Acta zool. cracov. **42**(2): 251-258, Kraków, 17 Dec., 1999

Three species with clear wings of the *regelationis* group: *Trichocera* (*Metatrichocera*) *annulata*, *T.* (*M.*) *rufescens* and a new species from Poland (Diptera, Trichoceridae)

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Received: 30 June, 1999
Accepted for publication: 9 Sept., 1999

KRZEMIŃSKA E. 1999. Three species with clear wings of the *regelationis* group: *Trichocera* (*Metatrichocera*) *annulata*, *T.* (*M.*) *rufescens* and a new species (Diptera, Trichoceridae). Acta zool. cracov., **42**(2): 251-258.

Abstract. Within the subgenus *Trichocera* (*Metatrichocera*), the *regelationis* group of species is distinguished by the shape of the aedeagal complex: an elevated ridge connecting the base of paramere and with lateral apodeme, and the very broad parameres. The group comprises, apart from *T.* (*M.*) *regelationis* (L.) and *T.* (*M.*) *maculipennis* MEIGEN, also three species with unspotted wings, *T.* (*M.*) *annulata* MEIGEN, *T.* (*M.*) *rufescens* EDWARDS and *T.* (*M.*) *michali*, sp. nov.

Key words: *Trichocera*, *Metatrichocera*, new species, Poland.

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I. INTRODUCTION

Within the subgenus *Trichocera* of genus *Trichocera* MEIGEN, 1803, the *regelationis* group of species was distinguished by KRZEMIŃSKA (1996b). Three species were included: *Trichocera annulata* MEIGEN, *T. maculipennis* MEIGEN and *T. regelationis* (LINNAEUS). (All these species were excluded from the subgenus *Trichocera* by STARÝ (1998) and transferred to the subgenus *Metatrichocera* DAHL; for comments see the Discussion). The main criterion of distinction was the angle at which the basal and lateral apodeme of the aedeagal complex meet, as compared to the *hiemalis* and *saltator* groups of species (KRZEMIŃSKA 1996b). My further studies resulted in stating that these angles are not always kept. However, I found a better set of characters of the male aedeagal complex which separates the *regelationis* group from all other species of the genus *Trichocera* (in Figs. 5-8 represented by *T.* (*M.*) *saltator*).

1. Basal parts of parameres are extended dorsad into a ridge raised over and along the fused section between both lateral apodemes. Thus the place where the basal and the lateral apodemes meet has a considerable thickness in lateral view (Figs 1, 5). The fused section and the ridge extend beyond this point.

2. Parameres are very broad in lateral, ventral and posterior view and appear as being composed of a stronger, more massive section and a lighter, but very broad blade (Figs 1-4). In ventral view, the blades of parameres are curved strongly toward the penis (to the inside) and close to each other (Fig. 3). There are no additional extensions on the ventral side to keep the aedeagus in place.

In other species (Figs 5-8), the parameres, and especially their bases, are slender; in lateral view the dorsal margin of the basal apodeme is directly prolongated into the ventral margin of the lateral apodeme (Fig. 5). The fused section between the lateral apodemes is shorter and often hidden between the basal apodemes (compare Fig.1 with 5 and Fig.4 with 8). In *T.* (*M.*) *saltator* and other species related to *T.* (*M.*) *implicata* there are small extensions of basal part of parameres which keep the aedeagus in place (Figs 7, 8).

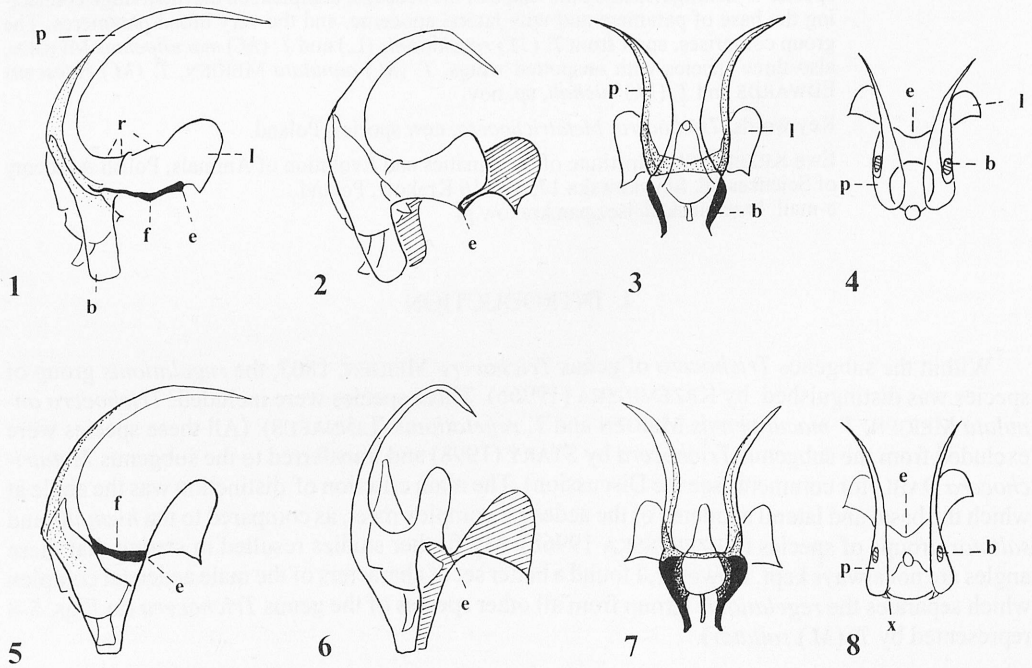
The female genitalia in the *regelationis* group are characterized by:

1. Apodeme of the vaginal plate (so called vaginal fork) almost undivided and devoid of additional structures.

2. Setulose area of the cerci of ovipositor distinctly limited and convex.

The features of the female seem however not unique to the *regelationis* group (for instance, they are present also in *T.* (*M.*) *montana* STARY, 1997).

Now further two species are added to the *regelationis* group: *T.* (*M.*) *rufescens* EDWARDS and *T.* (*M.*) *michali*, sp. nov.



Figs 1-8. Comparison of aedeagus in the *regelationis* group, represented by *Trichocera* (*Metatrichocera) regelationis* (upper row, Figs 1-4) and other species, represented by *Trichocera* (*M.*) *saltator* (lower row, Figs 5-8). 1 – aedeagus of *T. regelationis*, lateral view, 2 – dorsolateral view, 3 – ventral view, 4 – posterior view. 5-8: the same in *T. saltator*, respectively; b – basal apodeme (in Figs 4, 8 it is the position of the end of basal apodeme); e – end of fused section between both lateral apodemes; f – fused section between lateral apodemes; l – lateral apodeme; p – paramere; r – ridge between base of paramere and lateral apodeme; x – extension of basal part of parameres.

Abbreviations:

BM – British Museum, Natural History; London, UK,

DEI – Deutsches Entomologisches Institut; Eberswalde, Germany,

ISEA – Museum of the Institute of Systematics and Evolution of Animals, Kraków, Poland,

MHNN – Musee d'histoire naturelle, Neuchâtel, Switzerland,

ZIW – Zoological Institute, Pol. Acad. Sci., Warszawa, Poland.

Venation: *bM1+2* and *mM1+2* (Fig. 9) represent first (basal) and second (medial) section of *M1+2*, resp. (after LUKASHEVICH et al. 1998).

A c k n o w l e d g e m e n t s. I am very grateful for the help in collecting to the family of Andrzej PALACZYK (employed in ISEA). Christine DAHL is heartfully thanked for critical reading the manuscript.

II. MATERIAL AND METHODS

Specimens are housed in ISEA if not otherwise stated. Maceration of genitalia in 10% KOH was performed for only 2-3 hrs followed by further 1 hr rinse in water. The preparations were stored in vials with glycerine.

III. SYSTEMATICS

Trichocera (Metatrichocera) annulata MEIGEN, 1818

Figs 9-12

syn. *T. multicincta* (SANTOS ABREU), 1923: 126, figs 3, 4, 31

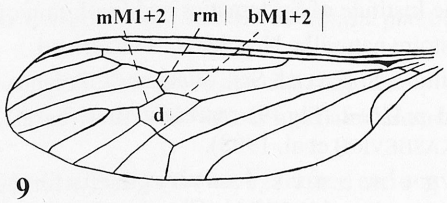
Adult and larva described and illustrated by DAHL (1966); adult also by PRATT (1984).

D i a g n o s i s. Abdomen striped; tergites and sternites proximally yellow, distally brown. Wing: *d* cell broad, pentagonal as in Fig. 9. Genitalia, ♂: area below the bridge almost circular; basal apodeme of the aedeagal complex narrow; lateral apodeme elongated, pointing the end of parameres. ♂, ovipositor bent at midth; the second half characteristically almost straight; tip blunt.

A d d i t i o n a l d e s c r i p t i o n. Colour: the stripes in abdominal segments are sometimes very poorly visible and appear only after maceration in NaOH or KOH. Genital segment in ♀ (VIII sternite and VIII+IX tergite) is light yellow, contrasting with dark stripe of the preceding segment and with brownish base of ovipositor. Similarly, in ♂ the gonocoxites and gonostyles are light yellow and contrast with brown sternites and tergites VIII and IX. Wings clear, in dry specimens with brownish shine, veins dark yellow. Cross-vein *r-m* sometimes with a trace of darker cloud (EDWARDS, 1938); on clear wings a faint trace of a spot or a darkened *r-m* sometimes appears on the photographs, even if invisible optically.

Wing (Fig. 9): in all specimens studied a characteristic, broad and pentagonal *d* cell is observed, with *bM1+2* being almost straight and nearly as long as *mM1+2* (i.e., *r-m* is positioned in the midth of upper part of *d* cell).

Terminalia, ♂ (Figs 10-12). Sternite IX short, broadly mildly incised, often with central small desclerotization (as in Fig. 11); two central bristles are the strongest ones among the setation of the margin and have a fixed position. Gonocoxite varies from short and massive (cf. Fig. 10) to slender (cf. Fig. 11); bridge low, delicate, the area encircled by the bridge is almost round. Gonostyle to 1.5 times as long as gonocoxite, nearly straight, with apex rounded, basal tubercle absent or small. Aedeagal complex (Fig. 12): basal apodemes narrow, with terminal parts slightly curved toward dorsal side and strongly to the inside; lateral apodemes narrow and expanded posteriorly (in lateral view); aedeagal apodeme most often small, but compare the variation in Fig. 12.



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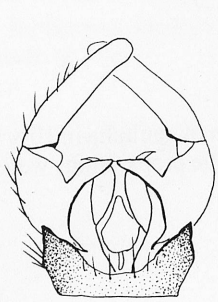

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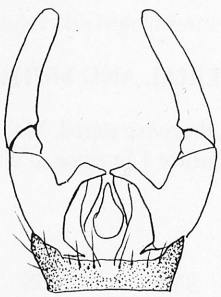

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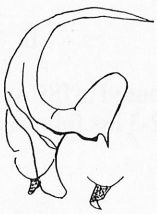

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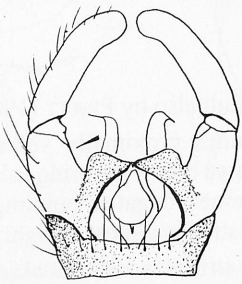

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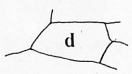

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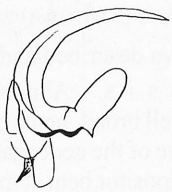

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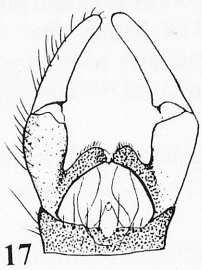

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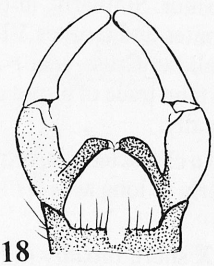

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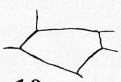

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Figs 9-20. Figs 9-12. *Trichocera* (*Metatrichocera*) *annulata*: 9 – wing, 10 – male terminalia ventrally; 11 – same, variation; complex of aedeagus with a variation of aedeagal apodeme. Figs 13-16. *Trichocera* (*Metatrichocra*) *rufescens*: 13 – male terminalia ventrally; 14 – d cell; 15 – male terminalia laterally; 16 – complex of aedeagus laterally. Figs 17-20. *Trichocera* (*Metatrichocera*) *michali*, n. sp.: 17 – male terminalia ventrally; 18 – same, variation; 19 – d cell; 20 – complex of aedeagus ventrally with a variation of aedeagal apodeme.

♀ (Figs 21-23): ovipositor bent at midth; the second half characteristically almost straight (esp. its ventral outline); tip blunt. Two extreme variants of ovipositors are illustrated: broad and strongly bent (Fig. 21) and more slender and straight (Fig. 22; both come from the same sample in Fano, Italy). Setulose area well separated, short and strongly concave. Genital plate (Fig. 23): apodeme shallowly incised, its two arms thin. Supragenital plate with two bristles closely set. Spermathecae with ducts ca. 1.5 times the diameter.

D i s t r i b u t i o n. An easily recognizable species; it was one of the first trichocerids described (from Austria) and since then frequently recorded from Europe (older literature cited by DAHL 1966). Probably the most widespread species of the genus, performing also a highest tolerance to warm temperatures; present in the Holarctic, including warm coasts of the Mediterranean (Algiers, Jerusalem; EDWARDS, 1923), Spain and Canarian Islands; introduced also to Australia and New Zealand (DAHL and ALEXANDER, 1976). From Poland recorded by KRZEMIŃSKI (1983; together with older records from Poland).

B i o l o g y: in subboreal regions adults show two main peaks of frequency in autumn and spring (DAHL 1970), in Great Britain from IX to V (EDWARDS 1938). Data below show that in warmer regions *T. annulata* occurs also in midwinter.

M a t e r i a l. Great Britain: London, 3.iii. 1991, 3♂♂, 1♀ (E. KRZEMIŃSKA). France, Massif Central: material listed in KRZEMIŃSKA and BRUNHES (1992). The Netherlands: De Brand Reserve, 1990: 6-13.x., 2♂♂; 13-20.x, 4♂♂, 2♀♀; 20-27.x., 1♀, 5♂♂ (cited also in KRZEMIŃSKA 1996a). Germany: Woldegk i/M. Str., D. Mecklemburg-Vorp., 29.ix.1900, 2♂♂ (Coll. C. F. KETEL; DEI). Switzerland: Canton Ticino, Gandria 1979: 2.x., 2♂♂; 2.xi., 1♂, 1♀; 11-20.xi., 12♂♂, 1♀; 9.xii., 10♂♂, 1♀ (L. Rezbanyai-Reser; MHNN). Italy: Fano, 7-8.ii. 1989, 12♂♂, 3♀♀; Misano Adriatico, 1-15.i. 1988, 15♂♂, 5♀♀ (G. Gentilini). Poland: Gdańsk-Oliwa: 21.x. 1989, 1♂, 3♀♀ (garden; R. SZADZIEWSKI); Kraków-Kurdwanów, 8.x.1989, 1♂; 20.x. 1998, 1♀ (E. KRZEMIŃSKA); Białowieża National Park: kw. 314, forest, 7.x.1966, 1♀ (22/66; W. MIKOŁAJCZYK; ZIW).

R e m a r k s. It is remarkable that the variation in ♂ gonocoxites and ♀ shape of ovipositor is observed within the sample of one locality, and not characteristic for populations of different regions of Europe.

Trichocera (*Metatrichocera*) *rufescens* EDWARDS, 1921

Figs 13-16; 24-26

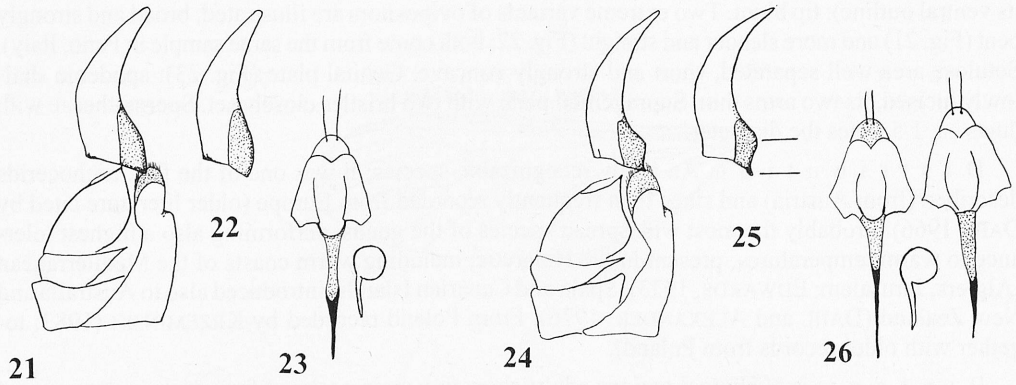
D i a g n o s i s. Colour from yellow to light brown; characteristic, pentagonal *d* cell similar to that in *T. annulata* (Figs 9, 14); ♂ genitalia with bridge low, massive and broken; basal and lateral apodeme narrow. ♀: ovipositor of crescent shape, with sharp apex, its largest concavity close to the base of cercus (Figs 24, 25); genital plate with almost unforked apodeme; supragenital plate with two bristles very closely set.

A d d i t i o n a l d e s c r i p t i o n. Size: ca. 5 mm, wing 5-6.5 mm.

Colour: dark yellow to reddish brown, wings light, clear, with brown shine, veins dark yellow. EDWARDS (1938) drew attention to the yellow scape contrasting with darker flagellum. Antennae: with the first flagellomere only a little longer than the second.

Wing: *d* cell pentagonal as in *T. annulata* (Fig. 9) or *bM1+2* shorter than *mM1+2* (Fig. 14); but always pentagonal, with *bM+2* markedly raised over the level of *Mb*.

Terminalia, ♂ (Figs 13, 15, 16): sternite IX short, "shallow", its margin straight; two central bristles as in *T. annulata*. Gonostyle more slender than in previous species, slightly narrowing and regularly curved to the inside, apex rounded, basal tubercle present, small. Gonocoxite slender, but wider than the dististyle; in ventral view its inner outline often slightly convex (arrowed in Fig. 13); bridge extremely low (Fig. 15), massive, its arms seem as if bent midway in ventral view. Aedeagal complex: basal apodemes narrow, straight; lateral apodemes narrow and expanded posteriorly (in lateral view).



Figs 21-26. Figs 21-23. *Trichocera* (*M.*) *annulata*, female genitalia: 21, 22 – variants of the ovipositor; 23 – genital plate and spermatheca. Figs 24-26. *Trichocera* (*M.*) *rufescens*, female genitalia: 24, 25 – variants of the ovipositor; 26 – variants of the genital plate, and spermatheca.

♀ (Figs 24-26): ovipositor of regular, nearly crescent shape, tip sharp; setulose field well defined and strongly concave but very short; its largest concavity positioned only in 1/5-1/6 of the ovipositor's height; in lateral view a basal protuberance of the cercus more conspicuously developed than in other species (both mentioned features arrowed in Fig. 25). Genital plate (Fig. 26) with the apodeme fork shallow to undivided. Supragenital plate broadly triangular, with two bristles very closely set. Spermathecae with ducts ca. 1.5 times as long as the diameter.

M a t e r i a l. Holotype, ♂ and paratype, ♂: Lelant, Cornwall 28.viii.1912 (leg. Yerbury); BM. Lectotype: ♂, Lelant, Cornwall 29.viii.1912 (leg. Yerbury; BM)

O t h e r m a t e r i a l. The Netherlands: De Brand Reserve 13-20. x. 1990, 3♂♂, 3♀♀. France: ♂, Pas de Calais, Cap Gris Nez 24-30.x.1966 (A. M. Hutson; BM). Great Britain: Bucks., Gerrard's Cross, xii.1951, reared from *Polyporus gigantea* (P. A. BUXTON; BM); Minchin Hampton 15.ix.1897 2♂♂ (ex RICARDO Coll., BM); Brecon: nr Llangynidr xi.1936, 1♂ (F. W. EDWARDS; BM). Switzerland: Canton Ticino, Aurigeno 4-9.xi.1980 6♂♂, (light trap; W. GEIGER; MHNN). Poland: Białowieża National Park: kw. 314, mixed forest 1♀, kw. 340, 7.x.1966, 1♀ (W. MIKOŁAJCZYK; ZIW, 22/66); Ojców National Park: wąwóz Korytania 19.x 1992, 1♀; 29. xi. 1992, 1♀ (A. KLASA, A. PALACZYK); Dolina Nidy (valley of river Nida), Pełczyska 3. xi. 1992, 1♂, 1♀ (E. SKALSKA, Kraków 20. x.1998, 1♂ (E. KRZEMIŃSKA); Bieszczady Mts: Przełęcz Wyżnia, 26. ix. 1991, 1♂, 1♀ (J. WIEDEŃSKA); potok (creek) Zwór, 800-900 m, 22-24.x. 1992 (E. KRZEMIŃSKA), potok (creek) Wołosatczyk, 750 m, 23. x. 1992 (E. KRZEMIŃSKA).

R e m a r k s. Adults occur X-XI. Probably a fairly common, but poorly known species. This species was never fully illustrated, even in its original description; a very schematic sketch of male gonostyles and aedeagus ventrally was given by EDWARDS (1938). DAHL considered it to be variation of *T. regelationis*. Features presented here place *T. rufescens* in the *regelatonis* group, close to *T. annulata* by the characters of wing venation (*d* cell shape) and male genitalia (shape of lateral apodemes). Both species are well separated by the characters listed. In Cornwall (locus typicus; Great Britain) *T. rufescens* seems to be lighter (dark yellow) or maybe this colour observed in old specimens in the collection of BM results from bleaching by time.

Trichocera (Metatrichocera) michali, sp. nov.

Figs 17-20

D i a g n o s i s. Medium sized, blackish species; wings clear. ♂: gonostyle short (ca. the length of gonocoxite), with conspicuous basal tubercle. Aedeagal complex: parameres short and broad; basal apodeme very broad; lateral apodeme narrow, elongated; distance between these apodemes is lesser than the height of the latter one; aedeagal apodeme long and broad basally.

D e s c r i p t i o n: wing size 6.2-7.7 mm. Colour overally dark brown to black; wing clear.

Head: antennae of ca. half the wing length; first flagelomere equal or only a little longer than the second.

Wings: *Sc* with scarce setation. Discal cell (Fig. 19) in all specimens characteristically widened distally, its distal anal corner markedly incised by the shape of first section of *M3+4*; *bM1+2* very short.

Terminalia, ♂ (Figs 17, 18): dark brown to black; setation more dense than in other species of the *regelationis* group. Sternite IX short, shallow and often with smaller or larger desclerotization medially (Fig. 17 and 18, respectively), its margin set with bristles of which two central ones are the strongest, as in two previous species. Gonocoxites long and slightly swollen distally; bridge rather low and massive, centrally desclerotized. Gonostyles about the length of the gonocoxites, more or less curved towards the inside, narrowing to the apex to parallel-sided in ventral view, with conspicuous basal tubercle. Aedeagal complex (Fig. 20): parameres short and broad; basal apodeme very broad, its apex rounded and gently curved dorsad; lateral apodeme narrow, elongated; distance between this apodeme and paremere is lesser than the height of the lateral apodeme; aedeagal apodeme long and broad basally, or more slender. Female unknown.

M a t e r i a l. Holotype: ♂, 24. x. 1998; Polana Szopka, 650 m, Pieniny National Park; Pieniny Mts (leg. Michał PALACZYK). Paratypes: 2♂♂, same date and locality; Pieniny Mts, Hala Majerz, 650 m, 25.x. 1998: 5♂♂ (M. PALACZYK).

R e m a r k s. The species clearly belongs to the *regelationis* group, judging from the aedeagal complex; its most remarkable feature are the broad basal apodemes.

Etymology: the new species is dedicated to its young collector, Michał PALACZYK (age 7).

IV. DISCUSSION

The characters on which the distinction of the regelationis group is based, indicate that the aedeagal complex offers mutliple occasions of separating the groups of species within the genus *Trichocera*. One such grouping was made earlier (KRZEMIŃSKA 1996b). Recently STARÝ (1998) elevated the *hiemalis* group of species to the subgenus *Trichocera* (*Trichocera*). Consequently, all other, very different species of the genus *Trichocera* were forced into subgenus *Metatrichocera* (DAHL 1966) of the genus *Trichocera*. *Metatrichocera* was originally given a status of separate genus and only later included as the subgenus in the genus *Trichocera* (in: DAHL & ALEXANDER 1976). This subgenus was originally characterized by outer male terminalia features: balloon-like gonocoxites and gonostyles with complicated armature and additinal larval characters. Presently STARÝ (1998) had based his diagnosis of the subgenus *Trichocera* on the aedeagus apparatus: long parameres not connected by a membrane against short parameres connected by a membrane in the *hiemalis* group, i. e., his subgenus *Trichocera* (*Trichocera*). His interpretation resulted from the fact that *Trichocera hiemalis* is the type species of the genus and, automatically, of the nominal subgenus.

The present work shows that elevation of only a group of species to the subgeneric level cannot be performed too easily. One could well separate in a similar way the *regelations* group of species

(ridge between bases of parameres and the lateral apodemes; broad parameres) against all other species – including *T. hiemalis* – in which the ridge is absent and parameres are slender.

The *hiemalis* group is probably rightly defined also by all other features accompanying those of the aedeagal complex, although not taken into consideration by STARÝ, as the characters of the vaginal plate and the venation. Although the venation characters are not discernible directly, a numerical analysis showed that *T. hiemalis* and *T. major* (also a member of this group) are beyond the main group of congeneric species (KRZEMIŃSKA 1992).

The subgenus *Trichocera* (*Metatrichocera*) awaits now an additional definition also based on world wide species analysis; its type species is *Trichocera* (*Metatrichocera*) *lutea* (BECHER, 1886), one of the most bizarre species of the genus. The subgenus include worldwide other species with heavy armature on the dististylus of the male. A modern phylogenetic analysis must, however, be based on multiple characters, both of the male and female.

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