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Re-classification of *Lycoriella* Frey *sensu lato* (Diptera, Sciaridae), with description of *Trichocoelina* gen. n. and twenty new species

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Abstract

On the basis of re-evaluation of morphological characters of the *Lycoriella* group of genera and subgenera, generic rank is given to the two species groups belonging to *Lycoriella* (*Hemineurina*) Frey, 1942 and to *Lycoriella* (*Coelostylina*) Tuomikoski, 1960. The *Lycoriella* (*Hemineurina*) *inflata* group, including the type species of the subgenus, *Sciara conspicua* Winnertz, 1867, is treated as the genus *Hemineurina* **stat. n.** and the *Lycoriella* (*Hemineurina*) *vitticollis* group as the genus *Trichocoelina* **gen. n**. (type species *Sciara vitticollis* Holmgren, 1883). *Coelostylina* Tuomikoski, 1960 (type species *Lycoriella* (*Coelostylina*) *freyi* Tuomikoski, 1960) is a junior homonym of *Coelostylina* Kittl, 1894, and is renamed *Stenacanthella* **nom. et stat. n.** The genera are diagnosed and their phylogeny is discussed. Eight species are excluded from the *Lycoriella* group. They are transferred to the genera *Bradysiopsi*s Tuomikoski, 1960, *Camptochaeta* Hippa & Vilkamaa, 1994, *Merizomma* Sasakawa, 2003 **stat. n.** and *Scatopsciara* Edwards, 1927 (five species) or are for the time being regarded as *incertae sedis* (two species) and as *nomen nudum* (one name). Numerous nomenclatural corrections are made also in the genera *Hemineurina* Frey, *Stenacanthella* Vilkamaa & Menzel and *Trichocoelina* Vilkamaa & Menzel. Altogether 42 new combinations, three changes in status and one new synonym are presented. A lectotype is designated for *Hemineurina algida* (Frey, 1948) and two *Hemineurina* species names are removed from synonymy and given full species status.

The following species of *Trichocoelina* are newly described: *Trichocoelina absidata* **sp. n**. (Russia: Krasnodarsk region), *T. aemula* **sp. n.** (Finland, Russia: Krasnodarsk region), *T. biplex* **sp. n.** (Canada: Newfoundland and Labrador, Yukon), *T. dicksoni* **sp. n**. (Russia: Arkhangelsk oblast, Kemerovsk oblast, Krasnodarsk region), *T. dispansa* **sp. n. (**Russia: Krasnodarsk region), *T. dividua* **sp. n.** (Canada: Northwest Territories), *T. hians* **sp. n.** (Canada: Yukon), *T. imitator* **sp. n.** (Canada: Yukon), *T. incrassata* **sp. n.** (USA: Alaska), *T. ithyspina* **sp. n.** (Norway), *T. jukkai* **sp. n.** (Finland)*, T. magnifica* **sp. n.** (Canada: Yukon), *T. nefrens* **sp. n.** (Russia: Krasnodarsk region), *T. obesula* **sp. n.** (Norway), *T. oricillifera* **sp. n.** (Finland, Norway), *T. planilobata* **sp. n.** (Finland), *T. quintula* **sp. n.** (Finland), *T. semisphaera* **sp. n.** (Finland, Norway), *T. semusta* **sp. n.** (Italy, USA: Alaska), and *T. tecta* **sp. n.** (Canada: Nunavut, Yukon, Russia: Krasnodarsk region, Yamalo-Nenets Autonomous Okrug, USA: Alaska). The *Trichocoelina* species are keyed, the 20 new species are described and illustrated, and the 9 previously known ones, transferred to the new genus, are briefly diagnosed and the taxonomically relevant literature regarding them is listed. *Trichocoelina janetscheki* (Lengersdorf, 1953) **comb. n.** and *Trichocoelina brevicubitalis* (Lengersdorf, 1926) **comb. n.** are redescribed. The genus *Trichocoelina* currently includes 29 species: 17 in the Palaearctic, 6 in the Nearctic and 6 in the Holarctic. All known species are northern or montane.

Key words: Sciaroidea, *Lycoriella* group, new taxa, new rank, diagnosis, keys, checklist

Introduction

Frey (1942: 36) described the genus *Lycoriella* with the type species '*Sciara vivida* Winnertz' *sensu* Frey (misidentification; = *Sciara sativae* Johannsen, 1912) and introduced 3 subgenera in the same publication: *Lycoriella* Frey *s. str.*, *Hemineurina* Frey (type species: *Sciara conspicua* Winnertz, 1867) and *Diorychophthalma* Frey (type species: *Lycoriella grandifrons* Frey, 1942). Of these, *Diorychophthalma* Frey, 1942 is today a junior synonym of *Scatopsciara* Edwards, 1927 *s. str.* (Tuomikoski 1960: 47; Menzel & Mohrig 2000: 719) and will not be discussed further here. Later, *Lycoriella s. str.* was synonymized erroneously with '*Chaetosciara* Frey' (Frey 1948: 57), *Hemineurina* Frey was retained for 9 Finnish species (Frey 1948: 51, 65), and both taxa—*Chaetosciara* Frey and *Hemineurina* Frey—were integrated as subgenera in the genus *Bradysia* Winnertz, 1867 (Frey 1948: 50, 51).

Tuomikoski (1960: 6, 73) based his discussion on the studies of Frey (1948), but did not follow the proposals of classification in Frey (1942, 1948). He reintroduced the genus *Lycoriella* Frey and divided it into the subgenera *Lycoriella* Frey, 1942 *s. str.*, *Bradysiopsis* Tuomikoski, 1960, *Coelostylina* Tuomikoski, 1960 and *Hemineurina* Frey, 1942. This concept of *Lycoriella* Frey with four re-defined or described subgenera was postulated by Tuomikoski based on morphological characters, although not in formal descriptions but in the form of an identification key.

A division of *Lycoriella* (*Hemineurina*) into species groups was first proposed by Mohrig *et al*. (1990) in an identification key. They defined the *L. venosa* group with 14 species, the *L. permutata* group with 10 species and the *L. bruckii* group with 10 species, all from the Palaearctic region. Based on the new synonymizations, the species groups were partly renamed by Menzel & Mohrig (2000: 379, 380) as follows: The *L. venosa* group became the *L. inflata* group, and the *L. permutata* group became the *L. vitticollis* group. The genus *Pseudolycoriella* was established for the *L. bruckii* group (Menzel & Mohrig 1998: 367), which at present includes 130 species worldwide. More information on this genus can be found primarily in Menzel & Mohrig (2000), Mohrig (2003, 2013), Mohrig *et al*. (2004, 2019), Mohrig & Kauschke (2019), Rudzinski (2003), and Vilkamaa *et al*. (2012a).

In the 1942 paper, Frey included names of 20 described Palaearctic species in his polyphyletic 'subgenus *Hemineurina*' These are currently classified as valid species or junior synonyms in 7 different genera: *Bradysia* Winnertz, *Bradysiopsis* Tuomikoski, *Camptochaeta* Hippa & Vilkamaa, *Corynoptera* Winnertz, *Lycoriella* Frey, *Scatopsciara* Edwards and *Schwenckfeldina* Frey. Six years later, Frey (1948) indicated only 7 northern European species, of which only *vittigera* (Zetterstedt, 1851) was not included in *Hemineurina* Frey *sensu* Tuomikoski (1960). Tuomikoski (1960) tranferred this species to the newly established subgenus *Bradysiopsis* Tuomikoski and also added *Lycoriella eflagellata* Tuomikoski, 1960 to *Hemineurina.* The latter was later transferred in the subgenus *Coelostylina* Tuomikoski, 1960 by Menzel & Mohrig (2000). Until now, 9 extant species from the Holarctic region (including 2 new combinations in this paper) and one fossil species from the Dominican amber belong to the genus *Bradysiopsis* Tuomikoski. In *Coelostylina* Tuomikoski, 6 species are currently known, distributed only in the Palaearctic.

Menzel & Mohrig (1998, 2000) formally described and classified *Lycoriella* Frey *s. l.*, including *Lycoriella* (*Hemineurina*) and *Lycoriella* (*Coelostylina*) *sensu* Tuomikoski (1960) as its subgenera, raised *Lycoriella* (*Bradysiopsis*) *sensu* Tuomikoski (1960) to generic rank and described the *inflata* and *vitticollis* groups of *Lycoriella* (*Hemineurina*) in detail. Based on morphological characters, they suggested the phylogeny of the subgenera as *Lycoriella s. str.* + (*Hemineurina* + *Coelostylina*). Subsequently, only one untypical species—*Lycoriella* (*Hemineurina*) *piristylata* Vilkamaa, Hippa & Heller, 2013—has been described and included provisionally in the *L. vitticollis* group (Vilkamaa *et al*. 2013). Shin *et al*. (2013) published a molecular phylogeny of 26 supraspecific sciarid taxa, suggesting that *Lycoriella s. str.* and *Lycoriella* (*Hemineurina*) are not closely related (not monophyletic), as they appeared in different main clades in the phylogenetic tree: (*Lycoriella s. str.* + *Bradysia fallaciosa* group with *B. sachalinensis*) + (*Camptochaeta* + [*Dichopygina* + {*Bradysiopsis* + *Corynoptera blanda* group}] + [*Hemineurina* with the *L. inflata* group only + {*Keilbachia* + *Corynoptera boletiphaga* group}]).

When we re-evaluated the morphological characters of the *Lycoriella* group of genera, subgenera and species groups (*Bradysiopsis* and *Lycoriella sensu lato* with *Lycoriella s. str.*, *Coelostylina*, *Hemineurina* with the *inflata* and *vitticollis* groups), it became evident that the current classification must be partly revised. The taxa concerned are diagnosed here and the new genus *Trichocoelina* gen. n. is erected for the *L. vitticollis* group. Here we do not aim to present a traditional revision of the species included in the new genus, but only to describe the new species and to briefly diagnose the ones described earlier. Only *Trichocoelina janetscheki* (Lengersdorf, 1953) comb. n. is redescribed here in detail, and two highly different species—*L. dearmata* Mohrig & Krivosheina, 1987 and *L. piristylata* Vilkamaa, Hippa & Heller, 2013, formerly included in the *L. vitticollis* group of *Hemineurina*—are excluded from the new genus.

Material and methods

The specimens were picked out from unsorted sciarid museum material collected with Malaise traps, pan traps or sweep-nets and stored in 70% or absolute ethanol, or pinned and dried. Undescribed species which were assigned to *Lycoriella* (*Hemineurina*) according to their barcodes were also obtained from the Centre for Biodiversity Genomics, Guelph. The specimens were mounted on microscope slides in Euparal, after dehydrating them in absolute ethanol, or in Canada balsam, after treating them with xylene. The pinned specimens were first treated with KOH, then transferred to distilled water, to 70% ethanol and finally dehydrated with absolute ethanol before mounting in Euparal.

The photographs of the slide-mounted specimens were taken with a Leica MC170 HD camera mounted on a Leica DM 4000 B LED research microscope, and the pencil drawings were made using a Leitz Diaplan microscope equipped with a drawing tube and finalized using indian ink. The figures were processed with Photoshop version CS5, CorelDraw2017 and CorelPhotopaint2017.

The terminology and methods of measuring and illustrating morphological structures with drawings follow Hippa & Vilkamaa (1991, 1994) and Hippa *et al.* (2010). The BINs, BOLD Sample IDs, BOLD Sequence IDs and GenBank Accession numbers for the COI barcodes of the species for which they were available (Appendix 1, 2) were obtained from Wirta *et al.* (2016), the Barcode of Life Data System (http://www.boldsystems.org/index.php/Public_BINSearch) and GenBank (https://www.ncbi.nlm.nih.gov/nuccore). The BOLD dataset for *Trichocoelina* has been named dx.doi.org/10.558/DS-TIRICHOC.

A maximum likelihood tree using the COI gene was constructed with the available species of *Trichocoelina*, the type species of the closely related genera of the former *Lycoriella* group and both morphological types of *Hemineurina sensu* Menzel & Mohrig (2000: 381) in the ingroup, and *Diadocidia ferruginosa* (Meigen, 1830) as the type species of the outgroup, because Diadocidiidae appeared as the sister group of Sciaridae in the analysis by Ševčík *et al.* (2016: 12) (Appendix 2–4).

For the new classification of the *Lycoriella* group, the standard publications on the recent and fossil Sciaridae were used, namely: *catalogues* [AET (Steffan 1980), ANT (Evenhuis 1989), AUS (Steffan 1989; Bugledich 1999), FOS (Evenhuis 1994), NEA (Stone & Laffoon 1965), NEO (Amorim 1992), ORI (Steffan 1972), PAL (Gerbachevskaja-Pavluchenko 1986)], *handbooks* [AET (Menzel & Smith 2017), NEA (Steffan 1981), NEO (Mohrig & Menzel 2009), PAL (Menzel & Mohrig 1997)] and larger *revisions* [NEA (Steffan 1966, Mohrig *et al.* 2013), PAL (Menzel & Mohrig 2000)]. Also utilized are the results of a 25-year-study of the literature and the relevant type material by F. Menzel. In this context, the taxonomy-related literature is listed in the references and information on the worldwide distribution of the species is given in the attached checklist.

The type material of all species of the former *L. vitticollis* group of *Hemineurina* (except that of *L. subcochleata* Komarov, 2009) has been seen by the authors, and this study is based on males only. Only the new species of *Trichocoelina* are formally described and illustrated with drawings and photographs, and the previously described species are only briefly discussed, with the exception of *T. janetscheki* (Lengersdorf, 1953) which is redescribed and illustrated with photographs. The original description of this species by Lengersdorf (1953) was rather insufficient and its type material has been lost. The type material of newly described species is deposited in the collections of CNC, CBG, ISEA, MZH, NTNU-VM, PJSR, PKHH, SDEI, SMNH, TMU, ZIN, and ZMHB (see abbreviations).

The following abbreviations were used in the text and checklist:

Collections

BMNH	The Natural History Museum, London, United Kingdom [former: British Museum of Natural History]
CBG	Centre for Biodiversity Genomics, Guelph, Canada
CNC	Canadian National Collection, Ottawa, Canada
DAUH	Department of Agricultural Sciences, University of Helsinki, Helsinki, Finland
ISEA	Institute of Animal Systematics and Ecology, Siberian Branch of Russian Academy of Sciences, Novosibirsk, Russia
MZH	Finnish Museum of Natural History, Helsinki, Finland
NHMO	Natural History Museum, University of Oslo, Norway
MZH	Finnish Museum of Natural History, Helsinki, Finland
NHMW	Naturhistorisches Museum Wien, Vienna, Austria
NTNU-VM	Department of Natural History, University Museum, Norwegian University of Science and Technology, Trondheim, Norway
PJSR	Private Collection of Jukka Salmela, Rovaniemi, Finland
PKHH	Private Collection of Kai Heller, Heikendorf, Germany
SDEI	Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany
SMNH	Swedish Museum of Natural History, Stockholm, Sweden
TMU	Tromsø Museum—Universitetsmuseet, Tromsø, Norway
ZFMK	Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany
ZIN	Zoological Institute of Russian Academy of Sciences, Zoological Museum, St. Petersburg, Russia
ZMHB	Leibniz-Institut für Evolutions- und Biodiversitätsforschung, Museum für Naturkunde (Zoologie), Berlin, Germany [formerly: Museum für Naturkunde der Humboldt-Universität zu Berlin]
ZMUC	Zoological Museum, Natural History Museum of Denmark, University of Copenhagen, Copenhagen, Denmark

Distribution or origin of the included species

AET = Afrotropical region; ANT = Antarctic region (Antarctic mainland, including subantarctic islands between 50ºS and 70ºS); AUS = Australasian region; FOS = Fossil fauna; NEA = Nearctic region; NEO = Neotropical region; ORI = Oriental region; PAL = Palaearctic region.

Species excluded from the *Lycoriella* group *sensu* Menzel & Mohrig (2000)

***Bradysiopsis dearmata* (Mohrig & Krivosheina, 1987) comb. n.**

Literature. *Lycoriella* (*Hemineurina*) *dearmata* Mohrig & Krivosheina—Mohrig *et al.* (1987): 94, fig. 4 a–d; Menzel *et al.* (1990): 335; Menzel & Mohrig (1991): 40; Menzel & Mohrig (2000): 382, 385; Komarov (2009): 100, 103.

Discussion. *Lycoriella* (*Hemineurina*) *dearmata* Mohrig & Krivosheina, 1987 is known only from a few specimens from Russia, Tuva and Altai Republics and Germany, Schleswig-Holstein (Heller 2004) and Thuringia, Saxonia (unpublished). The species was placed in the *L. vitticollis* group by Menzel & Mohrig (2000) but is exceptional in having a narrow gonostylus, medially not impressed, with a group of subapical megasetae and 2–3 medial elongated setae, and in having a peculiar intergonocoxal lobe of the hypopygium with unusually strong setae. Mohrig *et al.* (1987: 94) and Menzel & Mohrig (2000: 382) showed that the placement of *L. dearmata* in the *L. vitticollis* group of *Lycoriella* (*Hemineurina*) was somewhat problematic. The sensillar patch of the 1st palpal segment is distinctly bordered (not deepened and pit-like), the wing vein R_5 are apically both dorsally and ventrally setose, the scutellum has 4 long and strong setae, the fore tibia has weak spinose setae [1–3 setae in the basic vestiture], the legs are long and thick, the fore tibial organ has fine and dense setosity and bow-like borders, and the tarsal claws are untoothed. It is striking that that the setosity of mesonotum and abdomen is, unlike the species of *Lycoriella*, *Hemineurina* und *Trichocoelina,* dark brown and much longer and dense. Furthermore, the species has a slender, not impressed gonostylus (without medial margin), 2 or 3 elongated and nearly straight setae on its apical half (not homologous with the apically curved whiplash seta of *Lycoriella s. l.*) and a slender apical tooth and 2 to 3 strong and nearly straight subapical megasetae. These characters support the view that *L. dearmata* is closer to the species of *Bradysiopsis* than to the here proposed genera *Hemineurina* and *Trichocoelina* (compare here with, for example, *Bradysiopsis vittigera* (Zetterstedt, 1851) in Menzel & Mohrig (2000: 189, fig. 159) and *Bradysiopsis sordida* (Mohrig, 1999) **comb. n.** (see below). The two, very closely placed intergonocoxal lobes of *L. dearmata* are in no case homologous with with the intergonocoxal lobes of *Lycoriella s. str.*, *Hemineurina* or *Trichocoelina,* because at the base they are united with the intergonocoxal area by a strongly sclerotized bridge. Based on the above characters, *Lycoriella* (*Hemineurina*) *dearmata* Mohrig & Krivosheina is transferred to *Bradysiopsis* Tuomikoski.

***Bradysiopsis sordida* (Mohrig, 1999) comb. n.**

Literature. *Lycoriella* (*Hemineurina*) *sordida* Mohrig—Mohrig *et al*. (1999): 196, fig. 10 a–f.

Discussion. Both *Br. sordida* (Mohrig) **comb. n.** and *Br. dearmata* (Mohrig & Krivosheina) **comb. n.** (see above) are placed in the genus *Bradysiopsis,* in the here newly established *Br. dearmata* group. Both species have, unlike the *Br. vittata* group and *Br. disjuncta* group, a distinctly bordered patch of sensilla on the first palpal segment, conically narrowed and apically roundish tegmen, elongate-ovale gonostylus with the apex which is curved to the medial side and—like in *Pseudolycoriella*—densely setose, and which reaches apicad from the apical tooth. With their long three-segmented palpus, four strong setae on scutellum, untoothed tarsal claws, partly bow-like bordered and densely setose tibial organ, the lack of a whiplash seta on the gonostylus, the 2–3 long setae on the medial side of the gonostylus and a slender apical tooth in combination with three subapical megasetae, both species possess typical *Bradysiopsis* characters [compare with the genus diagnosis in Menzel & Mohrig (2000: 185)].

***Camptochaeta complexa* (Rudzinski & Baumjohann, 2009) comb. n.**

Literature. *Lycoriella complexa* Rudzinski & Baumjohann—Rudzinski & Baumjohann (2009): 216, figs 20–22.

Discussion. *Lycoriella complexa* was described based on one male from Spain (Rudzinski & Baumjohann 2009). We have not seen the holotype, but based on the description we exclude it from *Lycoriella* and transfer it to *Camptochaeta* Hippa & Vilkamaa, 2004. The single bristle on the first palpal segment, the sclerotized tegmen, the impressed gonostylus (in the original description the impression shown as a dotted line), the strong gonostylar

megasetae in the apical half, three of which on the dorsal (apical) side of the apical tooth and the two moderately long elongated setae on the apical third of the gonostylus differ from the characters of *Lycoriella s. str.* and fit better with *Camptochaeta.* By these characters, *Camptochaeta complexa* (Rudzinski & Baumjohann, 2009) **comb. n.** resembles *Cam. subcamptochaeta* (Mohrig, 1992) **[=** *Cam. pentacantha* Komarova, Hippa & Vilkamaa, 2007]. It is possible that these species are even synonymous [compare the descriptions and figures in Mohrig & Eckert (1992: 295, fig. 1 a–e) and Komarova *et al.* (2007: 7, figs 1–5)].

Merizomma codonopsivora (Sasakawa, 1997) stat. et comb. n.

Literature. *Lycoriella* (*Chorizomma*) *codonopsivora* Sasakawa—Sasakawa (1997): 171, figs 1–3. *Lycoriella* (*Merizomma*) *codonopsivora* Sasakawa—Sasakawa (2003): 119, 128. *Lycoriella codonopsivora* Sasakawa—Sasakawa (2008): 128; Eiseman *et al.* (2016): 527.

Discussion. Sasakawa (1997: 171) described the distinctive *Lycoriella codonopsivora* Sasakawa, 1997 from Hokkaido (Japan) whose larvae feed on deodeok leaves (*Codonopsis lanceolata*, Campanulaceae). For this species, he erected the monotypic subgenus *Chorizomma* of *Lycoriella* (Sasakawa 1997: 174 [preocc., not *Chorizomma* Simon, 1872; Araneae, Dictynidae] and renamed the subgenus later as *Merizomma* (Sasakawa 2003: 119, 128). The subgenus and the type species are not included in the monograph of the Palaearctic Sciaridae (Menzel & Mohrig 2000). Therefore, these taxa are discussed here in detail on the basis of the original descriptions by Sasakawa (1997) and included in the identification key and in the checklist.

Lycoriella codonopsivora Sasakawa, 1997 has characters which are not present in this combination in any other genus and which distinctly differ from those given to *Lycoriella s. l.* by Menzel & Mohrig (2000: 377):

Eye bridge not united at middle, without ommatidia; maxillary palpus 2-segmented, without pit of sensilla on 1st segment; scutellum without long lateral setae, only with two unregular rows of short setae; R_1 longer than R, ending beyond the base of M-fork; fore tibia with small, bow-like bordered tibial organ; tarsal claws untoothed; hypopygium with wide gonocoxa; gonocoxae united in v-form and with short setae, intergonocoxal area not modified, gonostylus elongate-triangular and with apical megaseta, without apical tooth; medial side of gonostylus without megasetae and at apical half strongly impressed; basal part [at 1/5 of the medial side of gonostylus] with long, upcurved seta on long basal body; tegmen roundish, without apical or lateral modifications.

On the basis of the above characters, *L. codonopsivora* Sasakawa must be excluded from the *Lycoriella* group. With its short gonocoxa, lacking intergonocoxal lobe and apical megaseta, the species resembles some species of the *K. nepalensis* group of *Keilbachia* Mohrig, 1987 [compare here Menzel & Martens (1995: 107), Menzel & Mohrig (2000: 348), Vilkamaa *et al.* (2006: 40) and Vilkamaa *et al.* (2009: 3)]. However, a strongly reduced eye bridge, a 2-segmented palpus, an unbordered patch of sensilla on 1st segment of palpus, a long R_1 and the lack of a spiral-formed megaseta on the medial side of gonostylus differ from the characters of *Keilbachia*. These characters are typical for the *M. hippai* group of the genus *Mohrigia* Menzel, 1995. Speaking against the combination of *L. codonopsivora* Sasakawa with *Mohrigia* are the *Keilbachia*-like form of the gonostylus, the missing long medial setae on the apical half of the gonostylus, the missing intergonocoxal lobe of hypopygium and the much smaller, weakly setose fore tibial organ [compare here Menzel & Martens (1995: 102), Menzel & Mohrig (2000: 415) and Rudzinski (2006: 450)]. Furthermore, neither *Keilbachia* nor *Mohrigia* have the lateral setae of scutellum reduced [both have two long and strong setae] nor an unmodified tegmen [the tegmen of *Mohrigia* has a straight, strongly sclerotized dorsomedial structure; the tegmen of *Keilbachia* is sclerotized laterally and often with a narrow apical process]. On the above grounds, *Merizomma* Sasakawa, 2003 **stat. n.** with the type species *Merizomma codonopsivora* (Sasakawa, 1997) **comb. n.** is raised to generic rank and excluded from the *Lycoriella* group *sensu* Menzel & Mohrig (2000).

Scatopsciara (*Scatopsciara*) *hoyti* (Hardy, 1956)

Literature. *Scatopsciara* (*Scatopsciara*) *spiculata* Vilkamaa, Hippa & Mohrig—Vilkamaa *et al.* (2012b): 69, fig. 2 A–D. *Sciara* (*Lycoriella*) *hoyti* Hardy—Hardy (1956): 80, fig. 6 a–c; Hardy (1960): 220, 224, fig. 72 a–c; Steffan (1976): 48. *Lycoriella* (*Lycoriella*) *hoyti* (Hardy)—Steffan (1973): 357. *Lycoriella hoyti* (Hardy)—Steffan (1974):

43, 46; Steffan (1989): 148. *Scatopsciara hoyti* (Hardy)—Mohrig *et al.* (2019): 427, 434, figs 19 A, B and 20 A–D.

Discussion. *Sciara hoyti* Hardy was described based on 7 males and 2 females from the Hawaii Islands (Keanakolu, Mauna Kea). Steffan (1973) included this species in *Lycoriella sensu* Tuomikoski (1960), in spite of the missing bow-like bordered tibial organ and the missing whiplash seta, and compared the species with *L. pallidior* Tuomikoski, 1960 although the structure of the genitalia of the latter is very different. Contrary to the known species of *Lycoriella*, the first palpal segment of *S. hoyti* has only one seta, the gonostylus is allegedly strongly extended in the middle (Hardy 1956: fig. 6c), and Hardy described six strong megasetae on the impressed area (three apically, two in the middle and one more basally at the medial corner of the impression). On the basis of these characters, *S. hoyti* does not belong to *Lycoriella* Frey. Mohrig *et al.* (2019: 427) have studied the holotype of *S. hoyti* Hardy and mention two conspecific males from Maui Island (Hawaii), and combine this species into the genus *Scatopsciara* Edwards *s. str.*, with *Scatopsciara spiculata* Vilkamaa, Hippa & Mohrig, 2012 from New Caledonia as junior synonym. They found that the gonostyli of holotype are deformed in fig. 6c by Hardy (1956: 81), the apex of the gonostyli has a strong tooth and the inner sides of gonostyli have only 4 megasetae (1 megaseta subapical and 3 further mesial up to the middle). The different lenght of tibial spurs at the middle and hind tibia, the narrow bristle row at the front tibia, the trapezoid tegmen, the sensory pit on the first palpal segment and the very short R_1 support the position in the *Sc. atomaria* group of the genus *Scatopsciara* Edwards (compare here especially with the detailed description in Vilkamaa *et al.* (2012b: 69).

Neosciara biarmata Lengersdorf, 1953

Literature. *Neosciara biarmata* Lengersdorf—Lengersdorf (1953) 167, fig. 2; Tuomikoski (1959a): 36; Tuomikoski (1960): 77 [under *L. modesta* (Staeger)]; Janetschek (1956): 471; Menzel & Mohrig (2000): 589. *Lycoriella* (*Hemineurina*) *biarmata* (Lengersdorf)—? Hondru (1968): 20; Gerbachevskaja-Pavluchenko (1986): 30.

Discussion. *Neosciara biarmata* Lengersdorf was described based on five males from the Austrian Alps. The collection data were defined on the basis of Janetschek's collection list in Lengersdorf's bequest by Menzel & Mohrig (2000) (letters and documents in ZFMK). Tuomikoski (1959a) saw an immature type specimen (male) and wrote that *N. biarmata* Lengersdorf is very close to '*L. modesta* (Staeger)'. However, belonging nowadays in this species complex are many species which are difficult to distinguish from each other without comparing the specimens. A reliable concept of the species is not possible until a type revision is undertaken. It is treated as a *nomen dubium* in Menzel & Mohrig (2000: 589), and not included in the present checklist.

Sciara morosa Meunier, 1904

Literature. *Sciara morosa* Meunier—Meunier (1904): 78, pl. 6, fig. 7; Handlirsch (1907): 930; Keilbach (1982): 342; Mohrig & Röschmann (1994): 82. *Lycoriella* (*Lycoriella*) *morosa* (Meunier)—Frey (1942): 37; Spahr (1985): 107. *Lycoriella morosa* (Meunier)—Evenhuis (1994): 172.

Discussion. *Sciara morosa* Meunier was described from Baltic amber on the basis of seven females. Mohrig & Röschmann (1994: 82) concluded in their revisionary work that the type material is lost and that Frey's (1942) placement of the species in *Lycoriella s. str.* must be strongly suspected because up till now no species of *Lycoriella* have been found in amber. We follow the decision of Mohrig & Röschmann (1994) and exclude the preoccupied name *Sciara morosa* Meunier, 1904 [not *Sciara morosa* Winnertz, 1867] from the *Lycoriella* group and place it in the unplaced taxa (species *incerta sedis*).

Sciara solita Walker, 1857

Literature. *Sciara solita* Walker—Walker (1857): 105; Brunetti (1920): 19; Edwards (1928): 24; Edwards (1931): 489. *Lycoriella solita* (Walker)—Steffan (1972): 466.

Discussion. *Sciara solita* Walker was described based on one female from Malaysia (Borneo: Sarawak). One

additional sample was found by Edwards (1931) from the lowlands of Northern Borneo (1 male, 14 females from 'Bettotan' near Sandakan, Sabah). Brunetti (1920) wrote that the holotype is in BMNH, and in good condition. The original description by Walker (1857) comprises only five lines and is so meagre that the species cannot be identified without studying the type. Of the male found later it is unclear whether it really is *S. solita sensu* Walker (1857) as there is no description nor figures of this specimen. On this account, *Sciara solita* Walker, 1857 is removed from the *Lycoriella* group and placed among the unplaced taxa of Sciaridae (species *incertae sedis*).

Taxonomic corrections within the *Lycoriella* group *sensu* Menzel & Mohrig (2000)

Hemineurina modesta (Staeger, 1840) comb. n.

Synonyms: = *arctica* (Holmgren, 1869) [as *Sciara*]; = *conglomerata* (Pettey, 1918) [as *Neosciara*]; = *ecalcarata* (Holmgren, 1869) [as *Sciara*]; = *frigida* (Holmgren, 1869) [as *Sciara*, preocc.]; = *fumatella* (Lundbeck, 1898) [as *Sciara*]; = *globiceps* (Becher, 1886) **syn. n.** [as *Sciara*]; = *groenlandica* (Holmgren, 1872) [as *Sciara*]; = *holmgreni* (Rübsaamen, 1894) [as *Sciara*, new name for *Sciara frigida* Holmgren, 1869].

Material studied. *Lectotype*, *male* of *Sciara modesta* Staeger (designated by Menzel in Menzel & Mohrig (2000): 405, 755). DEnmark, without locality details [as 'Danmark'], specimen no. 239, in May, Staeger (in ZMUC). *Lectotype*, *male* of *Sciara globiceps* Becher (designated by Menzel in Menzel & Mohrig (2000): 402, 752). NORWAY, Jan Mayen, inventory no. 5/70A/12/NMW, [August or September] 1882, F. Fischer (in NHMW).

Literature (selection). *Sciara globiceps* Becher—Becher (1886): 62, pl. 5, figs 2, 2 a–d; Edwards (1923): 236. *Lycoriella globiceps* (Becher)—Thunes *et al.* (2004): 85. *Lycoriella* (*Hemineurina*) *globiceps* (Becher)—Menzel & Mohrig (2000): 402 [in part]. *Sciara modesta* Staeger—Staeger (1840): 286. *Bradysia* (*Hemineurina*) *modesta* (Staeger)—Frey (1948): 66, 84; pl. 18, fig. 104; Frey (1953): 458; Nielsen *et al.* (1954): 21. *Lycoriella modesta* (Staeger)—Krivosheina & Mohrig (1986): 157, 162; Röschmann & Mohrig (1993): 383; Röschmann & Mohrig (1994): 203; Hellrigl (1996): 633; Hennicke *et al.* (1997): 99; Mukkala *et al.* (2005): 16, 32; Seeber *et al.* (2012): 369; Salmela *et al.* (2015): 87. *Lycoriella* (*Hemineurina*) *modesta* (Staeger)—Frey (1942): 36; Tuomikoski (1960): 75, 77; ? Gerbachevskaja (1963): 498; Tuomikoski (1967): 48; Freeman (1983a): 168; Freeman (1983b): 30, fig. 99; Gerbachevskaja-Pavluchenko (1986): 31; Franz (1989): 15; Menzel *et al.* (1990): 337; Jakovlev (1994): 76; Menzel & Mohrig (2000): 405; Menzel *et al.* (2003): 88, 101; Coulson & Refseth (2004): 103; Menzel *et al.* (2006): 108; Coulson (2008): 161; Coulson (2013): 154; Mohrig *et al.* (2013): 213, fig. 37 a–e; Vilkamaa (2015): 551.

Discussion. The only existing male of *Sciara globiceps* Becher (lectotype) is in poor condition. Because of the strongly deformed male genitalia Menzel & Mohrig (2000) did not realize that the lectotype of *Sciara globiceps* Becher is not identical with *Hemineurina algida* (Frey) [misidentification] but in reality represents *Hemineurina modesta* (Staeger), which has a longer and therefore a more slender-looking gonostylus. Consequently, some records of *H. algida* were erroneously published by Menzel & Mohrig (2000) under the name '*L. globiceps* (Becher)' [see literature under *H. algida* (Frey)]. These errors are corrected here, by treating *Sciara globiceps* Becher, 1886 **syn n.** as a junior synonym of *Hemineurina modesta* (Staeger, 1840) **comb. n.** and *H. algida* (Frey, 1948) **restit. et comb. n.** as a separate species. The distinct differences between *H. algida* and the similar *H. thuringiensis* are discussed under *H. algida* (Frey).

Hemineurina algida (Frey, 1948) restit. et comb. n.

Material studied. *Lectotype, male* (**here designated**). RUSSIA, 'Regio kuusamoensis, Paanajärvi' [= Republic of Karelia, Kemsky District, village Paanajärvi], specimen no. 739, type no. 8372 (ID GE.250), 24.VI.1937, R. Frey (without genitalia, in MZH). *Paralectotypes*. 4 males [all misidentification; = *Hemineurina modesta* (Staeger, 1840)]: FINLAND, Ab (Regio aboensis), Vichtis [= Vihti], Päivölä, wood pile, 28.VIII.1943, R. Frey, 1 male (ID GE.1769, in MZH); FINLAND, Ta (Tavastia australis), Kangasala [SE of Tampere], 11.VI.1942, R. Frey, 1 male (ID GE.1770, in MZH); FINLAND, LKem (Lapponia kemensis), Pallastunturi [= mountain Pallastunturi SW of Raattama], 8.VII.1943, R. Frey, 1 male (ID GE.1773, in MZH); FINLAND, Le (Lapponia enontekiensis), Kilpisjärvi, Malla [= Lapland, Enontekiö, Malla mountains near Kilpisjärvi], 18.VII.1943, R. Frey, 1 male (ID GE.1771,

in MZH). The other type specimens of '*Bradysia* (*Hemineurina*) *algida*' mentioned by Frey (1948: 84) were collected in 'N. Helsingfors, Kottby' [= FINLAND, Nylandia, Helsinki, Kottby district] and 'Le. Saana' [= FINLAND, Lapponia enontekiensis, Enontekiö, Saana mountain near Kilpisjärvi]. These paralectotypes could not be found in the MZH collection and were not revised.

Literature. *Lycoriella* (*Hemineurina*) *globiceps* (Becher)—Menzel & Mohrig (2000): 403 [in part, misidentification]; Coulson & Refseth (2004): 103; Salmela & Vilkamaa (2005): 291 [both misidentifications]. *Lycoriella globiceps* (Becher)—Mukkala *et al.* (2005): 16, 32; Vilkamaa *et al.* (2007): 228 [all misidentifications]. *Bradysia* (*Hemineurina*) *algida* Frey—Frey (1948): 66, 84, pl. 18, fig. 107. *Lycoriella algida* (Frey)—Jakovlev (1994): 76; Hellrigl (1996): 633. *Lycoriella* (*Hemineurina*) *algida* (Frey)—Tuomikoski (1960): 75, 77; Pavluchenko (1984): 94; Gerbachevskaja-Pavluchenko (1986): 30; Röschmann & Mohrig (1994): 203.

Discussion. *Hemineurina algida* (Frey) is a small, common, boreoalpine species (body length of the male 1.7–2.0 mm). Of Frey's original type series, only one male remains, which corresponds with the description by Frey (1948: 66, fig. 107). Frey (1948) prepared his figure 107 based on the now designated lectotype specimen (checked before the loss of male genital during the slide re-mounting). All other revised specimens of the type series in MZH belong to *H. modesta* (Staeger), as was already noted by Tuomikoski. *Hemineurina algida* (Frey) is similar to *H. thuringiensis* (Menzel & Mohrig) comb. n. The gonostylus of the very variable *H. algida* is mostly much narrower than that in *H. thuringiensis*, less impressed medially, the medial megasetae narrower and the basoventral seta groups of the intergonocoxal area hypopygium are less distinct. The seta groups of the intergonocoxal area can be very variable even in material from one locality [e.g., 1488 males were studied from the Tyresta National Park near Stockholm, Sweden (in SDEI, SMNH) and ca. 50 specimens from other European countries, incl. Finland and Norway (in MZH, SDEI)]. A morphological study showed that the basoventral seta groups can vary from 8–10 closely spaced setae to a near absence of setae. Furthermore, *H. algida* has a longer gonocoxa and somewhat wider basal bodies of the antennal flagellomeres with yellowish-whitish setosity. *H. thuringiensis* has the gonocoxa shorter and more compact, the flagellomeres slightly longer and with dirty pale brown setosity, the gonostylus shorter and thickened, the medial megasetae mostly stronger and the seta groups of the intergonocoxal area more dense and separated from each other like islands.

Hemineurina speciosissima (Strobl, 1898) comb. n.

Literature. *Sciara speciosissima* Strobl—Strobl (1898): 279; Gerbachevskaja-Pavluchenko (1986): 70. *Lycoria* (*Neosciara*) *speciosissima* (Strobl)—Lengersdorf (1928–30): 55. *Bradysia speciosissima* (Strobl)—Franz (1989): 23. *Lycoriella* (*Hemineurina*) *speciosissima* (Strobl)—Menzel (1992a): 249; figs 42–44; Menzel & Mohrig (2000): 386, 412.

Discussion *Sciara speciosissima* Strobl, 1898 is known only from one male in very poor condition and four females. They belong to *Lycoriella* (*Hemineurina*) *sensu* Menzel & Mohrig (2000) and to the genus *Hemineurina* Frey (former *L. inflata* group) in the present sense, but we cannot completely clarify their species status without an examination of male genitalia (Menzel 1992a, Menzel & Mohrig 2000).

Hemineurina unguicauda (Malloch, 1923) restit. et comb. n.

Literature. *Lycoriella* (*Hemineurina*) *riparia* (Holmgren)—Mohrig *et al.* (2013): 214, fig. 38 a, b [misidentification]. *Sciara unguicauda* Malloch—Malloch (1923): 180, pl. 13, fig. 3. *Bradysia* (*Bradysia*) *unguicauda* (Malloch)—Stone & Laffoon (1965): 234. *Bradysia unguicauda* (Malloch)—Steffan (1966): 37, 54.

Discussion. When the figure of the lectotype of *Sciara riparia* Holmgren in Menzel & Mohrig (2000: 407, fig. 375) is compared with the figure of the holotype of *S. unguicauda* Malloch by Mohrig *et al.* (2013: 215: fig. 38 a), it is clear that the species are distinct. *Hemineurina riparia* (Holmgren, 1883) comb. n. has a narrower gonostylus and a slightly impressed part on the basal side of the apical tooth, where there are three megasetae [two very close to the apical tooth, one of which on its dorsal, one on its ventral side and one megaseta medially at the apical third]. The medial part of the gonostylus between the two groups of megasetae has only short setae, the apical tooth is not on a lobe-like process, and the whiplash seta is on the middle of the medial side. Furthermore, all megasetae are narrow,

hyalinous, and on short basal bodies. In comparison, *Hemineurina unguicauda* (Malloch, 1923) **restit. et comb. n.** has a more voluminous gonostylus, the medial side of which is strongly impressed ventrally, and the medial margin between the apex of gonostylus and the medial megasetae has strikingly long setae. Of the four megasetae, three are much stronger than those of *H. riparia* and two of the megasetae are close to each other on high basal bodies at the middle of the gonostylus. Furthermore, the whiplash seta of *H. unguicauda* is more basally placed (on the basal third of the gonostylus), one slender megaseta is on the margin of the impressed area and one, stronger, megaseta just on the basal side of the apical tooth. Strikingly, the long apical tooth and the subapical megaseta are at the apex of a long non-setose lobe, which is absent from *H. riparia* (Holmgren).

Lycoriella piristylata Vilkamaa, Hippa & Heller, 2013

Literature. *Lycoriella* (*Hemineurina*) *piristylata* Vilkamaa, Hippa & Heller—Vilkamaa *et al.* (2013): 52, fig. 3 A–C.

Discussion. *Lycoriella piristylata* was described in the former subgenus *Hemineurina* Frey based on the holotype and nine paratypes from Northern Finland, Norway and Sweden (Vilkamaa *et al*. 2013). The species was provisionally placed in *L. vitticollis* group of *Lycoriella* (*Hemineurina*) but because it has a sensory pit on the first palpal segment, *Lycoriella piristylata* belongs—in spite of the completely reduced whiplash seta on the medial side of the gonostylus—to the genus *Lycoriella* Frey *s. str. sensu* Menzel & Mohrig (2000: 380). Furthermore, the species has a bow-like bordered fore tibial organ, lacks spinose setae on the fore tibia, the tarsal claws are without teeth, the basal portion of antennal flagellomeres have long and appressed sensilla, the gonocoxae are long, ventrobasally separated in a v-shape, and the tegmen is membraneous and broadly roundish. Basoventrally in the intergonocoxal area—contrary to the original description by Vilkamaa *et al.* (2013: p. 53, fig. 3 A)—there is no medial lobe. At that place on the medial margin there are at most a few setae, as, for example, in *L. lundstromi* (Frey, 1948) and *L. vanderwieli* (Schmitz, 1920).

Phylogeny and classification

The molecular phylogeny by Shin *et al*. (2013) challenged the monophyly of *Lycoriella s. str.* + (*Hemineurina* + *Coelostylina*) (only the *L. inflata* group was included in the ingroup of their analysis) suggested by Menzel & Mohrig (2000) on the morphological evidence. Shin *et al*. (2013) suggested that *Hemineurina* and *Lycoriella s. str.* are not closely related, as they appeared in different main clades in the phylogenetic tree. The morphological characters uniting *Lycoriella s. str.* and *Hemineurina* are indeed few: the presence of the whiplash seta and the pale and weak body setosity. *Coelostylina* Tuomikoski, 1960 (preocc.) is a junior homonym of *Coelostylina* Kittl, 1894 (Gastropoda: Coelostylinidae), and is here renamed as *Stenacanthella* **nom. et stat. n.** On the basis of the corrected nomenclature, the species groups of '*Coelostylina* Tuomikoski' *sensu* Menzel & Mohrig (2000: 380, 384) are kept and re-named here as the *St. freyi* group and *St. secundaria* group.

Hemineurina, Trichocoelina and *Stenacanthella* have several putative synapomorphies: the intergonocoxal area is long and the apicoventral margin of gonocoxa is therefore short, the intergonocoxal area is almost exclusively with setose lobe(s), the gonostylar megasetae usually have basal bodies, the megasetae are mostly slender and at least some of them are oblique in position, the gonostylus is impressed, the apex of gonostylus is densely setose, the tegmen is at least partly sclerotized, and the fore tibia has spine-like setae among the ordinary vestiture (lacking in *Lycoriella s. str.*). Furthermore, *Hemineurina* and *Trichocoelina* as sister groups share as synapomorphies the similar intergonocoxal area with two lobes (in some species a medial lobe), the whiplash seta medial or subbasal in position, and a well-developed apical tooth of gonostylus. Following our present morphological interpretation, we agree with Menzel & Mohrig (2000) with the phylogenetic relationships of these three taxa, but propose raising them to genus rank: *Stenacanthella* nom. et stat. n. + (*Hemineurina* stat. n. + *Trichocoelina* gen. n.). The genus *Hemineurina* here includes only the former *L. inflata* group with the type species *Sciara conspicua* Winnertz, 1867, and the new genus *Trichocoelina* is established for the former *L. vitticollis* group (type species *Sciara vitticollis* Holmgren, 1883).

The maximum likelihood tree for the COI gene indicates that *Trichocoelina* gen. n. is monophyletic (Appendix

3). However, the genus *Hemineurina* Frey in the present sense represented by two morphotypes sensu Menzel & Mohrig (2000)—*H. inflata* and *H. conspicua*—appears at different positions in the ML tree. This result is of course preliminary and not representative because only one gene was included in our genetic analysis and the taxon sampling was very limited. But this taxonomic problem was not the focus of this study and will be discussed in a later revision of the *Hemineurina* species.

Diagnostic characters of the *Lycoriella* group of taxa

The traditional *Lycoriella* group of taxa (subgenera *Lycoriella s. str.*, *Lycoriella* (*Hemineurina*) with *Hemineurina* stat. n. [former *L. inflata* group] and *Trichocoelina* gen. n. [former *L. vitticollis* group], *Stenacanthella* nom. et stat. n. [former *Lycoriella* (*Coelostylina*)] and *Bradysiopsis*, can be distinguished from other genera of Sciaridae by the following characters: Body vestiture weak and pale (dark and strong in *Bradysiopsis* and some *Stenacanthella*), fore tibia with a distinct tibial organ (densely setose and with arcuate boundary), gonostylus with two or more upcurved whiplash setae sub-basomedially (lacking in *Bradysiopsis* and *Stenacanthella*), apical tooth and subapical/mesial megasetae present, intergonocoxal area of hypopygium or basoventral parts of gonocoxa mostly with lobe(s) or seta group(s). Species of *Mohrigia* Menzel, 1995 also have one or more whiplash setae on the gonostylus and an intergonocoxal lobe, but differ in having a modified apical tooth with megasetae inside, the tegmen narrow and with a dorsomedial sclerotized rim, the tarsal claws with tiny teeth, and a very short and weak aedeagal apodeme (Menzel & Martens 1995; Menzel & Mohrig 2000). *Camptochaeta* Hippa & Vilkamaa, 1994 also has elongated seta(e) on their gonostylus, but these are strong and not whiplash-like (similar as in *Mohrigia*). *Camptochaeta* can also be distinguished by typical lambda-shaped basal sclerotization in the gonostylus, stronger gonostylar megasetae, and by generally stronger and darker body setosity. *Eugnoriste* Coquillett, 1896 and *Pseudolycoriella* Menzel & Mohrig, 1998 also have a whiplash-like seta on the gonostylus, but the seta is downcurved and sub-apicoventral in position (not medial or subbasal as in *Lycoriella s. str.*, *Hemineurina* and *Trichocoelina*). Furthermore, *Eugnoriste* and *Pseudolycoriella* have teeth on the tarsal claws, and strong body setosity.

Key to genera of the former *Lycoriella sensu lato* group

Note. Some species of *Trichocoelina* lack the apical tooth or whiplash seta(e) on the gonostylus and in some species of *Hemineurina* the intergonocoxal lobe of hypopygium is distinguishable only as a few setae or is completely lacking.

1 Eye bridge not complete, interrupted in the middle and without ommatidia, apical gonostylar megaseta present, subapical and mesial megasetae absent, gonostylus basally with an up-curved whiplash seta on very high lobe-like basal body . . . . . *Merizomma* Sasakawa **stat. n.** (former subgenus *Chorizomma* Sasakawa; preocc.)

\- Eye bridge complete, united in the middle and with ommatidia, apical gonostylar megaseta absent, subapical and/or mesial megaseta(e) present, gonostylus without whiplash seta or subapical/mesial/subbasal whiplash seta(e) on short basal body(es) 2

2 Gonostylus with at least one whiplash-like seta, apex of gonostylus densely setose 3

\- Gonostylus without whiplash setae, apex of gonostylus sparsely setose 5

3 Gonostylus with downcurved subapical whiplash seta, tarsal claws with teeth . . . . . *Pseudolycoriella* Menzel & Mohrig

\- Gonostylus with upcurved medial or subbasal whiplash seta, tarsal claws without teeth 4

4 Scutellum with 2 long and strong setae, R_1 short, merging with c well before base of M-fork, gonostylus mostly elongated and apically narrowed (when gonostylus somewhat thickened, then apical tooth very long) . . . . . *Hemineurina* Frey **stat. n.** (former *L. inflata* group of subgenus *Hemineurina* Frey)

\- Scutellum with 4 (rarely 3) long and strong setae, R_1 long, merging with c shortly before base of M-fork, gonostylus thickened, apically usually roundish or lobe-like enlarged (when gonostylus very thick, then apical tooth short or lacking) . . . . . *Trichocoelina* **gen. n.** (former *L. vitticollis* group of subgenus *Hemineurina* Frey)

5 First palpal segment long and narrow, scutellum with 4 strong setae, intergonocoxal area without lobe, gonocoxae separated, gonostylus convex, not impressed, with strong apical tooth (longer than the megasetae), all gonostylar megasetae without basal bodies, subapical in position . . . . . *Bradysiopsis* Tuomikoski

\- First palpal segment enlarged, scutellum with 2 strong setae, intergonocoxal area with 3 lobes, or 1 medial lobe and two lobes or seta groups at bases of gonocoxae, gonocoxae united, gonostylus impressed, apical tooth very short or lacking (if present, then shorter than the megasetae), gonostylar megasetae with basal bodies, part of gonostylar megasetae medial or subbasal in position . . . . . *Stenacanthella* **nom. et stat. n.** (former subgenus *Coelostylina* Tuomikoski; preocc.)

Genus *Trichocoelina* gen. n.

Type species: *Sciara vitticollis* Holmgren, 1883

Description. Male. **Head**. Eye bridge 2–4 facets wide. Coloration of antenna brown or scapus, pedicellus and/or 1st flagellomere yellow, flagellomeres with unicolorous necks, necks short. Maxillary palpus with 3 segments, 1st segment with dorsal patch of sensilla and a few sharp setae (without sensory pit). Face with many setae. **Thorax**. Brown and sparsely setose, setae usually pale. Scutellum with 4 (rarely 3) strong setae and many short setae. Katepisternum high and triangular, postpronotum non-setose. **Legs**. Yellow. Fore femur slender. Fore tibia with some spinose setae among vestiture and some spinose setae at apex. Fore tibial organ large and distinct, usually clearly demarcated, setae strong or fine, tibial spurs long, mid and hind legs with 2 equally long ones. Tarsal claws untoothed. **Wing**. Fumose. Anal lobe small. Veins distinct. Fork of M very long and weakly arcuate; R and R_1 long, R_1 merging with c nearly at level of base of M-fork; apical part of R_5 with only dorsal macrotrichia. **Abdomen**. Pale brown and sparsely setose, setae usually pale and fine. **Hypopygium**. Apicoventral corner with only one long seta, intergonocoxal area of hypopygium long, with one medial, usually at least apically divided lobe, or two separate lobes at bases of gonocoxae. Gonocoxa normal to wide, as long as or longer than gonostylus. Gonostylus rather narrow to very voluminous, apically densely setose, medially impressed, with an apical tooth (missing only in one known species), with 5 to numerous, usually slender and slightly procurved megasetae, with one or a few subbasal whiplash setae. Tegmen as long as broad, or shorter or longer, weakly sclerotized, rounded or with different modifications apically, with very small and fine aedeagal teeth (or these apparently lacking), and with distinct aedeagal apodeme.

Female. Without diagnostic characters at species level.

Discussion. *Trichocoelina* gen. n. differs from *Hemineurina* in having the gonostylus usually broader and more strongly impressed or excavated, the ventrolateral margin extending over the basal parts of the megasetae, in having the megasetae more numerous and slender, usually with distinct basal bodies, the whiplash setae subbasal in position, and the tegmen usually only weakly sclerotized. The intergonocoxal area of hypopygium is longer and the apical part of gonocoxa shorter than in *Hemineurina*. *Trichocoelina* differs from *Stenacanthella* in having a whiplash seta on the gonostylus, in having stronger apical tooth, and no tendency to have three lobes in the intergonocoxal area. *Trichocoelina* differs from both *Hemineurina* and *Stenacanthella* in having 4 or 3, not just two, long and strong setae on the scutellum.

Distribution. Northern Holarctic, south of 50° N only in mountains over 1000 meters high.

Etymology. The name is formed from the latinized Greek words *trichos*, hair, and *koilos*, hollow, referring to the narrow megasetae in the medially hollowed gonostylus of most species.

Trichocoelina species included

T. absidata **sp. n**. (Russia: Krasnodarsk region)
T. aemula **sp. n.** (Finland; Russia: Krasnodarsk region)
T. biplex **sp. n.** (Canada: Newfoundland and Labrador, Yukon)
T. brevicubitalis (Lengersdorf, 1926) **comb. n.** (Norway: mainland; ? Estonia)
T. chentejensis (Menzel, 1992) **comb. n.** (Finland; Mongolia)
T. cochleata (Rübsaamen, 1898) **comb. n.** (Czech Republic; Finland; Russia: Karelia, Siberia; Norway: mainland, Svalbard; Greenland)
T. dicksoni **sp. n**. (Russia: Arkhangelsk oblast, Kemerovsk oblast, Krasnodarsk region)
T. dispansa **sp. n. (**Russia: Krasnodarsk region)
T. dividua **sp. n.** (Canada: Northwest Territories)
T. hians **sp. n.** (Canada: Yukon)
T. hiemalis (Mohrig & Mamaev, 1985) **comb. n.** (Finland; Germany; Russia: Krasnodarsk region)
T. imitator **sp. n.** (Canada: Yukon)
T. incrassata **sp. n.** (USA: Alaska)
T. ithyspina **sp. n.** (Norway: mainland)
T. janetscheki (Lengersdorf, 1953) **comb. n.** (Austria; Greenland; Canada: Nunavut; USA: Colorado)
T. jukkai **sp. n.** (Finland; Norway: mainland)

T. magnifica **sp. n.** (Canada: Yukon)
T. nefrens **sp. n.** (Russia: Krasnodarsk region)
T. obesula **sp. n.** (Norway: Svalbard)
T. olschwangi (Mohrig & Mamaev, 1983) **comb. n.** (Russia: Krasnodarsk region; Canada: Yukon; USA: Colorado)
T. oricillifera **sp. n.** (Finland; Norway: mainland; Sweden)
T. planilobata **sp. n.** (Finland)
T. quintula **sp. n.** (Finland)
T. semisphaera **sp. n.** (Finland; Norway: Svalbard)
T. semusta **sp. n.** (Italy; USA: Alaska)
T. subcochleata (Komarov, 2009) **comb. n.** (Russia: Republic of Altai)
T. subpermutata (Mohrig & Mamaev, 1990) **comb. n.** (Russia: Krasnodarsk region; Sweden)
T. tecta **sp. n.** (Russia: Krasnodarsk region, Yamalo-Nenets Autonomous Okrug; Canada: Nunavut, Yukon; USA: Alaska)
T. vitticollis (Holmgren, 1883) **comb. n.** (Finland; Norway: Svalbard; Russia: Novaya Zemlya; Sweden; Greenland; ? Canada: Nunavut)

Key to species of *Trichocoelina* (males)

Note. Trichocoelina brevicubitalis (Lengersdorf, 1926) comb. n., known only in the female sex, is not included in the identification key (redescription and discussion see under 'The *Trichocoelina* species').

1 Apical tooth of gonostylus present . . . 2
- Apical tooth of gonostylus absent . . . *T. nefrens* **sp. n.**
2 Megaseta present on apical (lateral) side of apical tooth of gonostylus . . . 3
- Megaseta absent from apical (lateral) side of apical tooth of gonostylus . . . 6
3 Intergonocoxal lobe extremely broad, medially slightly notched . . . *T. planilobata* **sp. n.**
- Intergonocoxal lobe(s) narrower . . . 4
4 Tegmen and intergonocoxal lobe much broader than long . . . *T. dispansa* **sp. n.**
- Tegmen and intergonocoxal lobe at most slightly broader than long . . . 5
5 Tegmen apically and laterally roundish, gonostylus sparsely setose, gonostylar megasetae slender, intergonocoxal lobe at most apically bifid . . . *T. jukkai* **sp. n.**
- Tegmen apically and laterally straight, gonostylus richly setose, gonostylar megasetae thicker, intergonocoxal lobe deeply divided . . . *T. dividua* **sp. n.**
6 Megaseta(e) present on the ventral side of apical tooth or adjacent on its basal side . . . 7
- Megaseta(e) absent from the ventral side of apical tooth, none adjacent on its basal side . . . 9
7 Gonostylus broad, all gonostylar megasetae much narrower than apical tooth at its base . . . *T. obesula* **sp. n.**
- Gonostylus narrow, the basalmost megasetae only slightly narrower than apical tooth at its base . . . 8
8 Hypopygium with one elongated, apically bifid intergonocoxal lobe . . . *T. ithyspina* **sp. n.**
- Hypopygium with two separate triangular intergonocoxal lobes . . . *T. chentejensis* (Menzel)
9 Tegmen with distinct lateral teeth or corners, or strongly narrowed at middle . . . 10
- Tegmen without lateral teeth or corners, laterally straight or smoothly curved . . . 16
10 One of gonostylar megasetae with its basal body separated from others and larger . . . *T. magnifica* **sp. n.**
- None of gonostylar megasetae with their basal bodies separated, or larger than the others . . . 11
11 All gonostylar megasetae pointing at one direction, either perpendicularly or obliquely . . . 12
- Some groups of gonostylar megasetae pointing perpendicularly, some obliquely . . . 14
12 Gonostylus rather narrow with narrowed apex, with long apical tooth and oblique megasetae . . . *T. biplex* **sp. n.**
- Gonostylus voluminous, with tumid apex, with short apical tooth and megasetae . . . 13
13 Tegmen apicad from the lateral corners short, basally strongly broadened, intergonocoxal lobes long . . . *T. oricillifera* **sp. n.**
- Tegmen apicad from the lateral corners long, basally slightly broadened, intergonocoxal lobes short . . . *T. imitator* **sp. n.**
14 Gonostylus very broad, laterally semicircular, with dorsomedial lobe, tegmen with straight apicolateral sides . . . *T. incrassata* **sp. n.**
- Gonostylus narrower, laterally less curved, without dorsomedial lobe, tegmen with sharp lateral corners . . . 15
15 Intergonocoxal area of hypopygium with 1 long, apically divided lobe, tegmen longer than broad . . . *T. subcochleata* (Komarov)
- Intergonocoxal area with 2 short separate lobes, tegmen broader than long . . . *T. subpermutata* (Mohrig & Mamaev)
16 Gonostylus with one group of megasetae, with megasetae pointing in different directions . . . *T. olschwangi* (Mohrig & Mamaev)
- Gonostylus with groups of megasetae, in each group megasetae pointing in only one direction . . . 17

17 Gonostylus with both perpendicular and oblique groups of megasetae . . . . . *T. tecta* **sp. n.**
- Gonostylus with only perpendicular or oblique groups of megasetae 18
18 Gonostylar megasetae perpendicular . . . . . *T. hians* **sp. n.**
- Gonostylar megasetae oblique 19
19 Intergonocoxal area with 1 lobe, divided at apical half 20
- Intergonocoxal area with 2 separate lobes 21
20 Gonostylus subtriangular, basally broad, apically strongly narrowed . . . . . *T. semisphaera* **sp. n.**
- Gonostylus basally not especially broad and apically only slightly narrowed . . . . . *T. vitticollis* (Holmgren)
21 Gonostylus very large, with about 30 short megasetae, tegmen with acuminate hyalinous apical process . . . . . *T. janetscheki* (Lengersdorf)
- Gonostylus smaller, with at most 15 megasetae, tegmen without apical process or with a curved one 22
22 Tegmen with semicircular sclerotized apical process, apex of gonostylus with strikingly dark setosity 23
- Tegmen without apical process, apex of gonostylus not strikingly dark 24
23 Apical process of tegmen narrow and protruding, antennal scapus and pedicellus yellow . . . . . *T. cochleata* (Rübsaamen)
- Apical process of tegmen broad, not protruding, antennal scapus and pedicellus brown . . . . . *T. semusta* **sp. n.**
24 Gonostylus narrow, about 2.4x as long as wide, with 5 megasetae . . . . . *T. quintula* **sp. n.**
- Gonostylus broad, 1.7–2x as long as broad, with at least 7 megasetae 25
25 Apical tooth of gonostylus distinctly longer than gonostylar megasetae . . . . . *T. absidata* **sp. n.**
- Apical tooth of gonostylus subequal with gonostylar megasetae 26
26 Apical tooth of gonostylus and gonostylar megasetae relatively long, about 2/5 of the broadest part of gonostylus . . . . . *T. aemula* **sp. n.**
- Apical tooth of gonostylus and gonostylar megasetae relatively short, about 1/4–1/3 of the broadest part of gonostylus . . . 27
27 Gonostylus distinctly narrowed towards apex, its lateral side strongly curved, tegmen semicircular . . . . . *T. hiemalis* (Mohrig & Mamaev)
- Gonostylus apically truncate, its lateral side slightly curved, tegmen subtriangular . . . . . *T. dicksoni* **sp. n.**

The *Trichocoelina* species

Trichocoelina absidata sp. n.

Figs 1 A, 3 B

Material studied. *Holotype male.* RUSSIA, Krasnoyarsk region, Taimyr Peninsula, 12.5 km S of Dixon, 73°24'N, 80°39'E, on the river Lemberova, pan trap, 7–10.VII.2012, A. Barkalov (in ISEA).

Description. Male. **Head**. Face and antenna concolorous brown, maxillary palpus pale yellow. Eye bridge 3 facets wide. Face with 18 fine setae. Clypeus with 3 setae. Maxillary palpus with 3 segments, 3rd segment longer than 1st segment, 2nd segment shortest; 1st segment with 2 or 3 setae, with a dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 2.3x as long as wide, the neck shorter than broad, the longest setae slightly shorter than the width of flagellomere. **Thorax**. In poor condition in the specimen studied. Brown, setae pale. **Wing**. Fumose. Length 2.6 mm. Width/length 0.40. Anal lobe moderate. Veins distinct. c/w 0.60. R_1/R 0.70. stM and fork of M subequal in length. r-m 2x as long as bM, r-m and bM non-setose, Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a large patch of fine setae in depression. Fore tibial spur slightly longer than the tibial width. **Abdomen**. Pale brown, setae pale, short and fine. **Hypopygium** (Fig. 1 A). Brown, as abdomen. Intergonocoxal area long, with two short but distinct setose lobes. Gonocoxa broad, longer than gonostylus, medial margin basally smoothly curved, with short sparse setosity. Gonostylus (Fig. 3 B) broad, apically slightly narrowed, medially strongly impressed; with short setosity, with a long apical tooth, with about 15 megasetae medially, megasetae rather long and slender; with 2 well-differentiated whiplash setae on ventromedial margin. Tegmen subconical, weakly sclerotized, with a small area of minute aedeagal teeth. Aedeagal apodeme long.

BIN. Unknown.

Discussion. In the form of its gonostylus, *Trichocoelina absidata* sp. n. most resembles *T. dicksoni* sp. n. and *T. hians* sp. n. It differs from *T. dicksoni* in having a longer apical tooth of gonostylus and shorter and more numerous gonostylar megasetae, in its more conical and unsclerotized tegmen which is not subtriangular and laterally and apically sclerotized, and in having shorter intergonocoxal lobes of the hypopygium. It is similar to *T. hians* in having numerous short gonostylar megasetae, but differs in its basomedially less bulged gonostylus, in missing the narrowed apical part of the tegmen and in having short intergonocoxal lobes of hypopygium.

Etymology. The name is Latin, *absidata*, hollowed, referring to the strongly recurved gonostylus with an impressed medial side.

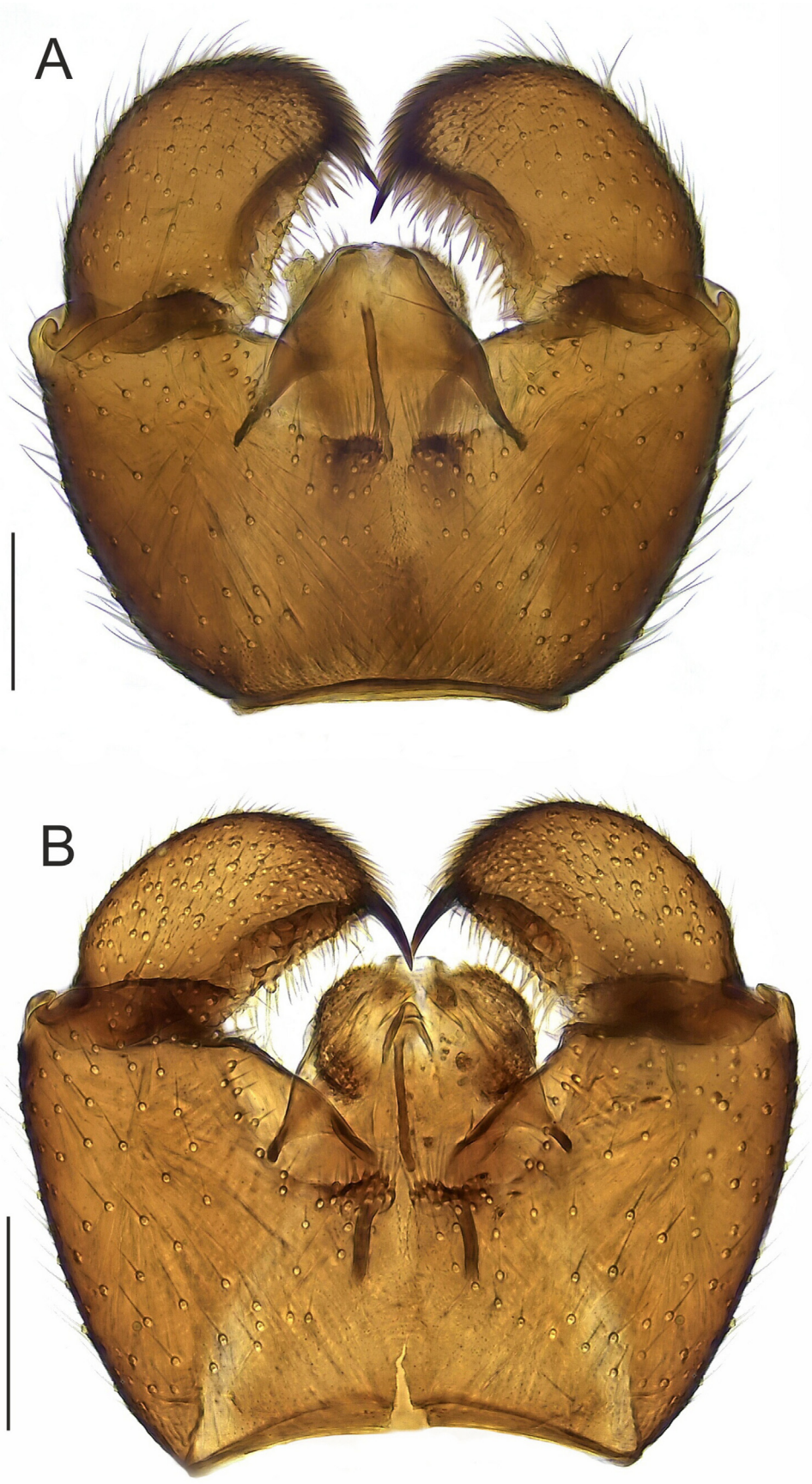

FIGURE 1. Hypopygium, ventral. **A.** *Trichocoelina absidata* sp. n. (holotype). **B.** *T. aemula* sp. n. (holotype). Scale 0.1 mm.

***Trichocoelina aemula* sp. n.**
Figs 1 B, 3 A, 18 A

Material studied. *Holotype male*. RUSSIA, Krasnodarsk region, Taimyr Nature Reserve, Aru-Mas, 72.50°N, 101.94°E, pan trap, 9–20.VII.2010, A. Barkalov (in ISEA). *Paratypes*. RUSSIA, same data as holotype, 4 males (in ISEA, MZH, NHMO, SDEI); FINLAND, Li (Lapponia inarensis) (grid 7759292:3539670), sandy river bank, pitfall trap, 13.VI–13.VII.2016, J. Salmela, 3 males (in MZH, PJSR, SDEI).

Description. Male. **Head**. Face and antenna concolorous brown, maxillary palpus pale yellowish. Eye bridge 2–3 facets wide. Face with 13–15 setae. Clypeus with 1–3 setae. Maxillary palpus with 3 segments, 1st segment as long as or longer than 3rd segment, 2nd segment shortest; 1st segment with 1–2 setae, with dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 1.7–2.0x as long as wide, the neck shorter than broad, the longest setae shorter than the width of flagellomere. **Thorax**. Brown, setae pale. Anterior pronotum with 4–6 setae. Proepisternum with 3–10 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. Fumose. Length 2.0–2.2 mm. Width/length 0.40. Anal lobe weak. Veins distinct. c/w 0.65–0.75. R_1/R 0.6–0.7. stM shorter than fork of M. r-m as long as bM or longer, bM non-setose, r-m with 1–4 setae. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a rather small patch in depression. Fore tibial spur longer than the tibial width. **Abdomen**. Pale brown, setae pale, short and fine. **Hypopygium** (Fig. 1 B). Brown, as abdomen. Intergonocoxal area long, with two short, distinctly separate setose lobes (Fig. 18 A). Gonocoxa broad, longer than gonostylus, medial margin basally strongly curved, with sparse and short setosity. Gonostylus (Fig 3 A) broad, laterally roundish, strongly impressed; with short setosity, with a long apical tooth, with 6–7 megasetae in the medial impression, megasetae long and slender, with distinct basal bodies; with 1 well-differentiated whiplash seta on ventromedial margin. Tegmen as long as broad, long and laterally rounded, apically straight, weakly sclerotized, with a dorsal finger-like process, aedeagal teeth not detectable in the specimens studied. Aedeagal apodeme long.

BIN. Unknown.

Discussion. The basally narrowed gonostylus with a long apical tooth of *Trichocoelina aemula* sp. n. is almost identical to that of *T. biplex* sp. n., but differs in having the intergonocoxal lobes of hypopygium much shorter, and the tegmen less strongly narrowed towards apex and without basolateral corners. Because of its rather long gonostylar megasetae, roundish tegmen and short intergonocoxal lobes of hypopygium, *T. aemula* also resembles *T. cochleata* (Rübsaamen, 1898) but is distinguished by having the gonostylar apex less strongly curved, paler and with a longer apical tooth of gonostylus, see Fig. 3 A and fig. 377 in Menzel & Mohrig (2000).

Etymology. The name is Latin, *aemula*, comparable, referring to the close resemblance to *Trichocoelina biplex* sp. n. and *T. cochleata.*

***Trichocoelina biplex* sp. n.**
Figs 2 A, 3 C

Material studied. *Holotype male.* CANADA, Newfoundland and Labrador, Torngat Mountains National Park, Saglek/Base Camp, 58.451°N, 62.798°W, 5 m, 9.VIII.2013, D. Whitaker (BOLD Sample ID BIOUG11125-C09, in CNC). *Paratypes*. CANADA, same data as holotype but 16.VIII.2013, 1 male (BOLD Sample ID BIOUG11632-G07, in CBG); same data as previous but 20.VII.2014, 3 males (BOLD Sample IDs BIOUG18960-C12, BIOUG18960-E11 and BIOUG18962-F10, in CBG); Yukon, Ogilvie Mts. North Fork Pass, 7.VIII.1963, P.J. Skitsko, 1 male (in MZH).

Description. Male. **Head**. Face and antenna concolorous brown, maxillary palpus pale yellowish. Eye bridge 2–3 facets wide. Face with 22–32 setae. Clypeus with 1 seta. Maxillary palpus with 3 segments, 1st segment as long as 3rd segment, 2nd segment shortest; 1st segment with 1 seta, with dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 2.2x as long as wide, the neck shorter than broad, the longest setae shorter than the width of flagellomere. **Thorax**. Brown, setae pale. Anterior pronotum with 4–9 setae. Proepisternum with 6–9 setae. Scutellum with 3–4 longer and some short and fine setae. **Wing**. Fumose. Length 2.0–2.1 mm. Width/length 0.40. Anal lobe weak. Veins distinct. c/w 0.55–0.65. R_1/R 0.55–0.70. stM shorter than fork of M. r-m longer than bM, bM non-setose, r-m with 1–6 setae. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a sparse patch in depression. Fore tibial spur longer than the tibial width. **Abdomen**. Pale

brown, setae pale, rather long and fine. **Hypopygium (**Fig. 2 A). Brown, as abdomen. Intergonocoxal area long, basally with strongly sclerotized medial stripe, with two long, subtriangular elongated setose lobes. Gonocoxa pale brown, narrow, longer than gonostylus, medial margin basally smoothly curved, with rather long but sparse setosity. Gonostylus (Fig. 3 C) yellow, rather long, apically slightly narrowed, strongly impressed; with normal setosity, with a long apical tooth, with 6–7 megasetae at middle, megasetae slightly curved, long and slender; with 1 well-differentiated whiplash seta on ventromedial margin. Tegmen broader than long, basolaterally broadened, apically roundish, with subapical semicircular sclerotization, aedeagal teeth not detectable in the specimens studied. Aedeagal apodeme short.

BIN. BOLD:ACG3979.

Discussion. By the general structure of its hypopygium, *Trichocoelina biplex* sp. n. resembles *T. vitticollis* (Holmgren) but differs in having the intergonocoxal lobes distinctly separate and shorter, the tegmen more modified with basolateral shoulders and a sclerotized apical rim, the gonostylus less curved and with a shorter apical tooth, the megasetae in a less compact group, and in its darker antennal flagellomeres. See also under *T. aemula.*

Etymology. The name is Latin, *biplex,* divided, referring to the distinctly separate, long intergonocoxal lobes of hypopygium.

Trichocoelina brevicubitalis (Lengersdorf, 1926) comb. n.

Literature. *Sciara brevicubitalis* Lengersdorf—Lengersdorf (1926): 6; Gerbachevskaja-Pavluchenko (1986): 61. *Lycoria* (*Neosciara*) *brevicubitalis* (Lengersdorf)—Lengersdorf (1928–30): 61. *Neosciara brevicubitalis* (Lengersdorf)—? Lackschewitz (1934): 155; Soot-Ryen (1942): 77. *Lycoriella* (*Hemineurina*) *brevicubitalis* (Lengersdorf)—Frey (1942): 36; Menzel & Mohrig (2000): 408.

Redescription. Female. **Head**. Dark brown. Eye bridge united, 2–3 facets wide. Maxillary palpus long, with 3 segments, all segments narrow, 1st segment with 4 sharp setae, with a dorsal unbordered patch of sensilla. Scapus and pedicellus dark bown and roundish; antennal flagellomers missing in the specimen studied. **Thorax**. Postpronotum non-setose. Scutellum with 8 long and strong setae. **Legs**. Strong, with long tibial spurs; tibial spurs of mid and hind tibiae unequally long [one spur is about 1/4 shorter than the other]; tarsal claws without teeth. **Wing**. Large, anal lobe strong, hind veins distinct, stCuA short, 1/3 of bM; bM = r-m, bM non-setose, r-m with 4–5 setae distally, c/w 0.50. Body length 2,7 mm, wing length 2,5 mm.

BIN. Unknown.

Discussion. The species was described from females from Northern Norway by Lengersdorf (1926): for the lectotype designation and literature, see Menzel & Mohrig (2000). After a study of the lectotype, which so far is the only specimen of the species (in ZFMK) available for study, Menzel & Mohrig (2000) stated that the scutellum has many long and strong setae, the 1st palpal segment has a unbordered patch of sensilla, the fore tibia has spine-like setae, and that R_1/R complex is long (R_1 ends near the level of the base of the M-fork). We have studied the lectotype again and have found characters that might be helpful in identification of the male of this species and for supporting its placement in the genus *Trichocoelina*. Of the characters given above, only the somewhat unequally long spurs of the mid and hind tibiae as well as the high number of long scutellars are unusual for *Trichocoelina*.

Trichocoelina chentejensis (Menzel, 1992) comb. n.

Literature. *Lycoriella* (*Hemineurina*) *chentejensis* Menzel—Menzel (1992b): 87, figs 1–5; Menzel & Mohrig (2000): 65, fig. 83; Salmela *et al.* (2015): 64, 87. *Lycoriella chentejensis* Menzel—Menzel & Mohrig (1997): 63, fig. 6.51.

BIN. Unknown.

Discussion. The species was described from the holotype male from Mongolia (Menzel 1992b). For discussion, see under *Trichocoelina dispansa* sp. n.

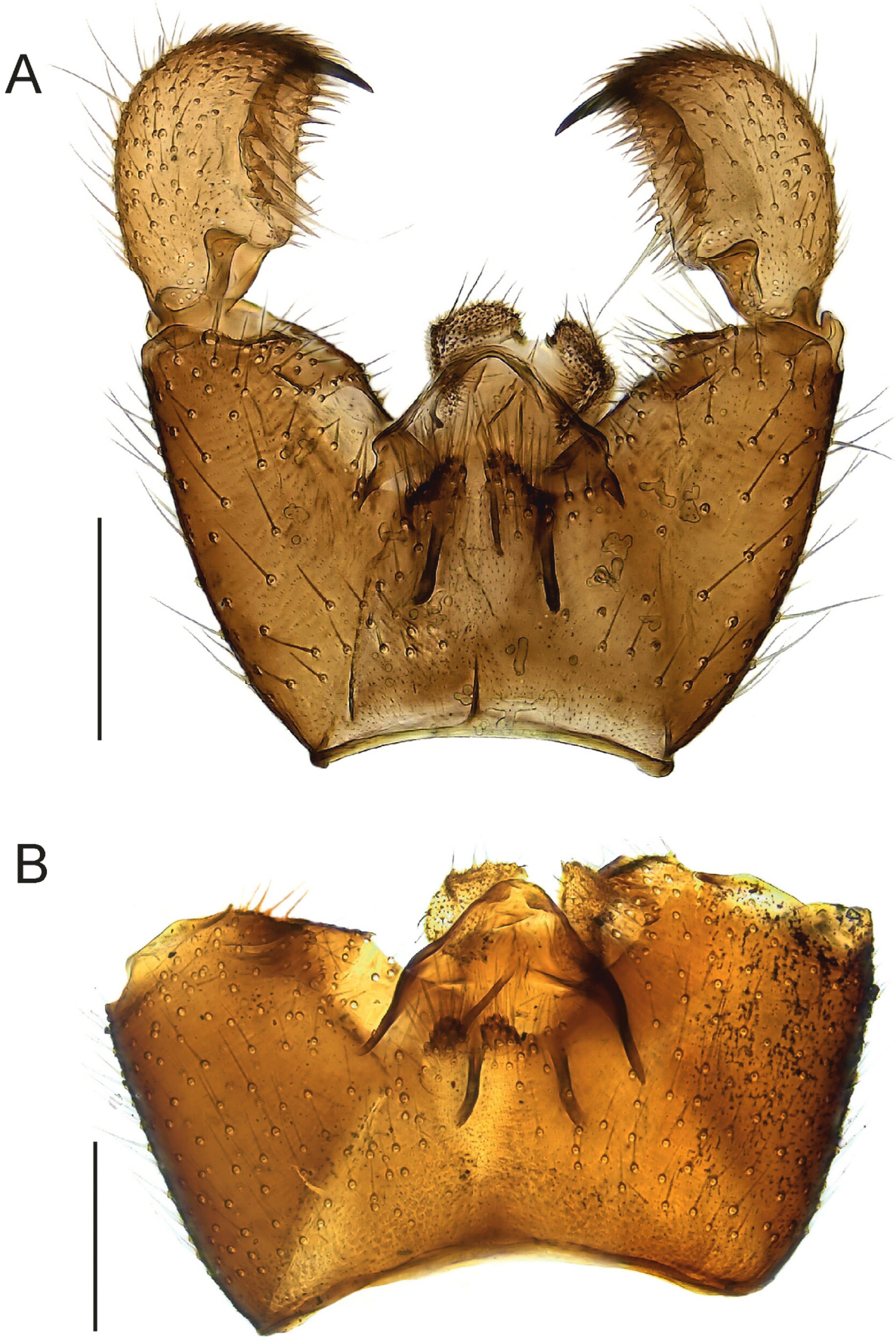

FIGURE 2. Hypopygium (**A**) and basal part of hypopygium (**B**), ventral. **A.** *Trichocoelina biplex* sp. n. (holotype). **B.** *T. dicksoni* sp. n. (holotype). Scale 0.1 mm.

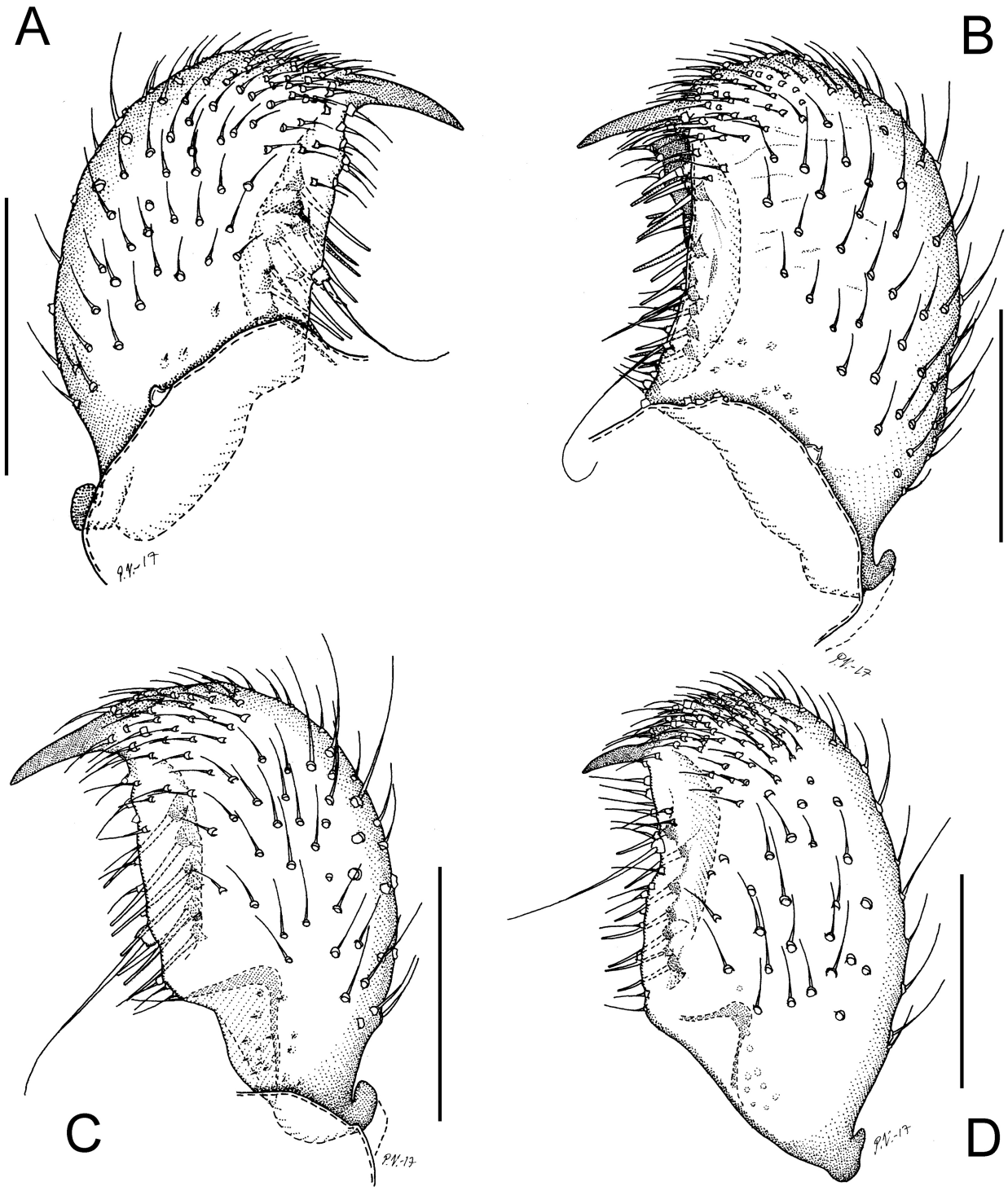

FIGURE 3. Gonostylus, ventral. **A.** *Trichocoelina aemula* sp. n. (holotype). **B.** *T. absidata* sp. n. (holotype). **C.** *T. biplex* (holotype). **D.** *T. dicksoni* (holotype). Scale 0.1 mm.

Trichocoelina cochleata (Rübsaamen, 1898) comb. n.

Synonym: = *haemorrhoidalis* (Lundbeck, 1898) [as *Sciara*].

Literature. *Sciara haemorrhoidalis* Lundbeck—Lundbeck (1898): 247, pl. 5, fig. 6. *Sciara cochleata* Rübsaamen—Rübsaamen (1898): 108; text fig. 4, pl. 6, fig. 22; Lundbeck (1900): 312. *Lycoria* (*Neosciara*) *cochleata* (Rübsaa-

men)—Lengersdorf (1928–30): 33, pl. 2, fig. 40. *Neosciara cochleata* (Rübsaamen)—Lengersdorf (1936): 191; Maschke (1936): 177, 179, 180; Soot-Ryen (1942): 77; Lengersdorf (1951): 26. *Bradysia* (*Hemineurina*) *cochleata* (Rübsaamen)—Frey (1948): 65, 83, pl. 17, fig. 100. *Lycoriella cochleata* (Rübsaamen)—Steffan (1966): 50, 52; Krivosheina & Mohrig (1986): 157, 161. *Lycoriella* (*Hemineurina*) *cochleata* (Rübsaamen)—Tuomikoski (1960): 75, 76; Stone & Laffoon (1965): 232; Tuomikoski (1967): 47; Gerbachevskaja-Pavluchenko (1986): 30; Menzel & Mohrig (2000): 409, figs 377–379; Coulson & Refseth (2004): 103; Coulson (2008): 161; Coulson (2013): 154; Mohrig *et al.* (2013): 270; Vilkamaa (2015): 551; Wirta *et al.* (2016): appendix, unpaginated p. 21 (table S1) and unpaginated p. 39 (cladogram).

BIN. BOLD:ABW3844.

Verified records. CZECH REPUBLIC, 'Glatzer Schneeberg, Graphit-Bergwerk Klein Würben bei Mährisch-Altstadt' [= Králický Sněznik, graphite mine in Malé Vrbno near Staré Mešto], K. Maschke, 16.VII.1935, 3 males, 3 females (in ZFMK); same data but 12.X.1935, 2 males (in ZFMK).

New records. FINLAND, Obb (Ostrobothnia borealis borealis), Tornio, Kiviranta, Malaise trap, 30.VI–4.VII.2008, A. Haarto, 1 male (in MZH); W GREENLAND, Disko Bugt, Quegertasussuk, 68°35'N, 51°05'W, 7.VIII.1991, J. Böcher, 1 male (in ZMUC). NE GREENLAND, Zackenberg, 74°28'N, 20°34'W (UTM8265500:0513778), 44 m, 2–11.VII.2011, T. Roslin & G. Várkonyi, 1 male (in MZH); same locality but UTM 8265758:0513786, 37 m, Malaise trap, 11–20.VII.2011, T. Roslin & G. Várkonyi, 2 males (in MZH, SDEI); same locality but Reseach Station, 74.50°N, 21.00°W, 35 m, 7.VIII.2011, J.B. Mosbacher, 1 male (BOLD Sample ID GRPV2, in DAUH).

Discussion. The species was described from Greenland (Rübsaamen, 1898), and redescribed and illustrated by Menzel & Mohrig (2000), with the discussion of the type material. *Trichocoelina cochleata* is characterized by having a medially impressed gonostylus, with a strongly curved apical part. The antennal scapus and pedicellus as well as the hypopygium and legs are yellow, but the apex of gonostylus has strikingly dark setosity. The gonostylus bears 6–7 rather long and slender gonostylar megasetae, the tegmen is broadly subconical with a sclerotized dorsoapical process. The intergonocoxal lobes of the hypopygium are short. For similar species, see under *Trichocoelina aemula* sp. n. and *T. semusta* sp. n.

Trichocoelina dicksoni sp. n.

Figs 2 B, 3 D

Material studied. *Holotype male*. RUSSIA, Krasnoyarsk region, Dikson Island, Konus Islet, Korotkevich, 31.VII.1948 (in ZIN). *Paratypes*. RUSSIA, same data as holotype, 3 males (1 in SDEI, 2 in ZIN). *Other material*. RUSSIA, Arkhangelsk oblast, Novaya Zemlya, Tuylenya Zaliv, 10.VII.1901, Timofeev, 1 male (in ZIN); Kemerovsk oblast, river Mrassu on upper river Tom, 15.VII.1908, Hvorov, 1 male (in ZIN).

Description. Male. **Head**. Face brown, maxillary palpus pale yellowish. Eye bridge and face not well visible in the specimens studied. Clypeus with 2–3 setae. Maxillary palpus with 3 segments, 1st segment longer than 3rd segment, 2nd segment shortest; 1st segment with 5–6 setae, with dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 2.25–2.35x as long as wide, the neck shorter than broad, the longest setae shorter than the width of flagellomere. **Thorax**. Dark brown, setae pale. Anterior pronotum with 7–12 setae. Proepisternum with 8–17 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. In poor condition in the specimens studied. Fumose. Length 2.2–2.3 mm. Anal lobe weak. Veins distinct. c/w 0.55. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a patch in depression. Fore tibial spur longer than the tibial width. **Abdomen**. Pale brown, setae pale and fine. **Hypopygium** (Fig. 2 B). Brown, as abdomen. Intergonocoxal area moderately long, with 2 long separate setose lobes. Gonocoxa moderately broad, slightly longer than gonostylus, medial margin basally strongly curved, with sparse setosity. Gonostylus (Fig. 3 D) long, apically truncate, strongly impressed; with normal setosity, a short apical tooth, and 7 rather short and slender megasetae; with 1 well-differentiated whiplash seta on ventromedial margin of the apical fourth of gonostylus. Tegmen subtriangular, laterally slightly curved, apically roundish, laterally and apically sclerotized; aedeagal teeth not detectable in the specimens studied. Aedeagal apodeme long.

BIN. Unknown.

Discussion. The above description is based only on the type material. In its rather tumid gonostylus, *Trichocoelina dicksoni* sp. n. resembles most *T. absidata* sp. n. For distinguishing characters, see under the latter.

Etymology. The species is named after the Swedish merchant and philanthropist Oskar Dickson (1823–1897), after whom the type locality of the species, Dikson Island, was named.

Trichocoelina dispansa sp. n.

Figs 4 A, 6 A, 18 B

Material studied. *Holotype male*. RUSSIA, Krasnoyarsk region, Taimyr Peninsula, 12.5 km S of Dixon, 73°24'N, 80°39'E, on the river Lemberova, pan trap, 7–10.VII.2012, A. Barkalov (in ISEA). *Paratype*. RUSSIA, same data as holotype (in MZH).

Description. Male. **Head**. Face and antenna concolorous darkish brown, maxillary palpus pale yellowish. Eye bridge 2–3 facets wide. Face with 21–22 setae. Clypeus with 1–2 setae. Maxillary palpus with 3 segments, 1st segment as long as 3rd segment, 2nd segment shortest; 1st segment with 1–2 setae, with a dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 1.8–1.9x as long as wide, the neck shorter than broad, the longest setae slightly shorter than the width of flagellomere. **Thorax**. Brown, setae pale. Anterior pronotum with 8 setae. Proepisternum with 10 setae. Scutellum with 3 longer and some short and fine setae. **Wing**. Fumose. Length 1.9–2.0 mm. Width/length 0.45. Anal lobe weak. Veins distinct. c/w 0.60. R_1/R 0.70–0.85. stM shorter than fork of M. bM non-setose, r-m with 3 setae or non-setose. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a large patch of setae in depression. Fore tibial spur longer than the tibial width. **Abdomen**. Pale brown, setae pale, fine and moderately long. **Hypopygium** (Fig. 4 A). Brown, as abdomen. Intergonocoxal area rather long, basally with strongly sclerotized medial stripe, with a large subtriangular apically bifid setose lobe (Fig. 18 B). Gonocoxa narrow, longer than gonostylus, medial margin basally smoothly curved. Gonostylus (Fig. 6 A) long, apically tumid, strongly impressed; densely setose on apical third; with a rather long apical tooth, with 2 megasetae subapically near the apical tooth and 2 or 3 at a medial position, megasetae long and slender, with distinct basal bodies; with 1 well-differentiated whiplash setae on ventromedial margin. Tegmen broader than long, apically and laterally roundish, sclerotized, aedeagal teeth not detectable in the specimens studied. Aedeagal apodeme long.

BIN. Unknown.

Discussion. *Trichocoelina dispansa* sp. n. resembles *T. chentejensis* (Menzel, 1992), *T. dividua* sp. n., *T. ithyspina* sp. n., *T. jukkai* sp. n. and *T. planilobata* sp. n. in having a long apical tooth and 5–6 rather long gonostylar megasetae, some of which are positioned apically and/or subapically near the apical tooth, directed nearly perpendicularly, and partly more basal in position, directed more obliquely. *Trichocoelina dispansa* differs from all others in having a broader gonostylus, a distinctly broader tegmen and a shorter intergonocoxal area. *Trichocoelina planilobata* can be distinguished from other species of this group in having one very broad intergonocoxal lobe, medially only slightly notched, one gonostylar megaseta distinctly on the apical side of the tooth and the gonostylus impressed only on the apical half. Of the four other species in this group, *T. chentejensis* and *T. ithyspina* have long bodies of antennal flagellomeres (4th flagellomere about 2.8–2.9x as long as broad *versus* 2.0x and ca 2.1–2.3x as long as wide in *T. dividua* and *T. jukkai*). *T. jukkai* differs from the other remaining species in its at most very slightly apically divided medial intergonocoxal lobe and its apically roundish, not truncate, tegmen. *T. jukkai* differs from *T. dividua* further in having a more slender and more sparsely setose gonostylus, with weaker megasetae. *T. dividua* differs further from *T. chentejensis* in its longer gonostylar megasetae, and its longer and narrower tegmen and intergonocoxal lobes. *T. ithyspina* differs from *T. chentejensis* in having a long, apically bifid intergonocoxal lobe instead of two separate lobes. By the arrangement of the gonostylar megasetae, *Trichocoelina obesula* resembles all the species above, but differs distinctly in having a much broader gonostylus.

Etymology. The name is Latin, *dispansa,* spread, referring to the broad intergonocoxal lobe of the hypopygium.

Trichocoelina dividua sp. n.

Figs 4 B, 6 B

Material studied. *Holotype male.* CANADA, Northwest Territories, Nahanni National Park, Reserve Nailicho (Virginia Falls), 61.606°N, 125.758°W, 578 m, 1.VIII.2014, Parks Canada (BOLD Sample ID BIOUG17502-A06,

in CNC). *Paratypes*. CANADA, same data as holotype, 1 male (BOLD Sample ID BIOUG17506-C03, in CBG); same data as previous but 4.VII.2014, 3 males (BOLD Sample IDs BIOUG17107-F02, BIOUG17109-F06 and BIOUG17129-B09, in CBG); same data but 12.VII.2014, 1 male (BOLD Sample ID BIOUG17213-C11, in CBG); same data but 25.VII.2014, 1 male (BOLD Sample ID BIOUG17423-E03, in CBG).

Description. Male. **Head**. Face brown, maxillary palpus pale yellowish. Eye bridge 2–3 facets wide. Face with 10–20 setae. Clypeus with 1–2 setae. Maxillary palpus with 3 segments, 1st segment longer than 3rd segment, 2nd segment shortest; 1st segment with 1 seta, with a large dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 2.0x as long as wide, the neck shorter than broad, the longest setae shorter than the width of flagellomere. **Thorax**. Brown, setae pale. Anterior pronotum with 5–9 setae. Proepisternum with 5–10 setae. Scutellum with 3–4 longer and some short and fine setae. **Wing**. Fumose. Length 1.5–1.6 mm. Width/length 0.35–0.40. Anal lobe weak. Veins distinct. c/w 0.65. R_1/R 0.45–0.7. stM as long as fork of M. r-m as long as bM, bM non-setose, r-m non-setose or with 1 seta. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a rather small patch in depression. Fore tibial spur longer than the tibial width. **Abdomen**. Pale brown, setae pale, long and fine. **Hypopygium** (Fig. 4 B). Brown, as abdomen. Intergonocoxal area moderately long, with long, apically bifid setose lobe. Gonocoxa moderately broad, longer than gonostylus, medial margin basally strongly curved, with sparse setosity. Gonostylus (Fig. 6 B) long, apically tumid, impressed; with normal setosity, a long apical tooth, and one megaseta on the dorsal side of apical tooth, one subapical and 3–4 megasetae more basally, megasetae long and slender; with one well-differentiated whiplash seta on ventromedial margin. Tegmen as long as broad, laterally roundish, apically straight, weakly sclerotized; aedeagal teeth not detectable in the specimens studied. Aedeagal apodeme long.

BIN. BOLD:AAL7893.

Discussion. *Trichocoelina dividua* sp. n. is especially similar to *T. jukkai* sp. n. For further discussion of these and similar species, see under *Trichocoelina dispansa* sp. n.

Etymology. The name is Latin, *dividua*, parted, referring to the apically distinctly divided intergonocoxal lobe of hypopygium.

Trichocoelina hians sp. n.

Figs 5 A, 6 C, 18 C

Material studied. *Holotype male*. CANADA, Yukon, Ogilvie Mountains, North Fork Pass, 4100 ft, 20.VI.1962, R.E. Leech (in CNC).

Description. Male. **Head**. Colours faded in the specimen studied. Eye bridge 3 facets wide. Setae of face not detectable in the specimen studied. Clypeus with 3 setae. Maxillary palpus with 3 segments, 3rd segment longer than 1st segment, 2nd segment shortest; 1st segment with 9 setae, with a dorsal patch of sensilla; antennae missing in the specimen studied. **Thorax**. Colours faded in the specimen studied. Anterior pronotum with 9 setae. Proepisternum with 18 setae. Scutellum with 5 longer and some short and fine setae. **Wing**. Fumose. Length 2.8 mm. Width/length 0.40. Anal lobe weak. Veins distinct. c/w 0.55. R_1/R 0.60. stM shorter than fork of M. r-m 2x as long as bM, bM and r-m non-setose. **Legs**. Colours faded in the specimen studied. Fore tibial organ forming a large patch in depression. Fore tibial spur slightly longer than the tibial width. **Abdomen**. Colours faded in the specimen studied. **Hypopygium** (Fig. 5 A). Colours faded in the specimen studied. Intergonocoxal area long, with two setose lobes (Fig. 18 C). Gonocoxa broad, slightly longer than gonostylus, medial margin basally rather strongly curved, with short sparse setosity. Gonostylus (Fig. 6 C) broad, apically tumid, strongly impressed; with short dense setosity, with a rather long apical tooth, with about 15 slender and rather short perpendicular megasetae; with 1 well-differentiated whiplash seta on ventromedial margin. Tegmen apically narrowed and truncated, laterally roundish, weakly sclerotized, aedeagal teeth not detectable in the specimen studied. Aedeagal apodeme long.

BIN. Unknown.

Discussion. By its broad and apically tumid gonostylus which is subbasally strongly broadened and which has numerous short megasetae, *Trichocoelina hians* sp. n. resembles *T. hiemalis* (Mohrig & Mamaev), *T. incrassata* sp. n. and *T. magnifica* sp. n. *Trichocoelina hians* differs from *T. hiemalis* in having the gonostylar apex broader and the apical tooth and megasetae shorter but intergonocoxal lobes of hypopygium longer, see Fig. 5 A and fig. 4 in Mohrig *et al*. (1985b). *Trichocoelina hians* differs from *T. incrassata* and *T. magnifica* in having its gonostylus

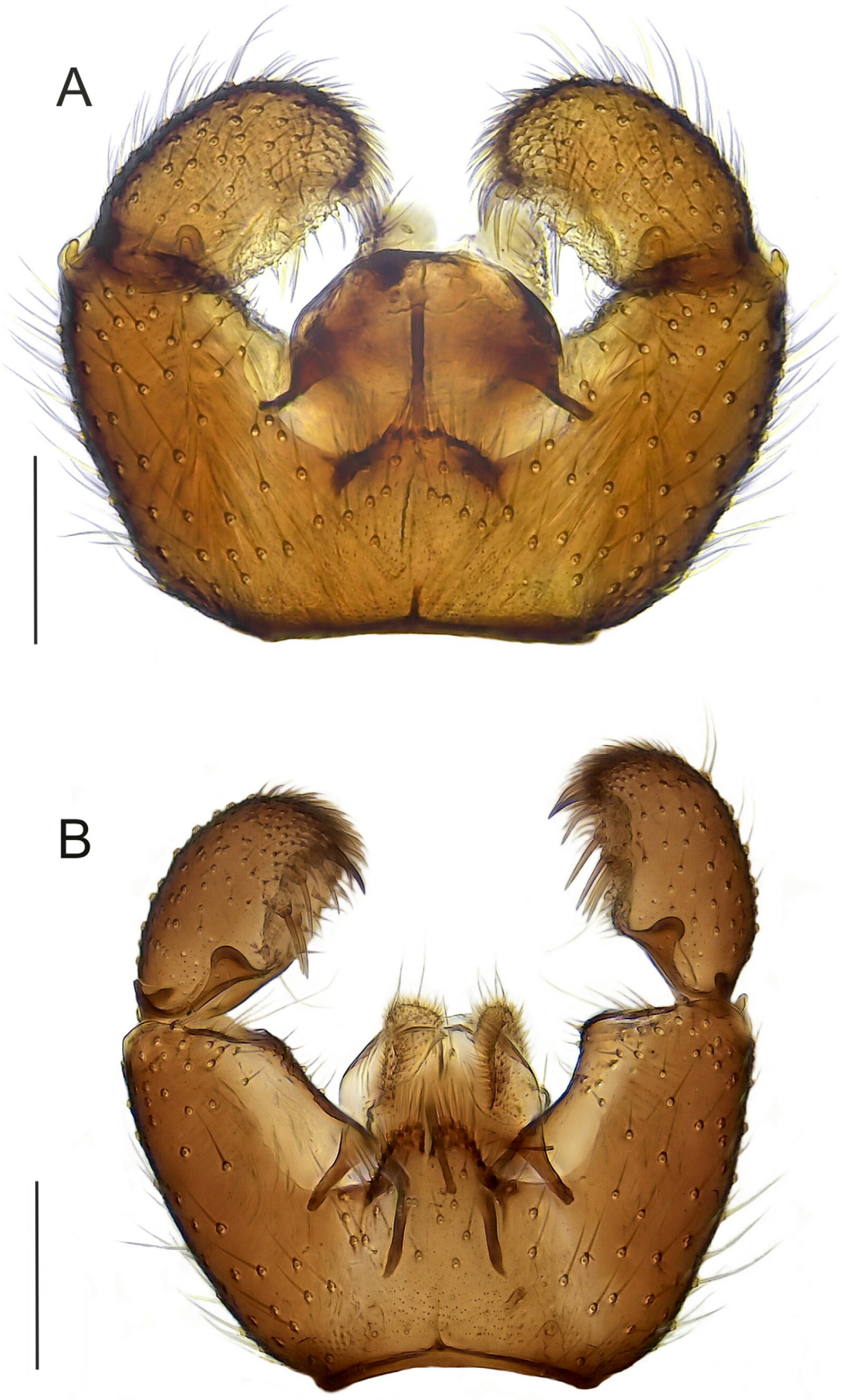

FIGURE 4. Hypopygium, ventral. **A.** *Trichocoelina dispansa* sp. n. (holotype). **B.** *T. dividua* sp. n. (holotype). Scale 0.1 mm.

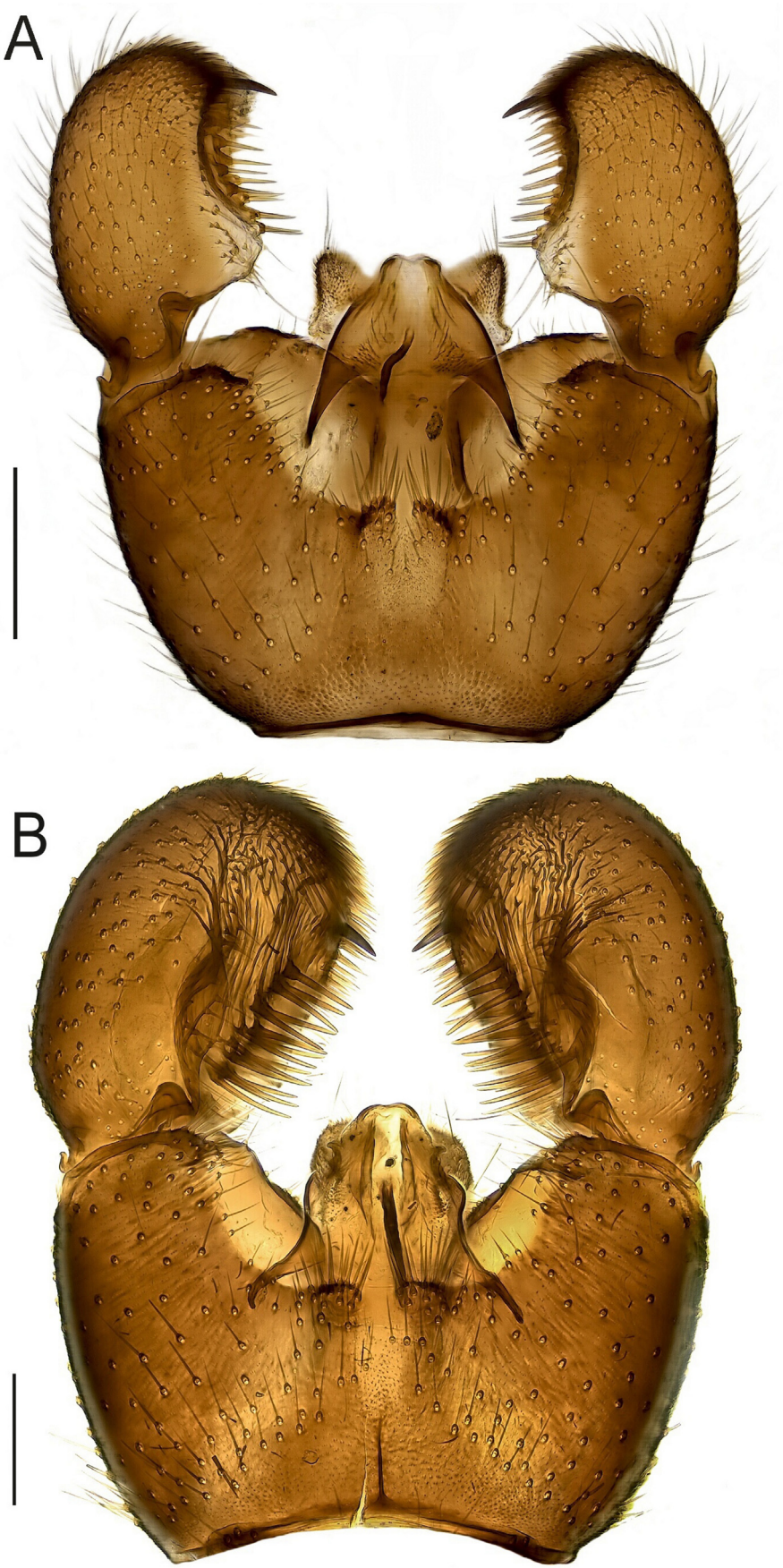

FIGURE 5. Hypopygium, ventral. **A.** *Trichocoelina hians* sp. n. (holotype). **B.** *T. imitator* sp. n. (holotype). Scale 0.1 mm.

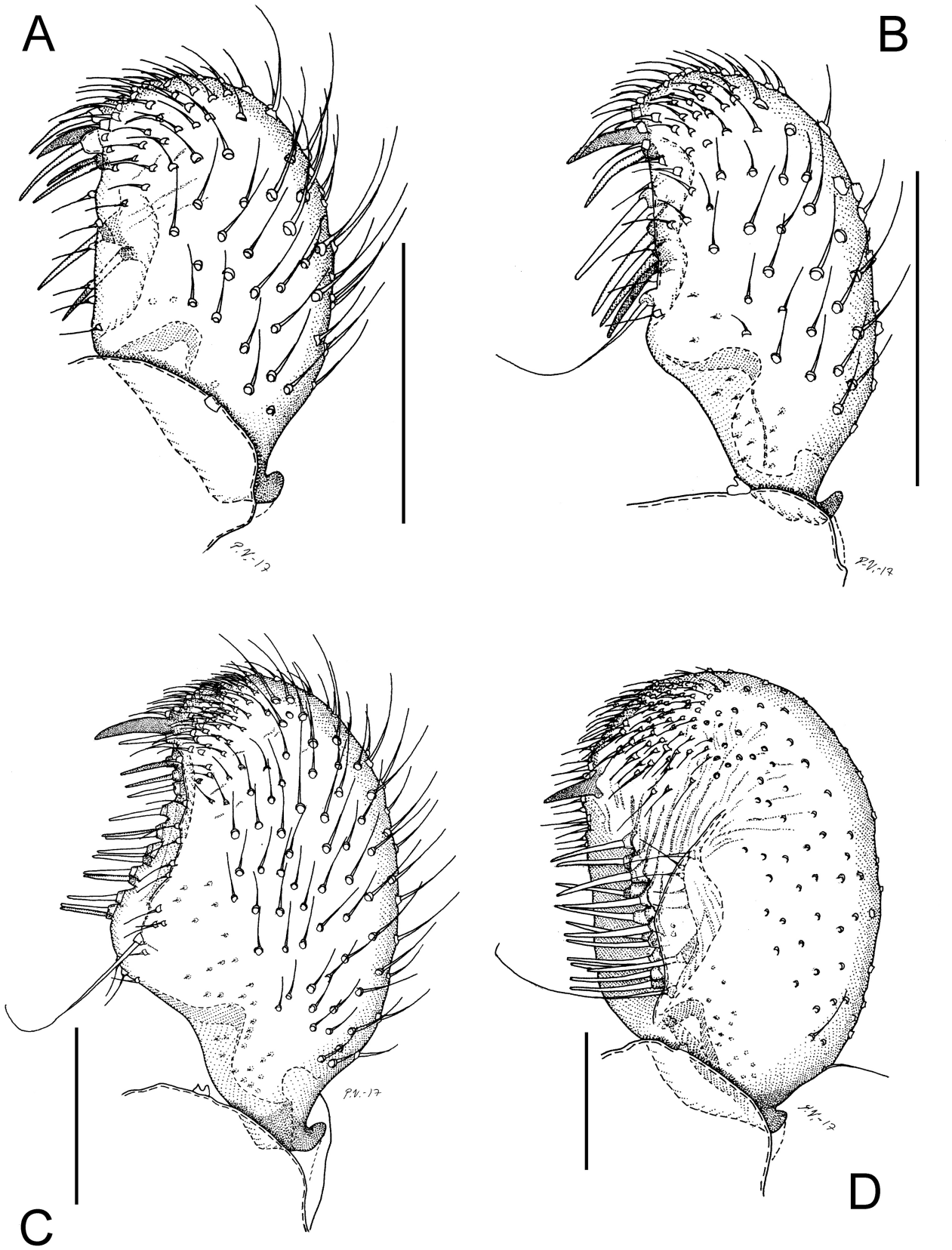

FIGURE 6. Gonostylus, ventral. **A.** *Trichocoelina dispansa* sp. n. (holotype). **B.** *T. dividua* sp. n. (holotype). **C.** *T. hians* (holotype). **D.** *T. imitator* (holotype). Scale 0.1 mm.

slightly narrower and lacking a subbasal lobe with a group of megasetae. From *T. incrassata* it differs also in having its tegmen less modified, laterally smoothly curved. Furthermore, *Trichocoelina hians* differs from *T. magnifica* in having all gonostylar megasetae of the same size, perpendicular and not arranged in groups, and in having shorter intergonocoxal lobes. See also under *T. absidata* sp. n.

Etymology. The name is Latin, *hians*, opened, referring to its medially strongly excavated gonostylus.

Trichocoelina hiemalis (Mohrig & Mamaev, 1985) comb. n.

Literature. *Lycoriella* (*Hemineurina*) *hiemalis* Mohrig & Mamaev—Mohrig *et al.* (1985b): 432, fig. 4 a–c; Menzel *et al.* (1990): 335; Menzel & Mohrig (2000): 385. *Lycoriella hiemalis* Mohrig & Mamaev—Salmela *et al.* 2015: 87 (not *sensu* Heller *et al.* (2009): 42 [misidentification]; = *Trichocoelina oricillifera* sp. n.).
BIN. Unknown.

Discussion. The species was described from three males from Southern Yamal, Northern Russia (Mohrig *et al*. 1985). By its broad, strongly impressed, basally broad gonostylus with numerous straight megasetae it resembles most the Nearctic *Trichocoelina hians* sp. n. (see above and under *T. semisphaera* sp. n.).

Trichocoelina imitator sp. n.

Figs 5 B, 6 D, 18 A

Material studied. *Holotype male.* CANADA, Yukon, Ogilvie Mountains, North Fork Pass, 4100 ft, 20.VI.1962, R.E. Leech (in CNC).

Description. Male. **Head**. Face brown, maxillary palpus pale yellowish. Eye bridge 3 facets wide. Face with 21 fine setae. Clypeus with 2 setae. Maxillary palpus with 3 segments, 1st segment as long as 3rd segment, 2nd segment shortest; 1st segment with 3 setae, with a dorsal patch of sensilla; antennae missing in the specimen studied. **Thorax**. Brown, setae pale. Anterior pronotum with 5 setae. Proepisternum with 19 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. In poor condition in the specimen studied. Fumose. Length about 2.8. Veins distinct. R_1/R 0.70. r-m much longer than bM, bM non-setose, r-m with 4 setae. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a large patch in depression. Fore tibial spur slightly longer than the tibial width. **Abdomen**. Pale brown, setae pale, fine and moderately long. **Hypopygium** (Fig. 5 B). Brown, as abdomen. Intergonocoxal area long, basally with strongly sclerotized medial stripe, with 2 short setose lobes (Fig. 18 A). Gonocoxa broad, as long as gonostylus, medial margin basally strongly curved, with short sparse setosity. Gonostylus (Fig. 18 A) long and broad, apically truncate, strongly impressed; with short and dense setosity, with a short dorsal apical tooth in subapical position, with 10–12 megasetae medially, megasetae long and slender; with one long and 2–3 shorter whiplash setae basad of the megasetae. Tegmen longer than broad, conical, with sharp apicolateral corners, basolaterally broadened, apically and laterally sclerotized; aedeagal teeth not detectable in the specimen studied. Aedeagal apodeme long.

BIN. Unknown.

Discussion. *Trichocoelina imitator* sp. n. is very similar to *T. oricillifera* sp. n. in the form of the large gonostylus with numerous perpendicular megasetae but differs from the latter in the form of the tegmen, which is basally broader and has a longer apical part, and in having shorter intergonocoxal lobes of hypopygium.

Etymology. The name is Latin, *imitator*, referring to the close resemblance of the species to *Trichocoelina oricillifera* sp. n.

Trichocoelina incrassata sp. n.

Figs 7 A, 9 A

Material studied. *Holotype male*. USA, Alaska, 11 mi S Anderson Jct, Rte 3, mi 270, alder-poplar-spruce, Malaise trap, 23.VI–11.VIII.1984, S. & J. Peck (in MZH).

Description. Male. **Head**. Face and antenna concolorous brown, maxillary palpus pale yellowish. Eye bridge

2–3 facets wide. Face with 20 fine setae. Clypeus with 1 seta. Maxillary palpus with 3 segments, 3rd segment longer than 1st segment, 2nd segment shortest; 1st segment with 1 seta, with a dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 2.2x as long as wide, the neck shorter than broad, the longest setae as long as the width of flagellomere. **Thorax**. Brown, setae pale. Anterior pronotum with 6 setae. Proepisternum with 15 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. Fumose. Length 2.6 mm. Width/length 0.40. Anal lobe weak. Veins distinct. c/w 0.70. R_1/R 0.55. stM and fork of M subequal in length. r-m 2x as long as bM. bM and r-m non-setose. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a large patch in depression. Fore tibial spur as long as the tibial width. **Abdomen**. Pale brown, setae pale, rather short. **Hypopygium** (Fig. 7 A). Brown, as abdomen. Intergonocoxal area long, with two small setose lobes. Gonocoxa broad, about as long as gonostylus, medial margin basally smoothly curved, with short sparse setosity. Gonostylus (Fig. 9 A) semiglobular, strongly impressed; subbasally with a dorsal lobe, with short setosity, with a rather long and narrow apical tooth, with numerous megasetae medially, the ventral megasetae oblique, the dorsal ones perpendicular, megasetae slender and rather short; with 1 weakly differentiated whiplash seta on ventromedial margin. Tegmen as long as broad, apically truncate, laterally with distinct shoulders, sclerotized, with an area of small aedeagal teeth. Aedeagal apodeme long and strong.

BIN. Unknown.

Discussion. By its large semigobular gonostylus with numerous short megasetae *Trichocoelina incrassata* sp. n. resembles most *T. janetcheki* (Lengersdorf, 1953) but differs in having groups of gonostylar megasetae pointing in two directions, in having shorter intergonocoxal lobes and in having the tegmen with lateral corners but without the apical process (see also under *T. hians* sp. n.).

Etymology. The name is Latin, *incrassata*, thickened, referring to the thick gonostylus.

Trichocoelina ithyspina sp. n.

Figs 8 A, 9 B, 18 C

Material studied. *Holotype male*. NORWAY, Hedmark, Stor-Elvdal, river Atna Solbakken, 61.746°N, 10.746°E, 380 m, Malaise trap, 30.VI–7.VII.2008, E. Stur (NTNU-VM 201775, BOLD Sample ID TRD-Sci029, in NTNU-VM).

Description. Male. **Head**. Face and antenna concolorous brown but pedicellus yellow, maxillary palpus pale yellowish. Eye bridge, face and clypeus poorly visible in the specimen studied. Maxillary palpus with 3 segments, 1st segment longer than 3rd segment, 2nd segment shortest; 1st segment with 1 seta, with dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 2.9x as long as wide, the neck shorter than broad, the longest setae longer than the width of flagellomere. **Thorax**. Brown, setae pale. Anterior pronotum with 9 setae. Proepisternum with 11 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. Fumose. Length 2.3 mm. Width/length 0.45. Anal lobe weak. Veins distinct. c/w 0.65. R_1/R 0.80. stM shorter than fork of M. r-m longer than bM, bM non-setose, r-m with 1 seta. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a large indistinct patch in depression. Fore tibial spur longer than the tibial width. **Abdomen**. Pale brown, setae pale, moderately long and fine. **Hypopygium** (Fig. 8 A). Brown, as abdomen. Intergonocoxal area moderately long, with long, apically bifid setose lobe (Fig. 18 C). Gonocoxa moderately broad, longer than gonostylus, medial margin basally smoothly curved, with rather long but sparse setosity. Gonostylus (Fig. 9 B) long, apically truncate, strongly impressed; with normal setosity, with a rather long apical tooth, with three megasetae subapically near the tooth and two more basally, megasetae long and slender, with distinct basal bodies; with 1 well-differentiated whiplash seta on ventromedial margin. Tegmen broader than long, laterally roundish, apically straight, weakly sclerotized, aedeagal teeth not detectable in the specimens studied. Aedeagal apodeme long.

BIN. BOLD:ACX5966.

Discussion. The gonostylus shown in Figs 8 A and 9 B was slightly distorted in preparation. *Trichocoelina ithyspina* sp. n. resembles most *T. jukkai* sp. n. For discussion, see under *T. dispansa* sp. n.

Etymology. The name is derived from the Greek word *ithys,* straight, and the Latin word *spina,* spine, referring to the straight megasetae of the gonostylus.

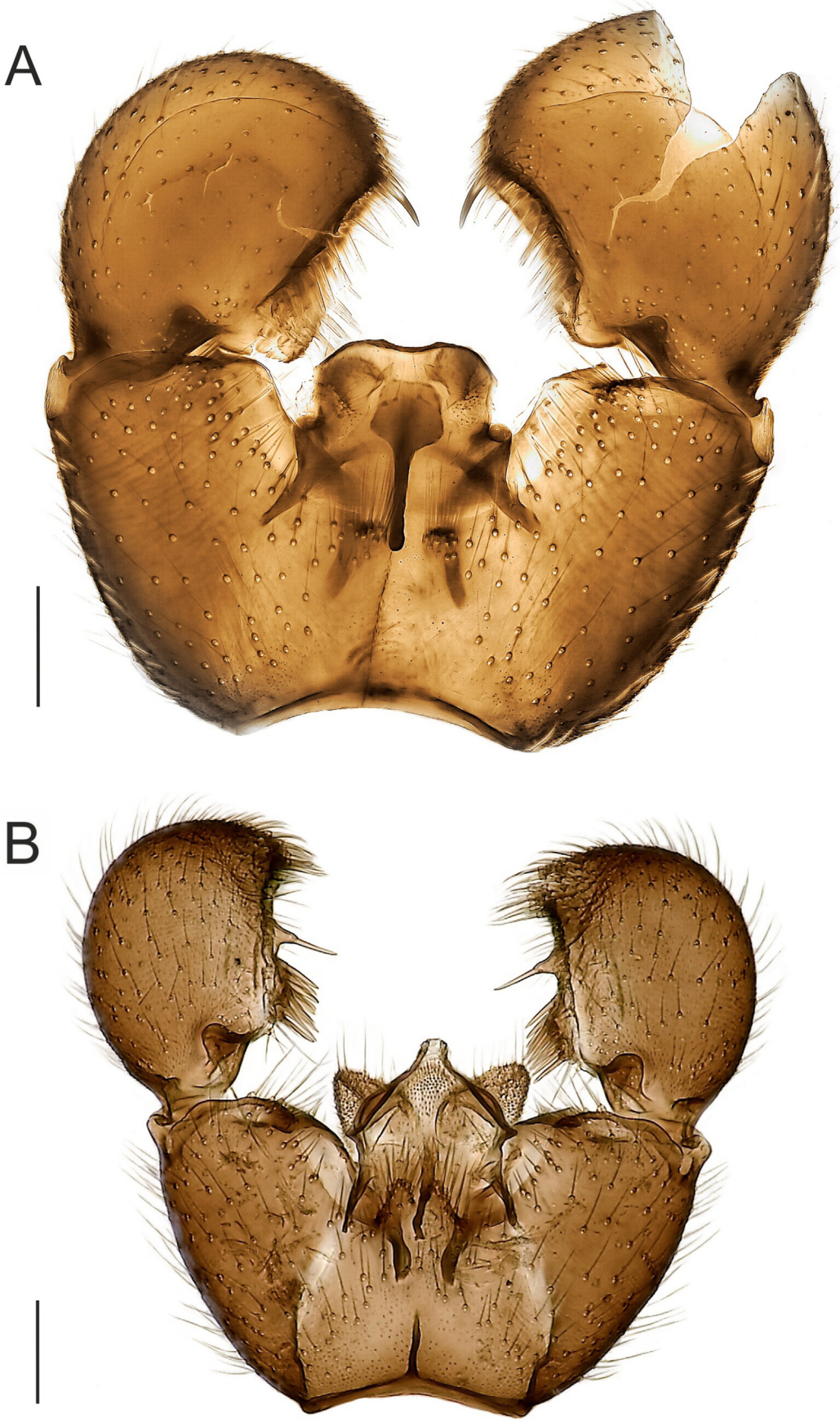

FIGURE 7. Hypopygium, ventral. **A.** *Trichocoelina incrassata* sp. n. (holotype). **B.** *T. magnifica* sp. n. (holotype). Scale 0.1 mm.

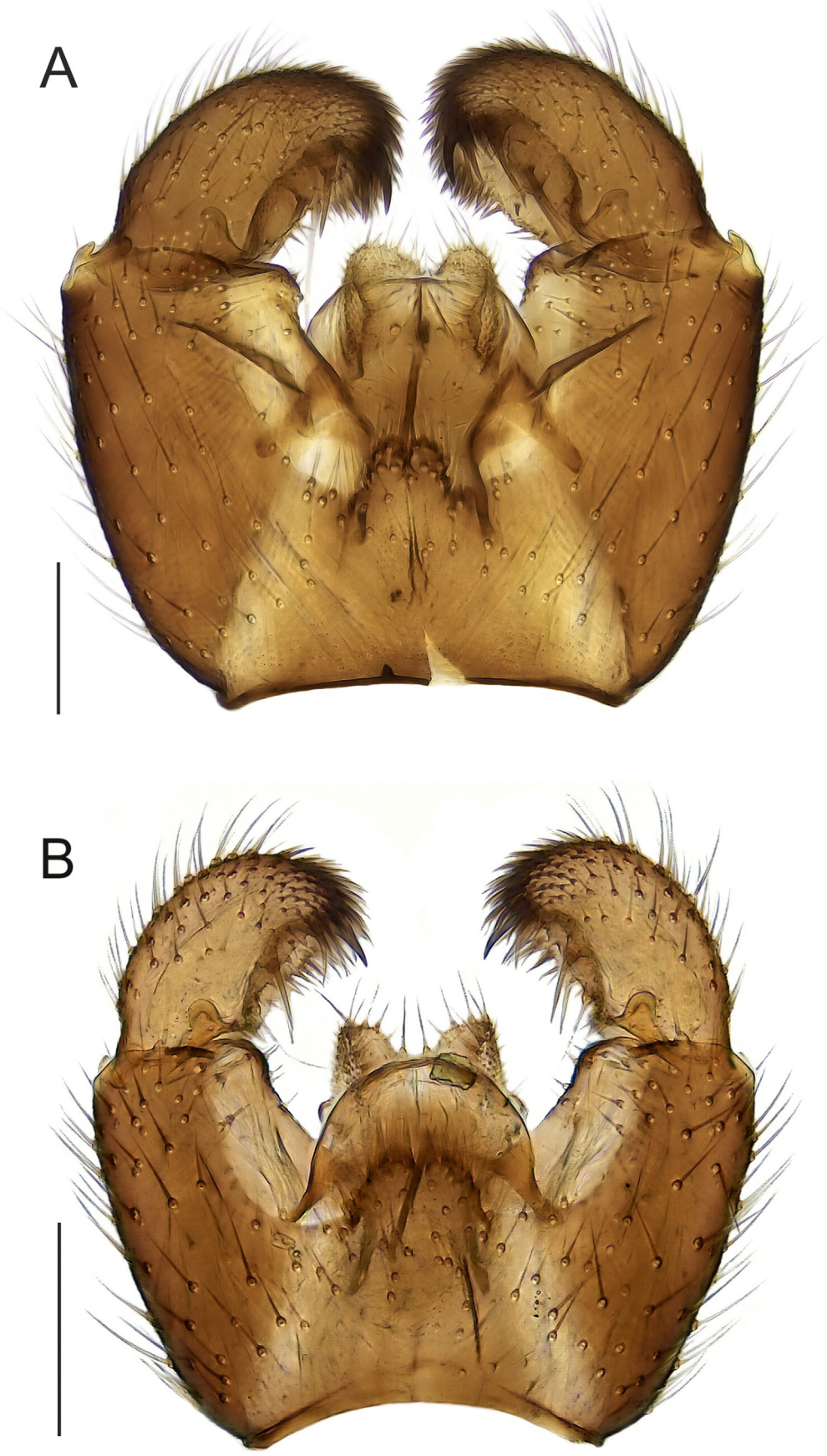

FIGURE 8. Hypopygium, ventral. **A.** *Trichocoelina ithyspina* sp. n. (holotype). **B.** *T. jukkai* sp. n. (holotype). Scale 0.1 mm.

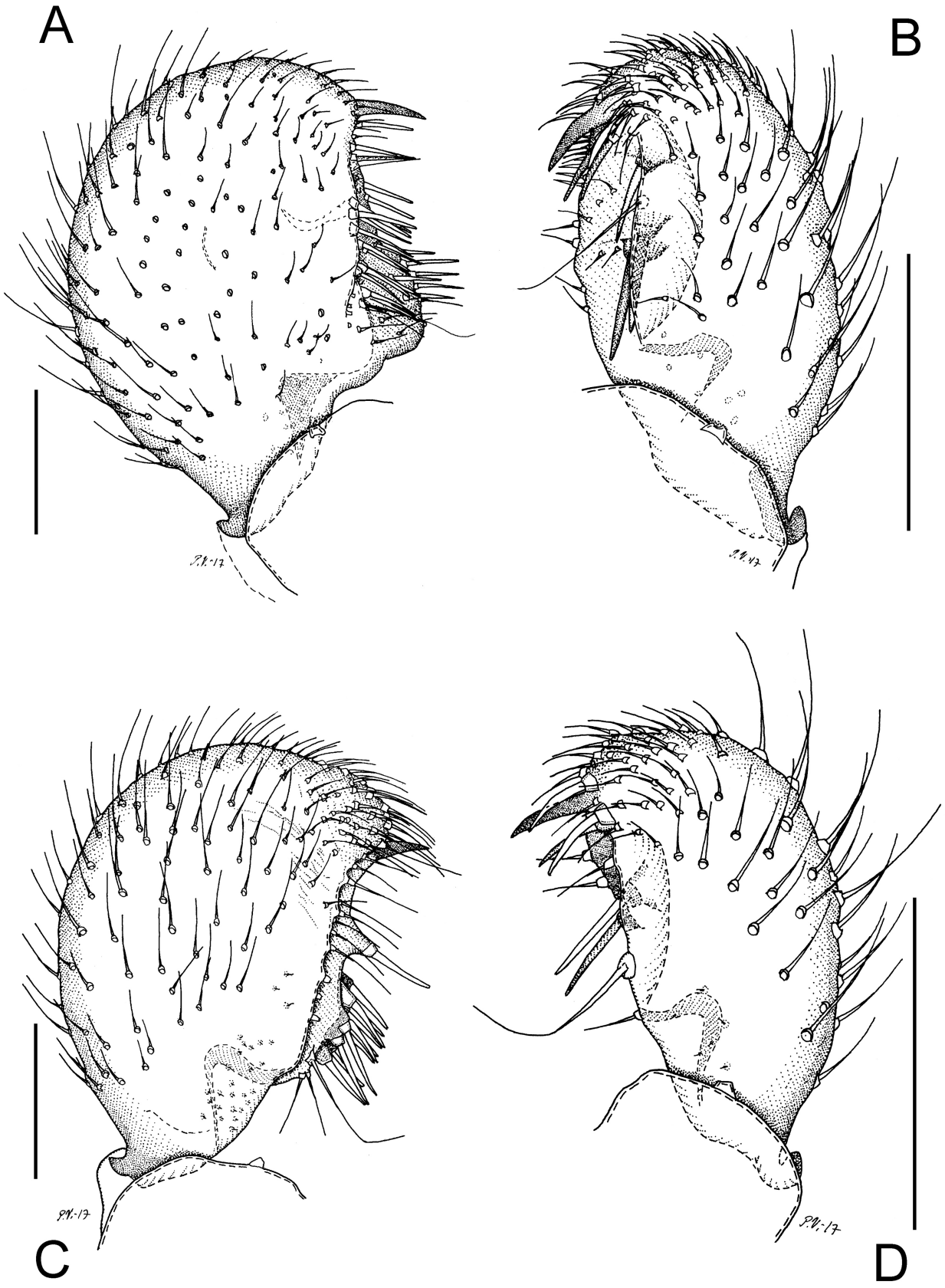

FIGURE 9. Gonostylus, ventral. **A.** *Trichocoelina incrassata* sp. n. (holotype). **B.** *T. ithyspina* sp. n. (holotype). **C.** *T. magnifica* sp. n. (holotype). **D.** *T. jukkai* sp. n. (holotype). Scale 0.1 mm.

***Trichocoelina janetscheki* (Lengersdorf, 1953) comb. n.**
Figs 10 A, 10 B, 17 D

Literature. *Neosciara janetscheki* Lengersdorf—Lengersdorf (1953): 167, fig. 1; Janetschek (1956): 471. *Lycoriella* (*Hemineurina*) *janetscheki* (Lengersdorf)—Tuomikoski (1959a): 35; Gerbachevskaja-Pavluchenko (1986): 31; Franz (1989): 14; Menzel & Mohrig (2000): 410; Wirta *et al.* (2016): appendix, unpaginated p. 21 (table S1) and unpaginated p. 39 (cladogram).

Material studied. CANADA, Nunavut, Sverdrup Islands, Elles Ringnes Island, Isachsen, 70.79°N, 103.55°W, lemming burrow, 17.VI.1960, J.R. Vockeroth, 4 males (3 in CNC, 1 in MZH); same locality but moss near very small stream, 14.VII.1960, J.F. McAlpine, 2 males (in CNC); Nunavut, Ellesmere Island, Fosheim Peninsula, Hot Weather Creek, 79°58'N, 84°28'W, 2.VII.1990, F. Brodo, 1 male (in MZH); NE Greenland, Mestersvig, 72.24°N, 23,92°W, C. Vibe (in ZMUC); NE GREENLAND, Zackenberg, 74°28'N, 20°34'W (UTM8265500:0513778), 44 m, 2–11.VII.2011, T. Roslin & G. Várkonyi, 1 male (in MZH); same locality but UTM 8265758:0513786, 37 m, Malaise trap, 11–20.VII.2011, T. Roslin & G. Várkonyi, 2 males (in MZH, SDEI); same locality but 74.50°N, 21.00°W, 44 m, 7.VII.2011, T. Roslin & G. Várkonyi, 1 male (BOLD Sample ID GRPV16, in DAUH); same locality but 74.4667°N, 20.5667°W, 48 m, 24.VII.2011, T. Roslin & G. Várkonyi, 3 males (BOLD Sample IDs ZA2012-50010, ZA2012-50011 and ZA2012-50012, in DAUH); USA, Colorado, Mt. Evans, 14 000 ft, 25.VII.1961, W.R.M. Mason, 1 male (in USNM).

Redescription. Male. **Head**. Face brown, antenna dark brown maxillary palpus pale yellowish. Eye bridge 2–3 facets wide. Face with 15–21 setae. Clypeus with 1–4 setae. Maxillary palpus with 3 segments, 1st segment as long as or longer than 3rd segment, 2nd segment shortest; 1st segment with 3–9 setae, with dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 1.95–2.75x as long as wide, the neck shorter than broad, the longest setae shorter than the width of flagellomere. **Thorax**. Dark brown, setae pale. Anterior pronotum with 5–11 setae. Proepisternum with 7–24 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. Fumose. Length 2.2–3.1 mm. Width/length 0.35–0.40. Anal lobe weak. Veins distinct. c/w 0.50–0.60. R_1/R 0.50–0.90. stM shorter than fork of M. r-m longer than bM, bM non-setose, r-m non-setose or with 1–2 setae. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a large patch in shallow depression. Fore tibial spur as long as the tibial width. **Abdomen**. Pale brown, setae pale, short and fine. **Hypopygium** (Fig. 10 B). Brown, as abdomen. Intergonocoxal area long, with two short setose lobes. Gonocoxa broad, as long as gonostylus, medial margin basally smoothly curved, with short and fine setosity. Gonostylus (Fig. 10 A) voluminous, apically truncate, impressed; with short setosity, a short apical tooth, and numerous megasetae in the medial impression; megasetae slightly curved or straight, short and slender; with 1 well-differentiated whiplash seta basally at ventromedial margin. Tegmen (Fig. 17 D) longer than broad, laterally straight, apically with a narrow hyalinous acuminate process, weakly sclerotized, aedeagal teeth not detectable in the specimens studied. Aedeagal apodeme long.

BIN. BOLD:ACK5495.

Discussion. In Fig. 10 A the gonostylus is flattened and distorted to show the arrangement of the megasetae. In its extremely voluminous gonostylus, *Trichocoelina janetscheki* (Lengersdorf, 1953) resembles most *T. incrassata* sp. n., for distinguishing characters, see under the latter.

***Trichocoelina jukkai* sp. n.**
Figs 8 B, 9 D, 18 D

Material studied. *Holotype male*. FINLAND, Li (Lapponia inarensis), Utsjoki, Pummankijoki (grid 7759292:539670), sandy shore, pitfall trap, 13.VI–13.VII.2016, J. Salmela (in MZH). *Paratypes*. FINLAND, same data as holotype, 10 males (6 in MZH, 2 in SDEI, 2 in PJSR); NORWAY, Troms, Tromsø, Nakkedalen, 300 m S of Estengammen, 69.612°N, 19.592°E, 150 m, Malaise trap, 16–19.VII.2012, T.E. Barstad, 2 males (BOLD Sample IDs TSZD-JKJ-103937 and TSZD-JKJ-104088, in TMU).

Description. Male. **Head**. Face and antenna brown, antenna darker, maxillary palpus pale yellowish. Eye bridge 2 facets wide. Face with 14–20 setae. Clypeus with 1–2 setae. Maxillary palpus with 3 segments, 1st segment longer than 3rd segment, 2nd segment shortest; 1st segment with 1–2 setae, with a large dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 2.15–2.25x as long as wide, the neck shorter than

broad, the longest setae longer than the width of flagellomere. **Thorax**. Dark brown, setae pale. Anterior pronotum with 3–8 setae. Proepisternum with 7–9 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. Fumose. Length 1.6–1.7 mm. Width/length 0.35–0.40. Anal lobe weak. Veins distinct. c/w 0.55–0.70. R_1/R 0.45–0.55. stM longer or shorter than fork of M. r-m longer than bM, both non-setose. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a rather small patch in depression. Fore tibial spur longer than the tibial width. **Abdomen**. Pale brown, setae pale and long. **Hypopygium** (Fig. 8 B). Brown, as abdomen. Intergonocoxal area moderately long, with long, apically bifid setose lobe (Fig. 18 D). Gonocoxa moderately broad, longer than gonostylus, medial margin basally strongly curved, with sparse setosity. Gonostylus (Fig. 9 D) long, apically truncate, impressed; with normal setosity, a long apical tooth, 1 megaseta on the apical side of the tooth, a pair of megaseta subapically near the tooth and another pair more basally; megasetae long and slender; with 1 well-differentiated whiplash seta at ventromedial margin. Tegmen broader than long, laterally and apically roundish, weakly sclerotized, aedeagal teeth not detectable in the specimens studied. Aedeagal apodeme long.

BIN. BOLD:ADL0130.

Discussion. See under *Trichocoelina dividua* sp. n.

Etymology. The species is named after the dipterist Jukka Salmela, Rovaniemi, Finland, who collected the holotype.

Trichocoelina magnifica sp. n.

Figs 7 B, 9 C, 17 F

Material studied. *Holotype male*. CANADA, Yukon, North Fork Crossing, Mi 43, Peel Plt. Rd., 3500 ft, 4.VII.1962, R.J. Leech, 1 male (in CNC). *Paratypes*. CANADA, same data as holotype but 26.VI.1962, 1 male (in MZH); Yukon, Ogilvie Mountains, 7.VII.1962, P.J. Skitsko, 1 male (in MZH).

Description. Male. **Head**. Colours faded in the specimens studied. Eye bridge 2 facets wide. Face with 10–19 fine setae. Clypeus with 2 setae. Maxillary palpus with 3 segments, 1st segment longer than 3rd segment, 2nd segment shortest; 1st segment with 1–2 setae, with a dorsal patch of sensilla; antennae missing in the specimens studied. **Thorax**. Colours faded. Anterior pronotum with 6–9 setae. Proepisternum with 13–15 setae. Scutellum with 3 longer and some short and fine setae. **Wing**. Fumose. Length 2.0–2.2 mm. Width/length 0.40. Anal lobe weak. Veins distinct. c/w 0.55. R_1/R 0.60–0.65. stM and fork of M subequal in length. r-m and bm subequal in length. bM non-setose, r-m with 3–4 setae non-setose. **Legs**. Colours faded. Fore tibial organ forming a small patch of strong setae in depression. Fore tibial spur longer than the tibial width. **Abdomen**. Colours faded. **Hypopygium** (Fig. 7 B). Intergonocoxal area long, basally with strongly sclerotized medial stripe, with two distinct setose lobes. Gonocoxa broad, as long as gonostylus, medial margin basally smoothly curved, with normal setosity. Gonostylus (Fig. 9 C) large, laterally roundish, apically slightly narrowed, medially impressed; with short setosity, with a short apical tooth, one megaseta with strong basal body at the apical third and a group of 3 megasetae on common basal body in a more basal position, on the dorsal side of the latter a group of 10–12 megasetae, megasetae rather straight, longer than apical tooth; with a long whiplash seta on ventromedial margin near the basalmost megasetae. Tegmen (Fig. 17 F) longer than broad, apically narrowed, with sharp corners at middle, sclerotized, with large area of small aedeagal teeth. Aedeagal apodeme moderate.

BIN. Unknown.

Discussion. *Trichocoelina magnifica* sp. n. resembles *T. nefrens* sp. n. in having a highly modified tegmen and one outstanding medial megaseta, but differs from the latter in its broader tegmen, in having an apical tooth and lacking any subapical megasetae on the gonostylus. See also under *T. hians* sp. n.

Etymology. The name is Latin, *magnifica*, referring to the magnificent structure of the hypopygium.

Trichocoelina nefrens sp. n.

Figs 11 A, 13 B, 17 E

Material studied. *Holotype male*. RUSSIA, Krasnoyarsk region, Taimyr Nature Reserve, Aru-Mas, 72.50°N, 101.94°E, pan trap, 9–20.VII.2010, A. Barkalov (in ISEA). *Paratypes*. RUSSIA, same data as holotype, 2 males

(in MZH); Krasnoyarsk region, Taimyr Peninsula, on Zakharova River, Rassokha, 72.70°N, 101.08°E, pan trap, 1–10.VII.2011, A. Barkalov, 2 males (in MZH, SDEI); Krasnoyarsk region, Taimyr Nature Reserve, VII.2010, A. Barkalov, 1 male (in ISEA).

Description. Male. **Head**. Face brown, antenna darker brown, maxillary palpus pale yellowish. Eye bridge 2–3 facets wide. Face with 24–26 fine setae. Clypeus with 2–3 setae. Maxillary palpus with 3 segments, 1st segment longer than 3rd segment, 2nd segment shortest; 1st segment with 1–2 setae, with a dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 1.95–2x as long as wide, the neck shorter than broad, the longest setae slightly shorter than the width of flagellomere. **Thorax**. Brown, setae pale. Anterior pronotum with 4–7 setae. Proepisternum with 6–8 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. Fumose. Length 2.0–2.2 mm. Width/length 0.40. Anal lobe weak. Veins distinct. c/w 0.65–0.75. R_1/R 0.50–0.60. stM slightly shorter than fork of M. r-m longer than bM, bM non-setose, r-m with 3–4 setae. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a dense patch of fine setae in depression. Fore tibial spur slightly longer than the tibial width. **Abdomen**. Pale brown, setae pale and fine. **Hypopygium** (Fig. 11 A). Brown, as abdomen. Intergonocoxal area long, with 2 distinct narrow setose lobes. Gonocoxa broad, as long as gonostylus, basally with strongly sclerotized medial stripe, medial margin basally smoothly curved, with short sparse setosity. Gonostylus (13 B) broad, laterally roundish, apically strongly curved and narrowed, dorsally forming a lobe; strongly impressed; with short setosity, without apical tooth, with one dorsal and two ventral subapical megasetae and a group of three ventral and six dorsal megasetae subbasally, megasetae slightly curved and on distinct basal bodies; with 1 weakly differentiated whiplash seta on ventromedial margin. Tegmen (Fig. 17 E) much longer than broad, conical with sharp apex, with sharp lateral corners, sclerotized, with area of very tiny aedeagal teeth. Aedeagal apodeme long.

BIN. Unknown.

Discussion. *Trichocoelina nefrens* sp. n. differs from all other known species of the genus in lacking the apical tooth and in the peculiar form of the gonostylus. See also under *T. magnifica* sp. n.

Etymology. The name is Latin, *nefrens*, toothless, referring to the lack of the apical tooth on the gonostylus.

Trichocoelina obesula sp. n.

Figs 11 B, 13 A

Material studied. *Holotype male*. NORWAY, 'Svalbard, Engelskelva' [= Svalbard, Bjørnøya, river Engelskelva in the NE part of island], 74.4768°N, 19.1779°E, 30 m, 30.VII.2009, T. Ekrem (NTNU-VM 50594 and BOLD Sample ID BJ244, in NTNU-VM). *Paratypes*. NORWAY, same data as holotype, 1 male (NTNU-VM 50595 and BOLD Sample ID BJ245, in NTNU-VM); 'Svalbard, Lakselva' [= Svalbard, Bjørnøya, river Lakselva], 74.4994°N, 18.9776°E, 15 m, 3.VIII.2009, T. Ekrem, 1 male (NTNU-VM 50605 and BOLD Sample ID BJ255, in NTNU-VM).

Description. Male. **Head**. Face and antenna concolorous brown, maxillary palpus pale yellowish. Eye bridge 3 facets wide. Face with 9 setae. Clypeus with 1 seta. Maxillary palpus with 3 segments, 1st segment as long as 3rd segment, 2nd segment shortest; 1st segment with 1–3 setae, with dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 1.5–1.75x as long as wide, the neck shorter than broad, the longest setae as long as the width of flagellomere. **Thorax**. Brown, setae pale. Anterior pronotum with 8–9 setae. Proepisternum with 10–13 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. Fumose. Length 1.8–2.0 mm. Width/length 0.40. Anal lobe weak. Veins distinct. c/w 0.65–0.75. R_1/R 0.55–0.60. stM shorter than fork of M. r-m as long as bM or longer, both non-setose. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming an indistinct sparse patch in depression. Fore tibial spur longer than the tibial width. **Abdomen**. Pale brown, setae pale, moderately long and fine. **Hypopygium** (Fig. 11 B). Brown, as abdomen. Intergonocoxal area moderately long, with two short, triangular setose lobes. Gonocoxa broad, longer than gonostylus, medial margin basally smoothly curved, with rather long but sparse setosity. Gonostylus (Fig. 13 A) broad, apically slightly narrowed, strongly impressed; with short and dense setosity, a short apical tooth, a megaseta on the ventral side of apical tooth, some subapical and some medial megasetae more basally, megasetae slightly curved, long and slender; with 1 well-differentiated whiplash seta on ventromedial margin. Tegmen broader than long, laterally slightly curved, apically straight, weakly sclerotized, aedeagal teeth not detectable in the specimens studied. Aedeagal apodeme long.

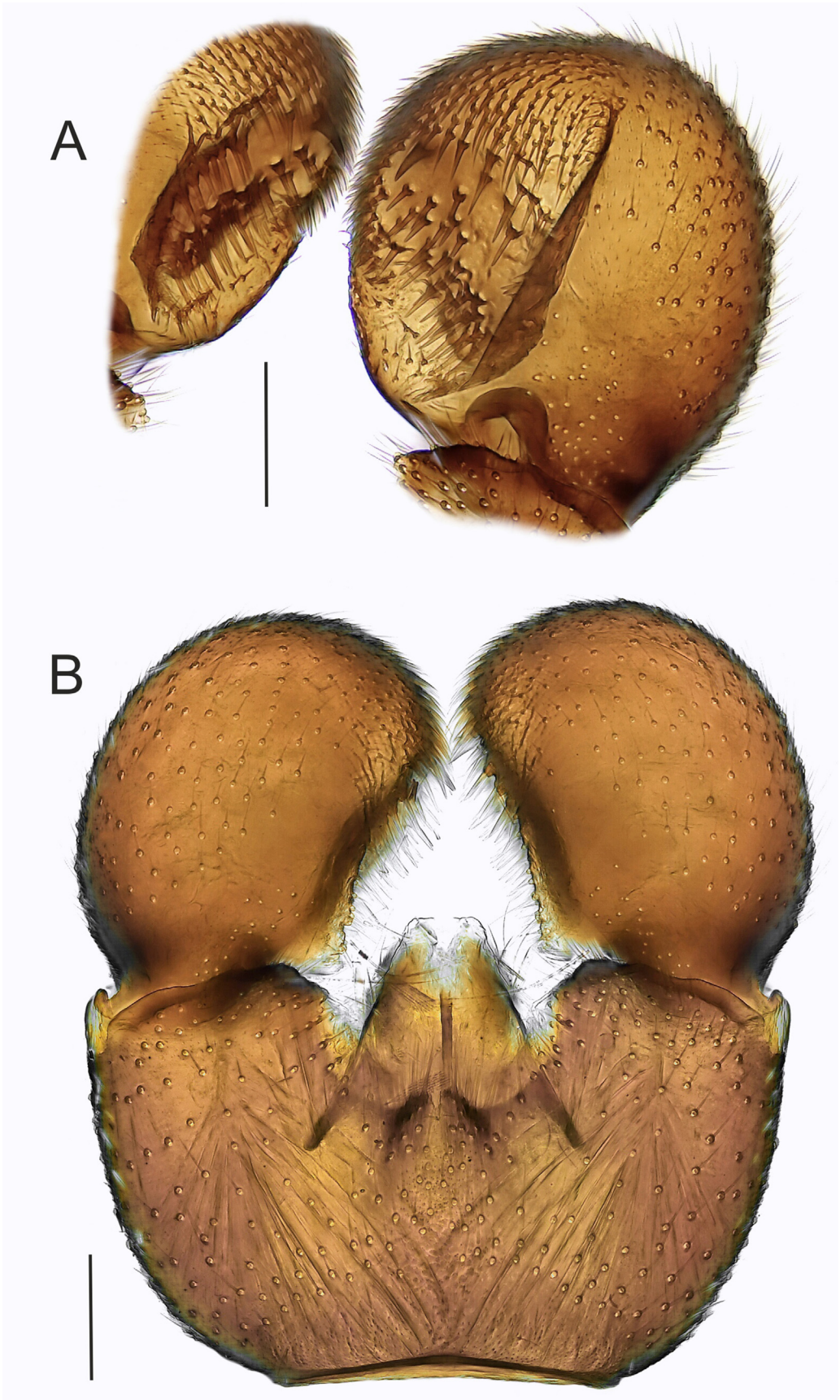

FIGURE 10. *Trichocoelina janetscheki* (Lengersdorf, 1953) (from Greenland). **A.** Gonostylus, ventromedial. **B.** Hypopygium, ventral. Scale 0.1 mm.

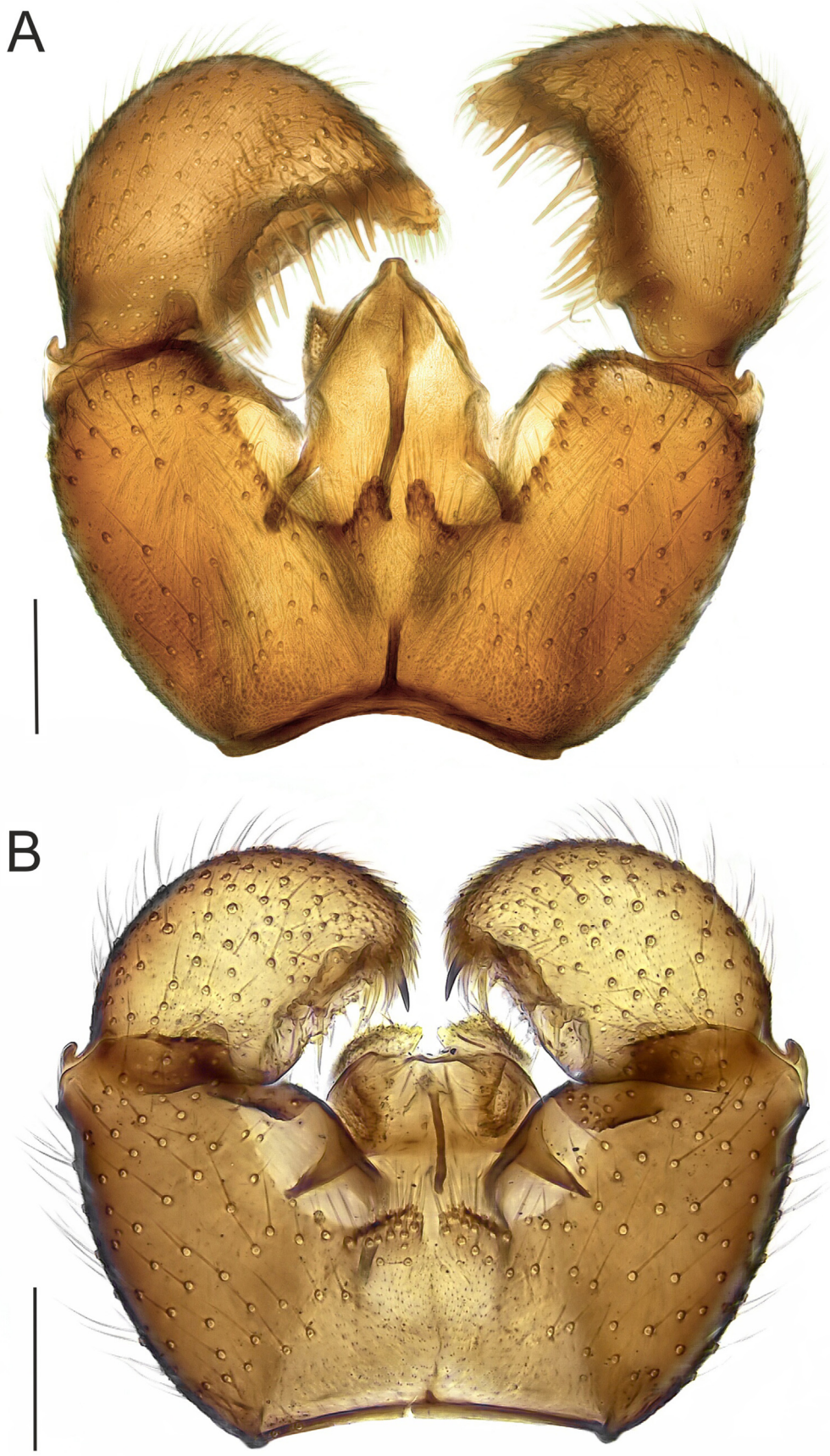

FIGURE 11. Hypopygium, ventral. **A.** *Trichocoelina nefrens* sp. n. (holotype). **B.** *T. obesula* sp. n. (holotype). Scale 0.1 mm.

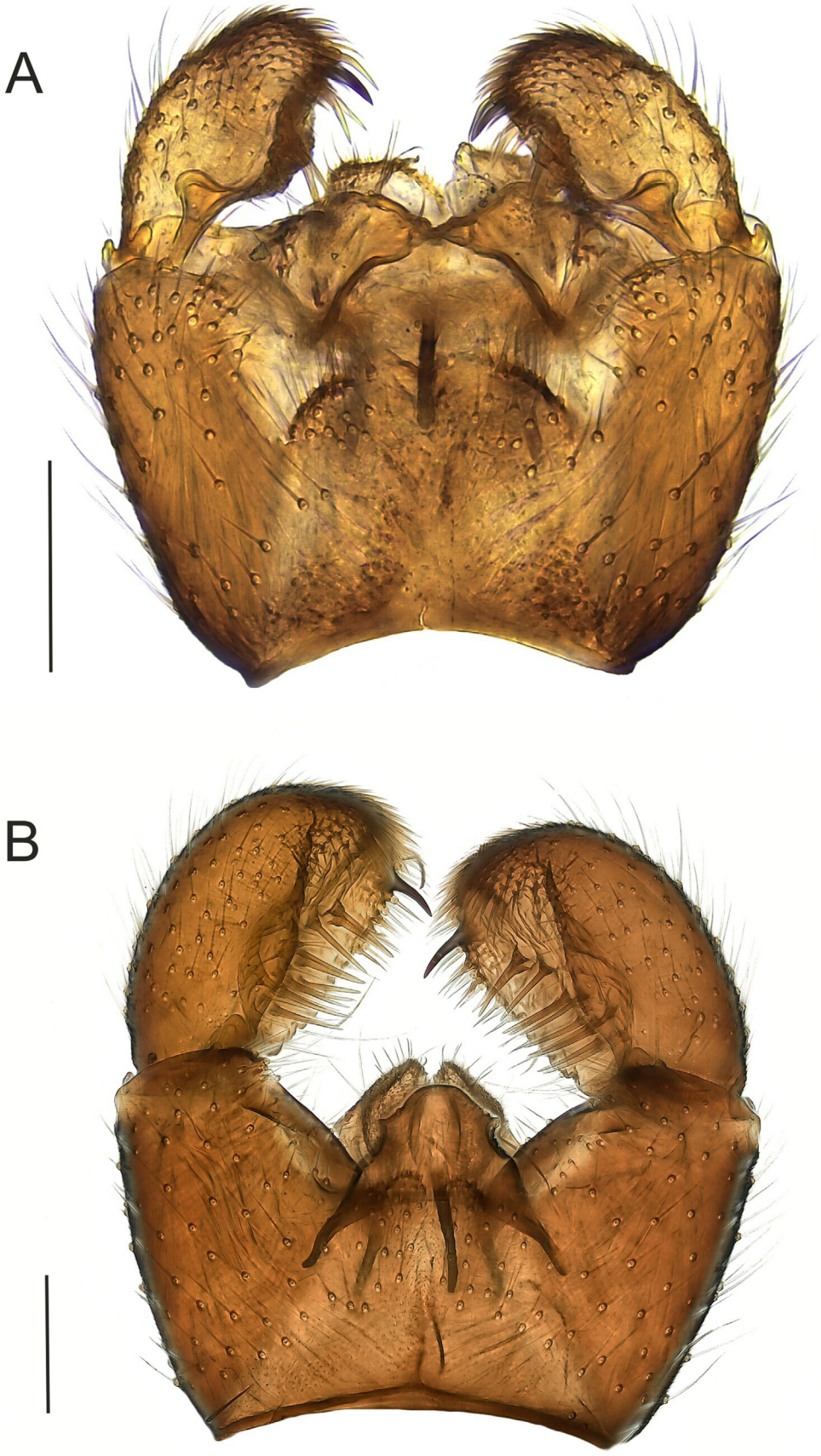

FIGURE 12. Hypopygium, ventral. **A.** *Trichocoelina planilobata* sp. n. (holotype). **B.** *T. oricillifera* sp. n. (holotype). Scale 0.1 mm.

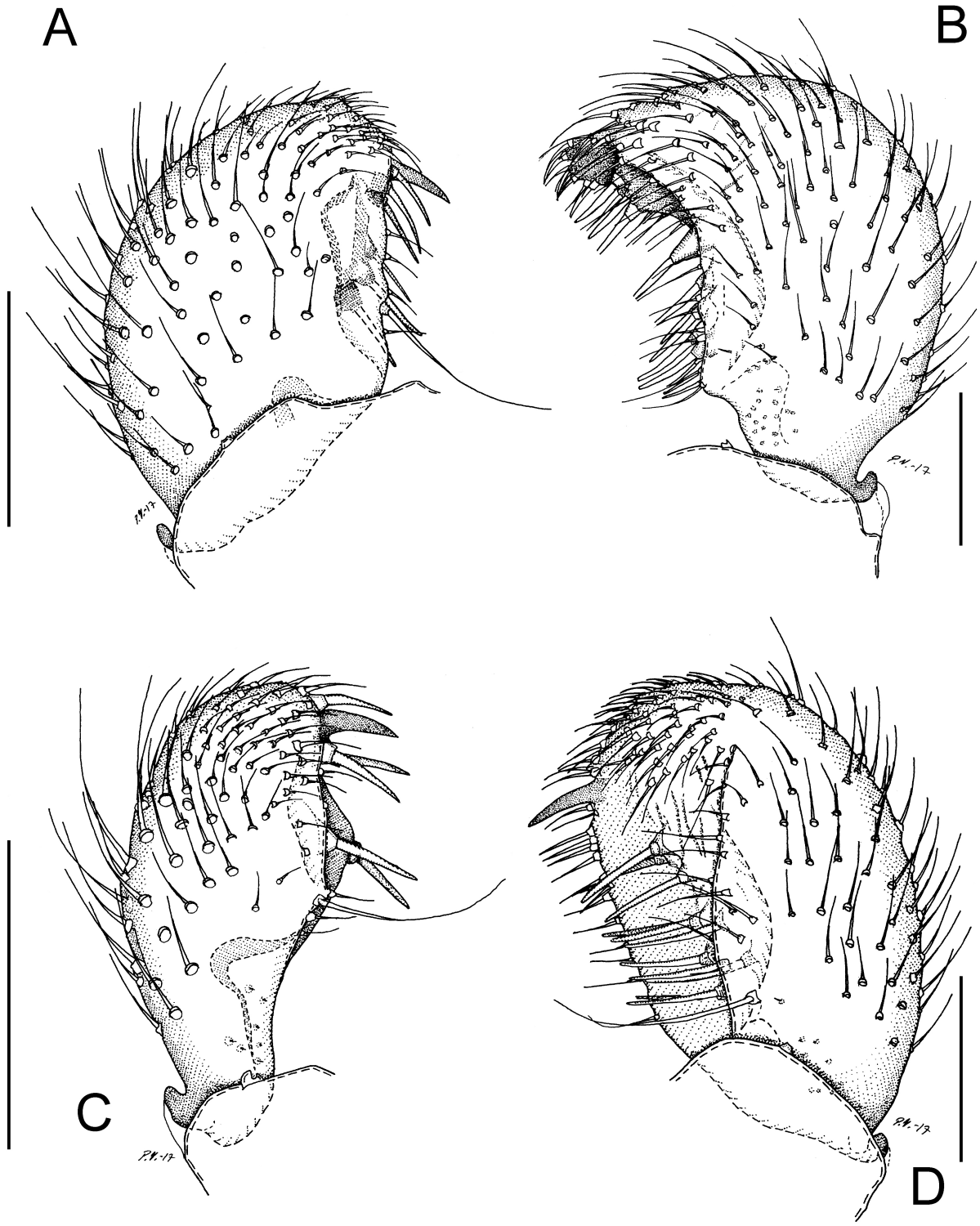

FIGURE 13. Gonostylus, ventral. **A.** *Trichocoelina obesula* sp. n. (holotype). **B.** *T. nefrens* sp. n. (holotype). **C.** *T. planilobata* sp. n. (holotype). **D.** *T. oricillifera* sp. n. (holotype). Scale 0.1 mm.

BIN. BOLD:ABA5289.

Discussion. By its gonostylus and tegmen, *Trichocoelina obesula* sp. n. resembles *T. dispansa* sp. n. and reminiscent species but differs in having the gonostylus broader and more richly setose. See under *T. dispansa*.

Etymology. The name is derived from the Latin word *obesa,* fat, referring to the broad gonostylus and gonocoxa of the species.

Trichocoelina olschwangi (Mohrig & Mamaev, 1983) comb. n.

Literature. *Lycoriella* (*Hemineurina*) *olschwangi* Mohrig & Mamaev—Mohrig *et al.* (1983a) 12, fig. 2 a–d; Menzel & Mohrig (2000): 410, figs 382–384.

New records. CANADA, Yukon, Ogilvie Mts., North Fork Pass, 4100 ft, 21.VI.1962, P. J. Skitsko, 1 male (in CNC); USA, Colorado, Mt. Evans, Summit L. (Lake), Flats, 24.VII.1961, C.W. Mann, 1 male (in MZH).

BIN. Unknown.

Discussion. The species was described from one male from Southern Yamal by Mohrig & Mamaev in Mohrig *et al.* (1983a) and redescribed by Menzel & Mohrig (2000). The species differs from all other *Trichocoelina* in in its gonostylus having a peculiar median lobe with a few megasetae pointing in different directions.

Trichocoelina oricillifera sp. n.

Figs 12 B, 13 D, 17 B

Literature. *Lycoriella hiemalis* Mohrig & Mamaev—Heller *et al.* (2009): 42 [misidentification].

Material studied. *Holotype male*. FINLAND, Lkor (Lapponia kemensis orientalis) Salla, Värriö, Kuntasjoki (grid 7520483:3610905), spruce mire, brook, Malaise trap, 29.VI–29.VII.2013, J. Salmela (in MZH). *Paratypes*. FINLAND, same data as holotype, 1 male (in SDEI); Le (Lapponia enontekiensis), Kilpisjärvi, Saana, SW-slope, Malaise trap, 2006, J. Jakovlev & J. Penttinen, 1 male (in MZH); Lkor (Lapponia kemensis orientalis), Kittilä, Pallas-Yllästunturi National Park, SE of Lehtirova, 67º59'N, 24º05'E, mixed taiga (spruce, birch, pine), sweep-net, 18.VII.2005, M. Jaschhof, 1 male (in SDEI); NORWAY, Finnmark, Tana, Nedre Storfoss, 4.VII.1964, R. Tuomikoski, 1 male (in MZH); Finnmark, Karasjok, 12. VIII.1985, J. Tuiskunen, 1 male (in MZH); SWEDEN, Lapland, Norrbottens län, Arjeplog, lake Sädvajaure (northern end), 66.33°N, 16.20°E, 500 m, subalpine birch forest, Malaise trap, 7.VII–12.VIII.2005, M. Jaschhof & C. Jaschhof, 5 males (no. 5846, 5848 and 5860, in PKHH; no. 898 and 980 in SMNH) [locality published in Heller *et al.* (2009) as 'Pite lappmark, Arjeplog 2'].

Description. Male. **Head**. Face brown, antenna slightly darker brown, maxillary palpus yellowish. Eye bridge 2 facets wide. Face with 17–28 fine setae. Clypeus with 2–3 setae. Maxillary palpus with 3 segments, 1st segment either longer or shorter than 3rd segment, 2nd segment shortest; 1st segment with 3–6 setae, with a dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 2.3–2.6x as long as wide, the neck shorter than broad, the longest setae shorter than the width of flagellomere. **Thorax**. Brown, setae pale. Anterior pronotum with 8–13 setae. Proepisternum with 10–13 setae. Scutellum with 3–4 longer and some short and fine setae. **Wing**. Fumose. Length 2.5–2.9 mm. Width/length 0.40. Anal lobe moderate. Veins distinct. c/w 0.60–0.85. R_1/R 0.70–0.85. stM longer than fork of M. r-m and bM of variable lengths, bM non-setose, r-m with 2–4 setae. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a large patch in depression. Fore tibial spur slightly longer than the tibial width. **Abdomen**. Pale brown, setae pale, fine and moderately long. **Hypopygium** (Fig. 12 B). Brown, as abdomen. Intergonocoxal area long, basally with strongly sclerotized medial stripe, with 2 distinct setose lobes (Fig. 17 B). Gonocoxa broad, as long as gonostylus, medial margin basally strongly curved, with short sparse setosity. Gonostylus (Fig. 13 D) long, apically truncate, strongly impressed; with short setosity, with a short dorsal apical tooth in subapical position, with 8–12 medial megasetae, megasetae long and slender, straight or slightly curved; with one long and 2–3 shorter whiplash setae basad of the megasetae. Tegmen longer than broad, conical, with sharp apicolateral corners, basolaterally broadened, apically and laterally sclerotized; aedeagal teeth not detectable in the specimens studied. Aedeagal apodeme long.

BIN. Unknown.

Discussion. See under *Trichocoelina imitator* sp. n.

Etymology. The name is derived from the Latin words *oricilla,* small ear, and *-fer*, bearing, referring to the lateral lobes of the tegmen.

Trichocoelina planilobata sp. n.

Figs 12 A, 13 C, 18 E

Material studied. *Holotype male*. FINLAND, Li (Lapponia inarensis), Utsjoki, Pummankijoki (grid 7759292:539670), sandy river bank, pitfall trap, 13.VI–13.VII.2016, J. Salmela (in MZH).

Description. Male. **Head**. Face and antenna pale brown, maxillary palpus pale yellowish. Eye bridge 3–4 facets wide. Face with 20 setae. Clypeus with 1 seta. Maxillary palpus with 3 segments, 1st segment longer than 3rd segment, 2nd segment shortest; 1st segment with 1 seta, with a large dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 2.3x as long as wide, the neck shorter than broad, the longest setae longer than the width of flagellomere. **Thorax**. Dark brown, setae pale. Anterior pronotum with 5 setae. Proepisternum with 12 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. Fumose. Length 1.7 mm. Width/length 0.40. Anal lobe rather weak. Veins distinct. c/w 0.70. R_1/R 0.50. stM shorter than fork of M. r-m longer than bM, both non-setose. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a rather large patch in shallow depression. Fore tibial spur longer than the tibial width. **Abdomen**. Pale brown, setae pale and rather long. **Hypopygium** (Fig. 12 A). Brown, as abdomen. Intergonocoxal area moderately long, with very broad, apically divided setose lobe (Fig. 18 E). Gonocoxa moderately broad, longer than gonostylus, medial margin strongly curved, with sparse setosity, ventroapically with denser setosity. Gonostylus (Fig. 13 C) long, broadest medially, apically truncate; impressed; with normal setosity, a long apical tooth, and one dorsal, two subapical and two medial megasetae; megasetae longer than tooth, basally angulate; with one well-differentiated whiplash seta on ventromedial margin. Tegmen broader than long, strongly sclerotized, aedeagal teeth not detectable in the specimen studied. Aedeagal apodeme rather long and strong.

BIN. Unknown.

Discussion. *Trichocoelina planilobata* sp. n. can be distinguished from all other congeneric species by its very broad intergonocoxal lobe of hypopygium. For further discussion, see under *T. dispansa* sp. n.

Etymology. The name is derived from the Latin words *plana*, flat, and *lobus*, lobe, referring to the broad intergonocoxal lobe of the hypopygium.

Trichocoelina quintula sp. n.

Figs 14 A, 16 A

Material studied. *Holotype male.* FINLAND, Lkor (Lapponia kemensis orientalis) Salla, Värriö, Kuntasjoki (grid 7520406:3610772), Malaise trap, 29.VII –19.IX.2013, J. Salmela (in MZH).

Description. Male. **Head**. Face brown, antenna darker brown, maxillary palpus pale yellowish. Eye bridge 3 facets wide. Face with 20 fine setae. Clypeus with 2 setae. Maxillary palpus with 3 segments, lengths of segments poorly comparable in the specimen studied; 3rd segment longer than 2nd segment; 1st segment with 1 seta, with a dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 2.1x as long as wide, the neck shorter than broad, the longest setae shorter than the width of flagellomere. **Thorax**. Brown, setae pale. Anterior pronotum with 7 setae. Proepisternum with 8 setae. Scutellum with 3 longer and some short and fine setae. **Wing**. Fumose. Length 2.0 mm. Width/length 0.40. Anal lobe moderate. Veins distinct. c/w 0.75. R_1/R 0.90. stM and fork of M subequal in length. bM slightly longer than r-m, bM and r-m non-setose. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a large distinct patch of pale setae in depression. Fore tibial spur longer than the tibial width. **Abdomen**. Pale brown, setae pale, moderately long. **Hypopygium** (Fig. 14 A). Brown, as abdomen. Intergonocoxal area long, with 2 small separate setose lobes. Gonocoxa narrow, longer than gonostylus, with short sparse setosity, medial margin basally smoothly curved. Gonostylus (Fig. 16 A) elongated, apically slightly narrowed, strongly impressed; with short setosity, a long and narrow apical tooth, and 5 medial megasetae; megasetae strong and slightly curved; with a long whiplash seta basad from the megasetae. Tegmen subtriangular, apically roundish, laterally straight, weakly sclerotized, with area of small aedeagal teeth. Aedeagal apodeme narrow and long.

BIN. Unknown.

Discussion. *Trichocoelina quintula* sp. n. resembles somewhat *T. hiemalis* (Mohrig & Mamaev) in having small intergonocoxal lobes and at most slightly curved, oblique gonostylar megasetae but differs in its much narrower gonostylus and in having only five, not more than ten, megasetae and in its narrower tegmen, see Figs 14 A, 16 A and fig. 4 in Mohrig *et al.* (1985). *Trichocoelina quintula* resembles also *T. cochleata* (Rübsaamen) but differs in having the gonostylus darker, not paler than gonocoxa, the gonostylus less strongly curved, the gonostylar megasetae shorter and stronger, smaller intergonocoxal lobes, and in lacking a semicircular rim on the tegmen.

Etymology. The name is derived from the Latin word *quintus*, fifth, referring to the five megasetae of the gonostylus.

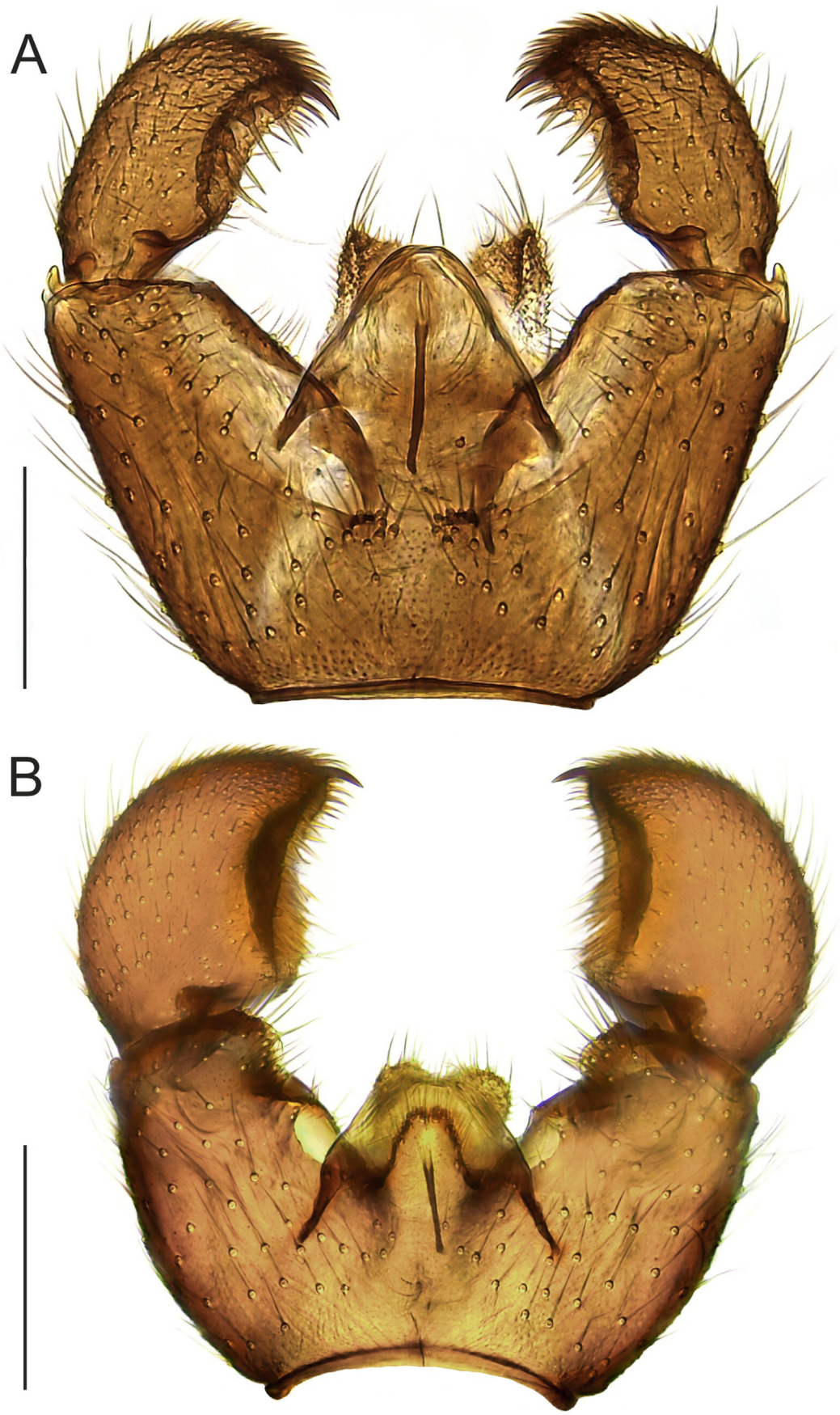

FIGURE 14. Hypopygium, ventral. **A.** *Trichocoelina quintula* sp. n. (holotype). **B.** *T. semisphaera* sp. n. (holotype). Scale 0.1 mm.

***Trichocoelina semisphaera* sp. n.**
Figs 14 B, 16 B

Material studied. *Holotype male.* FINLAND, Lkor (Lapponia kemensis orientalis), Salla, Värriö, Kuntasjoki (grid 7520406:3610772), over a brook, Malaise trap, 29.VII–19.IX.2013, J. Salmela (in MZH). *Paratypes.* FINLAND, Ks (Regio kuusamoensis), Taivalkoski, Kylmäoja (grid 7275293:3554865), by a brook, Malaise trap, 3.VII–1.VIII.2006, J. Salmela, 1 male (in PJSR); NORWAY, 'Svalbard, Lakselva' [= Svalbard, Bjørnøya, river Lakselva], 74.4994°N, 18.9776°E, 15 m, 28.VII.2009, T. Ekrem, 1 male (NTNU-VM 50613 and BOLD Sample ID BJ263, in NTNU-VM).

Description. Male. **Head**. Face brown, antenna darker brown, maxillary palpus pale yellowish. Eye bridge 2–3 facets wide. Face with 24–26 fine setae. Clypeus with 2–3 setae. Maxillary palpus with 3 segments, 1st segment longer than 3rd segment, 2nd segment shortest; 1st segment with 1–2 setae, with a dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 1.95–2.0x as long as wide, the neck shorter than broad, the longest setae slightly shorter than the width of flagellomere. **Thorax**. Brown, setae dark. Anterior pronotum with 4–7 setae. Proepisternum with 6–8 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. Fumose. Length 2.0–2.2 mm. Width/length 0.40. Anal lobe weak. Veins distinct. c/w 0.65–0.75. R_1/R 0.50–0.60. stM slightly shorter than fork of M. r-m longer than bM, bM non-setose, r-m with 3–4 setae. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a large indistinct patch of fine setae in depression. Fore tibial spur longer than the tibial width. **Abdomen**. Pale brown, setae dark, moderately long. **Hypopygium** (Fig. 14 B). Brown, as abdomen. Intergonocoxal area long, with large conical setose lobe. Gonocoxa broad, as long as gonostylus, medial margin basally strongly curved, with short sparse setosity. Gonostylus (Fig. 16 B) broad, laterally roundish, apically narrowed, strongly impressed; with short setosity, a short curved apical tooth, and a dorsal and a ventral group of 6–7 megasetae medially; megasetae long and slender, directed slightly differently in both groups; with 1–2 weakly differentiated whiplash setae on ventromedial margin. Tegmen subconical and sclerotized, with area of minute aedeagal teeth. Aedeagal apodeme narrow and rather short.

BIN. BOLD:ABA5290.

Discussion. By the subtriangular form of its gonostylus, *Trichocoelina semisphaera* sp. n. resembles *T. hiemalis* (Mohrig & Mamaev) but differs in having two groups of gonostylar megasetae, pointing in slightly different directions (all similarly directed in *T. hiemalis*), and one long intergonocoxal lobe of hypogium (two small ones in *T. hiemalis*) and in having the tegmen subconical (roundish in *T. hiemalis*).

Etymology. The name is derived from the Latin words *semi-*, half, and *sphaera*, ball, referring to the roundish lateral margin of the gonostylus.

***Trichocoelina semusta* sp. n.**
Figs 15 A, 16 C, 18 F

Material studied. *Holotype male*. ITALY, Trentino-Alto Adige, Bolzano, Parco nazionale dello Stelvio (NP Stilfser Joch), Suldental E of Gomagoi, 46°34'33''N, 10°32'51''E, 1220 m, mountainous area, spruce forest, Malaise trap, 18–21.V.2005, C. Lange & J. Ziegler (in ZMHB). *Paratypes*. ITALY, same data as holotype, 1 male (in SDEI); USA, Alaska, Kingfisher Creek, Grande Denali Lodge, 63.743024°N, 145.883416°W, 14.VI.2016, J. Fitzgerald, 1 male (in MZH).

Description. Male. **Head**. Face and antenna concolorous brown, maxillary palpus pale yellowish. Eye bridge 3 facets wide. Face with 19 setae. Clypeus with 1 seta. Maxillary palpus with 3 segments, 3rd segment longer than 1st segment, 2nd segment shortest; 1st segment with 1 seta, with dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 2.9x as long as wide, the neck shorter than broad, the longest setae as long as the width of flagellomere. **Thorax**. Dark brown, setae pale. Anterior pronotum with 3–5 setae. Proepisternum with 6–9 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. Fumose. Length 2.2–2.4 mm. Width/length 0.40. Anal lobe weak. Veins distinct. c/w 0.60. R_1/R 0.65–0.80. stM shorter than fork of M. r-m as long as bM, both non-setose. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a weakly demarcated patch. Fore tibial spur longer than the tibial width. **Abdomen**. Pale brown, setae pale, moderately long and fine. **Hypopygium** (Fig. 15 A). Brown, as abdomen. Intergonocoxal area long, with distinctly bifid setose lobe

(Fig. 18 F). Gonocoxa moderately broad, longer than gonostylus, medial margin smoothly curved, with sparse setosity. Gonostylus (Fig. 16 C) long, narrow, strongly impressed; with dense setosity, a long apical tooth, and 5–6 megasetae at middle; megasetae long and slender; with 1 well-differentiated whiplash seta at ventromedial margin. Tegmen as long as broad, laterally and apically roundish, with a semicircular subapical sclerotized rim, otherwise weakly sclerotized, aedeagal teeth not detectable in the specimens studied. Aedeagal apodeme long.

BIN. Unknown.

Discussion. By its strikingly dark setosity on the gonostylar apex, *Trichocoelina semusta* sp. n. resembles *T. cochleata* (Rübsaamen) but differs in having the apex less strongly curved, intergonocoxal lobes longer and closer to each other, the sclerotized rim of the tegmen broader and not protruding, and scapus and pedicellus concolorous brown with the flagellomeres, not yellow as in *T. cochleata.*

Etymology. The name is Latin, *semusta*, half-burned, referring to the dark setosity of the apex of the gonostylus of the species.

Trichocoelina subcochleata (Komarov, 2009) comb. n.

Literature. *Lycoriella* (*Hemineurina*) *subcochleata* Komarov—Komarov (2009): 100, 103, figs 1–5.

BIN. Unknown.

Discussion. *Trichocoelina subcochleata* (Komarov, 2009) was described based on one male from Russia (locus typicus: Republic of Altai, Kosh-Agachsky District, near Kosh-Agach, 50°09'N, 88°19'E). In its gonostylus with two groups of megasetae and its tegmen with sharp apicolateral corners it resembles most *T. subpermutata* (Mohrig & Mamaev) but differs in having two separate short interxoxal lobes instead of a long, apically bifid intergonocoxal lobe of hypopygium, and in its longer tegmen. By its tegmen and intergonocoxal lobes, *T. subcochleata* resembles also *T. imitator* and *T. oricillifera*, but these species have a large number of perpendicular megasetae in their gonostylus. We have not seen the holotype of *T. subcochleata* but suggest that the mention in the original description that the species lacks the whiplash setae from its gonostyli, is presumably a mistake, or that they have been broken off from the specimen studied.

Trichocoelina subpermutata (Mohrig & Mamaev, 1990) comb. n.

Literature. *Lycoriella* (*Hemineurina*) *permutata* (Lundbeck)—Mohrig *et al.* (1983a) 15, fig. 4 a–c [misidentification]. *Lycoriella permutata* (Lundbeck)—Krivosheina & Mohrig (1986): 157, 161 [misidentification]. *Lycoriella* (*Hemineurina*) *subpermutata* Mohrig & Mamaev—Mohrig *et al.* (1990): 15, fig. 3 a–d; Menzel & Mohrig (2000): 385. *Lycoriella subpermutata* Mohrig & Mamaev—Heller *et al.* (2009): 43.

BIN. Unknown.

Discussion. The species was described based on one male from Southern Yamal, Northern Russia (Mohrig *et al*. 1990). By its very large, apically bifid intergonocoxal lobe the species most resembles *T. vitticollis*, but differs in having its gonostylus broader, with megasetae pointing differently (subapical and subbasal megasetae perpendicular, medial oblique, whereas in *T. vitticollis* only a medial oblique group) and in having its tegmen with sharp apicolateral corners, absent in all other *Trichocoelina*. See also under *T. tecta* sp. n.

Trichocoelina tecta sp. n.

Figs 15 B, 16 D

Material studied. *Holotype male*. USA, Alaska, 11 mi S Anderson Jct, Rte 3, mi 270, alder-poplar-spruce, Malaise trap, 23.VI–11.VIII.1984, S. & J. Peck (in MZH). *Paratypes.* USA, same data as holotype, 1 male (MZH); CANADA, Nunavut, Qikitaaluk, Western Bylot Island, 73.157°N, 79.950°W, 12 m, 3.VIII.2007, L. Jolicoeur & L. McKinnon, 1 male (BOLD Sample ID 08WOLVES-01202, in CBG); Yukon, North Fork Crossing, Mi 42 Peel Plt. Road, 3500', 24.VI.1962, P.J. Skitsko, 1 male (in CNC); RUSSIA, Krasnoyarsk region, Taimyr Peninsula, river Zakharova, Rassokha, 72.70°N, 101.08°E, pan trap, 1–10.VII.2011, A. Barkalov, 1 male (in ISEA); Yamalo-Nenets Autonomous Okrug, near Seyakh, 70.7788°N, 72.0750°E, nival meadow, Malaise trap, 13–29.VII.2014, N. Zubryi, 5 males (1 in MZH, 1 in NHMO, 2 in SDEI, 1 in ZIN).

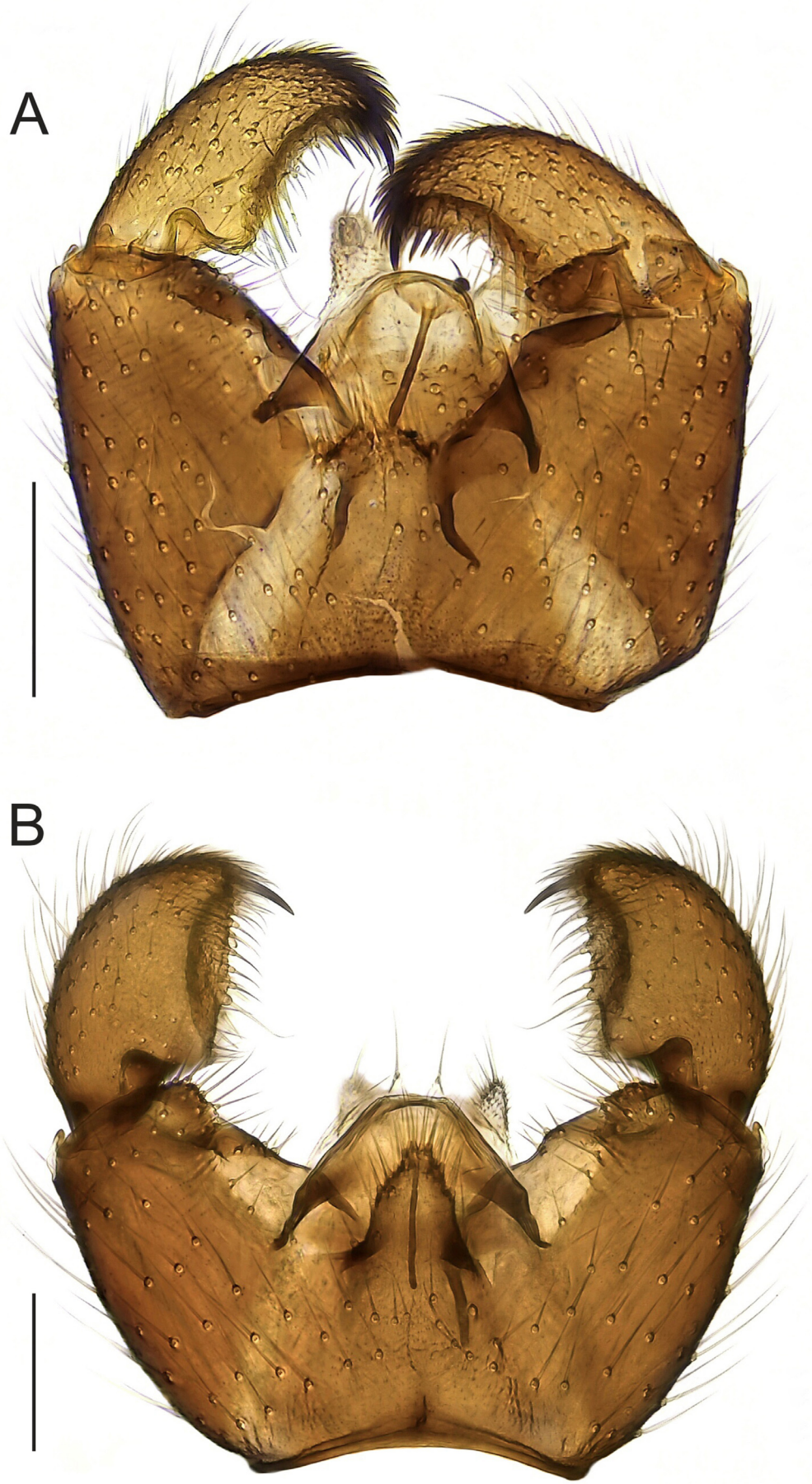

FIGURE 15. Hypopygium, ventral. **A.** *Trichocoelina semusta* sp. n. (holotype). **B.** *T. tecta* sp. n. (holotype). Scale 0.1 mm.

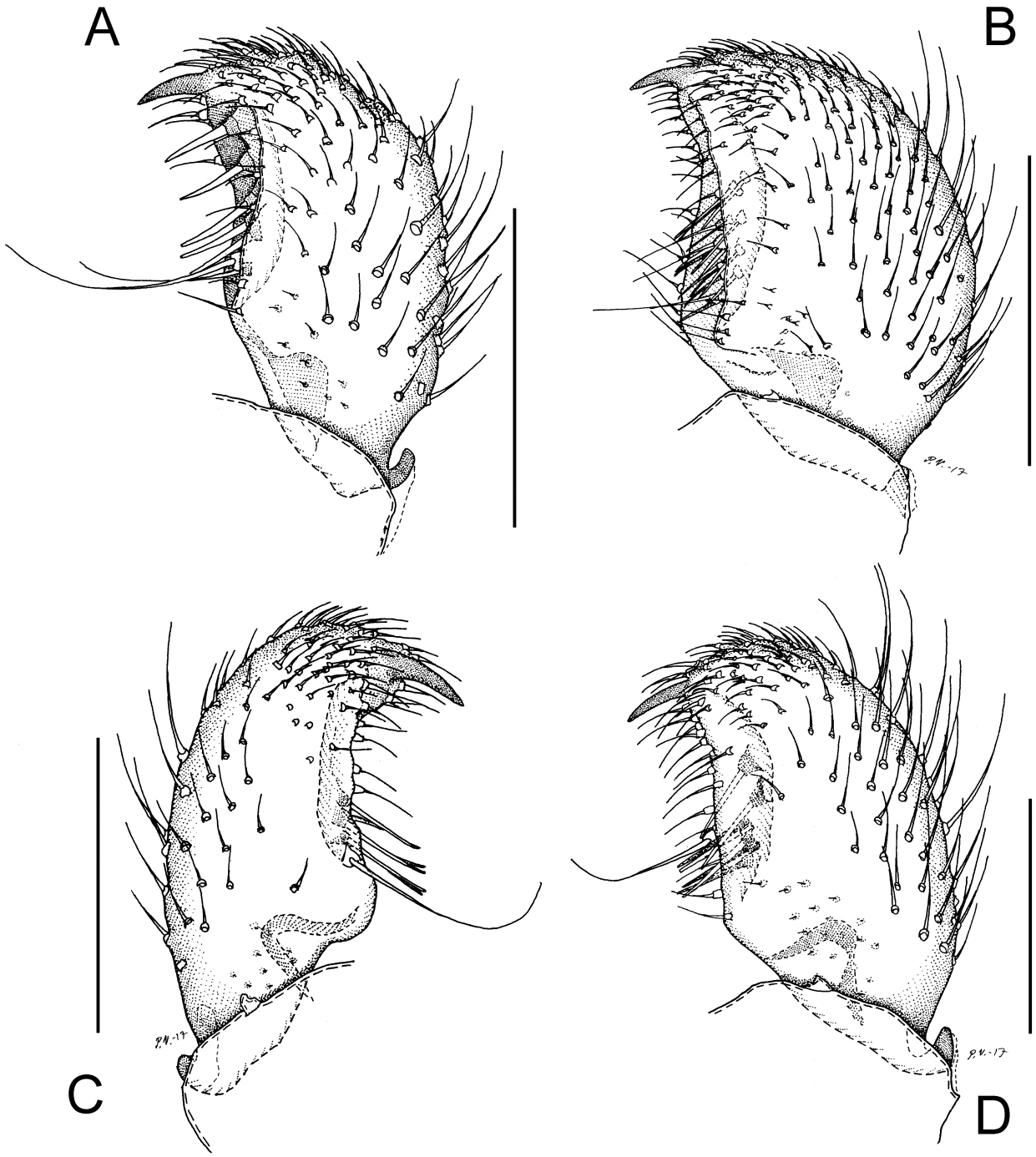

FIGURE 16. Gonostylus, ventral. **A.** *Trichocoelina quintula* sp. n. (holotype). **B.** *T. semisphaera* sp. n. (holotype). **C.** *T. semusta* sp. n (holotype). **D.** *T. tecta* sp. n. (holotype). Scale 0.1 mm.

Description. Male. **Head**. Face and antenna concolorous brown, maxillary palpus pale yellowish. Eye bridge 2–3 facets wide. Face with 13–20 fine setae. Clypeus with 2–5 setae. Maxillary palpus with 3 segments, 1st segment longer or shorter than 3rd segment, 2nd segment shortest; 1st segment with 1–2 setae, with a dorsal patch of sensilla; surface of antennal flagellomeres smooth, body of 4th antennal flagellomere 1.7–2.25x as long as wide, the neck shorter than broad, the longest setae slightly shorter than the width of flagellomere. **Thorax**. Brown, setae pale. Anterior pronotum with 2–6 setae. Proepisternum with 3–10 setae. Scutellum with 4 longer and some short and fine setae. **Wing**. Fumose. Length 1.9–2.1 mm. Width/length 0.40–0.45. Anal lobe weak. Veins distinct. c/w 0.60–0.65. R_1/R 0.60–0.85. stM and fork of M subequal in length. r-m and bM of variable length, bM non-setose,

r-m with 2–4 setae or non-setose. Halter yellow. **Legs**. Yellow, coxal setae pale. Fore tibial organ forming a small patch of dark strong setae in depression. Fore tibial spur slightly longer than the tibial width. **Abdomen**. Pale brown, setae pale, moderately long. **Hypopygium** (Fig. 15 B). Brown, as abdomen. Intergonocoxal area long, basally with strongly sclerotized medial stripe, with large subtriangular lobe with setae at margin. Gonocoxa broad, longer than gonostylus, medial margin basally strongly curved, with long sparse setosity. Gonostylus (Fig. 16 D) long, apically narrowed, strongly impressed; with short setosity, with a long apical tooth, with 6–7 medial megasetae in dorsal and ventral groups, megasetae long and slender, directed slightly differently in both groups; with 1 well-differentiated whiplash seta on ventromedial margin. Tegmen conical, apically and laterally straight or slightly curved, weakly sclerotized, with an indistinct area of minute aedeagal teeth. Aedeagal apodeme long.

BIN. BOLD:AAM9263.

Discussion. In having a long intergonocoxal lobe of hypopygium and 6–7 medial megasetae on the gonostylus, *Trichocoelina tecta* sp. n. resembles *T. vitticollis* (Rübsaamen) but differs in the intergonocoxal lobe being setose only on its margins, not on its ventral side, in its conical tegmen, not apically roundish, and in having the gonostylar megasetae in groups pointed at two directions, not all in a row pointing in one direction.

Etymology. The name is Latin, *tecta*, covered, referring to the ventromedial part of the gonostylus covering almost completely the medial megasetae.

Trichocoelina vitticollis (Holmgren, 1883) comb. n.

Synonyms: = *glacialis* (Lundbeck, 1898) [as *Sciara*; preocc., not *Sciara glacialis* Rübsaamen, 1898]; = *permutata* (Lundbeck, 1900) [as *Sciara*; new name for *Sciara glacialis* Lundbeck, 1898].

Literature. *Sciara glacialis* Lundbeck—Lundbeck (1898): 254, pl. 6, fig. 13. *Sciara humicola* Lundbeck—Lundbeck (1898): 252, pl. 6, fig. 11 [misidentification]. *Sciara permutata* Lundbeck—Lundbeck (1900): 313. *Bradysia permutata* (Lundbeck)—McAlpine (1964): 128. *Bradysia* (*Hemineurina*) *permutata* (Lundbeck)—Frey (1948): 66, 84; pl. 18, fig. 106. *Lycoriella* (*Hemineurina*) *permutata* (Lundbeck)—Tuomikoski (1959a): 36; Tuomikoski, (1960): 75, 76; Stone & Laffoon (1965): 232; Tuomikoski (1967): 48; Gerbachevskaja-Pavluchenko (1986): 31 [not *sensu* Mohrig *et al.* (1983a) 15; misidentification, = *T. subpermutata* (Mohrig & Mamaev, 1990)]. *Sciara vitticollis* Holmgren—Holmgren (1883): 182; Jacobson (1898): 190; Gerbachevskaja-Pavluchenko (1986): 71. *Lycoria* (*Neosciara*) *vitticollis* (Holmgren)—Lengersdorf 1928–30: 59. *Lycoriella* (*Hemineurina*) *vitticollis* (Holmgren)—Menzel & Mohrig (2000): 411, figs 380, 381; Coulson & Refseth (2004): 103; Coulson (2008): 162; Coulson (2013): 154; Mohrig *et al.* (2013): 271; Vilkamaa (2015): 551; Wirta *et al.* (2016): appendix, unpaginated p. 21 (table S1) and unpaginated p. 39 (cladogram).

New records. CANADA, Northwest Territories, Mackenzie Delta, Reindeer Depot, 29.VI.1948, J.R. Vockeroth, 1 male (in MZH); NE GREENLAND, Zackenberg, 74°28'N, 20°34'W, 1.VIII.1991, J. Böcher, 1 male (in ZMUC); NW GREENLAND, Thule, 8.VII.1940, C. Wibe, 1 male (in ZMUC); SE GREENLAND, Skoldängen, 14–27.VII.1992, 2 males (1 in MZH, 1 in ZMUC); SW GREENLAND, Nugssuak, 18.VII.1949, C. Wibe, 1 male (in ZMUC); Saputit, 6.VII.1949, C. Wibe, 1 male (in MZH); W GREENLAND, Arnangarnup kua, 11.VII.1984, J. Böcher, 1 male (im ZMUC); Skjoklungen, 'Bygder', 19–27.VII.1992, S. Andersen, 1 male (in ZMUC); Söndre Stormfjord, 21.VI.1952, C. Wibe, 1 male (in MZH); same locality but 67°02'N, 50°40'W, 2.VIII.1992, J. Böcher, 1 male (in MZH); NORWAY, 'Svalbard, Bjorndalen' [= Svalbard, Spitsbergen, Nordenskiöld Land, valley Bjørndalen W of Adventfjorden], 78.2320°N, 15.3270°E, 13.VII.2012, G.E.E. Søli, 1 male (NHMO 261403 and BOLD Sample ID SV985, in NHMO); 'Svalbard, Bolterdalen' [= Svalbard, Spitsbergen, Nordenskiöld Land, valley Bolterdalen on the southern side of Adventdalen], 78.1640°N, 15.9900°E, 100 m, 10.VII.2012, G.E.E. Søli, 3 males (NHMO 260984 and BOLD Sample ID SV1061, NHMO 260985 and BOLD Sample ID SV1062, 2 in NHMO; BOLD Sample ID SV1064, in SDEI); 'Svalbard, Colesbukta' [= Svalbard, Spitsbergen, Nordenskiöld Land, bay Colesbukta on the southern side of Isfjorden] 78.1120°N, 15.0290°E, 11.VII.2012, T. Ekrem, E. Stur & G.E.E. Søli, 1 male (NHMO 261328 and BOLD Sample ID SV910, in NHMO); 'Svalbard, Hanaskogdalen' [= Svalbard, Spitsbergen, Nordenskiöld Land, valley Hanaskogdalen on the eastern side of Adventfjorden], 78.2830°N, 15.6050°E, 25 m, 12.VII.2012, T. Ekrem, E. Stur & G.E.E. Søli, 4 males (NHMO 261385 and BOLD Sample ID SV967, NHMO 261390 and BOLD Sample ID SV972, 2 in NHMO; BOLD Sample ID SV945, 1 in NTNU-VM; BOLD Sample ID SV974, 1 in SDEI); 'Svalbard, Krossfjorden, 14. juli bukta' [= Svalbard, Spitsbergen, bay Fjortende Julibukta (northern side) on the eastern side of Krossfjorden], 79.1284°N, 11.8582°E, 3 m, 18.VII.2013, T. Ekrem, K. Harsaker & G.E.E. Søli, 1 male

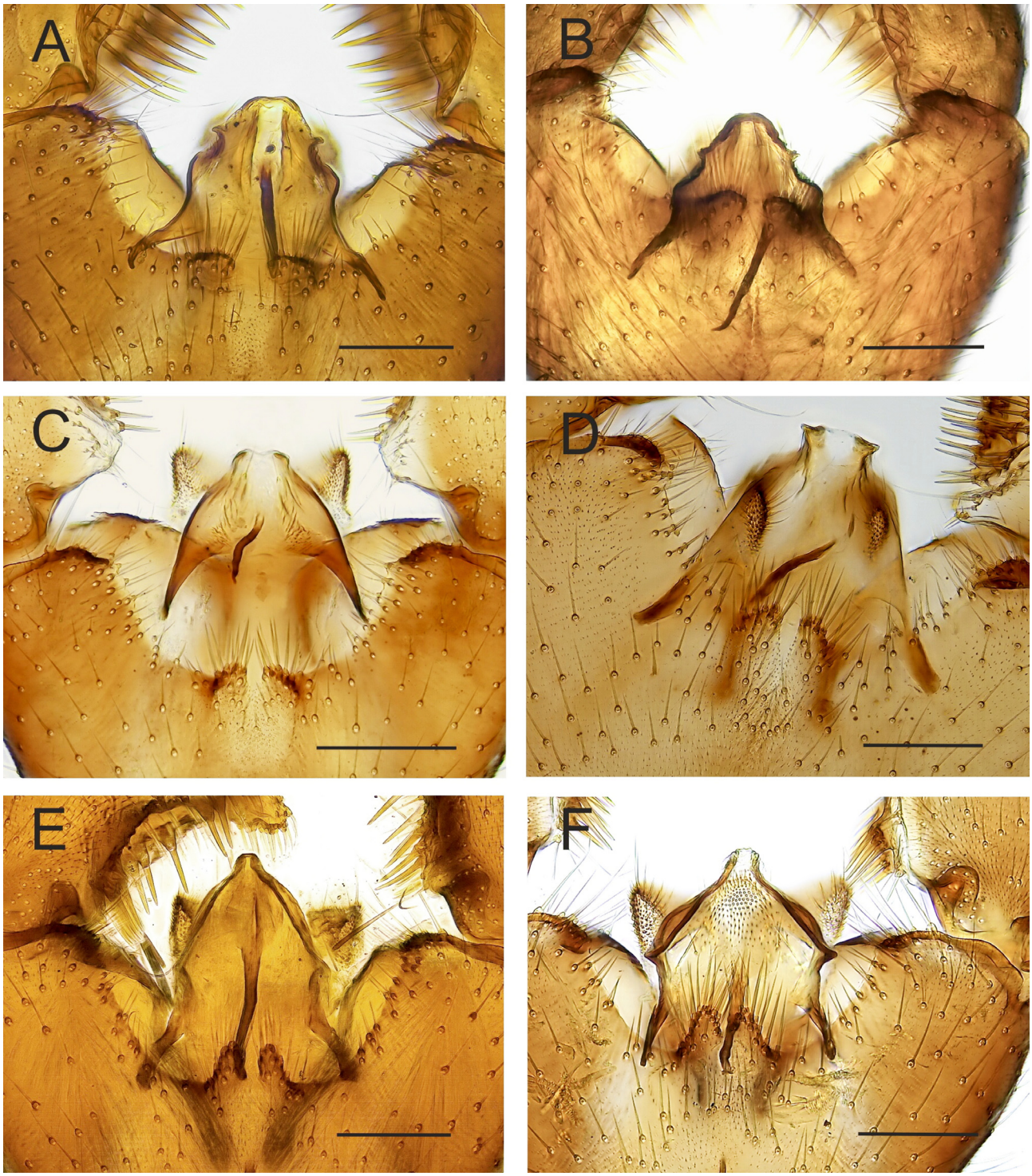

FIGURE 17. Tegmen, ventral. **A.** *Trichocoelina imitator* sp. n. (holotype). **B.** *T. oricillifera* sp. n. (paratype from Salla). **C.** *T. hians* sp. n. (holotype). **D.** *T. janetscheki* (Lengersdorf, 1953) (from Colorado). **E.** *T. nefrens* sp. n. (paratype from Rassokha). **F.** *T. magnifica* sp. n. (holotype). Scale 0.1 mm.

(NHMO 261046 and BOLD Sample ID SV1137, in NHMO); 'Svalbard, Lakselva' [= Svalbard, Bjørnøya, river Lakselva], 74.4994°N, 18.9776°E, 15 m, 28.VII.2009, T. Ekrem, 1 male (NTNU-VM 50612 and BOLD Sample ID BJ262, in NTNU-VM); same locality but 3.VIII.2009, T. Ekrem, 2 males (NTNU-VM 50606 and BOLD Sample ID BJ256, NTNU-VM 50608 and BOLD Sample ID BJ258, in NTNU-VM); 'Svalbard, Lillehoeoekfjorden, Nilspynten' [Sval-

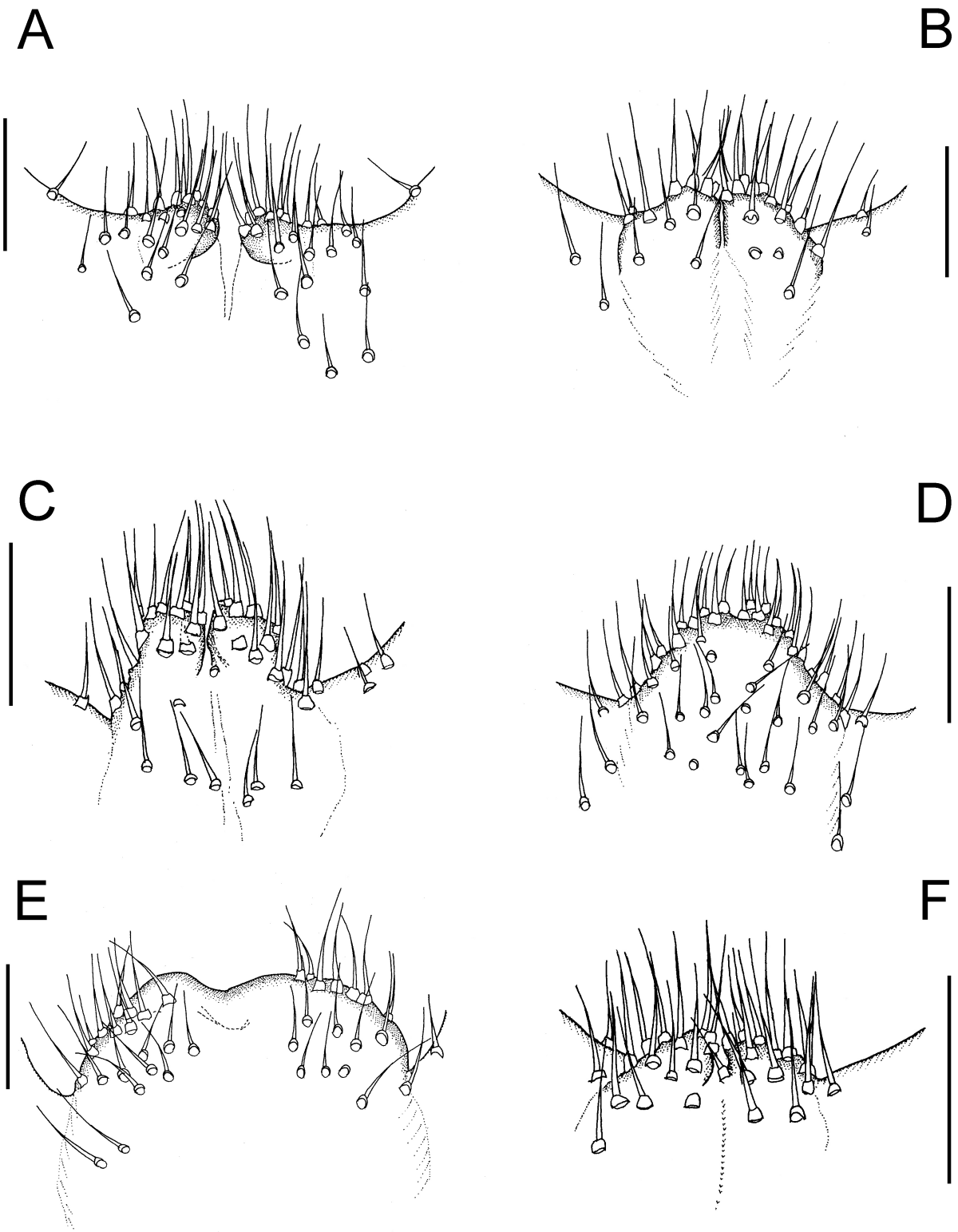

FIGURE 18. Intergonocoxal lobes of hypopygium, ventral. **A.** *Trichocoelina aemula* (holotype). **B.** *T. dispansa* sp. n. (paratype). **C.** *T. ithyspina* sp. n. (holotype). **D.** *T. jukkai* sp. n. (paratype). **E.** *T. planilobata* sp. n. (holotype). **F.** *T. semusta* sp. n. (holotype). Scale 0.05 mm.

bard, Spitsbergen, Albert I Land, Lillehøkfjorden, E part of Mitrahalvøya, Nilspynten], 79.2660°N, 11.5690°E, 10 m, 18.VII.2013, G.E.E. Søli, 6 males (NHMO 261244 and BOLD Sample ID SV825, NHMO 261245 and BOLD Sample ID SV826, NHMO 261253 and BOLD Sample ID SV834, NHMO 261254 and BOLD Sample ID SV835,

4 in NHMO; BOLD Sample ID SV828, in SDEI; BOLD Sample ID SV831 in MZH); 'Svalbard, Longyearbyen' [= Svalbard, Spitsbergen, Nordenskiöld Land, Longyearbyen in the Longyeardalen S of Adventfjorden], 78.2170°N, 15.6180°E, 16.VII.2012, G.E.E. Søli, T. Ekrem & E. Stur, 2 males (NHMO 261508 and BOLD Sample ID SV1263, NHMO 261175 and BOLD Sample ID SV1266, in NHMO); 'Svalbard, Longyearbyen' [= Svalbard, Spitsbergen, Nordenskiöld Land, Longyearbyen in the Longyeardalen S of Adventfjorden], 78.2088°N, 15.5889°E, 14.VII.2012, G.E.E. Søli, 2 males (NHMO 261508 and BOLD Sample ID SV-NHMO91, in NHMO; BOLD Sample ID SV-NHMO94, in SDEI); 'Svalbard, Longyearbyen' [= Svalbard, Spitsbergen, Nordenskiöld Land, Longyearbyen in the Longyeardalen S of Adventfjorden], 78.2130°N, 15.6040°E, 14.VII.2012, E. Stur, 2 males (NHMO 261191 and BOLD Sample ID SV1282, in NHMO; BOLD Sample ID SV1283, in MZH); Svalbard, NW part of Spitsbergen, southern coast of Kongsfjord, W of Ny Ålesund, yellow pan trap, 2–15.VII.1974, Stephan, 2 males (in NHMO, SDEI); SWEDEN, Lapland, Abisko, Naturvetenskapliga Station, meadow at the station, sweep-net, 28.VI.1988, M. von Tschirnhaus, 4 males (2 in NHMO, 2 in SDEI).

BIN. BOLD:ABA5288.

Discussion. The species was described from one female from Novaya Zemlya by Holmgren (1883) and later described again based on some males and females from Greenland as *Sciara glacialis* (Lundbeck 1898) and from Spitsbergen as *Sciara permutata* (Lundbeck 1900). The species was redescribed with a list of literature, synonyms and combinations by Menzel & Mohrig (2000). *Trichocoelina vitticollis* (Holmgren) can be distinguished from all other species of the genus by its very large, setose intergonocoxal lobe of hypopygium and in having the gonostylus with a group of slender, oblique medial megasetae. See also under *Trichocoelina tecta* sp. n.

Overview of taxonomic corrections in the system of Sciaridae

Here follows an overview of the corrections and changes of the nomenclature and systematics presented above. With the exclusion of the species *incertae sedis* and some species which will transferred to the genera *Bradysiopsis* Tuomikoski, *Camptochaeta* Hippa & Vilkamaa, *Merizomma* Sasakawa and *Scatopsciara* Edwards, the *Lycoriella* group currently includes 97 species in the following genera: *Hemineurina* Frey (24 species), *Lycoriella* Frey (38 species), *Stenacanthella* Vilkamaa & Menzel (6 species) and *Trichocoelina* Vilkamaa & Menzel (29 species).

***Bradysiopsis* Tuomikoski, 1960**
dearmata (Mohrig & Krivosheina, 1987) **comb. nov.** in Mohrig *et al.* (1987) [*Br. dearmata* group]—PAL
sordida (Mohrig, 1999) **comb. nov.** in Mohrig *et al*. (1999) [*Br. dearmata* group]—PAL

***Camptochaeta* Hippa & Vilkamaa, 1994**
complexa (Rudzinski & Baumjohann, 2009) **comb. n.**—PAL

***Hemineurina* Frey, 1942 stat. n.** (former *L. inflata* group)
abbrevinervis (Holmgren, 1869) **comb. n.**—PAL
acerstyla (Mohrig & Krivosheina, 1987) **comb. n.** in Mohrig *et al*. (1987)—PAL
algida (Frey, 1948) **restit. et comb. n.**—PAL
conspicua (Winnertz, 1867) **comb. n.**—NEA / PAL
= *polychaeta* (Pettey, 1918) in Pettey (1918a)—NEA
flavicornis (Mohrig & Mamaev, 1985) **comb. n.** in Mohrig *et al*. (1985a)—PAL
flavipeda (Mohrig & Krivosheina, 1987) **comb. n.** in Mohrig *et al*. (1987)—PAL
gerbatshevskayae (Antonova, 1975) **comb. n.**—PAL
gigastyla (Mohrig & Menzel, 1992) **comb. n.**—PAL
heydeni (Winnertz, 1867) **comb. n.**—PAL
honesta (Menzel, 1992) **comb. n.** in Menzel (1992b)—PAL
inflata (Winnertz, 1867) **comb. n.**—NEA / PAL
= *difficilis* (Grzegorzek, 1884)—PAL
= *interdicta* (Grzegorzek, 1884)—PAL
= *nitens* (Winnertz, 1867)—PAL

= *subvenosa* (Mohrig & Krivosheina, 1983) in Mohrig *et al*. (1983a)—PAL
johannseni (Enderlein, 1912) **comb. n.**—NEA
= *mesochra* (Shaw, 1941)—NEA
= *nigricans* (Johannsen, 1912) [preocc.]—NEA
laevigata (Lengersdorf, 1926) **comb. n.**—PAL
modesta (Staeger, 1840) **comb. n.**—NEA / PAL
= *arctica* (Holmgren, 1869)—PAL
= *conglomerata* (Pettey, 1918) in Pettey (1918a)—NEA
= *ecalcarata* (Holmgren, 1869)—PAL
= *frigida* (Holmgren, 1869) [preocc.]—PAL
= *fumatella* (Lundbeck, 1898)—NEA
= *globiceps* (Becher, 1886) **syn. n.**—PAL
= *groenlandica* (Holmgren, 1872)—NEA
= *holmgreni* (Rübsaamen, 1894)—NEA / PAL
neimongolana (Zhang & Yang, 1990) **comb. n.**—PAL
nudata (Mohrig & Mamaev, 1990) **comb. n.** in Mohrig *et al*. (1990)—PAL
postconspicua (Mohrig, 1985) **comb. n.**—PAL
proconspicua (Mohrig, 1985) **comb. n.**—PAL
riparia (Holmgren, 1883) **comb. n.**—PAL
speciosissima (Strobl, 1898) **comb. n.**—PAL
thuringiensis (Menzel & Mohrig, 1991) **comb. n.**—PAL
unguicauda (Malloch, 1923) **restit. et comb. n.**—NEA
venosa (Staeger, 1840) **comb. n.**—PAL
= *crassivenosa* (Lengersdorf, 1943)—PAL
= *lepida* (Winnertz, 1867)—PAL
= *praevenosa* (Mohrig & Menzel, 1990) in Menzel *et al*. (1990)—PAL
ventrosa (Lengersdorf, 1941) **comb. n.**—PAL

***Lycoriella* Frey, 1942**
= *Niadina* Rapp, 1946
abbreviata (Walker, 1848)—NEA
aberrans Tuomikoski, 1960—PAL
acutostylia Mohrig & Menzel, 1990 in Menzel *et al*. (1990)—PAL
agraria (Felt, 1897)—AUS / NEA / PAL
= *cellaris* (Lengersdorf, 1934)—PAL
= *multiseta* (Felt, 1897)—AUS / NEA
= *rufula* Tuomikoski, 1959 in Tuomikoski (1959b)—PAL
= *stramentorum* (Frey, 1948)—PAL
aliena (Winnertz, 1867)—PAL
altaica Komarov, 2009—PAL
antrocola Yang & Zhang, 1995—ORI
approximatonervis (Frey, 1948)—PAL
attenuata (Rübsaamen, 1898)—NEA
= *latipennis* (Lundbeck, 1898)—NEA
auripila (Winnertz, 1867)—PAL
= *detrita* (Frey, 1953)—PAL
= *tenuis* (Winnertz, 1867)—PAL
= *urbana* (Winnertz, 1867)—PAL
bispinalis Yang & Zhang, 1987 in Yang & Zhang (1987a)—PAL
brevipila Tuomikoski, 1960—PAL
deserticola (Mohrig & Mamaev, 1983)—PAL
epleuroti Yang & Zhang, 1987 in Yang & Zhang (1987a)—PAL

felix (Schmitz, 1919)—PAL
haipleuroti Yang & Tan, 1994 in Yang, Zhang & Tan (1994)—ORI
inconspicua Tuomikoski, 1960—PAL
ingenua (Dufour, 1839)—AET / ANT / AUS / NEA / NEO / PAL
= *caesar* (Johannsen, 1929)—ANT / NEA
= *bigoti* (Laboulbène, 1863)—PAL
= *celer* (Winnertz, 1867)—PAL
= *debilis* (Winnertz, 1867)—PAL
= *decliva* (Winnertz, 1867)—PAL
= *flammulinae* (Sasakawa, 1983)—PAL
= *flaviventris* (Winnertz, 1867)—PAL
= *humilis* (Winnertz, 1867)—PAL
= *jauva* (Rapp, 1946)—NEA
= *mali* (Fitch, 1856)—AUS / NEA / ORI / PAL
= *mycorum* (Frey, 1948)—AET / PAL
= *pauciseta* (Felt, 1897)—NEA
= *pleuroti* Yang & Zhang, 1987 in Yang & Zhang (1987a)—ORI / PAL
= *ramicola* (Kieffer, 1919)—PAL
= *segnis* (Winnertz, 1871)—PAL
= *solani* (Winnertz, 1871)—ANT / ORI / PAL
= *velox* (Winnertz, 1867)—PAL
= *venusta* (Winnertz, 1867)—PAL
= *womersleyi* (Séguy, 1940)—ANT
jingpleuroti Yang & Zhang, 1987 in Yang & Zhang (1987a)—ORI / PAL
jipleuroti Yang & Zhang, 1987 in Yang & Zhang (1987a)—PAL
latilobata Menzel & Mohrig, 2000—PAL
latistyla Freeman, 1987—PAL
lundstromi (Frey, 1948)—PAL
micria Mohrig & Menzel, 1990 in Menzel, Mohrig & Groth (1990)—PAL
minutula Mohrig & Krivosheina, 1987 in Mohrig *et al*. (1987)—PAL
parva (Holmgren, 1869)—NEA / PAL
= *curvispina* Tuomikoski, 1960—PAL
= *difficilis* var. *obscuratipes* (Frey, 1948)—PAL
piristylata Vilkamaa, Hippa & Heller, 2013—PAL
quadriseta Yang & Zhang, 1987 in Yang & Zhang (1987b)—PAL
sativae (Johannsen, 1912)—AET / ANT / AUS / NEA / PAL
= *agarici* Loudon, 1978—AUS
= *auberti* (Séguy, 1940)—ANT
= *brevipetiolata* (Shaw, 1941)—NEA
= *castanescens* (Lengersdorf, 1940)—AET / AUS / ORI / NEA / PAL
= *difficilis* (Frey, 1948) [preocc.]—PAL
= *fucorum* (Frey, 1948)—PAL
= *jeanneli* (Séguy, 1940)—ANT
= *kaiseri* (Shaw, 1941)—NEA
= *paucisetulosa* (Frey, 1948)—PAL
= *rufotincta* Tuomikoski, 1959 in Tuomikoski (1959b)—PAL
= *similans* (Johannsen, 1925)—AUS / NEA
= *solispina* (Hardy, 1956)—AUS
= *trifolii* (Pettey, 1918) in Pettey (1918b)—NEA
similis (Winnertz, 1867)—PAL
stylata Mohrig & Mamaev, 1985 in Mohrig *et al*. (1985a)—NEA / PAL
suboptica Mohrig & Mamaev, 1990 in Mohrig *et al*. (1990)—PAL

subterranea (Märkel, 1844)—PAL
= *vanderwieli* (Schmitz, 1920)—PAL
tenera Vilkamaa, Hippa & Heller, 2013—PAL
tibetana Yang & Zhang, 1987 in Yang & Zhang (1987b)—PAL
tuomikoskii Mohrig & Mamaev, 1978—PAL
weberi Menzel & Heller, 2013 in Heller & Menzel (2013)—PAL
yunpleuroti Yang & Zhang, 1987 in Yang & Zhang (1987a)—ORI / PAL

***Merizomma* Sasakawa, 2003 stat. n.**
= *Chorizomma* Sasakawa, 1997 [preocc.]
codonopsivora (Sasakawa, 1997) **comb. n.**—PAL

***Stenacanthella* Vilkamaa & Menzel nom. et stat. n.**
= *Coelostylina* Tuomikoski, 1960 [preocc.]
eflagellata (Tuomikoski, 1960) **comb. n.** [*St. secundaria* group]—PAL
freyi (Tuomikoski, 1960) **comb. n.** [*St. freyi* group]—PAL
lycorielloides (Mohrig & Krivosheina, 1985) **comb. n.** in Mohrig *et al*. (1985a) [*St. secundaria* group]—PAL
pallidior (Tuomikoski, 1960) **comb. n.** [*St. secundaria* group]—PAL
polaris (Mohrig & Mamaev, 1985) **comb. n.** in Mohrig *et al*. (1985b) [*St. freyi* group]—PAL
secundaria (Mohrig & Menzel, 1990) **comb. n.** in Menzel *et al*. (1990) [*St. secundaria* group]—PAL

***Trichocoelina* Vilkamaa & Menzel gen. n.** (former *L. vitticollis* group)
absidata Vilkamaa & Menzel **sp. n.**—PAL
aemula Vilkamaa & Menzel **sp. n.**—PAL
biplex Vilkamaa & Menzel **sp. n.**—NEA
brevicubitalis (Lengersdorf, 1926) **comb. n.**—PAL
chentejensis (Menzel, 1992) **comb. n.** in Menzel (1992b)—PAL
cochleata (Rübsaamen, 1898) **comb. n.**—NEA / PAL
= *haemorrhoidalis* (Lundbeck, 1898)—NEA
dicksoni Vilkamaa & Menzel **sp. n.**—PAL
dispansa Vilkamaa & Menzel **sp. n.**—PAL
dividua Vilkamaa & Menzel **sp. n.**—NEA
hians Vilkamaa & Menzel **sp. n.**—NEA
hiemalis (Mohrig & Mamaev, 1985) **comb. n.** in Mohrig *et al*. (1985b)—PAL
imitator Vilkamaa & Menzel **sp. n.**—NEA
incrassata Vilkamaa & Menzel **sp. n.**—NEA
ithyspina Vilkamaa & Menzel **sp. n.**—PAL
janetscheki (Lengersdorf, 1953) **comb. n.**—NEA / PAL
jukkai Vilkamaa & Menzel **sp. n.**—PAL
magnifica Vilkamaa & Menzel **sp. n.**—NEA
nefrens Vilkamaa & Menzel **sp. n.**—PAL
obesula Vilkamaa & Menzel **sp. n.**—PAL
olschwangi (Mohrig & Mamaev, 1983) **comb. n.** in Mohrig *et al*. (1983a)—NEA / PAL
oricillifera Vilkamaa & Menzel **sp. n.**—PAL
planilobata Vilkamaa & Menzel **sp. n.**—PAL
quintula Vilkamaa & Menzel **sp. n.**—PAL
semisphaera Vilkamaa & Menzel **sp. n.**—PAL
semusta Vilkamaa & Menzel **sp. n.**—NEA / PAL
subcochleata (Komarov, 2009) **comb. n.** —PAL
subpermutata (Mohrig & Mamaev, 1990) **comb. n.** in Mohrig *et al*. (1990)—PAL
tecta Vilkamaa & Menzel **sp. n.**—NEA / PAL
vitticollis (Holmgren, 1883) **comb. n.**—NEA / PAL

= *glacialis* (Lundbeck, 1898) [preocc.]—NEA
= *permutata* (Lundbeck, 1900)—NEA / PAL

***Scatopsciara* Edwards, 1927**
hoyti (Hardy, 1956) [*Sc. atomaria* group]—AUS
= *spiculata* Vilkamaa, Hippa & Mohrig, 2012 in Vilkamaa *et al*. (2012b)—AUS

Species *incertae sedis* (unplaced species of Sciaridae)
morosa Meunier, 1904 [*Sciara*]—FOS
solita Walker, 1857 [*Sciara*]—ORI

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APPENDIX 1. Collecting sites and reference numbers of the studied *Tichocoelina* species with DNA barcodes (COI) taken from the Barcode of Life Data System (BOLD) and GenBank. All included specimens are males. The taxa are listed alphabetically.

Species name	Collecting site	BIN on BOLD	BOLD Sample ID	BOLD Sequence ID	GenBank Accession no.
Trichocoelina biplex sp. n.	Canada (Newfoundland and Labrador)	BOLD:ACG3979	BIOUG11125-C09	CNTMA1078-14	KR235398
Trichocoelina biplex sp. n.	Canada (Newfoundland and Labrador)	BOLD:ACG3979	BIOUG11632-G07	CNTMC839-14	KR246962
Trichocoelina biplex sp. n.	Canada (Newfoundland and Labrador)	BOLD:ACG3979	BIOUG18960-C12	CNTGD1057-15	KR979274
Trichocoelina biplex sp. n.	Canada (Newfoundland and Labrador)	BOLD:ACG3979	BIOUG18960-E11	CNTGD1080-15	KR981235
Trichocoelina biplex sp. n.	Canada (Newfoundland and Labrador)	BOLD:ACG3979	BIOUG18962-F10	CNTGD1281-15	KR979582
Trichocoelina cochleata (Rübsaamen, 1898)	Denmark (Greenland)	BOLD:ABW3844	GRPV2	GRAFW2342-13	KU373168
Trichocoelina dividua sp. n.	Canada (Northwest Territories)	BOLD:AAL7893	BIOUG17502-A06	CNNHF064-14	KR593358
Trichocoelina dividua sp. n.	Canada (Northwest Territories)	BOLD:AAL7893	BIOUG17506-C03	CNNHF465-14	KR589278
Trichocoelina dividua sp. n.	Canada (Northwest Territories)	BOLD:AAL7893	BIOUG17107-F02	CNNHB1745-14	KR500086
Trichocoelina dividua sp. n.	Canada (Northwest Territories)	BOLD:AAL7893	BIOUG17109-F06	CNNHB1939-14	KR508923
Trichocoelina dividua sp. n.	Canada (Northwest Territories)	BOLD:AAL7893	BIOUG17129-B09	CNNHB2369-14	KR513884
Trichocoelina dividua sp. n.	Canada (Northwest Territories)	BOLD:AAL7893	BIOUG17213-C11	CNNHC2491-14	KR500515
Trichocoelina dividua sp. n.	Canada (Northwest Territories)	BOLD:AAL7893	BIOUG17423-E03	CNNHE1001-14	KR496597
Trichocoelina ithyspina sp. n.	Norway (Hedmark)	BOLD:ACX5966	TRD-Sci029	SCINO599-15	MN135641
Trichocoelina janetscheki (Lengersdorf, 1953)	Denmark (Greenland)	BOLD:ACK5495	GRPV16	GRAFW2355-13	KU373264

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APPENDIX 1. (Continued)

Species name	Collecting site	BIN on BOLD	BOLD Sample ID	BOLD Sequence ID	GenBank Accession no.
Trichocoelina janetscheki (Lengersdorf, 1953)	Denmark (Greenland)	BOLD:ACK5495	ZA2012-50010	GRAFW2854-14	KU374655
Trichocoelina janetscheki (Lengersdorf, 1953)	Denmark (Greenland)	BOLD:ACK5495	ZA2012-50011	GRAFW2855-14	KU374147
Trichocoelina janetscheki (Lengersdorf, 1953)	Denmark (Greenland)	BOLD:ACK5495	ZA2012-50012	GRAFW2856-14	–
Trichocoelina jukkai sp. n.	Norway (Troms)	BOLD:ADL0130	TSZD-JKJ-103937	NORSC1951-17	MN135644
Trichocoelina jukkai sp. n.	Norway (Troms)	BOLD:ADL0130	TSZD-JKJ-104088	NORSC2292-18	MN135668
Trichocoelina obesula sp. n.	Norway (Svalbard: Bjørnøya)	BOLD:ABA5289	BJ244	CHRSV629-11	MN135656
Trichocoelina obesula sp. n.	Norway (Svalbard: Bjørnøya)	BOLD:ABA5289	BJ245	CHRSV630-11	MN135647
Trichocoelina obesula sp. n.	Norway (Svalbard: Bjørnøya)	BOLD:ABA5289	BJ255	CHRSV640-11	MN135705
Trichocoelina semisphaera sp. n.	Norway (Svalbard: Bjørnøya)	BOLD:ABA5290	BJ263	CHRSV648-11	MN135659
Trichocoelina tecta sp. n.	Canada (Nunavut)	BOLD:AAM9263	08WOLVES-01202	DARC489-11	JN298515
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Bjørnøya)	BOLD:ABA5288	BJ256	CHRSV641-11	MN135651
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Bjørnøya)	BOLD:ABA5288	BJ258	CHRSV643-11	MN135663
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Bjørnøya)	BOLD:ABA5288	BJ262	CHRSV647-11	MN135706
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV825	SVDIP071-13	MN135640
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV826	SVDIP072-13	MN135674
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV828	SVDIP074-13	MN135693

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APPENDIX 1. (Continued)

Species name	Collecting site	BIN on BOLD	BOLD Sample ID	BOLD Sequence ID	GenBank Accession no.
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV831	SVDIP077-13	MN135657
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV834	SVDIP080-13	MN135648
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV835	SVDIP081-13	MN135699
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV910	SVDIP249-13	MN135646
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV945	SVDIP284-13	MN135684
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV967	SVDIP306-13	MN135691
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV972	SVDIP311-13	MN135698
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV974	SVDIP313-13	MN135678
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV985	SVDIP324-13	MN135661
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV1061	SVDIP210-13	MN135649
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV1062	SVDIP211-13	MN135671
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV1137	SVDIP367-14	MN135675
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV1263	SVDIP493-14	MN135686
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV1266	SVDIP496-14	MN135650
Trichocoelina vitticollis (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	BOLD:ABA5288	SV1282	SVDIP512-14	MN135677

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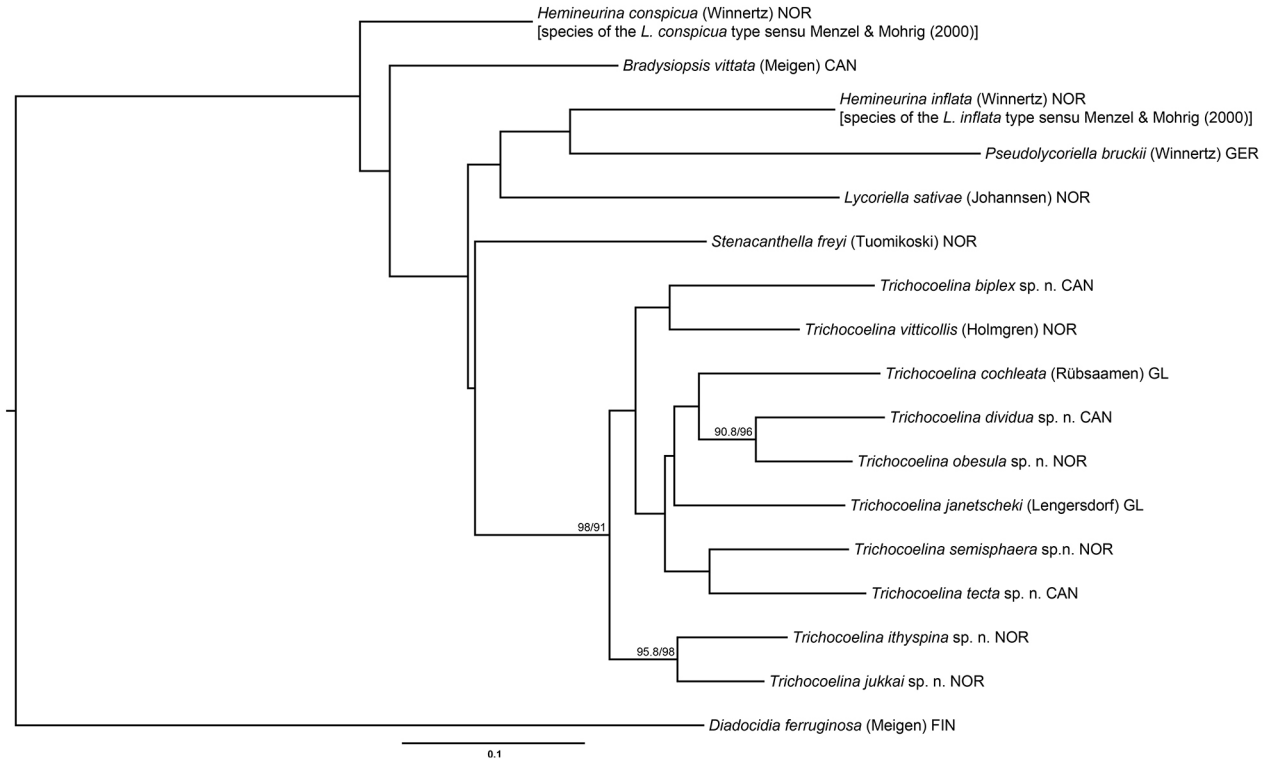
APPENDIX 2. List of specimens used in the Maximum Likelihood Tree (Appendix 3) based on the DNA barcodes (COI) taken from the Barcode of Life Data System (BOLD). All included specimens of the families Diadocidiidae and Sciaridae (former *Lycoriella* group *sensu* Tuomikoski) are males. The taxa were arranged alphabetically.

Family	Species	Collecting site	BOLD Sample ID	BIN on BOLD
Diadocidiidae	*Diadocidia ferruginosa* (Meigen, 1830)	Finland (Helsinki)	MZH_HP.1543	BOLD:AAY7756
Sciaridae	*Bradysiopsis vittata* (Meigen, 1830)	Canada (Alberta)	BIOUG03502-C09	BOLD:ACC1999
Sciaridae	*Hemineurina conspicua* (Winnertz, 1867)	Norway (Buskerud)	bf-sci-01239	BOLD:AAP4769
Sciaridae	*Hemineurina inflata* (Winnertz, 1867)	Norway (Trøndelag)	TRD-Sci073	BOLD:ACJ9929
Sciaridae	*Lycoriella sativae* (Johannsen, 1912)	Norway (Hedmark)	bf-sci-00699	BOLD:ABA1215
Sciaridae	*Pseudolycoriella bruckii* (Winnertz, 1867)	Germany (Rhineland-Palatinate)	BIOUG17114-G03	BOLD:ACJ1560
Sciaridae	*Stenacanthella freyi* (Tuomikoski, 1960)	Norway (Hedmark)	TRD-Sci020	BOLD:ACX5301
Sciaridae	*Trichocoelina biplex* sp. n.	Canada (Newfoundland and Labrador)	BIOUG11125-C09	BOLD:ACG3979
Sciaridae	*Trichocoelina cochleata* (Rübsaamen, 1898)	Greenland	GRPV2	BOLD:ABW3844
Sciaridae	*Trichocoelina dividua* sp. n.	Canada (Northwest Territories)	BIOUG17502-A06	BOLD:AAL7893
Sciaridae	*Trichocoelina ithyspina* sp. n.	Norway (Hedmark)	TRD-Sci029	BOLD:ACX5966
Sciaridae	*Trichocoelina janetscheki* (Lengersdorf, 1953)	Greenland	ZA2012-50010	BOLD:ACK5495
Sciaridae	*Trichocoelina jukkai* sp. n.	Norway (Troms)	TSZD-JKJ-103937	BOLD:ADL0130
Sciaridae	*Trichocoelina obesula* sp. n.	Norway (Svalbard: Bjørnøya)	BJ244	BOLD:ABA5289
Sciaridae	*Trichocoelina semisphaera* sp. n.	Norway (Svalbard: Bjørnøya)	BJ263	BOLD:ABA5290
Sciaridae	*Trichocoelina tecta* sp. n.	Canada (Nunavut)	08WOLVES-01202	BOLD:AAM9263
Sciaridae	*Trichocoelina vitticollis* (Holmgren, 1883)	Norway (Svalbard: Spitsbergen)	SV967	BOLD:ABA5288

APPENDIX 3. Maximum likelihood tree based on the known DNA barcodes (COI) of species of the former *Lycoriella* group *sensu* Tuomikoski and the type species of the family Diadocidiidae (sister group of the Sciaridae).



APPENDIX 4. Genetic distances between the species considered of the families Diadocidiidae and Sciaridae (former *Lycoriella* group *sensu* Tuomikoski) in %. The taxa were arranged alphabetically.

	Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	*Bradysiopsis vittata* (Meigen) CAN		13.34	7.16	9.58	10.54	14.04	7.34	8.40	10.49	10.26	9.43	10.54	9.50	10.60	9.47	10.45	9.68
2	*Diadocidia ferruginosa* (Meigen) FIN	13.34		12.67	16.08	15.75	15.15	12.71	14.67	14.87	15.69	14.50	16.39	15.30	15.95	16.41	15.71	16.67
3	*Hemineurina conspicua* (Winnertz) NOR	7.16	12.67		9.57	10.80	13.46	8.38	8.65	10.40	9.68	10.46	10.10	9.96	10.91	10.83	10.30	9.54
4	*Hemineurina inflata* (Winnertz) NOR	9.58	16.08	9.57		11.64	10.99	9.16	8.95	12.22	9.34	10.95	10.01	10.80	11.96	10.01	10.67	9.71
5	*Lycoriella sativae* (Johannsen) NOR	10.54	15.75	10.80	11.64		12.96	9.75	10.32	9.42	10.17	11.31	12.51	9.97	11.17	10.84	10.63	9.84
6	*Pseudolycoriella bruckii* (Winnertz) GER	14.04	15.15	13.46	10.99	12.96		11.58	14.74	12.94	13.22	10.88	12.86	11.42	12.80	12.07	13.82	13.08
7	*Stenacanthella freyi* (Tuomikoski) NOR	7.34	12.71	8.38	9.16	9.75	11.58		7.98	9.66	9.68	8.59	9.40	8.66	9.79	10.21	10.44	8.50
8	*Trichocoelina biplex* sp. n. CAN	8.40	14.67	8.65	8.95	10.32	14.74	7.98		8.36	7.66	8.67	7.05	7.86	8.08	7.51	7.43	6.35
9	*Trichocoelina cochleata* (Rübsaamen) GL	10.49	14.87	10.40	12.22	9.42	12.94	9.66	8.36		6.38	7.45	6.87	6.84	6.20	6.98	7.00	6.51
10	*Trichocoelina dividua* sp. n. CAN	10.26	15.69	9.68	9.34	10.17	13.22	9.68	7.66	6.38		6.55	6.39	6.91	4.43	7.43	6.43	7.49
11	*Trichocoelina ithyspina* sp. n. NOR	9.43	14.50	10.46	10.95	11.31	10.88	8.59	8.67	7.45	6.55		7.13	4.33	6.82	7.71	8.31	7.13
12	*Trichocoelina janetscheki* (Lengersdorf) GL	10.54	16.39	10.10	10.01	12.51	12.86	9.40	7.05	6.87	6.39	7.13		7.23	6.56	6.52	7.26	6.14
13	*Trichocoelina jukkai* sp. n. NOR	9.50	15.30	9.96	10.80	9.97	11.42	8.66	7.86	6.84	6.91	4.33	7.23		6.62	6.91	8.07	7.09
14	*Trichocoelina obesula* sp. n. NOR	10.60	15.95	10.91	11.96	11.17	12.80	9.79	8.08	6.20	4.43	6.82	6.56	6.62		7.06	6.39	6.69
15	*Trichocoelina semisphaera* sp. n. NOR	9.47	16.41	10.83	10.01	10.84	12.07	10.21	7.51	6.98	7.43	7.71	6.52	6.91	7.06		5.85	7.17
16	*Trichocoelina tecta* sp. n. CAN	10.45	15.71	10.30	10.67	10.63	13.82	10.44	7.43	7.00	6.43	8.31	7.26	8.07	6.39	5.85		6.22
17	*Trichocoelina vitticollis* (Holmgren) NOR	9.68	16.67	9.54	9.71	9.84	13.08	8.50	6.35	6.51	7.49	7.13	6.14	7.09	6.69	7.17	6.22	