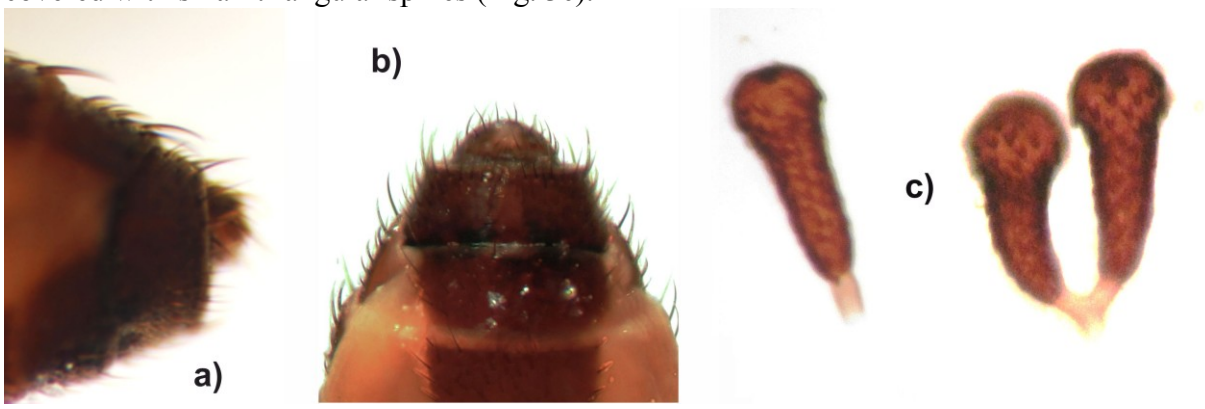


Fig. 3. *Trixoscelis marginella* (♀): a–b) postabdominal part, a - in lateral view; b – in ventral view; c – spermathecae.

4. *Trixoscelis obscurella* (FALLÉN, 1823)

MATERIAL EXAMINED.

Germany: 3♂♂,3♀♀, 29.07.1990, Nature Reserve "Die Spey", SE Krefeld, leg. STENMANS.

Poland: 1♀, 22.05.1994, Spała n. Tomaszów MZ, leg. A. PALACZYK; 1♂,1♀, Wrocław Leśnica, 28.06.1984, leg. T. ZATWARNICKI.

Portugal: 1♂,1♀, 17.06.2013, Freches, Trancoso, Guarda, leg, R. ANDRADE.

So far no data concerning the morphology of the female postabdominal characters of this species were given.

Remarks: sternite VII thin, and shorter than sternite VI (Fig. 4a-b). Sternite VIII thin, slightly concave anteriorly ad shorter than sternite VII (Figs 4b). Spermathecae pipe-like (Fig. 4c) and with short and well sclerotized blowpipe-like base [not as in *T. approximata* (Loew), where spermathecae are cup-like (WOŹNICA *in press*)].

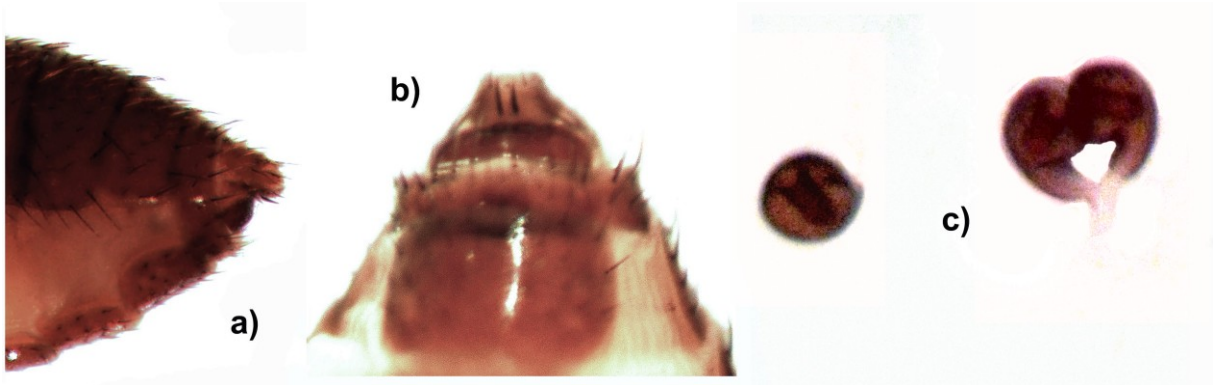


Fig. 4. *T. obscurella* (♀): a–b) postabdominal part, a - in lateral view; b – in ventral view; c – spermathecae.

5. *Trixoscelis similis* HACKMAN, 1970

MATERIAL EXAMINED.

Italy: 2♂♂,2♀♀, 9.08-15.08.2005, Schmelz, leg. CH. LANGE & J. ZIEGLER.

Czech Republic: 1♂,1♀, 27.05-26.06, Podyji NP., Liści Skala, Quercetum, 2,5 km S of Podmoli, 420 m MT 2001, leg. BARTAK, KUBIK; 1♀, 22.05-11.06.2002, Podyji NP, Pod Sóbem, Wetland near river, leg. MEIXNEROVA; *ibidem*, 1♂, 8-22.05.2002, leg. MEIXNEROVA.

Switzerland: 1♀,Visp VS, 9-11.08.1993, leg. G. BÄCHLI.

This species is not yet recorded from Poland, but occurs in the neighboring countries (WOŹNICA 2014), therefore available specimens of *T. similis* are studied and the results are included herein.

Description: sternite VII thin, slightly shorter than sternite VI (Fig. 5a-b) and regularly curved. Sternite VIII semiglobular and convex posteriorly (Figs 5b), slightly longer than sternite VII. Spermathecae well sclerotized, similar to those in *T. frontalis* (Fig. 5c). It should be noted that in both examined sexes of *T. similis* the costa is clearly yellow contrary to the blackish coloured in *T. frontalis*.

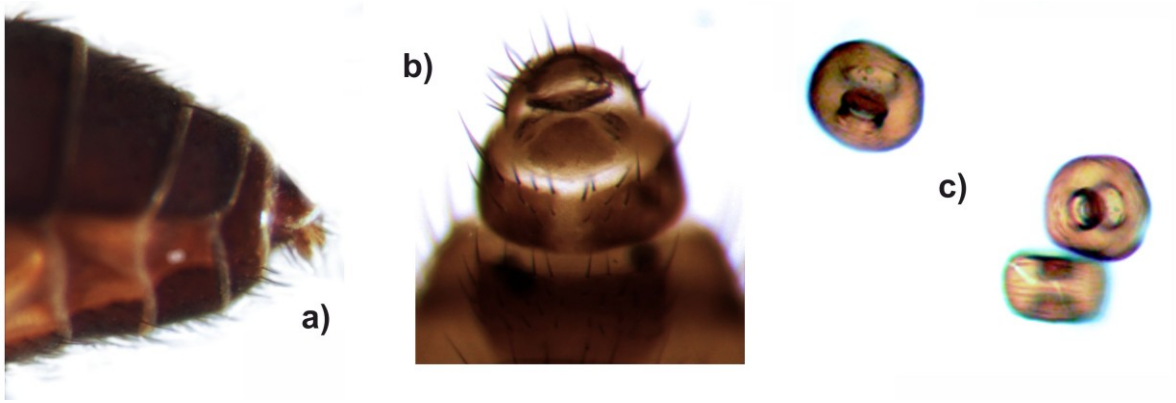


Fig. 5. *T. similis* (♀ from Italy): a–b) postabdominal part, a - in lateral view; b – in ventral view; c – spermathecae.

SUMMARY

Among five analyzed taxa, the female postabdomen of *T. frontalis*, *T. obscurella* and *T. similis* are described for the first time. The spermathecae of *T. canescens* and *T. marginella* are newly presented. The diagnostic characters of analyzed female postabdominal structures are included in the key given below.

KEY TO FEMALES OF THE POLISH SPECIES OF THE GENUS *TRIXOSCELIS* RONDANI

1. Wing membrane with anterior and posterior cross-veins areas distinctly clouded ……..... **2**
-. Wing membrane with unmarked cross-veins areas …….……....…..... **3**
2. Wing dark brown with confluent areas and with only three larger clear areas. Mesonotum with pair of brown longitudinal stripes. Sternite VIII regularly elongated. Spermathecae cone-like ……..……..……..…….…….…..... ***marginella*** (FALLÉN)
-. Wing narrower clouded at the cross-veins and with a brownish shade along costa. Mesonotum without stripes. Abdominal tergites I-V shiny brown with pollinose lateral borders. Sternite VIII concave anteriorly. Spermathecae blowpipe-like ... ***obscurella*** **(**FALLÉN)
3. Wings with costa and subcostal area including first longitudinal cell blackish darkened. Sternite VIII slightly concave anteriorly and convex posteriorly. Spermathecae as in Fig. 1c ……..…. ***canescens*** (LOEW)
-. Wing clear, not as above ……..……..……..……..……..…. **4**
4. Costa dark seen from above (blackish darkened). Sternite VIII convex posteriorly, forming a semicircular area and not longer than sternite VII. Spermathecae as in Fig. 2c ……..…… ***frontalis*** (FALLÉN)
-. Costa clearly yellow. Sternite VIII semiglobular and convex posteriorly (Figs 5b), slightly longer than sternite VII. Spermathecae as in Fig. 5c ……...….....… *[***similis*** HACKMAN]

*****Hitherto not recorded from Poland*

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