

## Sciaridae (Diptera) from central Finland: faunistics and taxonomy

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Sciaridae (Diptera) from forest and mire habitats from three localities in central Finland were identified. The material consisted of 609 specimens belonging to 106 species. The following species were found as new to Finland: *Bradysia subbetuleti*, *B. submoesta*, *B. subscabricornis*, *Corynoptera fera*, *C. furcifera*, *C. saetistyla*, *C. subsedula*, *Cratyna spiculosa*, *Leptosciariella helvetica*, *Lycoriella micria*, *Pseudolycoriella brunnea*, *P. nodulosa*, *Scatopsciara neglecta*, *Trichosia glabra* and *Sciara* sp. n. (Menzel & Salmela, in prep.) and *Ctenosciara exigua* sp. n. The latter is described as new to science. *Bradysia subbetuleti*, *Leptosciariella atricha*, *Leptosciariella tuberculigera* and *Lycoriella micria* are redescribed. The occurrence of some rare or poorly known species is discussed, and the importance of peatlands for sciarid biodiversity in the boreal region is emphasized.

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### 1. Introduction

Sciaridae (Diptera) are small and inconspicuous nematoceros flies which live in shaded or moist habitats, like forests. The larvae of most species are detritivorous, saproxylic, fungivorous or leaf miners (Irmeler *et al.* 1996, Menzel & Mohrig 2000, Komonen & Vilkamaa 2001). In addition to purely terrestrial habitats, some species of Sciaridae are probably dependent on peat bogs and semiaquatic biotopes (*eg.* Rudzinski 1993, 1998). A few species are regarded as pests in greenhouses or mushroom farms (Menzel *et al.* 2003a).

Frey (1948), Tuomikoski (1957, 1960), Hippan and Vilkamaa (1991, 1994, 2004) Hippan *et al.*

(2003), and Vilkamaa *et al.* (2004) have studied the Sciaridae fauna of northern Europe, but these studies were almost entirely taxonomic in scope, and knowledge of the distribution and ecology of sciarids in Finland and northern Europe as a whole has remained very scarce. Our primary aim here was to provide new information on the faunistics of Sciaridae of Finland, based on the material collected recently from different localities in central Finland, so far almost entirely unknown for its sciarid fauna.

The taxonomy of most genera of Sciaridae occurring in the Palaearctic region have not been treated thoroughly enough to guarantee the monophyly of genera, nor have all the species concepts been defined, although recently Menzel

Table 1. Location and tree characteristics of window traps in Rautalampi. Tree species in all the cases *Populus tremula*.

Trap	Location	Forest type	Snag/log	Tree diam. (cm)	Cover of bark (%)
WT6	6941:484	old growth	snag	25	90
WT10	6941:484	old growth	snag	100	85
WT12	6944:484	clear-cut	snag	70	55
WT14	6940:486	clear-cut	snag	60	15
WT17	6938:487	clear-cut	snag	35	40
WT18	6933:479	clear-cut	snag	35	45
WT19	6936:472	clear-cut	log	35	100

and Mohrig (2000) have done much to clarify the nomenclature and found valid names for most species. Typical for any faunistic work on Sciaridae is that undescribed species are constantly found in samples. Even if this was not the case, the existing identification tools (mostly only the original descriptions) are not always good enough to be used to identify with any certainty the taxa found. Owing to the lack of reliable reference material, we have left some species of the taxonomically notorious genus *Bradysia* Winnertz found in our samples unidentified, for example those species of this genus which we could not reliably identify because our material was in such poor condition. Many groups treated here are currently being studied by us and our co-workers for their phylogeny and taxonomy, and changes in species concepts and in generic combinations are to be expected later.

In our view, some species in the collected material are difficult to identify using the existing literature or are in need of a redefinition. These are redescribed or diagnosed and illustrated here, and one species of *Ctenosciara* Tuomikoski is described as new to science. A new species of *Sciara* Meigen found in the material will be described elsewhere.

For the taxonomic treatment of the selected species, all available material has been used, not only that found on the central Finland sites. The authors are well aware of the drawbacks of treating only selected species without taking the broader taxonomic issues of the groups into account. However, there is an urgent need to have more information on the sciarid fauna of northern Europe as well as to publish diagnoses of the spe-

cies to make them more easily identifiable in future studies, these species are redescribed here. Many others, which are listed in Table 5, certainly meet these criteria, but are currently under review and will be treated later.

## 2. Material and methods

Sciarids were collected in three municipalities in central Finland using three sampling methods: sweep netting, window traps and Malaise traps. In Rautalampi municipality, ten window traps were placed on decaying deciduous trees in a shaded forest (Kalajanvuori) and ten traps on deciduous trees in open clear-cut areas (Table 1; characteristics of the studied trees where sciarids were caught are presented). Kalajanvuori is an old growth, natural state forest characterized by a mixture of coniferous (*Picea abies*, *Pinus sylvestris*) and boreal deciduous trees (*Populus tremula*, *Alnus*, *Betula*) and relatively large amounts of decaying tree material, exceeding 20 m<sup>3</sup>/ha. The surrounding clear-cut areas had some retained dead trees, mainly *Betula* and *P. tremula* and saplings of various tree species. The traps were set on the trees on 10 May and removed on 27 October 2003. Glycol (50:50) and few drops of detergent were used as a preservative in the traps and the traps were emptied at 2–4 week intervals. On one occasion in June 2003, flies were collected in Kalajanvuori forest by sweep netting. The collected material was stored in 70% ethanol, and the sciarids were later sorted out in the laboratory under a dissecting microscope.

In Konnevesi municipality, adult sciarids

Table 2. Location and forest types of Konnevesi localities.

Location	Forest type	Other habitats
Siikakoski 6946:465	MT	
Biol. station 6945:466	OMT	
Teerimäki 6941:468	MT	brook
Pukara S 6945:460	MT	spring
Pukara N 6945:460	MT	spring
Sauvonniemi 6938:464	MT	spring

were collected by sweep netting from six spruce (*Picea abies*) dominated forests (Table 2). The collection sites were relatively uniform in terms of tree age (ca. 70 years), and the amount of coarse woody debris was ca. 1–3 m<sup>3</sup>/ha. In four of the six sites, the collection took place also in the vicinity of a spring or brook (Table 2). The sampling was done in June and July 2003 on three occasions in an area about 150 m<sup>2</sup> in each locality.

Table 3. Location and mire types of Malaise traps in Toivakka, Ruostesuo.

Trap	Location	Mire type
1	6886:443	mesotrophic spring
2	6886:443	tall-sedge pine fen
3	6886:443	ordinary spruce-pine mire
4	6886:443	ordinary spruce-pine mire

Flies were collected by sweeping lower vegetation, shrubs and tree branches, and the collected material was stored in ethanol in the field and sorted later.

To collect insects in Toivakka municipality, Ruostesuo mire, bilateral Malaise traps (length 110 cm, height 140 cm, width 70 cm) were used. The area of the mire covers about 4 ha and includes diverse mire vegetation types, such as spruce mires, pine mires, swamps, fens, eutrophic fens and spring vegetation. All levels of minerotrophy occur in the mire: oligo-, meso-

Table 4. Species reported for the first time from Finland and their distribution in Palaearctic region.

Species	Distribution	*Finland	References
<i>Bradysia subbetuleti</i>	Russian Far East	Tb	1
<i>Bradysia submoesta</i>	Lithuania, Russia, Czech Rep., Germany, Switzerland, Estonia	Tb	2, 3, 4, 5, 6
<i>Bradysia subscabricornis</i>	Great Britain, Germany, Austria, Netherlands, Czech Rep.	Tb	7, 8, 9, 11
<i>Corynoptera fera</i>	Germany	Tb	12, 13
<i>Corynoptera furcifera</i>	Russian Middle Asia, Germany, Bulgaria	Tb	14, 15, 16
<i>Corynoptera saetistyla</i>	Russia, Germany, Austria, Hungary, Czech Rep., Great Britain, Estonia	Tb	17, 8, 9, 18, 19, 20, 7, 6
<i>Corynoptera subseudula</i>	Russian Middle Asia	Tb	14
<i>Cratyna spiculosa</i>	Germany, Netherlands, Great Britain, Estonia	Tb	23, 10, 24, 6
<i>Leptosciariella helvetica</i>	Switzerland, Germany, Slovak rep.	Tb	25
<i>Lycoriella micria</i>	Germany, Czech Rep.	Tb	8, 13
<i>Pseudolycoriella brunnea</i>	Switzerland, Ukraine, Turkey, Germany	Tb, Ta, Ab	5, 26, 27, 9
<i>Pseudolycoriella nodulosa</i>	Germany, Austria, Czech Rep, Belarussia	Tb, St	15, 19, 20, 28
<i>Scatopsiara neglecta</i>	Central & NW Europe, Great Britain	Tb	29, 7
<i>Trichosia glabra</i>	Austria, Great Britain, Germany, Denmark	Tb, St, Li	19, 30, 7, 31
<i>Ctenosciara exigua</i> sp. n.	Finland	Tb, St	this paper
<i>Sciara</i> sp. n. (Menzel & Salmela in prep)	Estonia	Tb	6

\*Distribution in Finland, biogeographical provinces.

References: 1) Mohrig *et al.* 1989b, 2) Mohrig *et al.* 1989a, 3) Mohrig & Menzel 1993, 4) Rudzinski 1993, 5) Menzel 1998b, 6) Menzel & Salmela in prep, 7) Menzel 1998a, 8) Menzel *et al.* 1990, 9) Menzel 2001, 10) Menzel 2002, 11) Rudzinski 1998, 12) Heller & Mohrig 1992, 13) Menzel *et al.* 2003b, 14) Mohrig & Mamaev 1987, 15) Menzel 2000, 16) Dimitrova & Mohrig 1993, 17) Mohrig *et al.* 1985a, 18) Rulik *et al.* 2001, 19) Rudzinski 1994a, 20) Rudzinski & Košel 1997, 21) Mohrig *et al.* 1985c, 22) Freeman 1987, 23) Rudzinski 1993, 24) Laurence 1994, 25) Mohrig & Menzel 1997, 26) Mohrig *et al.* 1979, 27) Rudzinski 1996, 28) Mohrig *et al.* 1985b, 29) Menzel & Mohrig 1998, 30) Menzel & Mohrig 1997, 31) Petersen & Meier 2001.



Site nr	1	2	3	4	5	6	7	8	9
<i>Dichopygina aculeata</i> Vilkamaa, Hippa & Komarova 2004	7	–	–	–	–	–	–	–	2
<i>Dolichosciara flavipes</i> (Meigen, 1804)	2	–	–	–	–	–	–	1	–
<i>Dolichosciara orcina</i> (Tuomikoski, 1960)	2	–	–	–	–	–	–	–	–
<i>Dolichosciara ornata</i> (Winnertz, 1867)	9	–	–	–	–	–	–	–	–
<i>Dolichosciara saetosa</i> (Lengersdorf, 1929)	4	–	–	–	–	–	–	–	–
<i>Epidapus</i> (E.) <i>alnicola</i> (Tuomikoski, 1957)	1	–	–	–	–	–	–	–	–
<i>Epidapus</i> (E.) <i>atomarius</i> (De Geer, 1778)	2	–	–	1	–	1	–	–	–
<i>Keilbachia ferrata</i> (Hippa & Vilkamaa, 1994)	–	–	–	–	–	1	–	–	–
<i>Leptosciariella</i> ( <i>Hirtipennia</i> ) <i>hirtipennis</i> (Zetterstedt, 1838)	–	–	–	–	–	–	–	1	–
<i>Leptosciariella</i> (L.) <i>dimera</i> (Tuomikoski, 1960)	4	–	–	–	–	–	–	–	–
<i>Leptosciariella</i> (L.) <i>fuscipalpa</i> (Mohrig & Mamaev, 1979)	1	–	–	–	–	–	–	–	–
* <i>Leptosciariella</i> (L.) <i>helvetica</i> (Rudzinski, 1992)	–	–	–	–	–	1	–	–	–
<i>Leptosciariella</i> (L.) <i>nudinervis</i> (Tuomikoski, 1960)	–	1	–	–	–	–	–	–	–
<i>Leptosciariella</i> (L.) <i>scutellata</i> (Staeger, 1840)	–	–	–	–	–	–	–	1	–
<i>Leptosciariella</i> ( <i>Leptospina</i> ) <i>atracha</i> (Tuomikoski, 1960)	1	–	1	–	–	–	–	1	–
<i>Leptosciariella</i> ( <i>Trichosiopsis</i> ) <i>tuberculigera</i> (Tuomikoski, 1960)	–	–	–	–	–	2	–	–	–
<i>Lycoriella</i> ( <i>Hemineurina</i> ) <i>globiceps</i> (Becher, 1886)	1	2	–	1	–	–	–	–	–
<i>Lycoriella</i> (L.) <i>ingenua</i> (Dufour, 1839)	1	–	–	–	–	–	–	–	1
<i>Lycoriella</i> (L.) <i>lundstromi</i> (Frey, 1948)	8	–	1	–	1	–	–	2	1
<i>Lycoriella</i> (L.) <i>latilobata</i> Menzel & Mohrig 2000	–	–	–	–	1	–	–	–	–
<i>Lycoriella</i> (L.) sp.	4	–	–	–	–	–	–	–	–
* <i>Lycoriella</i> (L.) <i>micria</i> Mohrig & Menzel, 1990	–	–	–	–	–	–	–	–	1
<i>Peyerimhoffia crassistylata</i> (Frey, 1948)	–	–	–	2	–	–	–	–	–
<i>Peyerimhoffia vagabunda</i> (Winnertz, 1867)	1	–	4	–	–	–	–	–	–
<i>Prosciara plusiochaeta</i> Hippa & Vilkamaa, 1991	1	–	–	–	–	–	–	–	–
<i>Prosciara porrecta</i> (Lengersdorf, 1929)	6	–	–	–	–	–	–	–	–
<i>Prosciara prosciarioides</i> (Tuomikoski, 1960)	–	–	–	1	–	–	–	–	–
* <i>Pseudolycoriella brunnea</i> (Bukowski & Lengersdorf, 1936)	1	–	–	–	–	–	–	–	–
* <i>Pseudolycoriella nodulosa</i> (Mohrig & Krivosheina, 1985)	1	–	–	–	–	–	–	–	–
<i>Pseudolycoriella paludum</i> (Frey, 1948)	4	–	–	–	–	–	–	–	–
<i>Scatopsciara</i> (S.) <i>calamophila</i> Frey, 1948	–	–	–	1	–	–	1	–	–
<i>Scatopsciara</i> (S.) <i>cf. nacta</i> (Johanssen, 1912)	–	12	–	–	2	–	–	–	–
* <i>Scatopsciara</i> (S.) <i>neglecta</i> Menzel & Mohrig, 1998	1	–	–	1	–	1	–	–	–
<i>Scatopsciara</i> (S.) <i>pusilla</i> (Meigen, 1818)	1	–	–	–	–	–	–	–	–
<i>Scatopsciara</i> (S.) <i>tricuspidata</i> (Winnertz, 1867)	–	–	–	–	–	–	–	1	8
<i>Scatopsciara</i> (S.) sp.	–	–	–	3	–	1	–	1	–
<i>Scatopsciara</i> ( <i>Xenopygina</i> ) <i>simillima</i> (Tuomikoski, 1960)	8	–	–	–	1	–	–	–	–
<i>Sciara helveola</i> Winnertz, 1867	6	–	–	–	–	–	–	1	–
<i>Sciara thoamae</i> (Linnaeus, 1767)	1	–	–	–	–	–	–	–	–
<i>Sciara humeralis</i> Zetterstedt, 1851	1	–	–	–	–	–	–	–	–
<i>Sciara lackschewitzi</i> (Lengersdorf, 1934)	2	–	–	–	–	–	–	–	–
* <i>Sciara</i> sp. n. Menzel & Salmela (in prep.)	5	–	–	–	–	–	–	–	–
<i>Trichosia</i> (T.) <i>acrotricha</i> Tuomikoski, 1960	1	–	1	–	1	–	–	–	–
<i>Trichosia</i> (T.) <i>splendens</i> Winnertz, 1867	–	–	–	–	3	–	1	–	–
* <i>Trichosia</i> (T.) <i>glabra</i> (Meigen, 1830)	1	–	–	–	–	–	–	–	–
<i>Trichosia</i> (T.) <i>morio</i> (Fabricius, 1794)	3	–	–	1	–	–	–	–	–
<i>Xylosciara</i> ( <i>Protoxylosciara</i> ) <i>longiforceps</i> (Bukowski & Lengersdorf, 1936)	–	–	1	–	–	–	–	–	–
<i>Xylosciara</i> (X.) <i>betulae</i> Tuomikoski, 1960	3	–	–	–	–	–	–	–	–
<i>Xylosciara</i> (X.) <i>heptacantha</i> Tuomikoski, 1960	1	–	1	–	–	–	–	–	–
<i>Xylosciara</i> (X.) <i>lignicola</i> (Winnertz, 1867)	2	–	–	–	–	–	–	–	–
<i>Xylosciara</i> (X.) <i>misella</i> (Frey, 1948)	1	–	–	–	–	–	–	–	–
<i>Xylosciara</i> (X.) <i>phryganophila</i> (Frey, 1948)	–	–	–	–	–	–	–	–	2
<i>Xylosciara</i> (X.) <i>steleocera</i> Tuomikoski, 1960	–	–	1	–	1	–	–	–	–
<i>Zygoneura sciarina</i> Meigen, 1830	1	–	–	2	–	–	5	–	–



and eutrophy (Salonen & Kovanen 1983). Ground water seepage in the southern part of the Ruostesuo mire and the small brooks flowing through the mire greatly enhances the diversity of mire vegetation. Four Malaise traps were set in the Ruostesuomire on 3 May and removed on 18 October 2003. Trap 1 was put in the highest part of the mire, where percolating ground water forms a helocrene spring. Traps 2 and 3 were set in the immediate vicinity of the brooks flowing through the mire, downstream from the spring area, and trap 4 on the shore of small Lake Vähä-Ilijärvi (Table 3). The mire area studied here is surrounded by spruce mires, spruce forests and pine forests. A solution of 50% glycol plus a few drops of detergent was used as preservative in the traps. The traps were emptied monthly and the material was placed in 70% ethanol to be later sorted in the laboratory. The sciarids were mounted on microscope slides in Euparal, either directly after dehydration in absolute ethanol or after treating them first with potassium hydroxide (KOH). The illustrations were made with the help of a drawing tube attached to a Leitz Diaplan compound microscope. The material studied in this paper is kept in the following collections: Deutsches Entomologisches Institut, Münchenberg (DEI), Private Collection of Jukka Salmela (PCJS) and Zoological Museum, Finnish Museum of Natural History, Helsinki (MZH).

The nomenclature generally follows Menzel and Mohrig (2000). In its new, monophyletic concept, *Peyerimhoffia* Kieffer is treated as a genus, not as a subgenus of *Cratyna* Winnertz (Vilkamaa & Hippa 2005). The *C. parvula* species group is included in *Camptochaeta*, following Hippa & Vilkamaa (1994), not in *Corynoptera*. *Dolichosciara* Tuomikoski and *Prosciara* Frey are treated as valid genera, not as subgenera of *Phytosciara* Frey, following Vilkamaa (2000). *Sciara thomae* (Linnaeus, 1767), not *Sciara hemerobioides* (Scopoli, 1763), is, according to Article 23.9.2. of the current Fourth Edition of International Code of Zoological Nomenclature (ICZN 1999), regarded as the valid name for the species.

### 3. Results and discussion

#### 3.1. Faunistics

A total of 106 species of Sciaridae were identified (Table 5). The Ruostesuo mire locality was richest in species (site 1; 76 spp.), followed by the Konnevesi spruce forest localities (sites 2–7; together 55 spp.) and the Rautalampi (sites 8 and 9; 21 spp.). Common species, which occurred at least on four study sites (Table 4), were *Bradysia hilariformis*, *Camptochaeta camptochaeta*, *C. hirtula*, *Chaetosciara estlandica*, *Corynoptera blanda*, *C. boletiphaga*, *C. hypopygialis*, *C. subdentata*, *C. trepida*, *Cratyna nobilis*, *C. uliginosa*, *Ctenosciara hyalipennis* and *Lycoriella lundstromi*. According to Tuomikoski (1960), *C. camptochaeta* is a very common species in “shaded forests” during early summer, and there are several records from different parts of Finland (Hippa & Vilkamaa 1994). *Bradysia hilariformis* may be a relatively southern species in Finland (Tuomikoski 1960, J. Salmela, unpubl.), and the localities of the present study are the northernmost records so far in the country. In contrast, *C. hirtula*, *C. boletiphaga*, *C. hypopygialis*, *C. trepida*, *C. subdentata*, *C. nobilis*, *C. hyalipennis* and *L. lundstromi* are also found in the northern parts of the country (Tuomikoski 1960, Hippa & Vilkamaa 1994, Salmela & Vilkamaa, in prep.). *Chaetosciara estlandica* may also be a southern species in Finland, and its preferred habitats seem to be moist forests and mires (Tuomikoski 1960). In this study, *C. estlandica* was caught on sites characterized by *Sphagnum* mosses (Ruostesuo) or other moist conditions (springs and brooks, Table 2).

The following species were caught only in window traps placed on decaying trees: *Bradysia placida* (trap 14), *Lycoriella micria* (trap 10), *Scatopsiara tricuspida*, *Scatopsiara* sp. (trap 12), and *Xylosciara phryganophila*. According to Tuomikoski (1960 and the references therein) *S. tricuspida* is saproxylic (or subcorticolous), living in both deciduous and coniferous wood. In the Rautalampi study area, *S. tricuspida* was observed in shaded old growth forest and in open clear-cut areas in traps 6, 12, 14 and 17. *Xylosciara phryganophila*, like other species of *Xylosciara* (Hippa & Vilkamaa 2004), is also most

probably a saproxylic or subcorticolous species. It was found in the clear-cuts (traps 18 and 19). In general, only a few species were caught in window traps and no direct comparison can be made between the number of species in the old-growth forest and the clear-cut areas.

Sixteen species are reported here for the first time from Finland: *Bradysia subbetuleti*, *B. submoesta*, *B. subscabricornis*, *Corynoptera fera*, *C. furcifera*, *C. saetistyla*, *C. subsedula*, *Cratyna spiculosa*, *Leptosciariella helvetica*, *Lycoriella micria*, *Pseudolycoriella brunnea*, *P. nodulosa*, *Scatopsiara neglecta*, *Trichosia glabra*, *Sciara* sp. n. (Menzel & Salmela in prep.) and *Ctenosciara exigua* sp. n. (see the description below). For the details of the distribution of these species, see Table 4.

In addition to the species found for the first time from Finland, some other little-known species were also identified. Among these, *Leptosciariella (Trichosiopsis) tuberculigera*, *Prosciara plusiochaeta*, *Camptochaeta sicilicula* and *Corynoptera vagula* were found in Finland for the second time since they were first described from Finnish materials (Tuomikoski 1960, Hippa & Vilkkamaa 1991, Hippa & Vilkkamaa 1994). *C. verrucifera* has been occasionally found in southern Finland (Hippa & Vilkkamaa 1994) whereas *Claustropyga corticis* is in Finland known only from one northern locality (Hippa *et al.* 2003). Two other rarely caught sciarids are perhaps worth mentioning: *Keilbachia ferrata*, which is known from Finland and Japan only [Hippa & Vilkkamaa (1994); as *Camptochaeta ferrata*] and *Prosciara porrecta*, which in Finland has been earlier reported from one locality (Tuomikoski 1960, Hippa & Vilkkamaa 1991). One should, however, bear in mind that we have little knowledge of the distribution and ecology of sciarids in Finland, and further studies are needed to classify species either as rare or common, and to understand their distribution.

A relatively high number of Sciaridae, 76 species, were found at Ruostesuo, which is a mire composed of diversity of different mire types (see Material and methods). According to the results obtained, wooded peatlands like the Ruostesuo mire may support a high diversity of sciarids, including species that may be more numerous in peatland habitats than in forest habitats. Mire

dwelling sciarids are not well known, but some species, such as *Bradysia strigata*, *Dolichosciara orcina*, *D. ornata*, *D. saetosa* and *Prosciara porrecta*, may be abundant in peatlands (Frey 1948, Tuomikoski 1960, Mohrig & Menzel 1994, Rudzinski 1998). In addition, our unpublished records from Finland and Estonia indicate that *Pseudolycoriella nodulosa*, *Trichosia glabra*, *Ctenosciara exigua* sp. n. and *Sciara* sp. n. (Menzel & Salmela, in prep.) prefer mires or are dependent on wet peatlands.

Because of the different sampling efforts in the different habitats in our study, no direct comparison between the sciarid faunas of the forest and peatlands is possible, and the diversity of the forest localities is certainly underestimated. However, the astonishingly high number of species of Sciaridae found in the present mire habitats would indicate the importance of the natural state peatlands in the overall diversity of the sciarid fauna of the boreal region, even if the diversity in the forests is no doubt higher. Concerning the sciarid fauna of coniferous forests, although itself insufficiently known, it is far better known than that of bogs and mires, so there is an even greater need to study peatland faunas. This need is urgent, because, due to forestry and agriculture, the area and quality of the natural state mires in Finland has strongly declined (Aapala & Lindholm 1995).

### 3.2. Taxonomy

#### *Leptosciarella (Trichosiopsis) tuberculigera* (Tuomikoski, 1960)

*Trichosiopsis tuberculigera* Tuomikoski, 1960: 28.

*Leptosciarella (Trichosiopsis) tuberculigera*, Mohrig and Menzel 1997

*Material examined.* Holotype male: Finland, Ab, Vihti, Vihtijärvi, 16.VI.1958, R. Tuomikoski (MZH). Other material: Finland, Tb, Konnevesi, Pukara (6945:460), 11.VI.2003, J. Salmela, 1 ♂ (PCJS), same data but 21.VI.2003, 1 ♂ (PCJS), Lk, Rovaniemi, Pisavaara, 30.VI.1964, R. Tuomikoski, 1 ♂ (MZH), Li, Inari, Sarmitunturi wilderness area (7619579:3555405) 6.VII.–1.VIII. 2004, J. Salmela, 1 ♂ (PCJS), same locality but by a brook, 3.VI.–6.VII.2004, J. Salmela, 1 ♂

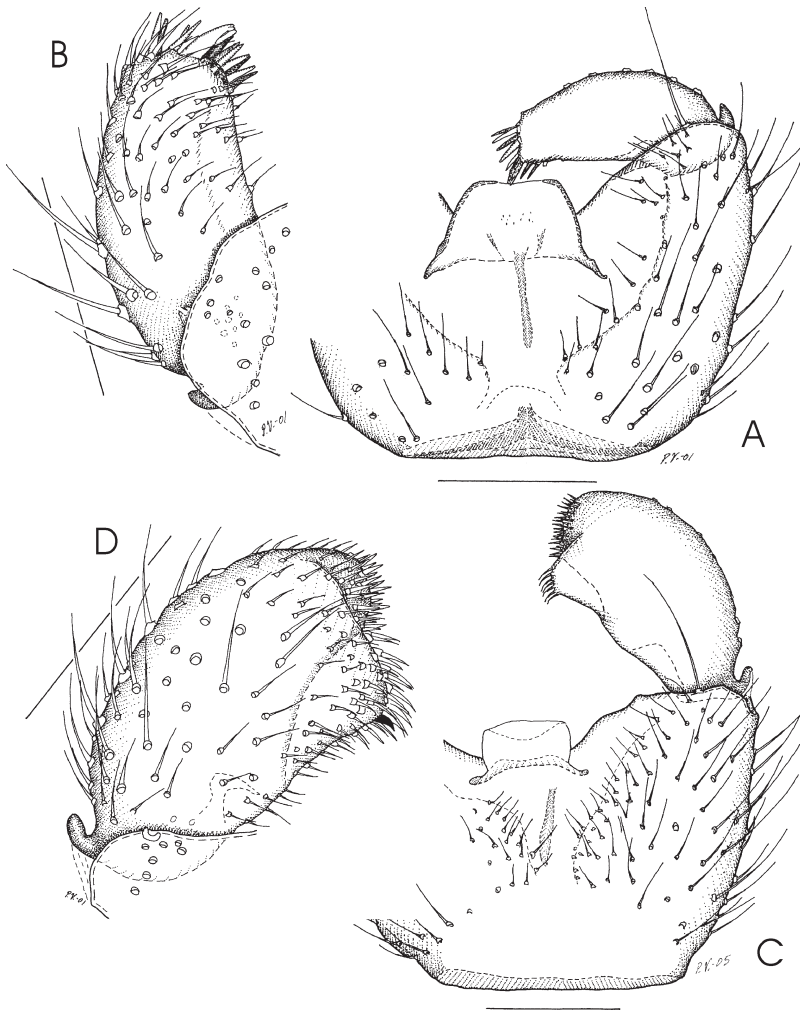


Fig. 1. Part of hypopygium (A and C) and gonostylus (B and D), ventral view. — A and B: *Leptosciarella (Leptospiina) atricha* (Tuomikoski) (A from Finland, D lectotype). — C and D: *Leptosciarella (Trichosiopsis) tuberculigera* (Tuomikoski) (from Finland). Scale 0.10 mm.

(PCJS).

*Description.* See also Tuomikoski (1960), Mohrig and Menzel (1997) and Menzel and Mohrig (2000).

*Male.* Head. Eye bridge with 2–3 rows of facets. Anterior vertex non-setose, prefrons with 12–17 setae, clypeus non-setose. Antennal flagellum long; length/width of flagellomere 4 1.60–2.25. Maxillary palp with three palpomeres; palpomere 1 with 3–5 setae, sensillae scattered on dorsal side. Thorax. Dark; notal setae pale. Episternum 1 with 2–3 setae. Wing. Length 1.8–2.1 mm, width/length 0.45. c/w 0.75, R1/R 1.15–1.20. Wing membrane non-setose, veins M and CuA non-setose, hind margin with dorsal and ventral setae. Legs. Pale. T1 with subapical prolateral patch of pale setae, not in depression.

Abdomen. Yellowish brown, setae pale. Hypopygium, see Fig. 1C–D. Gonostylus with tiny apical tooth in the ventral lobe. Sternite 10 with 1 seta on each half.

*Discussion.* Tuomikoski (1960) based his monotypic genus *Trichosiopsis* on this species, and later Mohrig & Menzel (1997) regarded *Trichosiopsis* as a subgenus of their redefined *Leptosciarella* Tuomikoski. *L. tuberculigera* resembles other species of *Leptosciarella* by having stout spine-like megasetae at the apex of gonostylus. It differs strongly by having a characteristic large, apically broad gonostylus, divided into distinct ventral and dorsal lobes. The ventral lobe is produced strongly mesiad and bears a tiny sharp apical tooth (Fig. 1D) that was overlooked by Tuomikoski himself (1960) and the later revi-



sors (Mohrig & Menzel 1997, Menzel & Mohrig 2000). The species has so far been found only in Finland.

***Leptosciarella (Leptospina) atricha* (Tuomikoski, 1960)**

*Trichosia (Leptosciarella) atricha* Tuomikoski, 1960: 27.

*Leptosciarella (Leptospina) atricha* Mohrig & Menzel 1997

*Material examined.* Lectotype male (des. Menzel in Mohrig & Menzel 1997): Finland, Lk, Sodankyla. Korvanen, Mutenia, 30.VII.1958. *Other material:* Finland, Tb, Konnevesi, Kalajanvuori (6941:484), 31.VII. 2003, J. Salmela, 1 ♂ (PCJS), same data but Teerimäki (6941:468), 26.VII.2003, 1 ♂ (MZH), Tb, Konnevesi, Biol. Sta. (6945:466), 26.VII.2003, J. Salmela, 1 ♂ (PCJS), Tb, Toivakka, Ruostesuo (6886:3443), Malaise trap, 1.–29.VII.2003, J. Salmela, 1 ♂ (PCJS), Ta, Somero, Koisthuhta, 2.–3.VIII.1986, H. Hipa, 2 ♂ (MZH).

*Description.* See also Tuomikoski (1960), Mohrig and Menzel (1997) and Menzel and Mohrig (2000).

Male. Head. Eye bridge with 3 rows of facets. Anterior vertex non-setose, prefrons with 8–9 setae, clypeus with 1 seta. Antennal flagellum long; length/width of flagellomere 4 2.05–2.25. Maxillary palp with 3 segments; palpomere 1 with 2 setae, sensillae scattered on dorsal side. Thorax. Dark; notal setae pale. Episternum 1 with 4–6 setae. Wing. Length 1.8–2.0 mm, width/length 0.45. c/w 0.55–0.60, R1/R 1.05–1.35. Membrane non-setose, veins M and CuA without dorsal setae, R5 with ventral setae. Hind margin without ventral setae. Legs. Pale brown. T1 with subapical retrolateral patch of dark modified setae. Tibiae with strong dark spinose setae. Tarsal claws without teeth. Abdomen. Yellowish brown, setae pale. Hypopygium, see Fig. 1A–B. Sternite 10 with 1 seta on each half.

*Discussion.* *Leptosciarella (Leptospina) atricha* has up till now been known only from the type specimens. The above description is based on the lectotype and six additional males, four of which were found on the present study sites (Table 4). *L. atricha* is similar to other three known species of *Leptospina* by having at least part of

the lateral (i.e. on the dorsal side of the apical tooth) megasetae of gonostylus strong. It differs from all other species of the subgenus by having all the dorsal megasetae (four) subequally strong and by having a group of subapical megasetae on its gonostylus (see Fig. 1B and Mohrig & Menzel 1997: figures 34–37). Furthermore, the apical tooth of *L. atricha* is peculiar in structure in being blunt and as if formed by longitudinal lobes (Fig. 1B), not sharp and compact like the apical tooth of other species of *Leptosciarella*. Whether other species of *Leptosciarella (Leptospina)* have this kind of apical tooth cannot be judged from the original descriptions or redescrptions (Mohrig & Menzel 1997). *L. atricha* has also in the intercoxal area of its hypopygium a short, sclerotized septum, unknown in other species of the genus (Fig. 1A). It is considerably smaller than other species of *Leptosciarella (Leptospina)* (Mohrig & Menzel 1997).

Female. Unknown.

***Lycoriella (Lycoriella) micria* Mohrig & Menzel, 1990**

*Lycoriella (Lycoriella) micria* Mohrig & Menzel in Menzel, Mohrig & Groth, 1990: 342.

*Material examined.* Finland, Tb, Rautalampi, Kalajanvuori (6941:484), window trap on dead aspen, 17.VI.–20.VII.2003, J. Salmela, 1 ♂ (PCJS), Germany, Brandenburg, Landkreis Barnim, Grumsin, Blocksberg, eclector trap, 19.IX.1999, Schulz & Taeger, 1 ♂ (DEI), Czech Republic, Bilina-Holibka, 50 31 20 N, 13 49 40 E, stony steppe, 450 m, emergency trap, 24.VII.–23.IX.1998, Barták, 1 ♂ (DEI).

*Description.* See also Menzel *et al.* (1990).

Male. Head. Eye bridge with 2 rows of facets. Anterior vertex non-setose, setae of prefrons and clypeus not clearly visible in the specimens studied. Antennal flagellum long; length/width of flagellomere 4 2.05–2.90. Maxillary palp with 2–3 palpomerees, basal palpomere with 2 setae, sensilla in pit. Thorax. Pale brown, nota lsetae pale; anterior pronotum with 2–4 setae, episternum 1 with 4–5 setae. Wing. Length 0.9–1.1 mm, width/length 0.35–0.45. c/w 0.0.70, R1/R 0.60. Anal lobe weak. Legs pale. Tarsal claws without teeth. Abdomen. Yellowish, setae pale. Hypopygium. Fig. 2A and B. Sternite 10

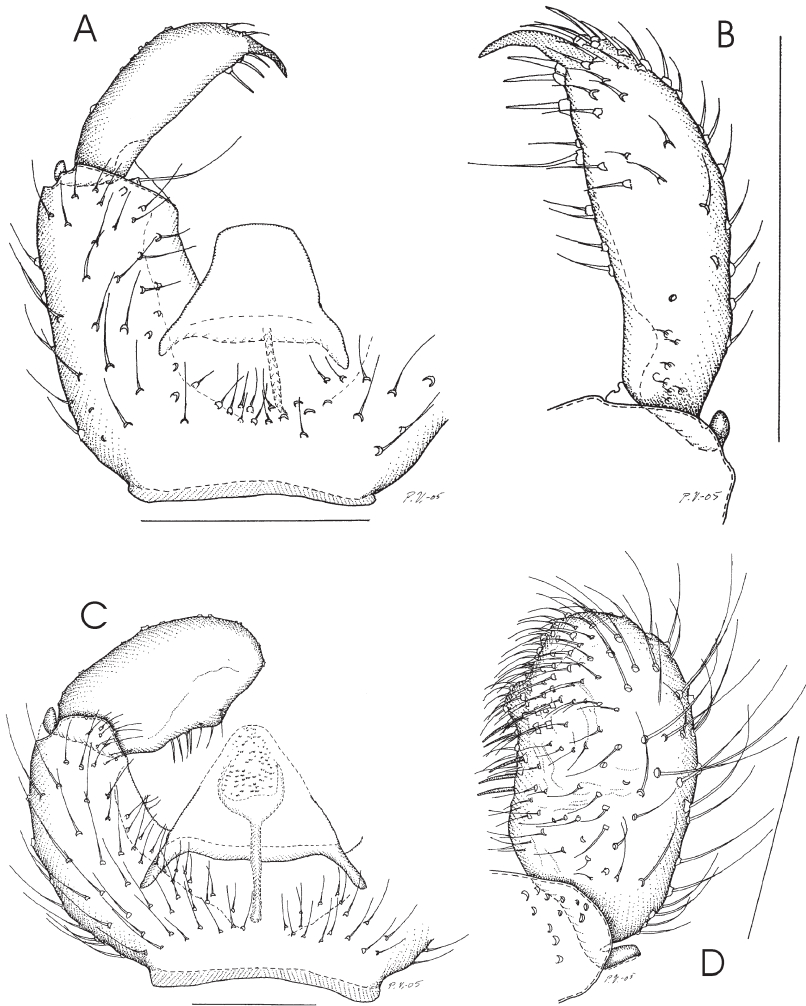


Fig. 2. Part of hypopygium (A and C) and gonostylus (B and D), ventral view. – A–B. *Lycoriella micria* Mohrig & Menzel (from Finland). – C–D. *Bradysia subbetuleti* Mohrig & Krivosheina (from Finland). Scale bar 0.10 mm.

with 1 seta on each half.

Female. Unknown.

**Discussion.** *Lycoriella micria* was described from the holotype male from Germany and a paratype male from the Czech Republic (Menzel *et al.* 1990). We have not seen the type material, and the above description is based on the three non-type specimens listed above. *Lycoriella micria* is very similar to *Lycoriella deserticola* (Mohrig & Mamaev, 1983) from Uzbekistan (Mohrig *et al.* 1983). The concepts of these species are difficult to judge on the basis of the available material. Menzel *et al.* (1990) stated that *L. micria* has longer subapical megasetae on the gonostylus, shorter antennal flagellomeres, a three-segmented, not two-segmented maxillary palp, and longer wings (lengths not given). The

Finnish specimen of *L. micria* (Fig. 2A–B) seems to have shorter megasetae in relation to the apical tooth than the German one(s) have, but still longer than *L. deserticola*, as illustrated in the original descriptions. The number of megasetae might not be decisive: The type specimens of *L. micria* have three, *L. deserticola* two megasetae on both gonostyli, and the new Czech specimen two on the left, three on the right gonostylus. The German specimen studied here has the apical segment of the maxillary palp partly reduced and fused into the subapical one, similar to *L. deserticola*, and the Czech specimen has fairly long antennal flagellomeres (L/W ratio 2.90), even longer than *L. deserticola* (L/W 2.4, versus hardly two times as long as wide in the types of *L. micria*). Furthermore, the Finnish specimen has a

similar group of slightly elongated setae as *L. deserticola* in the intercoxal area, not indicated in the original description of *L. micria*. Based on these characters, it may be that only one variable species is concerned, but as we have not seen the types of either species, we follow the existing concepts here (Menzel *et al.* 1990, Menzel & Mohrig 2000).

There is no doubt that both species belong to *Lycoriella* s.str., having a slender gonostylus with slender apical tooth, slender subapical megasetae and a mediocentral flagellate seta; the fore tibial patch in depression, sensilla of maxillary palp in pit, and pale and faint setosity of the thorax and abdomen.

***Bradysia subbetuleti* Mohrig & Krivosheina, 1989**

*Bradysia subbetuleti* Mohrig & Krivosheina in Mohrig, Krivosheina & Mamaev, 1989: 433.

*Material examined.* Finland, Tb, Konnevesi, Sauvonniemi 6938:464, 22.VIII.2003, J. Salmela, 1 ♂ (PCJS), Tb, Konnevesi, Teerimäki (6941:468), 29.VIII.2003, J. Salmela, 2 ♂ (PCJS).

*Description.* See also Mohrig *et al.* (1989); in the following redescription, figures in brackets from the original description.

Male. Head. Eye bridge with 2–3(4) rows of facets. Anterior vertex non-setose, prefrons with 17–26 setae, clypeus with 1 seta. Antennal flagellum long; length/width of flagellomere 4.325 (3.0). Maxillary palp, with 3 palpomeres; palpomere 1 with 3–4 setae, sensilla in patch. Thorax. Dark brown; anterior pronotum with 4 setae, episternum 1 with 6 setae. Wing. Length 2.2 mm, width/length 0.45–0.50. c/w 0.80–0.85, R1/R 0.75–0.85. Legs. Length of basitarsomere 1/length of tarsus 1 0.50. Tarsal claws without teeth. Abdomen. Yellowish brown. Hypopygium. Fig. 2C and D. Sternite 10 setae not observable in the specimens studied.

*Discussion.* *Bradysia subbetuleti* was described based on two males from Russia, Habarovsk region. Up till now no further specimens have been found. We have not seen the type material but based on the original description there is no doubt about the conspecificity of our specimens, provided that no very similar species

live in Europe. *B. subbetuleti* belongs to the well-defined *Bradysia nervosa* group characterized e.g. by richly setose ventromesial parts of the gonocoxite, roundish-elongated gonostylus without the apical tooth but with uniform mesial setosity at least in the apical half, in some species a group of slender megasetae or at least slightly modified setae mesially, and by long and slender lateral setae on the gonostylus. *B. subbetuleti* is similar to *B. diversiabdominalis* (Lengersdorf) and *B. laurencei* Menzel & Mohrig, 2000 = *B. betuleti* (Lengersdorf; 1940) *sensu* Tuomikoski (1960), by having a dense uniform setosity mesially on the gonostylus. *B. subbetuleti* differs from *B. diversiabdominalis* and is similar to *B. laurencei* by having this uniform setosity restricted to the apical half of the gonostylus, not extending far to the basal half, and by having a group of narrow sharp megasetae basad of this setosity. *B. subbetuleti* differs from *B. laurencei* by having the megasetae more central, not slightly basal on the gonostylus, and by having the gonostylus shorter and with a subapical mesial shallow lobe (*see* Fig. 2D and Tuomikoski 1960: fig. 30d and Mohrig *et al.* 1983: fig. 1).

The Finnish specimens are the first of the species from Europe. This kind of apparently disjunct distribution has also been found for other Sciaridae: *Camptochaeta tenuipalpalis* (Mohrig & Antonowa, 1978), *Claustropyga corticis* (Hippa *et al.* 2003) and *Keilbachia ferrata* (Hippa & Vilkamaa 1994), and reflects probably rather inadequate collecting than a real pattern of distribution.

*Female* unknown.

***Ctenosciara exigua* sp. n.**

*Material examined.* Holotype male: Finland, Oa, Kauhajoki, Kauhaneva mire (6911097: 3259448), Swampy tall-sedge fen, Malaise trap, 13.VII.–4.X.2003, J. Salmela (MZH). Paratypes: same locality as holotype, but Oligotrophic-Papillosum tall-sedge fen, 1 ♂ (PCJS), Tb, Toivakka, Ruostesuo (6886:3443), Malaise trap, 1.VII.–29.VII.2003, J. Salmela, 1 ♂ (MZH), same data but 30.VIII.–18.X.2003, 1 ♂ (MZH).

*Description.* Male. Head. Eye bridge with 3 rows of facets. Anterior vertex non-setose, prefrons with 16–22 setae, clypeus non-setose.

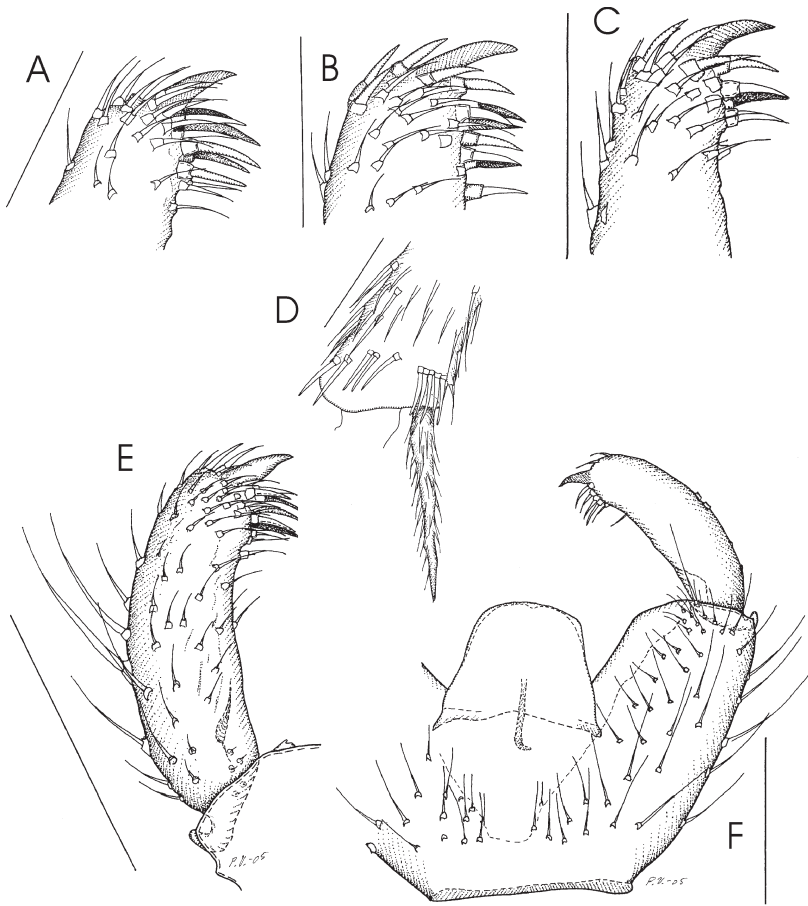


Fig. 3. Apex of gonostylus (A–C), ventral view, apex of front tibia (D), prolateral view, gonostylus (E), and part of hypopygium (F), ventral view. – A. *Ctenosciara exigua* sp. n. (holotype). – B. *C. hyalipennis* (Meigen) (from Finland). – C. *C. japonica* Sutou & Ito (from Japan). – D–F. *Ctenosciara exigua* sp. n. (D paratype from Ruostesuo; E–F holotype). Scale bar for A–D 0.05 mm; for E–F 0.10 mm.

Antennal flagellum long; length/width of flagellomere 4 2.80–3.65. Maxillary palp with 3 palpomeres; palpomere 1 with 2 setae, sensillae in small patch. Thorax. Brown; notal setae pale. Anterior pronotum with 3 setae, episternum 1 with 5–7 setae. Wing. Length 1.6–1.9 mm, width/length 0.45. c/w 0.70–0.80, R1/R 0.60–0.70. Wing membrane non-setose, R, R1 and R5 with many dorsal setae, R5 with a few ventral setae, M and CuA1 with many dorsal setae, CuA2 with 9–13 dorsal setae, hind margin with dorsal and ventral setae. Legs. (Fig. 3D). Pale. T1 with subapical prolateral two or three-parted comb of pale setae. Tarsal claws with basal teeth. Abdomen. Pale, smaller setae pale, larger brown. Hypopygium. Fig. 3A, E and F. Sternite 10 with 1 seta on each half.

**Discussion.** *Ctenosciara exigua* is similar to all other known species of *Ctenosciara* in having an unmodified gonocoxite, an elongated gono-

stylus with a sharp apical tooth and a group of subapical megasetae on the mesial side; setose M and CuA, the fore tibia with a subapical prolateral comb of setae, divided into two (sometimes three) parts, and tarsal claws with teeth.

By the general form of the gonostylus, *Ctenosciara exigua* is similar to the eastern Palaearctic *C. japonica* Sutou & Ito: *C. japonica* has the gonostylus distinctly attenuated at the apical third, *C. exigua* has its gonostylus nearly evenly broad or slightly attenuated (Fig. 3A and C, Sutou & Ito 2003: figure 1). The western Palaearctic *C. lutea* (only the description seen) and especially *C. hyalipennis* have their gonostylus broadened towards the apex. *C. exigua* is similar to *C. lutea* and differs from the other two species mentioned by lacking the megasetae on the dorsal (lateral) side of the apical tooth (Fig. 3A–C). *C. exigua* differs from *C. lutea* by the shape of gonostylus mentioned above, by being darker and consider-



ably smaller (length of *C. lutea* ca 4 mm, length of *C. exigua* at most 2 mm) and by having less richly setose CuA1.

The new species has been collected from Ruostesuo and from the large and fairly pristine Kauhaneva mire system (Kauhaneva–Pohjan kangas National Park, western Finland). In the latter locality *C. exigua* was found on a spring-water influenced Swampy tall-sedge fen and on an Oligotrophic Papillosum tall-sedge fen. According to the present knowledge, *C. exigua* is a peatland dwelling species, associated with oligotrophic fens and mesotrophic mires.

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