ISEA PAS

Acta zoologica cracoviensia, 64(1) 2021
Kraków, May, 2021
http://www.isez.pan.krakow.pl/en/acta-zoologica.html
Zoobank Account: urn:lsid:zoobank.org:pub:9CC4F52B-9F46-43F5-8596-15019C70018E

e-ISSN 2300-0163
https://doi.org/10.3409/azc.64.01

Key and atlas to the genus *Trichocera* MEIGEN in Europe (Diptera, Trichoceridae)

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Received: 10 April 2021. *Accepted: 20 May 2021.* *Available online: 31 May 2021.* *Issue online: 31 May 2021.*

Original article

KRZEMIŃSKA E. 2021. Key and atlas to the genus *Trichocera* MEIGEN in Europe (Diptera, Trichoceridae). *Acta zool. cracov.*, **64**(1): 1-157.

Abstract. The key presents all 59 species of the genus *Trichocera* MEIGEN which occur in Europe. Four subgenera are represented: *Trichocera* MEIGEN 1803 (five species), *Metatrichocera* DAHL 1967 (seven species), *Saltrichocera* KRZEMIŃSKA 2002 (35 species), and *Staryia* KRZEMIŃSKA & GORZKA 2016 (13 species). The type material of two species, one from North America and one from Asia, are described (*Trichocera columbiana* ALEXANDER, 1927 and *T. arctica* LUNDSTRÖM, 1915), whose identities cause some problems and whose presence in the northern regions of Europe is possible. Two new species are described, *Trichocera* (*Saltrichocera*) *longa*, n. sp., and *T.* (*Staryia*) *oulankae*, n. sp. *Trichocera versicolor* is resurrected from synonymy; *T. limpidipennis* is synonymized with *T. regelationis*. There are separate keys to males and females; species are illustrated with camera pictures of diagnostic features: genitalia, antennae, and male tarsal claws, and additionally, wings and thoraces when only one sex is known, to enable further search. The state of knowledge of the genus in Europe and in the world is discussed.

Key words: *Saltrichocera*, *Metatrichocera*, *Staryia*, new species, *Trichocera columbiana*, *Trichocera arctica*.

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A female of *Trichocera annulata* drinking water (photo: A. PALACZYK).

CONTENTS

I. INTRODUCTION

The nematoceran family Trichoceridae is placed either among the infraorder Tipulomorpha as a superfamily, Trichoceroidea (e.g., HENNIG 1973; WOOTTON & ENNOS 1989; SHCHERBAKOV et al. 1995; STARÝ 1992, 2008), or is separated into its own infraorder, Trichoceromorpha (KRZEMIŃSKI 1992; KRZEMIŃSKI & KRZEMIŃSKA 2003). Both positions acknowledge the close relationship of Trichoceridae to the Limoniidae, which are the oldest lineage of Tipulomorpha.

The family Trichoceridae RONDANI, 1841, comprises c. 160 recent species included in two subfamilies: Trichocerinae RONDANI, 1841, and Paracladurinae KRZEMIŃSKA, 1992. Each subfamily has three genera. The Trichocerinae comprise *Trichocera* MEIGEN, 1803, *Cladoneura* SCUDDER, 1894 (former *Diazosma* BERGROTH, 1913), and *Nothotrichocera* ALEXANDER, 1926; the Paracladurinae, *Paracladura* BRUNETTI, 1911, *Asdura* KRZEMIŃSKA, 2006, and *Zedura* KRZEMIŃSKA, 2005. The taxonomy, morphology, and history of the family was recently presented in a monograph on fossil Trichoceridae (KRZEMIŃSKA et al. 2009). The family

belongs to oldest among the Diptera, having been represented already in the Lower Jurassic (Toarcian; KRZEMIŃSKA & LUKASHEVICH 2017). Both subfamilies, along with the extinct Kovaleviinae KRZEMIŃSKA, KRZEMIŃSKI & DAHL, 2009, were represented in the Upper Jurassic. A second extinct subfamily, the bizarre Ewauristidae SHCHERBAKOV & AZAR, 2019, is known only from early Cretaceous Lebanese amber. Today the family is relict when compared to its diversity in the Mesozoic (KRZEMIŃSKA et al. 2009).

The genus *Trichocera*, known since the Cretaceous, is scarcely recorded from Eocene Baltic amber and various Cenozoic sediments in Europe, Asia, and North America (records summarized in KRZEMIŃSKA & al. 2009). *Trichocera,* with its 117 recent species (Table 1 under Discussion), is the largest genus among the family and occupies mainly subarctic to temperate zones in the Holarctic; only three species also have isolated populations in the southern hemisphere, most probably being introduced by man (e.g., DAHL 1970b; VOLONTERIO et al. 2013). All species of *Trichocera*, as well as almost all other members of the family (except *Cladoneura*), are cool-adapted and adults appear from autumn to spring; the duration of their flight period varies between the species.

The earliest descriptions of trichocerids were published in the XVIII century and concern the three most common European species (*Trichocera regelationis* (LINNAEUS) 1757; *T. hiemalis* (DE GEER), 1776; *T. saltator* (HARRIS), 1776. During the XIX century, Trichoceridae were described mainly from Europe (for old references see KRZEMIŃSKI 1983), but were also recorded from Asia, including Ural (EVERSMANN 1834; other old records for Russia in PETRAŠIUNAS & PARAMONOV 2014). Descriptions and records from the Palearctic in the XX century are cited further in this key. Knowledge available on the Nearctic Trichoceridae we owe mostly to ALEXANDER (numerous papers cited therein); PRATT (2003) published a key to 22 species occurring in North America.

The morphology of Trichoceridae was described and illustrated several times in recent years (DAHL & KRZEMIŃSKA 1997; KRZEMIŃSKA et al., 2009); therefore, in this key, only the characters distinctive for the subgenera and species are summarized in the Materials and Methods.

The biology of trichocerids is still poorly known; these flies are not reared by man and records are limited to observations in nature. One exception is *Trichocera maculipennis* MEIGEN, 1818, an almost synanthropic species. For fascinating observations on its life cycle in various conditions see KARANDIKAR (1931). Most of the observations and experiments on trichocerids in nature, summarized below, we owe to Christine DAHL (e.g., DAHL 1965, 1969b, 1970a). Trichoceridae are saphrophitic; larvae live in soil. Their life cycle starts in autumn when the larvae pupate after a summer diapause (hibernation); pupation lasts only few hours. Freshly emerged adults are easily recognized by their soft, whitish bodies and characteristically upturned abdomens full of fat. This stage is short; chitinized segments darken and harden, and fat is promptly consumed. It is supposed that adults do not feed, as their alimentary ducts are empty (but they do at least drink; see figure on the front cover). According to my observations, the alimentary ducts of some adults do contain some dark organic matter. Males emerge c. two weeks earlier than females. Adult males in some species form characteristic swarms; these are approached by females, and a mating pair lands on soil for copulation. A fertilized female lays eggs into some compost-like substrate, such as dead leaves, rotten vegetables, or detritus-rich soil. Adults live probably not longer than two months. The duration of larval development seems to be an enigma. Observations of freshly emerged adults in the midst of winter in Norway (HÅGVAR & KRZEMIŃSKA 2007) suggest that the larvae are able to develop all four of their stages in 2-3 months (under snow), from the time of the main autumn flight of adults. Alternatively, the larvae may have developed since the previous autumn-winter, i.e., in the course of one year. Possibly, the duration of larval development is modified by temperature and weather conditions in a particular year; such plasticity is characteristic to Arctic and Antarctic insects (e.g., DANKS et al. 1994). In any case, the pupation, this most vulnerable stage for holometabolans, may occur also in winter, closely followed by females laying their eggs. The adults of some species appear throughout the entire winter, others are observed only in autumn, while some seem to have two generations and appear abundantly in autumn-winter and in spring. Information on this, wherever known, is included herein, in descriptions of particular species.

Larvae diapause in soil throughout the summer at considerable depth (even 30 cm; DAHL 1969b; 1970a) and start to pupate in autumn; this autumn peak of trichoceriid abundance is well known to specialists; most records are dated at October-November.

Keys to the genus *Trichocera* published till now included only a limited number of species (DAHL 1966b – eight species; 1967b – six species of the subgenus *Metatrichocera* DAHL; DAHL & KRZEMIŃSKA (2014) – eight species of Greenland; STARÝ (1999) – 15 species of the *saltator* group; STARÝ (2009) – key to six species of the *rectistylus* group (now: subgenus *Staryia*)). Larvae were treated by KEILIN & TATE (1940) and BRINDLE (1962). A key to the larvae of nine species was provided by DAHL (1973).

The present keys to males and females include 59 species known from Europe, as well as two species, one from North America and one from Asia (*Trichocera columbiana* ALEXANDER, 1927 and *T. arctica* LUNDSTRÖM, 1915), whose identities cause some problems and whose presence in the northern regions of Europe is possible.

II. MATERIAL AND METHODS

Material

The key is based on the collections of the ISEA PAS, and large collections of Juha VIRAMO from Finland, of Christine DAHL and Karl MÜLLER from Sweden (in some samples the name of collector is not mentioned), and of the Musée National d'histoire naturelle in Neuchâtel, Switzerland; the two latter collections are deposited temporarily in the ISEA PAS. The paratypes of many species and other specimens (first of all, of the *implicata* group) were generously offered by Jaroslav STARÝ to the ISEA PAS.

The specimens listed in captions belong to the ISEA PAS, if not otherwise stated.

Methods

I tried to tailor the key so that identification relies on external features as much as possible, especially those preserved in specimens stored in alcohol from old collections. Therefore, the key rarely includes coloristic features and setation of the thorax, as these characters are often poorly preserved after a prolonged stay in alcohol (sometimes interrupted by episodes of desiccation...). Moreover, body color may vary among freshly collected or dry specimens even from the same sample (KRZEMIŃSKA 2000c, 2003). Keeping in mind that the keys might also be used by amateur collectors, I have included a detailed description of preparation.

Preparing Trichoceridae specimens

Freshly collected specimens, or those stored in alcohol, can be dissected at once by cutting off the last two segments of the abdomen (male or female) with a pin. Dry specimens are placed in a humidifier (a closed jar or plastic box, with some wet cotton wool or tissue inside) for c. 1hr; afterwards the specimens become wet and flexible. They should not be left for longer because water droplets will accumulate on the wings and cause them to fold. The distal segments are best cut off with the use of sharp, small scissors moistened with water or glycerin, to prevent them randomly chipping off. The segments are then placed in 10% KOH or NaOH overnight or for up to 24 hrs. Attention: in the case of desiccated or worn-looking specimens from old collections, maceration should last only 2-4 hrs. Afterwards, the segments are transferred with lightweight pincers to distilled water (3-5 ml) for 2 hrs or overnight; a second wash is recommended. The reaction will still go on slowly in water until stopped with glycerin. Sometimes in entomological literature it is advised to use diluted acetic acid for the last rinse; I do not recommend this, as the reaction is too strong and the genitalia may be damaged. Even if this does not happen, lots of small bubbles accumulate inside and details become difficult to observe, much less be photographed. The preparation should be stored in a small vial of glycerin, pinned under the dry specimen or in a vial with ethanol (55-75%) together with the wet specimen. Extraordinary care is necessary when dealing with KOH or NaOH: these agents are highly corrosive and the pincers and all utensils used should be promptly washed in cold water, as well as hands. No drop should fall on the table or anywhere – usually these chemicals are not used outside a fume hood or other laboratory space adapted for the purpose.

In order to prepare female genitalia, I use two needles to separate the connection between the hypogynal valves and tergites (guide yourself with Fig. 0.1). This action allows you to separate the dorsal and ventral portions of the genital segment; the genital plate is usually left with the tergites intact (dorsal portion of the genital segment) and can be examined without further separation. All parts should be stored with the specimen.

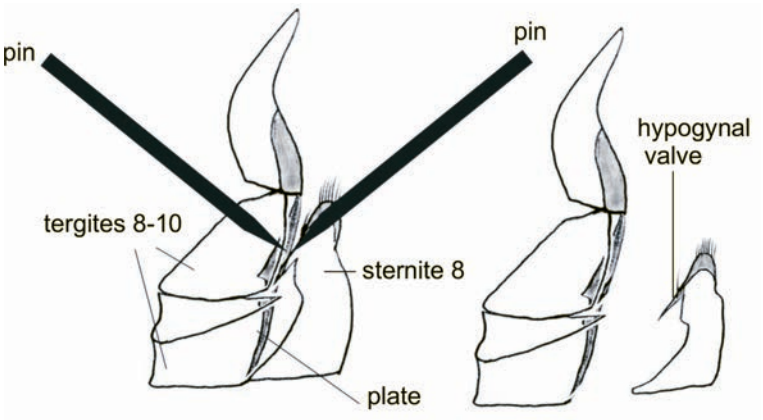


Fig. 0.1. Scheme of preparation of female genitalia.

Photographs of terminalia suspended in a droplet of glycerin were taken using a digital camera, Canon Eos 600, mounted on a binocular microscope, Leica M165C, operated by computer. Stacked pictures (usually 5-20) were combined by use of Helicon Focus 5.3x64 (Helicon Soft Ltd (c) 2013). Camera pictures were processed in Corel Draw v. 15 and X7. Some old, analogous photographs of holotypes were made many years ago, using a hand-held camera, hence their poor quality.

Herewith, I would like to add a word in defense of old, wet collections. Many institutional and amateur collections contain large quantities of undetermined trichocerids, sometimes stored for more than 50 years. Today, in view of the rapid disappearance of insect fauna, the specimens collected many years ago should not be wasted and should be included in research; these collections may comprise species which are vanishing. Such old collections compiled by Christine DAHL, Karl MÜLLER, Hans MENDL, Hans MALICKY, and Juha VIRAMO, among others, enabled me to research the subgenus *Staryia*, an exciting new lineage of *Trichocera*. In the current day, insects from older collections, including trichocerids, may be used for molecular analyses even after a 30 year soak in diluted alcohol (e.g., POTOCKA et al. 2020; specimens of *T. maculipennis* from Switzerland were collected in 1986).

Morphology and Terminology (Fig. 0.2A-N)

Antenna (Fig. 0.2.D): the setosity of flagellomeres appeared helpful for discerning the species of the *implicata* group (see STARÝ & MARTINOVSKÝ 1998); pubescence means a more or less dense cover of very short, soft seate, while verticils are prominent, much longer bristles that usually appear in scarce number at the end of flagellomeres. Wing venation (Fig.0.2. A-B): terminology follows that in KRZEMIŃSKA et al. (2009). Thoracic sclerites (Fig. 0.2.C): terminology follows that in the Manual of Neractic Diptera (MCALPINE 1981). STARÝ used different terms for the anepimeron and metanepisternum (mesothoracic epimeron; metathoracic episternum or metepisternum, respectively); these terms are also included in Fig. 0.2.C to exclude confusion. The setation of these pleura is considered an important key character for the species of the *implicata* group (STARÝ & MARTINOVSKÝ 1996); however, they are most visible in dry or freshly collected specimens. In old, alcoholic collections, usually only mere traces of pits may be observed under large magnifications. The proportions of thoracic sclerites appear variable between species; this set of characteristics has only recently been recognized by myself and therefore is not used for identification. Nevertheless, camera pictures of a lateral view of thoraces are included, especially for the species known only from one sex, to help future identification of the unknown male or female. Tarsal claws in the male (Fig. 0.2.E): relative size of tarsal claws is measured as the length of chord of the semi-circle formed by the claw compared to the length of the fifth tarsomere (t5). Usually the claw of a hind leg is taken under consideration, but claws from the fore and middle legs do not differ much in size within species (personal observation); females have smaller claws than males. The claws are described as delicate or strong, and mildly or strongly curved. In order to present this feature objectively, the camera pictures of claws are presented in the key wherever possible. However, it was observed that populations from remote regions may differ in size of claws (e.g., *T. saltator* in Central Europe and Northern Africa; DRIAUACH et al. 2015).

Genitalia (male: Fig. 0.2.F-J, female: 0.2.K-N). Terminology of the genitalia follows that used in the Manual of Nearctic Diptera (MCALPINE 1981), with exceptions listed below and also those used earlier, in literature on Trichoceridae. It should be noted here, that DAHL is opposed to the terms ”gonostyle” and ”gonocoxite” in place of the previously used ”dististyle” and ”basistyle” (e.g., DAHL & KRZEMIŃSKA 1997). Her study of development and innervation (DAHL 1980) has shown that in Trichoceridae, Limoniidae, and Anisopodidae, the outer grasping organs of the male and the ovipositor of the female are of segmental origin and not gonapophyses. In male genitalia, the term ”aedeagal complex” is used for the inner armature which includes the aedeagus and its external sheath composed of parameres, lateral and basal apodemes, and the hood (a membrane stretched between parameres over the tip of the aedeagus; the term was introduced by WOOD 1991).

Abbreviations:

f – female(s)

m – male(s)

T. – *Trichocera*

T. (*T.*) – *Trichocera* (*Trichocera*)

T. (*M.*) – *Trichocera* (*Metatrichocera*)

T. (*S.*) – *Trichocera* (*Saltrichocera*)

T. (*St.*) – *Trichocera* (*Staryia*)

Abbreviations for morphological structures are in the caption to Fig. 0.2.

Institutional acronyms:

BMNH – Natural History Museum, London, UK

CNC – Canadian National Collection (Insecta), Ottawa, Canada

ISEA PAS – Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Poland

MNHN – Musée National d’histoire naturelle in Neuchâtel, Switzerland

MNW – Naturhistorisches Museum, Wien

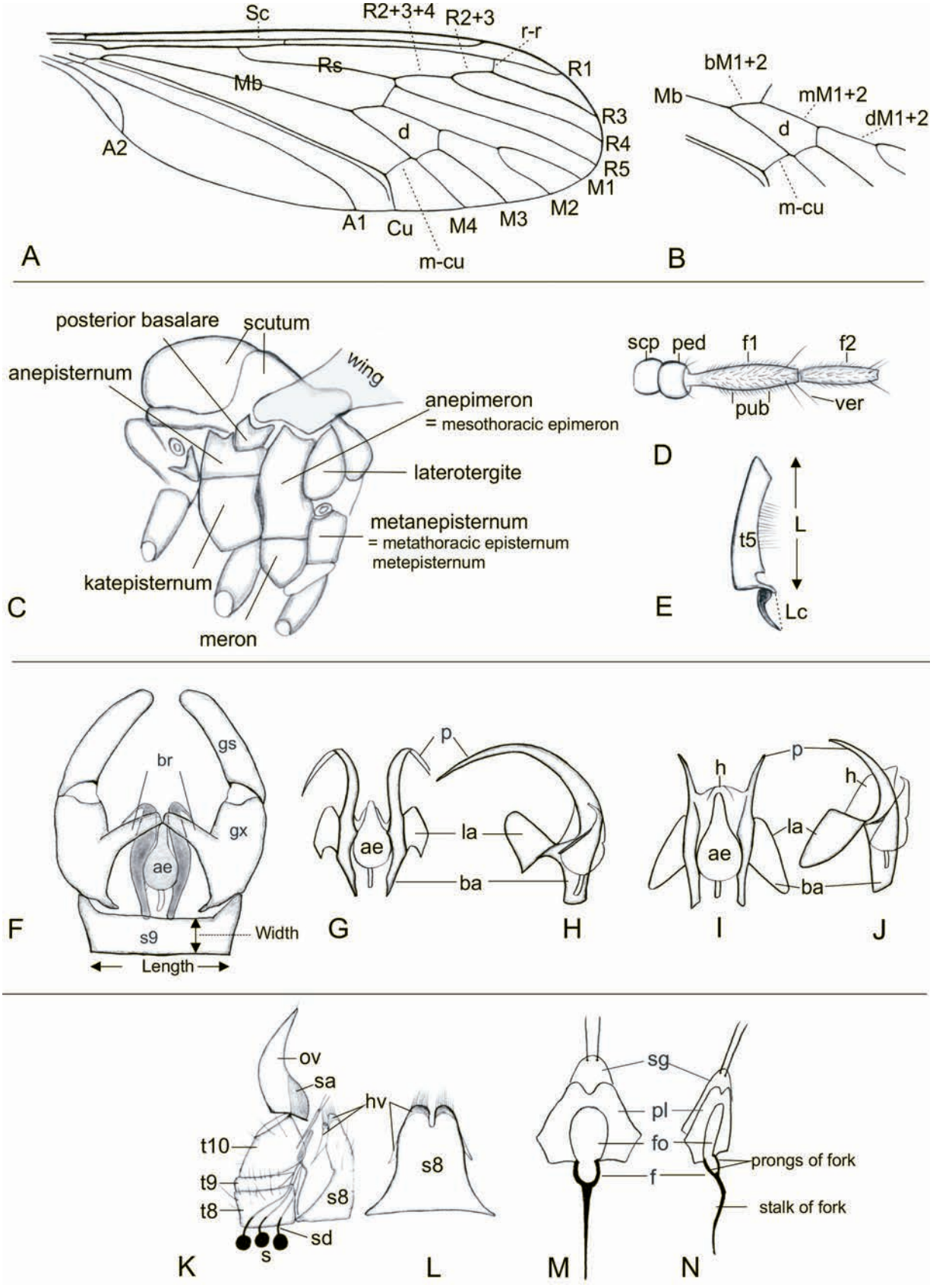


Fig. 0.2. Diagnostic features and terminology. A, B, wing venation; C, thorax; D, setation of flagellomeres; E, tarsal claw (Lc, length of claw's chord; L, straightline length of fifth tarsomere); F, male genitalia in ventral view; G-H, aedeagal complex in ventral and lateral views, respectively (subgenus *Saltrichocera* and *Metatrichocera*); I-J, aedeagal complex in ventral and lateral views, respectively (subgenus *Trichocera*); K, female genital segment, lateral view; L, sternite 8 in ventral view; M-N, genital plates in ventral and lateral views, respectively. Abbreviations: ae, aedeagus; ba, basal apodeme; br, bridge; f1, f2, first, second flagellomere; gs, gonostyle; gx, gonocoxite; h, hood over aedeagus; la, lateral apodeme; p, paramere; ped, pedicel; pub, pubescence; s, spermatheca; s8, s9, sternite 8, 9; sa, setulose area; scp, scapus; sd, spermathecal duct; t5, fifth tarsomere; t8-10, tergites 8-10; ver, verticil.

Acknowledgements

I am greatly indebted to Christine DAHL for her generous, constant help during my study of Trichoceridae, including long-termed loans of large collections. Jaroslav STARÝ is thanked for discussions on „difficult" species, and especially, for gifts of paratypes of numerous species described by him. The opportunity to examine vast collections from Switzerland, I owe to Christophe DUFOUR (Musée National d'histoire naturelle in Neuchâtel, Switzerland) and to Agnieszka SOSZYŃSKA and her students (University of Łódź, Poland), collections of Trichoceridae from under snow cover in the Beskidy Mts., Poland.

The journal *Zoologisch Anzeiger* is thanked for permission of re-use following camera pictures: 1c, 2a, 3a,c from my article (KRZEMIŃSKA & GORZKA 2016), and *Acta zoologica cracoviensia* for fig. 1, 2, 3 in KRZEMIŃSKA (2020) and fig. 1, 2 in KRZEMIŃSKA & GORZKA (2014).

Finally, the manuscript has been considerably improved by corrections and suggestions of both anonymous Referees.

III. KEY TO MALES

The distinction into subgenera is based on the outer and inner genitalia of males. The key is constructed so as to enable identification without prior preparation as far as possible; therefore, males of *Trichocera* and *Saltrichocera* are included in one key; for *Staryia*, remarks are included wherever a possibility of misidentification arises. Two non-European species, *T.* (*S.*) *arctica* and *T.* (*S.*) *columbiana*, are not included in this key (Fig. 17 and 24, respectively).

1. Gonocoxite balloon-like. . . . . 3 (subgenus *Metatrichocera*; part)

– gonocoxite other, short or long, but not balloon-like . . . . . 2.

2. Outer genitalia of unusual shape (as compared to that in Introduction: Fig. 0.2.F), such as: gonocoxites widely spaced, protruding far outside sternite 9; and/or bridge extra large, or with a conspicuous medial gap, or much wider than long; and/or sternite 9 unproportionally small; aedeagal complex: parameres short to medium, massive and straight, usually perpendicular to long body axis, close to lateral apodemes; basal apodemes absent or very short, not extending beyond vesica (parameres and basal apodemes are frequently visible in unprepared genitalia) . . . 42 (subgenus *Staryia* *)

– outer genitalia of usual shape, unlike those characterized above for *Staryia*; aedeagal complex: parameres raised well above lateral apodemes, long, curved (subgenus *Saltrichocera* and *Metatrichocera*) or very short and delicate, fused at least basally (subgenus *Trichocera*); basal apodemes longer than vesica . . . . . 6.

3. Sternite 9 with large outgrowth . . . . . 4.

– sternite 9 not transformed . . . . . 5.

4. Outgrowth of sternite 9 bulbous, irregular, flanked laterally with two brushes of bristles . . . . . *T.* (*M.*) *mackenzie* [Fig. 10]

– outgrowth narrow, dilated at end; brushes absent, wing with spot on r-m . . *T.* (*M.*) *gigantea* [Fig. 7].

5. Gonostyle crescent, curved to the inside, with long, narrow, mesobasal processes overlapping over bridge . . . . . *T.* (*M.*) *forcipula* [Fig. 6]

– gonostyle not curved to the inside, with multiple processes; antenna often short. . . . . *T.* (*M.*) *lutea* [Fig. 9].

6. Wings with spots . . . . . 7.

– wings clear. . . . . 9.

7. Single dark spot on r-m**, sometimes accompanied by a dark smudge along Cu, and/or along the distal radial veins (R2+3, r-r, R3). . *T.* (*S.*) *regelationis* [Fig. 40]

– wings with more spots, usually accompanied by a dark smudge along Cu . . . . . 8.

8. Spots at origin of Rs and on r-m; d cell often small, pentagonal . . *T.* (*S.*) *maculipennis* [Fig. 29]

– as *maculipennis*, with an additional large spot between R3 and R5 and smaller spots distally between all other radial and medial veins; spot on Rs very large . . . . . *T.* (*S.*) *versicolor* [Fig. 48].

9. Abdomen distinctly striped (distal halves of tergites are darker) . . . . . *T.* (*S.*) *annulata* [Fig. 15]

– abdomen not striped; if so, then distal halves are lighter . . . . . 10.

10. Gonostyle more or less S-curved or bent outside, much longer and thinner than gonocoxites, without any tubercle . . . . . 11 (*mutica* group of species)

– gonostyle straight (only the apical part might be curved to the inside), with distinct process(es) about midlength; bridge narrow, triangular or otherwise expanded . . . . . 15.

*with two exceptions: *T.* (*St.*) *geigeri* has outer genitalia quite similar to those of *T.* (*S.*) *implicata*, and *T.* (*St.*) *rectistylus* has basal apodemes longer than the vesica (but still shorter than the aedeagal apodeme).

**but check *T.* (*T.*) *hiemalis*; also unknown male of *T.* (*St.*) *muelleri* probably has wings with a spot.

– gonostyle straight to slightly curved to the inside, with or without small mesobasal tubercle; bridge not expanded, medially fused or separated . . . 19.

11. Gonostyle strongly S-shaped, with mesal bulge reaching almost half of gonostyle; bridge expanded into narrow triangle; tarsal claw c. 1/2 t5, its distal half is straight . . . . . *T.* (*S.*) *candida* [Fig. 22]

– gonostyle without mesal bulge . . . . . 12.

12. Sternite 9 deeply incised in middle; bridge triangular, its meeting portions are closely set and forming a small beak; tarsal claw small, 1/3 of t5 . . . . . *T.* (*S.*) *dahlae* [Fig. 25]

– bridge without beak, tarsal claw almost as long as t5 . . . . . 13.

13. Sternite 9 deeply incised, bridge narrow, triangle-like, its halves are parallel-sided . . . . . *T.* (*S.*) *simonyi* [Fig. 45]

– sternite 9 only slightly incised in the middle; bridge low, massive, rounded . . . . . 14.

14. Gonostyle distinctly S-shaped, strongly curved to the inside . . . . . *T.* (*S.*) *mutica* [Fig. 33]

– gonostyle only slightly S-shaped . . . . . *T.* (*S.*) *andorrensis* [Fig. 14].

15. Gonostyle straight, with two mesal hook-like processes, one larger midway and one smaller in distal 1/4; bridge fused, triangular, with button-like outgrowth at top [aedeagal complex of subgenus *Trichocera* type, i.e., lateral apodemes are declined from parameres; parameres short, basally fused] . . . . . *T.* (*T.*) *sibirica* [Fig. 5]

– gonostyle with one process midway; bridge other . . . . . 16.

16. Gonostyle with small, acute process midway; apex curved to inside and largely dilated; bridge tightly set or fused and expanded into long needle-like outgrowth . . . . . *T.* (*M.*) *ticina* [Fig. 11]

– gonostyle straight . . . . . 17.

17. Gonostyle with large mesal hook-like process midway; bridge triangular without central outgrowths . . . . . *T.* (*M.*) *kotejai* [Fig. 8]

– gonostyle other . . . . . 18.

18. Gonostyle with small obtuse process midway, bridge fused and expanded medially into narrow, sharp ended beak [aedeagal complex of the subgenus *Trichocera* type] . . . . . *T.* (*T.*) *inexplorata* [Fig. 2]

– gonostyle dilated midway, with small mesal outgrowth; remainder of gonostyle over it is abruptly narrowed into stick-like shape; bridge separated, very narrow and expanded apically . . . . . *T.* (*M.*) *unica* [Fig. 12].

19. Gonostyle much longer (1.5x) than gonocoxite, not thinned, very slightly S-shaped, without any tubercles, apices mildly curved to the inside . . . 20.

– gonostyle shorter, with or without mesal basal tubercles . . . . . 21.

20. Bridge separated, rounded; lateral apodeme c. 3x as long as wide, directed to tips of parameres . . . . . *T.* (*S.*) *hirta* [Fig. 26]

– bridge fused at apex, very low, triangular, pointed; parameres short, fused basally [aedeagal complex of the sugenus *Trichocera* type] . . . . . *T.* (*T.*) *major* [Fig. 3].

21. Bridge triangular, fused (may be partially desclerotized medially, then fusion may be poorly visible) . . . . . 22.

– bridge rounded, distinctly separated . . . . . 23.

22. Gonostyle curved to the inside, with small finger-like tubercle at base; sternite 9 more or less expanded medially into small beak; parameres short . . . . . *T.* (*T.*) *hiemalis* [Fig. 1]

– gonostyle straight, without tubercle; sternite 9 straight to very slightly elevated medially; parameres long, curved . . . . . *T.* (*T.*) *mendli* [Fig. 30].

23. Sternite 9 with straight margin set with row of setae; very small medial notch may be present . . . . . 24.

– sternite 9 more or less deeply, ovally incised . . . 32.

24. Gonostyle without tubercle, or tubercle indistinct . . . . . 25.

– gonostyles with tubercles . . . . . 28.

25. Sternite 9 narrow (see Fig. 0.1.F for length and width), with very small medial notch; tarsal claw c. 1/3 of t5; antennae with verticils depressed, not conspicuous . . . . . *T.* (*S.*) *nordica* [Fig. 34]

– sternite 9 wide, notch absent . . . . . 26.

26. Gonostyle straight, evenly narrowing to round apex; halves of bridge straight, curved to each other just before apex; tarsal claw small (c. 1/4 of t5); body reddish to pale brown . . . . . *T.* (*S.*) *rufulenta* [Fig. 42]

– gonostyle slightly curved to the inside . . . . . 27.

27. Bridge wide, rounded; tarsal claw c. 1/3 of t5; vein Sc densely setate . . . . *T.* (*S.*) *pappi* [Fig. 36]

– bridge of usual width, tarsal claw large, c. 1/2 of t5, Sc bare or with few setae on distal section (dorsal and ventral side) . . . . . *T.* (*S.*) *brevis* or *T.* (*S.*) *saltator** [Fig. 20 and 43, respectively].

**brevis* has shorter antennae, and more plump flagellomeres, but distinction between males of these species is difficult; females are well discernible by the size of their ovipositor.

28. Aedeagal complex of subgenus *Trichocera* type (Introduction: Fig. 0.2.I-J). . . . . *T.* (*T.*) *marocana* [Fig. 4]

– aedeagal complex of subgenus *Saltrichocera* type (Introduction: Fig. 0.2.G-H). . . . . 29.

29. Sternite 9 wide, at least 1/4 of length; gonostyle distinctly longer than gonocoxite; aedeagal complex not of the *regelationis* type [i.e., lateral apodemes are close to bases of parameres in lateral view]. . . . . 30.

– sternite 9 narrow, c. 1/5 of length; gonostyle usually c. as long as gonocoxite, narrowing to apex; aedeagal complex of *regelationis* type (similar to that in Fig. 40.1.D) . . . . . 31.

30. Tarsal claw large, more than 1/2 of t5; antennae often shortened. . . . . *T.* (*S.*) *borealis* [Fig. 19]

– tarsal claw small, 1/4 of t5 . . . . . *T.* (*S.*) *sardiniensis* [Fig. 44].

31. Body dark, bridge wider than high . . . . . *T.* (*S.*) *michali* [Fig. 31]

– body reddish . . . . . *T.* (*S.*) *rufescens* [Fig. 41].

32. Basal tubercle of gonostyle large, finger-like; halves of bridge are broad. . . . . 33.

– basal tubercle not finger-like, but smaller, triangular or absent . . . . . 34.

33. Sternite 9 excised only mildly, ovally; apical portions of bridge are darker than remainder; gonostyle usually as short and thick as gonocoxite; aedeagal complex with lateral apodeme c. 2x longer than wide, pointing at distal 1/3 of parameres; flagellomeres with erect verticils, wings and veins very delicate, pale . . . . . *T.* (*S.*) *parva* [Fig. 37]

– sternite 9 excised in V-shape; gonostyle much longer than gonocoxite; aedeagal complex with lateral apodeme characteristically very long (3x longer than wide; longest in the genus), and extended toward the ends of the parameres; verticils somewhat depressed toward flagellomeres . . . . . *T.* (*S.*) *carpathica* [Fig. 23].

34. Tubercle conspicuous, triangular. . . . . 35.

– tubercle small, triangular. . . . . 36.

– tubercle absent. . . . . 40.

35. Bridge triangular, high vaulted; antennae with verticils erect; metanepisternum with few setae; claw 1/3 of t5. . . . . *T.* (*S.*) *montium* [Fig. 32]

– bridge rounded, apices of halves somewhat convex, making the bridge bi-lobate at apex; lateral apodeme narrow (2x longer than wide), pointing at ends of parameres; tarsal claw very small, 1/4 of t5 which is also short, only twice longer than wide; pleura bare . . . . . *T.* (*S.*) *bilobata* [Fig. 18]

– bridge very broadly triangular (basal sections straight, distal curved), apices not bulbous, lateral apodeme rounded, pointing at middle of parameres; anepimeron with few short setae; tarsal claw large, 1/2 of t5 . . . . . *T.* (*S.*) *obtusa* [Fig. 35].

36. Gonostyles much narrower than gonocoxites, and basal swelling is distinct; bridge widely separated due to short, desclerotized section in middle; katepisternum and metepimeron with bristles; tarsal claw small, 1/5-1/4 of t5 . . . . . *T.* (*S.*) *alpina* [Fig. 13]

– gonostyles only not much narrower than gonocoxites; halves of bridge meeting in middle . . . . . 37.

37. Bridge distinctly triangular (its halves meeting at a small angle) 38

– bridge not triangular . . . . . 39.

38. Gonostyles parallel-sided or almost so, mildly curved to the inside; antennae without distinct verticils; pleura bare . . . *T.* (*S.*) *implicata* [Fig. 27]

– gonostyles straight, evenly narrowing to apex; bridge massive, with transparent flange on inner margin; antennae with erect verticils; katepisternum and metanepimeron with bristles; tarsal claw 1/3 of t5 . . . . . *T.* (*S.*) *pubescens* [Fig. 38].

39. Bridge delicate, large, rounded; katepisternum and metepimeron with bristles; tarsal claw 1/3 of t5 . . . . . *T.* (*S.*) *antennata* [Fig. 16]

– bridge broadly trapezoidal (basal sections of halves straight, distally curved to meet in middle); pleura bare; verticils indistinct; pleura bare; tarsal claw c. 1/4 of t5. . . . . *T.* (*S.*) *recondita* [Fig. 39].

40. Gonostyles short, as long and as thick as gonocoxites, with basal swelling; bridge rounded and low; some bristles on katepisternum and on posterior basalare; tarsal claw extremely small, c. 1/7 of t5. . . . . *T.* (*S.*) *thaleri* [Fig. 47]

– gonostyles longer than gonocoxites, bridge rounded, large. . . . . 41.

41. Gonostyles nearly as thick as gonocoxites; thoracic pleura without bristles; tarsal claw 1/4 of t5. . . . . *T.* (*S.*) *calva* [Fig. 21]

– both gonocoxites and gonostyles are narrow; basal swelling barely visible or absent; bridge delicate, rounded; tarsal claw large, c. 1/2 of t5; thoracic pleura with setae . . . . . *T.* (*S.*) *sparsa* [Fig. 46].

42. Subgenus *Staryia*. Bridge triangular 43

– bridge other . . . . . 46.

43. Gonocoxites widely spaced and expanded far beyond sternite 9 (lateral view). 44

– gonocoxites not expanded beyond sternite 9 . . . . 45.

44. Halves of bridge tightly set at apex which is somewhat raised; gonostyle curved in basal section, parallel-sided almost to apex; sternite 9 excised medially . . . . . *T.* (*St.*) *altipons* [Fig. 49]

– halves of bridge separated at apex by membranous section; gonostyle straight, evenly narrowing to apex; sternite 9 with straight margin. . . . . *T.* (*St.*) *villosa* [Fig. 61].

45. Bridge large, massive, with serrate flange along inner margins; gonostyle with distinct mesobasal tubercle; sternite 9 narrow (axially), paramere very short, close to lateral apodeme and barely reaching beyond it . . . . . *T.* (*St.*) *basidens* [Fig. 50]

– bridge medium, gonostyles and sternite 9 of size and appearance not much different from that in *T.* (*S.*) *implicata*; paramere extending beyond lateral apodeme . . . . . *T.* (*St.*) *geigeri* [Fig. 54].

46. Bridge very wide, separated at apex by membranous section; halves distally strongly convex, forming two distinct bulges; lateral apodeme rounded . . . . . *T.* (*St.*) *polanensis* [Fig. 57]

– bridge narrow, rounded, wider than long; lateral apodeme triangular, expanded . . . . . 47.

47. Gonostyle straight, without tubercle . . . . . T. (*St.*) *rectistylus* [Fig. 59]

– gonostyle curved, with mesobasal tubercle . . . . . *T.* (*St.*) *transversa* [Fig. 60].

IV. KEY TO FEMALES

Only females of *T.* (*Staryia*) are determinable by their outer genitalia, therefore species of the three other subgenera are in one key. Females of *T.* (*Staryia*) begin at the 35th couplet. Two non-Europaean species, *T.* (*S.*) *arctica* and *T.* (*S.*) *columbiana*, are not included in this key (Fig. 17 and 24, respectively).

1. Lateral view of genitalia, ventral side: hypogynal valves on sternite 8 stiff and strong, separated by a distinct gap from base of ovipositor; ovipositor may be fixed in position oblique to long axis of abdomen; genital segment is transformed when compared to the groundplan (as in Introduction: Fig. 02.K), e.g., desclerotized patch in lateral view, folds on tergites 8-10); spermathecae absent or transformed . . . . . 35 (subgenus *Staryia*)

– valves soft, short, ending close to ventral base of ovipositor; ovipositor short to long, fixed in prolongation of long axis of abdomen; genital segment not transformed as specified above; three round, well sclerotized spermathecae present. . . . . 2 (subgenera: *Trichocera*, *Metatrichocera* and *Saltrichocera*).

2. Antennae very short (only 1/2-1/3 of wing length), flagellomeres oval to bead-like . . . . . 3.

– antennae longer . . . . . 4.

3. Ovipositor shorter than genital segment, distal portion triangular, base broad; tergite 10 swollen in lateral view . . . . . *T.* (*M.*) *lutea* [Fig. 9]

– ovipositor as long as genital segment, or longer, strong, curved; tergites of usual shape . . . . . *T.* (*S.*) *borealis* [Fig. 19].

4. First flagellomere (f1) greatly swollen (at least 3x thicker than second), subsequent flagellomeres much thinner; ovipositor longer than genital segment, mildly curved . . . . . *T.* (*S.*) *antennata* [Fig. 16]

– f1 up to twice thicker than f2 . . . . . 5.

5. Wings with spots . . . . . 6.

– wings clear. . . . . 7.

5. Single dark spot on r-m*, sometimes accompanied by a dark smudge along Cu, and/or along the distal radial veins (R2+3, r-r, R3) . . . . . *T.* (*S.*) *regelationis* [Fig. 40]

– wings with more spots, usually accompanied by a dark smudge along Cu. . . . . 6.

6. Spots at origin of Rs and on r-m; d cell often small, pentagonal . . . . . *T.* (*S.*) *maculipennis* [Fig. 29]

– as above for *maculipennis*, with an additional large spot between R3 and R5 and smaller spots distally between all other radial and medial veins; spot on Rs very large . . . . . *T.* (*S.*) *versicolor* [Fig. 48].

7. Abdomen distinctly striped (distal halves of segments are darker) . . . . . *T.* (*S.*) *annulata* [Fig. 15]

– abdomen not striped; if so, then indistinctly, and distal halves are lighter . . . . . 8.

8. Ovipositor more than 2x as long as genital segment, narrow, straight up to distal 1/3 . . . . . *T.* (*T.*) *major* [Fig. 3]

– ovipositor shorter than double the length of genital segment . . . . . 9.

9. Ovipositor distinctly longer (c. 1.3-1.5x) than genital segment. . . . . 10.

– ovipositor c. as long as to slightly longer (up to 1.2x) than genital segment. . . . . 16.

– ovipositor much shorter than genital segment . . . 33.

10. Ovipositor c. 1.5x as long as genital segment . . . 11.

– ovipositor c. 1.3x as long as genital segment . . . 14.

11. Genital segment (especially tergite 10) swollen in lateral view. . . . . 12.

– genital segment not swollen . . . . . 13.

12. Ovipositor only slightly curved, distal portion wide, tip blunt; setulose area well delimited, flat, reaching mid ovipositor; hypogynal valves very broad . . . . . *T.* (*T.*) *sibirica* [Fig. 5]

– ovipositor very narrow, ending sharp, bent at midlength, distal portion straight; genital fork shallow, with long lateral extensions . . . . . *T.* (*M.*) *mackenzie* [Fig. 10].

13. Vein Sc bare or with few setae on distal section (dorsal and ventral side); genital fork almost circle-like; supragenital plate with 4 bristles . . . . . *T.* (*S.*) *saltator* [Fig. 43]

*check also *T. (M.) gigantea, T. (St.) muelleri* and *T. (T.) hiemalis*

– Sc densely setate, genital fork shallow, quadrangular; genital plate with 2 bristles . . . . . T. (*S.*) *longa*, **n. sp.** [Fig. 28].

14. Ovipositor basally broad, regularly narrowing to tip, setulose area greatly convex, well delimited, not reaching mid ovipositor; genital fork massive but shallow, with prongs slightly tucked to the inside; supragenital plate with 4 bristles . . . . . *T.* (*S.*) *calva* [Fig. 21]

– setulose area reaching mid ovipositor which is otherwise similar to that in *T.* (*S.*) *calva* but less curved; genital fork delicate, shallow, prongs divergent, connected to plate with desclerotized sections; supragenital plate with 2 bristles . . . . 15.

15. Setulose area well delimited; lateral portions of genital plate are shortened as in Fig. 32.K (arrows) . . . . . *T.* (*S.*) *montium* [Fig. 32]

– setulose area poorly delimited in distal section; genital plate of usual shape . . . . . *T.* (*S.*) *nordica** [Fig. 34].

16. Hypogynal valves transformed into small hooks directed to the inside; sternite 8 with dark, sclerotized stripes along lateral margins; ovipositor basally broad, but setulose area is flat; distal 2/3 of in shape of a narrow triangle; apex of plate not incised, fork shallow, prongs divergent . . *T.* (*M*) *forcipula* [Fig. 6]

– valves and sternite 8 of usual shape (Introduction: Fig. 0.1.K) . . . . . 17.

17. Setulose area of ovipositor not delimited, or suture faint and incomplete, visible only in basal portion . . . . . 18.

– setulose area delimited . . . . . 23.

18. Ovipositor almost straight, setulose area reaching up to mid ovipositor . . . . . 19.

– setulose area very long, reaching almost to tip of ovipositor . . . . . 20.

19. Ovipositor broad, also distally, setulose area wide, occupying greater part of ovipositor's base (lateral view); hypogynal valves very narrow; genital fork with short straight prongs connected to plate by long desclerotized extensions; large species (wing c. 10 mm), body pale brown, antennae thin . . . . . *T.* (*T.*) *inexplorata* [Fig. 2]

– ovipositor slender, distal portion strongly narrowed dorsally; setulose area of usual width, less than half of ovipositor's base; valves wide; genital fork short but massive, with small angular extensions; species of medium size (5-7 mm), body dark brown, antennal flagellomeres more or less swollen . . . . . *T.* (*S.*) *bilobata* [Fig. 18].

20. Ovipositor slender, at least 3x as long as its greatest width, genital fork with delicate prongs parallel to slightly divergent . . . . . 21.

– ovipositor very broad, triangular, ca. twice longer than its greatest width; genital fork almost forming a circle, hypogynal valves with distinct gap in-between (ventral view) . . . . . 22 (*mutica* group of species).

21. Ovipositor triangular (ventral margin straight), hypogynal valves wide . . . . *T.* (*S.*) *parva* [Fig. 37]

– ovipositor mildly curved; valves very narrow . . . . . *T.* (*S.*) *thaleri* [Fig. 47].

22. Supragenital plate with four bristles . . . . . *T.* (*S.*) *simonyi* [Fig. 45]

– supragenital plate with two bristles . . . . . *T.* (S.) *mutica*, *candida* (Carpathians, Alps) or *andorrensis* (Pyreneen Mts.); females are not distinguishable.

23. Entire ovipositor narrow and almost straight, setulose area flat, dark; fork shallow, with prongs slightly angular . . . . . *T.* (S.) *pappi* [Fig. 36]

– setulose area distinctly convex and/or much wider than remainder of ovipositor . . . . . 24.

24. Supragenital plate with 4-6 bristles. 25

– supragenital plate with 2 bristles 26

25. Genital fork circle like; flagellomeres 1-6 oval, without distinct verticils. . . . *T.* (S.) *brevis* [Fig. 20]

– fork massive but shallow, with small angular projections laterally; flagellomeres with strong erect terminal bristles; thoracic sclerites (anepimeron and metanepisternum) with setae . . . . . *T.* (S.) *sparsa* [Fig. 46].

26. Base of ovipositor very broad (c. 2.5x); setulose area strongly convex, reaching mid ovipositor . . . . 27.

– ovipositor more narrow and setulose area shorter. . . . . 29.

27. Ovipositor somewhat shorter than genital segment, genital plate wider than long, fork delicate, bowl-like, its prongs longer than the distance between them; flagellomeres with soft pubescence, without erect verticils; thoracic pleura bare . . . . . *T.* (*S.*) *implicata* [Fig. 27]

– ovipositor approximately as long as genital segment; flagellomeres with erect verticils; thoracic pleura with setae. . . . . 28.

28. Anepimeron and metanepisternum with numerous long setae; genital fork shallow, with massive lateral sclerotizations [hypogynal valves unknown] . . . . . *T.* (*S.*) *alpina* [Fig. 13]

– anepimeron with few short setae; fork shallow, bowl-like and delicate; hypogynal valves are narrow . . . . . *T.* (*S.*) *obtusa* [Fig. 35].

*Differences between *T.* (*S.*) *montium* and *T.* (*S.*) *nordica* are well expressed in males; females are barely discernible.

29. Ovipositor slightly longer than genital segment; foramen of genital plate is heart-like (widening toward apex); fork deep, with straight, divergent prongs; short section of stalk below fork is broad; f1 large, around twice as long as the f2, club-like . . . . . *T.* (*T.*) *hiemalis* [Fig. 1]

– plate and fork other . . . . . 30.

30. Genital fork very short to almost non-existent; prongs strongly divergent, if present . . . . . 31.

– genital fork of medium depth (prongs are parallel, about as long as distance between their tips) . . . . 33.

31. Ovipositor rather slender and only mildly curved . . . . . *T.* (*S.*) *sardiniensis* [Fig. 44]

– ovipositor distinctly curved; tip sharp. . . . . 32.

32. Ovipositor strongly curved, almost semicircular; d cell very broad; body yellow to red . . . . . *T.* (*S.*) *rufescens* [Fig. 41]

– ovipositor less curved, body dark . . . . . *T.* (*S.*) *michali* [Fig. 31].

33. Thoracic pleura with tufts of setae . . . . . *T.* (*S.*) *pubescens* [Fig. 38]

– no setae on pleura . . . . *T.* (*S.*) *recondita* [Fig. 39].

34. Ovipositor very broad basally, with well delimited, strongly convex setulose area stretched almost over entire ovipositor, and very short, narrow distal portion . . . . . *T.* (*S.*) *dahlae* [Fig. 25]

– ovipositor narrow, rather straight, setulose area not delimited . . . . . T. (*S.*) *rufulenta* [Fig. 42].

35. Subgenus *Staryia*. Ovipositor as long as or longer than genital segment, curved and pointed, of common trichocerid shape; setulose area distinctly delimited . . . . . 36.

– ovipositor other, smaller than genital segment . . . 37.

36. Ovipositor narrow beyond base, mildly curved, longer than genital segment; hypogynal valves very prominent, curved outside; small, poorly sclerotized spermathecae present in distal part of genital segment; genital plate large. . . . . *T.* (*St.*) *christinae* [Fig. 51]

– ovipositor not longer than genital segment, stout, curved and narrowed in distal 1/3, setulose area short, greatly convex at base, valves not very prominent; spermathecae absent, genital plate small. . . . . *T.* (*St.*) *muelleri* [Fig. 55].

37. Ovipositor evenly cut across at end; three spermathecae present. . . . *T.* (*St.*) *polanensis* [Fig. 57]

– ovipositor other, spermathecae absent, genital plate small . . . . . 38.

38. Ovipositor fixed in prolongation of long body axis; genital segment without desclerotized patch; dorsal side of genital segment (tergites) not protruding over sternite 8 . . *T.* (*St.*) *viramoi* [Fig. 62]

– ovipositor fixed in bent position; genital segment with large, desclerotized patch present (lateral view); tergites extended far over sternite 8 . . . . . 39.

39. Ovipositor declined more than 90° from long body axis, tip obtuse; desclerotized patch rounded . . . . . *T.* (*St.*) *rectistylus* [Fig. 59]

– ovipositor bent less than 90° . . . . . 40.

40. Lateral view, dorsal side: two strong, acute folds (on tergites 9 and 10) ovipositor basally rounded, distal half abruptly narrowed to sharp tip . . . . . T. (*St.*) *basidens* [Fig. 50]

– ovipositor other . . . . . 41.

41. One small fold on dorsal side (tergite 9); patch in genital segment is elongated, irregular, extending from valves; ovipositor with distal margin evenly curved, convex setulose area and obtuse tip . . . . . *T.* (*St.*) *villosa*. [Fig. 61]

– dorsal side and ovipositor other . . . . . 42.

42. Dorsal side with one deep, rectangular fold created by tergite 10 being much more narrow than 9; ovipositor very narrow, c. 3x as long as greatest width; setulose area almost flat . . . . *T.* (*St.*) *rannanenae* [Fig. 58]

– tergite 9 with large, oval dorsal outgrowth; ovipositor narrowly triangular, setulose area round. . . . . *T.* (*St.*) *dufouri* [Fig. 53]

– tergites 9 and 10 each with one small, sharp fold; ovipositor with small hump in mid of ventral margin; setulose area indistinct. . . . . *T.* (*St.*) *altipons* [Fig. 49].

V. TAXONOMIC PART

Genus: ***Trichocera*** MEIGEN, 1803

For a list of synonyms see DAHL & ALEXANDER (1976).

Diagnosis. Antennae with 13 elongated flagellomeres; palpi 1-1.5x as long as head, first of five palpomeres very small. Wing venation uniform; Sc long, c. 0.7x wing length, ending about cross-vein r-r; fork Rs distinctly beyond midwing (at 0.56-0.6x wing length); d cell small (length 0.15-0.2x Wl); A2 short, 0.15-0.2x wing length, last section more or less retrieved from and curved to wing margin. Thorax: area proportion of katepisternum to meron is c. 2-2.5. Legs: first tarsomere 1.5-2.0 as long as second; strong tibial spurs arranged 1:2:2 on fore, mid and hind leg, respectively. Male genitalia: gonostylus single, sometimes with process(es); ventral bridge between gonocoxites raised, fused or separated medially; aedeagal complex consisting of aedeagus and its sheath which is closed at dorsal side and open ventrally, composed of paired parameres, basal and lateral apodemes. Female genitalia (subgenera: *Trichocera*, *Metatrichocera* and *Saltrichocera*): sternite 8 medially with short, oval incision between hypogynal valves which are short and soft; ovipositor from c. 3x as long as to shorter than genital segment, down curved. Genital fork more or less bowl-like, connected with genital plate; three spermathecae present. Females in subgenus *Staryia* have reproductory system transformed; see diagnosis of this subgenus.

The genus is Holarctic and comprises 121 species (see Table 1 in Discussion).

Type species: *Tipula hiemalis* DE GEER, 1776, by original assignation.

Subgenus: ***Trichocera*** MEIGEN, 1803

Diagnosis as in KRZEMIŃSKA (1996b) for the *hiemalis* group of species; males have an aedeagal complex with short parameres, fused basally to form a membranous hood over tip of the aedeagus, and lateral apodeme is declined from the parameres to the basal apodeme (scheme: Introduction: Fig. 0.2.I-J). Outer male genitalia may be simple (as in *T. hiemalis*) or with gonostyles and bridge transformed (*T. inexplorata*). Females lack characters distinguishing them from the *Metatrichocera* and *Saltrichocera* subgenera.

Type species: *Tipula hiemalis* DE GEER, 1776, by original assignation. List of world species as in KRZEMIŃSKA (2001b), but without *T. mendli* (see redescription herein) and four species of the former *rectistylus* group (*altipons*, *basidens*, *rectistylus*, *transversa*) listed therein, and now in the subgenus *Staryia*. One species from North Africa, *T. marocana* DRIAUACH, KRZEMIŃSKA & BELQAT, 2015, is added.

Trichocera* (*Trichocera*) *hiemalis (DE GEER), 1776

Fig. 1.1 (male), 1.2 (female)

Trichocera (*Trichocera*) *hiemalis* in: STARÝ 1998

Trichocera (*Trichocera*) *hiemalis* in: DAHL & ALEXANDER, 1976

Trichocera hiemalis in: DAHL 1973: fig. 20 (larva)

Trichocera hiemalis in: DAHL 1967a: 53, fig. 16-21 (male), 61-66 (female)

Trichocera hiemalis in: DAHL 1966: fig. 3, 7, 10, 14 (male), 36, 37, 40, 41, 45 (female)

Trichocera hiemalis in: KEILIN & TATE 1940: 41, fig.1-12 (larvae, pupae)

Trichocera hiemalis in: EDWARDS 1938: fig. 31f (male)

Tipula hiemalis DE GEER, 1776: Mem. hist. Ins. VI (Stockholm): 360, fig. XXI: 1-4

Diagnosis. Antennae with f1 c. 2x as long as f2; verticils very short, soft, inconspicuous. Thorax: pleura bare. Male genitalia: sternite 9 expanded medially into small beak; gonocoxal bridge fused, usually with small apical protuberance (beak); gonostyle with finger-like process at mesal basal face. Aedeagus of the *Trichocera* subgenus type, with short parameres and lateral apodemes bent to basal apodemes. Female: sternite 8 with wide hypogynal valves; ovipositor as long as genital segment or slightly longer, curved, with acute tip; shape variable; setulose area c. 1/3 of ovipositor's length, more or less convex, well delimited. Genital plate characteristic, narrow, subtriangular, foramen widening distally; genital fork short; total length not exceeding 1.5x plate length; fork as deep as wide, stalk widened below fork.

Comparison. Male is characteristic by its conspicuous process at the base of gonostyle, and two small beaks, on the apex of fused bridge and on the sternite 9. However, if the bridge is poorly sclerotized (see Fig. 1.1.D), it makes the impression of being divided. Such specimens, especially with poorly developed beak on sternite 9 and shorter gonostyles, may be mistaken with *T.* (*S.*) *parva*. The ovipositor of female is easily mistaken with that of several other species, the more so that its shape is extremely variable (see Fig. 1.2.E, G, J). Additional characters in *T. hiemalis*: wide hypogynal valves, f1 expanded and twice as long as f2, and soft, inconspicuous verticils should help determination, but decisive is the shape of genital plate.

Additional description. Species variable in many features; existence of several sibling species is possible. Wing length in Europe 5-8 mm (in Siberian Yakutia smaller; KRZEMIŃSKA 1996b). Body color light to dark brown, in winter black specimens are observed (KRZEMIŃSKA 2003). Antennae (male, Fig. 1.1., female, Fig. 1-2.A-B) with soft, indistinct veriticils. First flagellomere characteristically twice as long as second, often club-like (narrowed in middle). Flagellomeres from very narrow to thick, oval; probably depending on climate conditions. Thorax: pleura bare. Wing: usually clear, but rarely with diffused cloud on r-m (observed, e.g., in Hungary; KRZEMIŃSKA 2003); d cell is shifted distally in comparison with other species; this character, although rather not noticeable optically, is of statistic value (KRZEMIŃSKA 1992b). Tarsal claw in male (Fig. 1.1.I) very small, c. 1/5 of t5. Abdomen sometimes striped (distal portions of segments lighter than proximal ones).

Male (Fig. 1.1.A-I). Sternite 9 medially expanded into a longer or shorter beak provided with a bunch of few setae; best visible in lateral view. Bridge fused, apically with a small protuberance, or beak (Fig. 1.1.A, B) is a most frequent shape; if the beak is less sclerotized, the bridge may have a ribbon-like shape (Fig. 1.1.C); still less sclerotized bridges look as if separated medially, due to transparent central portion (Fig. 1.1.E); after dyeing with chorazol black the junction and the central beak becomes distinct (Fig. 1.1.F) (see also similar remarks in DAHL 1966, 1967a, b, 1968). The variation in height of the bridge is remarkable; compare Fig. 1.1.B,C,E. Gonostyle parallel-sided, usually more or less curved to inside; tip rounded. At basal mesal face a finger-like process is present (Fig. 1.1.D). Aedeagal complex is of the subgenus *Trichocera* type, i.e., parameres are short, basally connected by membrane (which is a part of the hood: Fig. 1.1.G, arrow) and the lateral apodemes are bent to basal ones.

Female (Fig. 1.2.A-K). Sternite 8 (Fig. 1.2.I) with wide hypogynial valves. Ovipositor as long as genital segment or slightly longer, most often evenly curved, with acute tip, but shape is variable (compare Fig. 1.2.E,G,J). Setulose area c. 1/3 of ovipositor's length, more or less convex, well delimited. Genital plate (Fig. 1.2.F,H,K), subtriangular, foramen characteristically widening distally (sometimes less so, see Fig. 1.2.K); stalk of genital fork short; total length not exceeding 1.5x plate length. Fork as deep as wide, or slightly deeper; stalk below fork widened to various degree. Sclerotized portions of spermathecal ducts are short, not longer than spermathecal diameter.

Material examined is listed in papers of KRZEMIŃSKA, also co-authorized, listed below. The neotype was examined by me.

Distribution. Holotype (non-existent) and neotype male were described from Central Sweden (DAHL & ALEXANDER 1976). *Trichocera hiemalis* is an early described species, well known and easily recognizable (but see Remarks), widespread in central and northern Holarctis (DAHL & ALEXANDER 1976). One of the most cool-adapted species, reaching 80° N, far beyond northern limit of tree-like conifers (DAHL 1967: fig. 81). The species is recorded in all checklists from Europe: Iceland (DAHL 1967); Great Britain (EDWARDS 1924; LAURENCE 1956); Sweden (DAHL 1966, 1967, 1968); Finland, north-eastern Russia (DAHL 1968; PETRAŠIŪNAS & PARAMONOV 2014); Poland (KRZEMIŃSKI 1983; old records from Poland therein); Norway (HÅGVAR & KRZEMIŃSKA 2007); Lithuania (PODENAS 1995; PETRAŠIŪNAS & VISARČUK 2007); The Netherlands (KRZEMIŃSKA 1996a, KRZEMIŃSKA & BEUK 2002); Germany: DAHL (1966, 1999); Switzerland (STARÝ & PODENAS 1995); Austria (THALER 2000); Hungary (KRZEMIŃSKA 2001a); Romania (UJVAROSI & KRZEMIŃSKA 2002). Asia: Yakutia (KRZEMIŃSKA 1996b); East Siberian Sea Island, Chukchi Peninsula (PETRAŠIŪNAS & PARAMONOV 2014); Mongolia (PETRAŠIŪNAS & PODENAS 2011; therein found on alt. 2080 m), Korea (PETRAŠIŪNAS & PODENAS 2017). Northern Canada from Alaska to Labrador: DAHL (1967; therein also records from USA).

Occurrence. Adults exhibit two peaks of occurrence: autumn (IX-XI) and spring (II-V) in Europe which indicate two main generations. However, the data show that specimens can be found throughout winter with a short break for January; one record from Korea is from July ((PETRAŠIŪNAS & PODENAS 2017).

Remarks. Geographic variation in in males and females from North America, Europe and a population from Iceland was widely discussed and illustrated by DAHL (1966, 1967a, b).

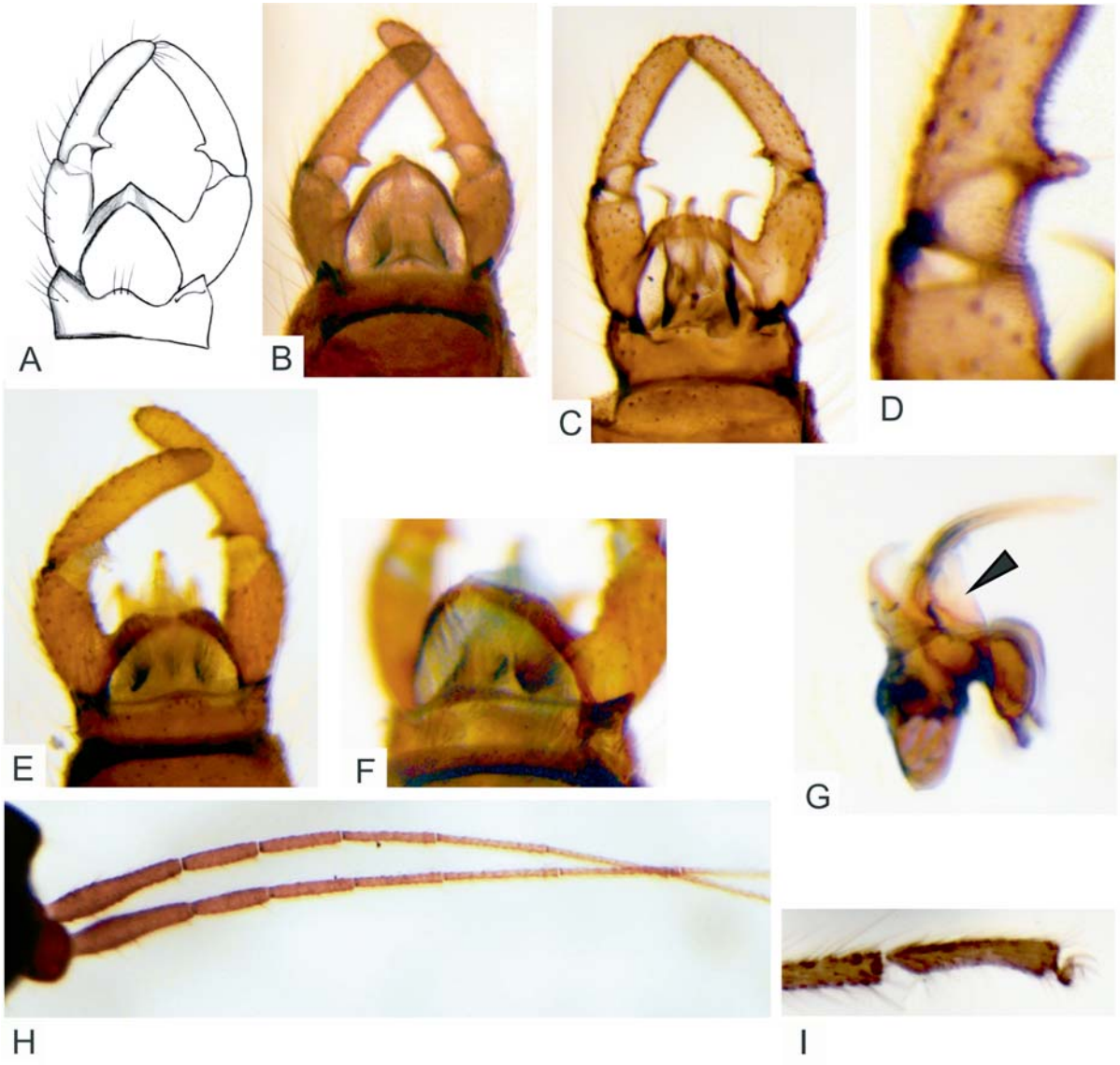


Fig. 1.1. *Trichocera* (*Trichocera*) *hiemalis* (DE GEER), 1776, male: A, drawing of genitalia; B-F, variation in bridges (B, first specimen; C-D, second; E-F, third specimen, prior to and after dyeing); D, basal tubercle on gonostyle, magnified; G, aedeagus (hood arrowed); H, antenna; I, hind tarsal claw.

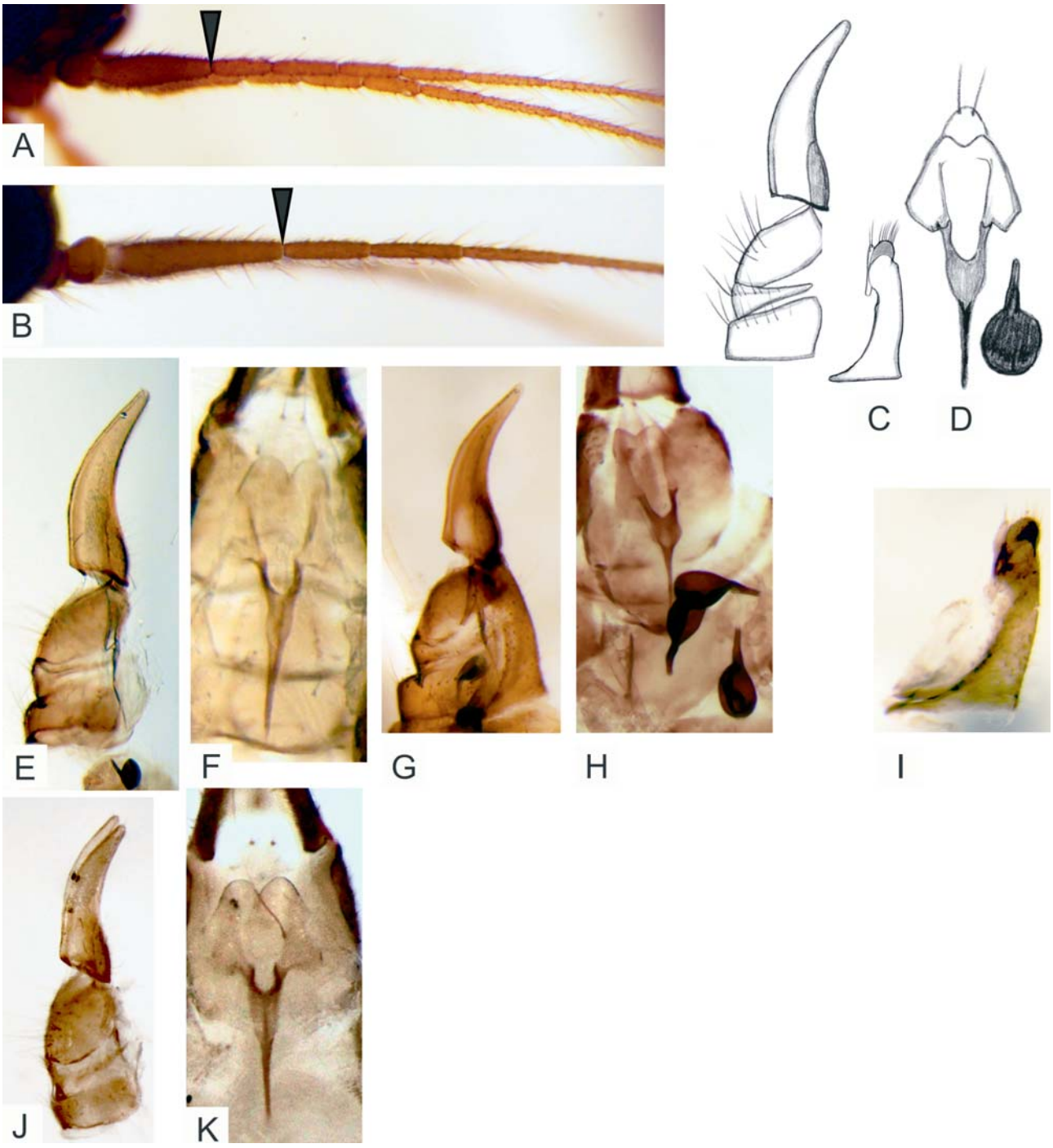


Fig. 1.2. *Trichocera* (*Trichocera*) *hiemalis* (DE GEER), 1776, female: A, B, variation in antennae (arrow: end of f1); C, D, drawing of outer genitalia and plates, respectively; I, sternite 8; E-H, J-K, variation in shapes of ovipositor and genital plate: E-F, first specimen, G-H, second, J-K, third specimen.
Males and females: Poland, Beskid Sądecki Mts., Krynica, 3.IV. 2012 (leg. J. ŁUSZCZAK).

Trichocera (*Trichocera*) *inexplorata* DAHL, 1967

Fig. 2

Trichocera (*Trichocera*) *inexplorata* in: STARÝ 1998

Trichocera (*Metatrichocera*) *inexplorata* in: MARTINOVSKÝ & STARÝ 1988: fig. 7-12 (male)

Trichocera (*Metatrichocera*) *inexplorata* in: DAHL & ALEXANDER, 1976

Metatrichocera inexplorata DAHL, 1967b: Opusc. ent.: 192, fig. 6-11 (male), 20-24 (female, described as *M. sibirica*)

Diagnosis. Antennae thin, flagellomeres cylindrical. Thoracic pleura bare. Male: sternite 9 narrow, very mildly excised; gonocoxite balloon-like, bridge very narrow, extended into acute apex; gonostyle straight, with triangular process medially on mesal face; aedeagal complex of the subgenus *Trichocera* type: parameres are short and fused basally, lateral apodeme declined from parameres. Female: sternite 8 with narrow valves; ovipositor straight, about as long as genital segment, apex obtuse; setulose area flat in lateral view and not delimited with suture; genital plate short; fork widened apically, with small lateral teeth; prongs are short, thin and divergent.

Comparison. Male genitalia, especially gonostyles, are of unique shape. Ovipositor of female may remind those of the *mutica* group, or *T. parva*, but is broader distally, and setulose area is short; shape of genital plate is unique.

Additional description. Antennae thin, long, flagellomeres cylindrical; length of basal 2-3 segments is variable, possibly in result of fusion of f1and f2 (Fig. 2.F, G). Thoracic pleura are bare. Wing (Fig. 2.I): cell d is long and narrow; cell m1 is short; A2 is close to wing margin. Legs very long and thin; tarsal claw in male (Fig. 2. E) c. 1/3 of t5.

Male (Fig. 2.A-G): gonocoxite almost balloon-like, bridge is very narrow and seemingly separate, extended into acute apex; gonostyle is straight, with triangular process medially on mesal face. Aedeagal complex (Fig. 2.D): parameres are short and fused basally, sometimes up to half their length; lateral apodeme is round, declined from parameres.

Female (Fig. 2.I-N): sternite 8 with narrow valves, their free sections are very short (Fig. 2.J, arrow); ovipositor straight, about as long as genital segment, apex obtuse; setulose area almost flat in lateral view (but compare variation in Fig. 2.J and L); area is not delimited with suture, but darker and characteristically circular; genital plate is short, heart-like incised, with narrow lateral portions; foramen large; fork widened apically, with small lateral teeth; prongs are short, thin and divergent. Supragenital plate large, with two bristles (sometimes three, asymmetrically distributed; compare Fig. 2.N). Spermathecae with sclerotized ducts shorter than diameter.

Material examined. Finland, Ks Kuusamo 1969: 20.IX – 1m; 10.X – 13m, 1f; 21.X. – 1m, 1f; 22.XI – 2m, 7f (leg. E. HUTTUNEN). Sweden: Rickleå, Fällstationen, 1971: 2. IX. – 1f; 2. X. – 1f; 7. X. – 4 f (leg. C. DAHL); Messaure Ecol. Station, 1973: 19-24.IX – 1f; 21-24.IX – 3f; 24.IX. – 2m; 1-2.X. – 1m, 2f; 8-15.X. – 1f (coll. C. DAHL). Czech Republic, Moravia, Slatinice Kosir 24.X. 1993 – 5m, 6f (coll. et det. J. STARÝ).

Distribution. *T. inexplorata* was considered a boreo-alpine species, but may have a wide, continuous distribution in Europe, as is suggested by its occurrence in the lowlands of Lithuania. Described from Sweden, and known from Finland and Lithuania (PODENAS 1991, PETRAŠIŪNAS & PARAMONOV 2014), and Central Europe: Slovakia, Germany, (MARTINOVSKÝ & STARÝ 1988, STARÝ 2001), Switzerland (STARÝ & KRZEMIŃSKA 1998, STARÝ & PODENAS 1995), Czech Republic, Slovakia (STARÝ 1997); Germany (DAHL 1999). Most Northeastern European localities are in Russia: Murmańsk, Archangelsk, Varlam Is., St Petersburg (PETRAŠIŪNAS & PARAMONOV 2014).

Occurrence. Adults were collected IX-XII.

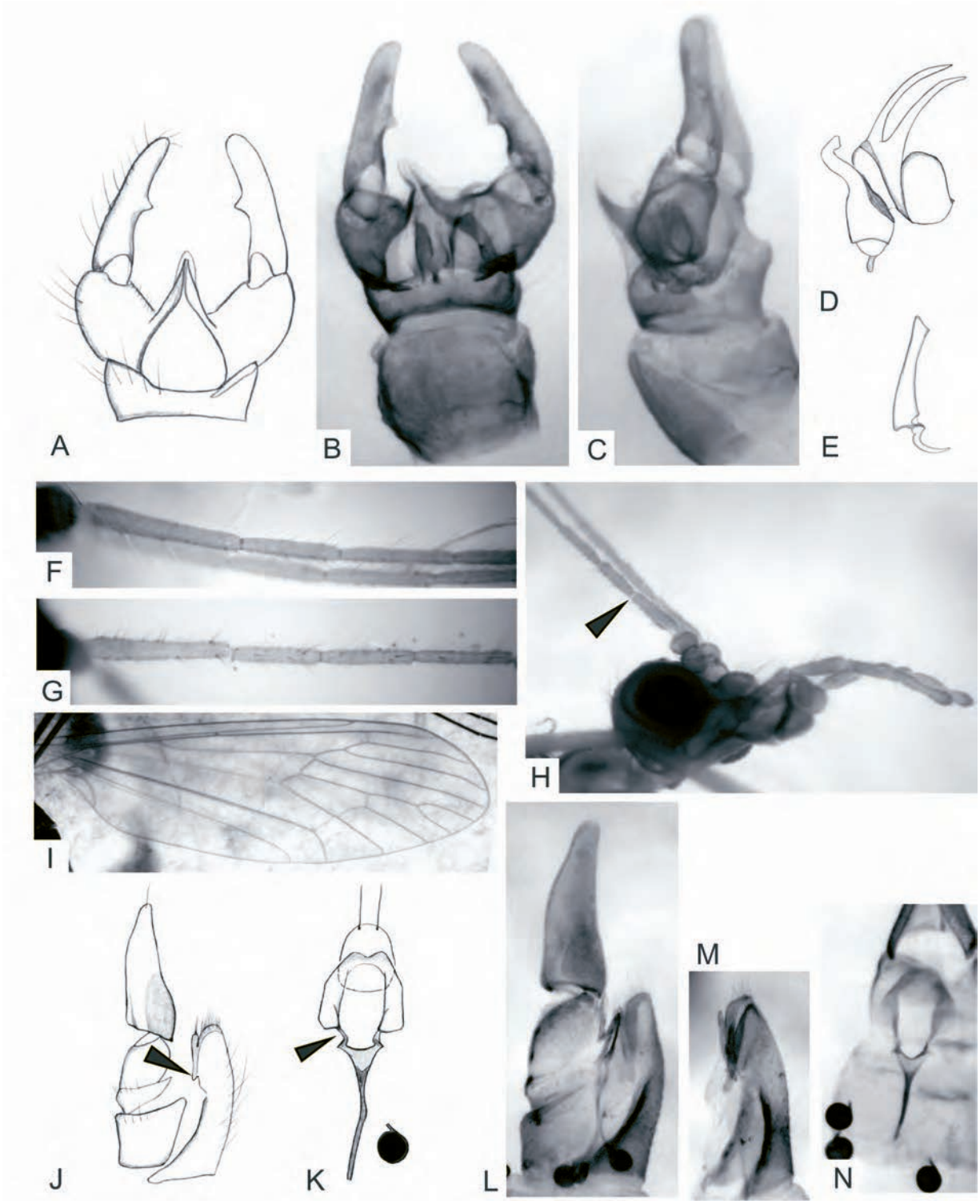


Fig. 2. *Trichocera* (*Trichocera*) *inexplorata* DAHL, 1967. A-F, H male: A, drawing of genitalia; B, C, genitalia ventrally and laterally, resp.; D, aedeagal complex; E, hind tarsal claw; F, antenna; H, palpi and variation in length of flagellomeres (arrow: end of f1). G, I-N, female: I, wing; G, antenna; J, K, drawing of genitalia and genital plates (arrows: short free section of hypogynal valves in J; shape of prongs in K); L, genitalia laterally; M, sternite 8; N, genital plates.
Male, female: Finland, Ks Kuusamo 10.X. 1969 (leg. J. VIRAMO).

Trichocera (*Trichocera*) *major* EDWARDS, 1921

Fig. 3

Trichocera major in: KRZEMIŃSKA 2001a: fig. 1-8 (male), 10-17 female)

Trichocera (*Trichocera*) *major* in: STARÝ 1998

Trichocera major in: KRZEMIŃSKI 1983: fig. 8-10 (male)

Trichocera (*Trichocera*) *major* in: DAHL & ALEXANDER, 1976

Trichocera major in: DAHL 1973: fig. 16 (larva)

Trichocera major in: DAHL 1966: fig. 18, 23, 28 (male), 49, 59 (female), 68, 72 (larva)

Trichocera major in: EDWARDS 1938: fig. 31a (male), 31k (female)

Trichocera major EDWARDS, 1921: Trans. Ent. Soc. Lond.: 229.

Diagnosis. Large species of wing size up to 13 mm. Antennae of male and female are thin, flagellomeres cylidrical. Pleura bare. Tarsal claw in male small, c. 1/3 of t5. Male: sternite 9 with small medial protuberance; bridge massive, low, with small medial beak; gonostyles very long, more or less S-shaped, parallel-sided; aedeagal complex of subgenus *Trichocera* type, with short, fused parameres and lateral apodemes declined from parameres. Female: ovipositor very long, c. 2x genital segment, sabre-like; genital plate with large foramen and narrow lateral portions; genital fork with prongs short, straight and widely divergent (angle c. 100°); supragenital plate with two bristles.

Comparison. Both male and female are very characteristic, not to be mistaken with other species.

Additional description. Antennae (Fig. 3.G, H) are long and thin, flagellomeres elongated and cylidrical. Wings with R2+3+4 usually much shorter than R2+3. Pleura bare. Hind tarsal claw small (Fig. 3.E), c. 1/4 of t5.

Male genitalia (Fig. 3. A-D, F). Sternite 9 broad, with central beak provided with few setae; gonocoxal bridge low, triangular, massive, with small beak; gonostyle much longer than gonocoxite, more or less S-shaped (for variation in this character see KRZEMIŃSKA 2001a). Aedeagal complex (Fig. 3.F) of the subgenus *Trichocera* type, with very short parameres fused up to half their length with a transparent membrane; lateral apodemes declined from parameres.

Female genitalia (Fig. 3.I-M). Sternite 8 with narrow hypogynal valves (Fig. 3.I, K), their lateral portions are short; tergite 10 is characteristically large in ventral and lateral views, exceeding tergites 8th and 9th combined (Fig. 3.I, J). Ovipositor longest among the genus and the family, 2x as long as genital segment, or more, narrow and straight; mildly curved only in distal 1/3; setulose area prominent, short. Genital plate (Fig. 3.L, M) with large, oval foramen and very narrow lateral portions; genital fork with prongs short, widely divergent; sometimes armoured with small lateral protuberations. Supragenital plate with two bristles widely to closely set apart (Fig. 3.L). Spermathecae with sclerotized ducts shorter than diameter.

Material examined is listed in papers with my autorship; see below.

Distribution. The species was described from Great Britain and has a rich record from Palearctic region, due to its remarkable size and characteristic appearance. Europe: Great Britain (EDWARDS 1921), Ireland (ASHE & O'CONNOR 1989), Finland (FREY & STORÅ 1941; DAHL 1968); Norway (HÅGVAR & KRZEMIŃSKA 2007), Sweden (DAHL 1966, 1967b); Russia (vicinity of St. Petersburg and Moscow; Caucassus Mts, 2700 m, on snow, highest altitude recorded for this species!: PETRAŠIŪNAS & PARAMONOV 2014); Netherlands (KRZEMIŃSKA 1996a); Lithuania (PETRAŠIŪNAS & VISARČUK 2007); Sweden, Ukraine, Switzerland, Spain (KRZEMIŃSKA 2001a); France (KRZEMIŃSKA & BRUNHES 1991); Poland (KRZEMIŃSKI 1983); Germany (DAHL 1999); Austria (THALER 2000); Romania (UJVAROSI & KRZEMIŃSKA 2002); Hungary (KRZEMIŃSKA 2001c); France (KRZEMIŃSKA & BRUNHES 1991); Spain (DAHL et al. 2002; CARLES-TOLRÁ et al. 2006). Asia: Japan (NAKAMURA 2014), Korea (PETRAŠIŪNAS & PODENAS 2017).

Occurrence. Adults appear IX-XII, I, females are frequently found walking on snow. Males form small swarms of few specimens.

Remark. A similar species, *Trichocera setosivena* ALEXANDER, 1927, occurs in North America. It was synonymized with *T. major* by DAHL & ALEXANDER (1976), and resurrected from synonymy by KRZEMIŃSKA (2001a). Thus, *T. major* is known only from the Palaearctis.

Trichocera major had apparent ancestors in Eocene: *Trichocera* (*T.*) *antiqua* DAHL, 1971 and *T.* (*T.*) *primaeva* DAHL, 1971, described from Baltic amber. The male of *T. major* is very similar to first mentioned species (for comparison see KRZEMIŃSKA et al. 2009: fig. 71-75), while the female is superficially almost identical with *T.* (*T.*) *primaeva* DAHL, 1971 (op. cit: fig. 91-92). It is probable that these fossil male and female were conspecific.

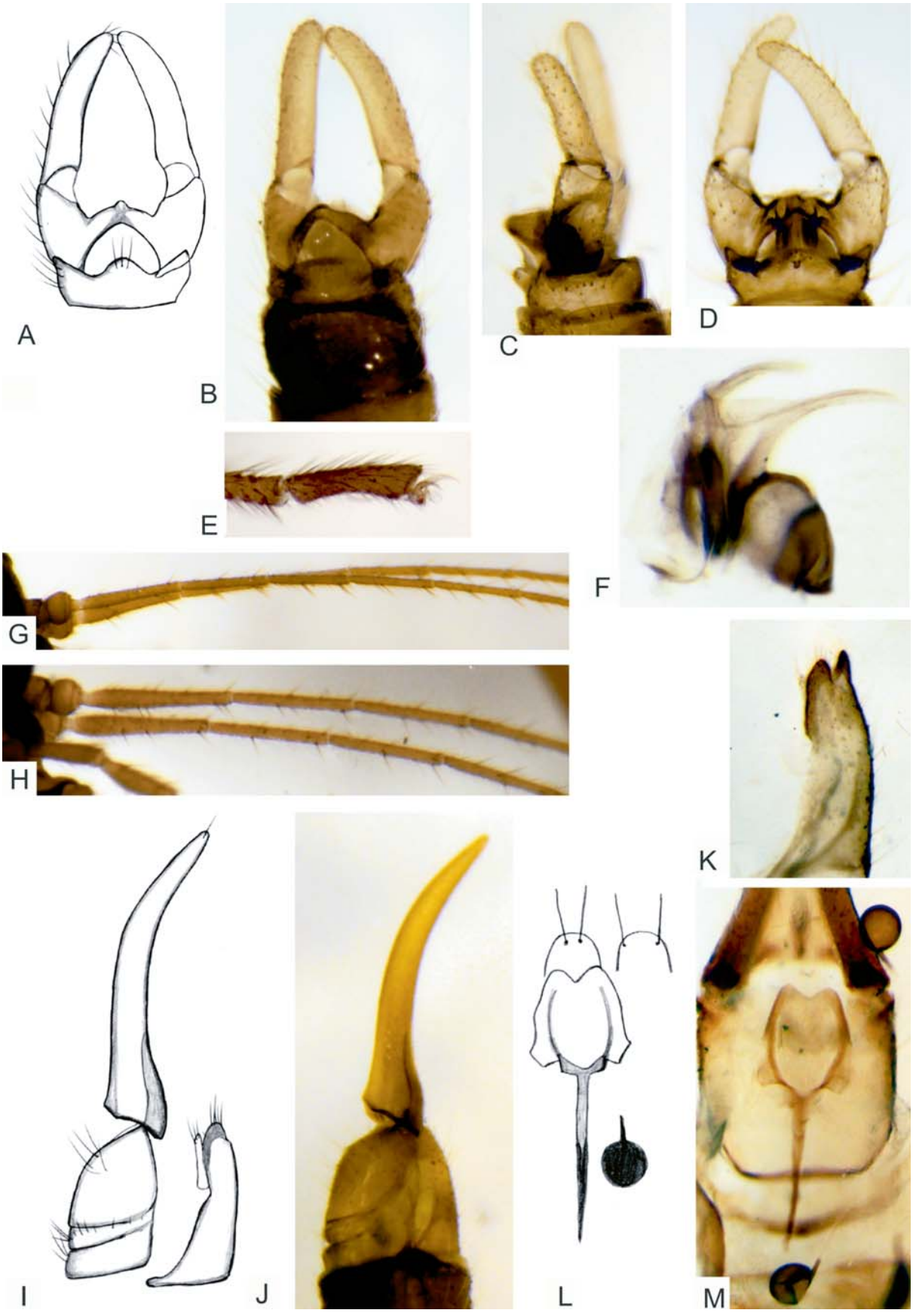


Fig. 3. *Trichocera* (*Trichocera*) *major* EDWARDS, 1921. A-G, male: A, drawing of genitalia; B, C, D, genitalia in lateroventral, lateral and ventral views, respectively; E, hind tarsal claw; f, aedeagal complex; G, antenna. H-M, female: H, antenna; I, drawing of genitalia laterally; J, genitalia; K, sternite; L, M, genital plates, drawing and photo.
Male and female: Poland, Beskid Sądecki Mts., Krynica, Mochnaczka Wyżna, 1-10.I. 2012 (leg. J. ŁUSZCZAK).

Trichocera (*Trichocera*) *marocana* DRIAUACH, KRZEMIŃSKA & BELQAT, 2015

Fig. 4.

Trichocera (*Trichocera*) *marocana* DRIAUACH, KRZEMIŃSKA & BELQAT, 2015: Zootaxa 4059: 182, fig. 2 (male)

Diagnosis (after DRIAUACH et al. 2015). Antenna: f1 almost twice as long as f2; thoracic pleura bare. Tarsal claw of hind leg small, ca. 1/4 of t5. Male genitalia: sternite 9 broad, posterior margin straight, set with bristles; gonocoxal bridge divided; gonostyle with basal tubercle; aedeagal complex of the subgenus *Trichocera* type, with lateral apodemes inclined to basal apodemes; parameres relatively long and fused only in basalmost section; tip of aedeagus broad, open. Female unknown.

Comparison. Due to the divided bridge, *T.* (*T.*) *marocana* seems to belong to the subgenus *Saltrichocera*, and especially reminds *T.* (*S.*) *sardiniensis* which occurs in same region. Two species differ in the aedeagal complex, which in *T.* (*T.*) *marocana* has lateral apodemes inclined to basal ones, and the aedeagus with very wide, open tip, while in *T.* (*S.*) *sardiniensis* lateral apodemes are perpendicular to aedeagus' long axis and narrow tip of aedeagus.

Additional description. No other specimens were found since the description of this species. Herein, additional photographs are presented: antenna and palpus (Fig. 4.G), details of divided bridge (Fig. 4.D), and wing (Fig. 4.H). Male genitalia are characterized by low bridge, small when compared to long gonostyles, triangular in genuine specimens (Fig. 4.C) and more rounded after preparation (Fig. 4.A, B). Wide tip of aedeagus and lateral apodemes are visible after preparation without necessity of dissecting (Fig. 4.E).

Material examined. Holotype and paratype, as listed in DRIAUACH et al. (2015).

Distribution. Known only from the type locality in Morocco, the Rif Mts. range; collected in XI.

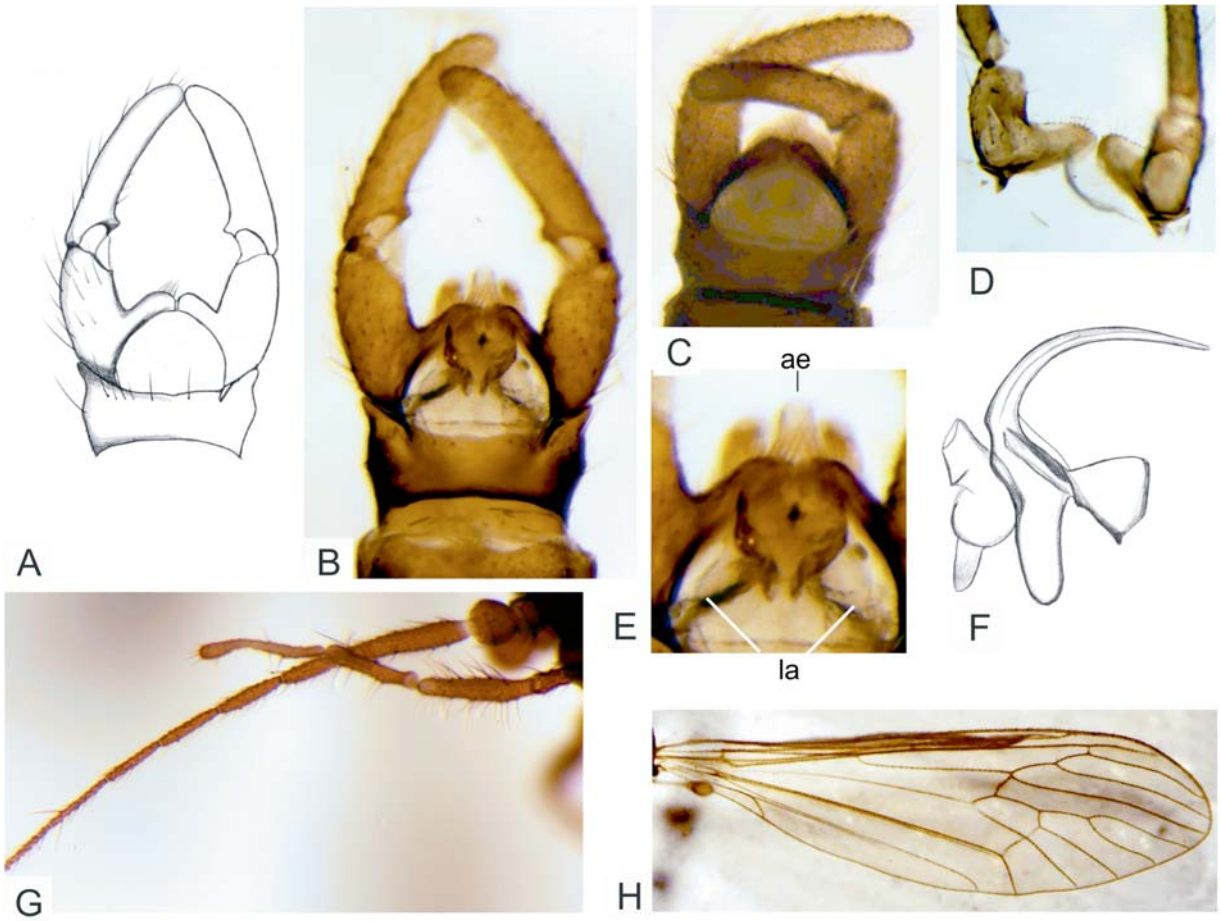


Fig. 4. *Trichocera* (*Trichocera*) *marocana* DRIAUACH, KRZEMIŃSKA & BELQAT, 2015, male: A, drawing of genitalia; B, C, genitalia of paratype after preparation (B) and in genuine specimen (C); D, isolated bridge; E, details of B, magnified: note tip of aedeagus and lateral apodemes seen through membrane; F, drawing of aedeagal comlex; G, palpus and antenna; H, wing.
Males: D, H, holotype, Morocco, Affluent Oued Akrir, 23.XI. 2012 (leg. O. DRIAUACH & B. BELQAT), B, C, E-G, paratype, same data.

Trichocera* (*Trichocera*) *sibirica EDWARDS, 1920

Fig. 5.1 (male), 5.2 (female)

Trichocera (*Trichocera*) *sibirica* in: STARÝ 1998

Trichocera (Metatrichocera) sibirica in: MARTINOVSKÝ & STARÝ 1988: fig. 19-24 (male)

Trichocera (Metatrichocera) sibirica in: DAHL & ALEXANDER, 1976

Metatrichocera sibirica in: DAHL 1967b: 190, fig. 1-5 (male)

Metatrichocera sibirica in: DAHL 1966: 98

Trichocera siberica in: ALEXANDER 1938: 132

Trichocera sibirica EDWARDS, 1920: Ann. Mag. Nat. Hist.: 432

Diagnosis. Antennae and legs thin and long; thoracic pleura elongated, bare. Male: bridge triangular, expanded and narrow, with apex trasformed into obtuse process; gonostyle with two hook-like processes on mesal face in 1/3 and 2/3 of gonostyle's length; aedeagal complex with short, partially fused parameres. Female: sternite 8 with valvae of medium width; ovipositor longer than genital segment, mildly curved, apex obtuse; setulose area c. 1/3 of ovipositor's length, rather flat; genital plate with narrow lateral portions and large foramen; genital fork without prongs, only dilated into small triangle; supragenital plate with two bristles.

Comparison. The male has genitalia of unique shape; female's ovipositor is characteristic by its distal portion wider than in other trichocerids; thin, cylindrical flagellomeres indicate the subgenus other than *Saltrichocera*.

Additional description. Antennae thin and long in male and female, first flagellomeres almost as thin as proceeding ones; palpi shorter than head length (Fig. 5.1.G, 5.2.A). Thoracic pleura characteristically elongated (Fig. 5.2.E), bare. Male genitalia (Fig. 5.1.A-F, H, I): tergite 9 narrow, with short medial incision (Fig. 5.1.H). Gonocoxite much wider than gonostyle, but not balloon-like; bridge triangular, expanded and narrow, with apex trasformed into obtuse process extending to inside (Fig. 5.1.D); note the difference in shape of apex in Europaean and Asiatic specimens (Fig. 5.1.C and I, respectively); gonostyle with two hook-like processes on mesal face in 1/3 and 2/3 of gonostyle's length. Aedeagal complex (Fig. 5.1E, F) with short, partially fused parameres.

Female genitalia (Fig. 5.2.B-D, F-I): sternite 8 with valves of medium width and very short, lateral portions (Fig. 5.2.C,F,G); ovipositor longer than genital segment, mildly curved, apex obtuse (Fig. 5.2.B,D); setulose area c. 1/3 of ovipositor's length, rather flat. Genital plate (Fig. 5.2.H,I) with narrow lateral portions and large, oval foramen; genital fork without prongs, only dilated into small triangle; supragenital plate with two bristles.

Material examined. Finland, Ks Kuusamo 1969: 25.IX – 1m; 10.X – 12m (leg. E. HUTTUNEN). Slovakia: W. Tatra Mts., Spálena Dolina, alt. 1450-1750 m; 9.X. 1996 – 1m, 2f (leg. et det. J. STARÝ). Asia, Yakutia, Aldan River: n. Dhzebarika Kaya, 27.VIII.1990 – 2m (leg. V. ZHERIKHIN); left coast 63 km of Krest-Kholtzhi, 6.IX. 1990 – 1m (leg. I. SUKACHEVA).

Distribution. Described from Asia (Irkutsk Province, Russia; EDWARDS 1920); Yakutia, see material listed above; Korea (ALEXANDER 1938, PETRAŠIŪNAS & PARAMONOV 2017). Europe: Sweden (DAHL 1967b), Finland (DAHL 1968), Germany (DAHL 1999), Czech Republic (MARTINOVSKÝ & STARÝ 1988), Slovakia (STARÝ 1997); Romania (UJVAROSI & KRZEMIŃSKA 2002).

Occurrence. Adults were collected in late summer-autumn months.

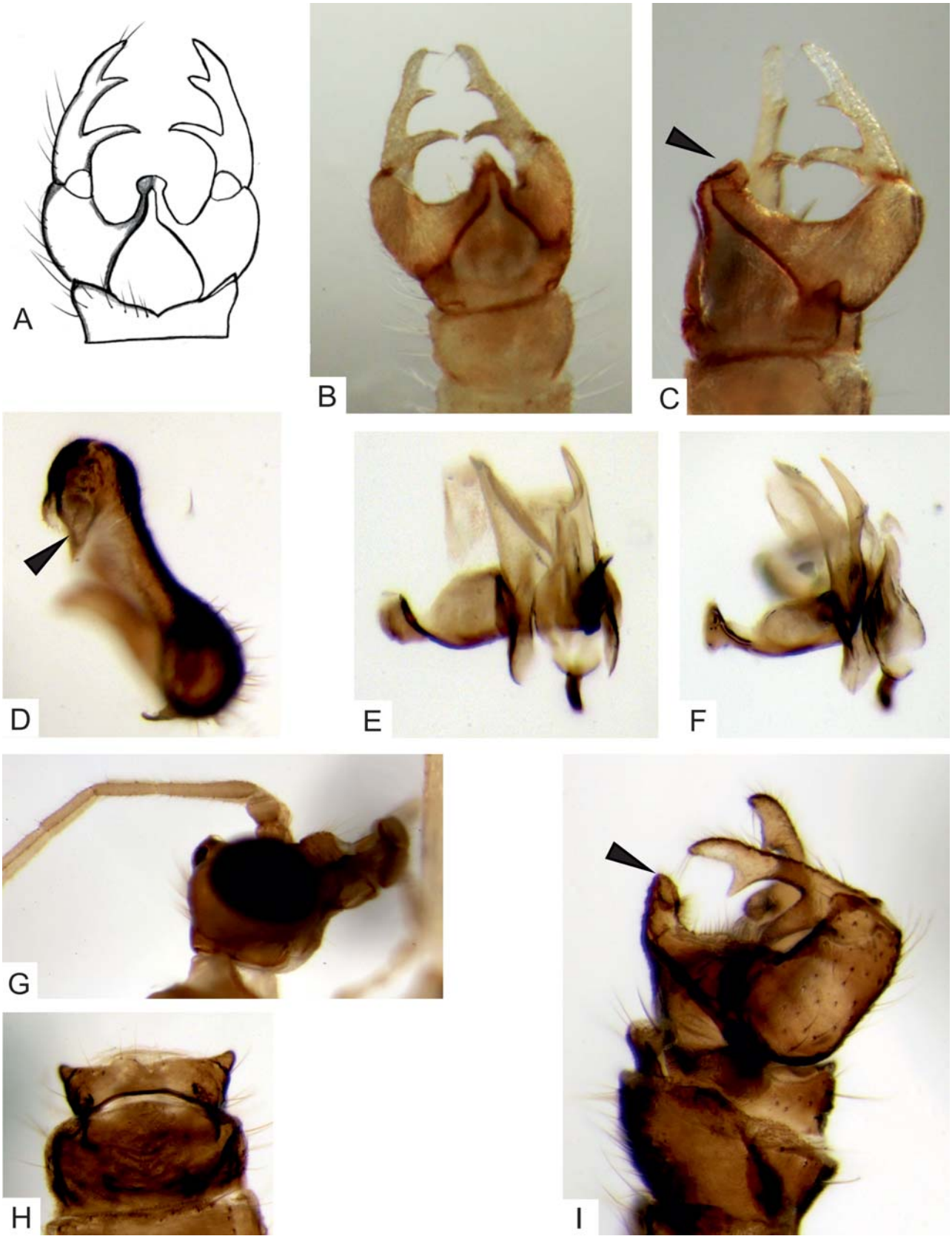


Fig. 5.1. *Trichocera* (*Trichocera*) *sibirica* EDWARDS, 1920, male: A, drawing of genitalia; B, C, genitalia ventrally and laterally (Sweden); D, bridge from apical view (arrow: outgrowth inside); E, F, aedeagal complex in lateroventral and lateral views, respectively; G, basal antenna; H, tergite 9; I, male from Yakutia (in C and I difference in apex of bridge is arrowed).

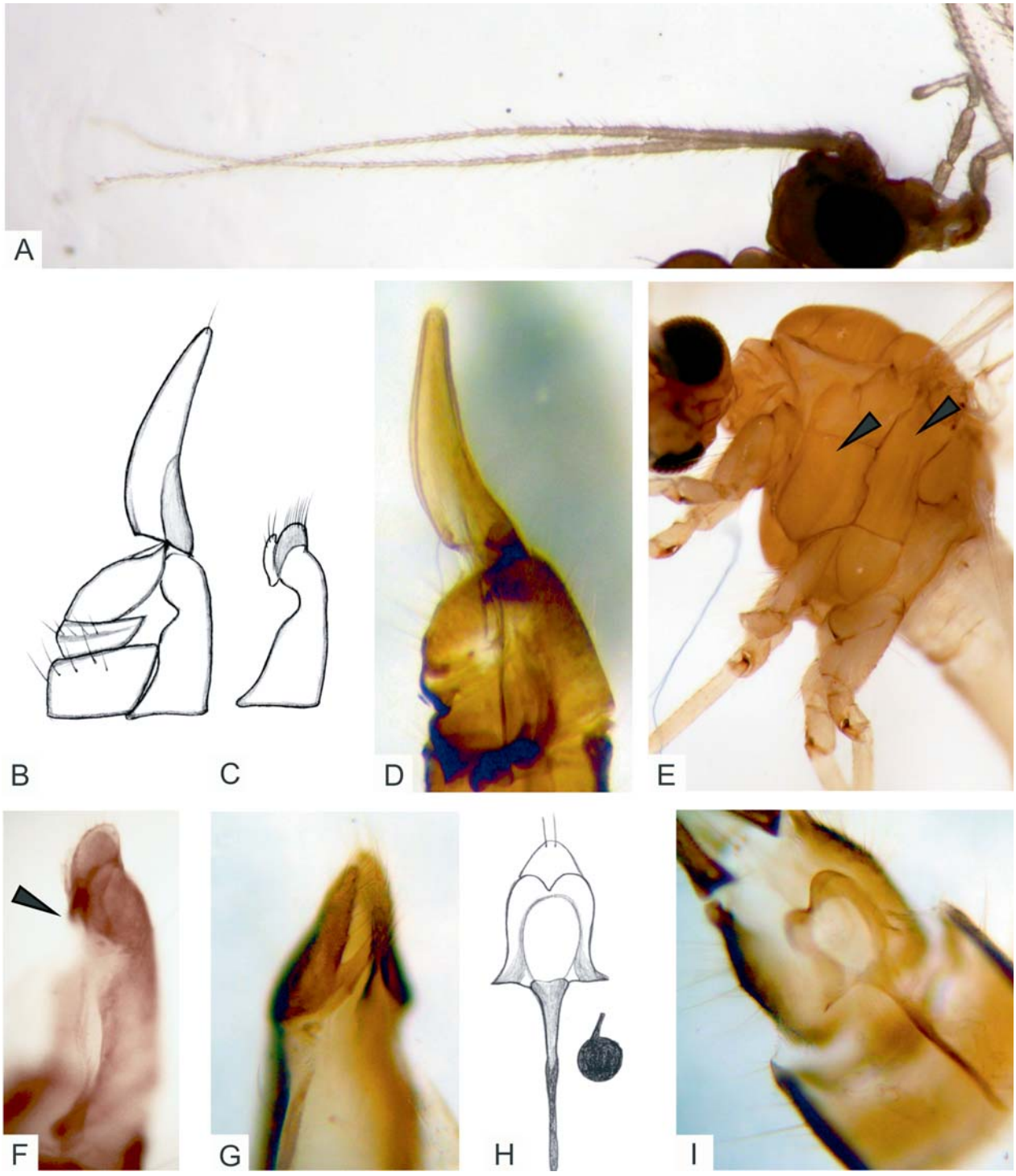


Fig. 5. 2. *Trichocera* (*Trichocera*) *sibirica* EDWARDS, 1920, female: A, antenna; B, C, drawings of genitalia and sternite 8; D, genitalia; E, thorax (note elongated katepisternum and anepisternum, arrowed); F, sternite 8 (arrow: very short lateral portion of hypogynial valve); G, hypogynal valves, inside view; H, I, genital plates, drawing and photo.
Males: 1. B-C, G, Finland: Ks Kuusamo, 10.X. 1969 (leg. J. VIRAMO); D, H, Slovakia, data as in female. I, Asia, Yakutia, Aldan River n. Dhzebarika Kaya, 27.VIII.1990 (leg. V. ZHERIKHIN). Female: Slovakia, W. Tatra Mts., Spálena Dolina, alt. 1450-1750 m; 9.X. 1996 (leg. et det. J. STARÝ).

Subgenus: ***Metatrichocera*** DAHL, 1966

Trichocera (Metatrichocera) in: DAHL & ALEXANDER, 1976

Metatrichocera DAHL, 1966b: Opusc. ent. 31: 97.

Diagnosis as in KRZEMIŃSKA (2002a), briefed here as follows. Male: gonocoxite much wider than gonostyle; bridge transformed; gonostyle with large process(es); aedeagal complex: all parts are more delicate and elongated that in other subgenera; parameres close to each other, long, thin, raised high over lateral apodemes; lateral and basal apodemes arranged as in *Saltrichocera*. For females no differences can be listed in relation to subgenera other than *Staryia*.

Type species: *Trichocera* (*Metatrichocera*) *lutea* BECHER, 1886, by original designation of DAHL (1966). To the list of world species provided by KRZEMIŃSKA (2002a) four species are added: *T.* (*M.*) *unica* KOLCSÁR, 2018 (following original assignation to the subgenus; KOLCSÁR et al. 2018), and three from North America: *T. idahoensis* PRATT, 2003, *T. banffi* PRATT, 2003, and *T. arnaudi* PRATT, 2003; two first mentioned are herein (Table 1) tentatively ascribed to *Metatrichocera*, based on balloon-like gonocoxites; the third is left without subgeneric ascription.

Remark. Discussion on the diagnosis of *Metatrichocera* was conducted by DAHL (1966, 1971; DAHL & ALEXANDER 1976), STARÝ (1998), NAKAMURA & SAIGUSA (1997); these efforts are summarized in KRZEMIŃSKA (2002a). The genus awaits phylogenetic revision, but morphological features seem not sufficient for resolving its presumed paraphyly.

Trichocera (***Metatrichocera***) ***forcipula*** NIELSEN, 1920

Fig. 6

Trichocera (*Metatrichocera*) *forcipula* in KOLCSÁR et al. 2018: fig. 4 (male), 5 (female)

Trichocera (*Metatrichocera*) *forcipula* in MARTINOVSKÝ, STARÝ 1988: fig. 1-6 (male)

Trichocera (*Metatrichocera*) *forcipula* in: KRZEMIŃSKI 1983: fig. 1-6 (male)

Trichocera (*Metatrichocera*) *forcipula* in: DAHL & ALEXANDER 1976

Metatrichocera forcipula in: DAHL 1973: fig. 9, 17 (larva), fig. 24 (male, pupa), fig. 30-31 (female, pupa)

Metatrichocera forcipula in: DAHL 1966b, figs. 2, 6, 11 (male), 35, 39, 43 (female)

Trichocera forcipula NIELSEN, 1920: Entomol Medd. 13: 160, fig. 1-3, 9 (male, female, wing)

Diagnosis. Male: gonocoxite balloon-like, bridge massive, triangular, apex acute; gonostyle crescent-like, at dorsal side with large, bulbous process directed to inside. Female: sternite 8 with darker strips along lateral margins; ovipositor rather narrow, as long as genital segment, evenly curved, setulose area reaching almost to tip but not delimited with suture. Genital plate not incised apically; supragenital plate with two bristles.

Comparison. Male is very characteristic and cannot be mistaken with other species; shape of female genitalia may be somewhat similar to *T.* (*M.*) *lutea*; see remarks to this species.

Additional description. Antenna slender in male and female (Fig. 6.F, G). Wing (Fig. 6.H) with narrow, triangular d cell. Tarsal claw in male very small, c. 1/4 of t5 (Fig. 6.D).

Male genitalia (Fig. 6A-C, E). Sternite 9 narrow, with small medial incision; gonocoxite large, balloon-like, bridge small but massive, triangular, apex acute. Gonostyle parallel-sided, strongly curved to inside, at dorsal side with basal large, bulbous process directed to inside (Fig. 6.C, arrows); processes of both gonostyles overlap. Aedeagal complex (Fig. 6.E): parameres long, close together; basal apodeme massive, subtriangular, broadly connected with lateral apodeme which is very narrow, extended toward end of paramere.

Female genitalia (Fig. 6.I-M): sternite 8 with darker strips along lateral margins (Fig. 6.I-K); hypogynal valves with reduced lateral portions (Fig. 6.I, arrow), strongly sclerotized laterally, as in *T.* (*M.*) *lutea*. Ovipositor rather narrow beyond base, as long as genital segment, evenly curved, setulose area broad basally, reaching to mid ovipositor or farther, but poorly delimited. Genital plate not incised apically (Fig. 6.M); supragenital plate with two bristles.

Larvae and pupae were described by DAHL (1973).

Material examined is listed in KRZEMIŃSKA & BRUNHES (1991; France) and KRZEMIŃSKA (2001c; Hungary). Poland: KRZEMIŃSKI (1983); Bieszczady Mts., Ustrzyki G., 2.X. 1983 – 3m, 3f (W & EK)

Distribution. Described from Denmark. Recorded from entire Europe: Sweden (DAHL 1966b), Russia (STACKELBERG 1951), Lithuania (PODENAS 1993; PETRAŠIŪNAS & VISARČUK 2007), Poland (KRZEMIŃSKI 1983), Czech Republic (MARTINOVSKÝ & STARÝ 1988), Slovakia (STARÝ 1997, 2009); Germany (DAHL 1992; SCHACHT 2000), France (THOMAS & VAILLANT 1977; KRZEMIŃSKA & BRUNHES 1991), Belgium (MORTELMANS & DEKEUKELEIRE 2012), Switzerland (BANGERTER 1948; STARÝ & KRZEMIŃSKA 1998), Hungary (KRZEMIŃSKA, 2001), Bulgaria, Serbia (KOLCSÁR et al. 2018). Not known outside Europe.

Occurrence. Adults were collected IX-XI; males form swarms.

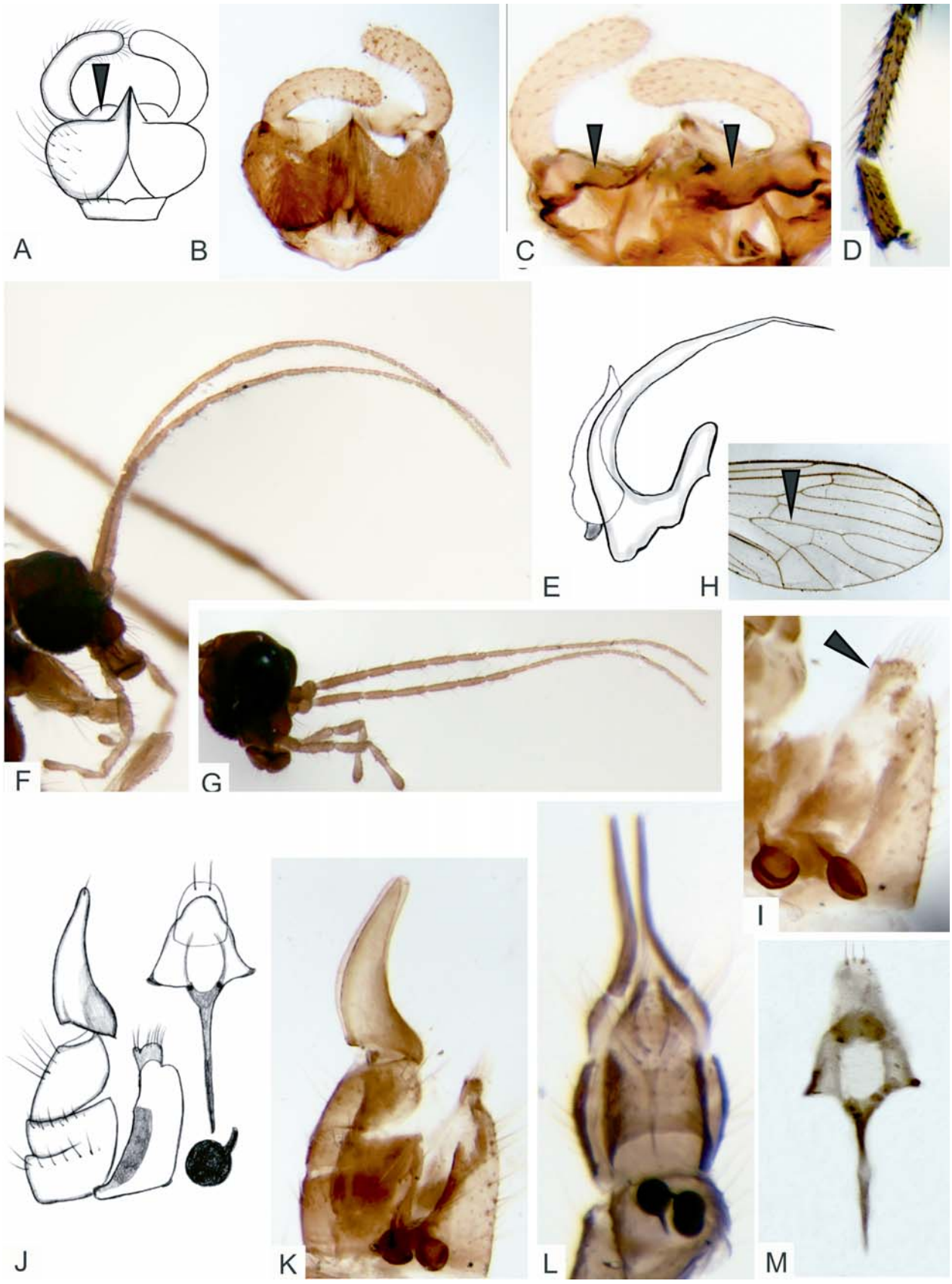


Fig. 6. *Trichocera* (*Metatrichocera*) *forcipula* NIELSEN, 1920. Male (A-F), female (G-M): A, drawing of genitalia (arrow: part of dorsal process of gonocoxite, magnified in C); B, genitalia in ventral view; C, process of gonostyle, dorsal view; D, hind tarsal claw; E, aedeagal complex; F, G, male and female antenna, respectively; H, wing fragment (narrow d cell is indicated); I, sternite 8 (reduced hypogynal valva is indicated); J, drawing of genitalia and genital plate; K, L, genitalia laterally and ventrally, respectively; M, genital plates.
Male and female: France, Massif Central; male, Chambedaze 20.X.-2.XI. 1981; female, Chaudefoir 18.X. 1987 (both leg. H. BRUNHES).

Trichocera (*Metatrichocera*) *gigantea* DAHL, 1967

Fig. 7.1 (male), 7.2 (female)

Trichocera (*Metatrichocera*) *gigantea* in: KRZEMIŃSKA 2020: fig. 3 (female)

Trichocera (*Metatrichocera*) *gigantea* in: DAHL & ALEXANDER 1976

Metatrichocera gigantea DAHL, 1967: Opusc. ent. 32: 195; fig. 15-19 (male), 12-14 (female, misidentified; see *T.* (*Staryia*) *muelleri* KRZEMIŃSKA 2020).

Diagnosis. Revised description of female was recently provided (KRZEMIŃSKA 2020) and is repeated herein.Wings with spots on r-m. Antennae: flagellomeres cylindrical, thin and long. Genitalia, male: sternite 9 expanded into large, tubular projection dilated laterally at end; gonocoxites baloon-like; gonostyle narrow, with basal process almost as long as remainder of gonostylus and directed to inside; aedeagal complex with thin parameres; lateral apodemes long, narrow; basal apodemes long and wide. Female: ovipositor slender, longer than genital segment, gently curved at midlength. Genital plate heart-like incised, two prongs of fork are short, with small angular extensions. Supragenital plate with two bristles.

Comparison. The female is very similar to *T.* (*M.*) *mackenzie* DAHL, 1967 in having a long ovipositor and a similar genital plate; in the latter the extensions of genital fork are longer, and the hypogynal valves are much wider. The easily observed difference between both species is a spotted wing in *T.* (*M.*) *gigantea*. Males of both species are also similar; their genitalia differ mainly by the shape of a large projection of sternite 9.

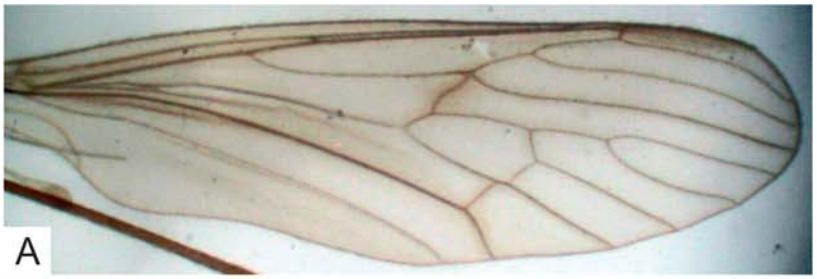
Additional description was provided in KRZEMIŃSKA (2020); female (Fig. 7.2) was re-described based on specimens from Yakutia; male from Finland (Fig. 7.1A-H) and from Yakutia (Fig. 7.1I-J) are presented here. Tarsal claw (Fig. 7.1C) in male is very small, c. 1/6 of hind t5.

Material examined. Specimens from Yakutia (current name: Sakha Republic of the Russian Federation), at the Aldan River are listed in KRZEMIŃSKA (2020). Sweden: Messaure, Kaltisjokk, 3-10.09.1973 – 15m, 8-15.10.1973 – 9m (coll. Ch. DAHL). Finland: Ks Kuusamo, 29.08.1983 - 1m (coll. J. VIRAMO).

Distribution of this species seems continuous across the northern regions of Eurasia, from Scandinavia to the Far East of Asia. Records in Europe: Scandinavia (Sweden: DAHL 1967; Finland: DAHL 1968), Russia: vicinity of Murmańsk (PETRAŠIŪNAS & PARAMONOV 2014). Asia: arctic tundra (LANTSOV & TSCHERNOV 1987), Mongolia (PETRAŠIŪNAS & PODENAS 2011) and Yakutia at the Aldan River (KRZEMIŃSKA 2020).

Occurrence. Specimens in Scandinavia were captured in IX; in Mongolia and Yakutia in VIII. The highest altitude, 1709 m, was noted in Mongolia by PETRAŠIŪNAS & PODENAS (2011).

Fig. 7.1. *Trichocera* (*Metatrichocera*) *gigantea* DAHL, 1967, male: A-H, Sweden, Messaure; I-J, Yakutia, Aldan River. A, wing; B, basal antenna; C, hind tarsal claw; D-F, genitalia in ventral, lateral and apical views, resp.; G-H, aedeagus in lateral and ventral view, resp. I-J, genitalia in lateral and ventral view, respectively (gsp, process on gonostyle; other abbreviations as in Introduction: Fig. 0.2).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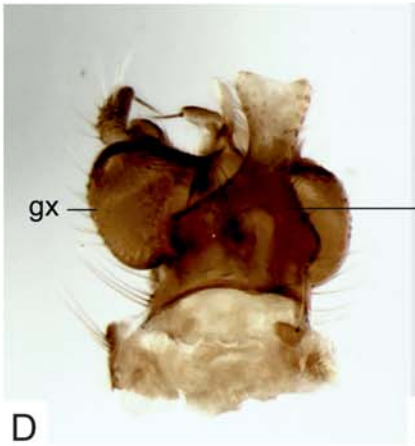
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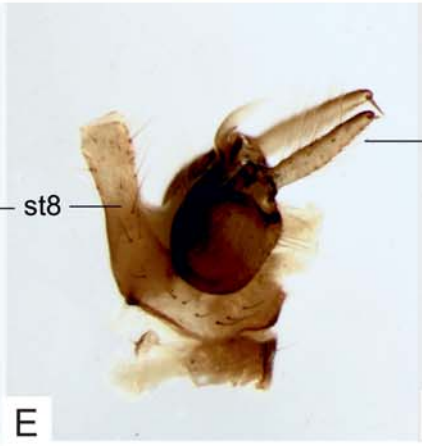
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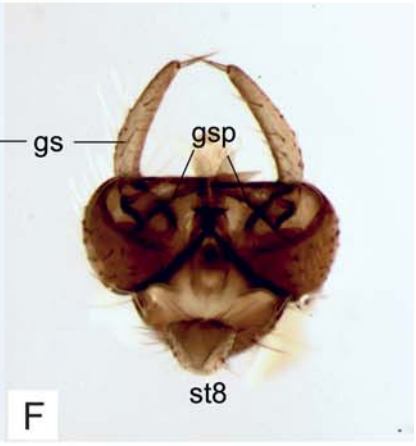
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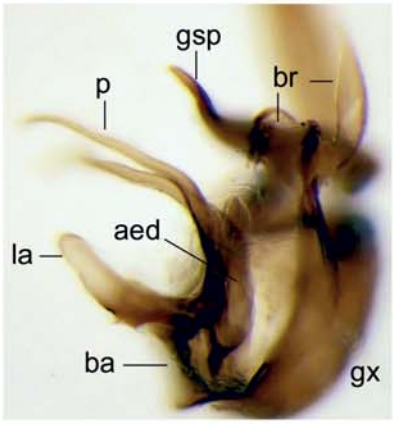
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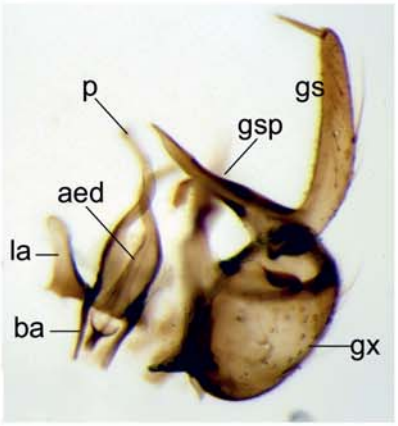
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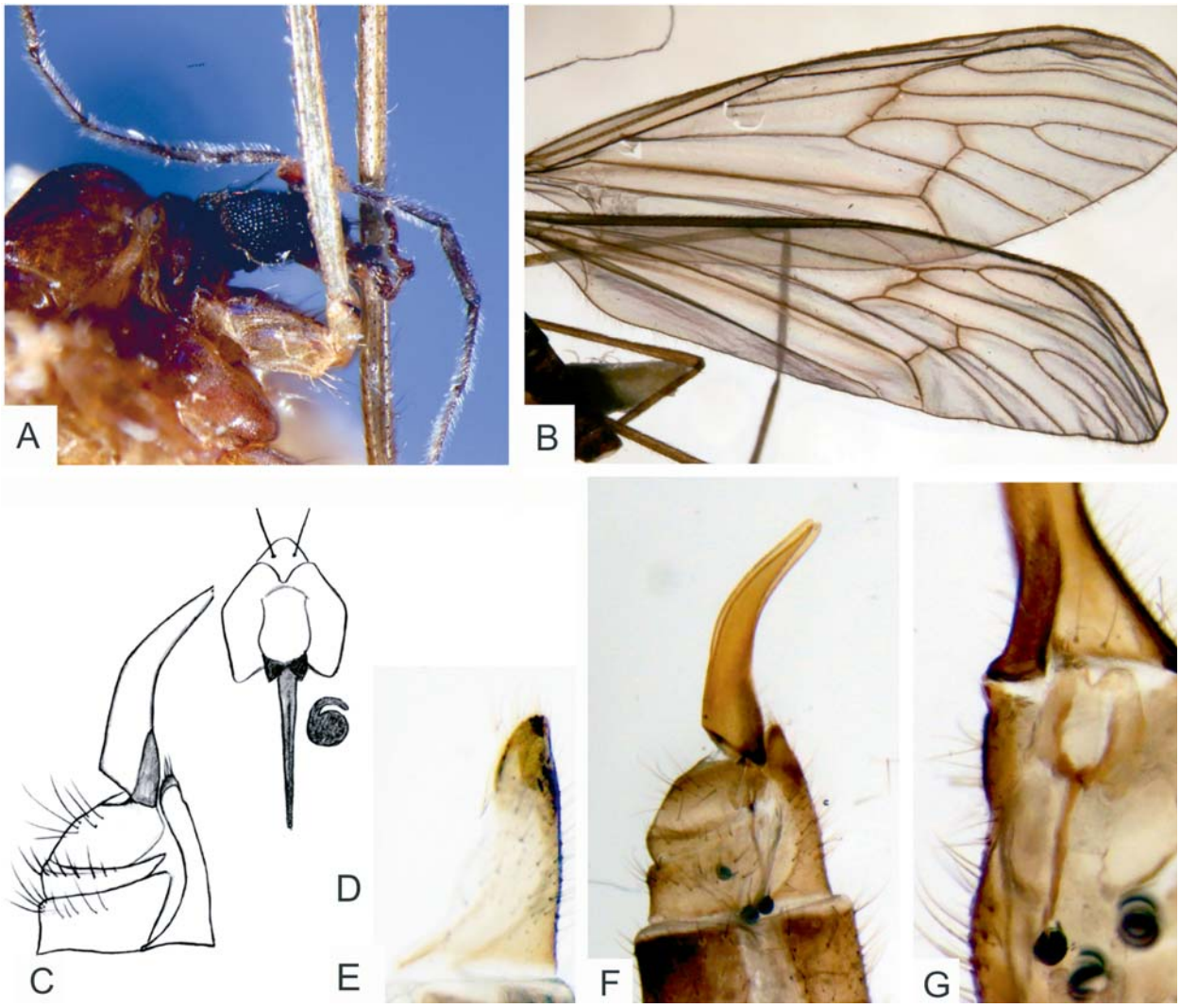


Fig. 7.2. *Trichocera* (*Metatrichocera*) *gigantea* DAHL, 1967, female: A, basal antenna; B, wing; C, D, drawings of ovipositor and genital plates; E, sternite 8; F, ovipositor; G, genital plates (photos from KRZEMIŃSKA 2020: fig. 3, with permission). Male: Sweden, Messaure, Kaltisjokk, 3-10.09.1973 (det. Ch. DAHL); H-J, Yakutia, Aldan River near Dzhebarika-Kaya, 27.08. 1990 (leg. V. ZHERIKHIN). Female: Yakutia, Aldan River near Dzhebarika-Kaya, 27.08. 1990 (leg. V. ZHERIKHIN).

Trichocera* (*Metatrichocera*) *kotejai KRZEMIŃSKA, 1992

Fig. 8

Trichocera (*Metatrichocera*) *kotejai* KRZEMIŃSKA, 1992: Pol. Pis. Entomol. 61: 58, fig. 1-8 (male)

Diagnosis. Antennae: flagellomeres with verticils sparse, erect. Thorax: pleura bare. Male: bridge highly arched, triangular; sternite 9 massive, with deep excision; gonostyle with large, falcate process in 1/3 length on mesal face. Female unknown.

Comparison. Male is distinct among European species by its long process on gonostyle and a beak-like, triangular bridge. The most similar species, *T.* (*S.*) *chuluuta* PETRAŠIŪNAS & PODENAS, 2011, was described from Mongolia; in *chuluuta* the tips of gonostyli are expanded, and a process is smaller than in *T. kotejai*. Several species of the subgenus *Trichocera* from North America are also superficially similar, but can be easily discerned by inner genitalia of the subgenus *Trichocera* type. These are: *T.* (*T.*) *tetonensis* ALEXANDER 1945 (in which the bridge is fused and gonocoxites are long and slender; see KRZEMIŃSKA 2001: fig. 19-22), *T.* (*T.*) *sakaguchii* ALEXANDER 1930 (tips of gonostyle expanded and curved, bridge fused; KRZEMIŃSKA 2001: fig. 11-15), and *T.* (*T.*) *colei* ALEXANDER 1919 (tips of gonostyles transformed, bridge fused; KRZEMIŃSKA 2001: fig. 1).

Additional description. Antennae (Fig. 8D): flagellomeres with verticils sparse, erect, only terminally on segments. Thorax: pleura bare. Legs: hind tarsal claw in male large, strongly curved, more than 1/2 of t5 (Fig. 8G). Characteristic proportions of tarsomeres: t5 almost equal t4, which is remarkably short (almost 1/3 of t3). Wings (Fig. 8F): A2 close to wing margin.

Genitalia, male (Fig. 8.A-C). Tergite 9 broad and massive, with medial excision. Bridge large, highly arched, triangular; both halves form a beak. Gonostyle with large, falciform process on mesal face in 1/3 of gonostyle's length; below it a brush of straight bristles is present. Aedeagal complex (Fig. 8E): parameres separate, of medium length; basal apodeme massive, very broad in lateral view; lateral apodeme slender, subtriangular.

Female is unknown. The female illustrated in KRZEMIŃSKA (1992: fig. 9) was identified later by me as *T.* (*S.*) *sparsa*.

Material examined. Holotype male, Poland, Bieszczady Mts, Ustrzyki Górne, 5.XI. 1989 (leg. W. KRZEMIŃSKI); potok [creek] Wołosatczyk, alt. 750m, 23.X. 1992 – 1m (WK). Additional material: male, Krynica Kopcińska, oddz. 5 (forest section 5), on snow in fir forest, temp. -3°C, 3.XII. 2012 (leg. M. J. ŁUSZCZAK).

Distribution. Europe: known till now only from lower ranges of Carpathians, Bieszczady Mts. and Beskidy Mts. (Krynica) (Poland).

Occurrence: a rare species; the finding from Krynica evidences its presence in mid winter, and adaptation to snowy conditions.

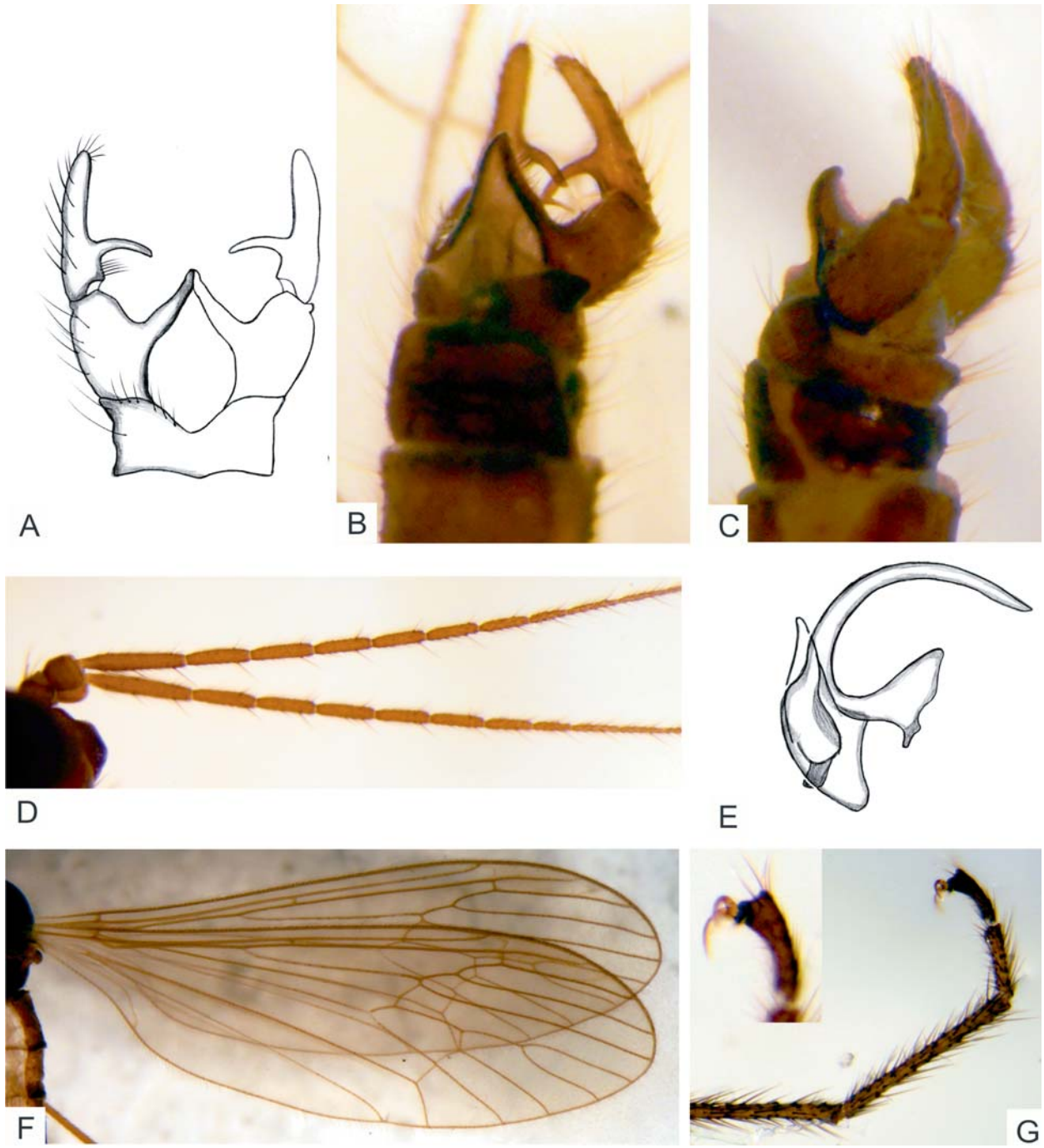


Fig. 8. *Trichocera* (*Saltrichocera*) *kotejai* KRZEMIŃSKA, 1992, male. A, drawing of genitalia ventrally; B, C, genitalia lateroventrally and laterally, resp.; D, antenna; E, aedeagus; F, wings; G, last tarsomeres (hind leg); insertion, claw magnified.
Male: Poland, Beskidy Mts., Krynica Kopcińska, oddz. 5, on snow in fir forest, temp. -3°C, 3.XII. 2012 (leg. M. J. ŁUSZCZAK).

Trichocera* (*Metatrichocera*) *lutea BECHER, 1886

Fig. 9.1 (male), 9.2 (female)

Trichocera (*Metatrichocera*) *lutea* in: MARTINOVSKÝ & STARÝ 1988: fig. 13-18 (male)

Trichocera (*Metatrichocera*) *lutea* in: DAHL & ALEXANDER 1976

Metatrichocera lutea in: DAHL 1967a: fig. 1-3 (male), 52-53 (female)

Metatrichocera lutea in: DAHL 1966b: 7, type species to genus

Trichocera lutea in: DAHL 1957: fig. 1 (wings), 2 (male), 5-7 (female)

Trichocera stecki BANGERTER, 1948: 190, figs 3a, b; Mitt. Schweiz. Ent. Ges. 21, synonymized by DAHL & ALEXANDER 1976.

Trichocera lutea in: LACKSCHEWITZ 1934.

Trichocera lutea BECHER, 1886: Beob. Erg. Österr. Polarsat. Jan Mayen III (Wien): 64, fig. 7a, b

Diagnosis. Male: gonocoxites balloon-like, bridge narrow, triangular; gonostyles thin, of complicated shape: one process at base, directed to inside, second obtuse process in c. 1/4 length, from that point on gonostyle is curved to inside and terminates with two obtuse processes; aedeagal complex narrow in ventral and dorsal views, basal apodeme massive, lateral apodeme narrowly triangular; aedeagus with broad, straight tip. Female: genital segment, and especially tergite 10 swollen; sternite 8 with hypogynal valves broadly divided, chitinized at lateral angles; ovipositor c. as long as genital segment, or little shorter, distal portion triangle-shaped; genital plate with shallow fork, its prongs ending with desclerotized sections; supragenital plate with two bristles.

Comparison. Male is not to be mistaken with any other species due to characteristic shape of gonostyles; female genitalia are similar to those of *T.* (*M.*) *forcipula*, but the ovipositor in the latter is more slender, the setulose area is not delimited, and the antennae are longer and slender. The expanded genital segment and triangular, sharp ended ovipositor of *T. lutea* resemble also those of *T.* (*M.*) *ursa-major* ALEXANDER (DAHL 1967a: fig. 54-56), but this species is known from Alaska and northern Canada, not recorded from Palearctic region.

Additional description. Antennae, especially in female, are short (but their length is variable, often shorter than that in Fig. 9.2.A), and flagellomeres are oval up to 6-7th (Fig. 9.1.J, 9.2.B). Wing (Fig. 9.1.B, Fig. 9.2.A) with narrow d cell; in extreme arctic climate great variation and frequent abnormalities in wing venation are observed (DAHL 1957: fig. 1). Hind tarsal claw in male is large, c. 1/2 of t5 (Fig. 9.1.G). In arctic regions legs are sometimes very short, not longer than the body (Fig. 2.H; compare also *T. maculipennis*, Fig. 29.2.A, B).

Male (Fig. 9.1): gonocoxites are greatly expanded, balloon-like; bridge is narrow, triangular (Fig. 9.1A, C); gonostyles thin, of complicated shape: one process at base, directed to inside, second obtuse process in c. 1/4 length (both are visible in dorsal view, Fig. 9.1.D), from that point on gonostyle is curved to inside and terminates with two obtuse processes. Aedeagal complex (Fig. 9.1.F) is characterized by very broad basal apodeme, narrow lateral apodemes extended toward end of parameres, parameres are closely set in ventral and dorsal views (Fig. 9.1.C); aedeagus with broad, open, straight tip. Among the specimens from Sweden I found a male with gonostyles twisted at c. 180° around long body axis (Fig. 9.1.H-I). The same arrangement is illustrated in MARTINOVSKÝ & STARÝ (1988: fig. 13). Either this is an abnormality, or gonostyles in this species operate in plane perpendicular to the usual direction of movement!

Female (Fig. 9.2): genital segment is swollen in ventral and lateral views, and especially so the tergite 10 (Fig. 9.2.C, G, arrow); sternite 8 with hypogynal valves very short and chitinized at lateral angles, separated with a gap (ventral view, Fig. 9.2.G). Ovipositor c. as long as the genital segment, distal portion triangle-shaped; length and shape of setulose area are variable (compare Fig. 2.C, F; similar shapes are also illustrated by DAHL 1957: fig. 5, 6).

The genital plate (Fig. 9.2.D, E) with a shallow and a rather short fork, its prongs end with desclerotized sections; supragenital plate has two bristles.

Material examined. Spitsbergen, 28.VIII. 1979 – 1m (leg. GORODKOV, det. LANTSOV; ISEA). East Greenland: Rosenvingen Bay, VIII. 1933 – 3m, 1f (LACK[SCHEWITZ] & GC BERTRAM, BM 1934-233). Sweden: Rickleå, Fällstationen, L1, 1.I.1971 – 1f (leg. C. DAHL); Messaure Kaltbach, Lu, Messaure 7-14. IX. 1966 – 1m (leg. C. DAHL). Switzerland: CH Pilatus Kulm, 12. VII. 1978, OW/NW 2050m LF – 6m; 7f (leg. L. REZBANYI); Vuisse, 11-17.X. 1980 – 1m (W. GEIGER). Austria: Obergurgl, Brenner, pine forest, 31. VII. 1972 – 1m; 11.VIII. 1972 Ramolhaus path above Gurglerache, alt. 1930 m., light trap. (BM 1972-400; leg AC & B PONT).

Distribution. The species is described from Jan Mayen (holotype non existent or lost, acc. to DAHL & ALEXANDER 1976). Distribution circumpolar according to DAHL (1967a: fig. 80), but from the Nearctic the species was recorded only from Greenland which zoogeographically belongs to this region; in Europe arcto-boreal and alpine, probably disjunct. Arctic region (EDWARDS 1922, 1924, 1935; LACKSCHEWITZ 1934; DAHL 1957, 1967a, b): Jan Mayen Is., Spitsbergen, Bear Is., Greenland, east and west coast; Iceland, Fennoscandia; north western Russia (LACKSCHEWITZ 1934), Alps (western part: BANGERTER 1948), Switzerland (STARÝ & PODENAS 1995) and Austria (THALER 2000); France (THOMAS & VAILLANT 1977); Germany (SCHACHT 2000); Carpathians: High Tatra Mts. (MARTINOVSKÝ & STARÝ 1988).

Occurrence. According to DAHL (1970), adults appear in Arctic region from June to August (but note a female from January in Rickleå); in boreal regions (Fennoscandia) in September. MARTINOVSKÝ & STARÝ 1988 found the species in Tatra Mts. in June to August; similar season is observed in the Alps (see Material examined). Species occurs in coniferous forests, in Alps and Tatra Mts. at alt. 1300-2000 m. GORODKOV marked at the label from Siptsbergen that swarming specimens form a pyramid-like shape over rock at the coast.

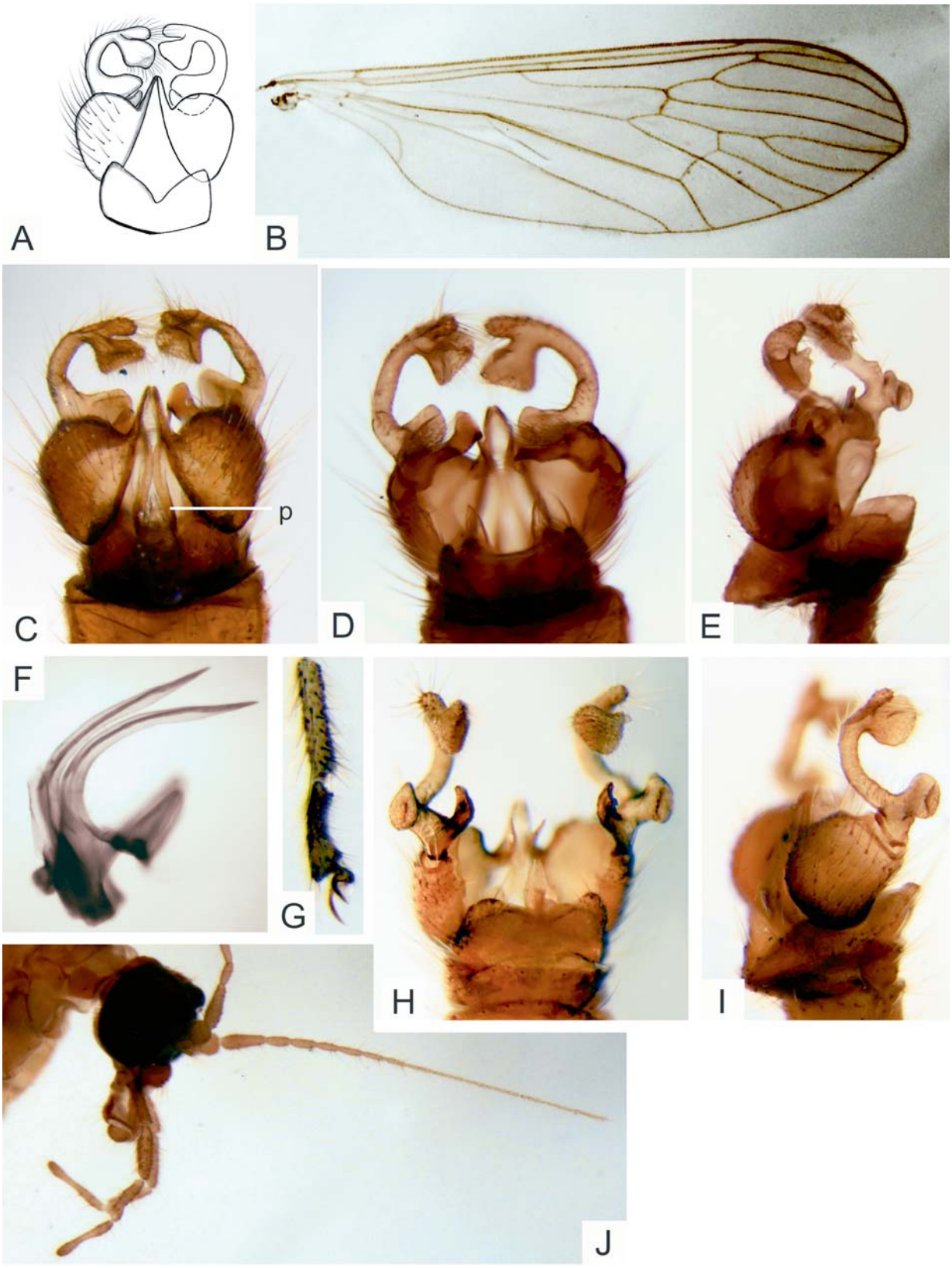


Fig. 9.1. *Trichocera* (*Metatrichocera*) *lutea* BECHER, 1886, male. A, drawing of genitalia; B, wing; C-E, genitalia in ventral (C), dorsal (D) and lateral (E) views; F, aedeagal complex; G, hind tarsal claw. H-I, specimen with twisted gonostyli in dorsal (H) and lateral (I) views. J, antenna.

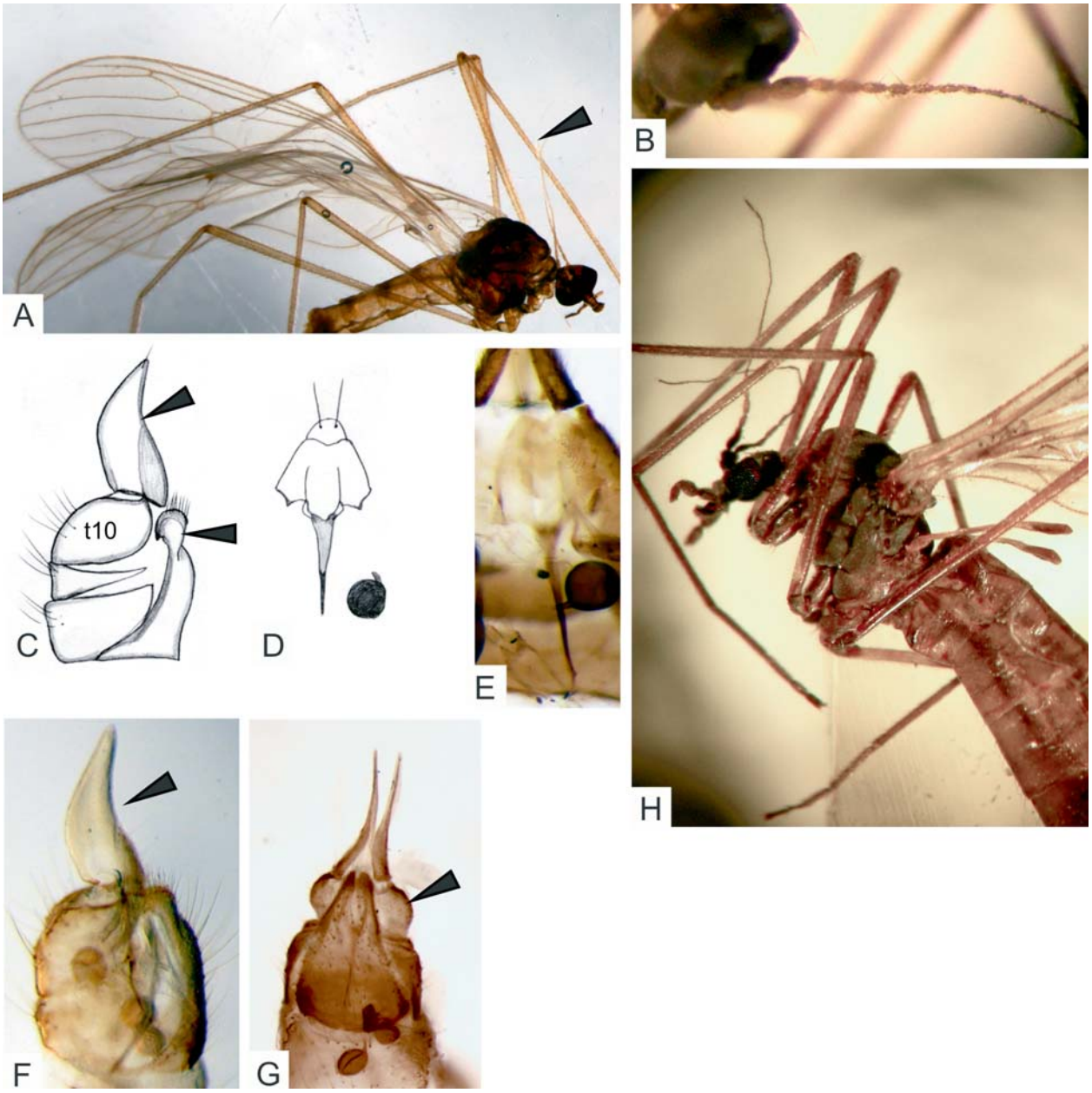


Fig. 9.2. *Trichocera* (*Metatrichocera*) *lutea* BECHER, 1886, female. A, length of antenna (arrow) in relation to body size; B, antenna; C-G, genitalia: drawing in lateral view (C, arrows: end of setulose area and shape of hypogynal valves); plate (D, E); genital segment laterally (F: arrow, end of setulose area), ventrally (G: arrow, swollen tergite 10). H, female from Bear Island: note short fore leg (arrow).
Males B-G, female (except H): Switzerland, Vuisse, 11-17.X. 1980 (W. GEIGER). Male, H-I: Sweden, Rickleå, 35D, V. 1971. Female, H: Bear Island (BMNH).

Trichocera* (*Metatrichocera*) *mackenzie DAHL, 1967

Fig. 10.1 (male), 10.2 (female)

Trichocera (*Metatrichocera*) *mackenziei* in: KRZEMIŃSKA & GORZKA 2016: fig. 1 C-D (female)

Trichocera (*Metatrichocera*) *mackenziei* in: DAHL & ALEXANDER 1976

Metatrichocera mackenzie DAHL 1967: Opusc. ent. 32: 60; fig. 11-15 (male), 57-60 (female)

Diagnosis. Large species. Wing clear. Antennae long; flagellomeres slender, without distinct verticils, f1 only a little longer than f2. Thoracic pleura bare. Male: sternite 9 expanded into large, obtuse projection; gonocoxite balloon-like, with lateral large bunch of short bristles; bridge bulge-like, with sharp conical process at apex; gonocoxite balloon-like; gonostyle with perpendicular mesal process almost as long as reminder of gonostyle; aedeagus narrow in ventral view, parameres of medium length, distal 2/3 strongly divergent, basal apodemes long, lateral apodemes narrow, long. Tarsal claws in male 1/5x of t5. Female: ovipositor c. 1.3x as long as genital segment, narrow, bent about midlength; setulose area well delimited, short, mildly convex; hypogynal valves wide; genital plate heart-like, incised at apex; fork long, its prongs very short, strongly sclerotized, with long narrow projections directed outside; supragenital plate triangular, with two bristles widely set apart.

Comparison. Male is distinctive by its large, oval outgrowth of sternite 9; gonocoxites and gonostyles are similar as those in *T.* (*M.*) *gigantea*. Female is very similar to *T.* (*M.*) *gigantea*, differs mostly by lack of spots on wings.

Additional description. Large species; wing length 8-10 mm. Wing clear (Fig. 10.1.A, 2.A). Antennae (Fig. 10.1.B, 2.B) long, flagellomeres with dense delicate pubescence, without distinct verticils, cylindrical in male, and only slightly swollen in female, f1 c. 3x as long as pedicel and only a little longer than f2. Palpi longer than head, slender (Fig. 10.1.B, 10.2.B). Thoracic pleura bare. Legs: hind tarsal claws in male only 1/5 of t5 length (Fig. 10.1.C).

Male genitalia (Fig. 10.1.D-G). sternite 9 is expanded into large, obtuse projection; gonocoxite balloon-like, with lateral large bunch of short bristles on short, round projection (Fig. 10.1.F-G); bridge bulge-like, with sharp conical process at apex; gonocoxite balloon-like; gonostyle with perpendicular mesal process almost as long as reminder of gonostyle (Fig. 10.1.E-G); aedeagal complex (Fig. 10.1.H-J) narrow in ventral view, parameres of medium length, distal 2/3 strongly divergent (Fig. 10.1.J), basal apodemes long, lateral apodemes narrow, long.

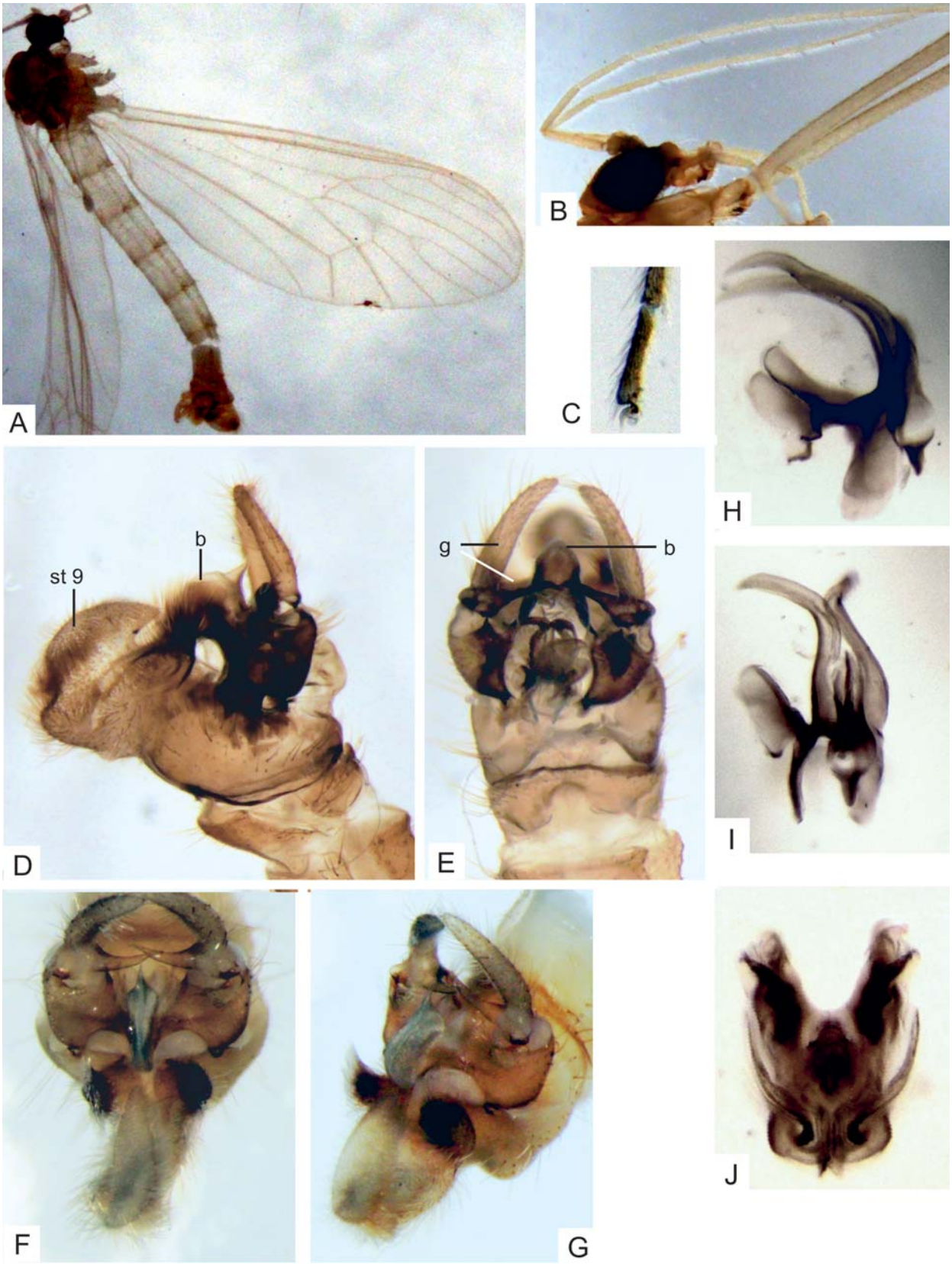
Female genitalia (Fig. 10.2.C-G): ovipositor c. 1.3x as long as genital segment, narrow, bent about midlength, ending sharp; setulose area well delimited, short, only mildly convex. Sternite 8: hypogynal valves wide (Fig. 10.2.C, E-F); genital plate (Fig. 10.2.D, G) heart-like, incised at apex; fork very long, prongs very short, strongly sclerotized, with long narrow projections directed outside; supragenital plate triangular, with two bristles widely set apart.

Material examined. Holotype *Trichocera mackenzie* male, Reindeer Depot, Mackenzie Delta, 1.VIII. 1948 (J.R. VOCKEROTH), Type No.52326 (CNC). Paratype female, same locality and collector, 12.VIII. 1948 (CNC). Sweden: Messauregruppen, Abisko, 1975: 27.VII-4.VIII. – 1m; 4-11.VIII. – 1f; Messaure Ecol. Station, 6-7.IX. 1973 – 1m (all leg. C. DAHL).

Distribution. Holarctic, circumboreal: Canada, NWT (Delta of Mackenzie riv.), Alaska, Scandinavia (DAHL 1967a, b); Russia (LANTSOV & TSCHERNOV 1987); Mongolia (PETRAŠIŪNAS & PODENAS 2011).

Occurrence. Adults appear VIII-IX.

Remarks. The species is described from west-northern regions of North America. In the same year DAHL (1967b) recorded the specimens from Sweden and listed the differences in male genitalia between the Nearctic and Palearctic specimens; she considered a description of a new species based on these differences. In both these papers (DAHL 1967a, b) the species name is “mackenzie”; the form “mackenziei” appears later, in the catalogue (DAHL & ALEXANDER 1976).



10.1. *Trichocera* (*Metatrichocera*) *mackenzie* DAHL, 1967, male: A, wing; B, basal antenna; C, hind tarsal claw. D-G, outer genitalia in lateral (D), dorsal (E), apical (F) and oblique apical (G) views. H-J, aedeagal complex in lateral (H), ventral (I) and apical (J) views.

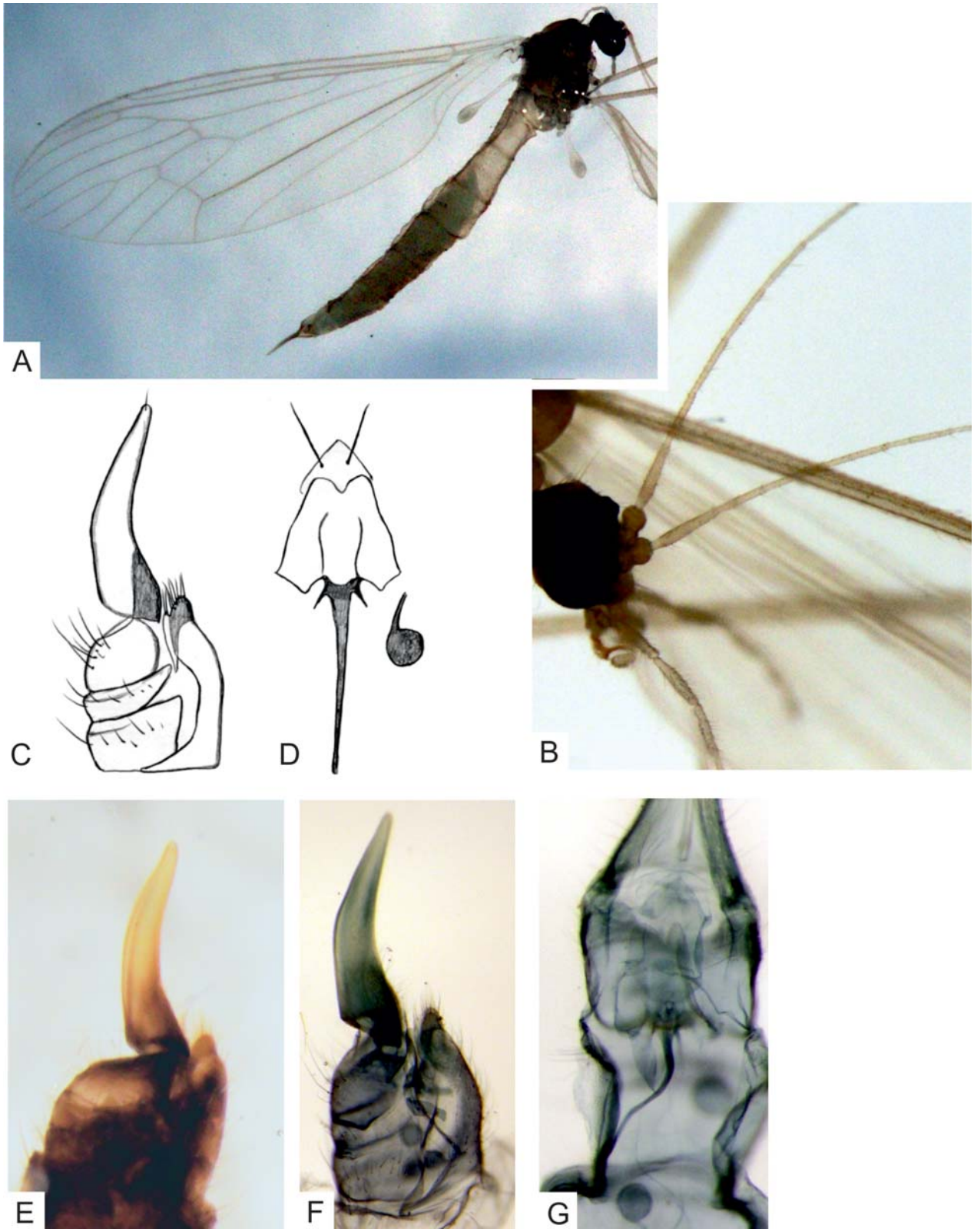


Fig. 10.2. *Trichocera* (*Metatrichocera*) *mackenzie* DAHL, 1967, female: A, habitus; B, antennae; C, D, drawings of genitalia and plates, respectively; E, F, genitalia prior to (E) and after (F) maceration and dyeing; G, genital plates.
Males: D, E, holotype, Reindeer Depot, Mackenzie Delta, 1.VIII. 1948 (J.R. VOCKEROTH), Type No.52326 (CNC); A-C, F-J, Sweden: Messauregruppen, Abisko, 27.VII-4.VIII. 1975 (leg. C. DAHL). Females: A,B, F, G, Sweden: Messauregruppen, Abisko, 4-11.VIII. 1975 (leg. C. DAHL); E, paratype female, Reindeer Depot, Mackenzie Delta, 12.VIII. 1948 (J.R. VOCKEROTH; CNC).

Trichocera* (*Metatrichocera*) *ticina
STARÝ & PODENAS, 1995

Fig. 11

Trichocera (*Metatrichocera*) *ticina* in: KOLCSÁR et al. 2018, fig. 6 (male)

Trichocera (*Metatrichocera*) *ticina* STARÝ & PODENAS, 1995: Mitt. Schw. Ent. Ges. 68: 133, fig. 1-4 (male)

Diagnosis. Antennae slender, long; flagellomeres with verticils short, c. 2x pubescence; palpi shorter than head. Male genitalia: sternite 9 with straight distal margin set with bristles; bridge massive, triangular, medially expanded into long spine-like protuberance; gonostyle with large, acute process at midlength, and apex expanded into obtuse bulge directed dorsad; aedeagal complex: basal apodeme broadly triangular. Female unknown.

Comparison. The male is unique among trichocerids by the shape of bridge and gonostyles.

Additional description. No additional specimens were seen by me since studies on Hungarian collection. The drawings 11.A-C are based on these specimens. For detailled description including venation and colouristic features see STARÝ & PODENAS (1995), and excellent photographs by KOLCSÁR et al. (2018: fig. 6). In the latter paper, noteworthy are the parameres closely set in ventral view. Similar arrangement occurs also in *T.* (*M.*) *unica*.

Material examined. Hungary: KRZEMIŃSKA (2001c).

Distribution. Central and southern Europe. Described from Switzerland (STARÝ & PODENAS 1995), Hungary (KRZEMIŃSKA 2001c); Serbia, Romania (KOLCSÁR et al. 2018).

Occurrence. A very rare species; males were collected in mountains of central Europe, in X-XI.

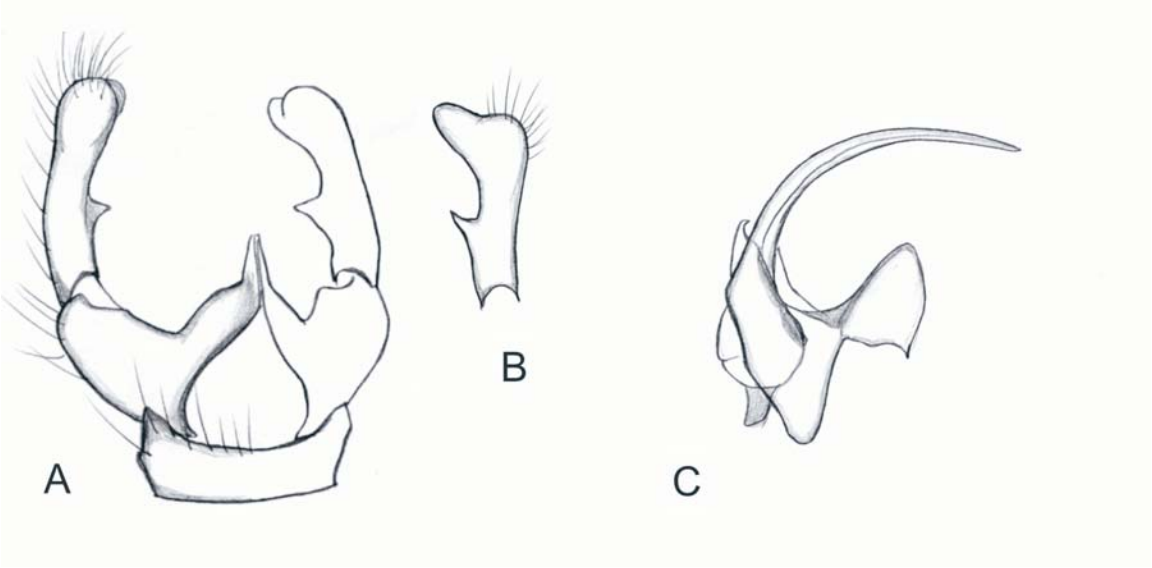


Fig. 11. *Trichocera* (*Metatrichocera*) *ticina* STARÝ & PODENAS, 1995. Male: drawings of genitalia (A), gonostyle in lateral view (B), and aedeagal complex (C). Based on photographs of specimen from Hungary, Pellerd, lapret [boggy meadow], 7. XI. 1981 (leg. L. PAPP).

Trichocera* (*Metatrichocera*) *unica KOLCSÁR, 2018

Fig. 12

Trichocera (*Metatrichocera*) *unica* KOLCSÁR, 2018 in: KOLCSÁR, PETRAŠIŪNAS, TÖRÖK & KERESZTES 2018: Turk. J. Zool. 42: 173, fig. 1, 2 (male), 3 (female)

Diagnosis. Antennae slender; verticils somewhat adpressed. Wing may have faint spot on r-m. Male: gonocoxite massive, c. 3x as wide as gonostyle in its basal portion; bridge highly vaulted, both halves forming extended beak; gonostyle as long as gonocoxite, straight, distal third portion narrowed finger-like. Aedeagal complex: parameres very closely set, of medium length; lateral apodeme raised toward paramere, distal portion dilated into hammer-like shape. Female: ovipositor rather narrow, little longer than genital segment, mildly curved; setulose area delimited, dark; fork with massive and rectangular prongs; supragenital plate narrow, distally wit oval, lateral excisions.

Comparison. Male is not mistaken with any other species; ovipositor of female has common trichoceriid shape similar to that in several species (e.g., some *T*. (*T*.) *hiemalis*, *T*. (*S*.) *calva*, *T*. (*S*.) *brevis*; if the spot on wing is distinct, the female of *unica* may be superficially mistaken even with *T*. (*S*.) *regelationis*); the characteristic genital fork is similar to that in *T*. (*S*.) *calva* and *T*. (*S*.) *bilobata*, but the rectangular distal part between prongs is deeper in *T*. (*M*.) *unica*; narrow, excised supragenital plate of this species is unique.

Additional description. No material was examined by me; I based on excellent photographs and detailled description in KOLCSÁR et al. (2018); drawings of male (Fig. 12.A-C) and female (Fig. 12.E-F) genitalia are based on this publication. Noteworthy are the closely set parameres (Fig. 12.C, arrow).

Distrubution and occurrence. The species was described from Bulgaria, Stara Planina Mts. and till now was not recorded from other localities. Adults were collected in X.

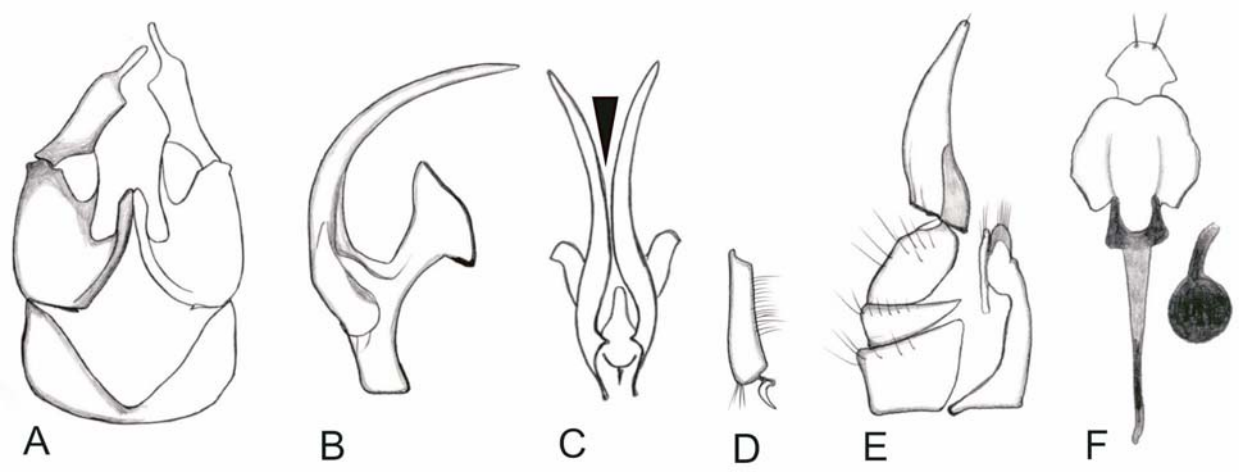


Fig. 12. *Trichocera* (*Metatrichocera*) *unica* KOLCSÁR, 2018. Male (drawings A-D): A, genitalia; B-C, aedeagal complex laterally and ventrally, respectively (arrow: arrangement of parameres); D, tarsal claw. Female (drawings E-F): E, outer genitalia; F, genital plates. Redrawn from photographs in KOLCSÁR et al. (2018: fig. 1-3).

Subgenus *Saltrichocera* KRZEMIŃSKA, 2002

Diagnosis. Male hypopygium with gonocoxite longer than wide, gonostyle with or without small tubercle, gonocoxal bridge usually divided (fused only in *T*. (*S*). *mendli* and *T*. (*S*). *arctica*), rounded, wide, leaving a cospicuous membraneous area over sternite 9. Aedeagal complex (scheme: Introduction Fig. 02.G-H) with strong, long to medium sized parameres raised high over lateral apodemes; basal apodemes long, meeting lateral ones at angle close to 90°. Females are not discerned from those of other subgenera, except *Staryia*. Type species: *T*. (*S*.) *saltator* (HARRIS);1776 .

From this rather uniform taxon, the *mutica* group of species stands out in having gonostyles of transformed shape, although without processes; two of these species, *T*. (*S*.) *dahlae* and *T*. (*S*.) *candida*, have also triangular bridges.

Trichocera (*Saltrichocera*) *alpina* STARÝ, 2000

Fig. 13

Trichocera (*Saltrichocera*) *alpina* in KRZEMIŃSKA 2002a: 157

Trichocera (*Metatrichocera*) *alpina* STARÝ 2000: Čas. Slez. Muz. Opava (A), 49: 97, fig. 1-6 (male, female)

Diagnosis. Antennae long; flagellomeres slender, with erect verticils 4x as long as pubescence. Anepimeron and metanepisternum with numerous long setae. Male: hind tarsal claw c. 1/4 of t5. Sternite 9 with outer margin deeply indented medially; bridge widely separated at apex, both halves connected with membrane; gonostyle long, mildly curved to inside, with small and obtuse basal tubercle. Female (based on description of STARÝ 2000): ovipositor stout, mildly curved, somewhat longer than genital segment, tip obtuse; setulose area ending before midlength of ovipositor; genital plate with shallow incision, rather narrow, fork massive, with lateral extensions. Supragenital plate narrow, with two bristles.

Comparison. Setation of pleura, deeply incised sternite 9 and the tubercle on gonocoxite make the males of this species similar to several species of the *implicata* group, especially *T*. (*S*.) *pubescens*, *obtusa* and *carpathica*. STARÝ (2000) stressed a similarity to the first mentioned species in dense setae on both anepimeron and metanepisternum. The main difference between these two species is the shape of bridge, which is much more massive and highly vaulted in *pubescens*; here also the gonostyles are straight and distinctly tapering to the apex. When the setae are poorly preserved or subject of specific variation (which is unknown; only few specimens from one region were collected), the males may be difficult to discern from *T*. (*S*.) *obtusa* (same shape of gonocoxal tubercle, bridge more similar than in *T*. *pubescens*); there the most distinct difference will be the large tarsal claws in obtusa. *T*. (*S*.) *carpathica* has a similar bridge, but the tubercle is much larger and of different shape. *T*. (*S*.) *implicata* and *T*. (*S*.) *recondita* have no setae on pleura; otherwise the basic shapes of gonostyle and the bridge may appear misguidingly similar. *T*. (*S*.) *thaleri* has short, thick gonostyle.

Additional description. Antennae long; male flagellomeres are very slender (Fig. 13.D), including f1; f2 and consecutive 5 flagellomeres subequal f1, with long, erect verticils. Palpi delicate, very slender and long (1.5x as long as the head in lateral view); last palpomere only slightly longer than the penultimate one. Anepimeron and metanepisternum with numerous long setae (Fig. 13.H, arrows). Hind tarsal claw in male is short (Fig. 13.E); sternite 9 with outer margin deeply indented medially. Bridge widely separated, both halves connected with membrane (Fig. 13.A, arrow; B-C). Sternite 9 wide (= long axially) at lateral margins, deeply indented in middle. Gonostyle long, mildly curved to inside, parrallel-sided above the basal tubercle; apex round; basal mesal incision of the article is long (Fig. 13.A, arrow).

Female (Fig. 13.I, J) is unknown to me, and characters are based on original description of STARÝ (2000). Width of hypogynal valves is unknown. Ovipositor stout, somewhat longer than genital segment, tip obtuse; setulose area ending before midlength of ovipositor; tip of ovipositor is described as obtuse, although it is sharp in original picture. Genital plate with shallow incision; genital fork, based upon the drawing of STARÝ (2000: Fig. 5), is distinct, massive, with lateral extensions; supragenital plate narrow, with two bristles.

Material examined. Paratype, male: Switzerland, Canton Vaud, Bex, Pont de Nant (1250m), 18.IX. 1995 (J. STARÝ leg. et det.; ISEA). Canton Valais: Vuisse, 11-17.X.1980 - 2m (W. GEIGER); Rochefort 780 m, Chateau 551, 320/201,750; 3-8.XI.1982 – 1m (Malaise; Ch. DUFOUR).

Distribution. Switzerland. Montane species, described from alt. 1250 m.

Occurrence. Adults were collected from end of VIII to X.

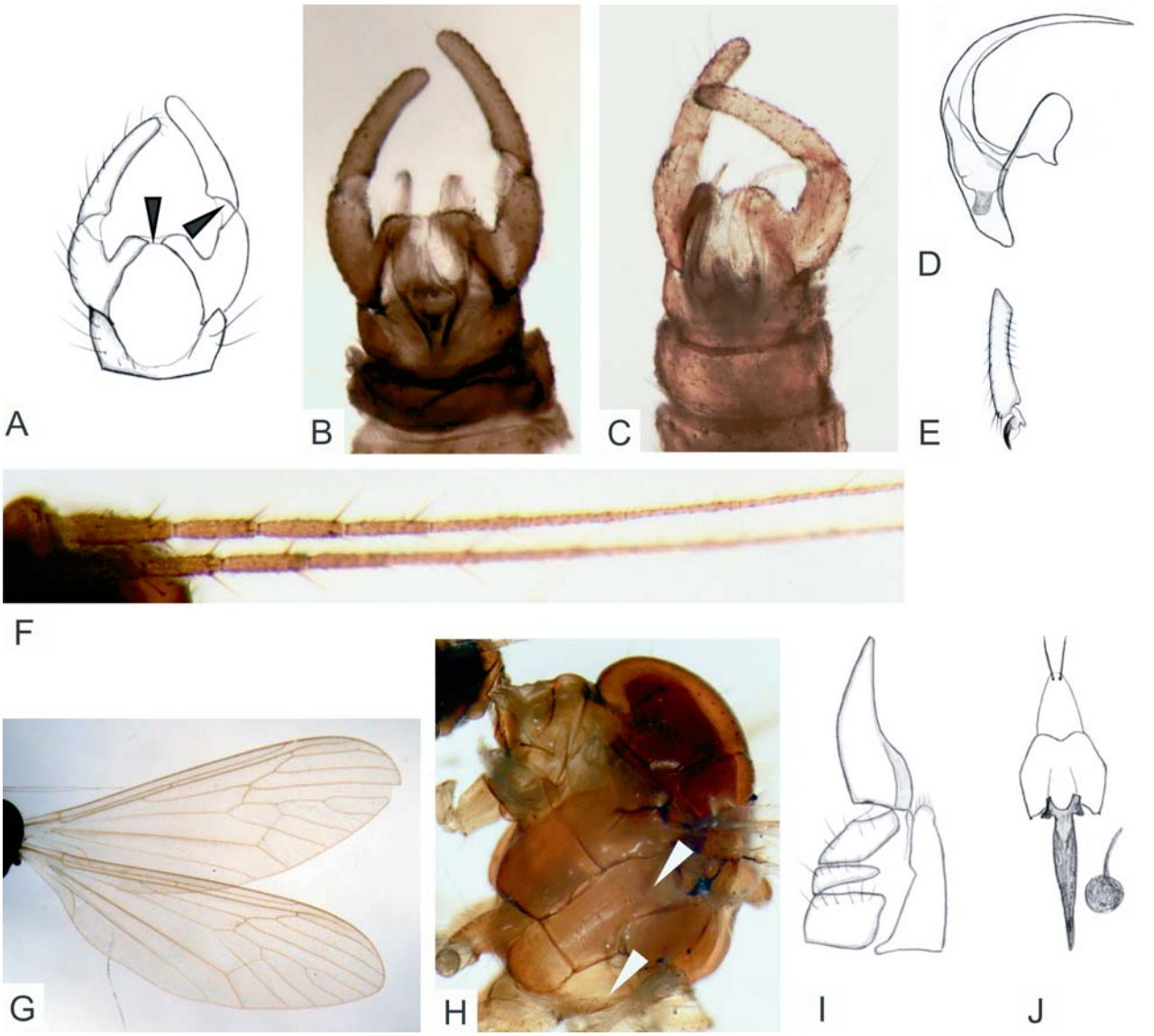


Fig. 13. *Trichocera* (S*altrichocera*) *alpina* STARÝ, 2000. A-H, male: A, drawing of genitalia; B, C, genitalia in ventral and lateroventral views, resp.; D, aedeagal complex; E, hind claw; F, antenna; G, wing; H, thorax (anepimeron and metanepisternum with bristles marked with arrows); I-J, female: ovipositor (I) and genital plates (J). (D, E, I, J, redrawn from STARÝ (2000: fig. 3, 4, 5, 6). Male: Switzerland, Canton Valais: Vuisse, 11-17.X.1980 (W. GEIGER).

Trichocera (*Saltrichocera*) *andorrensis* KRZEMIŃSKA, 2000

Fig. 14

Trichocera (*Saltrichocera*) *andorrensis* in KRZEMIŃSKA 2002a: 157

Trichocera (*Metatrichocera*) *andorrensis* KRZEMIŃSKA, 2000a. Pol. J. Entomol.: 446, figs 13-15 (female), 26-30 (male)

Diagnosis. Member of the *mutica* group of species, very similar to *T*. (*S*.) *mutica* and *T*. (*S*.) *simonyi*. Antennae with erect verticils; palpi relatively long and thin. Thoracic pleura bare. Male: sternite 9 wide, distal margin almost straight; bridge rounded, distinctly separated; gonostyle much longer and thinner than gonocoxite, and slightly S-shaped, without any trace of tubercle, apex rounded. Female: hypogynal valves of medium width, separated by gap; ovipositor little longer than genital segment, straight, massive; setulose area not delimited. Genital plate with distinct incision, fork massive, its prongs almost closed, forming circular to pentagonal shape. Supragenital plate with two bristles usually widely set.

Comparison. The differences between five species of the *mutica* group are listed in the section on *T*. *mutica*.

Additional description. For a detailed description see KRZEMIŃSKA (2000a). Additional features: palpi are thin and long, c. 2x as long as head (Fig. 14.G). Thorax: pleura bare. Legs: hind tarsal claw in male is long (1/2 of t5, Fig. 14.E).

Male genitalia (Fig. 14.A-D, H). Sternite 9 wide, massive, distal margin is almost straight, with tiny medial incision (Fig. 14.B, D), set with a row of long bristles. Bridge is roundish, low, its halves narrowing toward apex (Fig. 14.C). Gonostyle long, thin and very slightly S-shaped, without any trace of tubercle, apex rounded. Aedeagal complex as in Fig. 14.H, with hood positioned almost perpendicular to body long axis.

Female genitalia (Fig. 14.K-O). Tergite 10 swollen in lateral view. Sternite 8 with small protuberance between hypogynal valves, which are separated by a conspicuous gap (Fig. 14.M, arrow). Ovipositor straight, slightly longer than genital segment, subtriangular; setulose area almost flat, not delimited by suture and extending almost to tip. Genital plate with distinct heart-like incision, fork massive, its prongs usually almost closed, forming pentagonal shape; distance between their apices however is variable (variation of shapes of ovipositors and forks in KRZEMIŃSKA 2000: fig. 15). Supragenital plate with two bristles usually widely set. Spermathecae with ducts shorter than diameter.

Material examined is listed in KRZEMIŃSKA (2000a).

Distribution and occurrence. This species is known only from the Pyrenees (2000-2200 m). Specimens were collected in X.

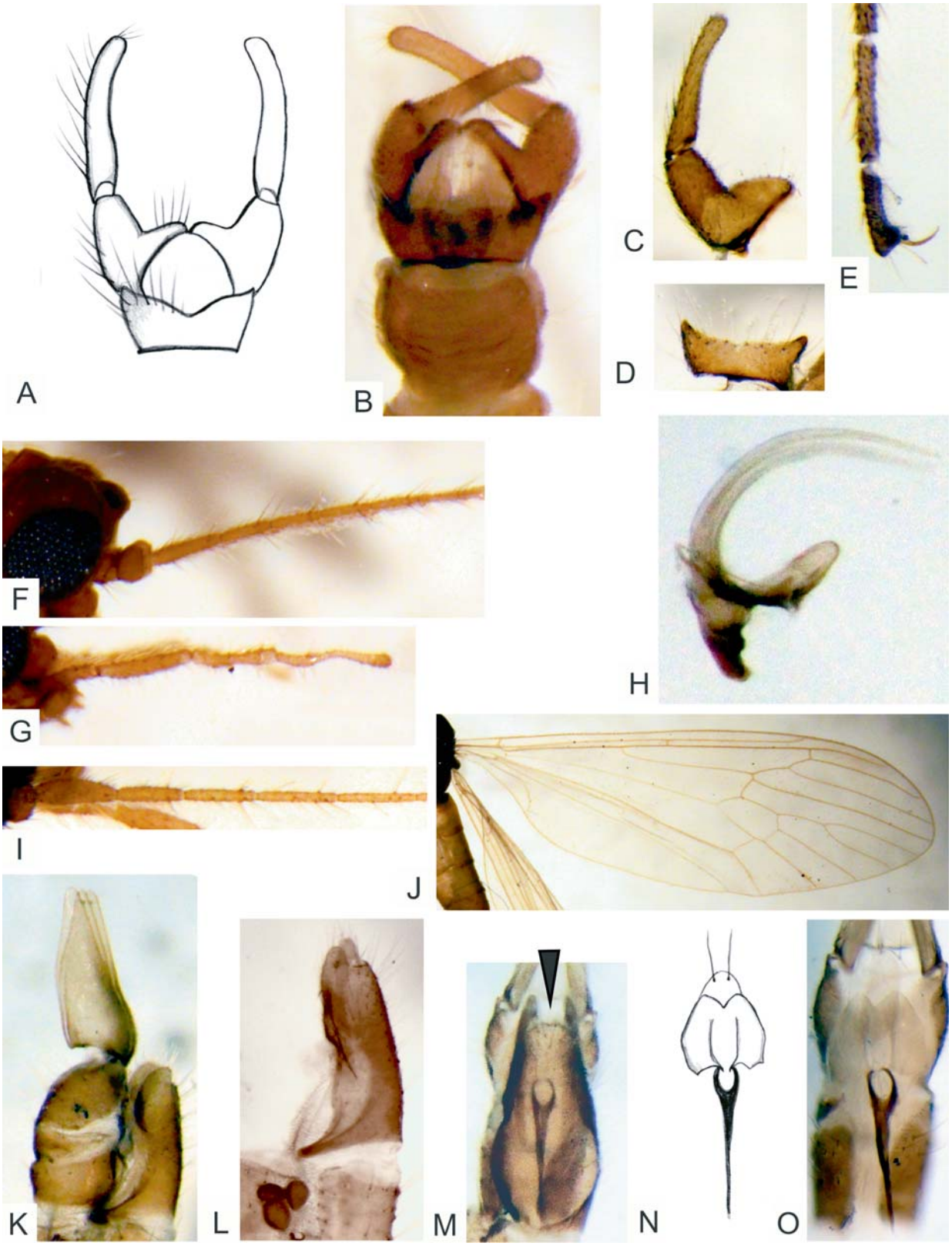


Fig. 14. *Trichocera* (*Saltrichocera*) *andorrensis* KRZEMIŃSKA 2000. A-H, male: A-B, genitalia, drawing and photo; C, shape of bridge; D, sternite 9; E, hind tarsal claw; F, basal antenna; G, palp; H, aedeagal complex. I-O, female: I, basal antenna; J, wing; K-O, genitalia; K, genital segment and ovipositor; L, M sternite 8 laterally and ventrally (gap between hypogynal valves is indicated); N, O, genital plates, drawing and photo.
Male: Andorra, Grau Roig n. Bordes d' Envalira, 31.X. 1998; female: Andorra, Vall d'Ineles n. Solden, 2200 m, 31.X. 1998 (leg. W. KRZEMIŃSKI).

Trichocera (*Saltrichocera*) *annulata* MEIGEN, 1818

Fig. 15

Trichocera (*Saltrichocera*) *annulata* in: KRZEMIŃSKA 2002a: 157

Trichocera (*Metatrichocera*) *annulata* in: KRZEMIŃSKA 1999: 253, fig. 9-12 (male), 21-23 (female)

Trichocera annulata in: DAHL 1973: fig. 11, 19 (larva), fig. 23 (male, pupa), fig. 34-3 (female, pupa)

Trichocera annulata MEIGEN, 1818: Syst. Beschr. bek. Eur. Zweifl. Ins. I (Aachen): 215

Diagnosis. Species of the *regelationis* group, abdomen characteristically striped: each segment is darker in distal portion. Wings clear. Thorax: pleura bare. Male: tarsal claw small (1/4 of t5); sternite 9 rather narrow, its distal margin straight or slightly lowered medially, narrow, set with a row of bristles; bridge low, rounded, gonostyle parallel-sided, apex round. Aedeagal complex as in the *regelationis* group of species (see remarks on *T.* (*S.*) *regelationis*). Female: sternite 8 with wide hypogynal valves; ovipositor as long as genital segment, mildly curved, setulose area strongly convex, short. Genital plate subtriangular, prongs of genital fork almost non-existent, as in the r*egelationis* group of species. Supragenital plate with two bristles.

Comparison. The striped abdomen distinguishes this species among other species. Some species may also have more or less striped abdomen (*T. maculipennis*, *T. hiemalis*), but then the distal portions of segments are lighter. The striping in *T. annulata* is sometimes restricted only to distal segments of abdomen.

Additional description. A species of *regelationis* group, unique among congeners by striped abdomen; distal portions of segments are darker than proximal (Fig. 15.I). Genital segment and ovipositor of female, and hypopygium of male are light yellow, contrasting with dark adjacent margin of the preceding segment (Fig. 15.I, M). Antennae (Fig. 15.G, H) as in *T.* (*S.*) *michali*, *T.* (*S.*) *regelationis* and *T.* (*S.*) *rufescens*: f1 not much longer than f2, verticils soft. Thorax: pleura bare. Wings usually clear, but see the photo on the front cover! R2+3+4 not much longer or equal R3+4; d cell usually broad, of characteristic, trapezoidal shape due to bM1+2 being subequal to mM1+2 (Fig. 15.F; arrows); m-cu and bM3 usually meet at same point of M4, unlike in *T. regelationis*, where m-cu is shifted proximally. Thoracic pleura bare. Tarsal claw in male hind leg is short, c. 1/4 of t5 (Fig. 15.E).

Male genitalia (Fig. 15.A-D): sternite 9 is rather narrow, its distal margin straight or mildly lowered, set with a row of bristles; bridge is low, rounded, delicate; its shape in untreated specimens (Fig. 15.B) may change markedly after preparation (compare Fig. 15.C of same specimen). Gonostyle gently curved inwards, almost parallel-sided, apex rounded; a mere trace of basal tubercle is present on mesal face. Aedeagal complex is of *regelationis* group type, with broad section between bases of parameres and lateral apodemes; basal apodemes are narrow.

Female genitalia (Fig. 15.J-O). Sternite 8 is convex, with small protuberance just below hypogynal valves which are wide. Ovipositor as long as or little shorter than genital segment, bent halfway, distal portion in north and central Europaean localities is usually obtuse and straight, as in Fig. 15.J; in more southern regions (France, Italy, Switzerland) a narrower and curved shape was observed (Fig. 15.L, M). Setulose area distinctly convex, darker than light yellow remainder of ovipositor, and ending before midlength of ovipositor (Fig. 15.L). Genital plate with foramen whose shape may be various in different regions of Europe (compare Fig. 15.N and O); genital fork ending bowl-like (prongs are almost non existent, typical for *regelationis* group of species). Supragenital plate with two bristles set apart at a narrow to wide distance. Ducts of spermathecae longer than diameter.

Material examined. Specimens listed in KRZEMIŃSKA (1999, 2001c), HÅGVAR & KRZEMIŃSKA (2007), KRZEMIŃSKA & GORZKA (2014), DRIAUACH & KRZEMIŃSKA (2015). Italy: a sample of specimens from Fano, January, 1989 (coll. G. GENTILINI; unpublished data).

Distribution. A species of wide Holarctic distribution. The holotype was described from Austria, and since long it has been recorded from all countries of Europe, from Scandinavia to north Africa, but absent from northernmost localities: Greenland, Spitsbergen, Jan Mayen. Records: Norway (HÅGVAR & KRZEMIŃSKA 2008); Sweden (DAHL 1966b); Finland (FREY & STORÅ 1941; DAHL 1968; KRZEMIŃSKA & GORZKA 2014); Lithuania (PETRAŠIŪNAS & VISARČUK 2007), Russia: Karelia and vicinity of Krasnodar (PETRAŠIŪNAS & PARAMONOV 2014); Great Britain (EDWARDS 1924, LAURENCE 1956); Netherlands (KRZEMIŃSKA 1996a, KRZEMIŃSKA & BEUK 2002), France (KRZEMIŃSKA & BRUNHES 1991); Germany (DAHL 1999, KRZEMIŃSKA 2000b); Poland (KRZEMIŃSKI 1983; KRZEMIŃSKA 1999, 2002b); Switzerland (STARÝ & KRZEMIŃSKA 1998); Romania (UJVAROSI & KRZEMIŃSKA 2002; PINTILIOAIE & KOLCSÁR 2020); Hungary (KRZEMIŃSKA 2001c); Italy (see above); Andorra (DAHL & KRZEMIŃSKA 2002); Mediterranean islands: Sardinia (PETRAŠIŪNAS 2009); Mallorca (PETRAŠIŪNAS & KVIFTE 2016), Malta (EBEJER 2015), Menorca (CARLES-TOLRÁ & VENTURA 2009). North Africa: Algeria (EDWARDS 1923), Morocco (DRIAUACH et al. 2015). Asia: Japan (DAHL & ALEXANDER 1976). North America: western Canada, USA (PRATT 2003).

Noteworthy, a very similar species, *Trichocera nipponensis* TOKUNAGA, 1938, was described from Japan. Description and drawings (TOKUNAGA 1938: fig. 2, 12) state the same striping of the abdo-

men, and shape of d cell as in *T. annulata* (however, the author does not refer to the latter species); male has also simple gonostyles; the ovipositor seems longer and more slender. A unique character in venation is the cell m1 constricted distally. According to DAHL & ALEXANDER (1976), the type is lost. Authors acknowledge *T. nipponensis* a valid species, not identical with *T. annulata* which is also reported by them from Japan.

T. annulata is present also in Australia and New Zealand, most probably introduced by man (DAHL & ALEXANDER 1976).

Occurrence. Adults appear from early autumn to late spring; males form small swarms.

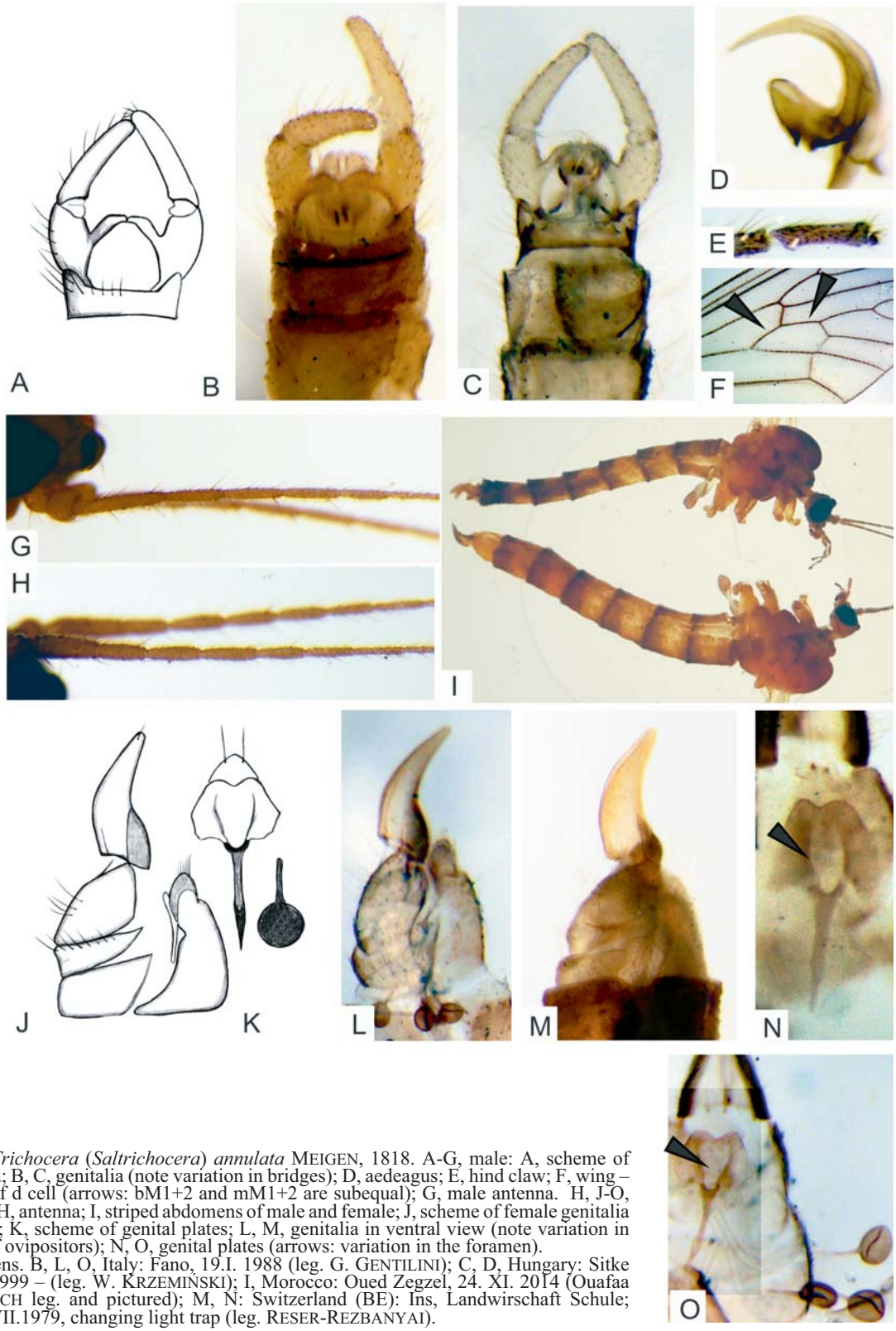


Fig. 15. *Trichocera* (*Saltrichocera*) *annulata* MEIGEN, 1818. A-G, male: A, scheme of genitalia; B, C, genitalia (note variation in bridges); D, aedeagus; E, hind claw; F, wing – region of d cell (arrows: bM1+2 and mM1+2 are subequal); G, male antenna. H, J-O, female: H, antenna; I, striped abdomens of male and female; J, scheme of female genitalia laterally; K, scheme of genital plates; L, M, genitalia in ventral view (note variation in shape of ovipositors); N, O, genital plates (arrows: variation in the foramen).
Specimens. B, L, O, Italy: Fano, 19.I. 1988 (leg. G. GENTILINI); C, D, Hungary: Sitke 10.XI. 1999 – (leg. W. KRZEMIŃSKI); I, Morocco: Oued Zegzel, 24. XI. 2014 (Ouafaa DRIAUACH leg. and pictured); M, N: Switzerland (BE): Ins, Landwirschaft Schule; 433m, VII.1979, changing light trap (leg. RESER-REZBANYAI).

Trichocera* (*Saltrichocera*) *antennata STARÝ, 1999

Fig. 16

Trichocera (*Saltrichocera*) *antennata* in KRZEMIŃSKA 2002: 157

Trichocera (*Metatrichocera*) *antennata* STARÝ 1999: Ent. Prob. 30(1): 6, fig. 16, 18-19 (male), 17, 20, 21 (female), 24

Diagnosis. Antennae: f1 greatly enlarged in female. Anepimeron and metanepisternum with few setae. Genitalia, male: bridge rounded, halves distinctly separated at apex; incision of tergite 9 is broad and deep; gonostyle parallel-sided, with small, indistinct basal tubercle; apex round. Female: ovipositor distinctly (c. 1.3x) longer than genital segment, almost straight, obtuse at apex; setulose area long, reaching almost mid ovipositor, but poorly delimited (only basally); setulose margin of sternite 8 narrow; fork of genital plate shallow. Supragenital plate with 6-8 bristles.

Comparison. Apart from transformed flagellomeres, the female mostly resembles *T.* (*S.*) *montium* and *T.* (*S.*) *nordica* by the shape of ovipositor; the latter has no setae on thoracic pleura. Male of *T.* (*S.*) *antennata* is similar to *T.* (*S.*) *sparsa* in having a deeply incised sternite 8, rounded bridge and a similar shape of gonostyles; in *T.* (*S.*) *antennata* the small tubercle on gonostyle is more distinct when compared to mere traces of such a tubercle in *sparsa*. These features remind also the male of *T.* (*S.*) *calva*, whose gonostyle is longer and pleura are bare.

Additional description. Antennae: first flagellomere in female is greatly enlarged (Fig. 16.H), composed of fused f1 and f2; in male (variation: Fig. 16.E, F) f1 is oval and short, only twice as long as pedicel, or less. Thorax (Fig. 16.C): few delicate setae on metepimeron and metanepisternum. Hind tarsal claw in male is large, c. 1/2x of t5, according to STARÝ (1999: fig. 24); in the paratype in my disposition it is smaller, c. 1/3x t5 (Fig. 16.F).

Male genitalia (Fig. 16.A, B, D). Sternite 9 with deep, broad incision, so that mostly lateral portions are visible in ventral view. Bridge rounded, delicate. Gonostyle moderately long, slightly curved, parallel-sided, with rounded apex; basal tubercle small. Aedeagal complex (Fig. 16.D): paramere rather massive, long; hood hidden between parameres in lateral view; lateral apodeme narrow and extended toward paramere.

Female genitalia (Fig. 16.I-L). Ovipositor longer than genital segment (c. 1.3x); setulose area long, almost reaching mid ovipositor, not delimited with suture (or only fragmentarily so); sternite 8 (Fig. 16.I – arrow, K) with very narrow hypogynal valves. Genital plate with a wide, shallow incision; fork shallow, its prongs divergent, connected to plate by short, desclerotized sections. Some females have small, sharp projections on fork (see variation in Fig. 16.I), much smaller than those in *T. sparsa*. Supragenital plate broad, with 6-8 bristles. Spermathecae with sclerotized portions of ducts as long as or longer than spermathecae diameter.

Material examined. Paratypes: male, Moravia Jeseníky Mts., 20.X. 1997, 850 m; female 7.X.1997, same locality; male, Jeseníky Mts., Vidly, "Jelení bučina" , 14.X. 1998 (5869); all leg. et det. J. STARÝ . Additional material examined is specified in papers of, or co-authorized by KRZEMIŃSKA (cited below).

Distribution. The species was described from the Czech Republic, Moravia and is known only from Europe. Scandinavia: south Norway (HAGVÅR & KRZEMIŃSKA 2007), Finland close to Polar Circle (KRZEMIŃSKA & GORZKA 2014); Kola Peninsula (PETRAŠIŪNAS & PARAMONOV 2014); Carpathian Mts. and uplands of central Europe: Czech Republic (STARÝ 1999), Poland, Hungary and Romania (KRZEMIŃSKA 2004; KRZEMIŃSKA & PAPP 2001; UJVAROSI & KRZEMIŃSKA 2002, resp.).

Occurrence. Most adults were collected in autumn; however, a specimen collected by Christine DAHL in midst of winter (February), in Rickleå (Sweden) almost at the Polar Circle documents adaptation of this species to severe conditions (KRZEMIŃSKA & GORZKA 2014).

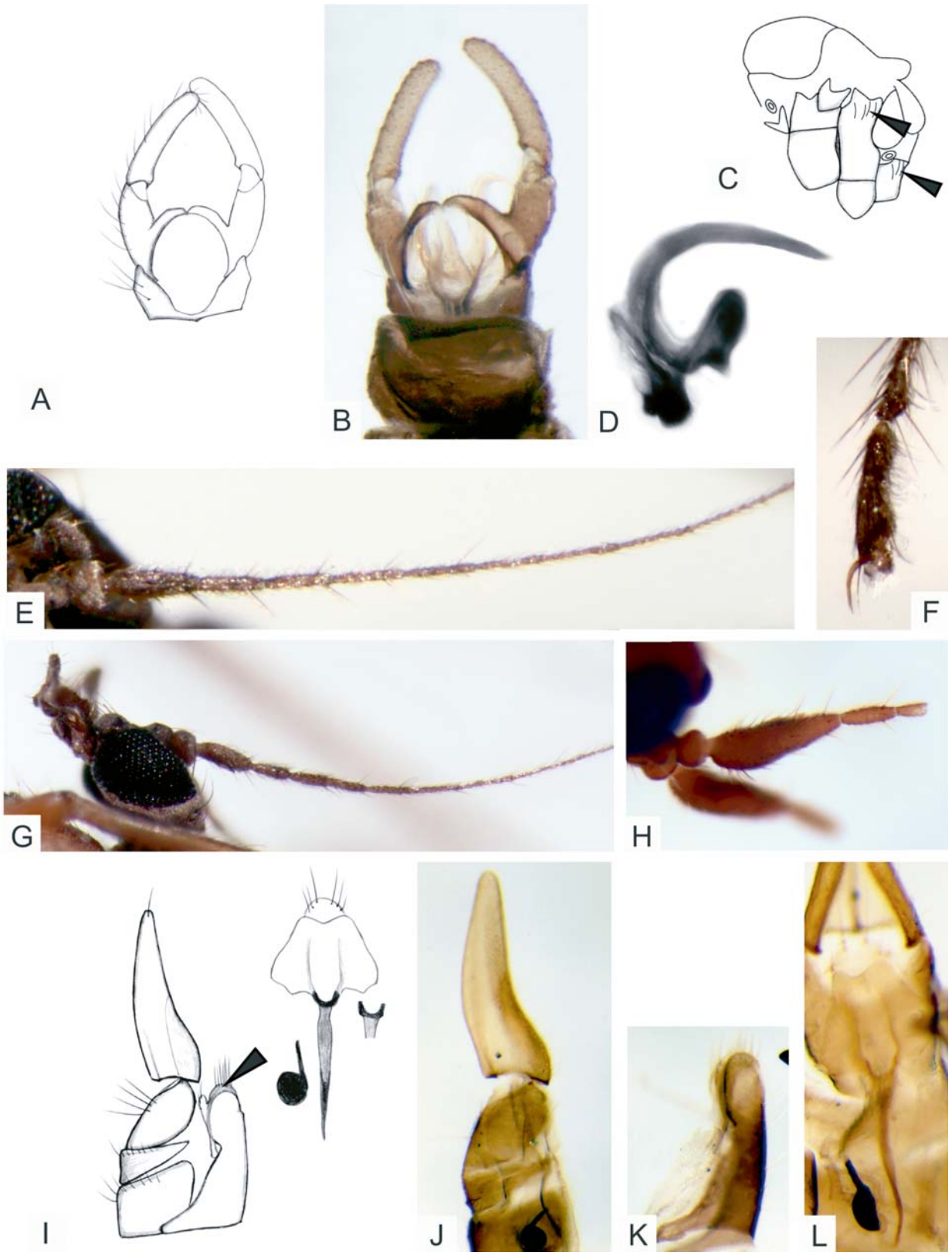


Fig. 16. *Trichocera* (*Saltrichocera*) *antennata* STARÝ 1999. A-G, male: A, B, genitalia ventrally, drawing and photo; C, thorax; D, aedeagal complex, E, G, antenna (note variation in length of basal flagellomeres); F, hind tarsal claw. H-L, female: H, basal antenna; I, drawing of genitalia and genital plates (narrow hypogynal valves are indicated); J, ovipositor; K, sternite 8; L, genital plates. Males: B, G, Moravia, Jeseníky Mts., Vidly, "Jeleni bučina", 14.X. 1998 (5869; leg. J. STARÝ); D, E, F, male paratype, Western Tatra Mts. 9.X. 1996, Roháč, dol. [valley] "Adamcula", 1200 m (6784; leg. J. MARTINOVSKÝ, det. STARÝ). Female, H- L, Norway, X. (leg. S. HÅGVAR).

Trichocera (*Saltrichocera*) *arctica* LUNDSTRÖM, 1915

Fig. 17.1 (male, female), 17.2 (additional pictures of male)

Trichocera (*Saltrichocera*) *arctica* in: PETRAŠIŪNAS & PARAMONOV 2014: fig. 1a,b (aedeagal complex)

Trichocera arctica in: PRATT 2003: fig. 22 (male)

Trichocera (*Trichocera*) *arctica* in: KRZEMIŃSKA 2002a: 157

Trichocera (*Trichocera*) *arctica* in: DAHL & ALEXANDER 1976

Trichocera arctica in DAHL, 1967: fig. 41, 42 (male), fig. 79 (female, plate)

Trichocera arctica in DAHL, 1960: Opusc. ent. 1960, 25: 1-2, fig. 2a (male), 2b (female).

Trichocera arctica in: LACKSCHEWITZ, 1934: fig. 3a-c (male)

Trichocera arctica LUNDSTRÖM, 1915: Mem. Acad. Imp. Sci. XIII: 28, Pl. II, fig. 41, 42 (male)

Diagnosis (based on type specimens). Antennae: f1 c. 2.5x as long as f2, with abundant, long and strong pubescence. Thoracic pleura bare in male; few setae on metanepisternum in female. Male: sternite 9 wide, outer margin straight; bridge triangular; gonostyle shorter than gonocoxite, straight, with finger-like, narrow process. Female: hypogynal valves of medium width; ovipositor longer than genital segment, slightly bent midway; setulose area almost flat, barely delimited. Genital plate with medial incision, fork very shallow, with two lateral spurs. Supragenital plate with four bristles.

Comparison. The male is distinctive by combination of short, thick gonostyle with a narrow process and the characteristic, triangular bridge. The female's ovipositor is similar to that of *T.* (*S.*) *columbiana* and several other species; decisive is the shape of genital fork.

Additional description. Body colour vivid brown, rather light. Antennae (Fig. 17.1.F, G; 17.2.E): f1 enlarged, c. 2.5x as long as f2; flagellomeres swollen in male and female, verticils c. 2x as long as pubescence, strong and erect, distributed over entire length of flagellomeres. Wings of both types show a very short R2+3+4 compared to long R3+4; moreover, R5 leaves R2+3+4, and not a cross-vein r-m, as usual; therefore, a very short section R2+3+4+5 exists (Fig. 17.1.E, H) and an outlet of R5 is thickened, especially in the female. As other authors did not observe this shift in the outlet of R5, it may be only an abnormality of these specimens (sometimes observed in other trichocerids; compare *regelationis* in KRZEMIŃSKA 2000c). Thorax: pleura in male are bare; in female few setae on anepimeron are present. Legs: t4 equal t5 at least in male; hind tarsal claw in male is medium, c. 1/3 of t5 (Fig. 17.1C).

Male genitalia (Fig. 17.1.A, B, D). Sternite 9 wide, massive; distal margin straight, set with bristles. Gonocoxite longer than gonostyle; bridge triangular, fused into acute apex. Gonostyle characteristically short, straight and broad (only tip is slightly directed to inside; compare original drawings of LUNDSTRÖM: Fig. 17.2.A-B herein), with finger-like, narrow process rising from a broad, elevated base. Inner genitalia in the fixed preparation (Fig.17.2.C-D) suggested to me the position of lateral apodemes as in the subgenus *Trichocera* (hence misclassification in KRZEMIŃSKA 2002a). PETRAŠIŪNAS & PARAMONOV (2014: fig. 1a, b) found that lateral apodemes are as in the subgenus *Saltrichocera*, and parameres, although not long, are definitely longer than in the subgenus *Trichocera*, and not fused basally (see also Fig.17.1.D based on their photographs).

Female genitalia (Fig. 17.1.I-M). Sternite 8 (Fig. 17.1.I) with hypogynal valves of medium width. Ovipositor (Fig. 17.1.J) large, c. 1.3x as long as genital segment; setulose area almost flat, concolorous with remainder of ovipositor and barely delimited (characters mentioned also by DAHL 1960: fig. 2b: "no setulose area or basal ventral swelling"). Genital plate with heart-like incision; fork (Fig. 17.1.K, M) short and shallow, with acute lateral spurs; supragenital plate with four bristles in the syntype (Fig. 17.1.M); two bristles are pictured in DAHL (1967: fig. 79).

Material examined. Paralectotype male, Neu-Sibirien, 19.VII/1.VIII. 1902 (in original paper: Ins. Neu Sibirien, Westkueste bei Stan Birula); preparation of genitalia in Canadian balm. Syntypus female , Nov. Sibir' (=Neu-Sibirien), 27.VI/10.VII. 1902 (for these dates the following locality listed in original paper is given: Ins. Neu Sibirien, Nord Kueste, Wonessenje-Bucht), preparation of genitalia in glycerine. Both specimens coll. A. CHIRUL', designated by LANTSOV; Zoological Institute, Academy of Sciences, St Petersburg, Russia.

Other material. Males in BMNH: Alaska, Point Barrow, N.A. WEBER, Nos. 2664 and 2666, det. Ch. DAHL (listed in DAHL 1967a).

Distribution. The species was described from Neusibirien Island (latitude c. 75°), East Siberian Sea, far beyond the Polar Circle, and has probably a holarctic, circumpolar distribution, although till now it was not found in Europe (maps: DAHL 1967a: fig. 82; LANTSOV & TSCHERNOV 1987: 21, 49: fig. 12). "In the genus *Trichocera* it has the most pronounced arctic distribution of all species known, living in tundra also far beyond the Polar Circle" (DAHL 1967a). In Asia known from northeastern coasts of Siberia to Kamchatka (LANTSOV & TSCHERNOV 1987); Chukchi Peninsula (DAHL 1960); westernmost locality in Asia: Tobolsk (PETRAŠIŪNAS & PARAMONOV 2014); North America: Alaska, North Western Territiories of Canada (Baffin Is.) (DAHL 1960, 1967a).

Occurrence and biology. Adults appear from mid June to September in the Arctic region (DAHL 1970: fig. 6). According to LANTSOV & TSCHERNOV (1987), this species is a typical inhabitant of the tundra zone; its massive frequency is observed in the region of Taimyr Penins. Almost an entire life of

trichocerids: *Trichocera* (*S.*) *arctica, T.* (*S.*) *borealis*, and *T.* (*S.*) *lackschewitzi* runs in, and in the vicinity of, the lemmings' holes. Females lay eggs in the droppings and vegetable rests, on which larvae feed. Pupation takes place in the soil around the holes, which offer also shelter for adults during mating (LANTSOV & TSCHERNOV 1987: fig. 32, a suggestive scheme illustrating the role of lemmings' holes in life of arctic Trichoceridae and Tipulomorpha, see also table 14 therein).

Remarks. The paralectotypes were designated by LANTSOV and are listed in the original paper of LUNDSTRÖM (1915). The photo (Fig. 17.2.C, D) and a drawing in the original paper (LUNDSTRÖM 1915: Pl. II, fig. 41, 42; redrawn in Fig. 17.2.A-B herein) show most probably the preparation of the same specimen. As it was evidenced by LANTSOV (1987), the drawings of male genitalia described as *T. arctica* by LACKSCHEWITZ (1934: fig. 3a-c) present in fact *Trichocera lackschewitzi* LANTSOV, 1987. The latter species belongs to the subgenus *Trichocera*, by the shape of aedeagal complex very similar to that in *T.* (*T.*) *hiemalis* (and the outer male genitalia also look somewhat like a "robust *hiemalis*"; female's genital plate is very similar to that in *hiemalis*; ovipositor is short, strongly curved and sharp ended; LANTSOV 1987: fig. 7-8). For additional description of male of this species see KRZEMIŃSKA (1996b). *T.* (*T.*) *lackschewitzi* occurs in north Siberia, on Taimyr Peninsula and Waigach Island; this characteristic species was not found any nearer Europe till now.

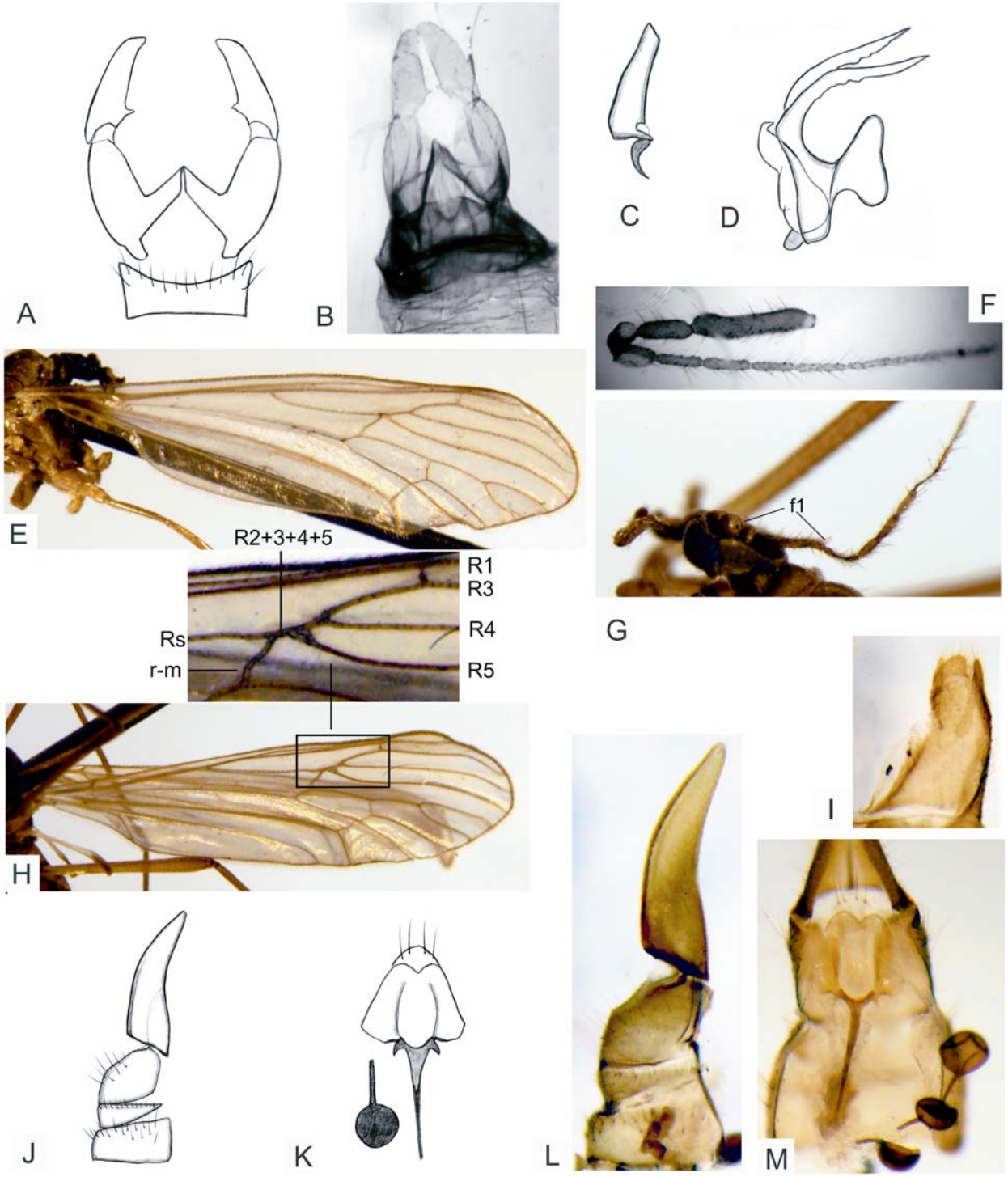


Fig. 17.1. *Trichocera* (*Trichocera*) *arctica* LUNDSTRÖM, 1915. A-E, male: A, tentative scheme of genitalia based on B, preparation of genitalia ventrally; C, hind tarsal claw; D, aedeagal complex (redrawn from PETRAŠIŪNAS & PARAMONOV 2014: fig. 1a); E, wing. F-M, female: F, wing and a closeup above; G, H, antenna; I, J, genitalia, drawing and photo; K, sternite 8; L-M, genital plates and spermathecae, drawing and photo.
Specimens: B-E, paralectotype male, Neu-Sibirien, 19.VII/1.VIII. 1902; F-M, syntype female, same locality, 27.VI/10. VII. 1902 (A. CHIRUL).

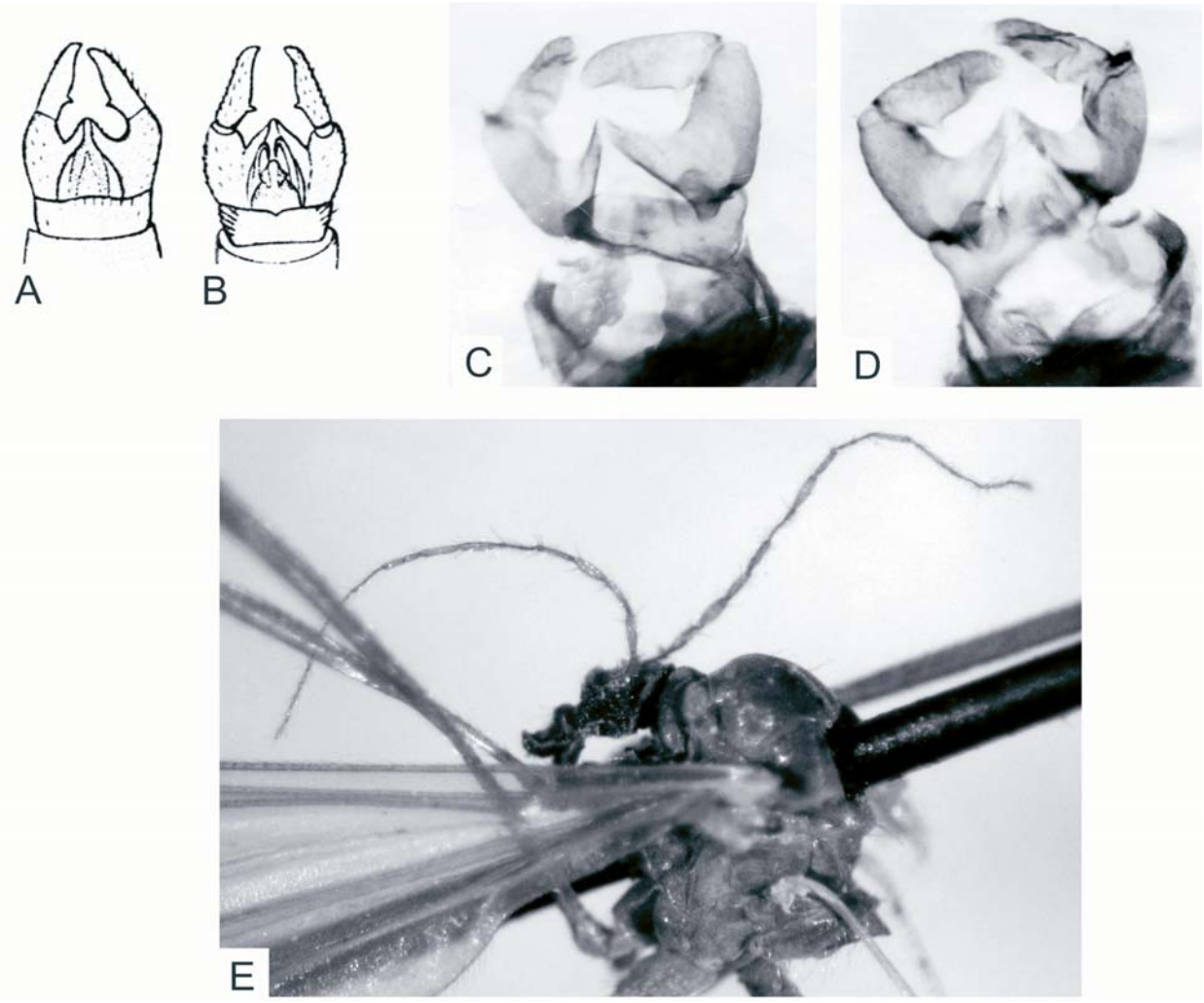


Fig. 17.2. *Trichocera* (*Saltrichocera*) *arctica* LUNDSTRÖM, 1915, additional pictures. A-B, drawings of male (redrawn from LUNDSTRÖM 1915: Pl. II, fig. 41, 42); C, D, preparation of male genitalia; E, male thorax and antennae. (Alaska, Point Barrow, BMNH).

Trichocera (*Saltrichocera*) *bilobata* STARÝ , 1999

Fig. 18

Trichocera (*Saltrichocera*) *bilobata* STARÝ in KRZEMIŃSKA 2002a: 157

Trichocera (*Metatrichocera*) *bilobata* STARÝ 1999: Ent. Probl.: 3(1): 5, fig. 11-13 (male), 14-15 (female)

Diagnosis. Antennae: flagellomeres slightly swollen in male and female; verticils rather soft, 2x as long as pubescence. Thoracic pleura bare. Tarsal claw in male c. 1/3 of t5. Male: excision of sternite 9 broad and deep; bridge wide, rounded, halves distinctly separated at apex; gonostyle parallel-sided, rounded at apex, with distinct, triangular basal tubercle. Female: hypogynal valves very wide; ovipositor slightly shorter than genital segment, almost straight; proximal portion obtuse, distal narrow; apex rounded; setulose area moderately convex, almost reaching mid ovipositor, but rather poorly delimited; suture barely visible. Genital plate characteristically wider than long; genital fork short; prongs massive, but short; supragenital plate narrow, with two bristles.

Comparison. Male genitalia are most similar to those of *T.* (*S.*) *obtusa* and *T.* (*S.*) *carpathica* in having a well pronounced basal tubercle on gonostyle; in all three species the gonostyle is parallel-sided, and the sternite 9 is deeply incised. Among these species, *bilobata* has the most massive bridge; *carpathica* has longest gonostyles and lateral apodemes characteristically expanded. *T. obtusa* shares with *bilobata* dark body color, but the two species differ in setosity of thoracic pleura. Female ovipositor is distinct in shape and size; the genital fork is similar to that in *T.* (*S.*) *calva*, but the shapes of genital plates of both species are different; supragenital plate of *calva* has several bristles.

Additional description. Body colour dark brown. Antennae: flagellomeres slightly swollen in male and female; verticils rather soft, 2x as long as pubescence. Thorax: pleura bare. Legs: tarsal claw in male small and not much curved, c. 1/3 of t5 (hind leg; Fig. 18.F).

Male genitalia (Fig. 18.A-C). Sternite 9 with deep and broad incision, so that mostly lateral portions are visible in ventral view. Bridge rounded, halves broad, at apex rounded and distinctly separated, making impression of bridge being "bilobate". Between two paratypes examined by me there is a difference in height of the bridge and length of gonostyles (compare Fig. 18.A, B). Gonostyle moderately long, gently curved, parallel-sided; basal tubercle is characteristically prominent, triangular (Fig. 18.E). Aedeagal complex: parameres long (in Fig. 18.C their apices are missing); hood noticeable in lateral view; basal apodeme characteristic, narrow, relatively long and curved. Lateral apodeme rather narrow.

Female (Fig. 18.H-L). Sternite 8 with very wide hypogynal valves (Fig. 18.H, arrow). Ovipositor almost straight, a little shorter than genital segment, obtuse basally and strongly narrowed in distal third portion; dorsal margin slightly concave before apex which is obtuse. Setulose area delimited with suture, but poorly contrasting with the remainder, almost reaching mid ovipositor. Genital plate and fork (Fig. 18.I, L) very characteristic: the plate is shorter than wide, outline angular, incision at apex is wide, shallow. Genital fork is short, its apical portion massive, but shallow, slightly angular at sides. Supragenital plate narrow, with two bristles. Spermathecae with sclerotized portions of the ducts c. as long as spermathecal diameter.

Material examined. Paratypes: two males, Czech Republic, Moravia, Libavá env., Stara Vodá, 31.X. 1997 [6271]; female same locality, 12.XI. 1997 (J. STARÝ). Hungary (KRZEMIŃSKA 2001).

Distribution. The species is described from Czech Republic (Moravia), known from central and northeastern Europe: Lithuania (PETRAŠIŪNAS 2008); Czech Republic: Moravia; Slovakia: Mala Fatra; Poland: Bieszczady Mts. (STARÝ 1999); Hungary (lowland; KRZEMIŃSKA 2001).

Occurrence. All specimens recorded till now were collected in X-XI.

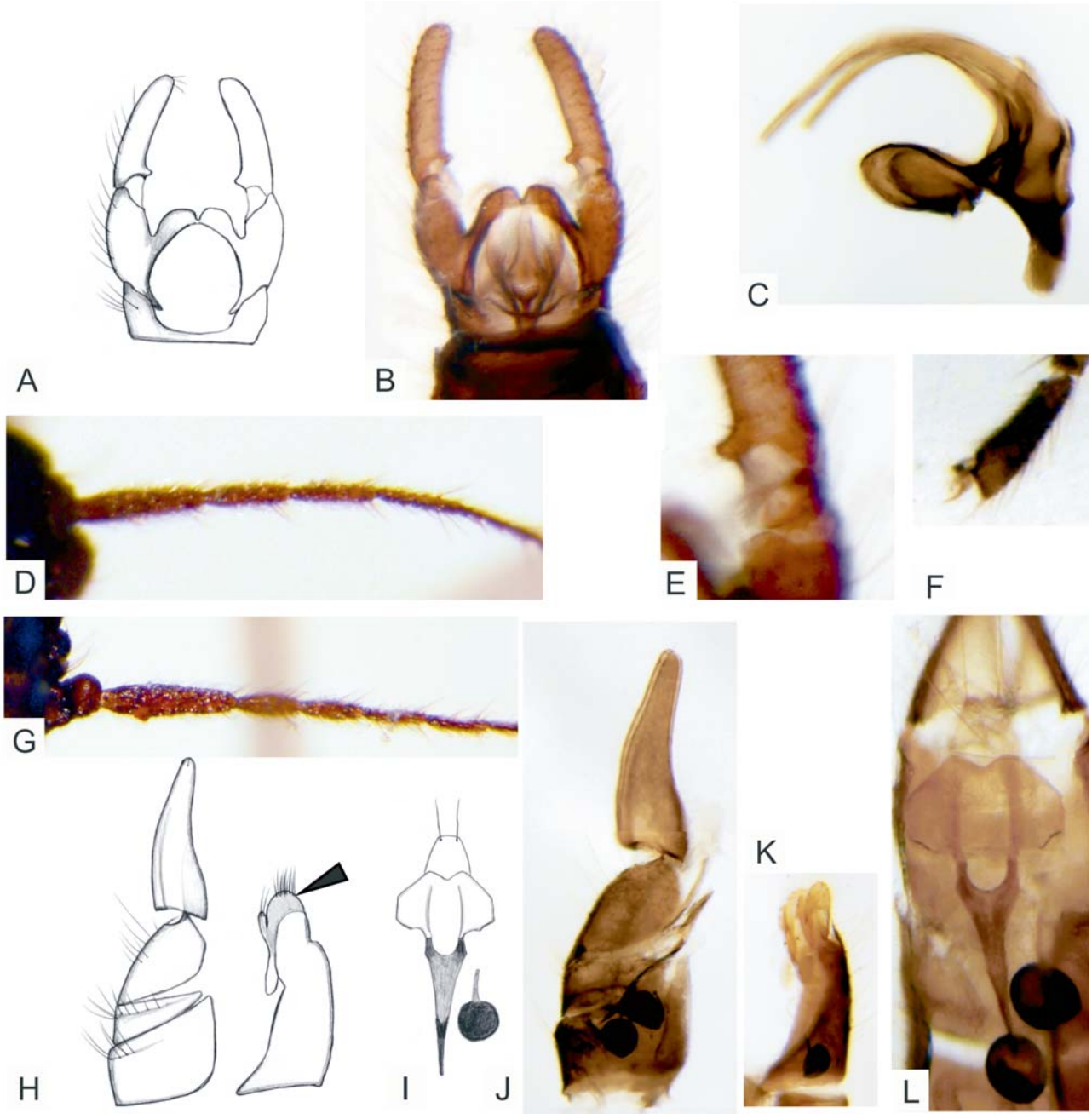


Fig. 18. *Trichocera* (*Saltrichocera*) *bilobata* STARÝ, 1999. A-F, male: A, B, drawing and photo of of genitalia; C, aedeagal complex; D, basal antenna; E, tubercle on gonostyle magnified; F, hind tarsal claw. G-L, female: G, antenna; H, I, drawings of outer genitalia and genital plates, respectively (arrow: wide hypogynal valves); J, ovipositor and tergites 8-10; K, sternite 8; L, genital plates. Specimens. Paratypes: male Libavá env., Stara Vodá, 31.X. 1997 [6271], female same locality, 12.XI. 1997 (leg. et det. J. STARÝ) (ISEA).

Trichocera (Saltrichocera) borealis LACKSCHEWITZ, 1934

Fig. 19

Trichocera (*Saltrichocera*) *borealis* in: DAHL & KRZEMIŃSKA 2008: fig. 1 (male), 2 (female)

Trichocera (*Saltrichocera*) *borealis* in: KRZEMIŃSKA 2002a: 157

Trichocera (*Metatrichocera*) *borealis* in: STARÝ 1998

Trichocera (*Trichocera*) *borealis* in: DAHL & ALEXANDER 1976

Trichocera borealis in: DAHL 1973: fig. 1-4, 12-13 (larva); 25-26 (pupa, male)

Trichocera borealis in: DAHL 1967a: fig. 22-33 (male), 67-72 (female)

Trichocera borealis LACKSCHEWITZ, 1934: Nathist. Avd. 9: 3, fig. 1a, b (male)

This species was recently described detailly on designation of the lectotype (DAHL & KRZEMIŃSKA 2008); the present diagnosis and additional description recapitulate briefly this article.

Diagnosis. Antennae short, c. twice as long as head; basal few flagellomeres are swollen. Thoracic pleura bare. Tarsal claw in male c. 1/2 of t5. Male genitalia: distal margin of sternite 9 straight, set with bristles; bridge rounded to angular; gonostyle parallel-sided, apex rounded, distinct basal tubercle on mesal face present. Aedeagal complex with long parameres, lateral apodeme narrow, elongated, directed to end of paramere. Female: hypogynal valves of medium width; ovipositor little longer than genital segment, shape variable; setulose area well delimited, convex. Genital fork bowl-like; supragenital plate with two bristles.

Comparison. The most similar species (both male and female) is *Trichocera* (*S.*) *sardiniensis* PETRAŠIŪNAS, 2009, known from the Mediterranean region (Sardinia and Morocco); for comparison and comment see description of this species. Among species living more north, the most similar males are those of *T.* (*S.*) *obtusa* and *montium* in having gonostyles of similar shape and large basal tubercles; both these species differ from *borealis* in long antennae and sternite 9 deeply cut out. The female genitalia, outer and inner, may be mistaken with several species (e.g., with females of the *regelationis* group, when clouds on their wings are not visible) but neither of them has that short and plump antennae.

Additional description. Antennae of male and female are short, c. twice the head length (Fig. 19.G, H), flagellomeres 1-4 swollen in male, in female antennae are even shorter and flagellomeres 1-7 plump; with strong verticils. Thorax: pleura bare. Legs: last two tarsomeres are equally long in all legs of female and male (Fig. 19.F); hind tarsal claw in male is large and strongly curved, c. 1/2 of t5.

Male genitalia (Fig. 19.A-E). Sternite 9 with straight distal margin (variations pictures in DAHL 1967a: fig. 27, 27, 31, 33), set with bristles; bridge highly vaulted, separated; gonostyle parallel-sided (see the difference in length and width in Fig. 19.B and E), wider only in basal part where large triangular tubercle is present on mesal face. Aedeagal complex: paramere long, hood visible in ventral view (Fig. 19.D, arrow), lateral apodeme triangular. Remarks on variation (geographical and within a population) are discussed by DAHL (1967a).

Female genitalia (Fig. 19.I-M). Hypogynal valves of medium width (Fig. L); ovipositor slightly longer than genital segment, of variable shape (Fig. 19.J-K); setulose area prominent, well delimited, darker than remainder and not reaching mid of ovipositor. Genital plate with a bowl-like fork (Fig. 19.I, M); supragenital plate with two bristles. Dark section of spermathecal duct is shorter than spermatheca's diameter.

Material examined. Europe: lectotype male, Spitsbergen Longyearbyen 14/7 -28 coll. S. SÖMME; paralectotype female, same data (both types designated by DAHL & KRZEMIŃSKA 2008). Spitsbergen, Diabasodden, Seefiord, swarm above cliff, 24.VII. 1954 – 3m, 31.VII. 1954 – 1m (C. J. PENNYQUICK; BMNH 1954-644). Faröer Islands, 1944 – 1m, 1f (J. R. STEWART; BMNH 1946 – 301). NE Greenland, Scoresby, Pingo Campside, 72°15', 23°55', 10.VII. 1970 – 1m (M. J. COTTON; BMNH 1971 – 394). Norway, Nedravatnet nr Straumen, VIII. 1980 (D. J. BRADLEY; BMNH). Asia: Taimyr, Dickson, near sea shore, 18.VII.1979 – 5m (leg. et det. V. LANTSOV). North America: Alaska, Pt Barrow, 29.VI. 1953 – 1m (P. D. HURD, det. C. DAHL); NWT Ellesmere, I. Fosheim Pen. Hot Weather Cr., 25.VI. 1990 – 3m, 1f (leg. et det. F. BRODO).

Distribution. The species has Holarctic circumpolar distribution. It was described from Spitsbergen, and later reported from Europe: Spitsbergen (DAHL 1957, 1973), King Karls Island (DAHL 1981); Greenland (DAHL 1967a; DAHL & KRZEMIŃSKA 2015); present also on Faröer Islands, as listed above. Asia, Russia: from Kola Peninsula to Chukchi Penins. (LANTSOV & TSCHERNOV 1987; PETRAŠIŪNAS & PARAMONOV 2014); North America: North West Territories, Alaska (DAHL 1967a).

Occurrence. A typical inhabitant of tundra (LANTSOV & TSCHERNOV 1987; see also remarks about *T. arctica*). Adults were caught VI to first half of VIII. In Spitsbergen, NWT and on Greenland this species is reported as the most common of trichocerids (DAHL 1973). The larvae are often coprophagous and live in holes of lemmings and north voles, also in vicivity of dead carcasses (DAHL, op. cit.; LANTSOV & TSCHERNOV 1987). According to observations of SYRJÄMÄKI (1968) on Spitsbergen, „males are intensively swarming over grass tussocks even in light rain; wind prevents from swarming".

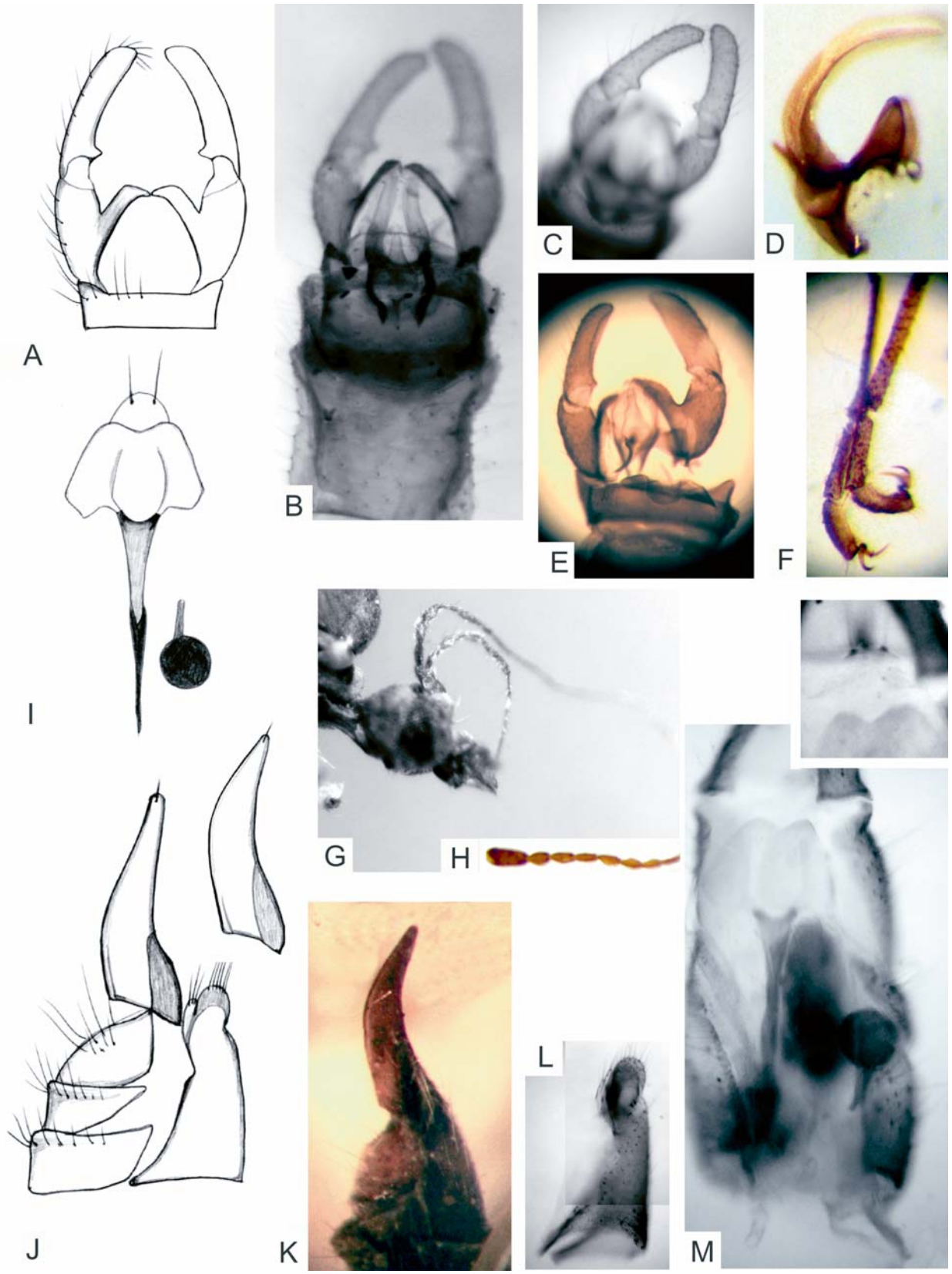


Fig. 19. *Trichocera* (*Saltrichocera*) *borealis* LACKSCHEWITZ, 1934. A-G, male: A, drawing of genitalia; B, male genitalia; C, gonostyles in dorsal view; D, aedeagal complex; E, genitalia in male from Faroer Islands; F, last tarsomeres (hind); G, length of antennae. H-M, female: H, antenna; I, J, drawings of outer genitalia (shape in paralectotype), variation in ovipositors (J) and genital plates (I); K, outer genitalia; L, sternite 8; drawing of; M, genital plate and apex of supragenital plate (above).
Specimens. B-D, F-G, male lectotype. E, Alaska, Pt Barrow, 29.VI. 1953 (P. D. HURD, det. C. DAHL); H, K, Faröer Islands, 1944 (J. R. STEWART; BMNH 1946 – 301); L-M, female paralectotype.

Trichocera (*Saltrichocera*) *brevis* KRZEMIŃSKA, 2002

Fig. 20

Trichocera (*Saltrichocera*) *brevis* KRZEMIŃSKA, 2002b: A. zool. crac.: 342, fig. 1C-F, 2-4, 5 (female), 7-10 (male)

Diagnosis. Probably a sibling species to *T* (*S.*) *saltator.* Antennae are shorter and flagellomeres more swollen, with scarce erect bristles. Major differences concern female whose ovipositor is c. as long as genital segment; inner genitalia and other features as in *T. (S.) saltator*. (See also the remarks on *T. brevis* and *T. fuscata* MEIGEN, 1818, in the section on *T. saltator*).

Comparison. Male genitalia of *T.* (*S.*) *brevis* are very similar to those of *T.* (*S.*) *saltator*, also to *T.* (*S.*) *pappi* and *T.* (*S.*) *rufulenta*, in having a massive sternite 9 with straight margin, and the gonostyles without tubercles. The distinguishing characters are listed under the description of *pappi.* However, males of *brevis* and *saltator* are very difficult to discern. Females of *brevis* are well recognizable among other females with oviposior of medium length by the inner genitalia: circular genital fork and supragenital plate with 4-6 bristles.

Additional description. Antennae: variation in length and shape of flagellomeres is greater than that in original description (KRZEMIŃSKA 2002b): male antenna may be as slender as that in Fig. 20.F, or more swollen; on the other hand, flagellomeres of female antennae are not always as spectacularly swollen as in Fig. 20.G. Tarsal claws in male (Fig. 20.D) are most often at least partially blackened at end. Shape of ovipositor is very variable (Fig. I, J; other types are pictured in KRZEMIŃSKA 2002b: fig. 1C-F). Hypogynal valves (Fig. 20.H, K) are of medium width.

Material examined. See KRZEMIŃSKA (2002b).

Distribution. Species was described from Poland, and was recorded from Hungary and Sweden (KRZEMIŃSKA 2002b), Czech Republic, Moravia and Slovakia (STARÝ 2004), Switzerland (under publication).

Occurrence. Adults were collected in IX-XI.

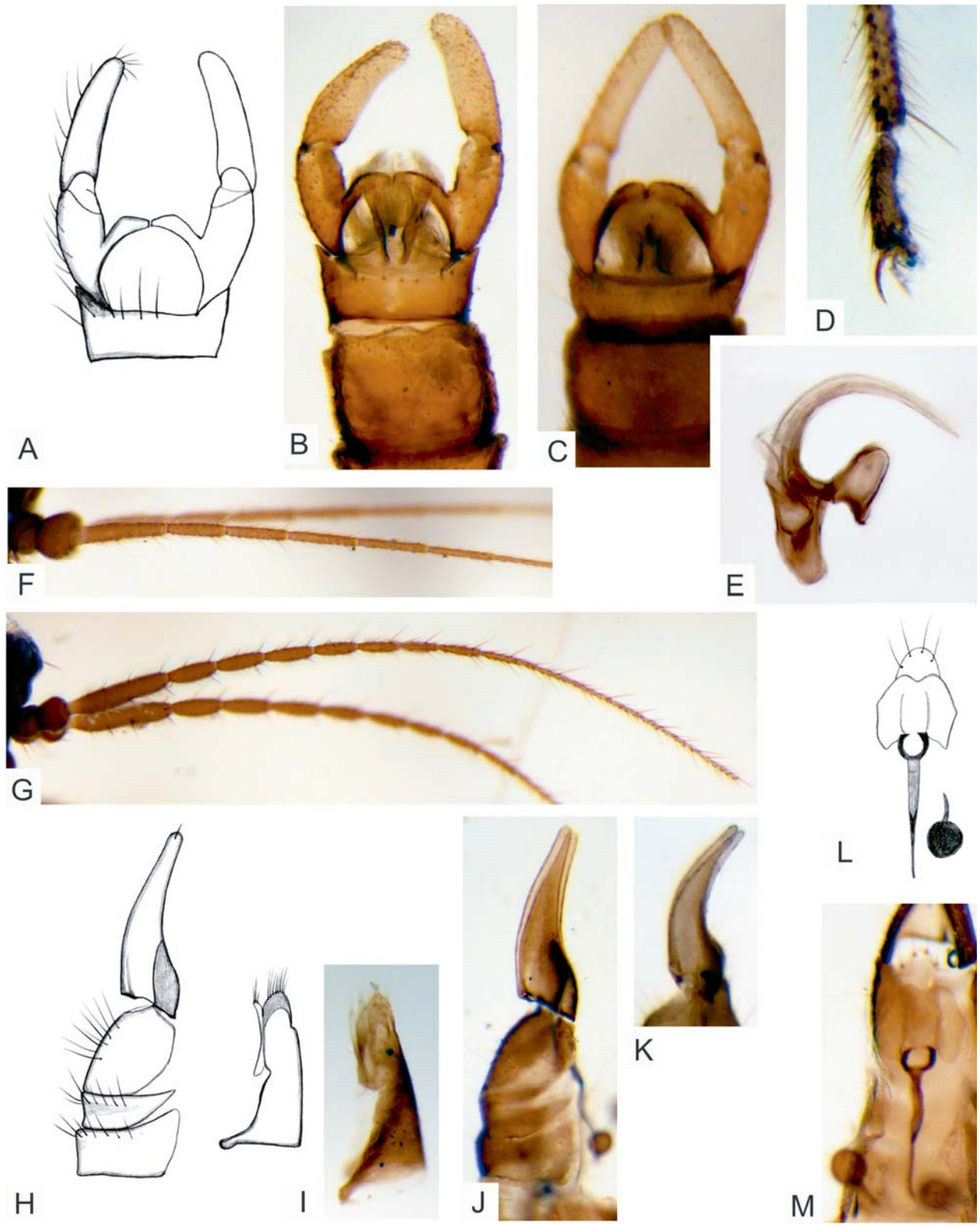


Fig. 20. *Trichocera* (*Saltrichocera*) *brevis* KRZEMIŃSKA, 2002. A-F, male: A, drawing of male genitalia; B, C, male genitalia, variation in length of gonostyles and width of sternite 9; D, hind tarsal claw; E, aedeagal complex; F, antenna. G-M, female: G, antenna; H, drawing of outer genitalia; I, sternite 8; J, K, variations in ovipositor; L, M, genital plates, drawing and photo. Paratypes, Poland: Wyskok n. Kętrzyn, 4.XI. 2001.

Trichocera (*Saltrichocera*) *calva* STARÝ, 1999

Fig. 21

Trichocera (*Saltrichocera*) *calva* in KRZEMIŃSKA 2002a: 157

Trichocera (*Metatrichocera*) *calva* STARÝ 1999: Ent. Probl.: 3, figs 1-5 (male, female), 22 (claw)

Diagnosis. Antennae: flagellomeres slender; verticils long (3-4x pubescence), erect. Thoracic pleura bare. Genitalia, male: bridge rounded, halves distinctly separated at apex. Incision of sternite 9 broad and deep. Gonostyle relatively long, parallel-sided, with a small basal swelling, apex round. Female: hypogynal valves are wide; ovipositor from as long as to longer (1.2x) than genital segment, gently curved, apex acute; setulose area long, reaching 1/3-1/2 ovipositor, well delimited; fork of genital plate massive, pentagonal, with darker lateral sclerotizations. Supragenital plate with four bristles.

Comparison. Male genitalia of *T. calva* are externally similar to *T.* (*S.*) *nordica* (differs by a deeper notch in sternite 9 and longer gonostyles), *T.* (*S.*) *sparsa* (differs by bare pleura, more delicate verticils on antenna, and longer gonostyles), and *T.* (*S.*) *antennata* (differs by bare pleura and longer f1). From all three species the males of *T. calva* differ also by the shape of aedeagal complex (Fig. 21.C; feature arrowed). The female's ovipositor is characteristic by its curvature (a strongly convex setulose area and a narrow distal section); the massive genital fork is very similar to that in *T.* (*S.*) *obtusa*, whose ovipositor has quite different shape.

Additional description. Body colour yellowish to light brown. Antennae (Fig. 21.E, F): flagellomeres in male long and slender, in female shorter and more plump; f1 c. 2x as long as f2, verticils sparse, long (3-4x pubescence), erect. Palpi relatively long and thin. Thorax: pleura bare. Legs: hind tarsal claw in male small and not much curved, c. 1/5 of t5 (Fig. 21.D). Wings: R2+3+4 shorter than R3+4.

Male genitalia (Fig. 21.A-C). Sternite 9 long; incision deep and broad, so that mostly lateral portions are visible in ventral view. Bridge small, rounded, halves broad and distinctly separated. Gonostylus moderately long, gently curved, parallel-sided; tubercle absent; only basal swelling is noticeable. Aedeagal complex: parameres rather short; hood characteristically horizontal in respect to long axis of aedeagal complex (Fig. 21.C, arrow). Lateral apodemes elongated.

Female genitalia (Fig. 21.G-L). Hypogynal valves wide (Fig. 21.I, K); ovipositor longer than genital segment, basal portion massive, distally narrowing to acute apex; dorsal margin slightly concave basally and apically (Fig. 21.H, arrow); setulose area long, well delimited by suture, reaching almost mid ovipositor. Genital plate (Fig. 21.G, L) longer than wide, with incision well marked; fork massive, pentagonal, with darker lateral sclerotizations; its prongs are slightly convergent. Supragenital plate broad, with 4 bristles. Spermathecae with sclerotized portions of the ducts c. 1.5x as long as spermathecae diameter.

Material examined. Paratypes: Poland, Bieszczady Mts., Wołosate 3.X. 1993 – 2 m, 1f , Cisna 1.X. 1993 – 1f (leg. et det. J. STARÝ). Additional material is listed papers with my authorship, see below.

Distribution. Holotype male, described from the Czech Republic. The species is probably ubiquitous in Europe. Czech Republic: Tatra Mts, Beskydy Mts., Moravia (STARÝ 1999). Poland: Bieszczady Mts. (STARÝ 1999); Romania (KRZEMIŃSKA & UJVAROSI 2002); Hungary: mountaineous and lowland localities (KRZEMIŃSKA 2001); Lithuania (PETRAŠIŪNAS & VISARČUK 2007); southernmost locality: Portugal (DAHL & KRZEMIŃSKA 2002); northernmost locality: Karelia (PETRAŠIŪNAS & PARAMONOV 2014).

Occurrence. All specimens recorded till now were collected in X-XI.

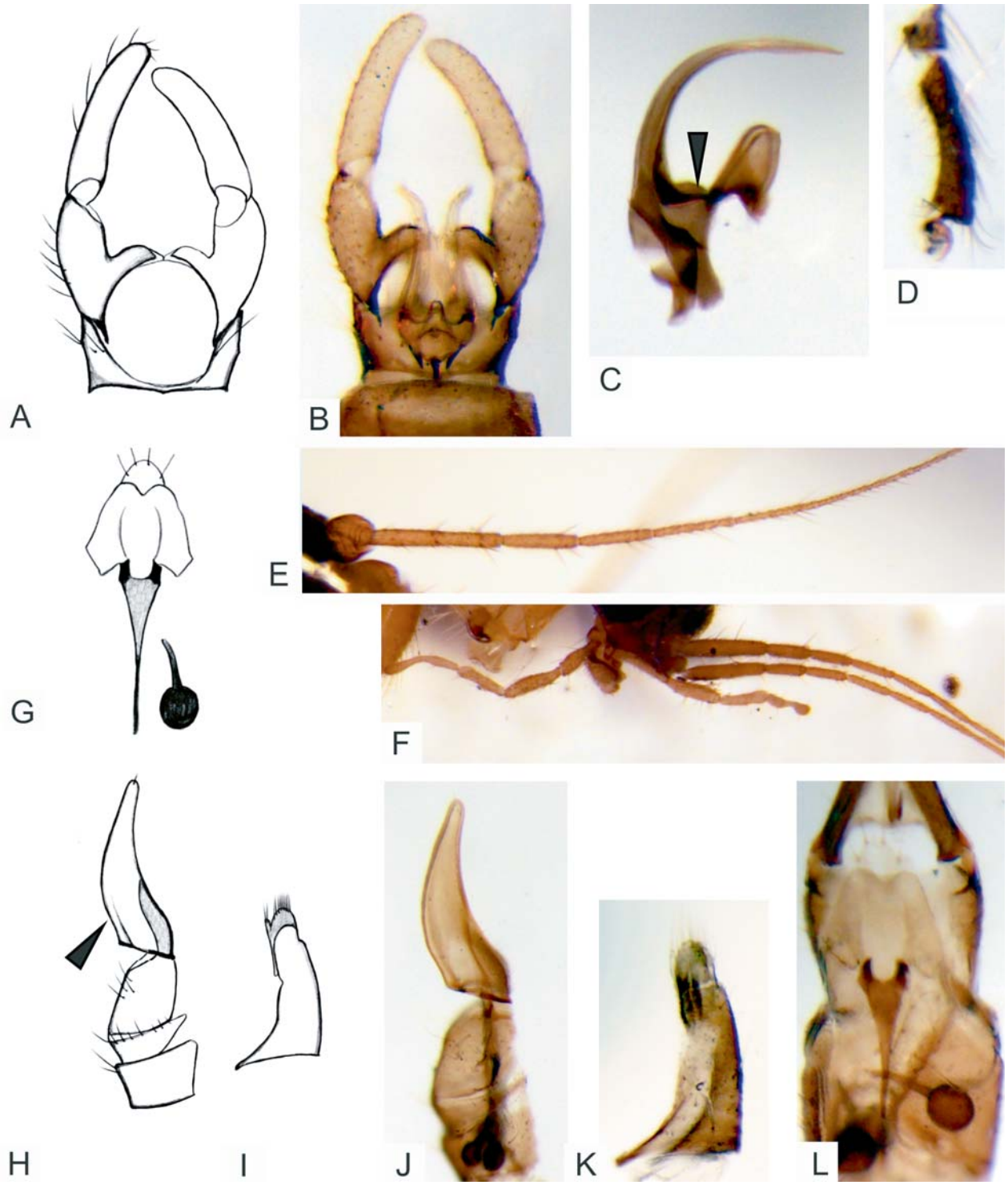


Fig. 21. *Trichocera* (*Saltrichocera*) *calva* STARÝ, 1999. A-E, male: A-B, genitalia ventrally, drawing and photo; C, aedeagal complex (arrow: horizontal, convex hood); D, hind tarsal claw; E, basal antenna. F-L, female: F, basal antenna; G, L, drawing and photo of genital plates, resp.; H, J, outer genitalia, drawing and photo, resp. (H, arrow: dorsal basal outline of ovipositor); I, K, drawing and photo of sternite 8.
Male and female paratypes, Poland, Bieszczady Mts: Wołosate, 3.X. 1993 (male), Cisna 1.X. 1993 (female) (leg. et det. J. STARÝ).

Trichocera* (*Saltrichocera*) *candida DAHL, 1976

Fig. 22

Trichocera (*Metatrichocera*) *candida* in: KRZEMIŃSKA 1992.

Trichocera (*Metatrichocera*) *candida* DAHL, 1976: Ent. Scand. 7: 63, fig. 13-18 (male)

Diagnosis. Member of the *mutica* group of species. Antennae long, verticils on flagellomeres stiff and erect. Thoracic pleura bare. Male: sternite 9 calyx-like,wide, slightly indented medially; gonocoxite broad, massive; bridge expanded into long, narrow triangle, separated at apex; gonostyle characteristic, S-shaped, with large mesal bulge; tip round. Hind tarsal claw in male c. 1/2 of t5. Female: sternite 8 with distinct protuberation between hypogynal valves which are separated by gap; ovipositor as long as genital segment, straight, triangular or almost so, setulose area flat, not delimited. Genital fork with massive prongs curved to inside. Supragenital plate broadly triangular, with two bristles.

Comparison. The gonostyles with large mesal bulges are unique for *T.* (*S.*) *candida*; further differences between four species of the *mutica* group are listed in the section on *T.* (*S.*) *mutica*.

Additional description. The species is belongs to the *mutica* group of species; beside the shape of gonostyles, nearly all other characters are similar to those of other members, *T.* (*S.*) *mutica*, *T.* (*S.*) *simonyi* and *T.* (*S.*) *andorrensis*: antennae with erect verticils (Fig. 22.E, F), shape of discal cell (Fig. 22.G; arrow); in male, shape of sternite 9 (Fig. 22.B) and of aedeagal complex (Fig. 22.C), and a large tarsal claw (Fig. 22.D). Female (Fig. 22.F-M) cannot be discerned from those in three other species; see remark on distribution.

Material examined. Poland: Beskidy Mts, Krynica, 18.I. 2012 - 1f; Kalonka n. Łódź, III. 2004 – 1f (leg. A. JAŻDŻEWSKA), and specimens from Tatra Mts. listed in KRZEMIŃSKA (1992); Dolina [valley] Miętusia at the outlet to Dolina Kościeliska, alt. 1050 m; 25.X. 2015 – 1m (leg. A. VAILLANT). Slovakia, Western Tatra Mts: Spalena Dolina, alt. 1450-1750 m, 9.X. 1996 – 1m; Rohačska dol., "Zverovka" env., alt. 1050 m, 8.X. 1996 – 1f (leg. et det. J. STARÝ).

Distribution. Type locality: Austria, Tirol. Records are from Switzerland (STARÝ & PODENAS 1995), Tatra Mts. in Poland ans Slovakia, Beskidy Mts., and the Upland of Łódź in central Poland (see above).

Occurrence. The species was known only from mountains, X-XI; the present finding of a single female from central Poland, and in March, is surprising. This location, Kalonka, is close to a large industrial city Łódź but in proximity of a few kilometers there is a natural reserve Włączyń and other forest complexes. Although the female of *T. candida* cannot be discerned from other species of the *mutica* group, this specimen was allotted here because *T. candida* is the only species of the *mutica* group known in Poland, and in this part of the Carpathians.

Remarks. The description of a female of *T. candida* in KRZEMIŃSKA (1992: fig. 9) is wrong. The identity of the female was ascertained later by Jaroslav STARÝ (see: Material examined).

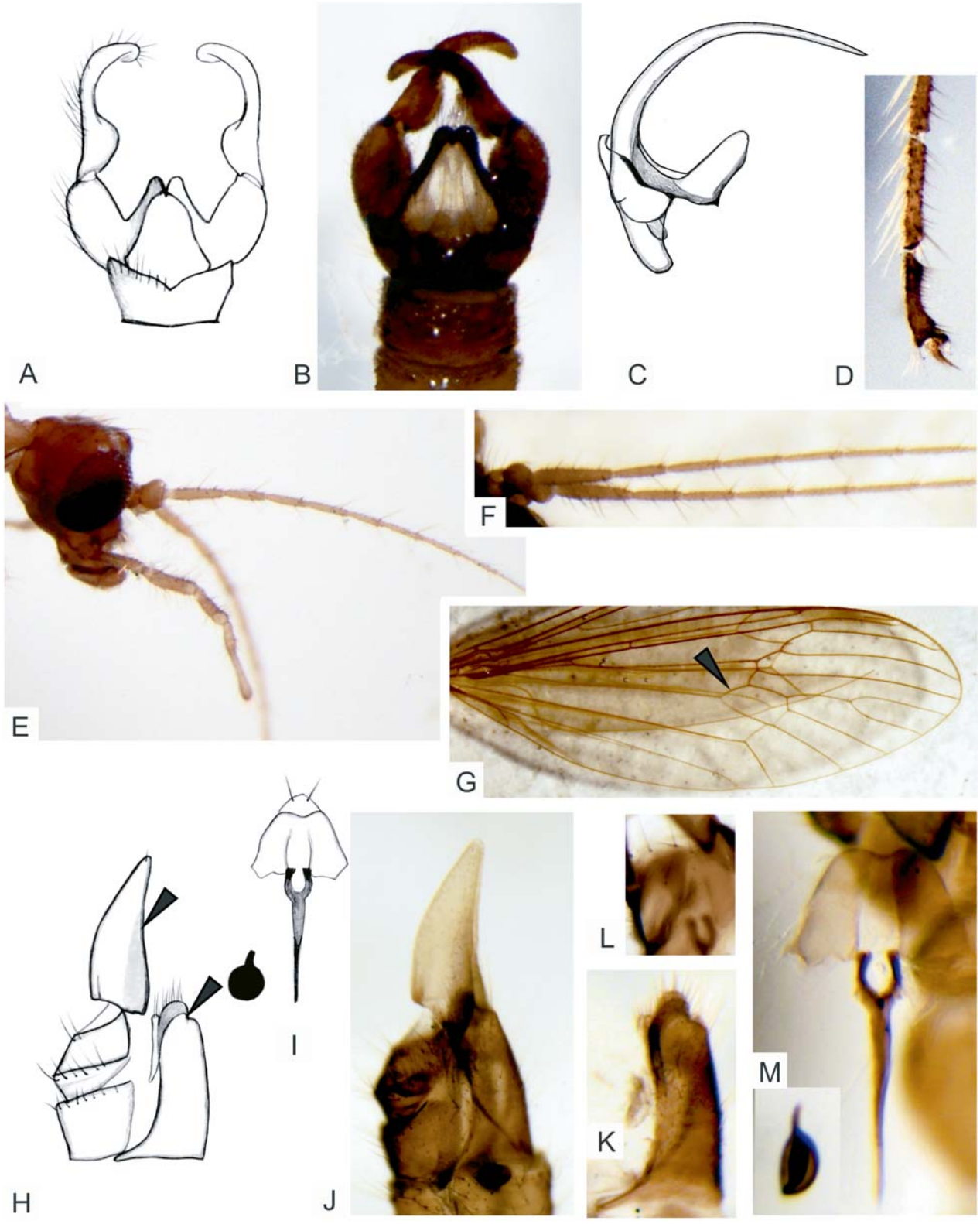


Fig. 22. *Trichocera* (*Saltrichocera*) *candida* DAHL, 1976. A-E, male: A-B, genitalia ventrally; C, aedeagal complex; D, hind tarsal claw; E, antenna. F-M, female: F, antenna; G, wing (arrow: long bM1+2 in discal cell); H, I, drawing of genitalia and genital plates, resp.; J, genitalia laterally; K, sternite 8 (arrow: protuberance); L, supragenital plate (note 3 bristles); M, genital plate and spermatheca. Male: Tatry Mts., Wodogrzmoty [Falls] Mickiewicza, alt. 1120 m, 5.XI. 1989 (EK, W. KRZEMIŃSKI). Female: Slovakia, Rohačska dol., "Zverovka" env., alt. 1050 m, 8.X. 1996 (leg. et det. J. STARÝ).

Trichocera (*Saltrichocera*) *carpathica* STARÝ & MARTINOVSKÝ, 1996

Fig. 23

Trichocera (*Saltrichocera*) *carpathica* in KRZEMIŃSKA 2002a: 158

Trichocera (s. str.) *carpathica* STARÝ & MARTINOVSKÝ, 1996: Ent. Prob. 27: 155, fig. 9, 18, 24 (male)

Diagnosis. Male: antennae long; flagellomeres slender, with erect verticils. Anepimeron and metanepisternum with few short setae or bare. Sternite 9 with outer margin deeply indented medially; gonocoxal bridge rounded, rather wide; gonostyle parallel-sided, with a distinct, finger-like basal mesal tubercle. Female unknown.

Comparison. Males of *T*. (*S*.) *carpathica* are distinctive by a large tubercle on gonostyle comparable in size to that in *T*. (*T*.) *hiemalis*, *T*. (*S*.) *parva*, and *T*. (*S*.) *obtusa*. The bridge in *T*. (*T*.) *hiemalis* is fused medially; *T*. (*S*.) *parva* and *T*. (*S*.) *obtusa* have shorter gonostyles; from these and any other species of the *implicata* group, *T*. (*S*.) *carpathica* can be discerned by the very long and narrow lateral apodemes of the aedeagal complex.

Additional description (for a detailed description see: STARÝ & MARTINOVSKÝ 1996). Flagellomeres short, thin, provided with erect distal setae. Wing narrow; the paratype I have examined has a very short cell m1 (Fig. 23.E, arrow). Hind tarsal claw (Fig. 23.F) short, c. 1/4 of t5.

Male genitalia (Fig. 23.A-D). Sternite 9 with outer margin deeply indented medially, with a still deeper medial notch. Gonocoxal bridge separated, rather wide and low, rounded (Fig. 23.C). Gonostyle almost parallel sided, with long, finger like basal tubercle provided with short setae; apex of the gonostyle is rounded, inclined to inside. Aedeagal complex (Fig. 23.D): parameres of medium size, lateral apodemes narrow and long.

Female unknown.

Material examined. Paratype male, Poland: Bieszczady Mts., env. Brzegi Górne, 2.X. 1993 (leg. J. STARÝ).

Distribution. A species known from Poland (Bieszczady Mts.) and Slovakia (Tatra Mts.) (STARÝ & MARTINOVSKÝ (1996)).

Occurrence. Montane species; adults were collected in X.

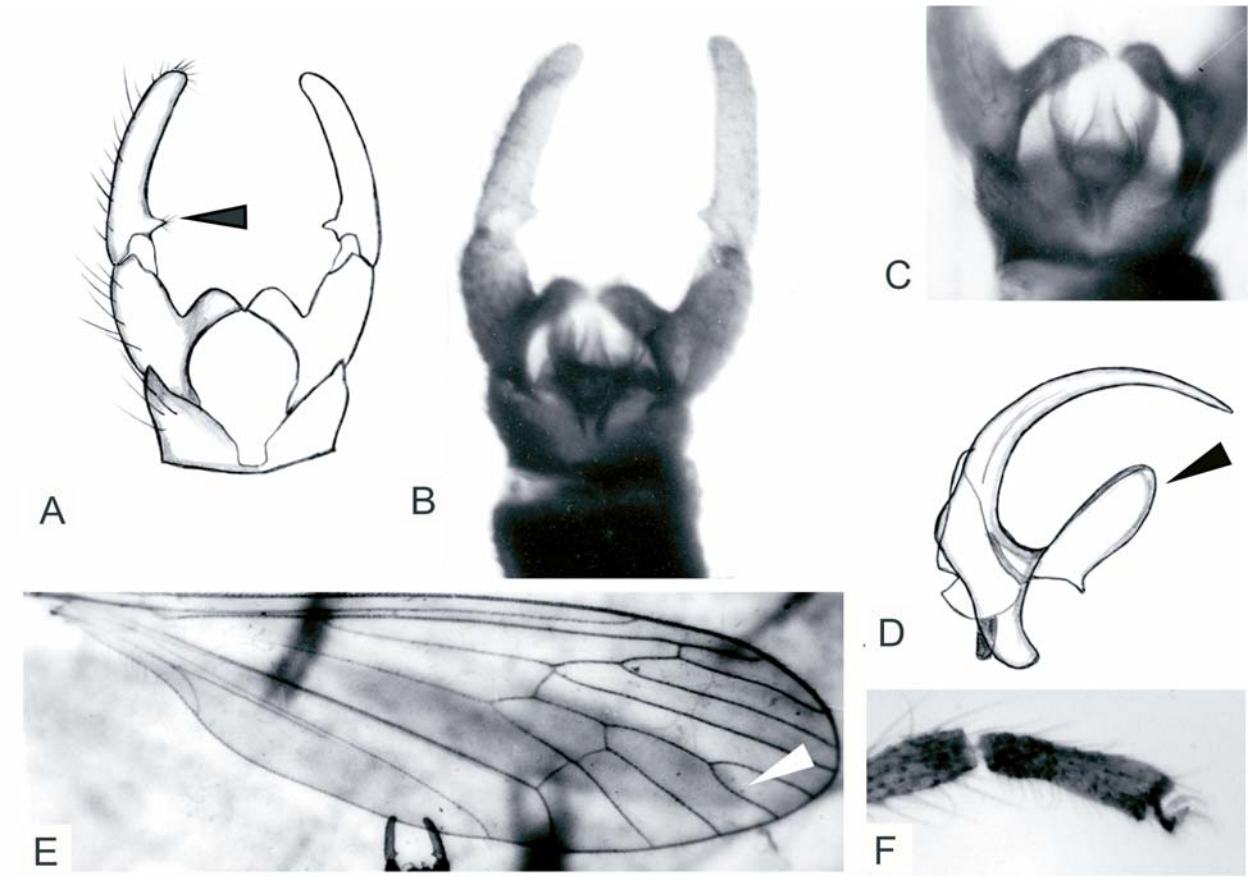


Fig. 23. *Trichocera* (*Saltrichocera*) *carpathica* STARÝ & MARTINOVSKÝ, 1996. Male: A, B, drawing and photo of genitalia (arrow: basal mesal tubercle of gonostyle); C, bridge magnified; D, aedeagal complex (arrow: long lateral apodeme); E, wing (short cell m1 arrowed); F, hind tarsal claw.
Paratype, Poland: Bieszczady Mts., env. Brzegi Górne, 2.X. 1993 (leg. J. STARÝ).

Trichocera (*Saltrichocera*) *columbiana* ALEXANDER, 1927

Fig. 24

Trichocera columbiana in PRATT 2003: fig. 30 (male)

Trichocera (*Metatrichocera*) *columbiana* in: STARÝ 1998

Trichocera (*Trichocera*) *columbiana* in: DAHL & ALEXANDER 1976

Trichocera columbiana in DAHL 1973: fig. 5-6, 15 (larva), fig. 27 (pupa)

Trichocera columbiana in DAHL 1967a: 49-78; fig. 34-39 (male), 48-51 (larva, pupa), 73-77 (female; misidentified)

Trichocera columbiana ALEXANDER, 1927: Can. Ent. 59 (Orillia): 70

Diagnosis (based on type specimens). Antennae relatively short; flagellomeres without long erect verticils, f1 only a little longer than f2, markedly swollen in female. Male: sternite 9 characteristically narrow (short axially), outer margin only mildly excised, with a row of bristles. Bridge delicate, highly vaulted, obtusely triangular. Gonostyle almost straight, parallel sided, without basal tubercle. Female: hypogynal valves wide; ovipositor little longer than genital segment, regularly curved; setulose area well delimited, short, convex. Genital plate heart-like incised at apex; prongs of fork long, slightly inclined to inside, stalk very long. Supragenital plate with two bristles close to each other.

The species is inluded here in the subgenus *Saltrichocera* based on its similarity to *T.* (*S.*) *saltator* and other species of this subgenus.

Comparison. Several features of male and female are similar to those in *T.* (*S.*) *saltator,* (*S.*) *brevis, T.* (*S.*) *rufulenta and T.* (*S.*) *pappi*: shape of flagellomeres and their soft setation, in male the shape of gonostyles; female has genital fork in shape of incomplete ring, which is similar to that in *saltator* and *brevis*, buth these have four bristles on supragenital plate. The main discerning feature in male genitalia is a narrow sternite 9 in *columbiana*. The bridge in *columbiana* is more delicate and rather triangular, as it is in *rufulenta* (roughly pentagonal in *saltator* and *brevis,* rounded in pappi).

Additional description of type specimens. Size: female wing 9 mm, male wing 8.2 mm. Body colour light yellowish brown. Antennae, male (Fig. 24.D): f1 is 1/3 as wide as pedicel and twice as long, and 1.1x as long as f2. Setation dense, half as long as width of f1; terminal bristles only twice as long as pubescence, soft, supressed. Antennae short, reaching a little behind the thorax if bent backwards. Antennae of female with initial segment markedly swollen (Fig. 24.G). Wings (Fig. 24.E): holotype with a very small d cell (0.13x wing length), m1 cell long , R2+3+4 1.7x R2+3. Female allotype: d cell proportionally longer (0.17x Wl), venation as in holotype.

Male genitalia (Fig. 24.A-C, F). Genitalia covered with coarse bristles. Sternite 9 narrow (axially) with mild, wide incision; outer margin with a row of delicate bristles. Bridge medially separated, high, delicate (Fig. 24.C), obtusely triangular; halves are not angulate but rather straight. Gonostyle long, almost straight, apex round, a trace of swelling on basal mesal face. Aedeagal complex (Fig. 24.F): paramere of medium length, in lateral view broad basally, basal apodeme long, narrow, gently curved to dorsal side; lateral apodeme elongated. Aedeagus with short, broad apodeme.

Female genitalia (Fig. 24.H-M). Hypogynal valves wide, separated by long gap (Fig. 24.L, arrow). Ovipositor longer (1.3x) than genital segment, slender, regularly curved; basal dorsal margin is convex (arrow in Fig. 24.H). Setulose area convex, a little longer than 1/3 ovipositor's length. Genital plate with shallow incision, prongs of fork long and slightly curved to inside, forming an incomplete ring; fork's stalk twice as long as plate. Supragenital plate with two bristles close to each other. Spermathecae: sclerotized portion of duct c. 1.2x diameter of spermatheca.

Material examined. Holotype *Trichocera columbiana* male, C.P. ALEXANDER; Type No. 52326, USNM; Prince Rupert BC; 6/7. 1919; Dyar coll. Allotype female *Trichocera columbiana*, C.P. ALEXANDER; Type No. 52326 USNM; Prince Rupert BC; 6/7. 1919; HG DYAR coll.; USNM 2050063.

Distribution. *T.* (*S.*) *columbiana* is described from northern Nearctic region: Alaska, Canada, Western USA (DAHL & ALEXANDER 1976). It was reported also from the Asiatic part of Arctic Russia (LANTSOV & CHERNOV 1987), but according to PETRAŠIŪNAS & PARAMONOV (2014) these records are doubtful; see also remarks below. To avoid further misidentifications of *T.* (*S.*) *columbiana*, the description of type material is included in this key.

Remarks. The descriptions of *T. columbiana* of DAHL (1967a) do not reflect the real characters of the holotype and the paratype female (allotype). A similar opinion was expressed also by PETRAŠIŪNAS & PARAMONOV (2014). The sternite 9 is very wide in the drawings of DAHL (1967a: 36, 39), while the holotype shows this sternite remarkably narrow (Fig. 24.B, C). The genital fork of a female in the description and pictures of DAHL (op. cit., fig.74, 76) is not bifurcated, and ends knoblike, unlike that in the allotype which has strong, long teeth slightly curved to inside (Fig. 24.M).

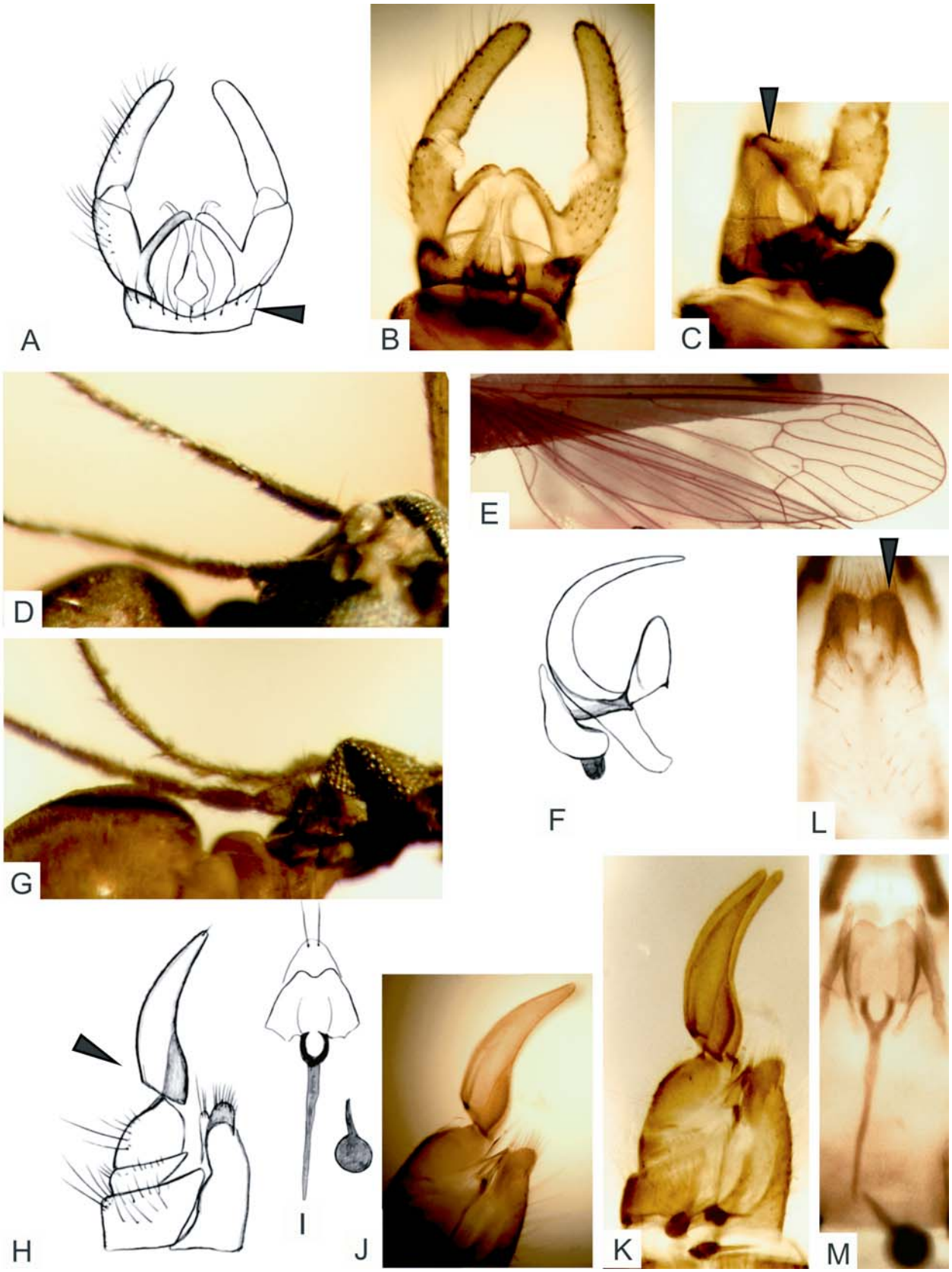


Fig. 24. *Trichocera* (*Saltrichocera*) *columbiana* ALEXANDER, 1927. A-F, male holotype: A, B, genitalia (arrow: narrow sternite 9); C, bridge laterally; D, aedeagal complex; E, basal antenna; F, wing. G-M, female allotype: G, basal antenna; H, I, drawings of ovipositor and plate, resp. (arrow: teeth of fork curved to inside); J, K, ovipositor and sternite 8; L, sternite 8 ventrally; M, genital plates. Data on type specimens are listed in Material examined.

Trichocera (*Saltrichocera*) *dahlae* MENDL 1971

Fig. 25

Trichocera (*Saltrichocera*) *dahlae* in PETRAŠIŪNAS & PARAMONOV 2014: fig. 1c. d, e (female), f, g, (male, tarsal claw and aedeagus)

Trichocera (*Saltrichocera*) *dahlae* in KRZEMIŃSKA 2002a: 158

Trichocera (*Metatrichocera*) *dahlae* in: STARÝ & PODENAS 1995

Trichocera dahlae MENDL in DAHL & ALEXANDER 1976: 15

Trichocera dahli MENDL 1971: 61, fig. 1, 2, by original description

Diagnosis. Antennae with soft, short verticils not much longer than pubescence. Thoracic pleura bare. Male: sternite 9 wide, deeply excised medially; bridge triangular, expanded at apex, distinctly separated; gonostyle characteristic, long and S-shaped, without any trace of tubercle, apex rounded. Female: hypogynal valves broad; ovipositor much shorter than genital segment, setulose area large, greatly convex, reaching beyond mid ovipositor; remainder of ovipositor strongly narrowed, tip rounded and darkened. Genital plate with shallow incision, prongs of fork shorter than distance between them, rounded. Supragenital plate with two bristles usually widely set.

Comparison. Both male and female are very characteristic and not to be confused with any other species; the ovipositor is one of two shortest among females of *Trichocera* (the other is in *T.* (*S.*) *rufulenta*, whose ovipositor is narrow). *T. dahlae* is a member of the *mutica* group of species; the similarity is visible in male genitalia.

Description. Body color usually light brown. Antennae: flagellomeres usually very slender in male; relatively so in female (Fig. 25.E, F, resp.); thicker in winter. Verticils in male antenna very soft and short, not much longer than pubescence. Thorax: pleura bare. Legs: hind tarsal claw in male small, 1/4 of t5 (Fig. 25.D), strongly curved.

Male genitalia (Fig. 25.A-C). Sternite and tergite 9 are long, calyx-shapex, characteristic to males of the *mutica* group. Sternite 9 wide, deeply excised; bridge triangular and expanded, halves slightly S- shaped, set at apex at low angle and distinctly separated. Gonostyle characteristic, long, thin and S-shaped, without any trace of tubercle, apex rounded. Aedeagal complex (Fig. 25.C): narrow in lateral view; hood conspicuous. Lateral apodemes narrow.

Female genitalia (Fig. 25.G-J). Tergite 10 rounded in lateral view. Sternite 8 with small protuberance between hypogynal valves, which are wide. Ovipositor much shorter than genital segment (c. 3/4 as long), setulose area well delimited, large, greatly convex, reaching beyond mid ovipositor; remainder of ovipositor strongly narrowed, tip rounded and darkened, contrasting with light color of ovipositor. Genital plate with shallow incision, fork shorter than wide, rounded, bowl-shaped. Supragenital plate with two bristles usually widely set apart. Spermathecae with ducts shorter than diameter.

Material examined. Specimens are listed in papers of, and co-authorized by, KRZEMIŃSKA, listed below. Abundant specimens from Poland, Krynica (Beskid Sądecki Mts.) were collected from snow by A. SOSZYŃSKA-MAJ and are under publication.

Distribution. Holotype male, described from Bayern, Germany (Allgau). A widespread and common species in Europe, in lowland as well as mountainous regions, noted up to 1400 m alt. (in Romania; UJVAROSI & KRZEMIŃSKA 2002). Sweden (DAHL & ALEXANDER 1976; KRZEMIŃSKA & GORZKA 2014); Norway (HÅGVAR & KRZEMIŃSKA 2007); Russia (St Petersburg; PETRAŠIŪNAS & PARAMONOV 2014); Lithuania (PETRAŠIŪNAS & VISARČUK 2007); Poland (MENDL 1982); Germany (DAHL 1999); Switzerland (STARÝ & PODENAS 1995); Austria (THALER 2000); France (KRZEMIŃSKA & BRUNHES 1991).

Occurrence. Adults appear IX to I. One of most frequent species encountered on snow (especially females).

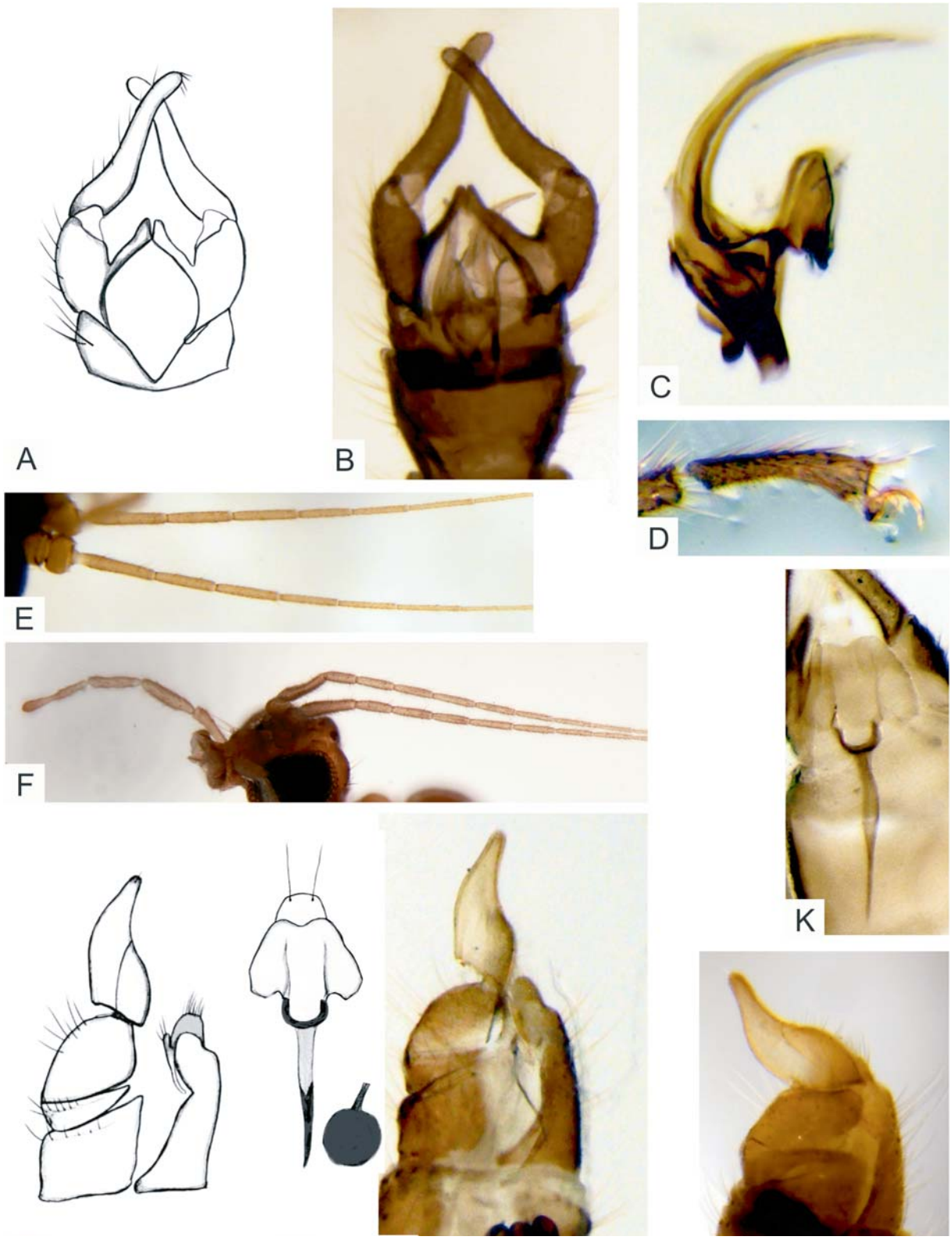


Fig. 25. *Trichocera* (*Saltrichocera*) *dahlae* MENDL, 1971. A-E, male: A, B, drawing and photo of genitalia; C, aedeagal complex; D, hind tarsal claw; E, antenna. F-K, female: F, antenna and palpi; G, I, genitalia, drawing and photo; H, K, genital plates, drawing and photo; J, ovipositor in characteristic position in females filled with eggs (untreated genitalia).
Male and female: Poland, Krynica Kopciowa 12.I. 2012 (J.M. ŁUSZCZAK).

Trichocera (*Saltrichocera*) *hirta* STARÝ & MARTINOVSKÝ, 1996

Fig. 26

Trichocera (*Saltrichocera) hirta* STARÝ & MARTINOVSKÝ in KRZEMIŃSKA 2002a: 158

Trichocera (s. str.) *hirta* STARÝ & MARTINOVSKÝ, 1996: Ent. Prob. 27: 162, fig. 19, 25 (male)

Diagnosis. Antennae with erect, long verticils. Anepimeron and metanepisternum with numerous long setae. Male: sternite 9 slightly indented medially, provided with a row of bristles; bridge characteristic, low and rounded, and very wide due to membraneous flange along inner margin; gonostyle much longer than gonocoxite, slightly S-shaped, without any trace of tubercle; apex rounded, inclined to inside. Lateral apodeme of aedeagus is very long, raised to parameres. Female unknown.

Comparison. The shape of gonostyles and of the bridge makes this species outstanding and not to be confused with any European species. A strikingly similar species, *T.* (*S.*) *latipons* PETRAŠIŪNAS & PODENAS, 2017, was recently found in Korea. The difference between this Korean species, and the Europaean *T.* (*S.*) *hirta* are: longer gonostyle, heavy setosity of pleurae and, possibly, of the antennae in *hirta*. The bridge and the aedeagal complex with a very long lateral apodeme are of same shape.

Additional description (following STARÝ & MARTINOVSKÝ 1996). Male antenna (Fig. 26.G) very long, reaching mid abdomen; flagellomeres thin, provided with very long, erect distal setae. Anepimeron and metanepisternum with numerous long setae. Wing: outer angle of d cell acute (Fig. 26.E, F, arrow).

Male genitalia (Fig. 26.A-D, H-I). Sternite 9 with outer margin partially desclerotized and slightly indented medially, provided with a row of bristles. Gonocoxal bridge is characteristic, distinctly separated, wide, rounded and low; along its inner margins a wide membraneous flange is present (Fig. 26.A, C, arrows). Gonostyle is much longer than gonocoxite, slightly S-shaped, without any trace of tubercle; apex rounded, inclined to inside. Aedeagal complex with lateral apodeme narrow and extremely long, directed to paramere (Fig. 26.D, arrow). Tarsal claw is not mentioned in the description of STARÝ & MARTINOVSKÝ (1996); tarsi in the paratype in my disposition are missing, and in the specimen from Switzerland only fore and mid tarsi are preserved; the claws are c. 1/4 of t5.

Female unknown.

Material examined. Paratype, Italy. Switzerland: Couvet 780 m (CH, NE), 538,6/198,0; 26-27. X. 1984 – 1m (T. Malaise lumineuse, J-P. JEANNERET; MHNN).

Distribution. A species known from the Italian (holotype: alt. 1960 m) and Swiss Alps, but a very similar species in Korea (see the remark under Comparison) suggests that the distribution may be across entire Palaearctic, and the differences between these two species exemplify clinal variation.

Occurrence. Montane species; specimens were collected IX-X.

Remark. The specimen from Switzerland has the gonostyles less curved than in the type specimen, and a lateral apodeme in the aedeagal complex is less extended than that in Fig. 26.D. Nevertheless, the length of gonostyle, shape of the bridge, and a distinct flange along its inner margin allow to include this male in the species.

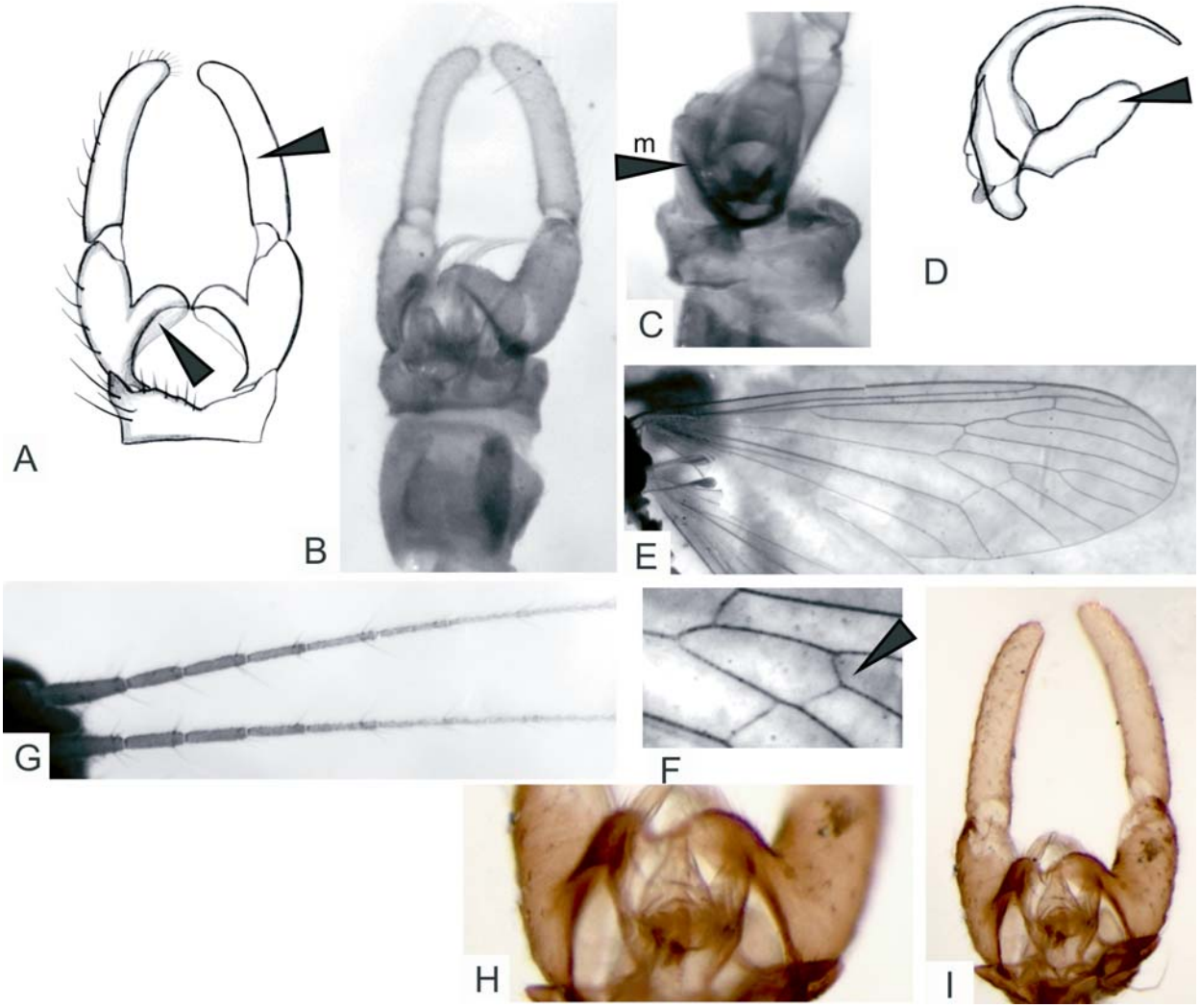


Fig. 26. *Trichocera* (*Saltrichocera*) *hirta* STARÝ & MARTINOVSKÝ, 1996. A, drawing of genitalia; B-F, paratype: B, C, genitalia lateroventrally and laterally (arrow: lateral apodeme); D. aedeagal complex; E, wing; F, antenna. G-H, specimen from Switzerland: G, bridge magnified; H, genitalia ventrally.
Males: B-F, paratype; G-H, Switzerland: Couvet 780 m (CH, NE), 538,6/198,0; 26-27. X. 1984 – 1m (T. Malaise lumineuse, J-P. JEANNERET; MHNN).

Trichocera* (*Saltrichocera*) *implicata DAHL, 1976

Fig. 27.1 (male, female), 27.2 (additional pictures)

Trichocera (*Saltrichocera*) *implicata* in: KRZEMIŃSKA 2002a: 158

Trichocera s. str. *implicata* in: STARÝ & MARTINOVSKÝ, 1996 (redescription): fig. 5, 14, 20 (male), 26, 30 (female)

Trichocera (*Trichocera*) *implicata* DAHL, 1976: 59, fig. 1-6 (male)

Diagnosis. Antenna: flagellomeres from slender to oval, also in male; verticils short, 2x as long as pubescence, relatively delicate. Male: bridge triangular, halves tightly set at apex; incision of sternite 9 deep, triangular to rectangular; gonostyle only slightly narrowing toward apex. Hind tarsal claw in male delicate and not much curved, c. 1/4x t5. Female: hypogynal valves wide; ovipositor slightly shorter than genital segment, with convex setulose area ending just before or at midlength; distal portion with straight margins. Genital plate wider than long, incision very shallow, prongs of fork rounded, bent to inside; supragenital plate with two bristles.

Comparison. Male genitalia are similar to those of *T.* (*S.*) *recondita*; the main difference is a rounded apical portion of the bridge in *recondita* (triangular in *implicata*). Female: shape of ovipositor is distinct by the ovipositor short and broad basally, while it is longer and more slender in *T. recondita*; both species have same shape of genital plates and fork (and same range of variation regarding the distance between bristles of supragenital plate, and length of sclerotized ducts of spermathecae). According to STARÝ & MARTINOVSKÝ (1996), *T. recondita* has more delicate verticils on flagellomeres and reddish body colour.

Additional description. Species has been detailly redescribed by STARÝ & MARTINOVSKÝ (1996). Females are usually much larger than males. Antennae: flagellomeres are most often slender as in Fig. 27.1.D, G, but, especially in winter, they may be quite plump (Fig. 27.2.A-B), also in male. Wing very variable, R2+3+4 usually longer than R3+4.

Male genitalia (Fig. 27.1.A-C, E). Incision of sternite 9 deep, triangular or rectangular, variable. Gonocoxite rather broad, bridge triangular, vaulted; halves tightly adherent in middle (in unprepared males; after preparation contact between them is somewhat loosened). Gonostyle almost straight to mildly curved to inside, slightly narrowing towards apex; basal tubercle small, but distinct (larger in prepared genitalia). Aedeagal complex: paramere narrow, also basally, of medium length (ending slightly beyond level of lateral apodeme). Hood prominent in lateral view (Fig. 27.1.E, arrow).

Female genitalia (Fig. 27.1.H-O). Hypogynal valves very broad; between them there is a small protuberance in sternite 8 (Fig. 27.1.K, arrow). Ovipositor little shorter than genital segment, setulose area strongly convex, not reaching mid ovipositor; variations in shape are shown in Fig. 27.1.J, L and Fig. 27.2.C-D. Noteworthy, females in Scandinavia have often very broad ovipositors, as that in Fig. 27.1.L. Genital plate (Fig. 27.1.M, N) is characteristically shorter than long, and its apical lobes are very wide; incision between them is shallow and wide; prongs of fork are curved to inside, delicate, slightly shorter than distance between them. Supragenital plate with an apex seemingly rectangular and two bristles usually widely set apart, but subject to variation; when dyed, plate reveals triangular apex, poorly sclerotized and therefore usually invisible (compare Fig. 27.1.N and O of same plate). Spermathecae with ducts longer than diameter.

Material examined. Czech Republic, Moravia, Jeseníky Mts.: Petrovy kameny, peat-bog (1330 m), 31.X. 1995 – 1m; Praděd, Bilii Opava valley (alt. 1050-1250 m), 5.XI. 1996 – 1m; Studanka, alt. 1500 m, 6.XI. 1996 – 1f, alt. 900 m, 6.X. 1996 – 1f. Slovakia, W. Tatra Mts.: Rohačska Dolina "Zverovka", alt. 1050 m, 8.X. 1996 – 1m; Spálena Dolina, alt. 1300 m, 9.X. 1996 – 1m (all leg. et det. J. STARÝ). Sweden: Uppsala, Botanical Garden, 17-19.X. 1999, multiple males and females (leg. EK & C. DAHL); Sweden and Finland: KRZEMIŃSKA & GORZKA (2014). Norway: listed in HÅGVAR & KRZEMIŃSKA (2007). Poland: recorded as *T. japonica* by KRZEMIŃSKA (1992b); for other unpublished records see end of this chapter.

Distribution. Type locality: Sweden, Lappmark, Messaure. Central and northern Europe, also in Great Britain (personal observation of Julian SMALL, UK). The species is ubiquitous and occurs in lowland to montane regions, up to altitude 1300 m (STARÝ & MARTINOVSKÝ 1996), but may be found also in city gardens.

Occurrence. Adults fly from end IX-II. Females frequently are found on snow (HÅGVAR & KRZEMIŃSKA 2007).

Remarks. STARÝ & MARTINOVSKÝ (1996) discussed the identity of three species:

T. implicata – described from Sweden

T. japonica MATSUMURA, 1915 – described from Japan

T. excilis DAHL, 1967 – described from Canada, Yukon (DAHL 1967a: 71), and synominized with *T. japonica* by DAHL (1967b: 198).

STARÝ & MARTINOVSKÝ (1996) checked the holotype of *T. excilis* (op. cit, fig. 12-13) and resurrected it from synonymy with *T. japonica*, based on the widely disjunct distribution of both species (although the holotype of *T. japonica* was not examined). They consider both species absent from Europe; later on, several Europaean species of the *implicata* group of species have been described in this and next papers by STARÝ (*T. pubescens*, *T. sparsa*, *T. obtusa*, *T. carpathica*, *T. alpina*, *T. thaleri*, *T. montium*). The females of these species are quite distinctive, but cannot be

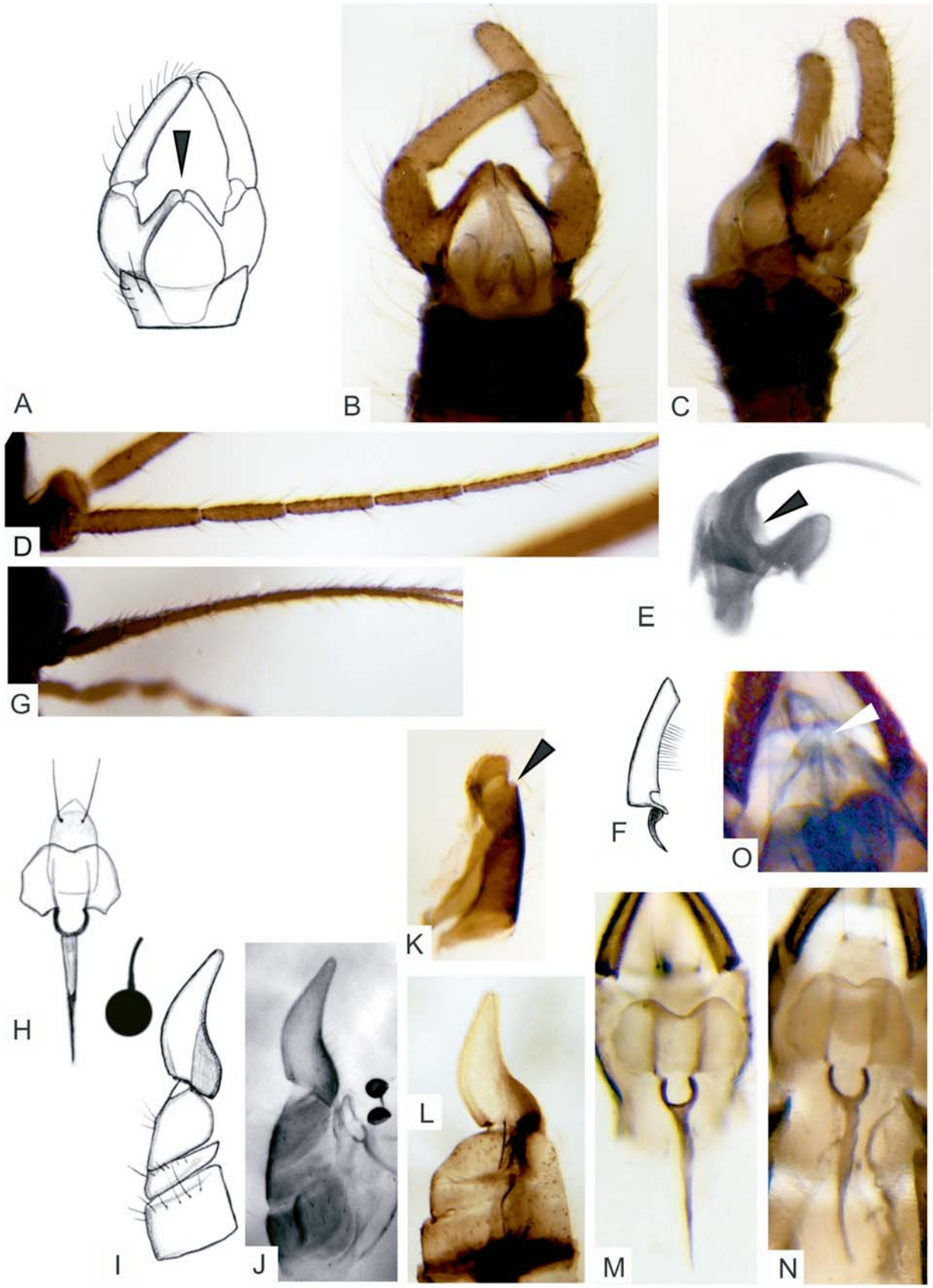


Fig. 27.1. *Trichocera* (*Saltrichocera*) *implicata* DAHL, 1967. A-F, male: A, drawing of genitalia; B, C, genitalia ventrally and laterally; D, antenna; E, aedeagal complex (arrow: hood); F, hind tarsal claw. G-O, female: G, antenna; H, I, drawing of ovipositor and genital plates; J, L, variation in ovipositors; K, sternite 8 (arrow: protuberance between valves); M, N, genital plates; O, apical portion of dyed supragenital plate N.
Specimens: B, C, D, G, N, O, Poland: Krynica, oddz. 92, Mochnaczka Wyżna, 13.XII. 2011 (M. J. ŁUSZCZAK); E, J, K, paratypes: male, Czech Republic, Moravia, Jeseníky Mts.: Petrovy kameny, peat-bog (1330 m), 31.X. 1995; female, Studanka, alt. 1500 m, 6.XI. 1996 (leg. et det. J. STARÝ); L-M, Sweden, Uppsala, Botanical Garden, 17-19.X. 1999 (EK & C. DAHL).

compared with *T. japonica* from Japan, because the female of *T. japonica* was not described. It may appear that, after all, *T. japonica* should be identified with one of them, when the holotype and female appear available.

Recently more „Europaean" species have been found in Asia, thanks to Lithuanian and Russian dipterists: PETRAŠIŪNAS & PARAMONOV (2014) and PETRAŠIŪNAS & PODENAS (2011, 2017), and prove their wide, Palearctic distribution. Quite possibly *T. japonica* may appear identical with one of the species described by STARÝ, but identification would call for a study of this species of Japan, and, first of all, for the description of female.

Records of *Trichocera implicata* from Poland: Gdańsk-Oliwa, garden, 21.X. 1989 – 5m (R. SZADZIEWSKI); Łódź, Las Łagiewnicki 25.I. 1995 – 7m, 2f (-2°C, on snow; B. SOSZYŃSKI); Gorce Mts.: Zabrze 26.X.1989 – 2m, 4f (J. WIEDEŃSKA), Przysłop-Małe Jaszcze, 15-17.X. 1991 – 10m (E. SKALSKA), Rdzawka, 5.XI.1989 – 25m (W. KRZEMIŃSKI); Ojców National Park, 19.XI. 1992 – 10m, 3f (A. KLASA, A. VAILLANT); Pogórze (Upland) Przemyskie: Bachórz n. Dubiecko, 21.XI. 1989 – 12m, 4f (W. KRZEMIŃSKI); Bieszczady Mts: Ustrzyki Górne 26.X. 1989 – 3m, 3f (W. KRZEMIŃSKI), potok (creek) Zwór, 800-900 m, 22-24.X. 1992 – 7m, 2f (E. KRZEMIŃSKA), potok (creek) Halicz, alt. 650 m, 21.X. 1992 – 4m (E. KRZEMIŃSKA), Lutowiska 26.X. 1989 – 6m (W. KRZEMIŃSKI); Pieniny Mts: Krynica, on snow: 16.I. 1999, +2°C, 1m; 27.I. 99, 0°C - 5m (A. SOSZYŃSKA); Tatra Mts, Głodówka, alt. 1100 m, 5.XI. 1989 – 4m (W. KRZEMIŃSKI), Wodogrzmoty [falls] Mickiewicza, 5.XI. 1989 – 6m (E. KRZEMIŃSKA); Beskidy Mts.: Krynica Kopciowa, oddz. 5, on snow, fir forest, -3°C, 3.XII. 2012 – 2f (M. ŁUSZCZAK). All housed in ISEA PAS.

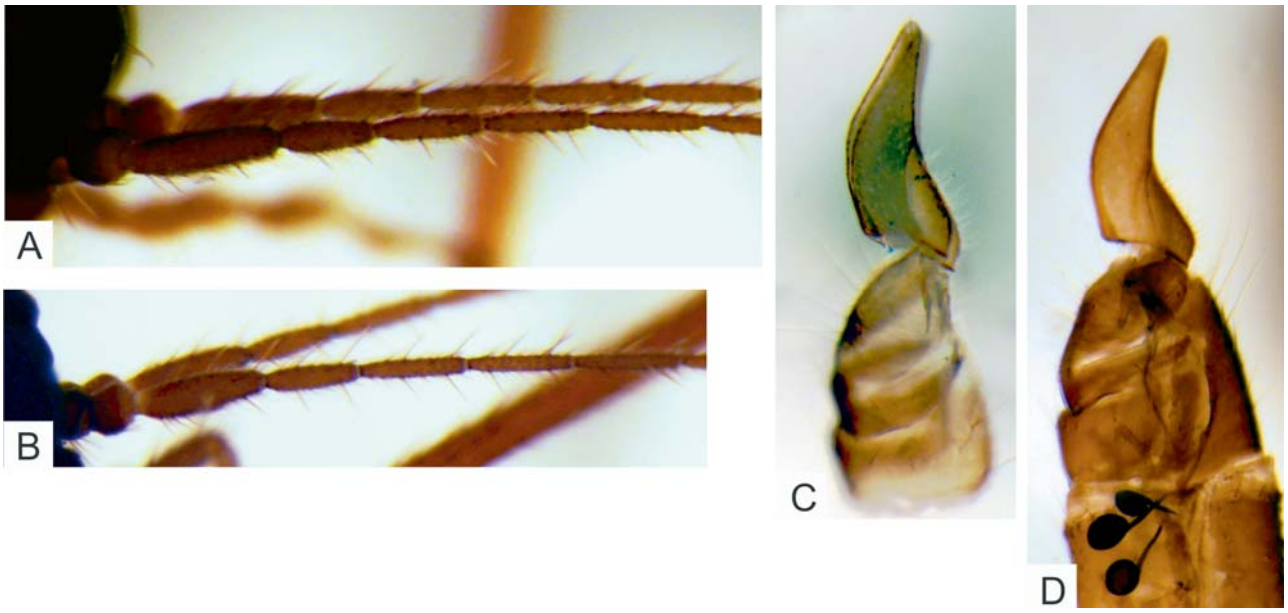


Fig. 27.2. *Trichocera* (*Saltrichocera*) *implicata* DAHL, 1967, cont. A, B, male and female antenna, respectively; C, D, variation in ovipositors. Specimens: Poland: Krynica Kopciowa, oddz. 5, on snow, fir forest, temp. -3°C, 3.XII. 2012 (M. ŁUSZCZAK).

Trichocera longa, n. sp.

Fig. 28

syn. *Trichocera inexplorata* DAHL, 1967 (only female): DAHL 1967b: Opusc. ent.: 192, fig. 20-24

Zoobank Account:
urn:lsid:zoobank.org:pub:9CC4F52B-9F46-43F5-8596-15019C70018E

Diagnosis. Antenna: flagellomeres elongated. Female: ovipositor c. 1.5x as long as genital segment, thin beyond base which is markedly convex; prongs of fork of genital plate are short and rectangular; supragenital plate with two bristles. Male unknown.

Comparison. Ovipositor is very similar to that of *T.* (*S.*) *saltator*; two species differ in shape of genital fork, which in *T. saltator* is almost circular. Antennal flagellomeres in *T. longa* are much longer, and subcostal vein is densely set with setae, unlike *T. saltator*.

Description. Large species, wing length 8-9 mm. Antennae long, first flagellomere (Fig. 28.A) thin, elongated, c. 4x as long as pedicel and twice as long as second flagellomere. Wing: R2+3+4 is twice as long as R2+3 (Fig. 28.B; arrows); d cell is broad, subrectangular and cell m1 is 2-3x as long as petiole (i.e., distalmost section of M1+2). Hind tarsal claw is c. 1/4 of 5th tarsomere (Fig. 28.C).

Female genitalia (Fig. 28.D-G). Hypogynal valves of medium width; their lateral portions are short (Fig. 28.D, arrow). Ovipositor long (1.5x genital segment); setulose area is greatly convex, constrasting with thin remainder of ovipositor; apical dorsal margin with slight, shallow indentation just before apex which is rounded. Genital plate (Fig. 28.F, G) with heart-like, deep incision; genital fork with straight, short, parallel prongs; at their bases small sharp extensions make expression of rectangular fork. Supragenital plate with two bristles closely set. Sclerotized sections of spermathecal ducts are slightly shorter than diameter of spermatheca.

Male unknown.

Material examined. Holotype female, Finland, Kuusamo Ecological Station, 24. IX.-1.X. 1973 (coll. K. MÜLLER); paratypes Finland, Ks Kuusamo: 21.X. 1968 – 1f; 29.X. 1968 – 1f ; 10. X. 1969 – 2f; 21.XI. 1971 – 1f ; [(leg. E. HUTTUNEN). Additional material: Sweden, Messaure: iche reg. 1970-71 – 1f.

Distribution. Scandinavia (Sweden: DAHL 1967b; Finland).

Remarks. The female of this species has been erroneously described as *T. inexplorata* (DAHL 1967b: fig. 20-24).

Large size, thin and long antennae and legs, and short palpi in the female of *T. longa*, n. sp., are similar to those in male of *T. mendli*, whose female is unknown. Both species occur in same region in Scandinavia. However, their thoraces differ in several features: shape of the scutum, upper part of anepisternum, more angular shape of katepisternum and meron in *T. mendli* (Fig. 28.H, I, arrows), therefore the identity of both species is rejected.

Classification to the subgenus is not possible until the male is known; the species is provisionally included in the section on *Saltrichocera*. To faciliate further search for the male of *T. longa*, additional features are pictured. The claw in the female is very short and curved; it is expected that the claw in male is also short, by analogy with other species.

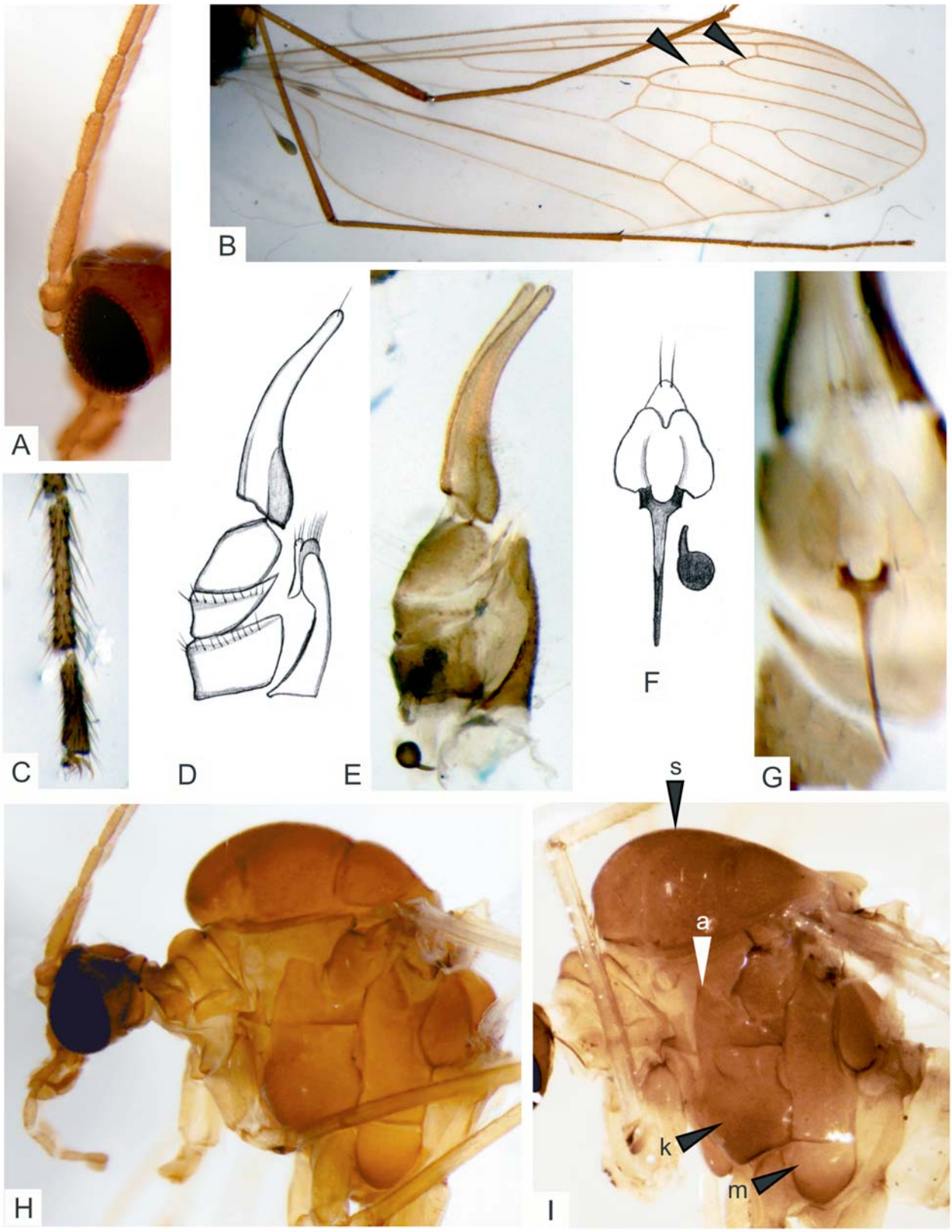


Fig. 28. *Trichocera longa*, n. sp., female: A, B, basal antenna; C, hind tarsal claw; D, wing (arrows: R2+3+4 and R2+3); E, G, drawing and photo of outer genitalia; F, H, drawing and photo of genital plates; I, J, thorax of *T. longa* and *T. mendli*, respectively (arrows mark differences, explained in text).
Holotype (A, C-I); paratype (B); Finland, Kuusamo Ecological Station, 24. IX.-1.X. 1973 (coll. K. MÜLLER).

Trichocera maculipennis MEIGEN, 1818

Fig. 29.1, 29.2

Trichocera (*Saltrichocera*) *maculipennis* in Maritime Antarctica: VOLONTERIO et al. 2013: fig. 2 (adults); POTOCKA & KRZEMIŃSKA 2018: fig. 3 (larvae); POTOCKA et al. 2020: molecular identification

Trichocera (*Metatrichocera*) *maculipennis* in: STARÝ 1998

Trichocera (*Trichocera*) *maculipennis* in: DAHL & ALEXANDER 1976

Trichocera maculipennis in: DAHL 1973: fig. 21 (larva)

Trichocera maculipennis in: DAHL 1966b: fig. 20, 25, 31 (male); fig. 51, 56, 61 (female) DAHL 1957: fig. 12 A, B (male, female)

Trichocera maculipennis in: SCHINER I. R. 1864: 546

Palaeopetaurista dubitata SEGUY 1940: 226, fig. 46 (female), Kerguelen Is.; synonymized by DAHL 1970b: 274

Trichocera maculipennis EDWARDS 1938: Pl. I, fig. 15

Trichocera maculipennis in: TOKUNAGA 1938: fig. 6 (female), fig. 23 (male)

Trichocera maculipennis in: KARANDIKAR 1931: larvae, pupae; life cycle

Trichocera maculipennis in: SCHINER 1864

Petaurista maculipennis MEIGEN, 1818: Syst. Beschr. bek. europ. zwiefl. Ins.: 214.

Tipula cinerea FABRICIUS, 1779: 301; according to DAHL (1966b) the specific name, although older than *maculipennis* MEIGEN, has not been in use for over 50 years while the latter name was constantly used. Moreover, the type specimen of FABRICIUS is not preserved. Under Article 23.9.3 (on suppressing the little-used names) of the International Code of Zoological Nomenclature, *Trichocera cinerea* (FABRICIUS) became a *nomen oblitum*.

Diagnosis. Wing spotted; brown spots on origin of Rs, on cross-veins r-r, r-m and m-cu, brown smudge along Cu; sometimes additional weaker spots between distal radial veins and on A2. Thoracic pleura bare. Male: sternite 9 wide, its distal margin set with bristles; bridge divided, with small beak medially (but see Remarks on variation); gonostyle thick and short (not much shorter than or equal to gonocoxite), mildly curved to inside, with distinct tubercle on mesal basal face. Female: ovipositor as long as genital segment, usually only mildly curved, ending sharp; setulose area dark, distinctly delimited, not much convex; genital plate deeply heart-like incised; supragenital plate with two bristles; fork shallow or prongs of fork non existent.

Comparison. The species is dinstinguishable from *T*. (*S.*) *regelationis* by a distinct spot on origin of Rs, mentioned also in old descriptions (MEIGEN 1818, EDWARDS 1921, 1938). Male genitalia in *maculipennis* differ from those of *regelationis* by a small medial beak on gonocoxal bridge, and by a wider (=longer axially) and more massive sternite 9. Entire genitalia are more heavily built, with thicker gonostyles. The female genitalia are very similar to those of *regelationis*; the ovipositor is usually only mildly curved, but the shape is subject of considerable variation. *T*. (*S.*) *versicolor* is another species with spotted wings, but the largest spot occurs here on radial distal veins, unlike in *T. maculipennis*.

Additional description. Antennae (Fig. 29.1.F, G): f1 usually 1.5x f2, slender in male, in female basally swollen, usually club like, but sometimes oval (e.g., specimens from Alpean Grottes, Switzerland). In arctic localities flagellomeres may be greatly swollen, and antennae and legs much shortened (Fig. 29.2.A-B). Wing spotted (Fig. 29.1.H); brown spots on origin of Rs, on cross-veins r-r, r-m and m-cu, brown smudge along Cu; sometimes additional weak spots between distal radial and medial veins and on A2 (more often in female). Spots fade in alcoholic specimens, but usually do not vanish (similarly as in *T. regelationis*). Proximal section of Rs often bent at angle; d cell sometimes very small, pentagonal. Abdomen with diffused lighter smudge along all sternites medially; in some populations abdomen is striped (distal portions of tergites are lighter than proximal), see the Remarks on variation below. Thorax: pleura without setae. Hind tarsal claw (Fig. 29.1.E) in male large, c. 1/2x t5.

Male genitalia (Fig. 29.1.A-D). Sternite 9 wide, c. 0.4-0.5x length; its distal margin somewhat wavy, set with bristles. Bridge (Fig. A-C) with with small beak at apex, formed by distalmost portions of halves slightly upturned. Gonostyle thick, mildly curved to inside, with distinct tubercle on mesal basal face. Aedeagal complex of the *regelationis* group type, with a massive and long section (Fig. D, arrow) between bases of parameres and lateral apodemes, which are rounded.

Female genitalia (Fig. 29.1.I-N). Sternite 8 convex, with small protuberance between hypogynal valves which are wide; partially sclerotized bands along lateral margin are visible at each side (Fig. L, arrow; character introduced by DAHL 1966b). Ovipositor as long as genital segment, slender, shape variable (Fig. I-K), more or less curved, tip acute. Setulose area usually less convex than in *regelationis*, well delimited, reaching 1/3 ovipositor's length. Genital plate (Fig. J, M, N) deeply heart-like incised, foramen is narrower than that in *T. regelationis*; supragenital plate rounded and broad, with two bristles; distance between them is variable; fork very shallow, or prongs of fork are absent; ducts of spermathecae long, 1.5-2x spermathecal diameter.

Material examined. Listed at end of this chapter.

Distribution. Species was described from Austria; the holotype of MEIGEN is non-existent, according to DAHL & ALEXANDER (1976). A holarctic species of probably widest distribution among all congeners. Europe: Sweden, Lapland (Messaure n. Polar Circle (DAHL 1967a, b); Greenland (DAHL 1967), Bear Is., Jan Mayen Is. (DAHL 1957). Great Britain (EDWARDS 1938, GRIMSHAW 1906); Lithuania (PETRAŠIŪNAS & VISARČUK 2007); Germany: DAHL (1966b); Luxemburg: PETRAŠIŪNAS & WEBER (2013,

records from mines); Poland (KRZEMIŃSKI 1983; here also older records); Romania (PINTILIOAIE & KOLCSÁR 2020). Wide distribution in Asia, Irkutsk to Kuril Islands (PETRAŠIŪNAS & PARAMONOV 2014), Japan (TOKUNAGA 1938). North America: Alta., British Columbia, Quebec (ALEXANDER 1965: 16).

Introductions to southern hemisphere: Kerguelen Is. (DAHL 1970b); King George Island (VOLONTERIO et al. 2013, POTOCKA & KRZEMIŃSKA 2018, POTOCKA et al. 2020).

Ocurrence. This species shows the widest range of temperature adaptation, from Mediterranean to Arctic localities. The species was reported as synanthropic, being found in cellars, mines and abandoned buildings. Recently it is recognised rather as a troglophile (see PETRAŠIŪNAS & WEBER 2013 for numerous records and discussion). In the caves adults may occur "in absolute darkness" (GRIMSHAW 1906) almost entire year round (observations on extreme northern localities in DAHL 1970a; unpublished data on collection of Kazimierz KOWALSKI from caves in High Tatra Mts., Poland). In Iceland and perhaps Greenland the species occurs both as a synanthrop and in natural biotopes (LINDROTH 1931: p. 270; NIELSEN et al. 1954: p.10; DAHL 1967a). According to observations of a speleologist (personal comm. of Joanna ZAKRZEWSKA-KOCOT), the specimens fly close to caves or rocks whose crevices provide shelter; it is also probable that the freely flying specimens spend winter in caves which may be still unknown to man (e.g., because of a very narrow entrance).

Trichocera maculipennis is known as the only member of the family being the "pest" of stored root vegetables (but only those with tissues already softened by attack of fungi and bacteria; DAHL & KRZEMIŃSKA 2015). Very probably the species was taken to Antarctic stations together with a cargo of vegetables infested with larvae (DAHL 1970b). The larvae appear also adapted to feed on and live in rich, semi-fluid or fluid organic substrate, e.g., the waste material of whisky distilleries in Scotland (see the fascinating paper of KARANDIKAR 1931), or the contents of sewage system in Antarctic stations on King George Island (VOLONTERIO et al. 2013; POTOCKA & KRZEMIŃSKA 2018). According to records of Demel (1918) from High Tatra Mts., the larvae in caves feed greedily on bats' guano. Presence of these flies in the cave makes a signal to a chiropterologist that bats live there (personal comm. of J. ZAKRZEWSKA-KOCOT).

DAHL (1970a) recorded two peaks of frequence, III-IV and VIII-IX in subboreal and boreal regions, and one (VI-VIII) in the Arctic.

Remarks on variation

T. maculipennis is one of earliest trichocerids described, and the only species in Europe that can be determined by spots on wings. Its mass appearance in the caves, abandoned mines and cellars and dwellings has caught human attention since long. Records on this species and comments on its remarkable variation are abundant, especially in older literature. STARÝ & MARTINOVSKÝ (1996) mentioned that two species exist in Europe under this name, but did not diagnosed them. Variation among the specimens concerns the following sets of characters.

1. Wing spotting. All descriptions (e.g., MEIGEN 1818, GRIMSHAW 1906: 210, figure of a wing) stress the presence of a spot on origin of Rs as a main diagnostic character for *T. maculipennis*. EDWARDS (1938) noticed variation: "this spot is sometimes confined to the base of the vein [Rs], but more often extends across the upper basal cell". The distinct spot on origin of Rs is present in populations living in caves, mines and cellars, including isolated populations on northern and southern islands, also in Antarctic Peninsula where the species has been introduced by human factor (VOLONTERIO et al. 2013; POTOCKA & KRZEMIŃSKA 2018).

2. Antennae and legs. The first flagellomere is usually club-like and much longer than second, but may be shorter and oval even in the same populations. In specimens from extreme northern localities the antennae, palpi and legs are much shortened and thickened (Bear Island; Fig. 29.2.A-B; compare also *T.* (*M.*) *lutea*, Fig. 9.2.H); legs are sometimes not longer than body, thick and hairy, but variation in their length is observed.

3. Ringed abdomen. This feature (distal portions of segments lighter) was occasionally observed in populations from Austria (MEIGEN 1818); also reported in Great Britain by GRIMSHAW (1906), EDWARDS 1938) and LAURENCE (1957). Ringed abdomens are characteristic for populations introduced to King George Island; see VOLONTERIO et al. (2013: fig. 2A, C, D) for a sample of specimens with this striping variously developed; some specimens are even unicolorous. Having in mind the fact that the genetic pool in this population must be much poorer than in natural habitats (the bottle neck effect), we shall assume that the various colouring of abdomens is within the intraspecific variability. The striping of abdomen does not go together with the beaked bridge: the population in King George Island has both characters, while populations from Switzerland and southern Poland have beaked bridge, but the abdomen is unicolorous.

4. Male genitalia. Gonocoxal bridge with a with small beak at apex, formed by distalmost portions of halves slightly upturned is encountered, e.g., in Switzerland (specimens from the Pilatus-Kulm and Grottes listed above), in southern Poland, and in populations from the King George Island (see VOLONTERIO et al. 2013: fig. 2G). The form without a beak, with a *regelationis*-like bridge, was illustrated by DAHL (1957, 1966b), but in DAHL (1967b: fig. 20) the half of a bridge has a small beak-like shape, similar to that in Fig. 29.1.C herein. This character is not

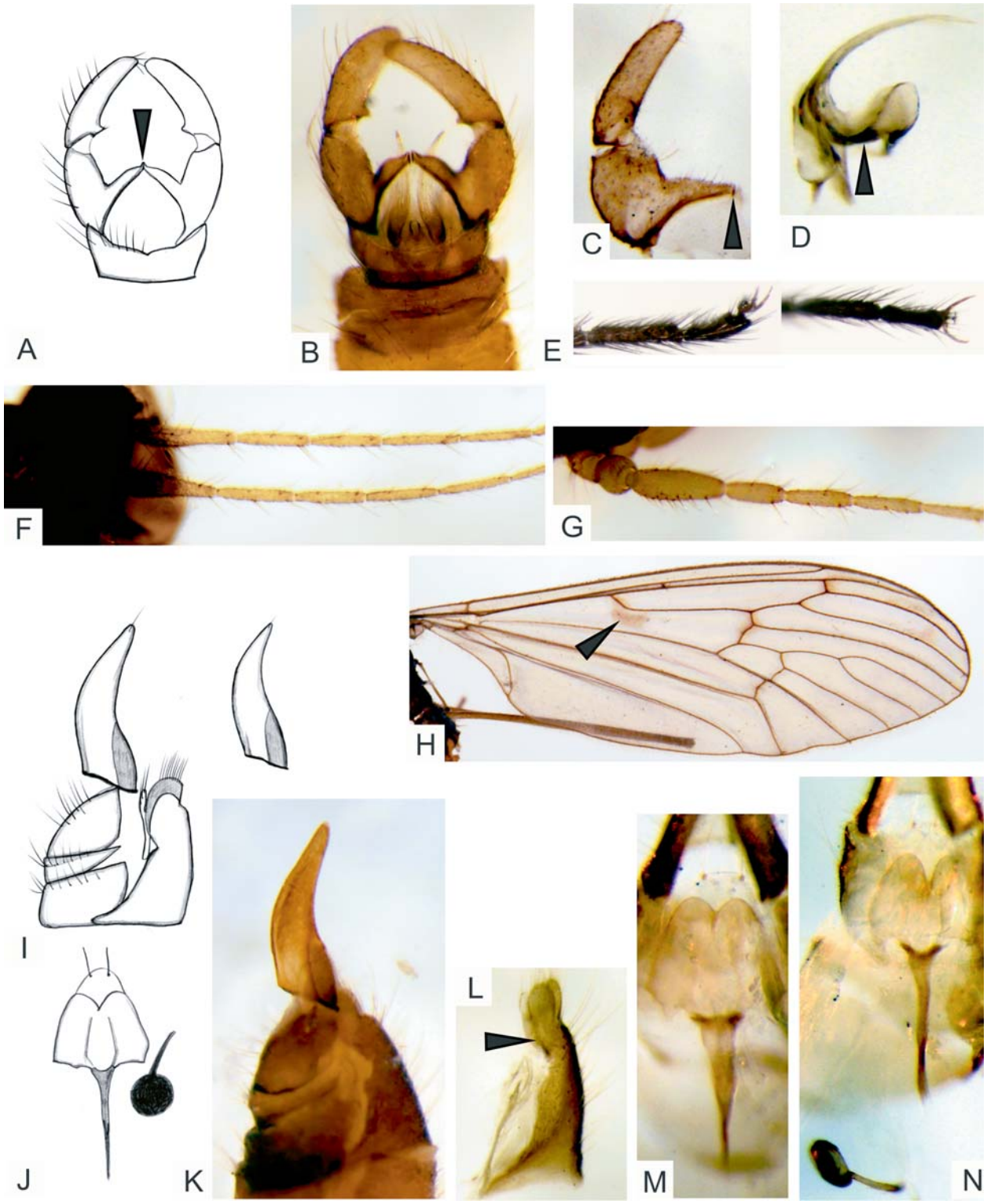


Fig. 29.1. *Trichocera* (*Saltrichocera*) *maculipennis* MEIGEN, 1818. A-F, male: A, scheme of genitalia ventrally; B, genitalia ventrally; C, gonocoxite with half of bridge (medial tooth is indicated); D, aedeagus (long junction between bases of parameres and lateral apodemes is arrowed); E, hind tarsal claw; F, antenna. G-N, female: G, antenna; H, wing (spot at origin of Rs is indicated); I, J, scheme of genitalia ventrally; K, genitalia laterally; L, sternite 8 (sclerotized band along lateral margin is arrowed); M, N, genital plates (note difference in length and shape of genital fork).
Specimens. Male, female: Switzerland, Sieben Hengste-Hohgant, Salle Ami 1501 m, 18.IV. -29.XII. 1987 (A. HOF; MNHN).

commented upon. Other authors (MEIGEN, EDWARDS, GRIMSHAW) also do not mention the shape of bridge. If the two forms represent two species, then the question arises, which is the true *maculipennis* of MEIGEN (the holotype is lost, and only colouristic features of the wings are mentioned in the original description). The bridge with a beak is diagnostic also in opinion of J. STARÝ (personal com.). Therefore, the present diagnosis is based on these two characters.

5. Female genital plate. DAHL (1966b: fig. 61) illustrated a plate with 10 bristles; but later (DAHL 1970b) wrote that this plate was rather exceptional, and the usual number of bristles is two. According to my notes from the BMNH, females from the Bear Island, Iceland and Great Britain show 2-4 bristles; all females from other European localities listed show two bristles only.

Material examined. Jan Mayen Island: O. U. Jan MAYEN Isle expedition, 8.VIII.1947, living rooms – 1m, 2f (A. MACFADYEN; BMNH 63-1947). Bear Island: Cap Holthof 15.VII.1932 – 1f, Tunheim, 26-29.VI.1932 – 4f, 1-10.VII. 1932 – 2m, 2f; South Coast, 18.VII.1932 – 1m; Mosevatnat 25.VII.1932 – 1f, Spitrefoss, 18.VII. 1933 – 1f, 1m, Fugleodden, 8-13.VII.1932 – 5f (all D. LACKSCHEWITZ; BMNH 1932-378). Iceland: Reykjavik 1.VIII.1921 – 1m, 9f (B. SAMUNDSSON; BMNH 1921-305); Unadsdalur 27.VIII.1947 – 1f (I.L. CLOUDSLEy-THOMPSON, det. P. NIELSEN; BMNH). Great Britain: Shefferd Beds – 1f (F. W. EDWARDS; BMNH); Midlothian, Fouldhouse, coal pit 31.VIII. 1909 – 1f (J. WATERSTON; BMNH); Somerset Friddy, Eastwater Conserv. 16. III. 1951 (R. SELLARS; BMNH); Tilberthwaite n. Lancs. 21. VII. 1923 – 1m (F. W. EDWARDS; BMNH); Edinburgh XII. 1928 – 1f (J. STEWART, MC DOUGALL; BMNH). Switzerland (dry specimens; all leg. L. REZBANYAI, if not otherwise stated; a.=days 1-10 of particular month; m.=11-20; e.=21-31; specimens are stored in MNHN and partially in ISEA): Pilatus-Kulm, Obwalden/Nidwalden, alt. 2050 m (LF) [light trap], 1977: 6.VI – 1f; 16.VI. – 1f; 17.vi – 1f; 23.VI. – 1f; 4.VII. 1977 – 2m; 17.VII – 1f; 4.VIII – 1m; 11.VIII – 1m; 12.VIII – 1f; 21.VIII – 1m; 1978: 2.VI – 2m; 28.VIII – 1m; 29.VIII – 1m; 4.IX – 1f, 1m; 1979: 12.VIII – 1m; a.x. – 1m. 1-10.VI.1980 – 1m. Gandria TI, alt. 340 m (LF) 1979: 11-20.III. – 2f, 21-30.IV. – 1m; e.XII.1980 – 1m; Generoso TI, Vetta, alt. 1600 m (LF), 1-10.VIII. 1979 – 2m; 1980: 1-10.VI. – 1m, 1f; 1-10.VIII. – 1f, 21-31.VIII. – 4m. Schrattenfluh LU 1600m (TF), 30.VI.1980 – 1m; Södenberg LU, Hallenbad, alt. 1160 m (LF), 6.VII. 1977 – 1f. Zermatt VS, Schwarzsee 27.VII. 1980 – 1f, 1m. Zentral Schweiz, Brisen-Haldigrat, alt. 1900m, 4.VI. 1977 – 1f. Montana VS, cab. d. Violettes, alt. 2250 m (LF), 17.VII.1980 – 1m. Alcoholic specimens: Generoso TI, PL, 1979: e.VI. – 2f, 5m; a.VII. – 9m, 1f; a.VIII – 1m, 1f; e.VIII – 3m, 2f; 9.ix. – c.15m, 5f; 1980: e.vi. – 1f; m.VII. 1980 – 2f, 3m; a.ix. – 2m, 2f; m.IX – 1m, 2f; e.IX. – c. 30m. Gandria TI, m.IX.1979 – 1f; . Vuisse, 26.V.-1.VI.1980 – 2m (leg. W. GEIGER). Rigi SZ PL, a+e.IX. 1980 – 3m. Altdorf, e.X.1979 – 1f. Fully, alt. 550 m, 12-18.V.1980 – 6m (leg. C. DUFOUR, W. GEIGER). Ins BE PL, e.IX.1979 – c. 40 m, f. Vezia TI, S. Martino, alt. 410 m, 15-21.X. 1979 – 2f; 22-28.X. – 3f (Malaise; leg. C. DUFOUR, W. GEIGER). Il Fuorn PL, 14.VI. 1980 – 1m; 16.VI. – 1m ((leg. C. DUFOUR). Aurigeno, TI, alt. 341 m, PL, 30.X.-3.XI.1980 – 3m, 2f; 4-9.XI. –3m, 5f (leg. W. GEIGER). Montana VS, cab. d. Violettes, alt. 2200 m (LF), 17.VII.1980 – 1m. Caves [Grottes] in Alps (in alcohol, probably soil traps; most specimens are dismembered): Sieben Hengste-Hohgant (all. leg. A. HOF): 1. [No. of sample] – c. 10f [no date provided]; 4. Galerie des Amours, 1675 m, 26.XII.1986- 29.XII.1987 – 1m, 2f; 3. Résean blanc, l'Etendard, alt. 1477 m, 26.XII. 1986-29.XII. 1987 – 5f; Salle de la fonction, alt. 1451m, 26-29.XII. 1987 – 24f, 2 m. Schattenfluh, Neuenburgerhöhle, 1987 [all leg. O. HUNKELER; no date beside the year is provided]: 1. [No. of sample]: 5f, 1m; 3. – 1m, 3f; 4. – 1m, 3f ; 5. – 25f, 1m; 6. – 4f. Suisse Vaud, gouffre Paradis de cases d'Aveneyze, IX.1986-IX.1987 – 4f; Suisse, Friburg, Albeuve VI. 1988, grotte: „Trou des Vents" (both samples leg. J. DUTZNIT) – 5f. Austria: Alte Sammlung – 3m (Label: SCHINER 1869, *maculipennis*, det. SCHINER; NHMW). Poland: Ojców: Wąwóz Jamki, 16-29.IV.1989 – 7f; 19.V. 1998 – 1f (E. KRZEMIŃSKA; ISEZ); Toruń 5.III. 1975 – 1f (J. BUSZKO; ISEA), Kraków, flat, Karolińska street, 1.III. 1884 – 1m, 1f, 29.III. 1866 – 1m, 31.III. 1866 – 1f, 12.IV. 1908 – 1f (collection of BOBEK or SIŁA-NOWICKI). Italy: Bernino 1922 – 1m (leg. CORTI "22; M. BEZZI, 1922; BMNH).

King George Island (Maritime Antarctida): specimens listed in VOLONTERIO et al. (2013), and POTOCKA & KRZEMIŃSKA (2018).

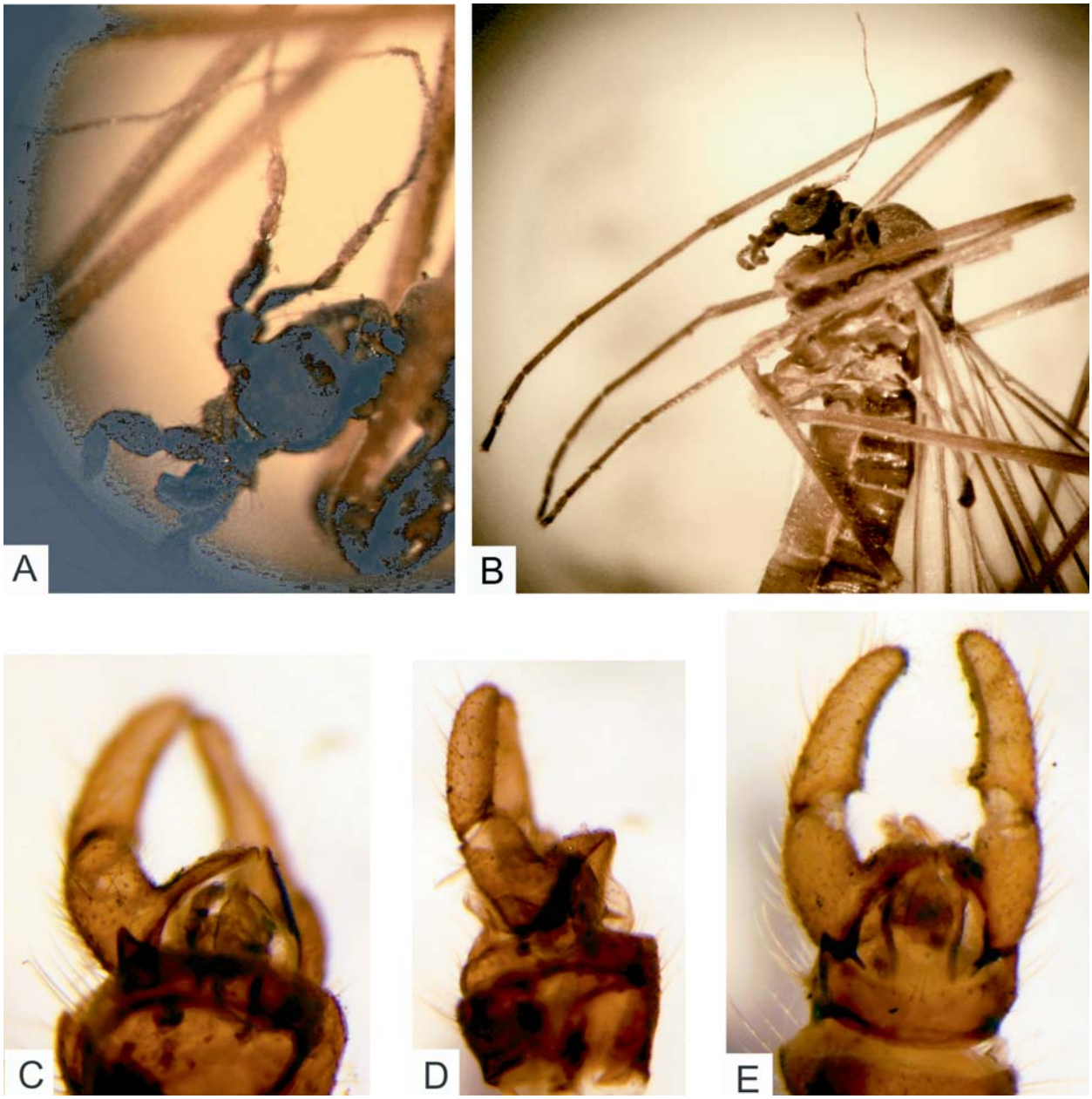


Fig. 29.2. *Trichocera* (*Saltrichocera*) *maculipennis* MEIGEN, 1818, additional features. A-B, female from Bear Island: Spitrefoss, 18.VII. 1933 (BMNH), note greatly swollen flagellomeres (A) and short legs (B). C-E, variation in two males, Austria, Alte Sammlung: C-D, male with medial beak; E, male without medial beak (det. SCHINER 1869, NHMW).

Trichocera (*Saltrichocera*) *mendli* DAHL, 1976

Fig. 30

Trichocera (*Trichocera*) *mendli* in: KRZEMIŃSKA 2001b
Trichocera (*Metatrichocera*) *mendli* in: STARÝ 1998
Trichocera mendli DAHL, 1976: 61, fig. 7-12 (male)

Diagnosis. Antennae thin, flagellomeres slender, verticils distinct, somewhat adpressed. Thoracic pleura bare. Male: sternite 9 wide, with row of bristles on medial part of outer margin; gonostyle almost straight, without tubercle, about as long as gonocoxite; bridge fused, triangular; aedeagal complex of subgenus *Saltrichocera* type. Female unknown.

Comparison. Superficially *T.* (*S.*) *mendli* is similar to *T.* (*T.*) *major* and differs in having almost straight gonostyles (more or less S-shaped and longer in *major*), no central beak on sternite 9, higher and more delicate bridge and longer parameres, not fused basally. The bridge is similar to that in *T.* (*T.*) *hiemalis*, in having a short desclerotized section medially. Despite these similarities to two members of the subgenus *Trichocera*, the aedeagal complex is characteristic of *Saltrichocera*. The bridge and aedeagal complex of *T. (S.*) *mendli* show great resemblance to those of *T.* (*S.*) *arctica*; *T. mendli* differs in gonostyles longer and without tubercles, and their apices not inclined to inside.

Additional description. The species is here allotted to subgenus *Saltrichocera* by the shape of aedeagal complex. Rather unexpectedly, it resembles superficially two species of the subgenus *Trichocera*, *T.* (*T.*) *major* and, to a lesser degree, *T.* (*T.*) *hiemalis*. Antennae are very thin (Fig. 30.D), f1 barely thicker than f2. Wing (Fig. 30.E): according to DAHL (1976), membrane is slightly brown tinged, and there are faint clouds on Rs, r-m, m-cu and smudges along medial and radial veins. Specimens in my disposition were largely discoloured. Tarsal claws were preserved only in fore and mid legs (Fig. 30.F, G); their size is c. 1/3 of t5. Thorax is pictured in description of *T.*(*S.*) *longa*, n. sp. (Fig. 28.I).

Male genitalia (Fig. 30.A-C, H, I). Sternite 9 wide, outer margin only somewhat elevated, with short row of few bristles medially; gonocoxite and gonostyle relatively long and slender, of equal length; gonostyle straight to mildly curved, without basal tubercle, with rounded apex. Bridge triangular; its halves are fused by a desclerotized section, as it is also observed in *T. hiemalis*. Aedeagal complex (Fig. 30.H, I) with lateral apodemes triangular, raised toward parameres; parameres short for the subgenus.

Female unknown.

Material examined. Holotype and specimens listed in DAHL (1976). Additional material: Sweden, Messaure, 28.VII-4.VIII 1975 – 1m; 1-8.IX.1971 – 1m (coll. K. MÜLLER).

Distribution and occurrence. Boreo-alpine species. The holotype was described from Messaure, Sweden. Germany: listed in DAHL (1976; 1999). Adults in Messaure were collected from end VII to X.

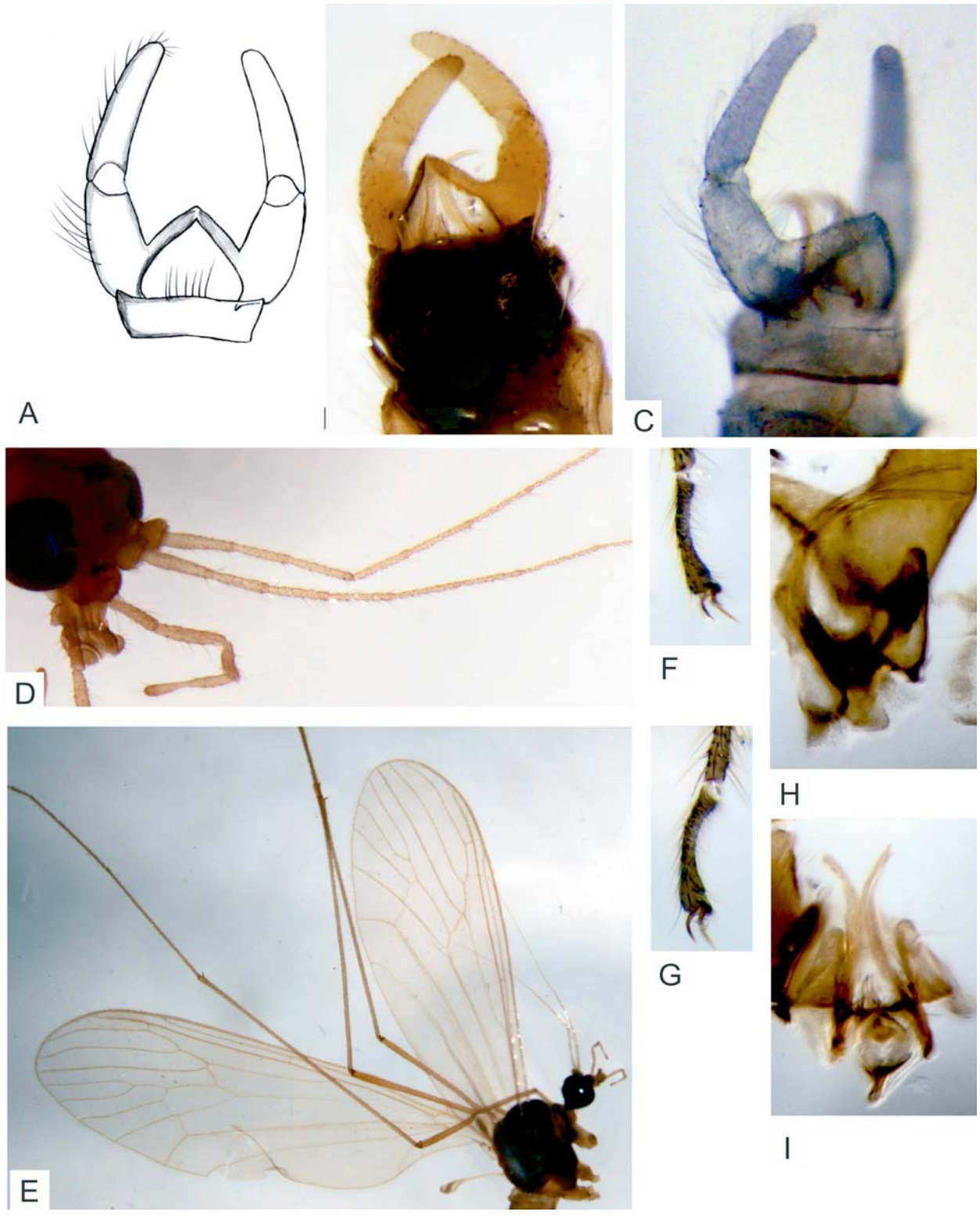


Fig. 30. *Trichocera* (*Trichocera*) *mendli* DAHL, 1976, male: A, drawing of genitalia; B, C, genitalia of two specimens; D, antenna and palp; E, wings; F, G, mid and fore tarsal claw, respectively; H, I, aedeagal complex in lateral and ventral view, respectively. Specimens. Sweden, Messaure: B, D-I, 28.VII-4.VIII 1975; C, 1-8.IX.1971 (leg. K. MÜLLER).

Trichocera (*Saltrichocera*) *michali* KRZEMIŃSKA, 1999

Fig. 31

Trichocera (*Saltrichocera*) *michali* KRZEMIŃSKA in: KRZEMIŃSKA & GORZKA 2014: 3, fig. 1 (female)

Trichocera (*Saltrichocera*) *michali* KRZEMIŃSKA in: KRZEMIŃSKA 2002a: 158.

Trichocera (*Metatrichocera*) *michali* KRZEMIŃSKA 1999: Acta zool. crac. 42: 257, fig. 18-20 (male).

Diagnosis. Species of the *regelationis* group, with clear wings. Thorax: pleura bare. Hind tarsal claw in male is small (1/4 of t5). Male: sternite 9 narrow, with straight margin set with bristles; bridge low and wide, rounded; gonostyle short, as long or only little longer than gonocoxite, with basal tubercle. Aedeagal complex as in *T.* (*S.*) *rufescens* and *T.* (*S.*) *annulata*. Female: ovipositor slightly longer than genital segment, strong, bent in middle, tip acute; setulose area distinct, short, not much convex. Genital plate rounded, with large foramen; prongs of genital fork very short. Supragenital plate with two bristles.

Comparison. Male genitalia, especially after preparation, become very similar to those of *T.* (*S.*) *regelationis* and *rufescens*. Male can be discerned from the former first of all by a much smaller tarsal claw, and clear wings with m-cu usually aligned with proximal section of M3; from the latter, by dark body color (which however fades in specimens stored in alcohol). Female has an ovipositor within the range of variation of *T.* (*S.*) *regelationis*, but can be discerned by spotless wings and venation (as in male).

Additional description. Species with clear wings of the *regelationis* group, known from scarce specimens, hence variation in features described therein is unknown. Body color brownish black. Antennae (Fig. 31.F, G): flagellomeres thin; f1 not much longer than f2; verticils soft, 2-3x as long as pubescence. Thorax: pleura bare. Wings clear; R2+3+4 as long or only a little longer than R3+4; d cell wide, subtriangular; m-cu usually aligned with proximal section of M3 (Fig. 31.H, arrow).

Male genitalia (Fig. 31.A-D). Sternite 9 narrow, with straight margin set with bristles; in type specimens a small medial indentation is present (Fig. 31.A, arrow). Gonocoxite long, only a little shorter than gonostyle, and slightly swollen in midlength; bridge low and very wide. Gonostyle slightly narrowing to apex, with distinct basal tubercle. Aedeagal complex as in *T.* (*S.*) *rufescens* and *T.* (*S.*) *annulata*, with lateral apodemes more elongated than in *T.* (*S.*) *regelationis*, and positioned closer to base of parameres than in latter species.

Female genitalia (Fig. 31.I-M). Ovipositor slightly longer than genital segment, strong, bent in middle, tip acute; setulose area distinct, short, not much convex. Genital plate rounded, with large foramen; prongs of of genital fork very short. Supragenital plate with two bristles.

Material examined. Holotype male, Pieniny Mts., Poland. Other material listed in description (KRZEMIŃSKA 1999), from Hungary in KRZEMIŃSKA (2003) and from Finland in KRZEMIŃSKA & GORZKA (2014). Switzerland: Rochefort 780 m, 29.XI.-5.XII. 1982 – 1m (*T. malaise lumineuse*); Rigi 1-10.X. 1980 – 1m; GD St Bernard (VS), 1-10.IX. 1980 – 1m (all leg. C. DUFOUR).

Distribution. *T.* (*S.*) *michali* is a poorly recognizable species, probably widespread in Europe. Scarce records come from: Sweden, vicinity of Polar Circle (Abisko) and Finland (KRZEMIŃSKA & GORZKA 2014), Poland (KRZEMIŃSKA 1999), Slovakia (STARÝ 2001) and Hungary. Also found in Switzerland, listed above.

Occurrence. Adults were collected in VIII (Sweden, Abisko), and IX-XII in Poland, Slovakia, Hungary and Switzerland.

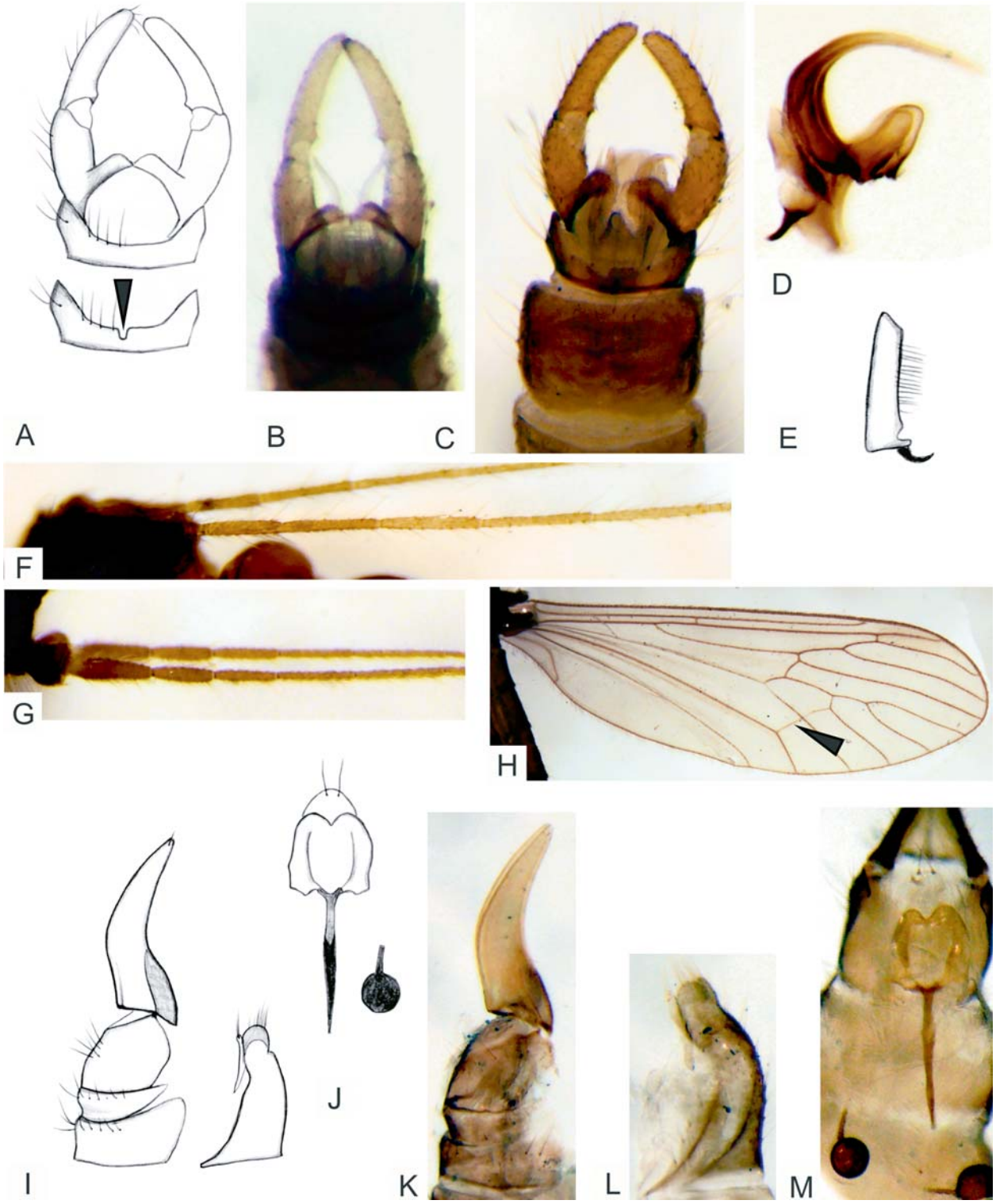


Fig. 31. *Trichocera* (*Saltrichocera*) *michali* KRZEMIŃSKA, 1999. A-F, male: A, drawing of genitalia (variation in sternite 9); B, unprepared genitalia; C, genitalia after short maceration; D, aedeagal complex; E, hind tarsal claw; F, antenna. G-M, female: G, antenna; H, wing (arrow: m-cu aligned with fork of M3+4); I, K, drawing and photo of genitalia; L, sternite 8; J, M, drawing and photo of genital plates.
Males: B, Finland 19-21. IX. 2012 (D. GORZKA); C, D, paratype, Poland, Pieniny Mts., Polana Szopka, alt. 650 m. Female: Sweden, Abisko LF (2), 4-11.08. 1975 – 1m, 1f (C. DAHL).

Trichocera (*Saltrichocera*) *montium* STARÝ, 2001

Fig. 32

Trichocera (*Saltrichocera*) *montium* in: KRZEMIŃSKA 2002a: 158

Trichocera (*Metatrichocera*) *montium* STARÝ 2001: Stud. dipt.: 413

Trichocera (*Metatrichocera*) *montana* STARÝ 1999: Ent. Probl.: 3, Figs 6-10, 23 (male, female). Preoccupied by BRUNETTI 1912: Fauna of British India: 512

Diagnosis. Antennae with erect verticils. Anepimeron with few setae. Male: bridge subtriangular, halves distinctly separated at apex; sternite 9 with broad and deep incision; gonostyle narrowing to apex, with conspicuous basal tubercle. Female: hypogynal valves rather narrow; ovipositor longer than genital segment (c. 1.3x), only mildly curved; setulose area long, reaching almost mid ovipositor, well delimited but not much darker than remainder of ovipositor; genital plate barely incised, fork shallow, with transparent connections to plate; supragenital plate with two bristles.

Comparison. Male genitalia of *T.* (*S.*) *montium* are most similar to those of *T.* (*S.*) *obtusa*. Although the paratypes of these species differ markedly (gonostyles of *montium* are longer, more narrowing to apex, bridge is higher and narrower), males outside their type locality may be very similar, including the shape of aedeagal complex; see the figures below. In fact, I could recognize *montium* in Swiss localities only because large samples of males and females were available. According to original descriptions (STARÝ & MARTINOVSKÝ 1996; STARÝ 1999) both species differ also by setation of antennae; *obtusa* has verticils longer and erect. Female of *montium* resembles mostly *T.* (*S.*) *nordica* and *T.* (*S.*) *antennata* in shape of ovipositor; *antennata* is readily discerned by antennae, and *nordica* can be distinguished by mild excision on basal dorsal margin of ovipositor and bare metanepisternum (noteworthy, *T. montium* has till now not been found in Scandinavia, which is the type locality of *T. nordica*). Regarding the variation in shape of ovipositor in *montium* (compare Fig. 32.L and M, below), the wider ovipositors of this species observed in Switzerland may be mistaken with a very broad ovipositor of *T.* (*S.*) *obtusa*. The difference between these two species is in the genital plate: in *montium*, lateral portions are extremely short, in *obtusa* they reach below the level of genital fork (Fig. 35. J, N, arrow).

The genital fork in *montium* is similar as in *T.* (*S.*) *antennata, T.* (*S.*) *nordica*, *T.* (*S.*) *obtusa* and *T.* (*S.*) *thaleri*; in all these species the prongs of fork are very short and are connected with desclerotized sections with the plate.

Additional description. In the original description (STARÝ 1999) a blackish body color is stressed, and is also confirmed in dry specimens from Switzerland. Antennae (Fig. 32.F, G) very long in male, subequal to body length; shorter in female; some alpine females have very thick flagellomeres (Fig. 32.H). Verticils thrice as long as pubescence, somewhat depressed. Thorax: few setae are present on anepimeron (Fig. 32.I). Legs: tarsal claw in male is c. 1/3x tarsomere 5th (Fig. 32.E).

Genitalia of male paratype from Tatra Mts. (Fig. 32.B) are more elongated, and gonostyle is more narrowing to apex than that in specimens from Switzerland (Fig. 32.C); tubercle distinct. Sternite 9 is deeply and widely incised, so that only lateral portions are visible in ventral view. Bridge is subtriangular, halves distinctly separated. Aedeagal complex: parameres are rather massive, of medium length, hood is hidden between parameres; basal apodemes are very broad (Fig. 32.D).

Female genitalia (Fig. 32.J-P). Hypogynal valves are rather narrow (Fig. 32.J, O). Ovipositor c. 1.3x as long as genital segment, slender in the paratype (Fig. 32.L); in some females from Romania and Switzerland its base is distinctly more broad (Fig. 32.N); setulose area is well delimited, and long, reaching almost mid ovipositor; its colour is barely darker than remainder of ovipositor. Genital plate is as wide as long, with shallow medial incision; lateral flexible portions are very short; their ends do not reach level of genital fork (Fig. 32.K, arrow); prongs of genital fork are short and divergent, connected to plate with short, desclerotized sections; stalk of fork is very long (2x as long as plate). Supragenital plate narrow in apical portion, with two bristles set at short distance from each other. Spermathecae with long sclerotized portions of ducts, c. 1.5-2x as long as spermathecae diameter.

Material examined. Paratypes: male Czech Rep.: Moravia, Jeseníky Mts, Bilá Opava valley, 1250 m (leg. et det. J. STARÝ), 20.X. 1997, 1250 m; female 7.X.1997, same data. Additional specimens from Romania are listed in UJVAROSI & KRZEMIŃSKA (2002) and from Hungary in KRZEMIŃSKA (2003). Switzerland: numerous specimens, e.g., Grand St Bernard (VS), 2472 m, 19-25.IX. 1980 – 19f, 20m (W. GEIGER; MNHN); CH Pilatus Kulm, OW/NW, 2050 m, LF: 10.X. 1977 –10f, 12.IX. 1977 – 1m, 14.X. 1978 – 1f (all leg. L.REZBANYAI).

Distribution and occurrence. Holotype male was described from the Czech Republic: Moravia, Jeseníky Mts (1250 m). Carpathians: Czech Republic, Moravia (STARÝ 1999), Romania (KRZEMIŃSKA & UJVAROSI 2002). Alps: Switzerland. Data from Hungary (Budapest!) show that this species is not confined to mountains. All specimens were collected in X.

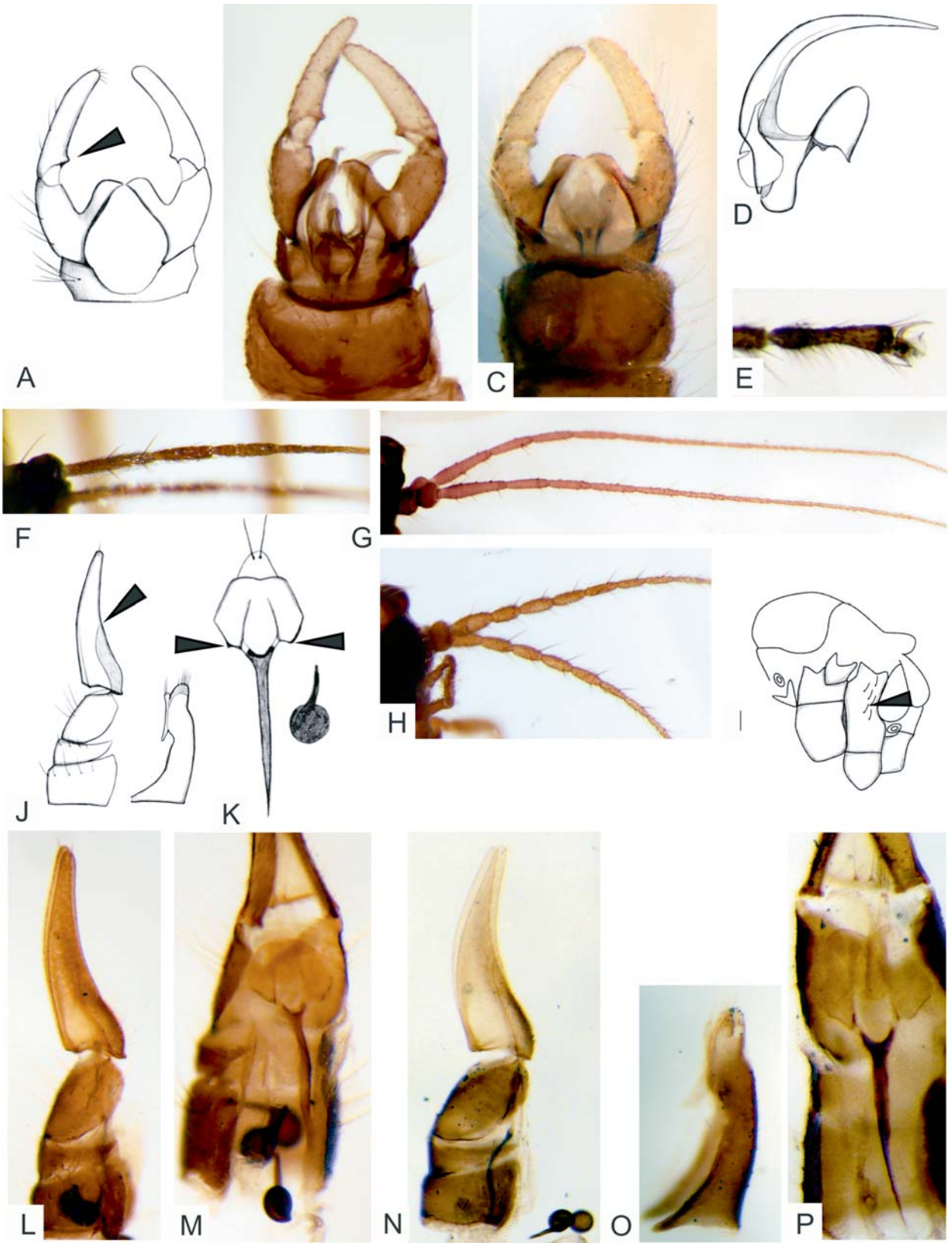


Fig. 32. *Trichocera* (*Saltrichocera*) *montium* STARÝ; 2001. A-F, male: A-C, drawing and photos of genitalia; D, aedeagal complex; E, hind tarsal claw; F, antenna basally; G-P, female: G, H, basal antenna; I, setae on metanepisternum; J, L, N, drawing and photos of ovipositors (L, paratype; N, female from Romania); O, sternite 8; K, M, P, drawing and photos of genital plates (M, paratype; P, female from Romania).
Specimens: B, male paratype 20.X. Czech Rep.: Moravia, Jeseníky Mts, Bilá Opava valley, 1250 m (leg. J. STARÝ); C, H, male and female, Switzerland, Grand St Bernard (VS), 2472 m, 19-25.IX. 1980 (W. GEIGER; MNHN); L-M, female paratype: 7.X. 1997, other data as in male paratype. N-P female, Romania, Vladeasa, 20.X. 2001 (leg. L. UJVAROSI).

Trichocera (*Saltrichocera*) *mutica* DAHL, 1966

Fig. 33

Trichocera (*Saltrichocera*) *mutica* in: KRZEMIŃSKA 2002a: 158

Trichocera (*Metatrichocera*) *mutica* in: KRZEMIŃSKA 2000a: 445, figs. 10-12 (female), 21-25 (male)

Trichocera (*Metatrichocera*) *mutica* in: STARÝ 1998

Trichocera (*Trichocera*) *mutica* in: DAHL & ALEXANDER 1976

Trichocera mutica DAHL, 1966a: Beitr. ent.16 (3/4): 271, figs. 1-3 (male)

Diagnosis. Member of the *mutica* group of species. Antennae long, distal setae on flagellomeres stiff and erect. Thoracic pleura bare. Male: sternite 9 calyx-like, massive; gonocoxite broad; gonocoxal bridge low, massive, rounded; gonostyle characteristic, S-shaped, tip round. Hind tarsal claw in male c. 1.2 of t5. Female: sternite 8 with distinct protuberation between hypogynal valves which are of medium width, with gap in-between; ovipositor little longer than genital segment, straight, triangular or almost so, setulose area flat, not delimited. Genital plate only slightly incised at apex; fork with strong prongs curved to inside. Supragenital plate broadly triangular, with two bristles.

Comparison. Member of the *mutica* group of species which comprises also *T.* (*S.*) *simonyi*, *T.* (*S.*) *andorrensis*, *T.* (*S.*) *candida* and *T.* (*S.*) *dahlae*, *T. candida*, *simonyi* and *andorrensis* differ from *mutica* mostly by the shape of male genitalia, as described detailly by KRZEMIŃSKA (2000a); females of these four species are very similar. The gonostyle in *T. mutica* is S-shaped (both outer and inner outline), the bridge is low and massive; in *T. simonyi* the gonostyle is mildly curved to inside (only inner outline in somewhat S-shaped), the bridge is narrow and highly vaulted. *T. andorrensis* seems intermediate between these two. *T. candida* differs from these three species by a large bulge on mesal face of gonostyle. The females of all four species are very similar; only *T. simonyi* differs in having four bristles on the supragenital plate, and not two as in remaining species. The ovipositors of these species are similar to that in *T. parva*, but are much wider. *T. dahlae* is a more remote member of the *mutica* group; the common features are found only in male genitalia: the triangular bridge and recurved gonostyles.

Additional description was given by KRZEMIŃSKA (2000a). Antennae are long, delicate (Fig. 33.D, F). Initial flagellomeres usually slender, but may be more plump than that shown in Fig. D, F, in female and sometimes in male; verticils are stiff and erect. Thorax: pleura bare. Wing oval, anal lobe poorly developed; d cell characteristic, broad and rectangular (Fig. 33.G), section bM1+2 often subequal mM1+2; m-cu somewhat wavy. Legs: t5 subequal t4 in male; tarsal claw in male is large, almost 1/2 of t5 (Fig. 33.E).

Male genitalia (Fig. 33.A-C). Sternite 9 is massive and calyx-like, outer margin only slightly incised. Gonocoxite broad, large; bridge massive, rounded and low, so that space beetween bridge and sternite 9 is small. Gonostyle twice as long as gonocoxite, characteristically S-shaped, basal half slightly swollen mesally; tip round, inclined to inside. Aedeagal complex (Fig. 33.C) with hood visible in lateral view; parameres strong basally, distally narrow, curved high over lateral apodemes.

Female genitalia (Fig. 33.H-L). Sternite 8 with distinct protuberance between bases of hypogynal valves which are rather narrow and separated by gap, as that pictured for *T. andorrensis* (Fig. 14.L). Ovipositor is massive, slightly longer than genital segment, triangular or almost so; setulose area flat and not delimited by suture, but extended almost to tip. Genital plate with very shallow incision; prongs of genital fork are almost semi-circular and strong. Supragenital plate broad, triangular, with two bristles set widely apart. Spermathecae with sclerotized sections of ducts shorter than the spermathecal diameter.

Material examined. The holotype and paratypes (males) were examined in the collection of Christine DAHL. Other specimens are listed in KRZEMIŃSKA (2000a).

Distribution. The species was described from Germany. Records are only from mountaineous regions of Alps. Germany: Oberbayern (DAHL 1966, 1999). Switzerland: see KRZEMIŃSKA (2000a). Italy, Alps (STARÝ & DELMASTRO 2001).

Occurrence. Adults appear X-XI.

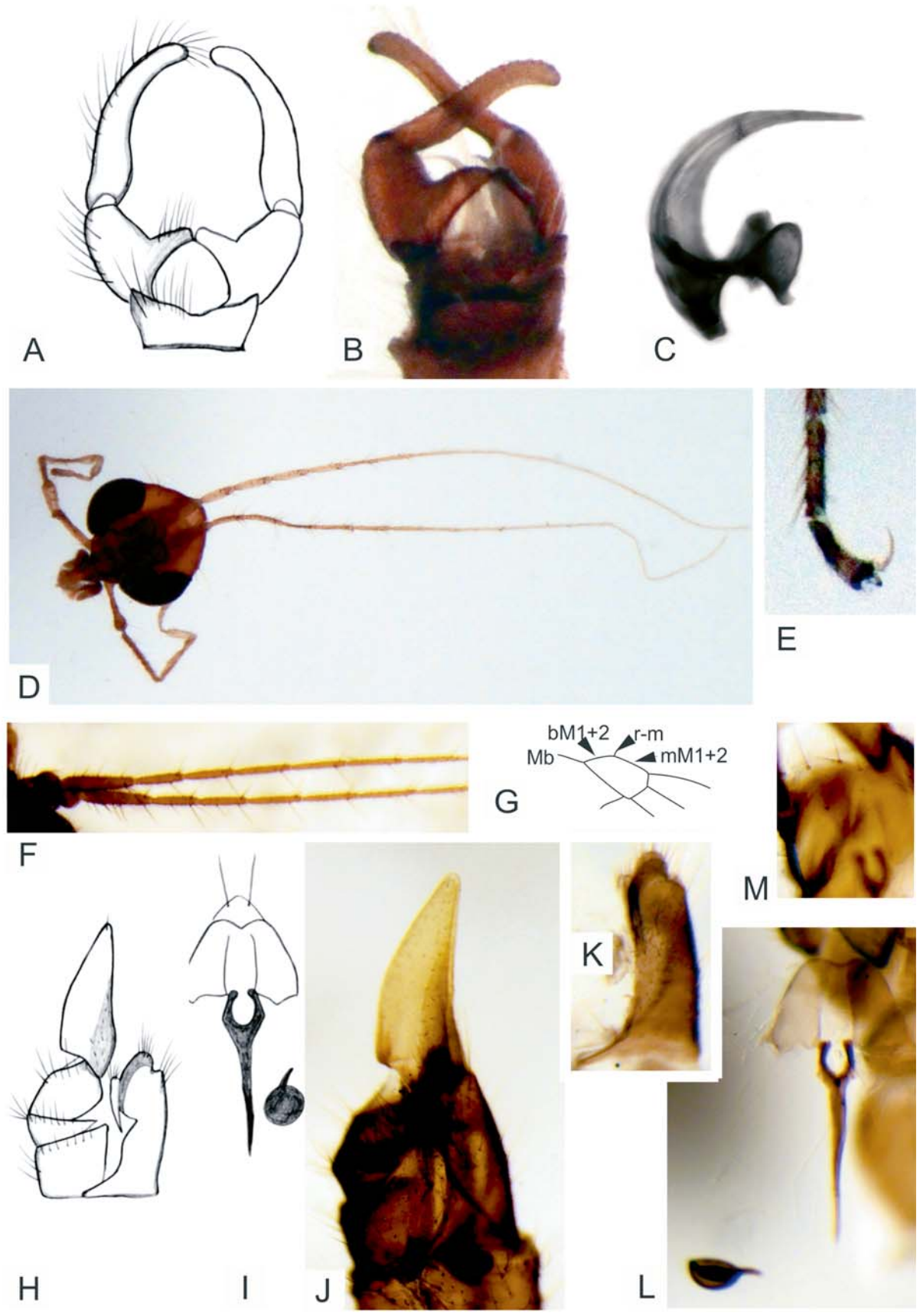


Fig. 33. *Trichocera* (*Saltrichocera*) *mutica* DAHL, 1966. A-E, male: A-B, genitalia ventrally; C, aedeagal complex laterally; D, antennae and palpi; E, hind tarsal claw. F-L, female: F, antenna; G, shape of discal cell; H-I, drawing of genitalia and plate; J, genitalia laterally; K, sternite 8 laterally; L, genital plate; L, apex of supragenital plate.
Male: Switzerland, Canton Uri, Hospental, 21-31.X. 1984 (coll. L.F. REZBANYAI-RESER; MHNN); female: Canton Ticino, Aurigeno, 30.X. 1980 (leg. W. GEIGER; MHNN).

Trichocera (*Saltrichocera*) *nordica* KRZEMIŃSKA & GORZKA, 2014

Fig. 34

Trichocera (*Saltrichocera*) *nordica* KRZEMIŃSKA & GORZKA, 2014: Acta zool. crac. 57: 5, fig. 2 (male, female)

Diagnosis. Antennae with dense, soft pubescence; flagellomeres short, verticils soft. Thoracic pleura bare. Male: sternite 9 narrow, outer (distal) margin evenly, very slightly depressed, frequently with small medial incision; bridge low, wide, rounded; gonostyles almost straight and parallel-sided, without tubercle; apex rounded. Female: hypogynal valves of medium width; ovipositor distinctly longer than genital segment, setulose area reaching almost mid ovipositor. Genital plate with very shallow, wide incision. Fork with prongs short, divergent, connected to plate by desclerotized sections. Supragenital plate broad, with two bristles.

Comparison. The male of *T. (S.) nordica* can be confused with those species whose gonostyles are also devoid of basal tubercles, bridge is low, wide, and sternite 9 has a straight distal margin: *T.*(*S.*), *pappi T.*(*S.*) *brevis, and T.*(*S.*) *saltator*. All these three species have the sternite 9 wider than *nordica*; however, over the sternite and parallel to it there is a strong membrane in *nordica*, and the edge of this membrane can be mistaken with the margin of sternite which may then appear wider (see Fig. 34.A, arrow).

The female is very similar in the shape of ovipositor and plate to those in *T.* (*S.*) *montium*; ovipositor in *nordica* has usually a small dorsal notch in basal part (Fig. 34.H, arrow) and this species has a softer setation of antennae than *montium*. Other species with long ovipositors and similar genital plate are: *T. antennata* and *T. thaleri*; *T. antennata* is distinct by its magnified first flagellomere, and ovipositor of *thaleri* differs by its shape and poorly delimited setulose area; flagellomeres differ markedly in shape and setation. See also remarks in the description of *montium*.

Additional description. Antennae (Fig. 34.E, F, G): basal flagellomeres short; f1 is as long as 2x pedicel and not much longer than f2; in male usually slender (but see Fig. 34.E, F); more oval in female; f1 and f2 in both sexes frequently fused or almost so (female, Fig. 34.G, arrow). Verticils soft, 2-3x as long as pubescence, depressed; pubescence dense. Palpi not shorter than head (Fig. 34.E, F). Thoracic pleura bare. Legs: hind tarsal claw in male c. 1/3x t5 (Fig. 34.D).

Male genitalia (Fig. 34.A-C). Sternite 9 of medium width, distal margin somewhat irregular, slightly wavy, with small medial incision. Over margin there is parallel edge of strong membrane (Fig. 34.A, arrow); see remarks in section on comparison. Bridge rounded, wide and low, halves closely contacting. Gonostylus almost straight and parallel-sided, with round apex, without basal tubercle. Aedeagal complex (Fig. 34.C): parameres raised high above aedeagus; hood hidden between parameres; lateral apodemes narrow.

Female genitalia (Fig. 34.H-M): ovipositor longer than genital segment, slender; small depression in dorsal basal margin usually present (Fig. 34.H, arrow); setulose area rather poorly delimited, reaching almost mid ovipositor; hypogynal valves moderately narrow (Fig. 34.J). Genital plate (Fig. 34.L-M) with incision broad, shallow; fork shallow, its short,divergent prongs are connected to plate by short, desclerotized sections. Supragenital plate broad, with two bristles closely set. Spermathecae with sclerotized portions of ducts 1.2-1.3x as long as spermathecae' diameter.

Material examined. Holotype female, Finland, Oulanka Res. St. pine forest at lake, 4.09. 2011 (coll. EK & W. KRZEMINSKI). Other material is listed in KRZEMIŃSKA & GORZKA (2014).

Distribution and occurrence. The species is known till now only from Finland. Adults were collected in IX.

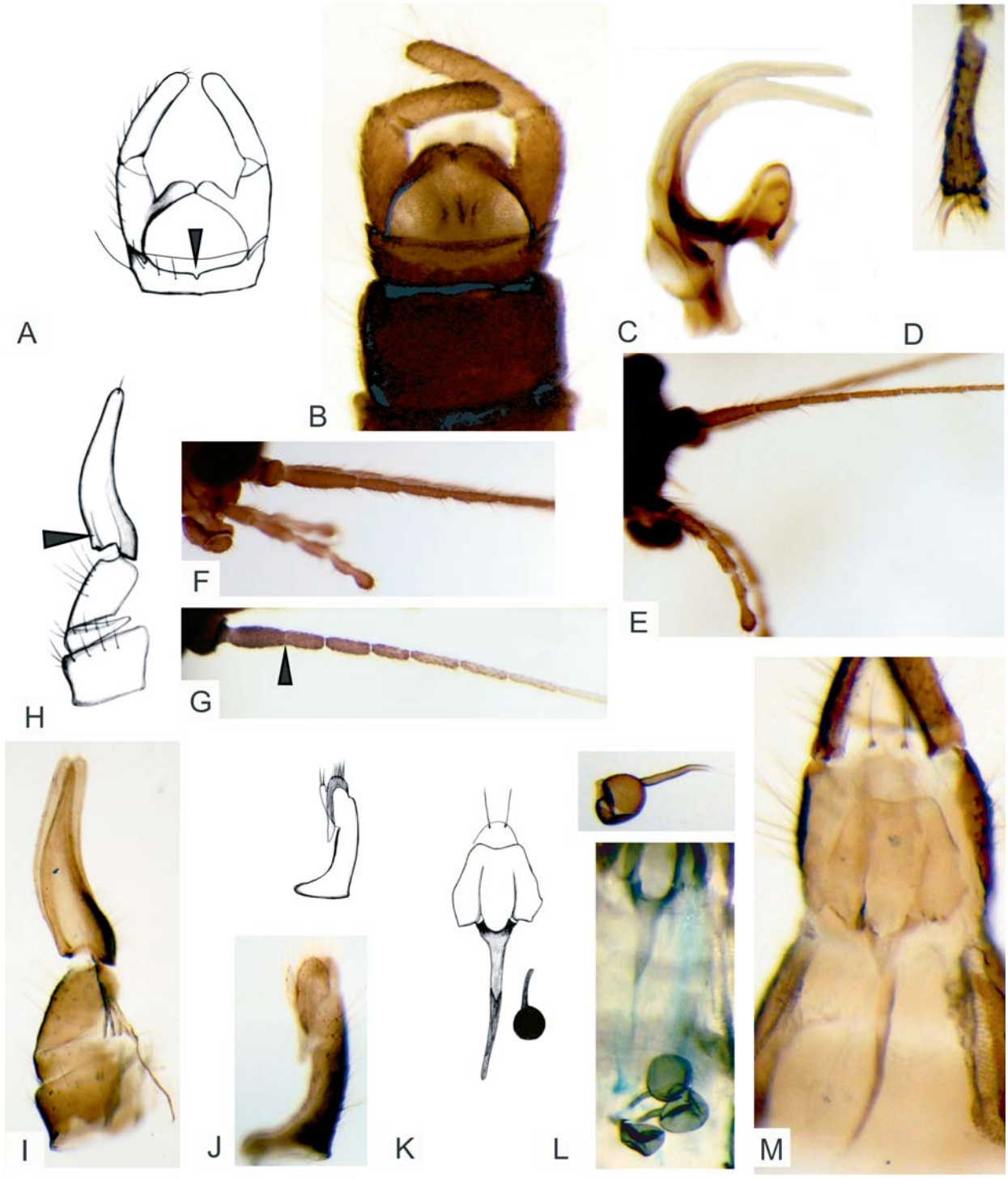


Fig. 34. *Trichocera* (*Saltrichocera*) *nordica* KRZEMIŃSKA, 2014. A-F, male: A-B, genitalia ventrally; C, aedeagual complex; D, hind tarsal claw; E, basal antenna and palp; F, antenna swollen. G-M, female: G-H, genitalia laterally; I, sternite 8; J-L, genital plates and spermathecae (K-tinted with chlorazol black); M, antenna.
Specimens: male and female paratypes, Finland, Oulanka Res. St. pine forest at lake, 4.09. 2011 (leg. EK & WK).

Trichocera (Saltrichocera) obtusa STARÝ & MARTINOVSKÝ, 1996

Fig. 35

Trichocera (Saltrichocera) obtusa in: KRZEMIŃSKA 2002a: 158

Trichocera (s. str.) *obtusa* STARÝ & MARTINOVSKÝ, 1996: Ent. Prob. 27: 158, fig. 3, 7, 16, 22 (male), 28, 32 (female)

Diagnosis. Antennae: flagellomeres with long, strong verticils. Anepimeron with few short setae. Male: sternite 9 deeply excised medially; bridge rounded, of medium height; gonostyle mildly curved, parallel-sided, apex round; prominent basal tubercle. Female: hypogynal valves of medium width; ovipositor little longer than genital segment, very broad basally; setulose area characteristically long (reaching beyond mid ovipositor) and greatly convex, well delimited. Genital fork delicate, shallow, connected to plate by less sclerotized sections, which makes the fork calyx-shaped; supragenital plate with two bristles.

Comparison. Male genitalia are most similar to those of *T.* (*S.*) *montium*; *montium* has a higher vaulted bridge and gonostyles narrowing to apex, but see remarks on these two species in the section on *montium*. The bridge in *obtusa* is similar to that in *T.* (*S.*) *recondita*, but this species has smaller tubercles on gonostyles, softer setation of antennae and bare pleura. Female: the ovipositor is characteristic by its basal width, and a large setulose area, reaching beyond midlength of ovipositor. The female may be mistaken with females of *T.* (*S.*) *pubescens*, *montium* and *recondita*, especially those with broader ovipositors. *T. montium* has a longer and more slender ovipositor (but see remarks on this species) and extremely short lateral portions of genital plate; both other species have shorter setulose area, longer prongs of genital forks (deeper forks), and wider hypogynal valves than *T. obtusa*. Remarkable are also long, erect verticils on antennae in *T. obtusa*, and the setae on anepimeron which are absent from T. *recondita*, while *T. pubescens* have them also on the metanepisternum.

Additional description. Body color reddish brown; for the detailed description see STARÝ & MARTINOVSKÝ (1996). Antennae with long verticils, 3-4x as long as pubescence; Fig. 35.H, I. Thorax: anepimeron with several short setae; metepisternum bare (Fig. 35.F). Legs: length of hind tarsal claw c. 1/3x t5 (Fig. 35.B).

Male genitalia (Fig. A-E): sternite 9 with deep, triangular to quadrangular excision; bridge is rounded to slightly narrowed apically. Gonostyle barely longer than gonocoxite, more or less curved and parallel-sided above prominent basal tubercle; apex round. Aedeagal complex (Fig. 35.E) long parameres, broad basal apodeme, and lateral apodeme perpendicular to long axis of aedeagal complex.

Female genitalia (Fig. 35.J-N): hypogynal valves of medium width, rather narrow (Fig. 35.J, M). Ovipositor slightly longer than genital segment, very broad basally (in paratype c. 2.2x longer than wide); setulose area is characteristically long, reaching beyond mid ovipositor, and greatly convex, well delimited; tip acute. Genital plate is longer than wide, with lateral portions extending beyond level of fork (Fig. 35.K, arrow); fork is delicate, with prongs shorter that distance between their apices, connected to plate by small, less sclerotized sections, which make fork calyx-shaped. Supragenital plate with two bristles close to each other. Spermathecae with ducts longer than spermathecal diameter.

Material examined. Paratypes, Czech Republic, Moravia: Jeseníky Mts., K. Studanka 900m, 11. X. 1994 – 1m, 1f; 13. X. 1994 – 1m; 19.X. 1994 – 1m, 1f. Moravia, Horni Mìsto, Skaly, 10. X. 1986 – 1m; Dlouhá Loučka, Valsov Zleb – 27. X. 1994 – 1m (all leg. et det. J. STARÝ). Poland: Bieszczady Mts., Ustrzyki Górne, 26.X. 1989 – 1f (EK & W. KRZEMIŃSKI); Las Łagiewnicki n. Łódź, 14.II. 1996 – 1f (A. SOSZYŃSKA).

Distribution and occurrence. Europe: Carpathians: Czech Republic, Slovakia and Poland (STARÝ & MARTINOVSKÝ 1996); Alps: Switzerland (STARÝ & KRZEMIŃSKA 1998); lowland region of Hungary (KRZEMIŃSKA 2001c). Most records are from X-XI; one record from February documents presence of adults also in mid winter, and in lowland.

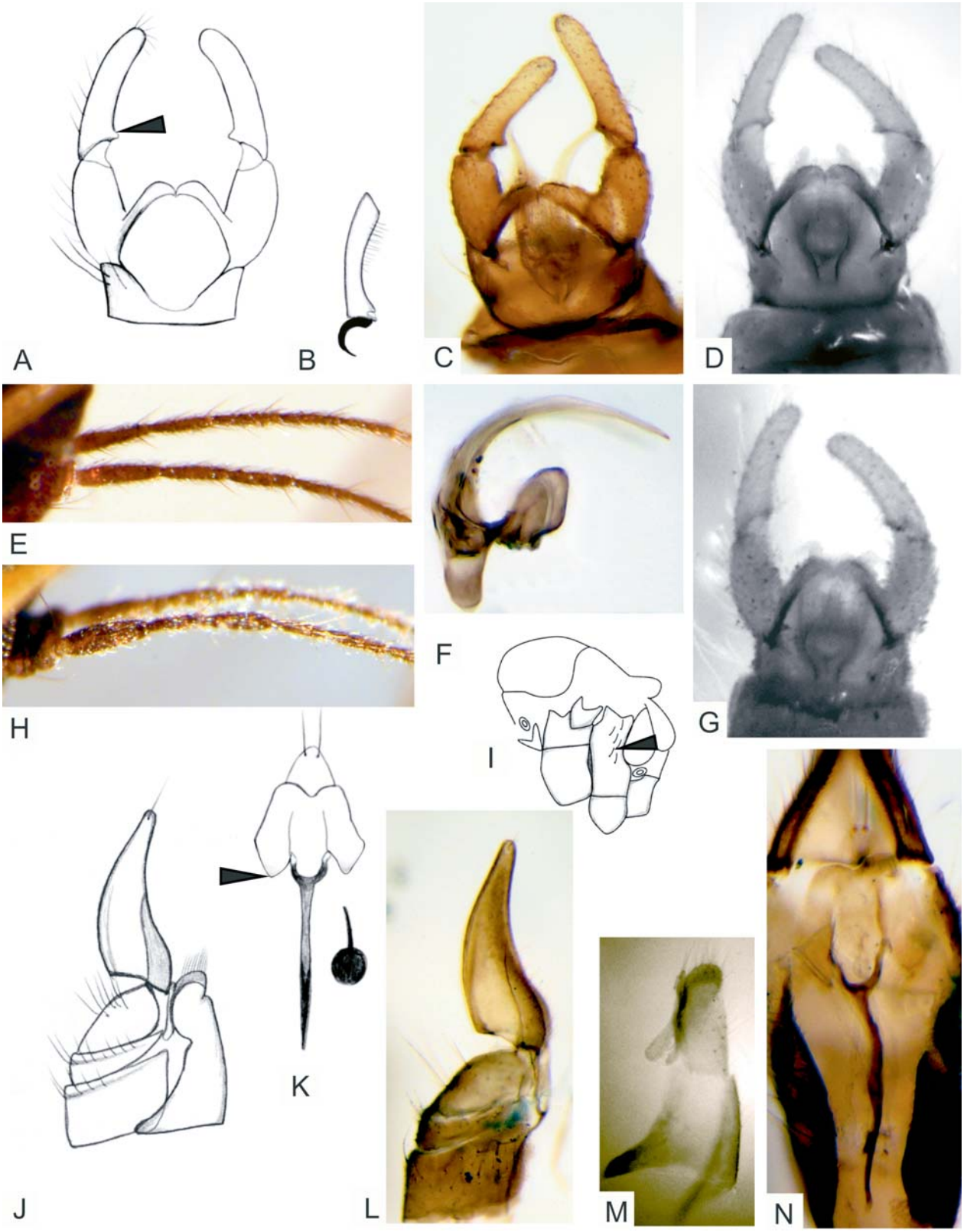


Fig. 35. *Trichocera* (*Saltrichocera*) *obtusa* STARÝ & MARTINOVSKÝ 1996. A-G, male: A, drawing of genitalia; B, hind tarsal claw; C-D, genitalia; E, antenna; F, aedeagal complex. H-N, female: H, antenna; J, K, drawings of ovipositor and genital plates; L, genitalia; M, sternite 8; N, genital plates.
Paratypes: B-D, H, L, N, Czech Republic, Moravia (B, E, H, L, N - Dlouhá Loučka, 27. X. 1994; C, D, Jeseníky Mts., K. Studanka 900m, 19.X. 1994 (leg. et det. J. STARÝ)).

Trichocera (*Saltrichocera) pappi*
KRZEMIŃSKA, 2003

Fig. 36

Trichocera (*Saltrichocera*) *pappi* KRZEMIŃSKA 2003: Fol. ent. hung. 278, figs 1-11(male, female)

Diagnosis. Antennae long; flagellomeres very slender, verticils short and soft. Thoracic pleura bare. Male: sternite 9 with outer margin straight, set with row of bristles; bridge separated and rounded, rather wide; gonostyle without basal tubercle, tip round. Female: ovipositor almost straight, with flat setulose area; length variable. Genital plate longer than wide, , apical portion of fork massive, more or less pentagonal, distinctly darker than remainder. Supragenital plate with two bristles.

Comparison. *T*. (*S*.) *pappi* belongs to the *saltator* group of species; male genitalia are similar to those of *T*. (*S*.) *saltator*, *T*. (*S*.) *brevis* and *T*. (*S*.) *rufulenta*, in having a wide sternite 9 with straight margin, and the gonostyles without tubercles. *T*. (*S*.) *saltator* and *brevis* can be distinguished by bare Sc (or almost so); males by a more elongated aedeagal lateral apodemes; tarsal claw is also larger in these species. Females of *saltator*, *brevis* and *rufulenta* are easily distinguishable by their ovipositors. *T*. (*S*.) *pappi* has the setulose area very flat in lateral view, unlike *saltator* and *brevis*, and much larger than the tiny ovipositor of *T*. (*S*.) *rufulenta*. The length of ovipositor of *pappi* is variable even in the type area (Hungary), and the variation is continuous.

Additional description. Male and female antennae (Fig. 36.F,G) with thin, short flagellomeres, f1 only c. twice as long as pedicel, thin (f1 and f2 somewhat thicker), with soft verticils. Anepimeron and metanepisternum with few short setae in upper part, or bare. Hind tarsal claw in male c. 1/3 of t5 (Fig. 36.E).

Male genitalia (Fig. 36.A-D). Sternite 9 with outer margin straight, with row of setae. Bridge separated, wide and rather low, rounded. Gonostyle almost parallel sided, without tubercle; apex rounded, inclined to inside; apex round. Aedeagal complex (Fig. 36.D): parameres of medium size, lateral apodemes narrow and relatively long.

Female genitalia (Fig. 36.H-M). Sternite 8 with wide hypogynal valves. Ovipositor characteristically straight, of variable length (see Fig. 36.H); setulose area flat, reaching 1/3-1/2 length of ovipositor. Genital plate subtriangular, longer than wide; genital fork with massive prongs more or less angular and blackened at tips which may be slightly inclined to inside (as in Fig. 36.J; compare also shorter prongs in Fig. 36.M). Spermathecae with sclerotized sections of ducts longer than spermathecae' diameter.

Material examined. Specimens are listed in papers by and co-authorized by KRZEMIŃSKA, specified below.

Distribution. Holotype female, described from Hungary. An ubiquitous species known from Sweden, Poland, (KRZEMIŃSKA 2003), Switzerland (under publication; e.g., NE 561,3/205,6, Neuchâtel (Cadolles), sur neige, 600 m, 17.II. 1991 -1f (leg. J-P. HAENNI)). Northern Africa (Morocco; DRIAUACH et al. 2015).

Occurrence. Adults fly from October till March, females are found also on snow (KRZEMIŃSKA 2003).

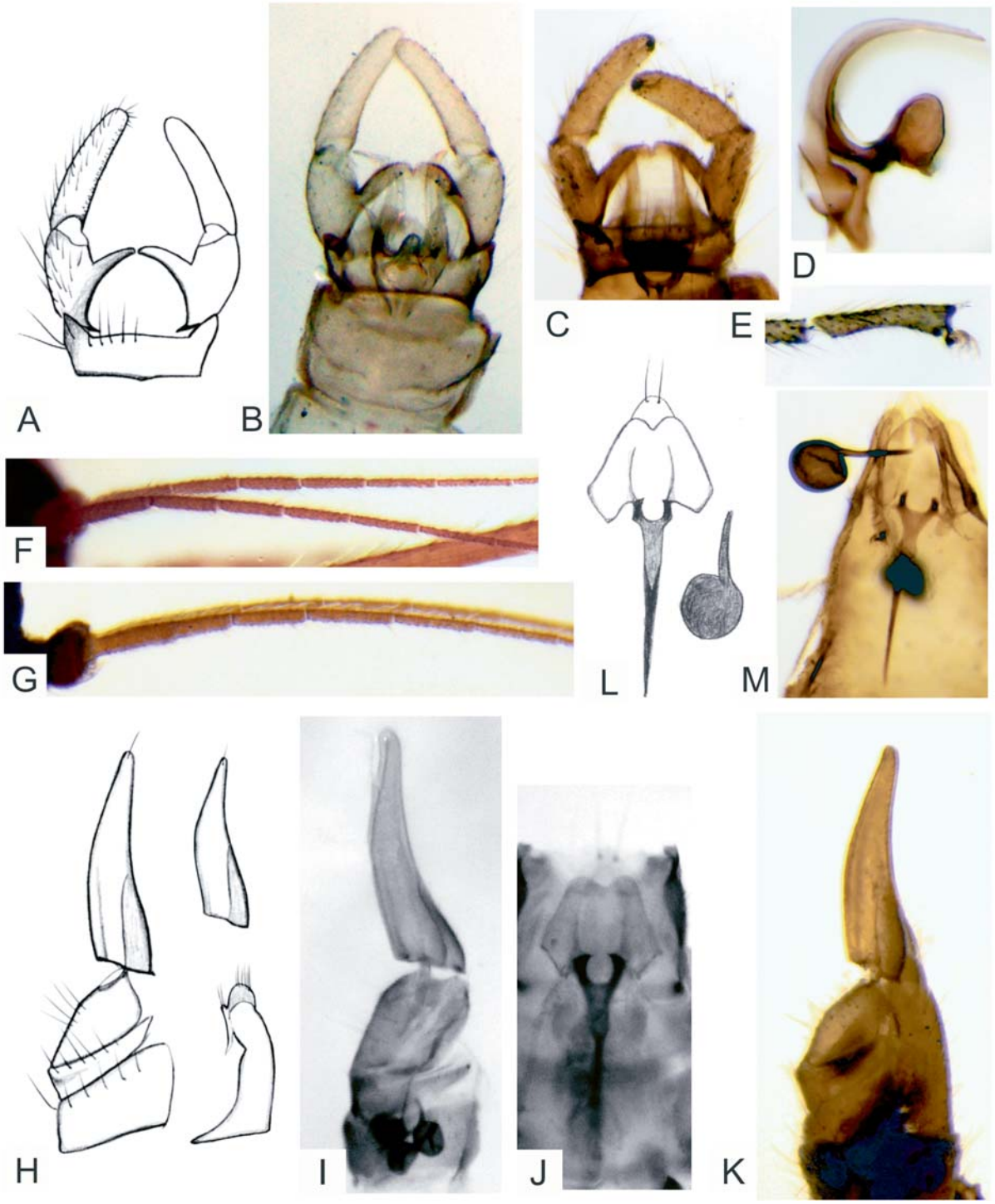


Fig. 36. *Trichocera* (*Saltrichocera*) *pappi* KRZEMIŃSKA 2003. A-F, male: A-C, drawing and photos of genitalia; D, aedeagal complex; E, hind tarsal claw; F, basal antenna. G-M, female: G, basal antenna; H, drawing of genitalia, note various lengths of ovipositors; I, K, genitalia; J, L, M, genital plates and spermathecae.
Males: B-D, G, M, paratypes, Hungary, Sitke n. Sárvár, park n. castle, 10.XI. l999 (WK); females: Poland, Łódź, Las Łagiewnicki, 5.II. 1995 (B. SOSZYŃSKI).

Trichocera (*Saltrichocera*) *parva* MEIGEN, 1804

Fig. 37

Trichocera (*Saltrichocera*) *parva* in: KRZEMIŃSKA 2002a: 158

Trichocera (*Metatrichocera*) *parva* in: STARÝ 1998

Trichocera (*Trichocera*) *parva* in: DAHL & ALEXANDER 1976

Trichocera parva in: DAHL 1966: 113, fig. 19, 24, 30 (male); fig. 50, 60 (female)

Trichocera parva in: EDWARDS 1938: fig. 31e (male)

Trichocera parva MEIGEN, 1804: Class. Beschr. europ. zweifl. Ins. I (Braunschweig): 49

Diagnosis. Antennae: verticils erect, 2-3x as long as pubescence. Thoracic pleura bare. Wings very delicate, veins pale. Male: sternite 9 only very slightly, evenly excised, with row of bristles. Bridge massive, halves terminally darkened and distinctly separated at apex. Gonostyle equal or even shorter than gonocoxite, thick, parallel-sided, curved to inside and provided with distinct process at mesal basal face. Female: ovipositor massive, as long as genital segment or slightly longer, characteristically straight or only slightly bent in middle. Setulose area flat, very poorly delimited at base but extending almost to ovipositor's tip. Genital plate longer than wide, fork shorter than wide, arms slightly divergent; supragenital plate with two bristles.

Comparison. Male and female are very characteristic and rather not to be confused with other species. Ovipositor of same shape but larger and wider is present in three species of the *mutica* group. Noteworthy: DAHL (1957, 1969) found out that in some old records the males of *T.(S.) parva* had been frequently confused with *T.* (*T.*) *hiemalis*; for possible reasons, see Remarks under *hiemalis*.

Additional description. In Europe this is the smallest species in the genus, of wing length frequently only c. 4 mm, although in some specimens wing reaches up to 7 mm. Colour variable; usually black, but LAURENCE (1957) noticed also reddish. Antennae are slender, f1 often not much longer than f2; verticils characteristically erect, 2-3x as long as pubescence (Fig. 37.F, G). Thoracic pleura bare. Wings very delicate, membrane clear, light, veins pale, thin; vein R2+3+4 is more straight than in other species. Hind tarsal claw in male (Fig. 37.D) is very small, c. 1/5 of t5.

Male genitalia (Fig. 37.A-C, E): sternite 9 is only very slightly, evenly excised, with row of bristles. Bridge is rounded, its halves are wide, apices darkened and not contacting or only barely so (Fig. 37.A, arrow). Gonostyle short, equal or even shorter than gonocoxite, thick, parallel-sided, curved to inside and provided with distinct process at mesal basal face which may be even finger-like, similar to that in *T.* (*T.*) *hiemalis* (Fig. 37.C). Aedeagal complex narrow in lateral view, hood is conspicuous (Fig. 37.E, arrow), lateral apodemes are narrow and directed to parameres.

Female genitalia (Fig. 37.H-O). Sternite 8 with moderately wide hypogynal valves. Ovipositor very characteristic, subtriangular and almost straight, as long as genital segment or slightly longer. Variations in shape shown in Fig. 37.K-M. Setulose area is flat, poorly delimited in basal portion, but extends almost to ovipositor's tip. Genital plate is distinctly incised, as long as wide; prongs of fork slightly divergent, usually slightly shorter than distance between their tips, and darker than remainder of fork. Supragenital plate with two bristles. Sclerotized spermathecal ducts not longer than spermathecae' diameter.

Material examined is listed in papers of, or co-authorized by, KRZEMIŃSKA, see below. In Poland found from north (Warmia; Wyskok) to south (Beskid Sądecki Mts., Krynica); data unpublished.

Distribution. Holotype male, described from Austria (non existent according to DAHL & ALEXANDER 1976). A well known, common and easily identifiable species, found in lowland as well as in mountainous regions (highest altitude 1300 m; Romania; UJVAROSI & KRZEMIŃSKA 2002), present in all checklists of Europe. Sweden: southern (DAHL 1966b), northern up to the Polar Circle: DAHL (1967b); Finland (FREY & STORÅ 1941; DAHL 1968; KRZEMIŃSKA & GORZKA (2014); southern Norway (HÅGVAR & KRZEMIŃSKA 2007); Russia, Kola Peninsula (PETRAŠIŪNAS & PARAMONOV 2014); Lithuania (PODENAS 1989, 1995; PETRAŠIŪNAS & VISARČUK 2007); Netherlands (KRZEMIŃSKA & BEUK 2002); Germany: DAHL (1999); Poland (KRZEMIŃSKI 1983; other unpublished records from northern to southern Poland); France (MACQUART 1834, THOMAS & VAILLANT 1977; KRZEMIŃSKA & BRUNHES 1991); Switzerland (STARÝ & KRZEMIŃSKA 1998); Hungary (KRZEMIŃSKA 2001); Spain (DAHL & KRZEMIŃSKA 2002).

Occurrence. Adults found IX-I in central Europe, frequently on snow. According to DAHL (1970), in subboreal regions the main peak of occurrence is X-XII, in boreal regions in spring and summer till X. PODENAS (1995) drew attention to preference to swampy or wet habitats in this species.

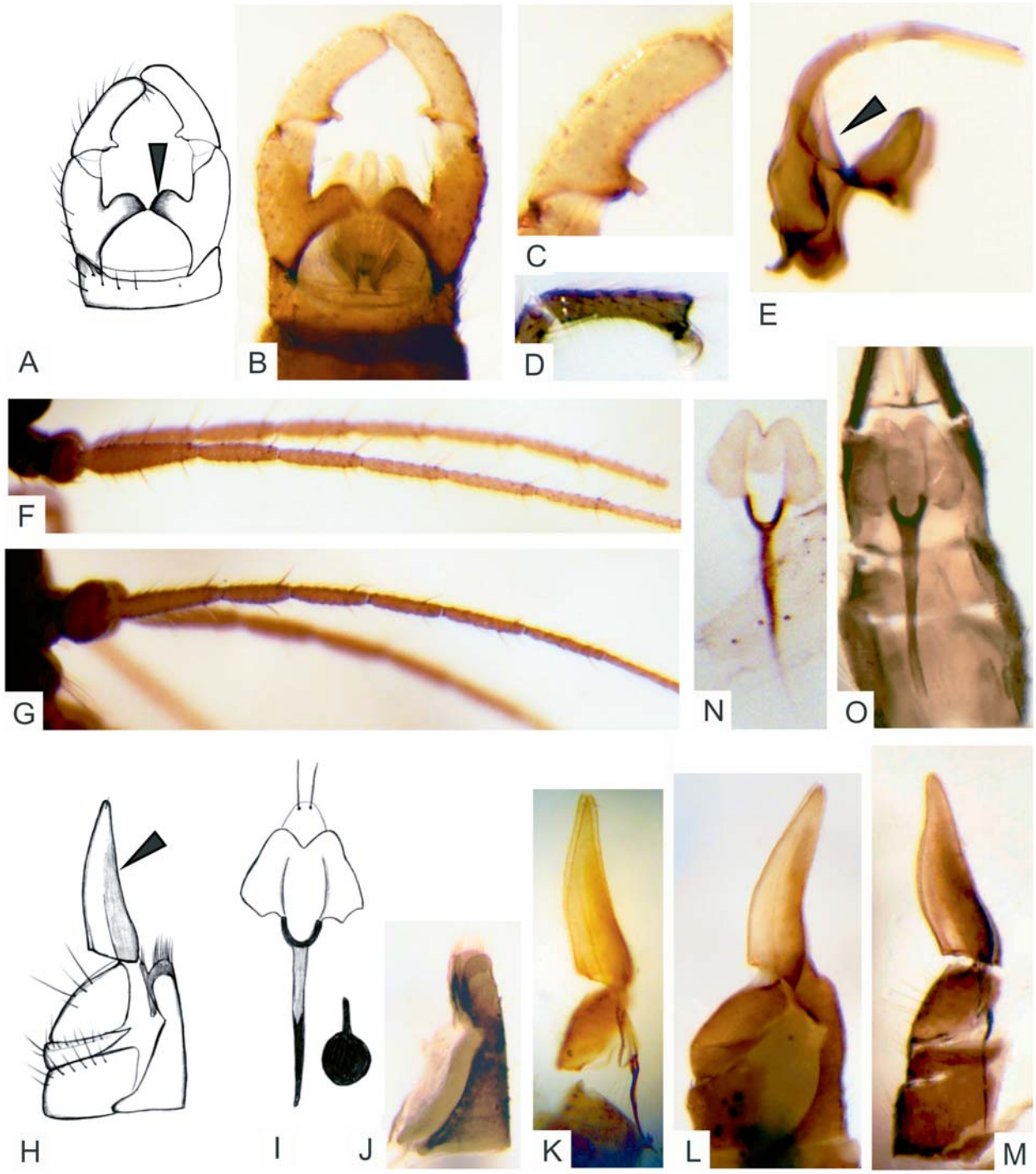


Fig. 37. *Trichocera* (*Saltrichocera*) *parva* MEIGEN, 1804. A-F, male: A, B, genitalia, drawing and photo; C, gonostylus magnified (note the shape of basal tubercle); D, hind tarsal claw; E, aedeagal complex (hood is arrowed); F, antenna. G-O, female: G, antenna; H-I, drawing of ovipositor and genital plates; J, sternite 8; K-M, variations in ovipositor's shape; N-O, genital plates. Specimens: Poland, Beskid Sądecki Mts., Krynica, 3.XII. 2012 (male, leg. A. SOSZYŃSKA-MAJ), 7 and 3.XII. 2011 (females, leg. M. J. ŁUSZCZAK).

Trichocera (*Saltrichocera*) *pubescens* STARÝ & MARTINOVSKÝ, 1996

Fig. 38

Trichocera (Saltrichocera) pubescens in: KRZEMIŃSKA 2002a: 158

Trichocera (*Metatrichocera*) *pubescens* in: STARÝ 1998

Trichocera (s. str.) *pubescens* STARÝ & MARTINOVSKÝ,1996: fig. 2, 6, 10 (thorax, antenna, leg), 15, 21 (male), 27, 31 (female)

Diagnosis. Antennae: flagellomeres with strong verticils c. 3x as long as pubescence. Thorax: anepimeron and metanepisternum with numerous setae. Male: sternite 9 deeply excised medially; bridge massive, low, triangular, with strong, membraneous flange along inner margin; gonostyle straight, gradually narowing to rounded apex, with small basal tubercle. Female: hypogynal valves wide; ovipositor little longer than genital segment; setulose area ending before mid ovipositor, convex, well delimited; remainder of ovipositor is slender. Genital plate little wider than long, incision very shallow, prongs of fork delicate, as long as distance between their tips; supragenital plate with two bristles.

Comparison. Male genitalia are distinctive by a massive bridge which is a most robust one among species of the subgenus; lateral apodemes in the aedeagal complex are distally bent to basal apodemes, which is a rare character among the subgenus. Female: genitalia may be mistaken with those of *T*. (*S*.) *recondita* (especially those with broader ovipositors), and with *T*. (*S*.) *obtusa*. According to STARÝ & MARTINOVSKÝ (1996), *pubescens* has a more convex setulose area than *obtusa*. This feature is certainly a subject to variation, but in my collection the females of *T. obtusa* have definitely larger setulose area, regarding the length and convexity. The three species differ also by setation of the antennae and of thorax: *pubescens* has abundant bristles on anepimeron and metanepisternum; *obtusa* has sparse bristles only on the anepimeron, while in *recondita* pleura are bare. However, it must be stated that these setae are easily lost while the specimens are stored, in wet state as well as in dry. In any case, this character must be carefully checked, and on both sides. In wet specimens sometimes the pits of lost setae are visible.

Additional description. Detailed colouristic features were described by STARÝ & MARTINOVSKÝ (1996). Antennae with long, prominent verticils (3x as long as pubescence; Fig. 38.G, I). Thorax: anepimeron and metanepisternum with abundant setae (Fig. H, arrows). Legs: hind tarsal claw in male is small, c. 1/4x t5 (Fig. 38.E).

Male genitalia (Fig. 38.A-D, F). Sternite 9 with deep, triangular (Fig. 38.C) to quadrangular excision. Bridge (Fig. 38.B, D) is characteristically massive, low, triangular, with dark membraneous flange along inner margin (Fig. 38.A, arrow). Gonostyle straight or almost so, rod-like, gradually narowing to apex which is rounded. Basal tubercle small. Aedeagal complex (Fig. 38.F) narrow in lateral view; lateral apodeme is characteristically strongly bent to basal apodeme which is massive; hood is distinct in lateral view.

Female genitalia (Fig. 38.J-N). Hypogynal valves are wide (Fig. 38.L). Ovipositor slightly longer than genital segment; setulose area strongly convex, well delimited and ending before mid ovipositor; tip acute. Genital plate is little wider than long (Fig. 38.N), apical incision is wide and shallow; fork is delicate, prongs straight, as long as distance between their tips; tips are sometimes slightly divergent; supragenital plate with two bristles close to each other. Spermathecae with visible portions of ducts up to 1.5x as long as diameter.

Material examined. Paratypes: Czech Republic, Moravia: Dlouhá Loučka, Valšov. žleb, 22.X. 1989 – 1m; Jeseníky Mts., Karlova Studanka, 900 m, 13. X. 1994 – 1m; 19.X. 1994 – 1f. Other specimens: Moravia: Dlouhá Loučka, Valšov. žleb, 12.X. 1986 – 1m; 27.X.1986 – 1f; Ondrášov nr Mor. Beroun, 16.X. 1990 – 1m (all leg. et det. J. STARÝ). Poland: Ojców National Park, Góra Rusztowa 21-11. XI. 1992 – 2m (A. PALACZYK). Switzerland: Rochefort (CH, NE) Chateau, 780 m, 551, 350/201, 750, 3-8.XI. 1982 – 2m (Malaise trap; coll. C. DUFOUR).

Distribution. Europe: mountainous regions in the Czech Republic, Poland, Germany, Italy (STARÝ & MARTINOVSKÝ 1996), and Switzerland (under publication).

Occurrence. All records are from end of September to November.

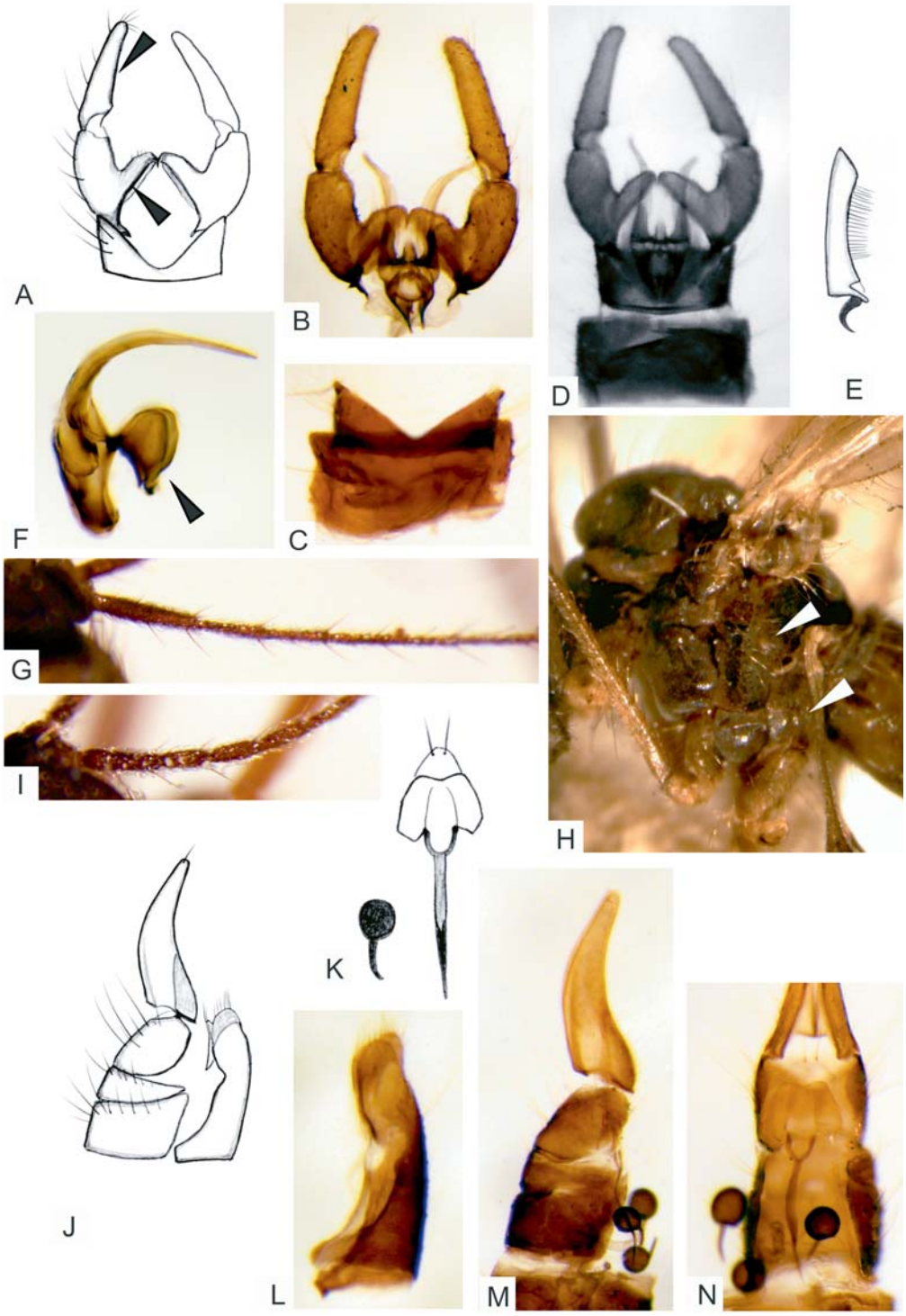


Fig. 38. *Trichocera* (*Saltrichocera*) *pubescens* STARÝ & MARTINOVSKÝ 1996. A-H, male: A, drawing of genitalia; B, shape of bridge and gonostyles; C, sternite 9; D, genitalia ventrally (paratype); E, hind tarsal claw; F, aedeagal sheath; G, antenna; H, setae on epimeron and metepisternum (arrows). I-N, female (paratype): I, basal antenna; J, K, drawing of ovipositor and genital plates; L, ovipositor; M, sternite 8; N, genital plates.
Specimens: D, L-N, paratypes Czech Republic, Moravia, Jeseníky Mts., (male: Dlouhá Loučka, Valšov. žleb, 22.X. 1989; female: Karlova Studanka, 900 m, 19.X. 1994; both leg. J. STARÝ); B, C, F, G, H, Poland: Ojców Nat. Park, Korytania 19.XI. 1992 (leg. A. PALACZYK).

Trichocera (*Saltrichocera*) *recondita* STARÝ, 2000

Fig. 39

Trichocera (*Saltrichocera*) *recondita* in: KRZEMIŃSKA 2002a: 158

Trichocera (*Metatrichocera*) *recondita* STARÝ, 2000: Čas. Slez. Muz.: 99, fig.7-13

Diagnosis. Antennae: flagellomeres oval; verticils short, delicate. Thoracic pleura bare. Tarsal claw of male small and delicate, c. 1/4 of t5. Male: genitalia: incision of sternite 9 deep, triangular to rectangular; bridge triangular but apex rounded; gonostyle only slightly narrowing toward apex, with basal tubercle. Female: hypogynal valves wide; ovipositor as long as genital segment, with convex setulose area ending about midlength; distal portion of ovipositor slender. Genital plate wider than long, incision very shallow, fork delicate, with prongs rounded, slightly bent to inside. Supragenital plate with two bristles.

Comparison. Male genitalia are very similar to those of *T.* (*S.*) *implicata*; the main difference is a slightly rounded apical portion of the bridge in *recondita.* Female of *T. recondita* differs from *T. implicata* by the ovipositor longer and more slender; both species have identical shapes of genital plates and fork (and same range of variation regarding the distance between bristles of supragenital plate, length of sclerotized ducts of spermathecae). According to STARÝ (2000), *T. recondita* has more delicate verticils on flagellomeres and reddish body colour. The shape of ovipositor of *T. recondita* is rather commonly met in several other species, including *T.* (*T.*) *hiemalis* (also with wide hypogynal valves and soft setation of antennae); from all these, *T. recondita* is dicerned by the genital plate shorter than wide.

Additional description. Antennae: flagellomeres slender to markedly swollen, in male and female (similar variation as in *T. implicata*); pubescence soft, verticils short and delicate (Fig. 39.F,G). Hind tarsal claw in male small and delicate, c. 1/4 of t5 (Fig. 39.D).

Male genitalia (Fig. 39.A-C, D): incision of sternite 9 is deep, triangular to rectangular. Bridge is triangular, but with apex rounded; halves strongly adherent in middle (in unprepared males, Fig. 39.B; after preparation contact is somewhat loosened, Fig. 39.C). Gonostyle almost straight to mildly curved to inside, only slightly narrowing towards apex; basal mesal tubercle is small, but distinct (larger, as if swollen, after preparation), covered with minute setae. Aedeagal complex: parameres delicate also basally, of medium length (ending slightly beyond level of lateral apodemes); lateral apodeme is broad, slightly inclined to basal apodeme. Hood is conspicuous in lateral view (Fig. 39.D, arrow).

Female genitalia (Fig. 39.H-N). Hypogynal valves wide. Ovipositor as long as genital segment or slightly longer; setulose area is strongly convex, contrasting with narrow remainder of ovipositor which is variable in shape (compare Fig. 39.J, K,M), dorsal margin can be slightly concave before apex; tip acute. Genital plate (Fig. 39.L,N) is characteristically short and rounded; apical incision is very shallow; genital fork with prongs semicircular, delicate, usually shorter than wide. Supragenital plate with rounded apex and two bristles. Spermathecae with sclerotized sections of ducts up to 1.5x as long as a spermathecal diameter.

Material examined. Paratypes: Slovakia, N. Tatra Mts., Donovaly (1000 m), 24. X. 1994 – 1f; 25. X. 1994 – 1f; 26. X. 1994 – 2m (ISEA; all leg. J. STARÝ). Material listed from Sweden and Finland (KRZEMIŃSKA & GORZKA 2014), Norway (HÅGVAR & KRZEMIŃSKA 2007), Hungary (KRZEMIŃSKA & PAPP 2001), Romania (UJVAROSI & KRZEMIŃSKA 2002). Poland: Beskidy Mts., Krynica Kopciowa, oddz. 5, on snow, fir forest, temp. -3°C 3.XII. 2012 – 4f, 1m (M. ŁUSZCZAK; ISEA); Ojców Nat. Park, Góra Rusztowa, 21-22.XI. 1992 – 2f (A. PALACZYK).

Distribution. Species is described from the Czech Republic and appears ubiquitous in central and northern Europe up to alt. 1400 m (Czech Republic, Slovakia, Switzerland; STARÝ (2000)); other countries are listed above.

Occurrence. Adults fly from end of September till December. *T. recondita* seems to be more common than *T. implicata*, at least in central Europe.

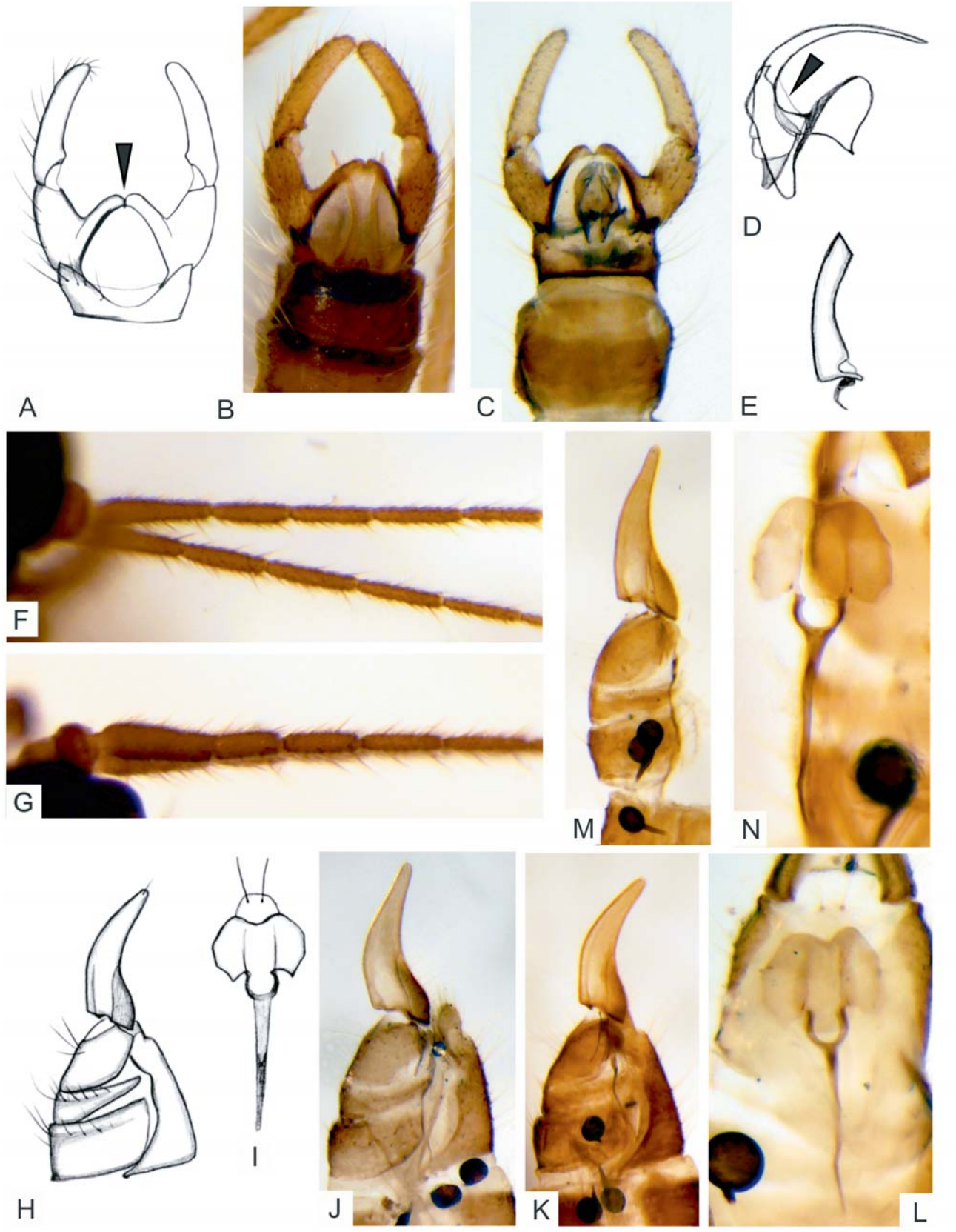


Fig. 39. *Trichocera* (*Saltrichocera*) *recondita* STARÝ , 2000. A-F, male: A, drawing; B, C, genitalia; D, aedeagus; E, hind tarsal claw; F, basal antenna. G-N, female: G, basal antenna; H, I, drawing of ovipositor and genital plates, resp.; J, K, M ovipositors, variation in shapes; N, L, genital plates.
Males: B, F, paratype, Slovakia, N. Tatra Mts., Donovaly (1000 m), 24. X. 1994 (leg. J. STARÝ); C, Sweden, Uppsala, Botanical Garden, 17-19.X. 1999 (EK & C. DAHL). Females, J-L, Poland: Krynica Kopciowa, oddz. 5, on snow, fir forest, 3.XII. 2012 (M. ŁUSZCZAK).

Trichocera (*Saltrichocera*) *regelationis* (LINNAEUS), 1758

Fig. 40.1, 40.2

Trichocera regelationis in: PRATT, 2003: fig. 20 (male)

Trichocera (*Saltrichocera*) *regelationis* in KRZEMIŃSKA, 2002a: 158

Trichocera (*Metatrichocera*) *regelationis* in KRZEMIŃSKA, 2000c: figs. 1-9, 10-11, 15-18, 20-23, 25-27

Trichocera (*Metatrichocera*) *regelationis* in: KRZEMIŃSKA 1999: fig. 1-4 (aedeagus)

Trichocera (*Metatrichocera*) *regelationis* in STARÝ 1998: 185.

Trichocera (*Trichocera*) *regelationis* in: DAHL & ALEXANDER 1976

Trichocera s. str. in: DAHL 1973: fig. 7-8, 14 (larva), fig. 29 (pupa)

Trichocerodes georgianus BRÈTHES 1925; synonymised by EDWARDS 1928: 34.

Trichocera limpidipennis LOEW, 1873: Beschr. europ. Dipt. 3 (Halle): 69, **synonymized herein**

Trichocera regelationis (LINNAEUS, 1758) in: MEIGEN 1818: 214

Tipula regelationis LINNAEUS, 1758: 587

Diagnosis. Wing with a dark spot on cross-vein r-m, sometimes with additional dark smudge along Cu and m-cu, and sometimes faint small clouds on origin of Rs and on distal radial veins (R2+3, r-r, and first section of R3). Thoracic pleura bare. Male: bridge delicate, halves distinctly separated at apex; sternite 9 narrow (axially), distal margin straight or slightly convex, set with bristles; gonostyle with distinct basal tubercle. Inner genitalia of male and female of *regelatonis* group type. Female: ovipositor as long as genital segment or slightly longer, curved, tip acute; setulose area convex, reaching c. 1/3 ovipositor, well delimited; hypogynial valves wide. Genital plate with heart-like incision, prongs of genital fork are very short or non-existent. Supragenital plate with two bristles.

Comparison. The species is recognizable by dominant spot on a cross-vein r-m; the other species with patterned wing, *T. maculipennis*, has a distinct, large and well defined spot on origin of Rs. See also remarks on variation below.

Additional description. Species is variable in body colour, expression of spots on wing, thickness of flagellomeres, shape of gonostyles (male) and ovipositor (female); details were discussed in KRZEMIŃSKA (2000c), see also remarks below. Antennae (Fig. 40.1.G, H): flagellomeres slender to markedly swollen in male and female. Verticils in male antenna rather soft, 2x as long as pubescence. Wing (Fig. 40.1.F) with dark spot on cross-vein r-m, sometimes with additional dark smudge along Cu and m-cu; also on distal radial veins (R2+3, r-r, and first section of R3). Cross vein m-cu is shifted proximad from the fork of M3+4 in all specimens examined including holotype of *limpidipennis*, described below (Fig. 40.1.F, arrow; Fig. 40.2.D). Thorax: pleura bare. Legs: tarsal claw in male large, strongly curved, at least 1/2 of t5 (Fig. 40.1.E).

Male genitalia (Fig. 40.1.A-D). Sternite 9 is narrow axially, width equal 0.25-0.3x length; distal margin straight to slightly convex, set with bristles. Bridge is delicate, halves distinctly separated at apex. Gonostyle usually short, narrowing to apex (Fig. 40.1.C), with basal tubercle distinct, triangular; however, parallel-sided and longer gonostyles are also encountered (Fig. 40.1.B). Inner genitalia of *regelatonis* group type (*sensu* KRZEMIŃSKA 1999), i.e., with the section between bases of parameres and lateral apodemes characteristically long and massive (Fig. 40.1.D, arrow); laterall apodemes are rounded and rather small.

Female genitalia (Fig. 40.1.I-P). Sternite convex in lateral view, with small protuberance between valves which are wide. Ovipositor as long as genital segment or slightly longer, more or less curved, tip acute (three various shapes in Fig. 40.1.K-M, for more shapes see KRZEMIŃSKA 2000c: fig. 23). Setulose area convex, reaching 1/3 ovipositor, well delimited, dark. Genital plate has distinct heart-like incision, prongs of genital fork very short to non-existent. Supragenital plate with two bristles, widely to closely set apart. Spermathecae with sclerotized portions of ducts longer (up to 1.5x) than spermathecae' diameter.

Material examined. Listed in KRZEMIŃSKA & BRUNHES (1991); KRZEMIŃSKA (2000c, 2001c), UJVAROSI & KRZEMIŃSKA (2002); HÅGVAR & KRZEMIŃSKA (2007); KRZEMIŃSKA & GORZKA (2014); DRIAUACH et al. (2015).

Distribution. A first described species of the family (LINNAEUS 1758). Holotype male, nonexistent (according to DAHL & ALEXANDER 1976).

Widespread in Holarctic region, from Great Britain to Kamchatka (PETRAŠIŪNAS & PARAMONOV 2014). Known in Europe from northern to the most southern localities, present in all European checklists: Czech Republic: Moravia; Slovakia: Mala Fatra Mts.; Poland: Bieszczady Mts (STARÝ 1999). Hungary (KRZEMIŃSKA & PAPP 2001); Russia: PETRAŠIŪNAS & PARAMONOV (2014). Germany: DAHL (1999; KRZEMIŃSKA 2000b); The Netherlands (KRZEMIŃSKA 1996b, KRZEMIŃSKA & BEUK 2002); Switzerland (STARÝ & KRZEMIŃSKA 1998); Austria (THALER 2000); France (PIERRE 1924; KRZEMIŃSKA & BRUNHES 1991); Iberian Peninsula (DAHL & KRZEMIŃSKA 2002). North Africa: Morocco (DRIAUACH et al. 2015). Asia: Korea (PETRAŠIŪNAS & PODENAS 2011). North America: Canada, Maine, Massachussetts (ALEXANDER 1965: 16).

T. regelationis is present also on southern hemisphere, on South Georgia Is., presumably introduced by human transport (e.g., with cargo of soil used as balast on ships; DAHL 1970b) and recorded already by BRÈTHES (1925). This population still exists.

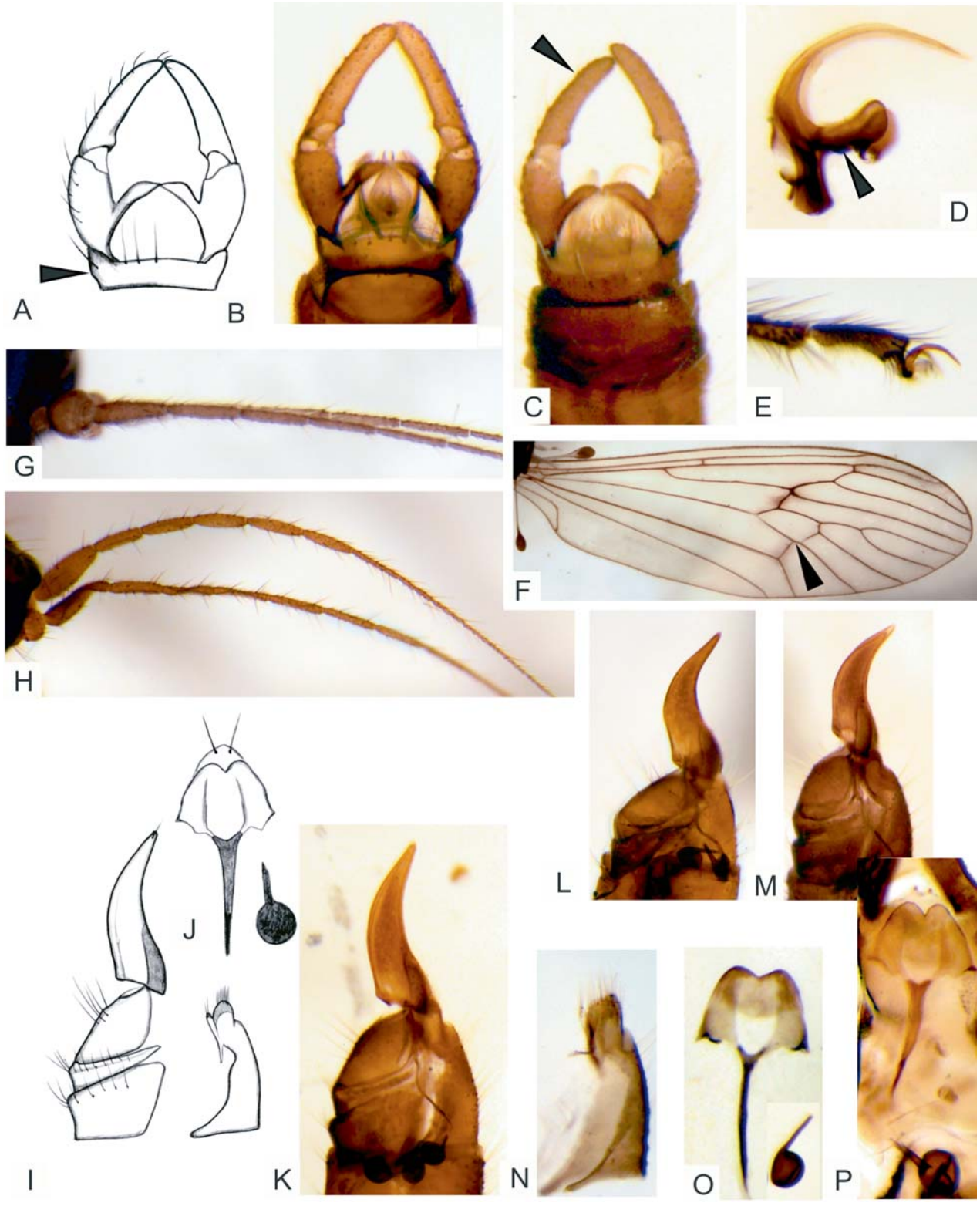


Fig. 40.1. *Trichocera* (*Saltrichocera*) *regelationis* (LINNAEUS, 1757). A-G, male: A, drawing of genitalia; B, C, genitalia (arrows: various shapes of gonostyles); D, aedeagal complex (arrow: long section between aedeagus and lateral apodemes); E, hind tarsal claw; F, wing (arrow: cross vein m-cu shifted from fork of M3+4); G, antenna. H-P, female: H, antenna; I, J, drawings of genitalia and genital plates; K-M, various shapes of ovipositors; N, sternite 8; O, P, genital plates.
Males and females: Poland, Beskid Sądecki Mts., Krynica Kopciowa, fir forest, 3.XII. 2012 (M. ŁUSZCZAK; ISEA).

Noteworthy, three species: *T.* (*S.*) *regelationis*, *T.* (*S.*) *annulata* and *T.* (*S.*) *maculipennis* are closely related (the *regelationis* group of species); and are also the only known members of the genus which populated the southern hemishere. Apparently the group is characterized by potential of dispersion highest among the genus.

Occurrence. One of most common species of the genus; males form large swarming clouds. Adults appear from autumn till late spring; two main peaks are observed in autumn and spring. Reported from caves in Great Britain by GRIMSHAW (1906); found in great amounts in caves of Luxemburg (PETRAŠIŪNAS & WEBER 2013); all these authors observed that this species occurs closer to the entrance of the cave than *T. maculipennis*. Larvae of *T. regelationis* are common inhabitants of voles' burrows (HACKMANN 1963).

Remarks on variation. Variation within the species is remarkable, and it is possible that *T. regelationis* represents several cryptic species; a similar situation as in *T. maculipennis*. Trials were undertaken to separate them, all in vain. Herewith, some characters checked by myself are briefly listed to help further efforts; see also KRZEMIŃSKA (2000c) for detailed information. Variation among the specimens concerns the following sets of characters.

1. Wing spotting. The spots on wings are expressed to various degree even in same sample. Larger specimens, especially older ones, with chitinous elements strongly sclerotized have darker wing membrane, veins and also more and darker spots, even a small cloud at the origin of Rs (Fig. 1.F therein); especially the females on snow. In the same sample larger specimens may have additional dark smudging along Cu, and other spots listed above, while in smaller ones (often males) only one spot on r-m is visible.

2. Body color is variable, and was discussed in KRZEMIŃSKA (1999, 2000c). In my opinion, darker body color develops more often in winter, especially in snowy conditions, as a kind of protection against low temperature (black colour absorbs more warmth). Also thicker, swollen flagellomeres are observed in severe conditions more often in winter than in autumn; see also Discussion in KRZEMIŃSKA et al. (2009).

3. Genitalia. Male genitalia in some populations appear more similar to those of *T. maculipennis*, in having a wider, more massive sternite 9; this variation is called here "morphotype 2" (Fig. 40.2.A-C). If this character is accompanied by a small cloud at the origin of Rs, and more robust antennae, such specimens can be mistaken with *T. maculipennis*. This happened to me while studying the collections from Holland (De Brand RESERve; KRZEMIŃSKA 1996a); specimens listed as *T. maculipennis* are in fact *T. regelationis* with wide sternite 8. However, the "morphotype 2" may represent a new, unrecognized species.

Description of the holotype of *Trichocera limpidipennis* (Fig. 40.2.D-E).

Trichocera limpidipennis LOEW, 1873: Beschr. europ. Dipt. 3 (Halle): 69.

Holotype is a female with label: "limpidipennis Lw.*. Galiz 6.72. Coll. H. LOEW. Typus. 49037." Museum für Naturkunde, Humboldt-Universität, Institut für Systematische Zoologie, Berlin. According to DAHL & ALEXANDER (1976) and to KRZEMIŃSKI (1983) the type locality is "Beskides; Carpathian Mountains". The description of LOEW says only: "Vaterland: Galizien, wo ich sie im Juni fand". "Galizien" was the XIX cent. name for a province which included southern Poland comprising also Beskidy Mts. The holotype female is the only representative of this species. It is a large specimen, body size 7.5 mm; wing length 8.5 mm. Body color yellowish brown; abdomen without pattern. Head lacking. Wing (Fig. 40.2.D) with a spot on r-m and additional dark smudges on R2+3, r-r, and on first section of R3; m-cu and Cu apparently not clouded, but according to original description, dark smudges were visible in fresh specimen, and even were described as darker that in *T. maculipennis* (LOEW 1873); the first section of Rs is darker than remainder and possibly a faint cloud was visible here too.

Ovipositor broken (Fig. 40.2.E), its distal half lacking. Genital plate as in *T. regelationis*, with a very shallow fork and thin apodeme; supragenital plate with two widely separated bristles.

Remarks. LOEW (1873) enhances the broad, delicate wings of *T. limpidipennis* and the lack of spot on Rs, as the main differences between this species and *T. maculipennis*. The holotype falls within the variation listed here for *T. regelationis*; the ovipositor, although broken, had probably the more slender shape, similar to that in Fig. 40.1.K. Incidentally, the latter specimen was collected also in the Beskidy Mts. (Krynica).

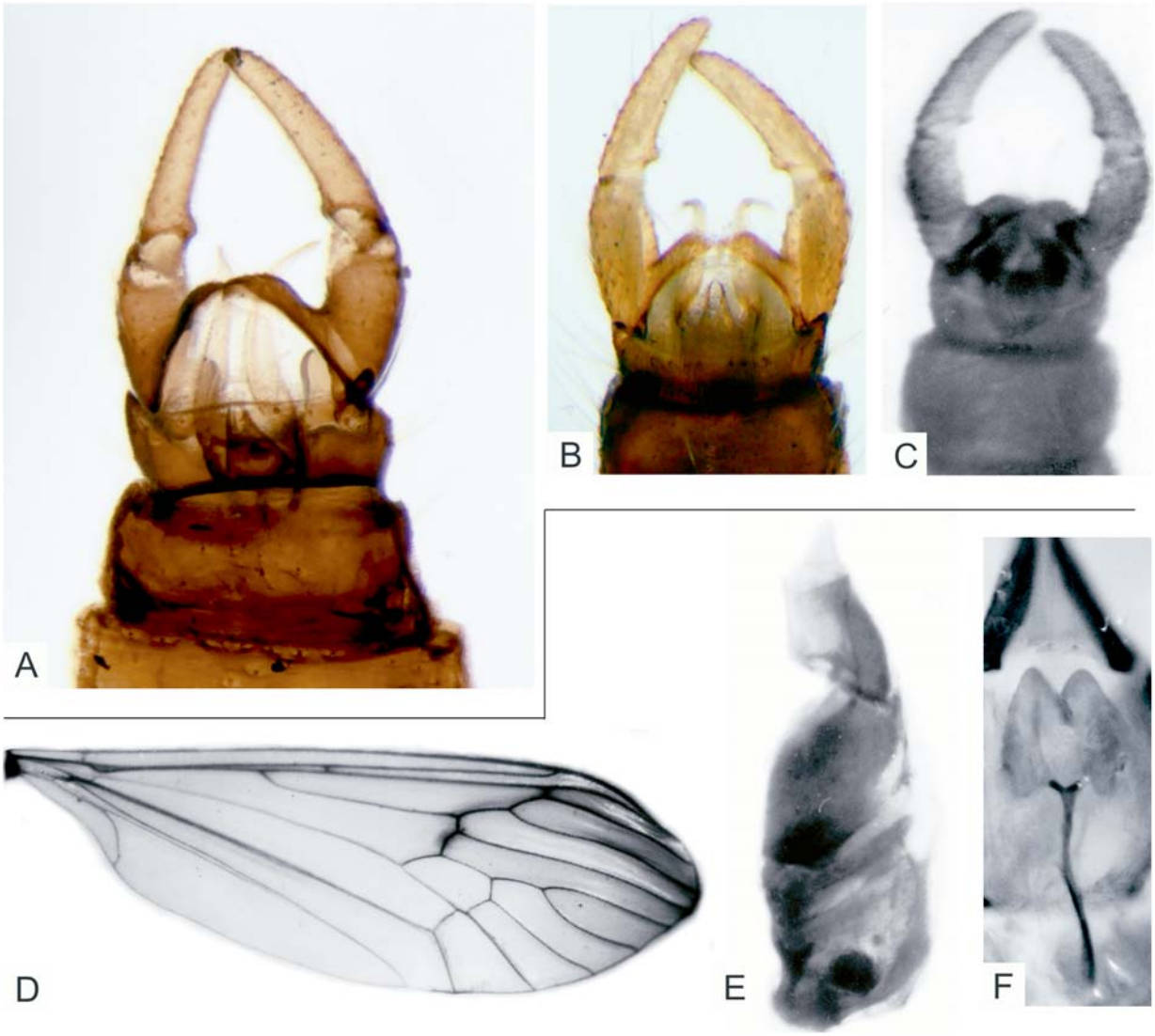


Fig. 40.2. *Trichocera* (*Saltrichocera*) *regelationis* (LINNAEUS, 1757), cont. A-C, male morphotype 2. A, Switzerland, Sempach, LU, Vogelwarte, alt. 505m, LF, 4.III. 1978; C, D, Holland, Brand Reserve, 8-14.IV. 1990. *D-F: Trichocera* (*Saltrichocera*) *limpidipennis* LOEW, 1873, holotype female, wing (D); genital segment with portion of ovipositor preserved (E); genital plates (F).

Trichocera (*Saltrichocera*) *rufescens* EDWARDS, 1921

Fig. 41

Trichocera (Saltrichocera) rufescens in: KRZEMIŃSKA 2002a: 158

Trichocera (Metatrichocera) rufescens in: KRZEMIŃSKA 1999: 255, fig. 13-16 (male), 24-26 (female)

Trichocera (Metatrichocera) rufescens in: STARÝ 1998

Trichocera (Trichocera) rufescens in: DAHL & ALEXANDER 1976

Trichocera rufescens in: EDWARDS 1938: fig. 31b (male)

Trichocera rufescens EDWARDS 1921: Trans. Ent. Soc. Lond.: 229

Diagnosis. Species of *regelationis* group, body color yellow to reddish or light brown; wings clear. Thorax: pleura bare. Male: tarsal claw small (1/4 of t5); sternite 9 rather narrow, straight, set with row of bristles; bridge low, rounded, gonostyle curved, parallel-sided, apex round; aedeagal complex as in *T. michali*. Female: hypogynal valves wide; ovipositor almost crescent, tip sharp; setulose area short, but greatly convex. Genital plate with distinct apical incision, genital fork with prongs almost non-existent. Supragenital plate with two bristles.

Comparison. Male: see remarks on *T.* (*S.*) *michali*. Female has an ovipositor of unique shape and cannot be mistaken with other species.

Additional description. Antennae (Fig. 41.D) as in *T.* (*S.*) *michali*, *T.* (*S.*) *regelationis* and *T.* (*S.*) *annulata*: f1 not much longer than f2, verticils soft. Thorax: pleura bare. Wings clear, veins yellow to light brown; R2+3+4 not much longer or equal R3+4; d cell usually of characteristic, trapezoidal shape (Fig. 41.G) similar to that in *T. annulata*; m-cu usually aligned with bM3. Hind tarsal claw in male is small, c. 1/4 of t5 (Fig. 41.E).

Male genitalia (Fig. 41.A-C, F). Sternite 9 rather narrow, distal margin straight, set with row of bristles. Bridge low, rounded (but see change of shape during maceration; Fig. 41.B, C). Gonostyle often not longer than gonocoxite, gently curved inwards, parallel-sided, apex rounded; mesobasal tubercle very small. Aedeagal complex of the *regelationis* group type, with massive section between bases of parameres and lateral apodemes (Fig. 41.F, arrow). Basal apodeme was described as narrow by KRZEMIŃSKA (1999), but appeared subject to intraspecific variation, and may be as wide as in *T. michali*.

Female genitalia (Fig. 41.H-L). Sternite 8 convex, with small protuberance just below hypogynal valves which are wide. Ovipositor as long as genital segment, of almost crescent shape, with sharp apex. Setulose area very short (c. 1/4 of ovipositor's length), but greatly convex. Genital plates and spermathecae (Fig. 41.I, L) as in *T. regelationis*, *rufescens* and *annulata.*

Material examined. Holotype male (described from Great Britain); paratype (BMNH). Other specimens listed in KRZEMIŃSKA (1999), and other papers co-authorized, listed below.

Distribution. Widely distributed in lowland and lower mountainous regions of Europe. Records: Norway (HÅGVAR & KRZEMIŃSKA 2007); Finland (KRZEMIŃSKA & GORZKA 2014); Lithuania (PETRAŠIŪNAS & VISARČUK 2007); Great Britain (EDWARDS 1921, LAURENCE 1957); Netherlands (KRZEMIŃSKA & BEUK 2002), Poland, Switzerland, France (KRZEMIŃSKA 1999); Germany (KRZEMIŃSKA 2000b); Switzerland (PODENAS 1995; STARÝ & KRZEMIŃSKA 1998); Romania (UJVAROSI & KRZEMIŃSKA 2002); Hungary (KRZEMIŃSKA 2001c); Italy (STARÝ & DELMASTRO 2001); Andorra (DAHL & KRZEMIŃSKA 2002); Mediterranean islands: Sardinia (PETRAŠIŪNAS 2009). North Africa: Morocco (DRIAUACH et al. 2015).

Occurrence. In central Europe and Great Britain adults appear early to late autumn, from end of VIII to XI. In Finland also V (KRZEMIŃSKA & GORZKA 2014); in Morocco throughout winter (at temperature c. 18^{o}C; DRIAUACH et al. 2015).

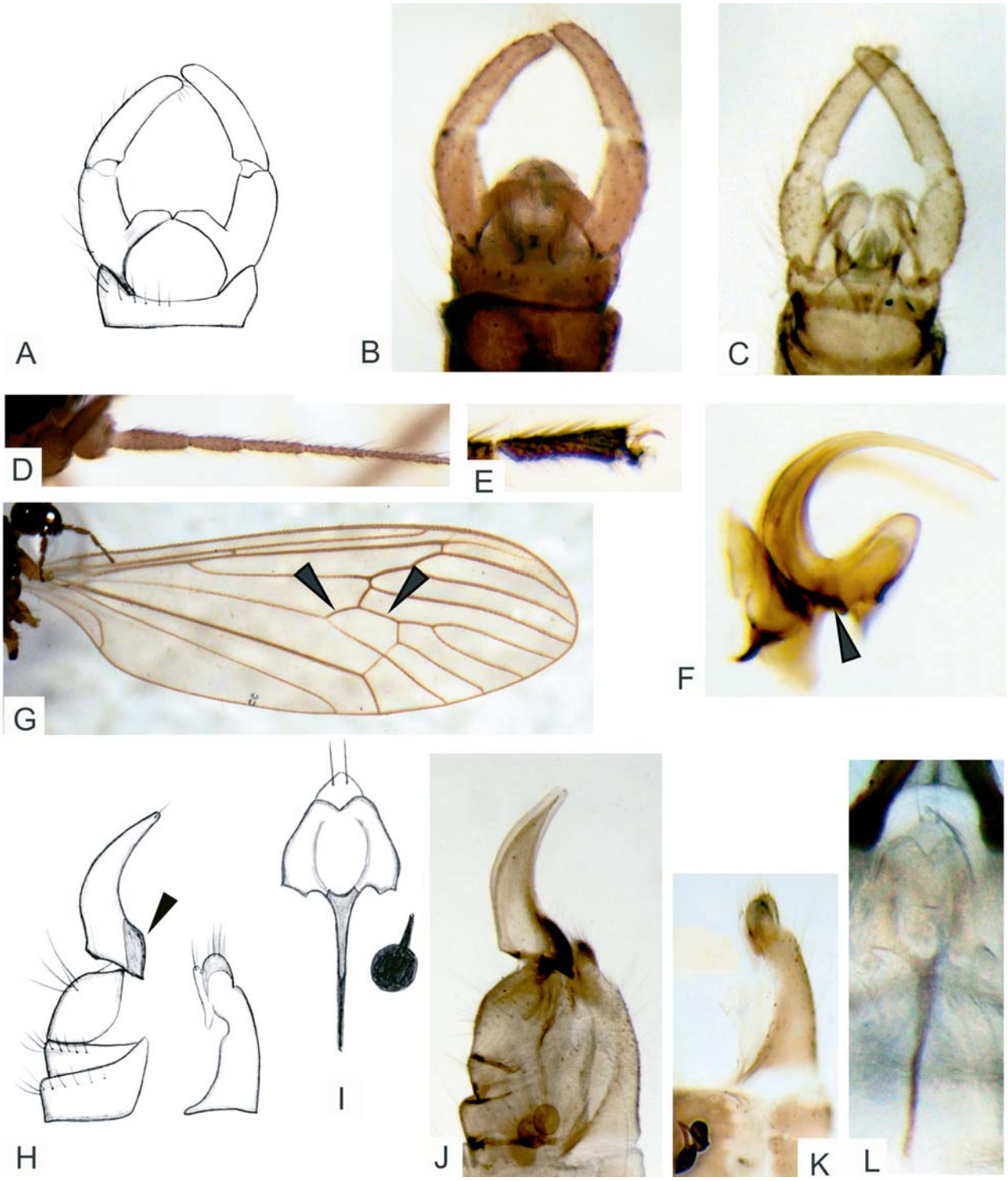


Fig. 41. *Trichocera* (*Saltrichocera*) *rufescens* EDWARDS, 1921. A-G, male: A, scheme of genitalia ventrally; B, C, genitalia ventrally (same specimen before and after maceration in NaOH); D, antenna; E, tarsal claw; G, wing. H-L, female: H, I, scheme of genitalia and genital plates, resp.; J, genitalia; K, sternite 8; L, genital plates.
Male, female: Finland, 27.05.2011, Oulanka, EMEP (P. RANNANEN, M. CORTTI).

Trichocera (*Saltrichocera*) *rufulenta* EDWARDS, 1938

Fig. 42

Trichocera (Saltrichocera) rufulenta in KRZEMIŃSKA 2002a: 158

Trichocera (Metatrichocera) rufulenta in: STARÝ 1998

Trichocera (s. str.) *rufulenta in:* STARÝ 1996: 361, FIG. 7-12

Trichocera saltator var. ? rufulenta EDWARDS, 1938: 156, fig. 31h (female terminalia)

Diagnosis. Antennae: verticils soft, short. Thoracic pleura bare. Male: sternite 9 broad, distal margin set with a row of bristles. Gonocoxal bridge broadly triangular; gonostyle straight, slightly narrowing to rounded tip, tubercle small, dark. Aedeagal sheath with hood visible in lateral view. Female: hypogynal valves wide; ovipositor very small, shorter than genital segment, almost straight, setulose area not delimited. Genital plate short and broad, fork delicate, its arms slightly inclined to inside and darkened at ends. Supragenital plate with two bristles.

Comparison. Male genitalia resemble those of *T.* (*S.*) *saltator*, *T.* (*S.*) *brevis* and *T.* (*S.*) *pappi* in having rounded bridge, broad sternite 9 and gonostyles without distinct tubercle. From all these species *T. rufulenta* differs in having straight gonostyles; also the mesal basal excision in the area of article is remarkably small; aedagal complex differs from three species mentioned by lateral apodeme bent to basal apodeme, and distinct hood visible in ventral view; tarsal claw in male is very small. Females are easily distinguishable by their unique ovipositor, the smallest in the genus (the genital plate and fork are very much like those in *T.* (*S.*) *recondita* and *T.* (*S.*) *implicata*).

Additional description. The species was acknowledged a separate species by STARÝ (1996), and not a variation of *T. saltator*. Therein a detailled discussion on this species and history of its description.

EDWARDS (1938) and STARÝ (1996) stressed the reddish body colour, reflected in the name and easily noticed, except specimens stored in alcohol for many years. Antennae (Fig. 42.E, F): flagellomeres rather slender, covered with soft pubescence and verticils soft, short, similar to those in *T. saltator* and *T. pappi*. Thorax: pleura bare. Wing with Sc densely covered with setae ventrally and dorsally (see also LAURENCE 1957). Hind tarsal claw in male short, c. 1/4x t5 (Fig. 42.D).

Male genitalia (Fig. 42.A-C, type: 42.L-M). Sternite 9 massive, broad, distal margin set with a row of bristles; behind margin of sternite, membrane is seen through mildly lowered margin (Fig. 42.A, B, L). Bridge subtriangular with rounded apex (according to STARÝ , this shape greatly resembles that in *T. recondita*). Gonostyle straight, slightly narrowing to rounded tip, tubercle very small, but distinct due to a black brush of small, short setae (in STARÝ 1996: fig 8-9 the gonostyles are curved to inside, although Author described the shape as "less bent inwardly than in *T. saltator*"). Also in the type material the gonostyles are straight (Fig. 42.L). Aedeagal complex (Fig. 42.C, M) with hood well visible in lateral view (Fig. 42.C, arrow); lateral apodemes are bent to basal apodemes, which are broad.

Female genitalia (Fig. 42.G-K, type specimen: 42.N-O). Sternite 8 with wide hypogynal valves. Ovipositor small, distinctly shorter than genital segment, almost straight, selulose area not delimited. Genital plate shorter than wide, with shallow, wide apical excision; fork exposed outside plate, delicate, its prongs slightly inclined to inside and as long as distance between their tips, which are strengthened. Supragenital plate with two bristles. Spermathecae with sclerotized ducts c. as long as diameter.

Material examined. Syntype specimens in BMNH (detailly listed and discussed by STARÝ 1996). Specimens listed in papers of KRZEMIŃSKA, below. Poland: Kraków, Piaski Nowe, 4.XI. 1989; Rdzawka 5.XI. 1989 – 1m (EK); Ojców National Park: 7.XI. 1987 – 20m; 13.XI. 1989 – 1f, Góra Rusztowa, 21-22.XI. 1992 – 1f; Korytania 19.IX. 1992 – 3f, 3m (all EK).

Distribution. Widespread in Europe; lowlands to mountains; highest altitude recorded: 950 m; Czech Republic, Slovakia, Poland, Switzerland (STARÝ 1996); Hungary (KRZEMIŃSKA 2001c); Germany (KRZEMIŃSKA 2000b); Lithuania (PETRAŠIŪNAS & VISARČUK 2007).

Occurrence. Adults were recorded from IX-XI.

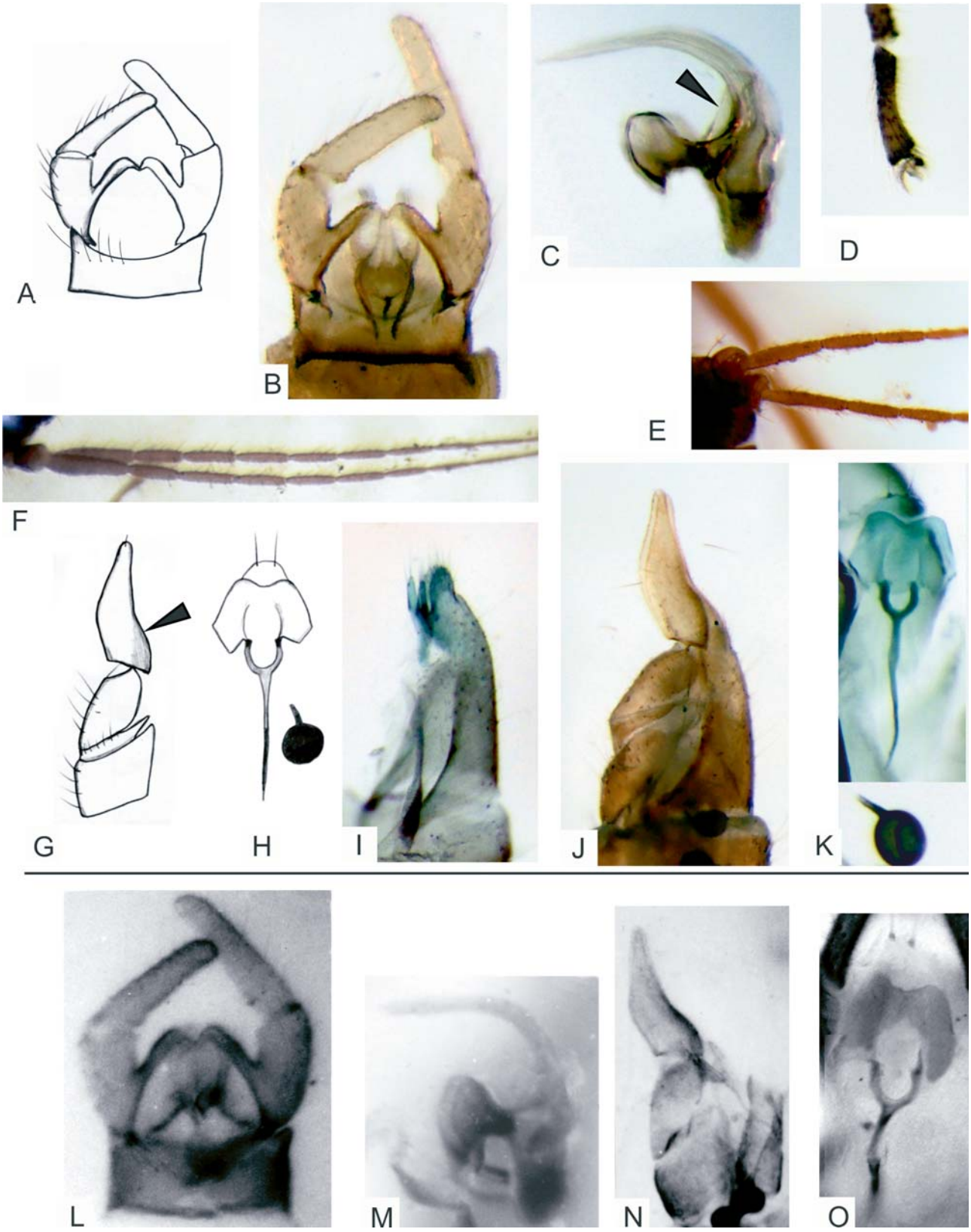


Fig. 42. *Trichocera* (*Saltrichocera*) *rufulenta* EDWARDS, 1938. A-E, L-M, male: A, scheme of genitalia ventrally; B, L, genitalia ventrally; C, M, aedeagal complex (arrow: distinct hood); D, hind tarsal claw; E, antenna. F-K, N-O, female: F, antenna; G, H, scheme of genitalia and plates; I, sternite 8; J, N, genitalia laterally; K, O, genital plates and spermatheca.
Specimens: male – Switzerland, Generoso, TI PL, 2.VIII.1970. 9 (leg. L. REZBANYAI); female: Switzerland, Marin Fanel, 28.XI. 1992 (leg. J. STARÝ); L-O, old camera pictures of type specimens, BMNH.

Trichocera (*Saltrichocera*) *saltator* (HARRIS), 1776

Fig. 43.1, 43.2

Trichocera (*Saltrichocera*) *saltator* in: KRZEMIŃSKA 2002b: fig. 1A, B, 6 (female)

Trichocera (*Saltrichocera*) *saltator* in: KRZEMIŃSKA 2002a: 158

Trichocera (*Metatrichocera*) *saltator* in: KRZEMIŃSKA 1999: fig. 5-8 (aedeagus)

Trichocera (*Metatrichocera*) *saltator* in: STARÝ 1998

Trichocera s. str. saltator in: STARÝ & MARTINOVSKÝ 1996: fig. 1 (thorax), 4 (antenna), 11 (leg)

Trichocera s. str. *saltator* in: STARÝ 1996: fig. 1-4 (male), 5-6 (female); designation of neotype, male

Trichocera (*Trichocera*) *saltator* in: DAHL & ALEXANDER 1976

Trichocera saltator in: DAHL 1973: fig. 10, 13 (larva), fig. 32-33 (pupa)

Trichocera saltator in: DAHL 1966b: fig. 21 (male), 33 (antenna); 65 (pupa); 69 (larva)

Trichocera saltator in: EDWARDS 1938: 156, fig. 31c, d (male), 31g (female)

Trichocera fuscata MEIGEN, 1818: Syst. Beschr. bek. europ. zweifl. Ins. I (Aachen): 212

Tipula saltator HARRIS, 1776: 57, fig. 5 (entire specimen)

Diagnosis. Body black. Antennae: basal flagellomeres oval; f1 less than 2x f2. Wing: Sc bare, scarce bristles present in distal section. Pleura bare. Male: hind tarsal claw c. 0.3 of t5; distal margin of sternite 9 straight, set with bristles; gonostyle straight or slightly curved inwardly, usually parallel-sided, without basal tubercle. Female: ovipositor long, c. 1.5x genital segment, narrow, evenly curved; tip round; setulose area short, strongly convex. Genital fork: prongs curved to inside forming circle; genital plate with 4-6 bristles.

Comparison. Male genitalia are similar to three species: *T*. (*S*.) *brevis*, *T*. (*S*.) *pappi*, and *T*. (*S*.) *rufulenta* in the straight, wide sternite 9, shape of the bridge and of gonostyles. The differences are listed under the description of *T*. (*S*.) *pappi.* Female of *saltator* is characteristic by a long, narrow, curved ovipositor that can only be mistaken with *T. longa*, n. sp.; both species differ externally by antennae (and possibly by body colour; *T. longa* is most probably light brown or even paler); their genital plates are also quite different.

Additional description. For current, detailled description of this species see STARÝ (1996: designation of neotype). Body is characteristically black and pruinose in fresh specimens (see Fig. 43.2.E). Antennae (Fig. 43.1.F, G) relatively short, basal flagellomeres often swollen, especially in female; setation soft, short, verticils short, rather soft (for variation in shape and length of flagellomeres from same sample see Fig. 43.2.A-C). Wing: Sc bare, only some setae occur in distal section on dorsal and ventral sides (this character was introduced by LAURENCE 1957; noteworthy, in specimens from Morocco I found more setae on Sc; also verticils on antennae were stronger). Thoracic pleura bare. Hind tarsal claw in male c. 1/3 of t5 (Fig. 43.1.D).

Male genitalia (Fig. 43.1.A-C, E). Sternite 9 is wide, with distal margin straight and set with bristles; bridge is rounded or somewhat rectangular; gonostyle usually straight to slightly curved to inside, parallel-sided; tip round; basal mesal tubercle absent or only a trace of it is noticeable. Aedeagal complex (Fig. 43.1.E) with rather long, narrow lateral apodemes directed to ends of parameres; hood not visible in lateral view.

Female genitalia (Fig. 43.1.H-L). Sternite 8 with hypogynal valves of medium width (Fig. 43.1.H, I); ovipositor 1.3-1.5x as long as genital segment, with convex setulose area, strongly narrowed beyond it; a characteristic small indentation in dorsal margin of ovipositor just below apex is present (Fig. 43.1.H, arrow); apex rounded. Genital fork (Fig. 43.1.K, L): prongs shaped circle-like; genital plate with rectangular foramen; supragenital plate with 4-6 bristles. Sclerotized sections of spermathecal ducts c. as long as diameter of spermathecae.

Material examined. Neotype male: Great Britain, Wales, Brecon, Llangynidr, XI. 1936 (designated by STARÝ ; leg. et det. F.W. EDWARDS; BMNH); other specimens from Great Britain listed by STARÝ (1996). Specimens listed in papers of or co-authorized by KRZEMIŃSKA, cited below. Additional specimens from Switzerland: Couvet 780 m (CH, NE), 538,6/198,0, 23-24.X. 1984 – 1m, 5-7.X. – 1m; 7-9.X. – 1m (T. Malaise lumineuse; J-P. JEANNERET); NE 566,5/206,15, Marin – 1 m (La Ramée) Forêt riveraire, 430 m, 3.XII. 1994 (leg. J-P. HAENNI; MHNN); CH Hasle LU Ballmoos 970 m, 3.XI. 1977 – 10 m (leg. L. REZBANYAI).

Distribution. A species of wide Palaearctic distrubution, described from Great Britain, and since long recorded from all countries of Europe, from Scandinavia to north Africa, but absent from northernmost localities: Greenland, Spitsbergen, Jan Mayen. Records from Europe: Norway (HÅGVAR & KRZEMIŃSKA 2007); Sweden (DAHL 1966b); Finland (FREY & STORÅ 1941; DAHL 1968; KRZEMIŃSKA & GORZKA 2014); Lithuania (PETRAŠIŪNAS & VISARČUK 2007), Russia, vicinity of Petersburg and Kola Peninsula (PETRAŠIŪNAS & PARAMONOV 2014); Great Britain (EDWARDS 1924, LAURENCE 1956, 1957); Netherlands (KRZEMIŃSKA 1996a, KRZEMIŃSKA & BEUK 2002), Luxembourg, caves (PETRAŠIŪNAS & WEBER 2013); France (KRZEMIŃSKA & BRUNHES 1991); Germany (DAHL 1999, KRZEMIŃSKA 2000b); Poland (KRZEMIŃSKI 1983; KRZEMIŃSKA 2002b); Switzerland (STARÝ & KRZEMIŃSKA 1998); Romania (UJVAROSI & KRZEMIŃSKA 2002); Hungary (KRZEMIŃSKA 2001c); Andorra (DAHL & KRZEMIŃSKA 2002); Austria (THALER 2000); Spain (CARLES-TOLRÁ & SALOÑA 2004; CARLES-TOLRÁ et al. 2006). Mediterranean islands: Sardinia (PETRAŠIŪNAS 2009), Mallorca (PETRAŠIŪNAS & KVIFTE 2016). North Africa: Morocco (DRIAUACH et al. 2015).

Asia: Siberia, Novaya Zem'la (after LANTSOV & TSCHERNOV 1987; STACKELBERG 1951); Japan (TOKUNAGA 1938).

Occurrence. Records indicate two peaks of abundance: autumn X-XI, and spring II-IV. Biology and morphology of larvae is treated in DAHL (1966b); swarming activity in DAHL (1965). Females are frequently found on snow.

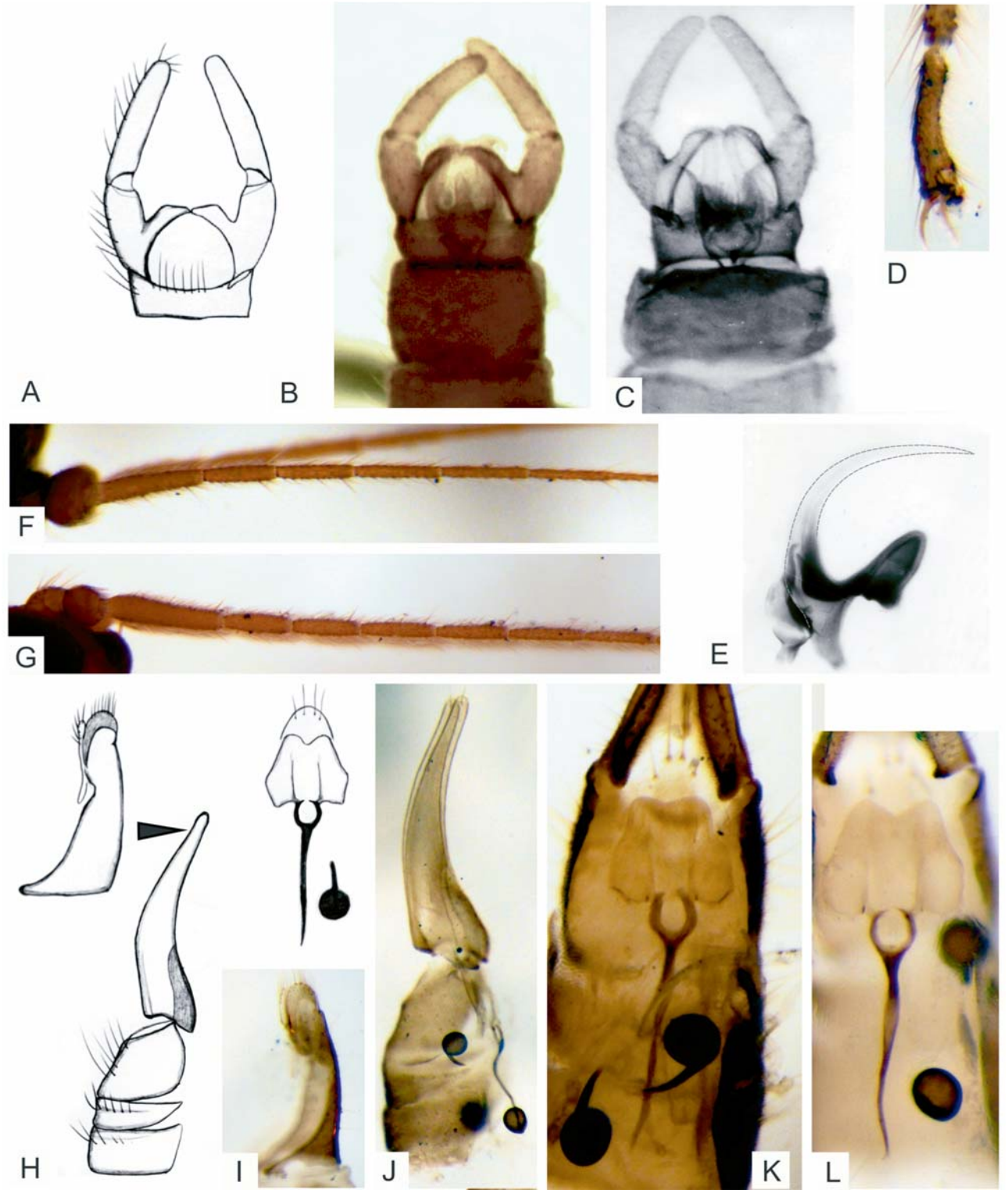


Fig. 43.1. *Trichocera* (*Saltrichocera*) *saltator* (DE GEER), 1776. A-F, male: A, drawing of genitalia; B, C, photos of genitalia; D, hind tarsal claw; E, aedeagal complex; F, antenna. G-L, female: G, antenna; H, drawings of outer genitalia, sternite 8 and genital plates; I, sternite 8; J, ovipositor and tergites 8-10; K, L, genital plates.
Male: B, Spain, Caldes de Montbui, trampa luz, 31. X. 1998 (leg. and phot. M. CARLES-TOLRÁ); D, E, F, and female: Poland, Miechów, 16.XI. 2001; C, Great Britain, Kent, 4.II. 1967 (A. M. HUTSON; BMNH).

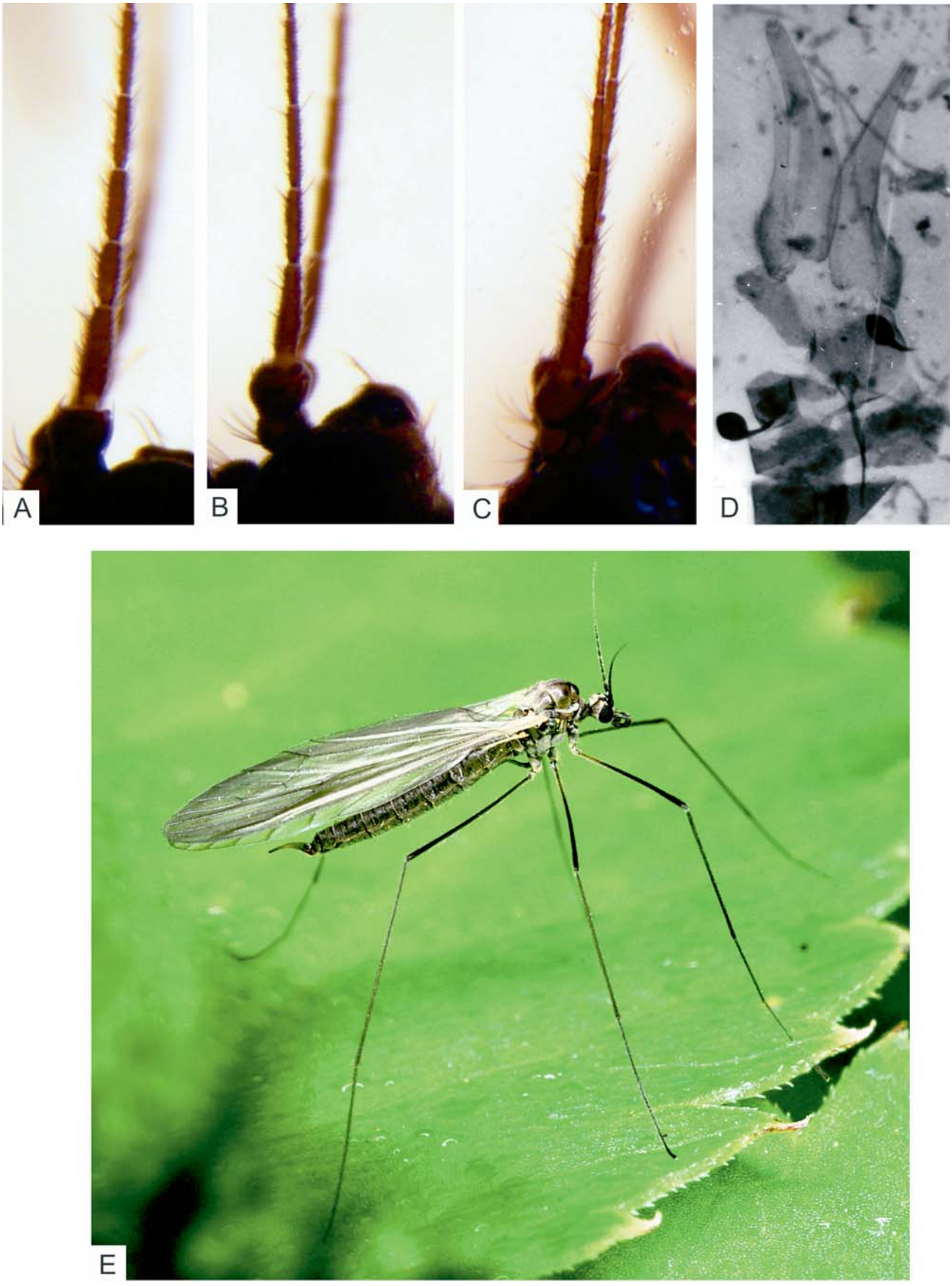


Fig. 43.2. *Trichocera* (*Saltrichocera*) *saltator* (DE GEER), 1776, additional photos. A-C, male antennae, variation (Poland, Miechów, 16.XI. 2001). D, preparation of female genitalia labelled *Trichocera fuscata*; Denmark Hall 1911, Verall Bequest, BMNH. E, female on a leaf (photo: A. PALACZYK).

Remark on *Trichocera fuscata* and *T. brevis*

T. fuscata MEIGEN, 1818, was synonymized with *T. saltator* by EDWARDS (1938: 156, fig. 31i). The type of *T. fuscata* is lost (DAHL & ALEXANDER 1976). A female labelled in handwriting: „*Trichocera fuscata*" is in the collection of BMNH; the camera picture of preparation of genitalia is pictured in Fig. 43.2.D. This ovipositor is quite long, with greatly convex setulose area. Basing on this specimen, I described *Trichocera* (*S.*) *brevis* which has a much shorter ovipositor. Nevertheless, EDWARDS highlights the shortness of ovipositor in *fuscata* as the only difference between this species and *T. saltator*; this characteristics fits *T. brevis* very well.

In conclusion, until the type material of *fuscata* is found, *T. brevis* remains a valid species.

Trichocera (*Saltrichocera*) *sardiniensis* PETRAŠIŪNAS, 2009

Fig. 44

Trichocera (Saltrichocera) sardiniensis in: DRIAUACH et al. (2015): fig 3 (male, female)

Trichocera (Saltrichocera) sardiniensis PETRAŠIŪNAS, 2009: 62, fig. 1-9 (male, female)

Diagnosis. Antennae in female with initial flagellomere enlarged and fused with second, or almost so. Thoracic pleura bare. Male: distal margin of sternite 9 not incised, set with a row of bristles. Gonocoxal bridge moderately high. Gonostyle characteristic, with large basal tubercle; tip round. Aedeagal complex with lateral apodemes narrow, close to parameres. Hind tarsal claw c. 1/4 of t5. Female: tergite 8 short, not much longer than tergite 9; ovipositor slightly longer than genital segment, curved, setulose area convex, well delimited. Genital plate with fork shallow, arms widely divergent. Supragenital plate with two bristles.

Comparison. Male and female of *T*. (*S*.) *sardiniensis* are most similar to *T*. (*S*.) *borealis* from north of Europe and differ in longer antennae, smaller tarsal claw in male and somewhat longer prongs of genital fork in female.

Additional description. Detailed description was given recently in original paper (PETRAŠIŪNAS 2009). Antennae (Fig. 44.D, F, G): flagellomeres 1-4 oval, in both sexes f1 fused with f2 or almost so; f1 subequal f2 in male, and greatly enlargened in female. Veriticils long, erect. Thorax: pleura bare. Hind tarsal claw in male small, c. 1/4 of t5 (Fig. 44.E).

Male genitalia (Fig. 44.A-C). Sternite 9 is straight, set with a row of bristles, more narrow than that in *T. saltator*. Gonostyle shaped as in *borealis*, tubercle of gonostyle is perhaps smaller. Aedeagal complex with hood visible in lateral view (Fig. 44.C); lateral apodemes rather narrow, subtriangular.

Female genitalia (Fig. 44.H-K). Tergite 8 short, not longer than tergite 9 (Fig. 44.H, J). Sternite 8 with wide hypogynal valves. Ovipositor slightly longer than genital segment, mildly curved, setulose area moderately convex, well delimited. Genital plate longer than wide, foramen large, fork shallow, but prongs are longer than those in *T. borealis*. Supragenital plate with two bristles. Spermathecae with sclerotized section of ducts c. one diameter.

Material examined. Paratypes: two females, one male, Italy: Sardinia (Cagliari)/ Iglesias Marganai, 700m, 8-21. I. 2004. Specimens from Morocco listed in DRIAUACH et al. (2015).

Distribution and occurrence. The species is described from Sardinia, and known till now from montane southern regions of Sardinia and of northern Africa (Morocco; DRIAUACH et al. 2015). Adults were captured at alt. 700m, in November-February.

Remark. A striking resemblance of both male and female of *T. sardiniensis* to *T. borealis* suggests close relationship of both species, whose distribution is now widely disjunct. *T. sardiniensis* very probably is a post glacial relict of an ancestor to both species, which had found a refugium in the Mediterranean region during glaciation. Speciation of *T. borealis* may be a consequence of postglacial recolonization of northern regions of Europe.

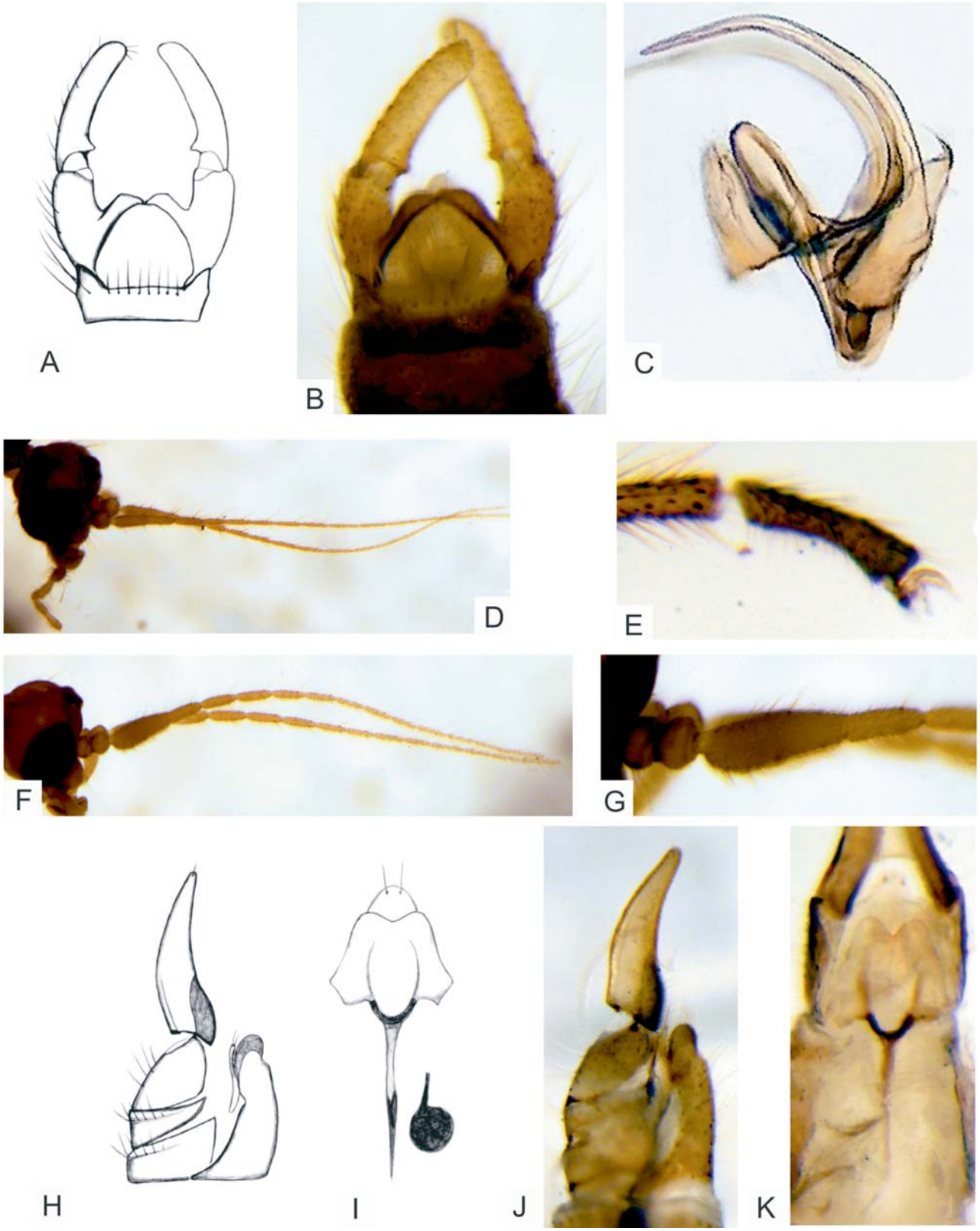


Fig. 44. *Trichocera* (*Saltrichocera*) *sardiniensis* PETRAŠIŪNAS, 2009. A-E, male: A, B, drawing and photo of genitalia; C, aedeagal complex; D, antenna; E, hind tarsal claw. F-K, female: F, antenna; G, first and second flagellomeres fused, magnified; H, J, drawing and photo of genitalia; I, K, drawing and photo of genital plates.
Male and female, paratypes, Italy: Sardinia (Cagliari)/ Iglesias Marganai, 700m, 8-21. I. 2004. (coll. G. CHESSA).

Trichocera (*Saltrichocera*) *simonyi* MIK, 1886

Fig. 45

Trichocera (*Saltrichocera*) *simonyi* in: KRZEMIŃSKA 2002a: 158.

Trichocera (*Metatrichocera*) *simonyi:* in: KRZEMIŃSKA 2000: 445, figs. 10-12 (female), 21-25 (male)

Trichocera (*Metatrichocera*) *simonyi* in: STARÝ 1998

Trichocera (*Trichocera*) *tenuistylus* STARÝ & GEIGER, 1995: Mitt. Schweiz. Entomol. Ges. 68: 413, fig. 2, 6-8 (male)

Trichocera (*Trichocera*) *simonyi* in: DAHL & ALEXANDER 1976

Trichocera simonyi MIK, 1886: Wien. Entomol. Zeit. 5: 57

Diagnosis. Member of *mutica* group of species. Antennae long, distal setae on flagellomeres stiff and erect. Thoracic pleura bare. Male: sternite 9 calyx-like, massive. Gonocoxite slender, narrow; gonocoxal bridge subtriangular, both halves are apically produced into rounded lobes. Gonostyle characteristic, gently bent to inside, narrow and almost twice as long as gonocoxite; tip round, curved to inside. Hind tarsal claw in male c. 1/2 of t5. Female: sternite 8 with distinct protuberance at base of hypogynal valves which are separated by gap; ovipositor as long as genital segment, very slightly bent, setulose area not delimited. Genital plate incised apically, fork with strong prongs curved to inside. Supragenital plate broadly triangular, with four bristles.

Comparison. Differences between *T.* (*S.*) *simonyi* and three other members of the *mutica* group are listed in the section on *T.* (*S.*) *mutica*.

Additional description was given by KRZEMIŃSKA (2000a). Antennae are long, delicate; initial flagellomeres more or less plump in female and slender in male (Fig. 45.E, F); verticils stiff and erect. Palpi thin and c. 2x as long as head length. Thorax: pleura bare. Wings oval, anal lobe poorly developed; d cell characteristic, broad and rectangular, as that pictured for *T. mutica* (compare Fig. 33.G), vein section bM1+2 often subequal mM1+2; m-cu wavy. Legs: t1 in all legs is relatively long, 2x t2; t5 subequal t4 in male; tarsal claw in male is large, exceeding half of t5 (Fig. 45.C).

Male (Fig. 45.A-B, D). Sternite 9 is massive and calyx-like, outer margin deeply incised. Gonocoxite slender; gonocoxal bridge narrow, high; each half apically distinctly rouned. Gonostyle c. 1.5x as long as gonocoxite, inner outline very slightly S-shaped and swollen in basal half; outer only gently curved to inside; tip round, inclined to inside. Aedeagal complex (Fig. 45.B), with large hood visible in lateral view; parameres strong basally, distally narrow, reaching far behind lateral apodemes.

Female genitalia (Fig. 45.G-K). Sternite 8 with distinct small protuberance between bases of the hypogynal valves (lateral view) which are slightly curved outwards (Fig. 45.J). In ventral view tergites 8-10 appear little swollen. Ovipositor (Fig. 45.G) massive, little longer than genital segment, only very slightly bent midway; setulose area slightly convex, not delimited by suture, but extended almost to tip, as in other members of *mutica* group. Genital plate with weak to distinct incision (compare Fig. 45.G and K); fork almost semi-circular and strong. Supragenital plate broad, triangular, with four bristles, two outer being very delicate. Spermathecae with sclerotized sections of ducts shorter than diameter.

Material examined. Holotype female, Austria, Tirol (NMW); other specimens see KRZEMIŃSKA (2000a).

Distribution. Alps: Austria, Tirol (MIK 1886); Switzerland; Germany, Bayern (KRZEMIŃSKA 2000a). Tatra Mts: Slovakia (STARÝ 2004).

Occurrence. The species is known only from mountains, adults were collected IX-XI; the holotype was found at 2875m, which is the record altitude for a trichocerid in Europe. Interestingly, this might be also element of cave fauna: STARÝ (2004) recorded a male and females from a cave in Tatra Mts. alt. 1556 m (soil trap).

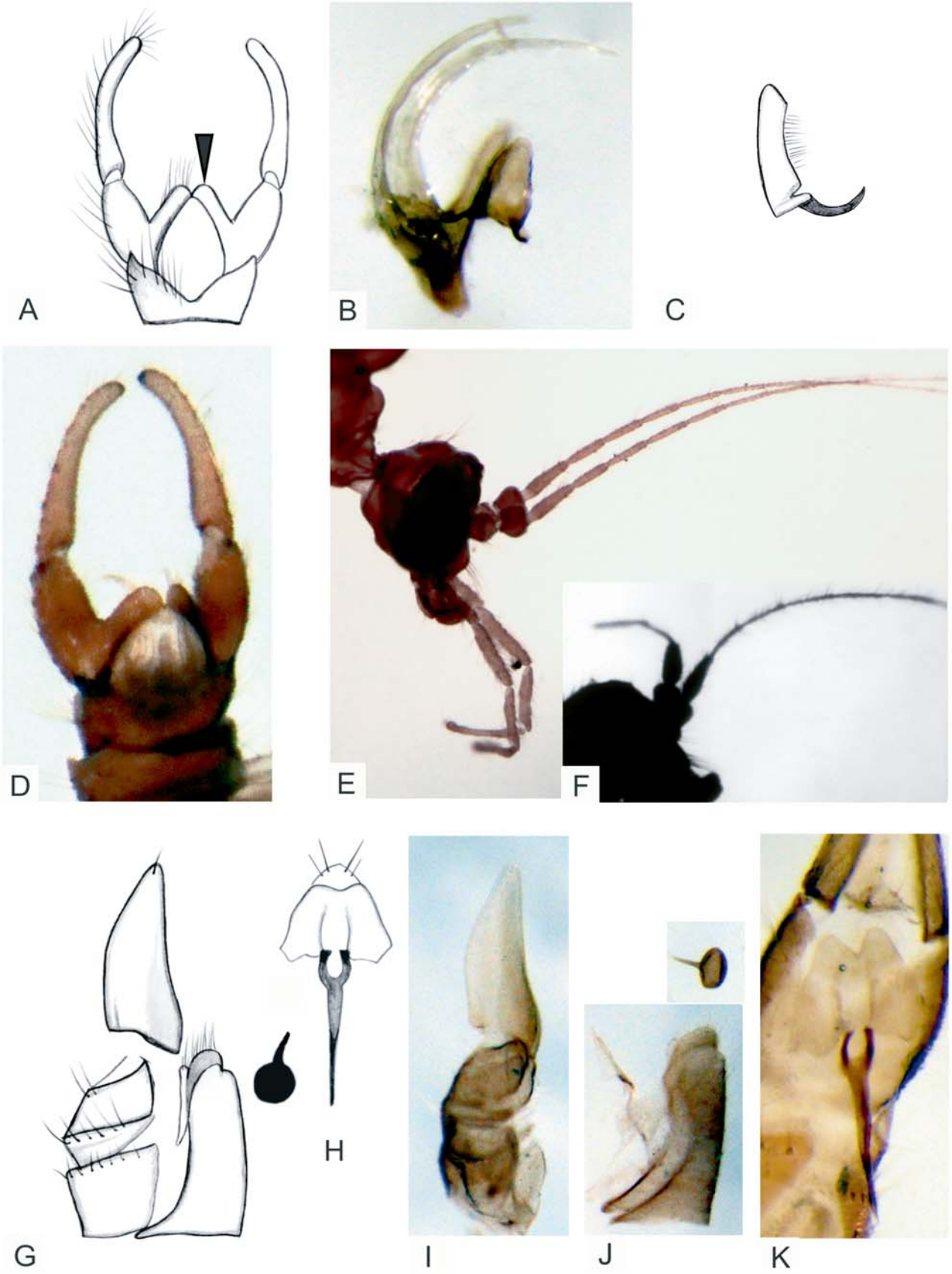


Fig. 45. *Trichocera* (*Saltrichocera*) *simonyi* MIK, 1886. A-E, male: A, scheme of genitalia ventrally; B, aedeagal complex; C, hind tarsal claw; D, genitalia; E, antennae and palpi. F-K, female: F, antenna of holotype; G, H, scheme of genitalia and plates; I, genitalia laterally; J, sternite 8; K, genital plates.
Specimens: F, holotype female (NMW; full text of labels in KRZEMIŃSKA 2000a); remaining specimens: Switzerland, Aurigeno, 30.X-3.XI. 1980 (W. GEIGER; MHNN).

Trichocera (*Saltrichocera*) *sparsa* STARÝ & MARTINOVSKÝ, 1996

Fig. 46

Trichocera (*Saltrichocera*) *sparsa* in: KRZEMIŃSKA 2002a: 158

Trichocera (*Metatrichocera*) *sparsa* in: STARÝ 1998

Trichocera (s. str.) *sparsa* STARÝ & MARTINOVSKÝ, 1996: Ent. Prob. 27: 159, fig. 8 (antenna); 17, 23 (male); 29, 33 (female)

Diagnosis. Antennae: flagellomeres with strong, erect verticils. Thorax: anepimeron and metanepisternum with setae. Male: sternite 9 deeply excised medially; bridge rounded; gonostyle only slightly curved to inside, parallel-sided, with very small basal tubercle or rather swelling; apex rounded. Female: hypogynal valves very narrow; ovipositor longer than genital segment, almost straight beyond setulose area, in shape of elongated triangle; setulose area well delimited, short (c. 1/3 of ovipositor's length), its lateral outline characteristically flattened; genital fork massive, shallow (prongs almost absent), with additional lateral sclerotizations; supragenital plate broad, with 4-6 bristles.

Comparison. The species is recognizable by especially strong, erect verticils on antennae. By this character, as well as by the setae on thoracic pleura, and by male and female genitalia, *T. sparsa* is most similar to *T.* (*S.*) *thaleri*. The differences are: verticils are distributed only terminally on flagellomeres (dispersed over flagellomeres' surface in *T. thaleri*), the hind tarsal claw in male is large (very small in *T. thaleri*), the gonostyle is longer and thinner (thick and short in *T. thaleri*), the setulose area of the ovipositor is short and well delimited (diffused and reaching almost to tip in *T. thaleri*); finally, the genital plates are different in these species.

Addditional description. Females are often conspicuously larger than males. Colouristic features were detailly described by STARÝ & MARTINOVSKÝ (1996). Antennae with long, strong and erect verticils, 4x as long as pubescence (Fig. 46.F, G). Thorax: anepimeron and metanepisternum with abundant setae (Fig. 46.C). Legs: large hind tarsal claw in male, c. 1/2x t5 (Fig. 46.D).

Male genitalia (Fig. 46.A-B, E): sternite 9 with triangular to quadrangular excision. Bridge is rounded and delicate; gonostyle c. 1.5x as long as gonocoxite, parallel-sided and slightly curved to inside; basal tubercle is absent, or indistinct; in its place gonostyle is often somewhat swollen (as in *T. saltator*). Aedeagal complex (Fig. 46.E) rather narrow in lateral view; lateral apodeme is directed to parameres; basal apodeme is massive.

Female genitalia (Fig. 46.H-L). Hypogynal valves are characteristically very narrow (narrowest valves in subgenus; Fig. 46.K, arrow). Ovipositor is slightly longer than genital segment, almost straight; its dorsal outline is characteristically bent below or at midlength of ovipositor; distal portion in shape of elongated triangle. Setulose area is well delimited, broad basally, but short (c. 1/3 of ovipositor's length) and flat in lateral view (Fig. 46.H, arrow). Genital fork is massive and very shallow (prongs are almost absent), with additional lateral sclerotizations of somewhat variable appearance; supragenital plate is rounded, broad, with 4-6 bristles. Spermathecae with ducts up to 1.5x as long as spermathecal diameter.

Material examined. Paratypes, Czech Republic, Moravia, Jeseníky Mts.: K. Studanka alt. 900 m, 2.XI. 1993 – 1f, 5.XI. 1993 – 1m; Skřitek alt. 850 m, 5.X. 1995 – 1f; Rejvíz, alt. 750 m, 16.X. 1995 – 1m. Other specimens: Czech Republic, Moravia: Dlouhá Loučka, 27.X. 1989 – 1m, 4.X.1986 – 1m (all leg. et det. J. STARÝ). Poland: Ojców Nat. Park, Góra Rusztowa, 21-22.XI. 1992 (leg. A. PALACZYK); Las Łagiewnicki n. Łódź, 25.I. 1995 – 2m, 1f (leg. B. SOSZYŃSKI). Sweden: Messaure Ecol. Station, 1973: 21-24.IX-1.X. – 1m; 24.IX. – 2m; 28-29.IX. – 2f; 1-8.X. – 1f; 8-15.X. – 4f (coll. C. DAHL). Specimens listed in papers of, and co-authorized by, KRZEMIŃSKA (see Distribution).

Distribution. Widespread in Europe: Sweden up to Polar Circle (Messaure), Russia: environs of Petersburg (PETRAŠIŪNAS & PARAMONOV 2014); lowland regions in Lithuania (PETRAŠIŪNAS & VISARČUK 2007), southern Norway (HÅGVAR & KRZEMIŃSKA 2007) and Finland (KRZEMIŃSKA & GORZKA 2014); mountaineous regions of Czech Republic, Slovakia, Poland, Switzerland (STARÝ & MARTINOVSKÝ 1996), Romania (UJVAROSI & KRZEMIŃSKA 2002). Asia: Korea (PETRAŠIŪNAS & PODENAS 2017).

Occurrence. Adults are recorded from IX to XII in central Europe; VI-VIII in Kola Penins. (PETRAŠIŪNAS & PARAMONOV 2014).

Remarks. On referring the finding of *T. sparsa* in Korea, PETRAŠIŪNAS & PODENAS (2017) discuss the possible identity of this species with *T. japonica* MATSUMURA, 1915, described from Japan, and identified with *T. excilis* DAHL, 1967 in Europe; for further comments on the problem see the section on *T. implicata*.

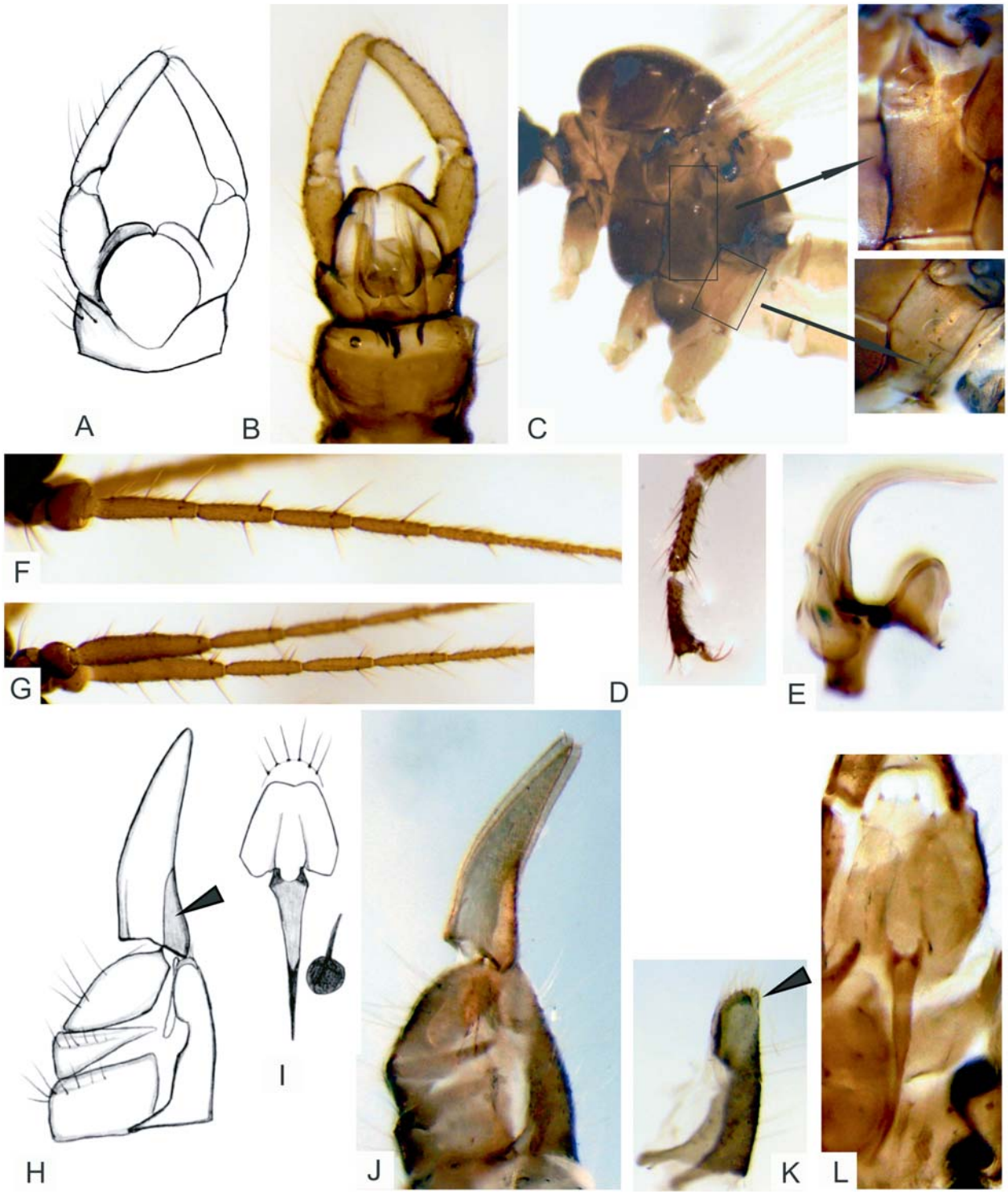


Fig. 46. *Trichocera (Saltrichocera) sparsa* STARÝ & MARTINOVSKÝ, 1996. A-F, male: A, drawing of genitalia; B, genitalia ventrally; C, setae on anepimeron and metanepisternum; D, hind tarsal claw; E, aedeagal complex; F, basal antenna. G-L, female: G, basal antenna; H, K, drawing of ovipositor and plate, respectively; I, genitalia laterally; J, sternite 8; L, genital plates.
Male and female: Poland, Ojców NP, Góra Rusztowa, 21-22.XI. 1992 (leg. A. PALACZYK).

Trichocera (*Saltrichocera*) *thaleri* STARÝ, 2000

Fig. 47

Trichocera (*Saltrichocera*) *thaleri* in: KRZEMIŃSKA 2002a: 158

Trichocera (Metatrichocera) thaleri STARÝ, 2000: Čas. Slez. Muz. Opava (A), 49: 102, fig. 14-20 (male, female)

Diagnosis. Antennae with stiff verticils distributed over entire surface of flagellomeres. Anepimeron and metanepisternum with few short setae. Male: gonostyle relatively short, with indistinct basal tubercle; sternite 9 with deep medial excision; bridge low, wide, rounded. Tarsal claw very small (1/5x t5). Female: sternite 8 with very narrow hypogynal valves; ovipositor 1.3x as long as genital segment, almost straight, setulose area delimited only at base. Genital plate with shallow fork; prongs are parallel or slightly divergent.

Comparison. Male genitalia are similar to other species of the *implicata* group of species (*implicata*, *obtusa*, *sparsa, alpina*) in having the gonostyle with a small basal tubercle and sternite 9 deeply excised, but *T. thaleri* is distinguished by combination of the gonostyles short and thick, a characteristic setation of the antennae and of the thorax. Females: ovipositor is similar to that in *T. parva*, but markedly longer and thinner at end.

Additional description. Antennae with f1 often fused with f2, hence entire first flagellomere seems long and narrowed about midlength, as in Fig. 47.G. Pubescence long and stiff, varying in length; verticils erect, distributed over entire surface of flagellomeres; both these kinds of setae are not easy to distinguish. Wing: R2+3+4 shorter than R2+3; d cell subtriangular, with bM1+2 subequal mM1+2; A2 close to wing margin (this feature is stressed by STARÝ (2000); in specimens from Hungary last section of A2 is detracted from wing margin). Thorax: anepimeron and metanepisternum with few short setae (Fig. 47.D). Leg: male tarsal claw very short, c. 1/5x t5 (Fig. 47.F).

Male genitalia (Fig. 47.A-C, E). Sternite 9 long at lateral sides, medially deeply excised. Bridge small, rounded, halves broad and distinctly separated. Gonostyle characteristically thick and short (as long as gonocoxite), gently curved, with indistinct basal tubercle. Aedeagal complex (Fig. 47.E): parameres broad at bases, of medium length; lateral apodemes narrow in lateral view.

Female genitalia (Fig. 47.I-N): sternite 8 with very narrow hypogynal valves (Fig. 47.J, arrow). Ovipositor longer than genital segment, slender, almost straight, apex acute; setulose area not delimited or only basally so, and extended to tip of ovipositor (Fig. 47.J, arrow); convexity of setulose area is not conspicuous but gradually merging into remainder of ovipositor. Genital plate (Fig. 47.I, M, N) with incision barely pronounced in paratypes (Fig. 47.M), but conspicuous in specimens from Hungary (Fig. 47.N); fork shorter than deep; prongs are parallel or slightly divergent, connected with plate by short desclerotized sections. Supragenital plate with two bristles. Spermathecae with sclerotized portions of the ducts as long as spermathecae' diameter.

Material examined. Paratypes, males and females: Austria: 20.X. 1979-13.VIII. 1980 Kärnten: Glocknerstrasse, 1950 m, soil trap (K. THALER leg.). Specimens from Norway and Hungary listed in papers of, or co-authorized by KRZEMIŃSKA, see below. Sweden: Messaure Ecol. Station 8-15.X.1973 – 1m (coll. C. DAHL).

Distribution. The species was described from Austria, from high montane altitudes, 2000-3000 m (STARÝ 2000). Norway (HÅGVAR & KRZEMIŃSKA 2008), Sweden; Hungary (KRZEMIŃSKA 2001c).

Occurrence. Most specimens were caught in X, or found in soil traps exposed for several months (Austria), but a male collected in IV in Hungary evidences long period of flight for this species (KRZEMIŃSKA 2001).

Remarks. The ovipositor in this species is frequently damaged along dorsal margin, as if it were chipped, probably in result of some unknown habit of oviposition (into a harder substrate?).

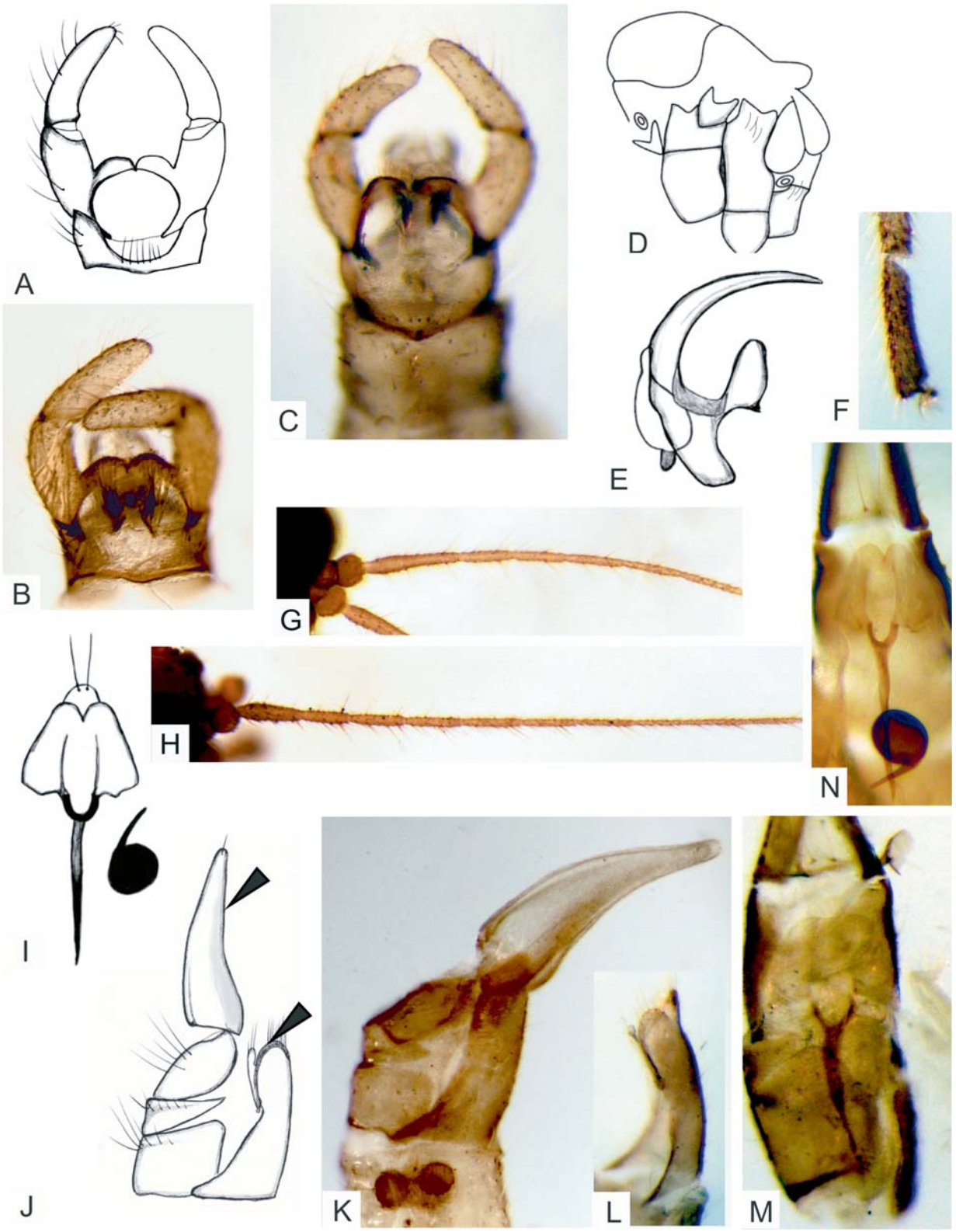


Fig. 47. *Trichocera* (*Saltrichocera*) *thaleri* STARÝ, 2000. A-G, male: A, drawing of genitalia; B-C, genitalia; D, setae on thorax; E, aedeagal complex; F, hind tarsal claw; G, basal antenna. H-N, female: H, basal antenna; J, K, genitalia; L, sternite 8; I, M, N, genital plates.
Paratypes, male and females, Austria: Kärnten: Glocknerstrasse, 1950 m, soil trap (coll. K. THALER).

Trichocera (*Saltrichocera*) *versicolor* LOEW, 1871, resurrected from synonymy

Fig. 48

Trichocera versicolor = *syn. Trichocera maculipennis* in: DAHL & ALEXANDER 1976

Trichocera versicolor LOEW, 1871: Beschreibungen europäischer Dipteren 2: 17

Diagnosis. Wing heavily spotted; abdomen brown, with yellow distinct banding. Ovipositor as long as genital segment, mildly curved, setulose area well developed, convex. Genital plate distinctly heart shaped, incision deep and rounded; fork with very short, divergent prongs. Male unknown.

Comparison. T. *versicolor* differs from *maculipennis* by much stronger pattern on wing: spot on origin of Rs is larger, reaching mid Rs; between R3 and R5 a large spot is present, connected with lower spots by vertical thin band.

Additional description of a holotype. Wing length 9.0 mm. Colour dark brown, scutum with two longitudinal dark strips, merging into one on scutellum (Fig. 48.B); tergites of abdomen with yellow banding; sternites with larger irregular yellow spots (Fig. 48.C).

Antennae (Fig. 48.A): first flagellomere swollen; subsequent ones are shorter and of nearly equal length; pubescence stiff and erect; verticils not much stronger and c. 2x as long. Legs: one complete leg preserved; darker diffuse ring on distal section of femur. Wing heavily spotted (Fig. 48.D): largest, rectangular spot begins at origin of Rs and reaches middle of this vein; next big, round spot is between R3 and R5 connected by thin strip with lower spot in medial field. Smaller, but darker spots are distributed on r-r, r-m, in all medial cells, distally to A2 and along Cu and A1. Discal cell characteristically small and broad, first two sections of M1+2 (bM1+2 and mM1+2) evenly arched; m-cu distinctly shifted from fork of M3+4 (Fig. D, arrow); cell m4 (under cross-vein M4) very long.

Female genitalia (Fig. 48.E-I). Ovipositor as long as genital segment, mildly curved about middle; setulose area prominent, reaching almost midth of ovipositor. Genital plate (Fig. 48.H, J) distinctly heart shaped, incision deep and rounded; fork massive, with short teeth; apodeme broad and with distinct expansion in middle, just before the apodeme starts to roll. Supragenital plate (Fig. 48.I) broad, with triangular tip provided with two bristles rather closely set . Sclerotized ducts of spermathecae 1.5x as long as spermathecae' diameter (Fig. 48.H).

Male unknown.

Material examined. Holotype female with label: "versicolor Lw.*. Sarepta; Christoph. Coll. H. LOEW. Typus. 9038." Museum für Naturkunde, Humboldt-Universität, Institut für Systematische Zoologie, Berlin. Locality „Sarepta" is the old name of a town now within the borders of Volgograd in Europaean part of Russia (not central Europe, as DAHL & ALEXANDER stated (1976)).

Remarks on the taxonomic status of *Trichocera versicolor, punctipennis, pictipennis* and *sapporensis*

T. versicolor and *T. punctipennis* versus *T. maculipennis*

T. versicolor is restored from synonymy with *T. maculipennis* because the heavy spotting of wings in *versicolor* is beyond range of variation in *T. maculipennis*. In Asia there are three other species/subspecies with the same heavy spotting: *T. punctipennis* BRUNETTI, 1912, *T. sapporensis* ALEXANDER, 1935, and *T. maculipennis* ssp. *pictipennis* ALEXANDER, 1930. The westernmost Palearctic locality of morphotypes with this kind of spotting is that of *T. versicolor*, almost at the Asian-Europaean border; their distribution extends eastwards, over India to the Far East.

PETRAŠIŪNAS & PODENAS (2017) synonymized *T. sapporensis* and *pictipennis* with *T. punctipennis,* based on a large sample of males and females of this species from Korea, other Far East localities, and India, including the type specimens. The rank of *T. punctipennis* was lowered to a subspecies within *T. maculipennis*.

However, in the Far East both *T. punctipennis* and *T. maculipennis* are present, and according to TOKUNAGA (1938) they are clearly discernible. This suggests their genetic separation and thus excludes possibility that *T. punctipennis* is only a geographical variation (or: a subspecies) of *T. maculipennis*. In old papers, including ALEXANDER (1922), we find arguments for distinction between *maculipennis* and *versicolor*. CZIŽEK (1931), after MIK (1883) reckoned the sequence of spots in distal portion of the wing a character discerning *versicolor* from *maculipennis* (citation: "versicolor LOEW is eine Varietät aus Russland mit Schattenflecken in den Zellen an der Flügelspitze"). According to ALEXANDER (1922), *versicolor* reminds the Nepalese species, *T. punctipennis* BRUNETTI, 1912.

Whether *T. versicolor* and *T. punctipennis* represent the same species, it cannot be resolved at present, before the male of the former species is known. If the identity is confirmed, *T. punctipennis* should be made a younger synonym of *T. versicolor*, which has the priority.

It is noteworthy to mention that *T. maculipennis* in the far East has a bridge without a beak (according to TOKUNAGA 1938: fig. 23), as also do all similar species listed here (camera pictures of genitalia: see PETRAŠIŪNAS & PODENAS 2017: fig. 10-13; of wings, fig. 1-6). *T. sapporensis* differs from all them by the gonostyles devoid of tubercles (op. cit. fig. 10). However, genitalia of the holotype are much squeezed in the preparation and it is quite possible that genuine gonostyles had the tubercles. I have frequently observed that these tubercles in various species readily vanish after preparation, especially when the gonostyles are separated from remainder of the genitalia.

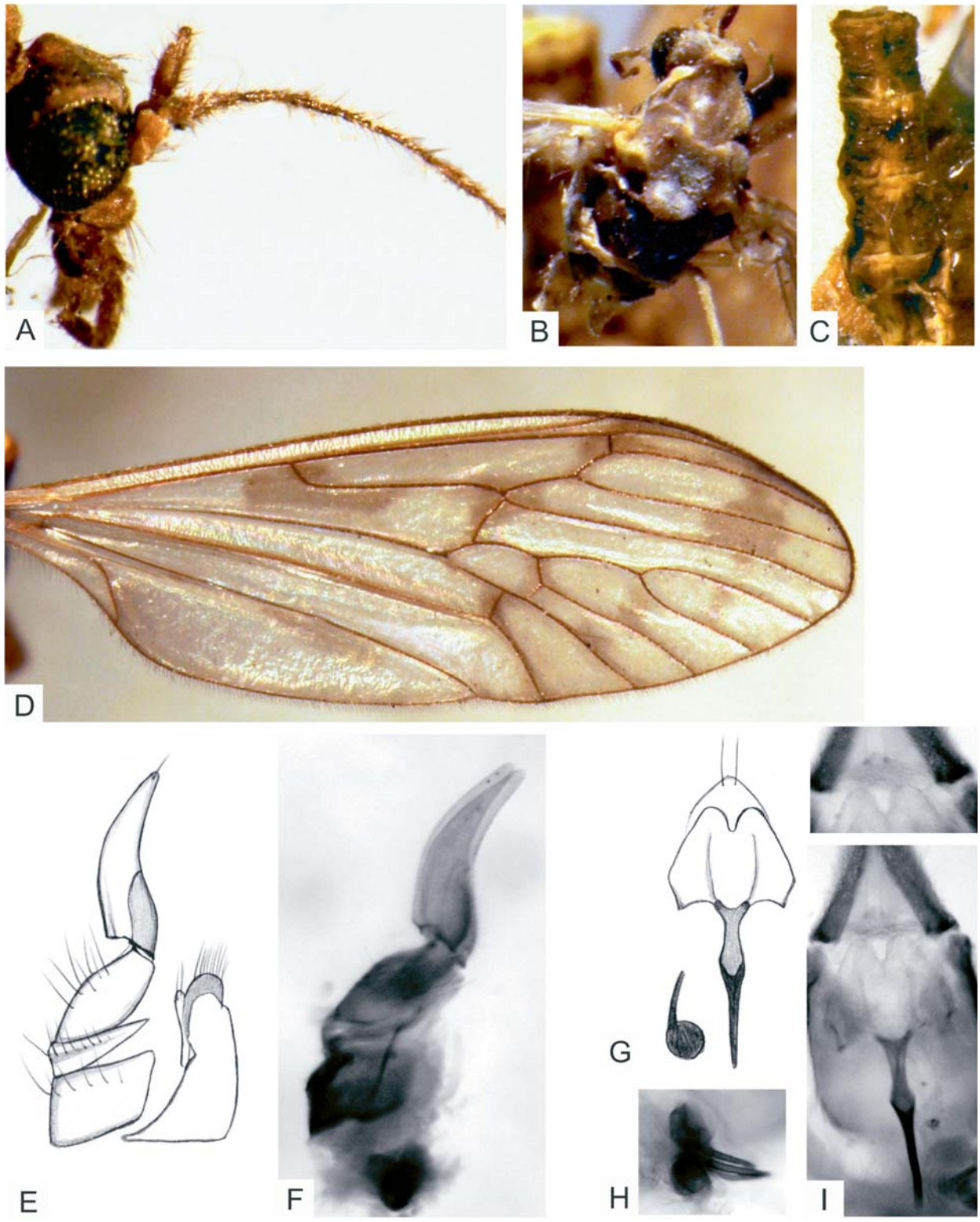


Fig. 48. *Trichocera* (*Saltrichocera*) *versicolor* LOEW, 1871. A-I, female: A, head and basal antennae; B, thorax dorsally; C, abdomen ventrally; D, wing; E, F, drawing and photo of genitalia; G, I, drawing and photo of genital plate (above: supragenital plate, apical portion); H, spermathecae. Female holotype; data in the text.

Subgenus: *Trichocera* (*Staryia*) KRZEMIŃSKA & GORZKA, 2016

Trichocera (*Staryia*) KRZEMIŃSKA & GORZKA, 2016: Zool. Anz. 263: 9

Diagnosis emended (in relation to diagnosis in KRZEMIŃSKA & GORZKA 2016). Female: dorsal side of genital segment often with ridges and fenestra (desclerotized, well defined patches) between tergites and/or tergites and sternite 8; lateral portions of tergite 9 extended to ventral side and fused or almost so over the sternite 8. Supragenital plate large, apex positioned between cerci of ovipositor. Genital plate usually greatly reduced (exceptions: *T.* (*St.*) *christinae*, *T.* (*St.*) *oulankae*, n. sp., with genital plates large as in other subgenera) and disconnected from genital fork, which is short and funnel-like; ventral receptacle present (exception: *T.* (*St.*) *polanensis*). Male: parameres massive, straight behind anterior bend, widely divergent and close to lateral apodemes; basal apodemes of aedeagal complex more or less reduced.

Type species: *T.* (*Staryia*) *altipons* STARÝ, 1998. Fourteen species are allotted to the subgenus; five of them are known from male and female (*altipons*, *basidens*, *polanensis*, *rectistylus*, *villosa*); three only of male (*geigeri*, *transversa, tsugaruensis* NAKAMURA & SAIGUSA, 2012), and six only of female (*dufouri*, *muelleri*, *oulankae* n. sp., *christinae*, *rannanenae*, *viramoi*).

Species of *Staryia* are known from northern, central and east Europe; only *T. tsugaruensis* was described from Japan, and allotted by the Authors to the *rectistylus* group, which was later described as the subgenus *Staryia*. Based on the description and figures, this species is formally included herein to *Staryia*.

Trichocera (*Staryia*) *altipons* STARÝ , 1998

Fig. 49.1 (male), 49.2 (female)

Trichocera (*Staryia*) *altipons* in: KRZEMIŃSKA & GORZKA 2016

Trichocera (*Trichocera*) *altipons* in: STARÝ, 2009: fig. 1-2 (female)

Trichocera (*Trichocera*) *altipons* STARÝ, 1998: Stud. dipterol. 5: 179, figs 6-7 (male)

Diagnosis. Antenna: verticils c. twice as long as pubescence. Male: sternite 9 deeply incised medially; bridge triangular, each half produced at apex into convex lobe; gonostyle almost straight, parallel-sided, without any tubercle; parameres close to lateral apodemes; basal apodemes absent; aedeagal apodeme large. Female: genital segment with rounded desclerotized patch in lateral view; three small, sharp folds visible on tergites in lateral view; ovipositor shorter than genital segment, subtriangular, bent at c. 80° to abdomen; setulose area convex, not delimited by suture; genital plate reduced, incised medially, fork small and U-shaped in ventral view; ventral receptacle poorly delimited, membraneous, without musculature. Spermathecae absent.

Comparison. Male is unique by the shape of bridge with two distinct bulges at apex; female belongs to a group of species with ovipositor fixed in a bent position: *T.* (*St.*) *dufouri*, *T.* (*St.*) *rectistylus* and *T.* (*St.*) *villosa*. *T.* (*St.*) *altipons* is superficially most similar to *T.* (*St.*) *dufouri*, and differs by the tergite 9 of simple shape while *dufouri* has a single, large outgrowth. *T.* (*St.*) *rectistylus* has the ovipositor rounded at apex and more strongly bent to abdomen; *T.* (*St.*) *villosa* has the distal portion of ovipositor more obtuse and only slightly bent, and the ventral receptacle well defined, funnel-like.

Additional description. Antennae of male and female from Scandinavia (Fig. 49.1.H, 49.2.C, resp.) are in accordance with the description of specimens from the Czech Republic (STARÝ 1998, 2009). Wings (male, Fig. 49.1.H; female, Fig. 49.2.C): as stated by KRZEMIŃSKA & GORZKA (2016), vein R2+3+4 is c. 3x as long as R3+4 in Scandinavian species, while those from Moravia may have R2+3+4 equal to R3+4. Thorax (Fig. 49.2.H): pleura bare.

Male genitalia (Fig. 49.1.A-C, E-G). Sternite 9 deeply incised medially; gonocoxite directed outwards; bridge large, triangular, each half produced at apex into convex lobe; gonostyle almost straight, long, parallel-sided, without tubercle, apex rounded. Aedeagal complex: parameres strong, straight in lateral view; *in situ* strongly divergent (Fig. 49.1.F, G); basal apodemes almost absent (Fig. 49.1.E, arrow); aedeagal apodeme large; lateral apodemes large, rounded, in situ directed outside (Fig. 49.1.F).

Female genitalia (Fig. 49.2.A, D-G). Genital segment in lateral view with rounded desclerotized patch; two sharp folds present, formed by expanded proximal and distal margins of tergite 9; one small sharp bump on tergite 10 (Fig. 49.2.E, arrows); hypogynal valves stiff, prominent. Ovipositor half as long as genital segment, subtriangular, bent at c. 80° to abdomen; setulose area strongly convex, not delimited by suture, ending with small protuberance (ventral margin; Fig. 49.2.E, arrow). In untreated specimens entrance to genital chamber may be blocked by abundant mucus (Fig. 49.2. G, arrow). Genital plate greatly reduced, incised medially; supragenital plate large, triangular, with two bristles. Genital fork is better recognizable in ventral view; it has a characteristic shape of shortened letter U (Fig. 49.2.F); in lateral view fork is barely visible even when dyed; ventral receptacle membraneous, without musculature. Shapes of ventral receptacle and of genital chamber are not as conspicuous as in other species.

Material examined. Paratype male, Moravia, Jeseníky Mts., Karlova Studánka, alt. 900 m, 1.XI. 1999 – 1m (#5969) (leg. et det. J. STARÝ). Specimens from Finland and Sweden are listed in KRZEMIŃSKA & GORZKA (2016). Russia: Vladimir Reg., park at Muromtsevo, 19.XI. 2016 – 1f (leg. A. PAVLOV).

Distribution and occurrence. Species was described form Czech Republic, Moravia: alt. 900-1250 m; adults collected in X (STARÝ 1998, 2009). Sweden: Messaure (latitude of the Polar Circle, also found on snow); Finland: Oulanka Research Station; adults were collected IX-XI (KRZEMIŃSKA & GORZKA 2016). Finding of a female in Russia indicates wide distribution of this species, not confined to subarctic and montane regions.

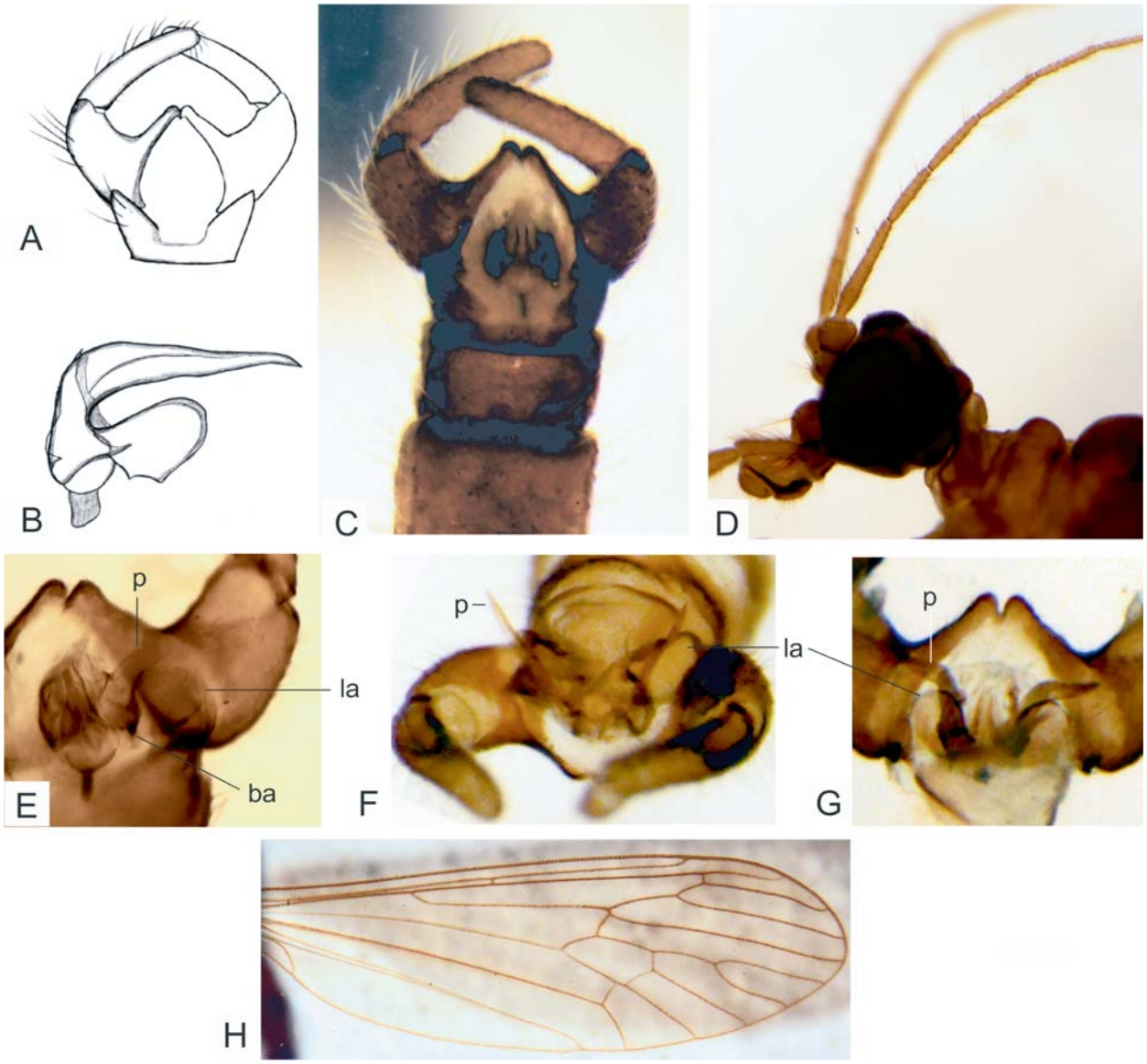


Fig. 49.1. *Trichocera* (*Staryia*) *altipons* STARÝ, 1998, male: A, C, drawing of genitalia and photo of untreated genitalia, resp.; B, aedeagal complex (drawing after STARÝ, 1998: fig. 7); D, basal antenna; E-G, preparation of genitalia in ventral (E), distal (F) and dorsal (G) views, showing genuine shapes of parameres, and lateral apodemes; H, wing.

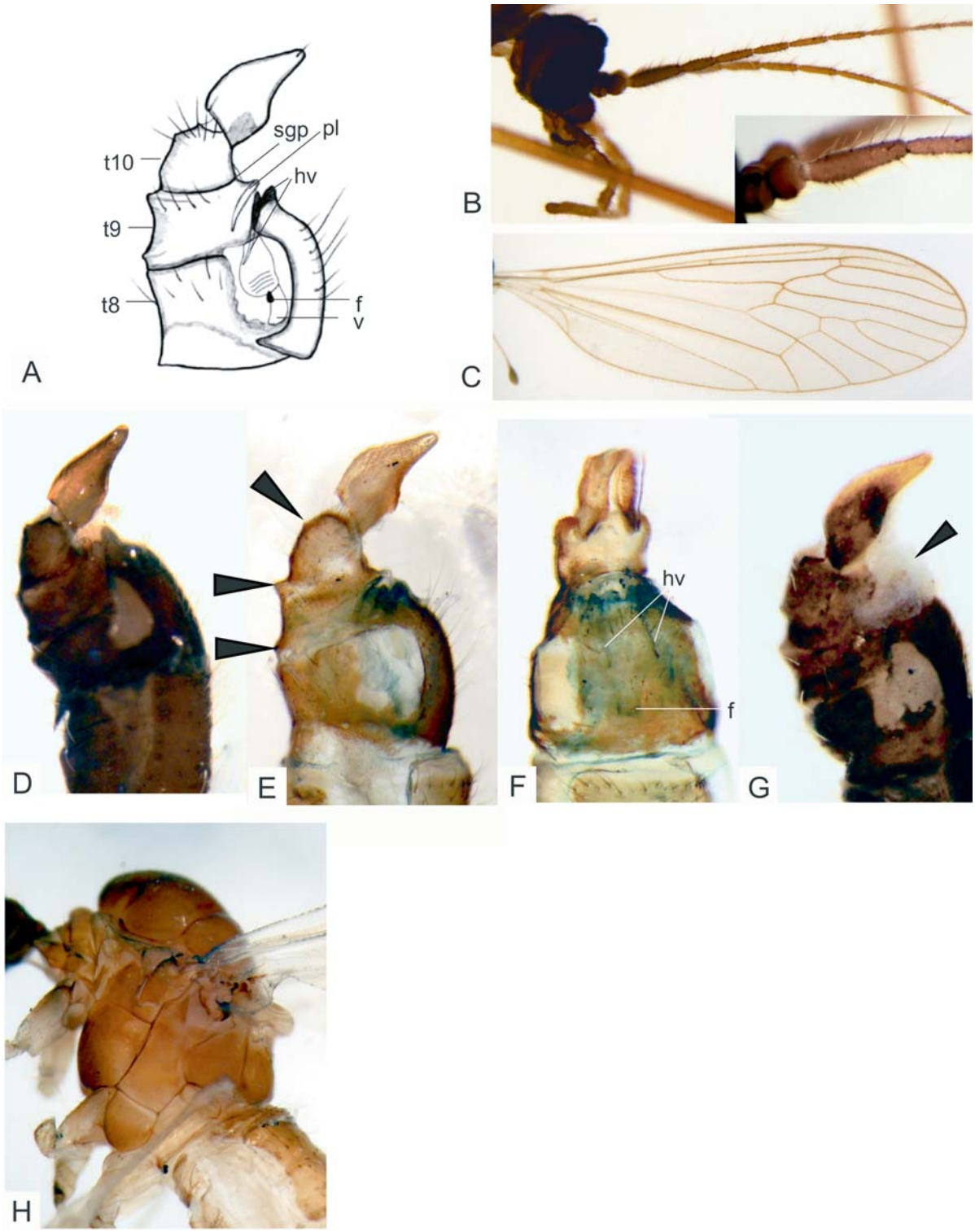


Fig. 49.2. *Trichocera* (*Staryia*) *altipons* STARÝ, 1998, female: A, drawing of genitalia; B, basal antennae and palpi (first flagellomere magnified in insertion); C, wing; D, genitalia before preparation; E, F, genitalia after preparation in lateral (E) and ventral view (F; fork and hypogynal valves are seen through); G, mucus at entrance to genital chamber in untreated specimen (arrow); H, thorax. Male and female A-F: Sweden, Messaure, 22-29.X. 1973, Falle 3 (leg. C. DAHL); G, female, Russia, Vladimir Reg., park at Muromtsevo, 19.XI. 2016 (leg. A. PAVLOV).

Trichocera (*Staryia*) *basidens* STARÝ, 1998

Fig. 50

Trichocera (*Staryia*) *basidens* in: KRZEMIŃSKA & GORZKA 2016

Trichocera (*Trichocera*) *basidens* in: STARÝ, 2009: fig. 3-4 (female)

Trichocera (*Trichocera*) *basidens* STARÝ, 1998: Stud. dipterol. 5: 178, fig. 4-5 (male)

Diagnosis. Male: sternite 9 calyx-like, ovally incised; bridge large, triangular, inner margins strengthened with serrate slats; gonostyle with basal tubercle at inner face; aedeagal complex: paramere close to lateral apodeme which is large and rounded; parameres widely divergent; aedeagal apodeme almost non-existent; basal apodeme not extending beyond aedeagal vesica. Female: dorsal outline of genital segment with two sharp folds, one between tergites 9 and 10, and other on tergite 10; desclerotized, longitudinal patch between tergites 8-9 and sternite 8; ovipositor half as long as genital segment, fixed in prolongation of abdomen or only slightly bent, curved, with convex base. Supragenital plate subtriangular, apex rounded, with two bristles; genital fork small, massive, Y-shaped; shape of ventral receptacle unknown. Spermathecae absent.

Comparison. The male is unique by its massive bridge with serrate slats along inner margins. Similar slats are present in *T*. (*S*.) *pubescens*, but the bridge is smaller and gonostyles taper to apex. Female is unique by the shape of ovipositor with greatly convex setulose area.

Additional description. Antennae (Fig. 50.F) with prominent verticils, c. 3x as long as pubescence. Wing as in Fig. 50.D. Hind tarsal claw (Fig. 50.G) only slightly curved, c. 1/3 of t5. Thorax, see Fig. 50.H. STARÝ (1998) drew attention to sparse, delicate setae on the anepimeron.

Male genitalia (Fig. 50.A-C). Sternite 9 calyx-like, rather wide at lateral edge, medially ovally excised. Bridge triangular, characteristically massive due to additional serrate slats on inner margins of bridge (Fig. A, arrow). Gonostyle not much longer than gonocoxite, with large basal tubercle, beyond it parallel sided and with rounded apex. Aedeagal complex (Fig. 50.C, E): paramere barely extended beyond lateral apodeme, its basal half is massive and wide in lateral view, distally getting thin; parameres are widely divergent which is visible in ventral view (Fig. 50.B); hood is well visible in lateral view; basal apodeme almost non existent, aedeagal apodeme greatly reduced.

Female genitalia (Fig. 50.I, J, after description and illustrations of STARÝ 2009: fig. 3, 4): as in the diagnosis.

Material examined. Paratype male, Czech Republic: Moravia, Jeseníky Mts., K. Studánka, alt. 900 m, 1.XI. 1999 – 1m (5969) (leg. et det. J. STARÝ).

Distibution and occurrence. A montane species, collected by Jaroslav STARÝ at alt. up to 1050 m. Slovakia: Tatra Mts. Czech Republic: Moravia, Jeseníky Mts. The adults were collected in X-XI.

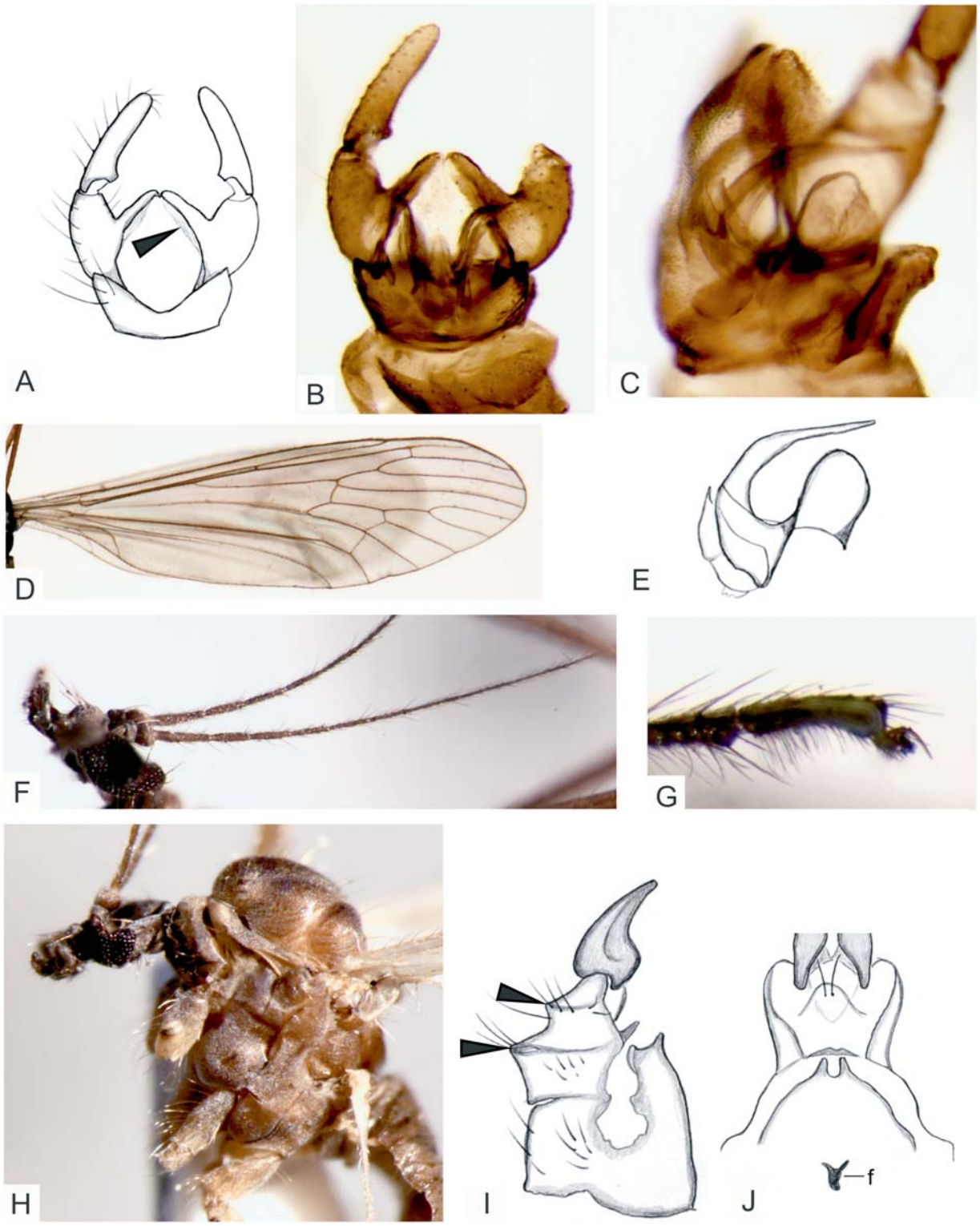


Fig. 50. *Trichocera* (*Staryia*) *basidens* STARÝ, 1998, male. A, drawing of genitalia (arrow: serrate slat); B, C, genitalia in ventral and lateral view, resp.; D, wing; E, aedeagal complex (arrows: short parameres, short basal apodeme); F, antennae; G, hind tarsal claw. Female: drawings after STARÝ, 2009: fig. 3-4.
Paratype male, Moravia, Jeseníky Mts., K. Studánka, alt. 900 m, 1.XI. 1999 – 1m (5969) (leg. et det. J. STARÝ).

Trichocera* (*Staryia*) *christinae KRZEMIŃSKA & GORZKA, 2016

Fig. 51

Trichocera (*Staryia*) *christinae* KRZEMIŃSKA & GORZKA, 2016: Zool. Anz. 263: 9, fig. 3 (female)

Diagnosis. Antenna: flagellomeres long, cylindrical; setae and verticils erect, stiff, but short. Female: genital segment with rounded desclerotized patch in lateral view; tergite 8 with basal fold vanishing toward lateral sides; tergites 9 and 10 fused; hypogynal valvae very prominent, forming recurved beak; ovipositor slightly longer than genital segment, regularly curved, with sharp tip and setulose area distinctly delimited. Genital plate large, connected with funnel-like, short fork. Ventral receptacle extending beyond sternite 8. Four spermathecae present positioned close to genital plate. Male unknown.

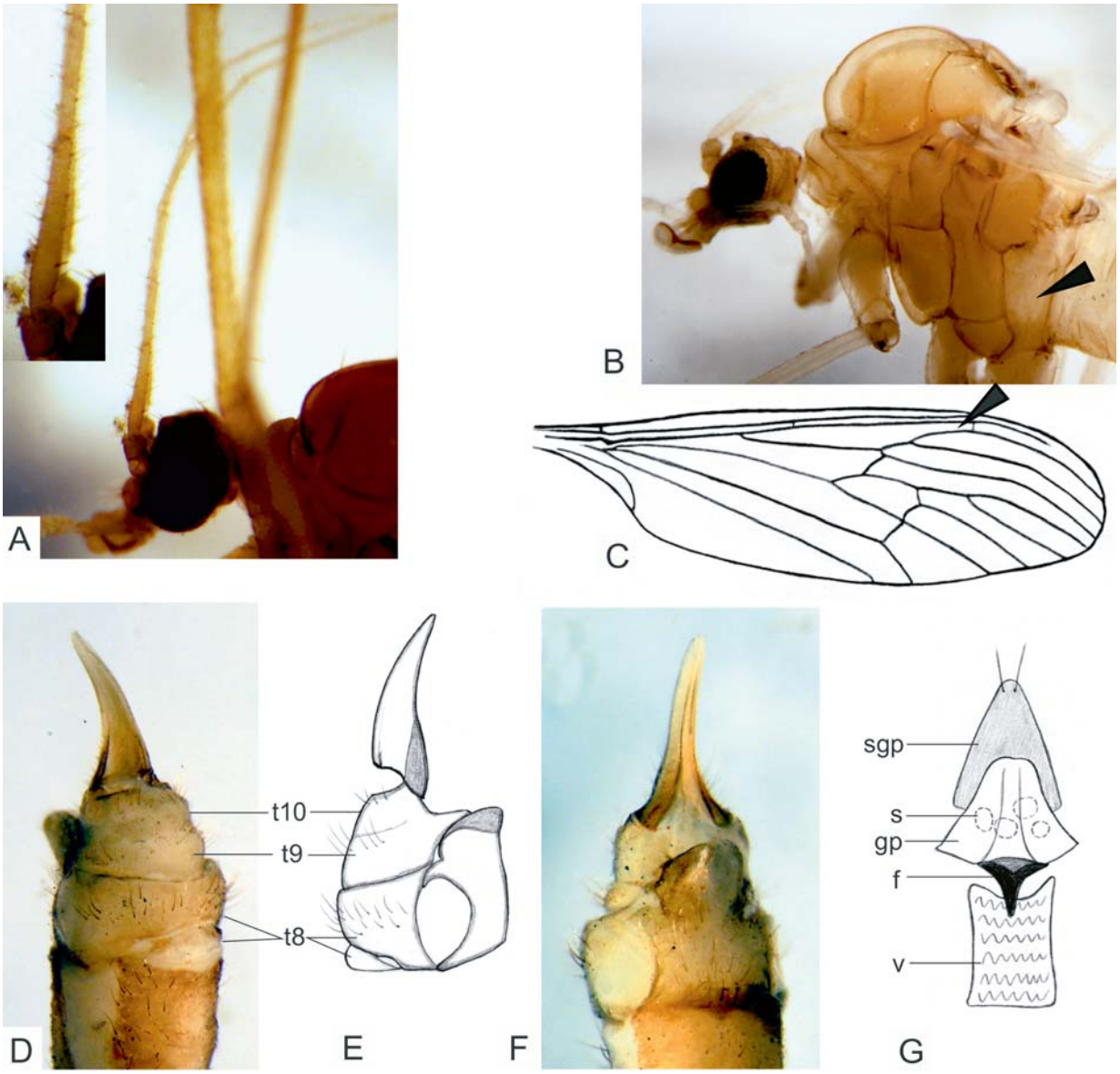
Additional description. Large species; wing c. 10 mm long, body colour probably yellowish (however, the specimen has been stored for long time in alcohol and certainly is partially discolored). Antennae (Fig. 51.A) long, covered with very short verticils (of length equal to segments' diameter), black and erect at angle almost 90°. Wing: membrane and veins very thin and tearable. Vein R2+3+4 only a third of R3+4 (Fig. 51.C, arrow); tip of R1 vanishing (this may be only feature of holotype, not of species). Thorax: pleura elongated; metanepisternum with a bunch of short bristles (Fig. 51.B, arrow).

Female genitalia (Fig. 51.D-G). Genital segment expanded; sternite 8 with large semicircular excisions laterally; hypogynal valves massive, hardened and curved outside to form double beak (Fig. 51.D, F). Tergite 8 with basal fold vanishing gradually at lateral sides (Fig. 51.D-E) and separated there with small fenestrae; tergites 9 and 10 fused, lateral portions of tergite 9 extended to protect space over sternite 8. Ovipositor little longer than genital segment, evenly curved, with setulose area convex, dark, distinctly delimited with suture; tip of ovipositor is acute; unlike other members of *Staryia*, this ovipositor does not differ from those of subgenera *Trichocera*, *Saltrichocera* and *Metatrichocera*. Inner genitalia (Fig. 51.G): genital plate large, subtriangular, not incised at apex, with narrow foramen, and connected with fork which is funnel shaped and about half as long as plate. Subgenital plate triangular, with two bristles. Additional glands in shape of very elongated triangles, with "pleated"walls (described and illustrated in KRZEMIŃSKA & GORZKA 2016: fig. 3G, H). Ventral receptacle large, extending beyond sternite 8; musculature visible as thin longitudinal fibres loosely distributed. Four spermathecae of unequal size positioned close to dorsal side genital plate. Spermathecae have smooth surfaces, similar to those in remaining species of the genus, but lighter (greyish yellow, and not dark brown), apparently less sclerotized. Ducts barely visible, apparently very thin and short. Male unknown.

Material examined. Holotype female, Sweden, Messaure (KRZEMIŃSKA & GORZKA 2016). No other specimen is known till now.

Distribution. Known only from the type locality.

Remarks. *Trichocera* (*Staryia*) *christinae* maintains a special phylogenetic position in the subgenus, having plesiomorphic characters of the reproductory system (spermathecae, large genital plate connected with fork, ovipositor of common, trichoceriid shape) as well as the apomorphic ventral receptacle and the shape of genital segment. For further reading see Supplementary material to KRZEMIŃSKA & GORZKA (2016).



51. *Trichocera* (*Starvia*) *christinae* KRZEMIŃSKA & GORZKA, 2016. Holotype female: A, antenna; B, wing; C, thorax (metanepisternum with setae arrowed); D-F, outer genitalia in oblique dorsal (D) and ventral (F) views; E, explanatory drawing; G, scheme of inner genitalia (D, F from: KRZEMIŃSKA & GORZKA 2016: fig. 3a, c, with permission).

Trichocera (Staryia) dufouri KRZEMIŃSKA, 2020

Fig. 52.1, 52.2

Trichocera (*Staryia*) *dufouri* KRZEMIŃSKA, 2020: Acta zool. crac.: 2, fig. 1

Diagnosis. Antennae of medium length; flagellomeres oval, with soft verticils only c. twice exceeding length of pubescence. Thoracic pleura bare. Female: ovipositor bent to ventral side at angle close to 80°; tergite 9 with an outgrowth; desclerotized roundish patch visible in lateral view formed by excised sternite 8 and tergite 8. Genital plate short, apex round, proximal margin straight; supragenital plate broad but very short, subtriangular, with two bristles; ventral receptacle small, elongated, rounded at proximal apex. Male unknown.

Comparison. The female of *T*. (*St*.) *dufouri* is similar to *T*. (*St*.) *altipons*, and differs in an outgrowth of the tergite 9.

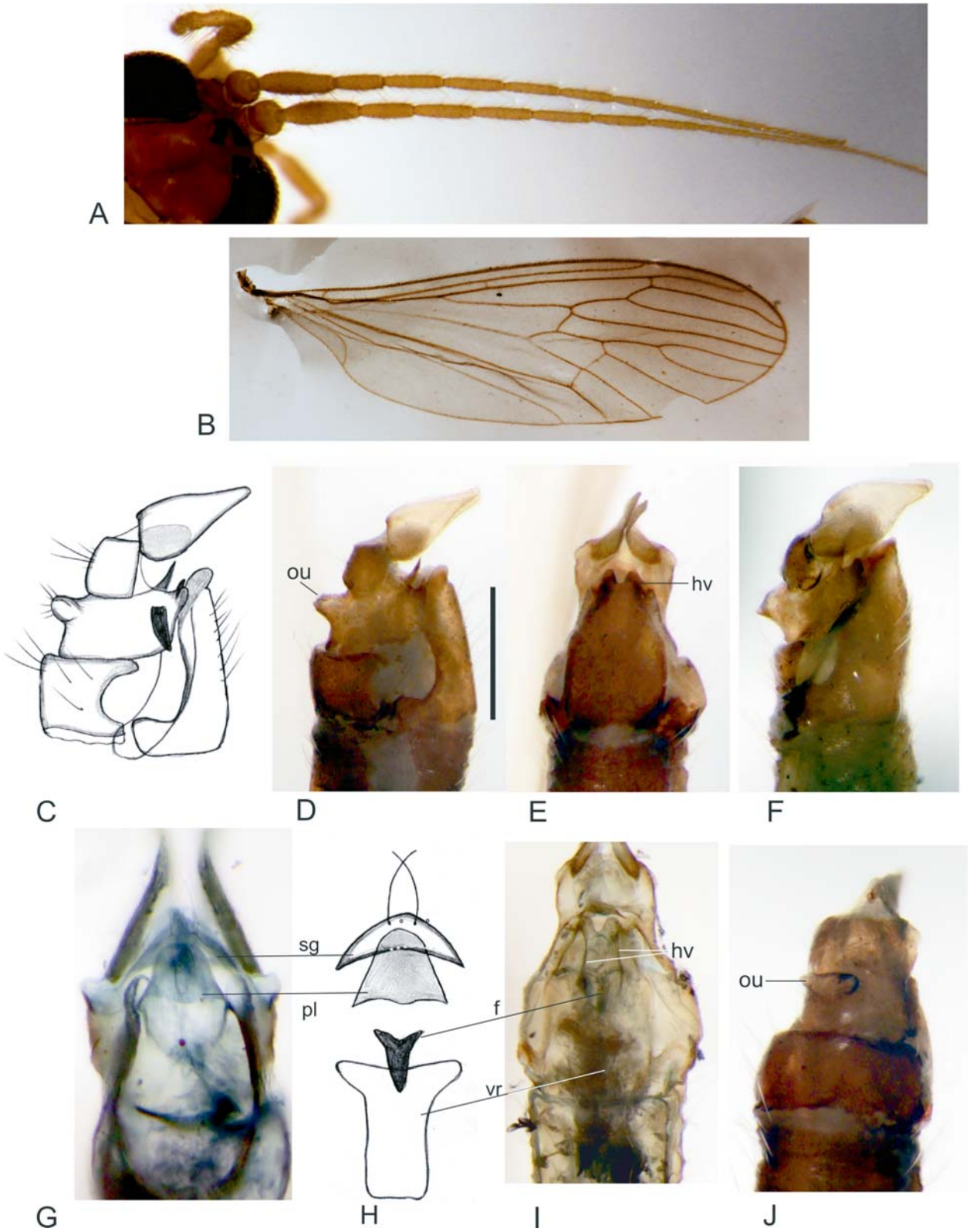
Additional description. Freshly caught specimens are dark brown (Sweden; Fig. 52.2). Antennae (Fig. 52.1.A, 52.2.B): initial flagellomeres are oval; f1 twice as long as pedicel, and 1.5x f2; verticils are soft and only twice as long as pubescence. Thoracic pleura bare. Wing (Fig. 52.1.B, 52.2.C): rather broad; proportions of R2+3+4 and R3+4 variable.

Female genitalia (Fig. 52.1.C-J, 52.2.A): ovipositor short, straight, subtriangular, bent to ventral side at angle close to 80°; apex obtuse; setulose area is large and round, but not delimited by suture. There is an intraspecific difference in shape of the ovipositor between the holotype, paratype, and the female from Sweden, compare Fig. 52.1.D, F, 52.2.A. Tergite 9 has distinct outgrowth which retains its shape after preparation; desclerotized roundish patch visible in lateral view is formed by incisions of sternite 8 and tergite 8. Genital plate (Fig. 52.1.G-H) is short, with round apex and the proximal margin straight; fork is detached from plate, weakly sclerotized, probably narrow as in Fig. 52.1.H. Supragenital plate is broad but very short axially, subtriangular, with two bristles; seminal receptacle (Fig. 52.1.H-I) is small, oval, somewhat narrowed about midlength, rounded at proximal apex; distal portion contacting fork is only slightly widened. Spermathecae absent.

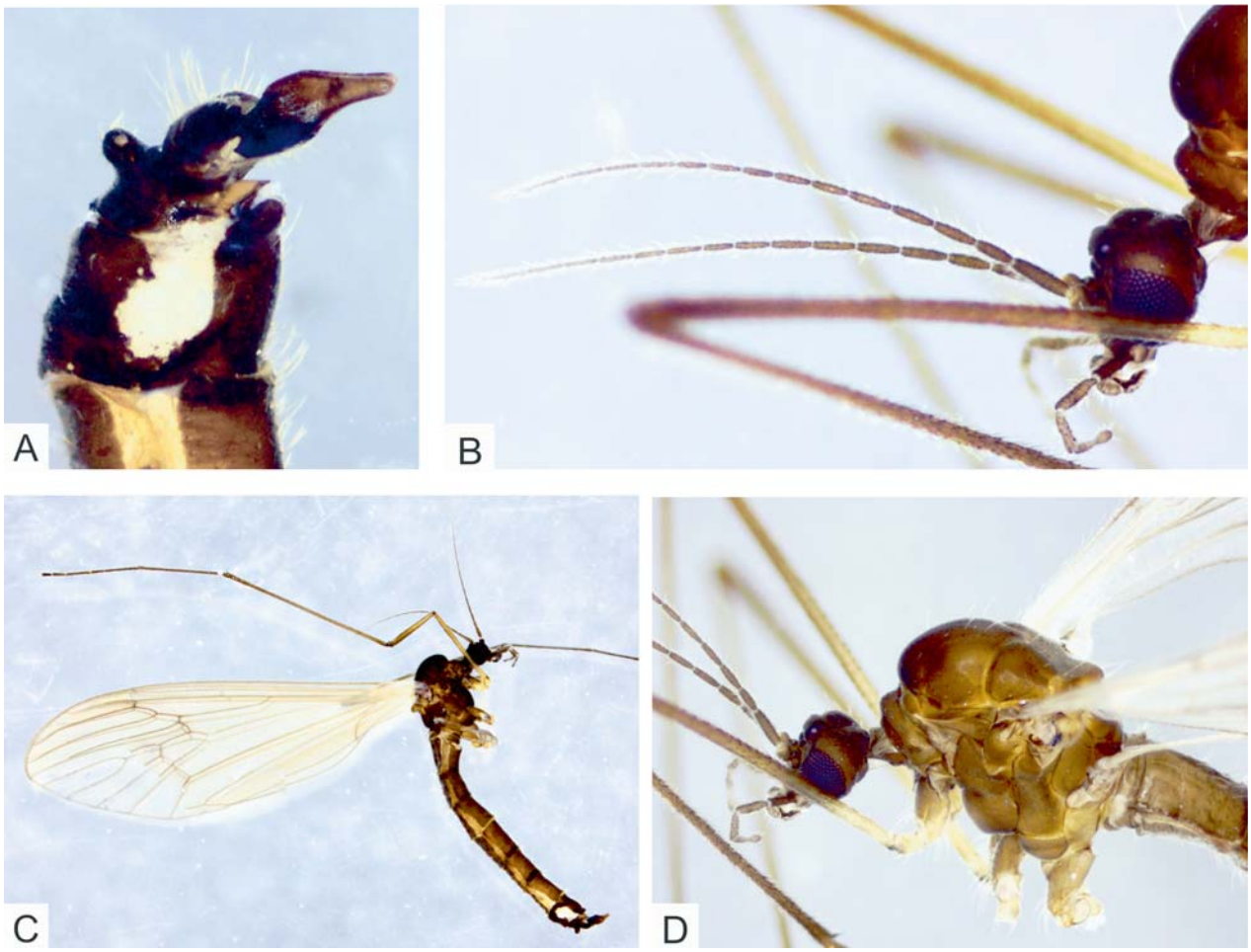
Male unknown.

Material examined. Switzerland: holotype and paratype (KRZEMIŃSKA 2020). Sweden: photo (Fig. 52.2) of a female, 8 km NE of Stockholm, Upl, Lidingö, Östra Långängskärret (N 56° 42.2390', E 16° 29.7876'), wetland with *Salix* (leg. Ole PAUS, det. Michael ANDERSSON).

Distribution. Probably boreo-alpine; Switzerland and Sweden.



52.1. *Trichocera* (*Staryia*) *dufouri* KRZEMIŃSKA, 2020, female, holotype (A, B, D, J) and paratype (E, F, G, I). A, antenna; B, wing; C-I, genitalia: scheme laterally (C), variation in ovipositor' shape (D, E); hypogynal valves in ventral view (F); subgenital and genital plate (G), scheme of internal genitalia (H); ventral receptacle (vr) (I); outgrowth (ou) on tergite 9 in dorsolateral view (J). (Photos from KRZEMIŃSKA 2020: fig. 1, with permission).
Female: holotype MHNN 65.6377, Switzerland, Canton Zurich, Birmensdorf, Rameren; alt. 560 m; Pt 676,750/246, 300 13-19.X. 1980 (coll. W. GEIGER, C. DUFOUR; MHNN); F, G, I, paratype, same data (ISEA).



52.2. *Trichocera* (*Staryia*) *dufouri* KRZEMIŃSKA, 2020, cont. A, untreated genitalia in fresh specimen; B, antennae and palpi; C, habitus; D, thorax.
Female: Sweden, 8 km NE of Stockholm, Upl, Lidingö, Östra Lĺngängskärret, wetland with *Salix* (leg. Ole PAUS, det. & photo: Michael ANDERSSON).

Trichocera (*Staryia*) *geigeri* STARÝ & KRZEMIŃSKA, 2000

Fig. 53

Trichocera (*Staryia*) *geigeri* in: KRZEMIŃSKA & GORZKA 2016: 9

Trichocera (*Metatrichocera*) *geigeri* STARÝ & KRZEMIŃSKA 2000: A. zool. crac.: 281, fig. 1-3 (male)

Diagnosis. Antennae: flagellomeres in male are thin, oval, with soft verticils only c. twice exceeding length of pubescence. Thoracic pleura bare. Male: sternite 9 with outer margin deeply indented medially; bridge separated, high, triangular, its both halves slightly swollen at apex; gonostyle almost parallel-sided, with small basal tubercle. Aedegagal complex with short, massive parameres gently curved; lateral apodemes almost round, basal apodemes very short, leaving narrow aedeagal apodeme exposed.

Comparison. Although this species is a member of the subgenus *Staryia*, the males are not easily discerned from the species of the *implicata* group in the subgenus *Saltrichocera*, especially from *T*. (*S*.) *implicata*, having similar outer genitalia; therefore, preparation is necessary to confim the presence of characteristic short, stout parameres and short basal apodemes; occasionally these characters may be seen in untreated specimens. Among the species of *Staryia*, the male of *geigeri* is most similar to *T*. (*St*.) *altipons*, and differs in having gonocoxites not much expanded laterally beyond the sternite 9, and straighter gonostyles.

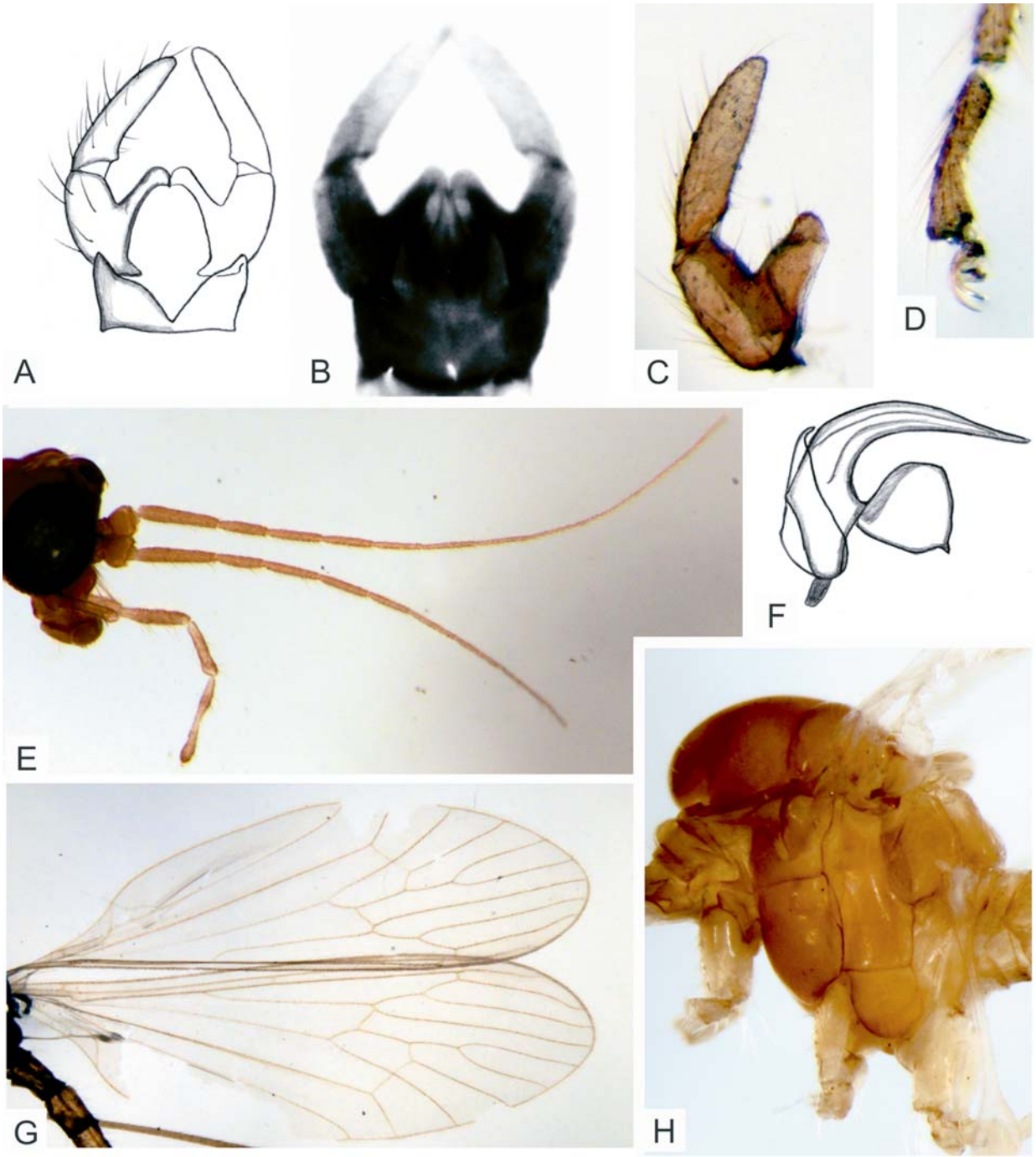
Additional description. No other specimens were found since description of this species. Antennae (Fig. 53.E): f1 slender; verticils are soft and only twice as long as pubescence. Wing (Fig. 53.G): R2+3+4 little longer than R3+4, but length ratio of these veins is various; cell m1 long. Thorax (Fig. 53.H): pleura bare. Hind tarsal claw large and strongly curved, c.1/2.5x of t5 (Fig. 53.D).

Male genitalia (Fig. 53.A-C, F). Sternite 9 with outer margin deeply indented medially. Bridge separated, high, both halves are straight and sightly inflated at apex. Gonostyle almost parallel-sided and straight, with small basal mesal tubercle. Aedeagal complex (Fig. 53.F): parameres relatively short, curved close to lateral apodemes which are large and rounded; basal apodeme short, barely reaching end of vesica.

Female unknown.

Material examined. Holotype (MNHN) and paratype (ISEA), listed in STARÝ & KRZEMIŃSKA (2000).

Distribution and occurrence. The species was described from Switzerland; found also in Czech Republic. Montane species; available records of adults: IX-X.



53. *Trichocera* (*Staryia*) *geigeri* STARÝ & KRZEMIŃSKA, 2000. Male: A, drawing of genitalia; B, genitalia in ventral view; C, gonocoxite and gonostyle; D, hind tarsal claw; E, antennae; F, aedeagal complex (redrawn after STARÝ & KRZEMIŃSKA 2000: fig. 2); G, wings; H, thorax.
Male paratype (ISEA): Switzerland, Canton Neuchâtel, Rochefort, 780 m; Chateau 551,350/201,750, 3-8.XI. 1982 (coll. C. DUFOUR).

Trichocera (*Staryia*) *muelleri* KRZEMIŃSKA, 2020

Fig. 54

Trichocera (*Staryia*) *muelleri* KRZEMIŃSKA, 2020: Acta zool. crac.: 4, fig. 2

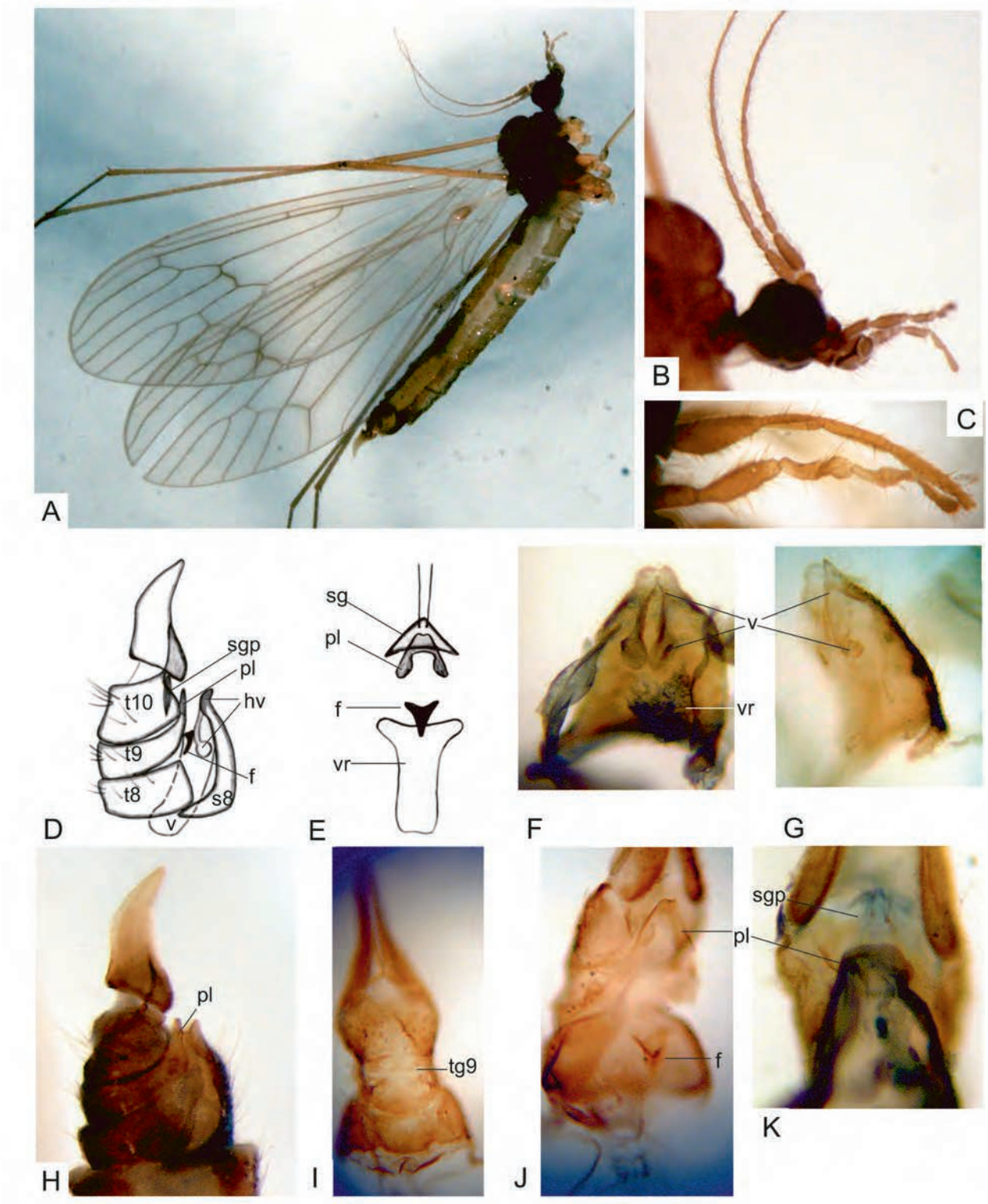
Diagnosis.Wing with spot on r-m. Antennae: basal flagellomeres in female are greatly expanded. Ovipositor massive, shorter than genital segment, curved, ending sharp; hypogynal valves stiff, detracted from ovipositor's base, lateral portions ending with round structures; genital plate reduced; genital fork short; spermathecae absent.

Comparison. The female may at the first sight resemble *T. regelationis* (L.), 1758, by the spots on wing, dilated first flagellomere, and a curved, sharp ending ovipositor, but is easily discerned by the hypogynal valves detracted from the ovipositor's base.

Material examined. Holotype and paratype, females.

Additional description and illustrations are repeated after original paper (KRZEMIŃSKA 2020). Ovipositor may be more narrow at base than that shown in Fig. 54.2H. Hypogynal valves are stiff and prominent; between them and ventral base of ovipositor there is distinct gap visible even without aid of microscope; into this gap apical portion of genital plate is protruding. Lateral portions of valves are very wide, thin and poorly sclerotized, but ending with round structures (Fig. 54.D, F-G), unique to this species. Genital plate is short and reduced to narrow curved plate, slightly incised at apex. Genital fork is delicate and short; in ventral view its apical funnel-like part makes appearance of being divided into two teeth (Fig. 54.J). Supragenital plate is triangular, wide, with two bristles closely set. Ventral receptacle is wide and long, protruding into segment 7, probably provided with musculature (the remnants of which are visible as black thin springs in Fig. 54.F). Spermathecae absent.

Distribution and occurrence. Northern Sweden and Finland; specimens were collected in VIII.



54. *Trichocera* (*Staryia*) *muelleri* KRZEMIŃSKA, 2020, female: A, habitus; B, antennae; C, palp and basal flagellomeres magnified; D, scheme of genitalia in lateral view; E, scheme of inner genitalia; F, G, hypogynal valves from inside of sternite 8 (F) and in lateral view (G); H, untreated genitalia; I, tergites 8-10; J, K, genital plates (after: KRZEMIŃSKA 2020: fig. 2, with permission). Female: holotype, Sweden, Messauregruppen, Abisko 4-11.08.1975 (coll. K. MÜLLER; ISEA).

Trichocera (*Staryia*) *oulankae*, n. sp.

Fig. 55

Zoobank Account:
urn:lsid:zoobank.org:pub:9CC4F52B-9F46-43F5-8596-15019C70018E

Diagnosis. Antennae: f1 expanded; flagellomeres covered with scarce, stiff and short setae. Dorsal outline of genital segment devoid of ridges. Ovipositor c. as long as genital segment, narrow, with constricted base, its position from straight (in prolongation of body long axis) to declined from it up to angle 30°, setulose area indistinct, almost flat. Apex of supragenital plate broad, rounded, with 8-10 bristles; genital plate large but very poorly sclerotized, foramen large; genital fork funnel-like; ventral receptacle very long, its distal portion (contacting with fork) bowl-like, with muscular fibres or microvili; remainder without fibres, strongly narrowing toward and entering into segment 7. Spermathecae absent. Male unknown.

Etymology. The new species is named to honour the Staff of the Oulanka Research Station who collected the holotype of this species during their everyday routine work.

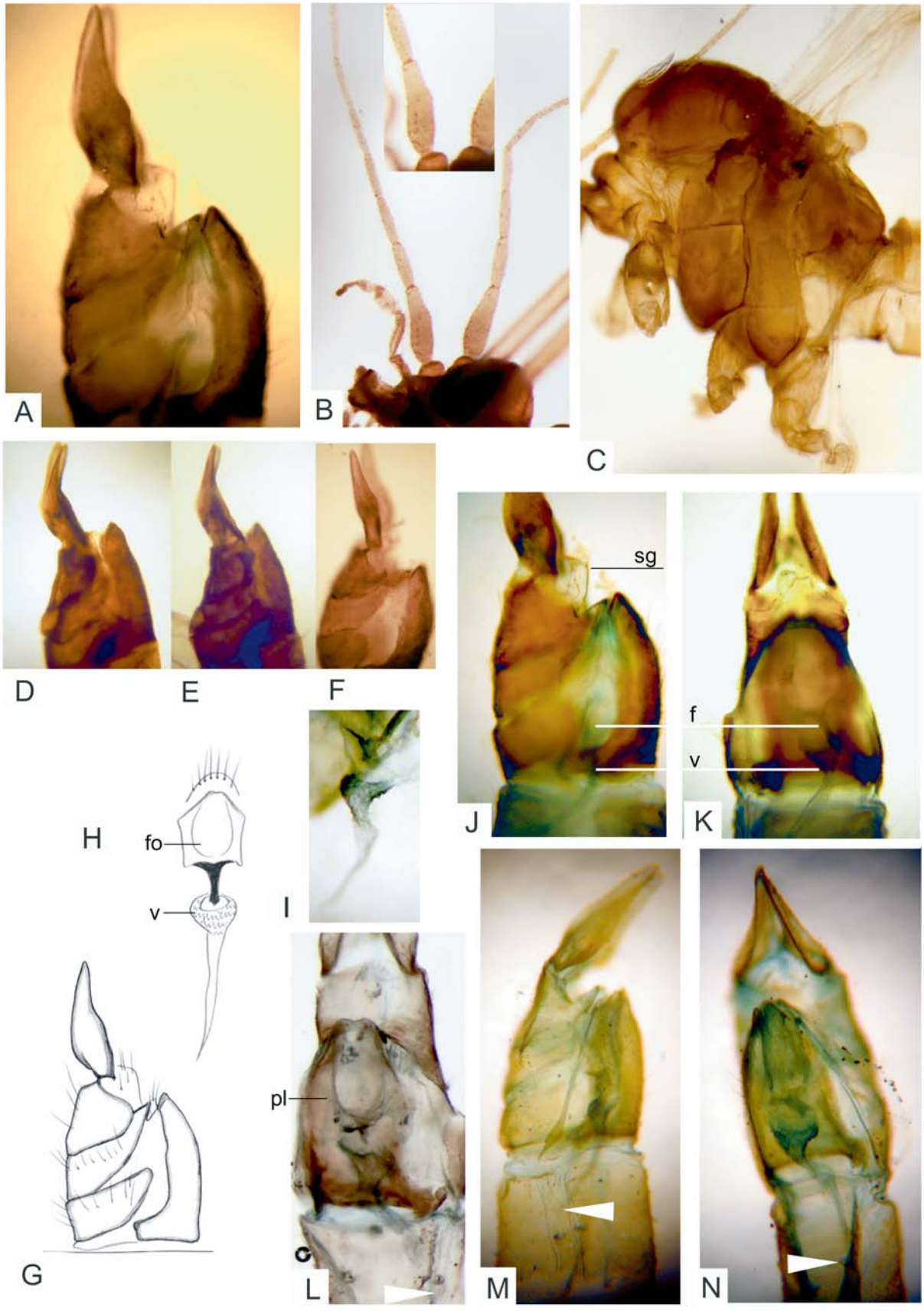
Comparison. By the antennae, shape of genital segment and ovipositor the species resembles *T*. (*St*.) *viramoi*; differences concern inner genitalia: broadly rounded supragenital plate with numerous bristles, large genital plate, and a very long ventral receptacle, endowed with musculature only in distalmost portion (in *viramoi* the plate is triangular with two bristles, and the ventral receptacle is hourglass shaped, shorter and entirely armoured with musculature). Without preparation the two species may be discerned by bristles of supragenital plate whose apex is usually visible. The ovipositor of *oulankae* is also similar to that in *T*. (*St*.) *rannanenae* in which, however, the dark setulose area is well delimited, and the dorsal outline of genital segment has prominent, rectangular ridge with a large fenestra.

Description. Antennae with first flagellomere expanded, scarcely covered with short, erect setae (Fig. 55.B). Thoracic pleura bare (thorax: Fig. 55.C). Wing membrane delicate, easily tearable; venation without characteristic features; R2+3+4 subequal R2+3; d cell narrow, trapezoidal.

Female genitalia (Fig. 55.A, D-N). Genital segment: lateral outline of tergites 8-10 smooth, tergite 10 slightly concave in genuine specimens (i.e., prior to preparation; Fig. 55.D, E); basalmost portion of tergite 8 is desclerotized to form flexible section between tergites 7 and remainder of tergite 8. Desclerotized area between tergites 8-10 and sternite 8 appears only after preparation (Fig. 55.A, J, F) and is not visible before preparation (Fig. 55.D, E). Ovipositor narrow, c. as long as genital segment, changeable in shape; compare shape of same ovipositor before (Fig. 55.D, E) and after preparation (Fig. 55.A, F). Two of five specimens allotted to this species have ovipositors declined to ventral side at angle c. 30° (Fig. 55.M) while holotype and two other females have it straight (in prolongation of body long axis). Supragenital plate broadly rounded, with 8-10 bristles which in central part of plate may be arranged in a row; therefore apex may be seemingly rectangular. Genital plate fully developed but poorly sclerotized, visible only after dyeing with toluidyne blue or chlorazol black (Fig. 55.H, L); foramen large, oval. Fork of funnel-like shape, broad, bowl-like at connection with plate and relatively long, entering into ventral receptacle which is at this point bowl-like and endowed with musculature or microvili; reminder abruptly narrowing into thin, smooth and very long ribbon-like shape, reaching to half length of segment 7 (Fig. 55.M, N; arrows mark end of ventral receptacle).

Material examined. Holotype female, Finland: Ks Kuusamo, Oulanka Research Station, 16.V. 2011, light trap Ranta (leg. P. RANNANEN & M. RONTTI). Paratypes, two females from Finland: Ks Kuusamo, 3.VI. 1982; 25.V. 1983 (both coll. J. VIRAMO; ISEA). Paratypes, two females from Sweden: Abisko 11-18.VIII. 1971; 18.VII-4.VIII. 1975 (both coll. Ch. DAH). All specimens are stored in wet collection.

Distribution and occurrence. Finland, Sweden, subpolar latitudes; all adults were collected from late spring to late summer.



55. *Trichocera* (*Staryia*) *oulankae*, n. sp., female. A, genitalia; B, antenna (insertion: f1 magnified); C, thorax; D-F, same specimen as in A; genitalia prior to preparation (D-E), after 2hrs of soak in NaOH (F); G, H, drawings of outer and inner genitalia, respectively; I, isolated ventral receptacle; J-K, inner genitalia dyed in situ; L, further stages of preparation, genital plate is visible; M, N, length of ventral receptacle marked with arrows. All preparations of genitalia except D-F are dyed with chlorazol black. Females: Finland, Ks Kuusamo: A-F, J-K, paratype, 25.V. 1983; I, M, N, paratype 3.VI. 1982; L, holotype.

Trichocera (*Staryia*) *polanensis* STARÝ, 2001

Fig. 56

Trichocera (*Staryia*) *polanensis* in: KRZEMIŃSKA & GORZKA 2016

Trichocera (*Trichocera*) *polanensis* in: STARÝ, 2009: fig. 5-7 (female)

Trichocera (*Trichocera*) *polanensis* STARÝ, 2001: Stud. dipt. 8: 412, fig. 1-2 (male)

Diagnosis. Antenna: flagellomeres slender, but oval (not cylindrical), wider in female; verticils long, c. 4x pubescence. Thorax: setae on anepimeron and metanepisternum. Male: sternite 9 short (axially) and deeply incised; gonocoxites expanded laterad far beyond sternite 9; bridge broad, distinctly separated medially, bilobate; gonostyle straight, without tubercles. Aedeagal complex: paramere straight, very close to and extended far beyond lateral apodeme which is large and round; basal apodemes absent. Female: smooth dorsal outline of genital segment; sternite 8 convex; ovipositor curved, with apex characteristically cut across; three spermathecae poorly sclerotized, their surfaces and initial sections of ducts are wrinkled.

Comparison. Neither the male, nor female remind any other species.

Additional description. Body colour very dark brown in all specimens (Fig. 56.G). Antenna (Fig. 56.C, J) long, flagellomeres not very long (f1 c. 3x pedicel), slender, but oval; verticils c. 4x as long as pubescence, not erect (adpressed to abdomen at angle c. 45°). Thorax: setae on anepimeron and metanepisternum (Fig. 56.G, arrows). Wing of male on Fig. 56.F. Male hind tarsal claw small and delicate, c. 1/4 of t5 (Fig. 56.E).

Male genitalia (Fig. 56.A-B, D). Sternite 9 narrow and deeply incised; gonocoxites expanded laterad so that genitalia across gonocoxites are twice wider than sternite 9; bridge is broad, with central gap, bilobate. Gonostyle straight, without tubercles. Aedeagal complex (Fig. 56.D): as in diagnosis.

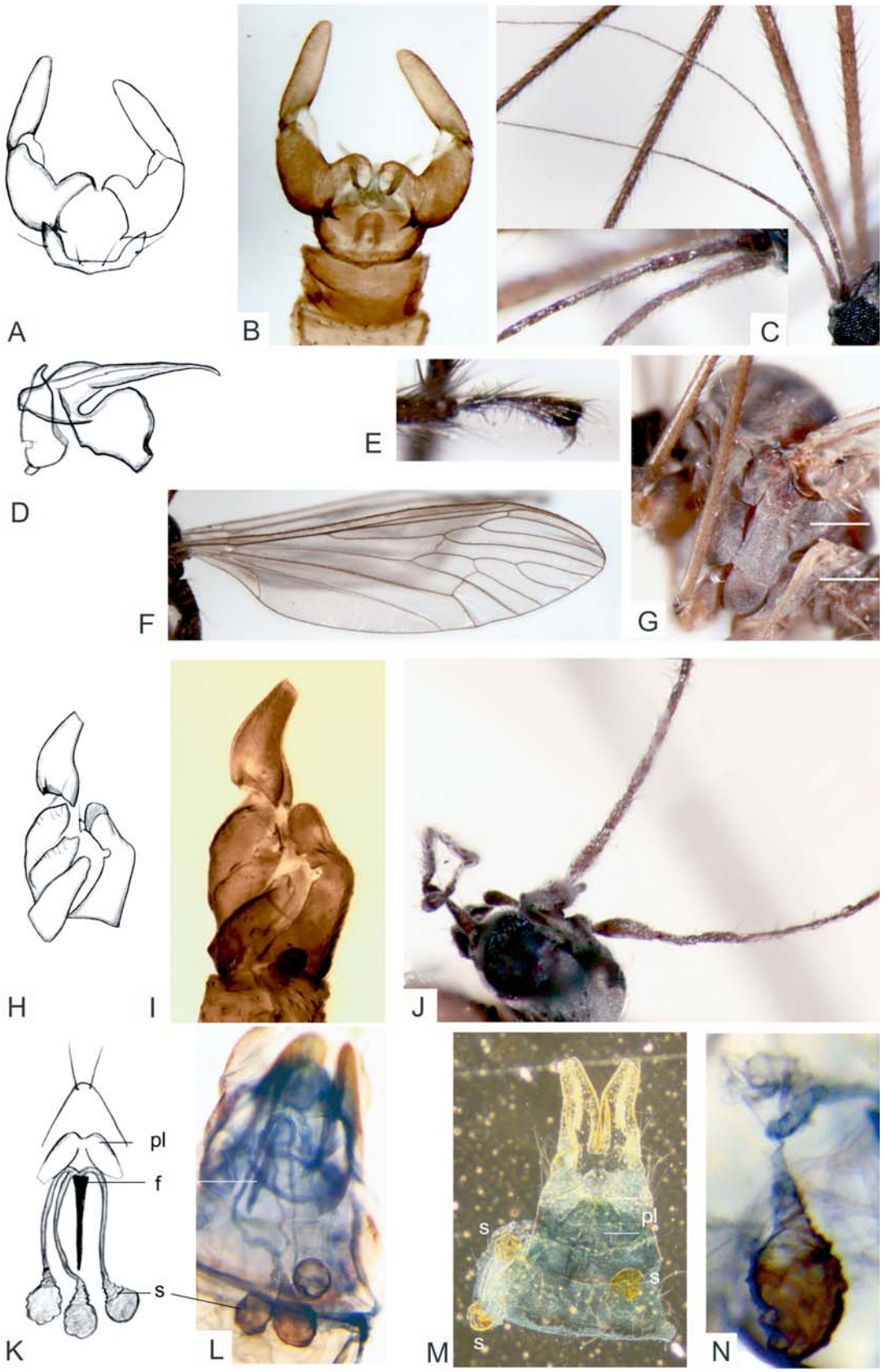
Female genitalia (Fig. 56.H-I, K-N). Dorsal outline of genital segment is smooth, without ridges; tergites 8 and 9 positioned obliguely (not perpendicular to body long axis); border between tergite 9 and 10 is obscured in central part; sternite 8 greatly convex in middle. Ovipositor c. half as long as genital segment, curved, with apex characteristically cut across. Genital plate when lit through under microscope (Fig. 56.M) appears larger than that pictured in KRZEMIŃSKA & GORZKA (2016: fig. 2C); three spermathecae poorly sclerotized, their surfaces and initial sections of ducts are wrinkled (Fig. 56.N); ducts become wider distally, i.e., near their outlet within genital plate. Paired accesory glands are present, as illustrated in KRZEMIŃSKA & GORZKA (fig. 2C, D), not pictured here.

Material examined. Czech Republic, Moravia: Jeseníky Mts, Kouty nad Desnou, Divoká Desná valley, "Zámčisko" (970 m), 9.X. 2007 – 1f; 10. X. 2007 – 2f, 1m; 16.X. 2007 - 2m (leg. et det. J. STARÝ; ISEA).

Distribution. The species is described from Slovakia; also recorded by STARÝ (2009) from the Czech Republic.

Remarks. The apex of ovipositor in shape of a sharp, even edge suggests its use for cutting the surface of some substrate (leaf? root?) to insert eggs, as was suggested by KRZEMIŃSKA & GORZKA (2016). This is the only species with such an ovipositor in the family.

Phylogenetically, *T*. (*St*.) *polanensis* is the basalmost species among the subgenus due to plesiomorphy of three spermathecae and no ventral receptacle; its classification to *Staryia* is based on a reduced genital plate in the female, and on the apomorphic shape of aedeagal complex in the male (see Supplementary Material in KRZEMIŃSKA & GORZKA, op. cit.).



56. *Trichocera* (*Staryia*) *polanensis* STARÝ, 2001. A-G, male: A, B, drawing and photo of genitalia, resp.; C, antenna (insertion: first flagellomeres magnified); D, drawing of aedeagal complex (redrawn after STARÝ 2001: fig. 2); E, hind tarsal claw; F, wing; G, thorax (setae on pleura are indicated). H-N, female: H, I, drawing and photo of outer genitalia; J, basal antenna; K, L, scheme and photo of inner genitalia (dyed with chlorazol black); M, genital segment from under microscope, dorso-ventral view (pl, size of genital plate); N, spermatheca and basal section of duct (I from: KRZEMIŃSKA & GORZKA 2016: fig. 2a, with permission).
Male and female: Czech Republic, Moravia: Jeseníky Mts, Kouty nad Desnou, Divoká Desná valley, "Zámčisko" (970 m), 9.X. 2007 (female),10. X. 2007 (male) (leg. et det. J. STARÝ; ISEA).

Trichocera (*Staryia*) *rannanenae* KRZEMIŃSKA & GORZKA, 2016

Fig. 57

Trichocera (*Staryia*) *rannanenae* KRZEMIŃSKA & GORZKA, 2016: Zool. Anz. 263: 11

Diagnosis. Antennae: flagellomeres slender, oval, verticils soft, adpressed. Female: genital segment with large pentagonal hyaline area between tergites 8-9 and sternite 8; tergite 8 with basal fold; large, rectangular fold with central fenestra between tergite 9 and 10; ovipositor straight, setulose area well delimited, dark, rather flat. Apex of supragenital plate triangular, with two bristles; genital plate reduced to narrow sclerite with straight distal margin; fork massive, subtrabgular, short; ventral receptacle large, with musculature, parallel-sided in ventral view. Spermathecae absent.

Comparison. The female is characteristic by large fold of tergite 9 and straight ovipositor; similar, but narrower ovipositor is present in *T*. (*St*.) *viramoi* and in *T*. (*St*.) *oulankae*, n. sp.; for further comparison see the section on the last mentioned species.

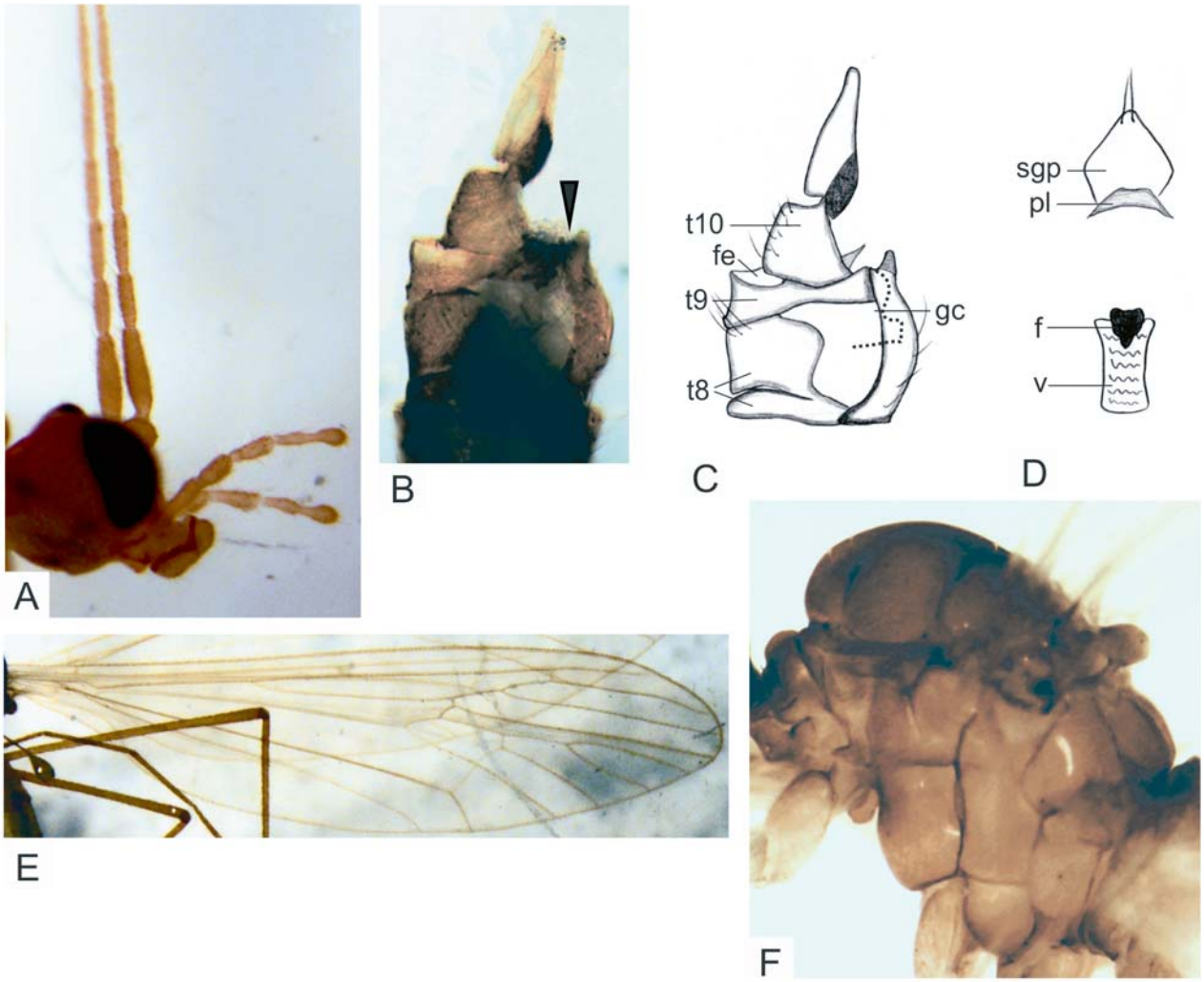
Additional description. Antennae (Fig. 57.A): flagellomeres slender, oval, not much elongated; verticils soft, adpressed; f1 c. 1.5x longer than f2; palpi short, not longer than head. Wing (Fig. 57.E) narrow; R2+3+4 and R2+3 equal and almost straight; d cell roughly triangular; M1 and M2 long, meeting at acute angle. Thorax pictured in Fig. 57.F.

Female genitalia (Fig. 57.B-D). Tergite 8 is split across thus forming basal fold (Fig. 57.C); narrow fenestrae are present along splitting. Tergite 9 extends far beyond tergite 10, forming characteristical, large, rectangular fold desclerotized into large, central fenestra (Fig. 57.B, C). Between sternite 8 and tergites large hyaline area is present, of shape and size varying between specimens. Sternite 8 with hypogynal valves somewhat recurved. Ovipositor straight, in prolongation of long body axis or almost so, c. 2/3 as long as genital segment, setulose area only moderately convex, dark, well delimited. Supragenital plate pentagonal, usually only triangular apical portion is visible, two bristles closely set and convergent. Genital chamber visible in lateral view in macerated and dyed genitalia, with ventral wall more sclerotized than dorsal, expanded ventrad into a subrectangular shape (scheme, Fig. 57.C). Genital plate reduced into small sclerite, distal margin almost straight; genital fork massive, triangular in lateral view, and of rather irregular shape in ventral view; ventral receptacle large, reaching margin of genital segment, parallel-sided in ventral view, with musculature. Opening of genital chamber in both specimens was closed by mucous substance (Fig. 57.B, arrow; this feature is discussed in KRZEMIŃSKA & GORZKA 2016).

Male unknown.

Material examined. Females, holotype and paratype, as listed in KRZEMIŃSKA & GORZKA (2016).

Distribution. Finland.



57. *Trichocera* (*Staryia*) *rannanenae* KRZEMIŃSKA & GORZKA, 2016. Female (holotype and paratype): A, antenna; B, genitalia (arrow: mucus at entrance to genital chamber); C, explanatory drawing to B (fe, fenestra; gc, ventral wall of genital chamber); D, scheme of inner genitalia; E, wing; F, thorax.

Trichocera (*Staryia*) *rectistylus* STARÝ, 1998

Fig. 58

Trichocera (*Staryia*) *rectistylus* in: KRZEMIŃSKA & GORZKA 2016

Trichocera (*Trichocera*) *rectistylus* STARÝ, 2009: fig. 8-9 (female)

Trichocera (*Trichocera*) *rectistylus* STARÝ, 1998: Stud. dipterol. 5: 176, figs 1-3, 10 (male)

Diagnosis. Antenna: flagellomeres with erect, long verticils; thorax: few delicate setae on anepimeron and metanepisternum. Male: sternite 9 narrow, lateral outline calyx-like, medially deeply excised; bridge rounded; gonostyle not longer than gonocoxite, straight, slightly swelled in mesal medial section. Aedeagal complex: paramere short, very close to lateral apodeme which is large and triangular; basal apodeme long for subgenus. Female (after STARÝ (2009)): dorsal lateral outline of genital segment with two folds on tergite 9 and one on tergite 10; large hyaline patch between tergites 8-9 and sternite 8. Ovipositor very characteristic, bent at 90^{o} to long axis of abdomen, less than half (0.4x) as long as dorsal margin of genital segment, with obtuse apex; setulose area convex. Supragenital plate rounded, with c. 10 bristles distributed over surface of plate.

Comparison. Male can be superficially mistaken with those species of the subgenus *Saltrichocera* of *implicata* group which have a rounded bridge (as: *T.* (*S.*) *sparsa*, *T.* (*S.*) *antennata, T.* (*S.*) *thaleri*), but *T.* (*St.*) *rectistylus* is discerned by much shorter gonostyles, slightly expanded medially, and a narrow sternite 9 (= short lateral outline). Female is unique by its ovipositor.

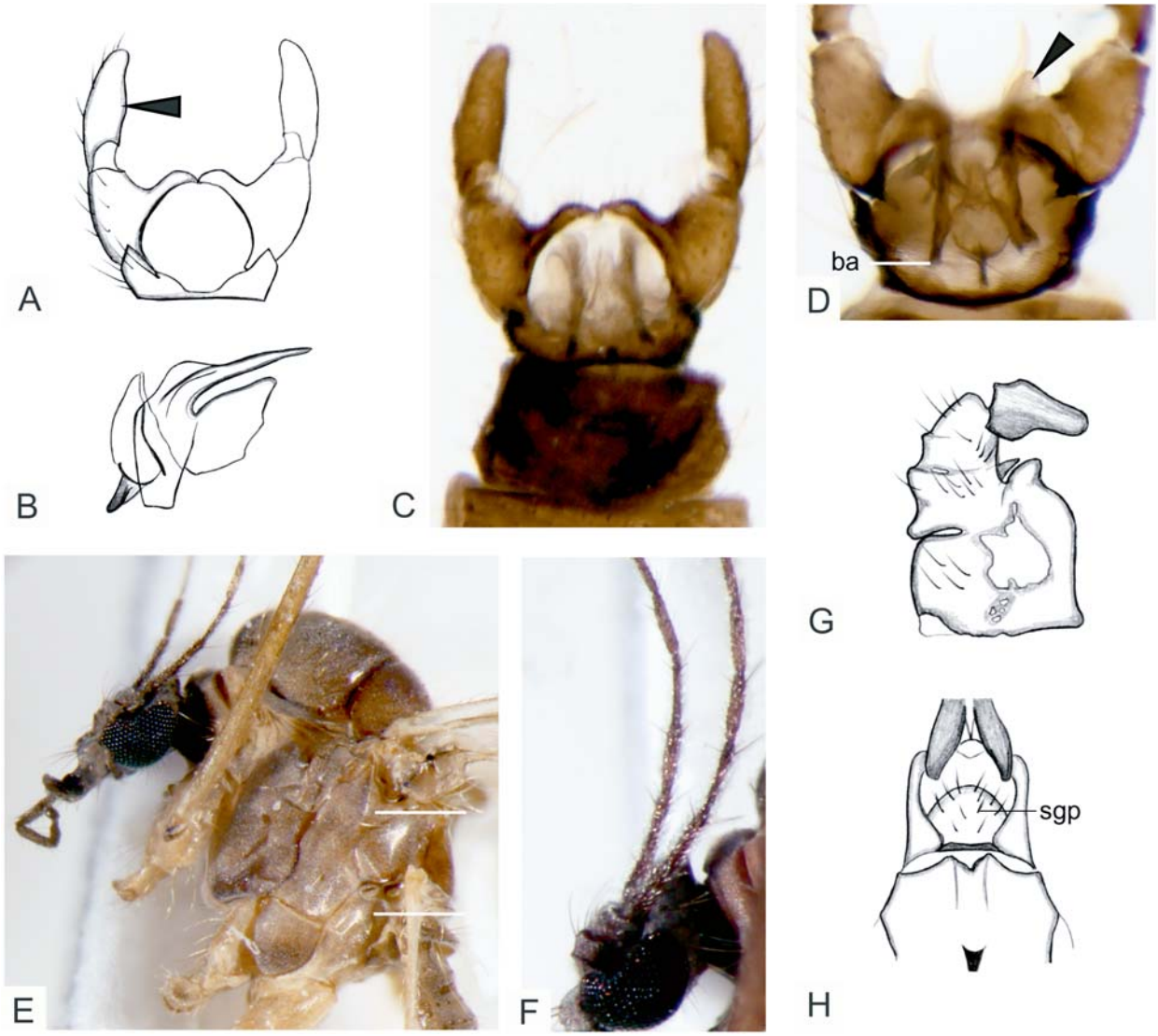
Additional description. Antenna long; flagellomeres slender in male (Fig. 58.F) with erect, long verticils (4x pubescence). Thorax (Fig. 58.E) with few delicate setae on anepimeron and metanepisternum. Hind tarsal claw in male long, c.1/2 of t5.

Male genitalia (Fig. 58.A-D). Sternite 9 narrow, lateral outline calyx-like, medially deeply excised, distal margin somewhat irregular. Gonocoxite broad basally, tapering to apex; bridge rounded. Gonostyle c. as long as gonocoxite, straight, slightly swelled in mesal medial section (Fig. 58.A, arrow); apex somewhat pointed. Aedeagal complex (Fig. B): paramere short and massive, expanded in basal section (Fig. 58.B and D, arrows), very close to lateral apodeme which is large and triangular; basal apodeme long for subgenus, extending bedind vesica (Fig. 58.D, arrow).

Female (Fig. 58.G, H, after STARÝ (2009, description and fig. 8-9)): as in the diagnosis. Inner structures are unknown to me, as the female was not available (and only one specimen is described).

Material examined. Paratype Czech Republic, Moravia: Jeseniky Mts., Skřitek, 19.X. 1995 – 1m; Slovakia, Pol'ana Mts. "Hronček ponds", alt. 650m, at light, 10.X. 2000 – 1m [7383] (both leg. et det. J. STARÝ; ISEA).

Distribution and occurrence. The species is known from montane regions of the Czech Republic and Slovakia (alt. 650-1400 m). Adults were collected from mid IX to mid X, some at light.



58. *Trichocera* (*Staryia*) *rectistylus* STARÝ, 1998. A-F, male: A, C, drawing and photo of genitalia; B, aedeagal complex; D, genitalia inclined apically, showing protuberance of parameres (black arrow) and length of basal apodemes (end marked by white arrow); E, thorax; F, basal antenna. G, H, female: drawings of outer genitalia (G) and supragenital plate and fork (H) (redwawn after STARÝ 2009: fig. 8-9).
Male: Slovakia, Pol'ana Mts. "Hronček ponds", alt. 650m, at light, 10.X. 2000 (leg. J. STARÝ). B, G, H, redrawn after STARÝ 1998: fig. 3(B), and 2009: fig. 8-9 (G, H).

Trichocera (*Staryia*) *transversa* STARÝ, 1998

Fig. 59

Trichocera (*Staryia*) *transversa* in: KRZEMIŃSKA & GORZKA 2016

Trichocera (*Trichocera*) *transversa* STARÝ, 1998: Stud. dipterol. 5: 178, fig. 8-9 (male)

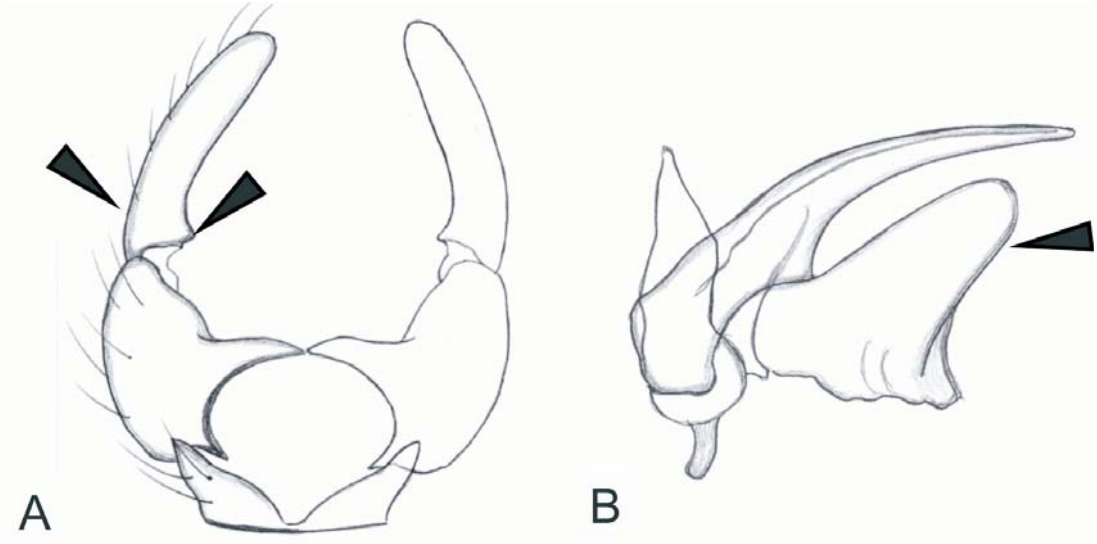
Diagnosis (based on STARÝ 1998). Antenna: basal flagellomeres relatively short; verticils short and delicate, c. 2x as long as pubescence. Few delicate setae on anepimeron and metanepisternum. Male: sternite 9 short (axially), deeply incised medially; gonocoxite inflated; bridge narrow, transverse, halves tapering towards apices; gonostyle curved at base, remainder almost straight, with distinct basal tubercle. Aedeagal complex with very large, triangular lateral apodeme; basal apodeme very short, not reaching base of vesica. Female unknown.

Comparison. Combination of a transverse, narrow bridge and gonostyles with tubercles allows to discern this male from other species.

Additional description. No material was available to me; the species is known only from the holotype. Fig. 59.A, B (male genitalia) are redrawn after original drawings of STARÝ (1998: fig. 8-9).

Female unknown.

Distribution. The species was described from Poland, Bieszczady Mts.



59. *Trichocera* (*Staryia*) *transversa* STARÝ, 1998. Male: A, B, drawings of outer genitalia and aedeagal complex, respectively (redrawn after STARÝ, 1998: fig. 8-9).

Trichocera (***Staryia***) ***villosa*** STARÝ, 2009

Fig. 60.1 (male), 60.2 (female)

Trichocera (*Staryia*) *villosa* in: KRZEMIŃSKA & GORZKA 2016

Trichocera (*Trichocera*) *villosa* STARÝ, 2009: Zoosymposia 3: 268, fig. 10-11 (male), 12-13 (female)

Diagnosis. Antennae: basal flagellomeres oval; verticils 4x as long as pubescence; thorax with setae on anepimeron and metanepisternum. Male: sternite 9 narrow, deeply incised medially; bridge large, triangular; gonostyle straight, tapering to apex, with small basal mesal tubercle. Female: roughly rectangular desclerotized space between sternite 8 and tergite 8 is present; tergite 8 with deep, basal, transverse fold; acute fold between tergites 9 and 10 (ventral view); ovipositor heavily pigmented, curved, bent at angle c. 45° to abdomen, setulose area convex, tip rounded. Genital plate reduced; apex of supragenital plate rectangular, with two bristles. Spermathecae absent; ventral receptacle in shape of elongated funnel, narrow portion with musculature.

Comparison. The male may superficially resemble *T.*(*S.*) *pubescens* in the shape of gonostyles and a triangular bridge, which in *T.*(*St.*) *villosa* is much larger, and the sternite 9 is proportionally shorter and wider (axially). Both species have setae on thoracic pleura. *T. villosa* is recognized by short, straight and broad parameres which are visible even in non macerated genitalia. Female is distinctive by the shape of genital segment, of ovipositor and of the ventral receptacle.

Additional description. Antennae: basal flagellomeres oval in male and female, longer in male paratype than in female, verticils 4x as long as pubescence (Fig. 60.1.B and 60.2.A). Thorax with setae on anepimeron and metanepisternum (Fig. 60.1.C). Hind tarsal claw in male delicate, c. 1/4 of t5 (Fig. 60.1.H). Wing (Fig. 60.1.G): d cell characteristic by acute outer angle.

Male genitalia (Fig. 60.1.A, D-F). Sternite 9 narrow (=short axially), deeply incised medially; gonocoxal bridge large, triangular; gonostyle straight, tapering to apex; tubercle small. Aaedeagal complex with longer basal apodemes (Fig. 1F, arrow) than those pictured by STARÝ (2009: fig. 11).

Female genitalia (Fig. 60.2.B-G). In lateral view a roughly rectangular desclerotized hyaline space is present between sternite 8 and tergite 8; tergite 8 with deep basal fold separated partially by two long, desclerotized „fenestrae"; acute fold present between tergites 9 and 10. Ovipositor heavily pigmented, curved, bent at angle c. 45° to abdomen, tip rounded; setulose area convex, poorly delimited. Genital plate reduced to small sclerite much wider than long, attached at both sides to tergite 10 (Fig. 60.2.F); supragenital plate with rectangular apex and two bristles; genital fork short, massive, angular; ventral receptacle in shape of long and narrow funnel, reaching proximal margin of sternite 8. Narrow portion of receptacle endowed with musculature visible as dark striping (after dying with chorazol black); receptacle widens abruptly toward genital fork (Fig. 60.2.F-H).

Material examined. Paratypes: Czech Republic, Moravia, Jeseníky Mts, male: Kouty nad Desnou, Divoká Desná valley, "Zámčisko" (970 m), 8.X. 2009; female: K. Studánka, 9.XI. 1998 (900 m), [5969] (both leg. et det. J. STARÝ; ISEA).

Distribution. The species is known from the Czech Republic, montane regions.

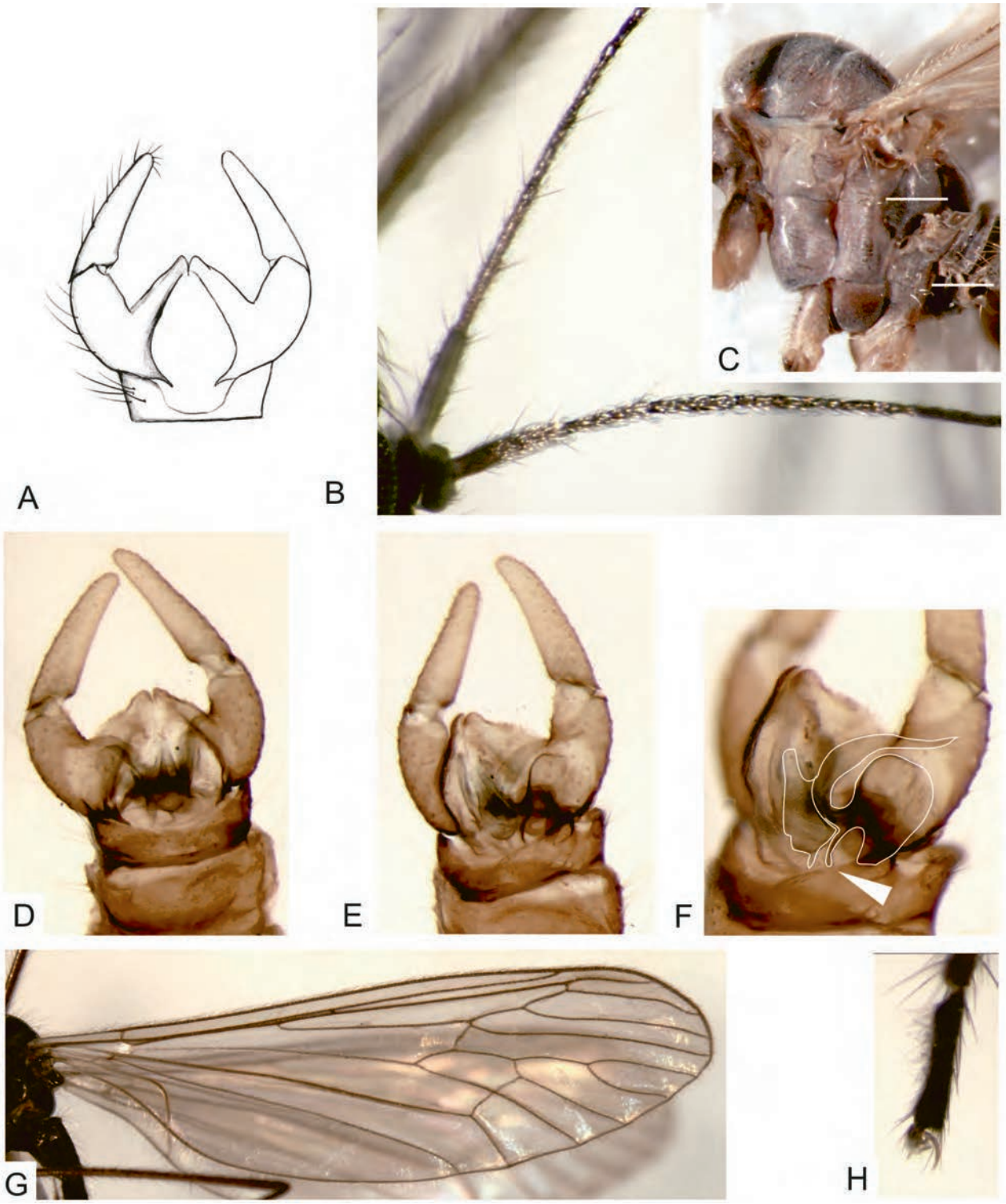


Fig. 60.1. *Trichocera* (*Staryia*) *villosa* STARÝ, 2009. Paratype male: A, drawing of genitalia; B, antennae; C, thorax; D, E, genitalia in ventral and ventrolateral view, resp.; F, outline of aedeagal complex seen through the genitalia (arrow: basal apodeme); G, wing; H, hind tarsal claw.

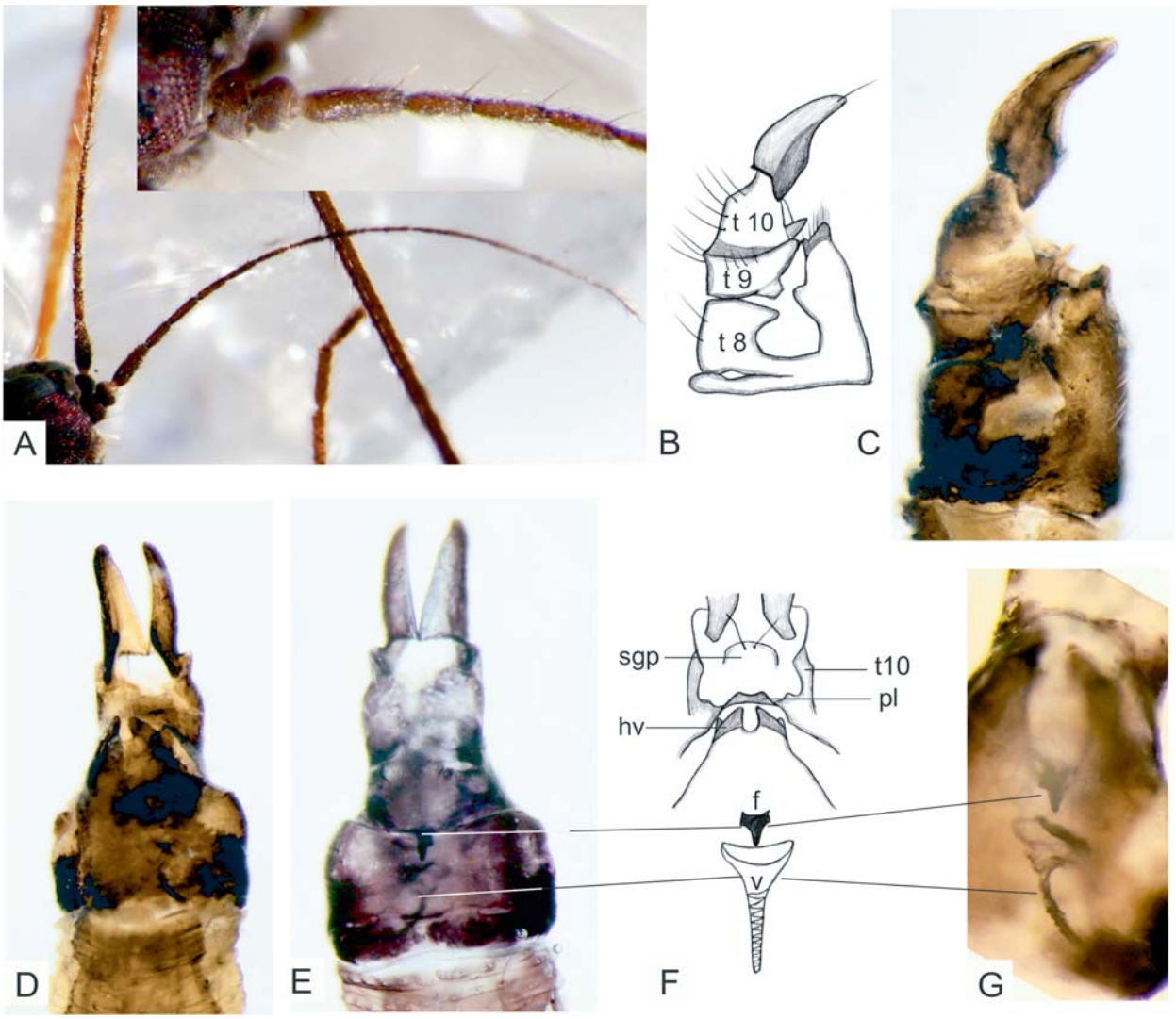


Fig. 60.2. *Trichocera* (*Staryia*) *villosa* STARÝ, 2009. Paratype female: A, wing; B, antennae (magnified in insertion); C, D, drawing and photo of outer genitalia; E, F, genitalia in ventral and dorsal views, repectively; G, H, scheme and photo of inner genitalia (f, genital fork; hv, hypogynal vavlae; pl, genital plate; sgp, supragenital plate; t 8-10, tergites 8-10; v, ventral receptacle). Paratypes: Czech Republic: Moravia, Jeseníky Mts, male: Kouty nad Desnou, Divoká Desná valley, "Zámčisko" (970 m), 8.X. 2009; female: K. Studánka, 9.XI. 1998 (900 m), #5969 (leg. et det. J. STARÝ).

Trichocera (*Staryia*) *viramoi* KRZEMIŃSKA & GORZKA, 2016

Fig. 61

Trichocera (*Staryia*) *viramoi* KRZEMIŃSKA & GORZKA, 2016: Zool. Anz. 263: 11, fig. 4 (female)

Diagnosis. Dorsal outline of genital segment devoid of ridges; tergite 8 basally desclerotized; large, elongated hyaline area between tergites 8-9 and sternite 8. Ovipositor slightly shorter than genital segment, almost straight, in prolongation of body long axis or declined up to 20°, setulose area indistinct, almost flat. Apex of supragenital plate triangular, with two bristles closely set; genital plate reduced to small triangle, distal margin mildly excised; genital fork short, funnel-like; ventral receptacle in shape of hourglass, with muscular walls. Spermathecae absent. Male unknown.

Comparison. By the ovipositor and shape of genital segment the species resembles mostly *T*. (*St*.) *oulankae*, n.sp., which superficially differs in supragenital plate rounded, with 8-10 bristles, usually visible in genuine specimen (=prior to maceration); other differences concern inner genitalia. The ovipositor of *T*. *viramoi* is also similar to that in *T*. (*St*.) *rannanenae* in which, however, the dark setulose area is well delimited, and the dorsal outline of genital segment has prominent, rectangular ridge with a large fenestra.

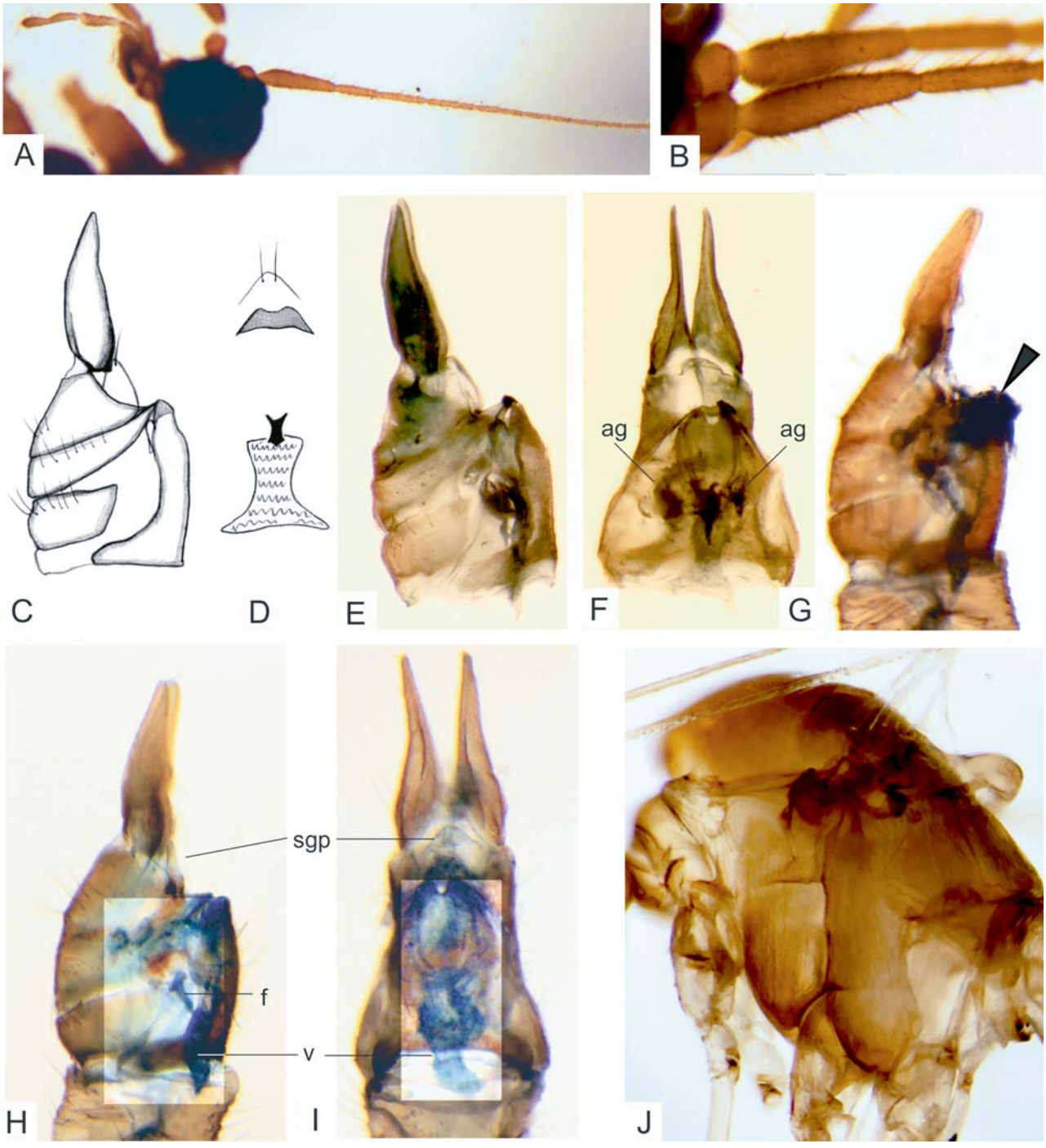
Additional description. The holotype is illustrated in KRZEMIŃSKA & GORZKA (2016: fig. 4); here additional specimens are shown. Antennae with basal flagellomeres elongated, covered with numerous short, erect setae over entire length of segments; first flagellomere (Fig. 61.A, B) somewhat expanded basally. Thorax: (Fig. 61.J): pleura bare.

Female genitalia (Fig. 61.C-I). Genital segment: lateral outline of tergites 8-10 smooth, mildly convex. Basalmost portion of tergite 8 is desclerotized, forming a flexible section between tergites 7 and 8. Ovipositor shorter than genital segment, in straight position or slightly inclined to ventral side (compare same specimen, Fig. 61.G, H), roughly pentagonal, with small triangular tooth on ventral margin more or less visible (compare Fig. 61.E, G, H). Entrance to genital chamber is covered with mucus visible in unprepared specimens or after short preparation; mucus strongly absorbs chlorazol black (Fig. 61.G, arrow). Genital plate reduced to narrow, triangular sclerite mildly excised posteriorly. Supragenital plate triangular, with two bristles (Fig. 61.D, I). Genital fork is short, funnel-like, proximally divided into three small triangular lobes. Two accessory secretory glands, very delicate and of irregular shape, are visible after dyeing (Fig. 61.F). Ventral receptacle broad, large, with musculature or microvili, in ventral view narrowed medially in shape of an hourglass (Fig. 61.D, F); in lateral view sac-like, parallel-sided (Fig. 61.E, G). Male unknown.

Material examined. Holotype and paratypes from Finland. Other specimens: Finland: Oulanka Research Station, 6.IX. 2011, trap RANTA– 1f (coll. P. RANNANEN, M. RONTTI); Sweden: Messauregruppen, Abisko, 4-11.VIII. 1975, LF 9 [light trap] – 1f (coll. C. DAHL).

Distribution and occurrence. Finland, Sweden. All specimens were collected in warm season, V-IX.

Remarks. The shape of ovipositors shown here and in KRZEMIŃSKA & GORZKA (2016: fig. 4) differ in width and shape; based on similar appearance of inner genitalia, this is recognized as due to intraspecific variation.



61. *Trichocera* (*Staryia*) *viramoi* KRZEMIŃSKA & GORZKA, 2016. Female: A, antenna; B, f1-f2 magnified; C, D, drawings of outer and inner genitalia, respectively; E, F, genitalia after prolonged preparation, accessory glands (ag) visible; G-I, other specimen, note black-dyed mucus at entrance to genital chamber (G, arrow) and changeable position of ovipositor after short and prolonged soak in NaOH (G and H, respectively). All preparations of genitalia were dyed with chlorazol black.
Females: A-B, E-F, Sweden: Messauregruppen, Abisko, 4-11.VIII. 1975 (LF 9); G-I, Finland: Oulanka Research Station, 6.XI. 2011, trap RANTA (coll. P. RANNANEN, M. RONTTI).

VI. DISCUSSION

The genus *Trichocera*: state of knowledge

An updated list comprises 121 world species of *Trichocera* (Table 1, below). The map (Fig. 62) shows a number of species restricted to particular continents as well as species recorded in Eurasia (the Palearctic), the Holarctic, and those occurring in North America and Asia but absent from Europe. It is obvious that this picture reflects the state of knowledge of trichocerids in particular continents, and not the actual richness of trichocerids. Europe, this small subcontinent poor in regions untouched by human activity, houses local 45 species and seems to be the most speciose part of the Holarctic. The same number of species is recorded from the entirety of Asia, while from North America (Nearctic Region) only 15 autochthonous species are listed.

Since Trichoceridae are cool-adapted and the distributions of many species reach polar latitudes, it is expected that migration between continents through northern regions will result in a high proportion of Holarctic species. And yet, they are only six currently known: *T.* (*T.*) *hiemalis*, *T.* (*M.*) *mackenzie, T.* (*S.*) *borealis*, *T.* (*S.*) *annulata*, *T.* (*S.*) *maculipennis*, and *T.* (*S.*) *regelationis*. Noteworthy is that the three species mentioned last are closely related (the *regelationis* group of species), and are also the only members of the genus which populate the Southern hemisphere. Apparently, the group is characterized by a high potential for dispersion, even if the migration was mediated by human activity.

Another interesting point is the comparison between the Asiatic and European composition of trichocerids. The subgenus *Saltichocera* is most abundantly represented (33 species out of 56) in Europe, in Asia the proportion of this group is lower, and that of *Metatrichocera* higher (15/57). The discoveries of NAKAMURA & SAIGUSA (1996, 1997, 2012) however allow for the anticipation of further spectacular Asiatic species. In addition, the latest paper proves that *Staryia*, the subgenus with evolutionary advanced reproductory system, is not restricted to the Western Palearctic.

At the present, there are only six species living to the east and west of the Palaearctic (*T.* (*T.*) *inexplorata*, *T.* (*T.*) *sibirica*, *T.* (*T.*) *major*, *T.* (*M.*) *gigantea*, *T.* (*S.*) *saltator,* and *T.* (*S.*) *sparsa*)). The last mentioned species, common in Central and Northern Europe, has been only recently found in Korea (PETRAŠIŪNAS & PODENAS 2017). Hopefully, similar finds will soon follow to give us better comprehension of actual distributions.

I also hope that the present key will help in these investigations.

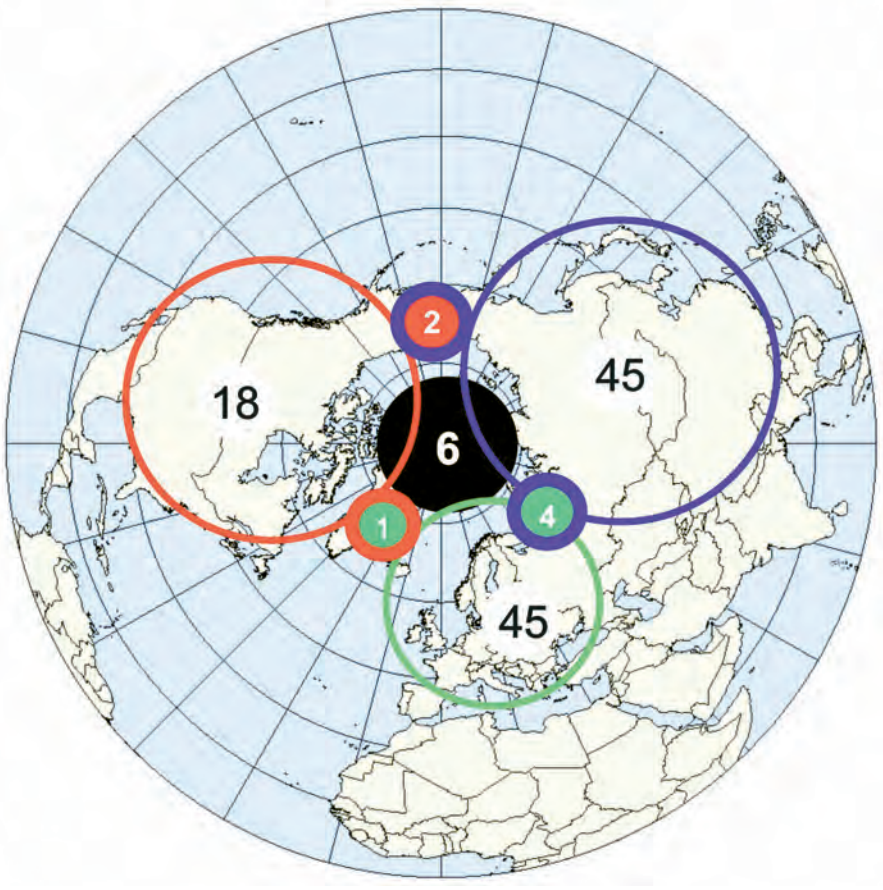


Fig. 62. Genus *Trichocera* in Holarctic Region: state of knowledge. Numbers of species considered autochthonous to particular constinents/subcontinents are presented on silhouettes of respective regions; number of species shared by the two and three continents are in filled circles (source of map: https://en.wikipedia.org/wiki/Northern_Hemisphere).

VII. UPDATED LIST OF SPECIES IN THE GENUS *TRICHOCERA*

Table 1

Presence of species of Trichocera on particular continents

Subgenus, species	Europe	Asia	North America	Other
Trichocera				
bituberculata ALEXANDER, 1924			+	
colei ALEXANDER, 1919			+	
fattigiana ALEXANDER, 1952			+	
garretti ALEXANDER, 1927			+	
hiemalis (DE GEER), 1776	+	+	+	north Africa
inexplorata DAHL, 1967	+			
irina KRZEMIŃSKA, 1996		+		
lackschewitzi LANTSOV, 1987		+		
lantsovi KRZEMIŃSKA, 1996		+		
longisetosa ALEXANDER, 1927			+	
major EDWARDS, 1921	+	+		
marocana DRIAUACH, KRZEMIŃSKA & BELQAT, 2015				north Africa
mirabilis ALEXANDER, 1934		+		
pallens ALEXANDER, 1954			+	
sakaguchii ALEXANDER, 1930		+		
sibirica EDWARDS, 1920	+	+		
tetonensis ALEXANDER, 1945			+	
tuberculifera ALEXANDER, 1938		+		
Metatrichocera				
appendiculata ALEXANDER, 1938		+		
banffi PRATT, 2003			+	
bifurcata NAKAMURA & SAIGUSA, 1997		+		
chaetopyga NAKAMURA & SAIGUSA, 1996		+		
corallifera NAKAMURA & SAIGUSA, 1997		+		
cordata NAKAMURA & SAIGUSA, 1997		+		
crassicauda NAKAMURA & SAIGUSA, 1996		+		
forcipula NIELSEN, 1921	+			
gigantea DAHL, 1967	+	+		
glacialis ALEXANDER, 1935		+		
hypandrialis NAKAMURA & SAIGUSA, 1997		+		
idahoensis PRATT, 2003			+	
kotejai KRZEMIŃSKA, 1992	+			
latilobata ALEXANDER, 1938		+		
lutea (BECHER), 1886	+		+	N. America: only Greenland
mackenzie DAHL, 1967	+	+	+	
monstrosa NAKAMURA & SAIGUSA, 1997		+		
salmani ALEXANDER, 1927			+	
schmidi ALEXANDER, 1959		+		
thaumastopyga ALEXANDER, 1960		+		
ticina STARÝ & PODENAS, 1995	+			

Subgenus, species	Europe	Asia	North America	Other
truncata NAKAMURA & SAIGUSA, 1997		+		
unica KOLCSÁR, 2018	+			
ursamajor ALEXANDER, 1959		+	+	
Saltrichocera				
abieticola ALEXANDER, 1935			+	
alpina STARÝ, 2000	+			
andorrensis KRZEMIŃSKA, 2000	+			
antennata STARÝ, 1998	+			
annulata MEIGEN, 1818	+	+	+	north Africa, New Zealand, Australia
arctica LUNDSTRÖM, 1915		+	+	
arisanensis ALEXANDER,1935		+		
barraudi KRZEMIŃSKA, 2002		+		
bellula ALEXANDER, 1961		+		
bilobata STARÝ, 1999	+			
bimacula WALKER, 1848			+	
bisignata ALEXANDER, 1959		+		
borealis LACKSCHEWITZ, 1934	+	+	+	
brevicornis ALEXANDER, 1952			+	
calva STARÝ, 1999	+			
candida DAHL, 1976	+			
carpathica STARÝ & MARTINOVSKÝ, 1996	+			
chuluuta PETRAŠIŪNAS & PODENAS, 2011		+		
columbiana ALEXANDER, 1927			+	
dahlae MENDL, 1971	+			
excilis DAHL, 1967			+	
hirta STARÝ & MARTINOVSKÝ, 1996	+			
imanishii (TOKUNAGA), 1935		+		
implicata DAHL, 1976	+			
japonica MATSUMURA, 1915		+		
latipons PETRAŠIŪNAS & PODENAS, 2017		+		
longa, n. sp.	+			
maculipennis MEIGEN 1818	+	+	+	Kerguelen Is; King George Is. (maritime Antarctida)
mendli DAHL, 1976	+			
mexicana ALEXANDER, 1946			+	
michali KRZEMIŃSKA, 1999	+			
minuta TOKUNAGA, 1938		+		
mishmi KRZEMIŃSKA, 2002		+		
montium STARÝ , 2001	+			
mutica DAHL, 1966	+			
nipponensis TOKUNAGA, 1938		+		
nordica KRZEMIŃSKA & GORZKA, 2014	+			
obtusa STARÝ & MARTINOVSKÝ, 1996	+			
ocellata WALKER, 1856		+		
pappi KRZEMIŃSKA, 2003	+			north Africa

Subgenus, species	Europe	Asia	North America	Other
parva MEIGEN, 1804	+			
pubescens STARÝ & MARTINOVSKÝ, 1996	+			
recondita STARÝ, 2000	+			
regelationis (LINNAEUS), 1758	+	+	+	north Africa; South Georgia Is.
reticulata ALEXANDER, 1933		+		
rufescens EDWARDS, 1921	+			north Africa
rufulenta EDWARDS, 1938	+			
saltator (HARRIS), 1776	+	+		north Africa
sardiniensis PETRAŠIŪNAS, 2009	+			north Africa
simonyi MIK, 1886	+			
sparsa STARÝ & MARTINOVSKÝ, 1996	+	+		
superna ALEXANDER, 1961		+		
szechwanensis ALEXANDER, 1935		+		
thaleri STARÝ, 2000	+			
tsutsui TOKUNAGA, 1938		+		
variata ALEXANDER, 1961		+		
versicolor LOEW, 1871	+	+?		
unimaculata YANG & YANG, 1995		+		
Staryia				
altipons STARÝ, 1998	+			
basidens STARÝ, 1998	+			
christinae KRZEMIŃSKA & GORZKA, 2016	+			
dufouri KRZEMIŃSKA, 2020	+			
geigeri STARÝ & KAHL, 2002	+			
muelleri KRZEMIŃSKA 2020	+			
oulankae n. sp.	+			
polanensis STARÝ, 2000	+			
rannanenae KRZEMIŃSKA & GORZKA, 2016	+			
rectistylus STARÝ, 1998	+			
transversa STARÝ, 1998	+			
tsugaruensis NAKAMURA & SAIGUSA, 2012		+		
villosa STARÝ, 2009	+			
viramoi KRZEMIŃSKA & GORZKA, 2016	+			
Not assigned to subgenus				
alticola ALEXANDER, 1935		+		
arnaudi PRATT, 2003			+	
auripennis ALEXANDER, 1960		+		
gracilis WALKER, 1848			+	
montana BRUNETTI, 1912		+		
percincta ALEXANDER, 1961		+		
tenuicercus ALEXANDER, 1959		+		
triangularis ALEXANDER, 1968		+		

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