

# A review of grass flies (Diptera, Chloropidae) of Karelia and Murmansk Province of Russia

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One hundred and sixteen species of Chloropidae (Diptera) are recorded in Russian Karelia and Murmansk Province: 112 in Karelia and 44 in Murmansk Province. Twenty-two and seven species are new for Karelia and Murmansk Province, respectively. *Calamoncosis oscinella* is for the first time reported from Russia and *Elachiptera breviscutellata* - from European Russia. *Pseudogaurax venustus* is reinstated as *Gaurax venustus*. Taxonomic notes are provided on *Eribolus nana*, *Polyodaspis ruficornis*, *Oscinella vindicata* and *Cetema simile*. The distribution and biological data are given for every species. Point maps are provided for species with at least one exactly known location. The zoogeographical structure of Chloropidae fauna on the examined territories is briefly discussed and compared with other north-European countries.

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## INTRODUCTION

The Chloropidae (Diptera, Brachycera, Acalyptratae) is one of the largest acalyptrate families. The family is usually named as grass flies or frit flies. The family is species-rich, nearly 3200 valid species are known in the World (M. von Tschirnhaus pers. comm.) and more than 700 species in the Palaearctic. Chloropidae are distributed worldwide and represented in a great variety of habitats including forests, meadows, wetlands, swamps, bogs, marshes and steppe. The larvae are phytophagous, saprophagous, mycetophagous or carnivorous. The ability of grass-flies to utilize variable substrates made them a family of great ecological importance. Phytophagous larvae develop in the shoots and seeds of Poaceae or in the stems of other plants. Some species in the genera *Oscinella*, *Chlorops*, *Lasiosina*, *Meromyza*, and *Dicraeus* are economically important pests of cereals. Saprophagous larvae live in the plant tissues previously damaged by other insects, in fungi or decaying wood with mycelia, in bird nests, in excrements and animal corpses. Carnivorous larvae develop in the egg cocoons of spiders (Araneae) or egg pods of grasshoppers, locusts (Acrididae), mantids (Mantidae), or egg masses of whip spiders (Amblypygi) and dobsonflies (Megaloptera). A few species are predatory on root aphids (Pemphigidae) or thrips (Thysanoptera). Ferrar (1987) and Nartshuk (2014) give extended reviews of larval biology of Chloropidae. Due to species richness and rather simple methods of collecting (sweep net, Malaise traps, color plates), this family is an excellent choice to monitor biodiversity in most terrestrial habitats.

The status of grass flies as a bioindicator group is questionable. It has been demonstrated that they are insensitive to fluorine- and sulphur-containing aerial emissions (Kozlov & Zvereva 1997), however, some authors mentioned increasing density of herbivorous flies including Chloropidae in polluted areas (Dabrowska-Prot 1984; Bährmann 1985). Chloropids are among the commonest flies in the examined regions and are found in almost all habitats.

The first list of Karelian Chloropidae containing 17 species dates to the mid-19th century (Chydenius & Furuhielm 1859). Frey (1934) recorded 29 species from Karelia and 17 species from Murmansk Province. Kanervo (1942) reported *Oscinella frit* (Linnaeus 1758) and *Chlorops pumilionis* (Bjerkander 1778) as pests of cereals in Karelia. Znamenskaya (1941, 1962) recorded *Oscinella frit* also from Murmansk Province. Krogerus (1960) recorded 12 species identified by Frey from bogs in the biogeographical province *Regio Kuusamoensis* (Paanajärvi and environs), with most of localities situated along the modern Russian-Finnish border or in Russia. Species from both Karelia and Murmansk Province are mentioned in several works (Nartshuk 1998, 1999a; Nartshuk & Przhiboro, 2003). Additional data on Karelian Chloropidae can be found in numerous local lists (Polevoi 1997, 2006; Yakovlev et al. 2000; Polevoi & Humala 2003, 2005, 2007, 2009; Humala & Polevoi 2006, 2008, 2009; Jakovlev et al. 2014). Two species in the genera *Chlorops* and *Incertella* have been described based on the materials from Russian Karelia (Duda 1933; Nartshuk & Przhiboro 2009). Up to now, no

comprehensive compilation is available for both regions. Eighty-seven species were listed from Karelia and 32 species, from Murmansk Province, in the recent review of North European fauna (Nartshuk & Andersson 2013), however, exact localities were given only for a few species. In the present work, we give a detailed annotated list of Chloropidae for Murmansk Province and Russian Karelia based on our original material, the material of other authors kept in the collections and the published data, and briefly discuss the features of their distribution in this region.

## MATERIAL AND METHODS

Most of the material examined was collected within the modern borders of administrative regions of Russia: Murmansk Province and the Republic of Karelia. In several cases, we also give additional data from neighboring areas of Leningrad and Archangelsk provinces. This area covers the entire Russian part of Fennoscandia, except the Karelian Isthmus. As finer delimitation, we use the biogeographical provinces of Fennoscandia so that our data are compliant with Scandinavian literature. Province borders and abbreviations (Figure 1) follow Henkinheimo & Raatikainen (1971) and Ahti & Boychuk (2006).

The list of species is based on the materials from the following collections: Zoological Institute of the Russian Academy of Sciences, St Petersburg, Russia (ZISP), Natural History Museum, Helsinki, Finland (NHMH) and Forest Research Institute, Russian Academy of Sciences, Petrozavodsk, Russia (FRIP). All species were identified or verified by the first author. The species listed by Frey (1934) were reexamined.

Systematics and nomenclature follow Ismay & Nartshuk (2000). Nomenclature of plant species is given according to Kravchenko (2007). Regions and localities are listed from north to south and from west to east. In the list, we provide only modern locality names, while the information on older names (or names used on the labels) and geographical coordinates are given separately (Appendix 1). Published records are mentioned only in the cases when the original materials from appropriate localities (or regions) were not seen or a species was published under a different name. There is a problem with the data by Rolf Krogerus from the biogeographic province *Regio Kuusamoensis* (Krogerus 1960), as his records may refer to Karelia, Murmansk Province or Finland. Pending future revision, we provisionally list these materials as being collected in Karelia, Paanajärvi.

The zoogeographical analysis was based on available checklists of North European countries (Stackelberg 1958; Nartshuk 1962; Nartshuk & Elberg 1979; Chandler 1998; Wendt 1999; Karpa 2001; Petersen 2001; Zatzwarnicki 2001; Pakalniškis et al. 2006; Nartshuk & Andersson 2013; Nartshuk & Kahanpää 2014). We have also included later additions for Poland (Grochowska 2006, 2007), Denmark (Nielsen 2014, 2015) and Finland (Haarto et al. 2019), as well as unpublished data available from online resources (<http://dipteratyoryhma.myspecies.info/fi/content/checklist-errata-addenda>; <https://artskart.artsdatabanken.no>) or received from personal communications by Michael von Tschirnhaus. We used nonmetric multidimensional scaling (NMDS) to analyse the similarity of the faunas. It was performed with freely available PAST software (Hammer et al. 2001), using the Dice similarity measure. Maps were produced using QGIS (<https://qgis.org>). Underlying map layers are based on Open Street Map and Natural Earth data (<https://www.naturalearthdata.com>; <https://www.openstreetmap.org>), except for the

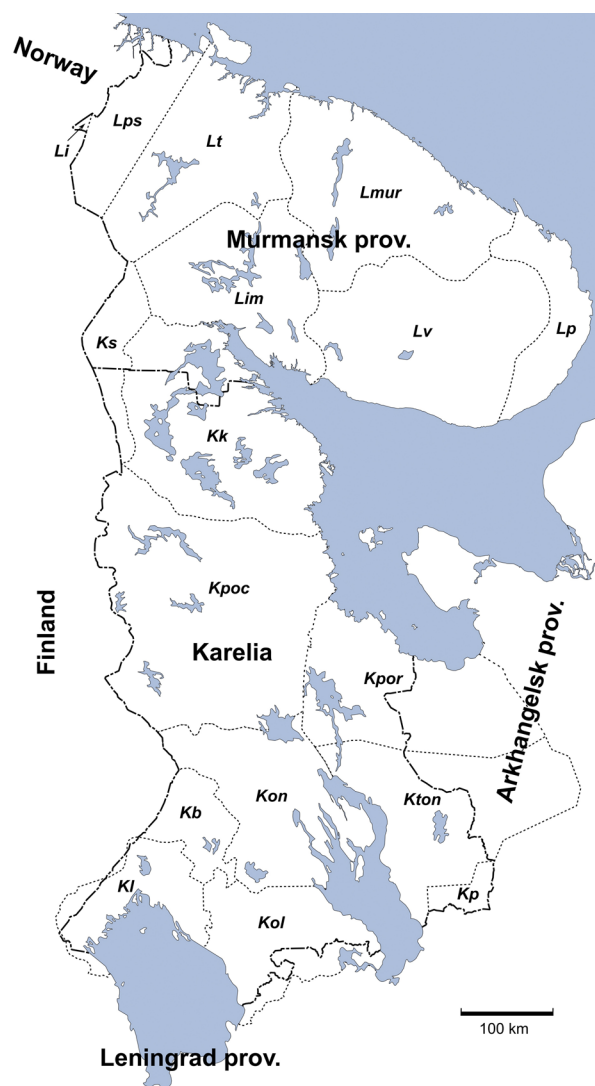


Figure 1. Delimitation of biogeographical provinces in the Russian part of Fennoscandia. *Li* – *Lapponia inarensis*, *Lps* – *Lapponia petsamoensis*, *Lt* – *Lapponia tulomensis*, *Lmur* – *Lapponia murmanica*, *Lp* – *Lapponia ponoensis*, *Lim* – *Lapponia Imandrae*, *Lv* – *Lapponia Varsugae*, *Ks* – *Regio kuusamoensis*, *Kk* – *Karelia keretina*, *Kpor* – *Karelia pomorica occidentalis*, *Kpor* – *Karelia pomorica orientalis*, *Kb* – *Karelia borealis*, *Kon* – *Karelia onegensis*, *Kton* – *Karelia transonegensis*, *Kl* – *Karelia ladogensis*, *Kol* – *Karelia olonetsensis*, *Kp* – *Karelia pudogensis*.

borders of biogeographical provinces, which were manually digitized by the authors.

## Species List

The list contains 116 species recorded from Russian Karelia (112 species) and Murmansk Province (44 species). Species new for Karelia are marked with a single asterisk (\*) and those for Murmansk Province, with a double asterisk (\*\*). Distribution maps are given in Appendix 2.

## Subfamily Oscinellinae

### *Aphanotrigonum cinctellum* (Zetterstedt, 1848).

**Material examined:** Karelia. *Kol*: 1 female, Petrozavodsk (NHMH).  
**Distribution:** Widely distributed in the Palaearctic. Tschirnhaus

(1981) recorded this species as *A. fasciellum* (Zetterstedt 1855) from the Afrotropical region (mangrove flowers in Gambia).

**Biological notes:** Dry habitats and coastal salt marshes, in which it is the second abundant chloropid after *Oscinimorpha albisetosa* (Duda 1932) along an investigated German coast section along the North Sea (Tschirnhaus 1981). Adults were reared from different species of Poaceae.

### *Aphanotrigonum nigripes* (Zetterstedt, 1848)

**Material examined: Karelia.** *Ks*: 1 female, Paanajärvi, Frey (NHMH); *Kk*: 23 males, 7 females, Kartesh, 9–16.VIII.1989, Sugonyaev; 20–21.VIII.1996, 3–5.VII.2000, 12–20.VI.2002, Przhiboro (ZISP); *Kpor*: 1 male, Island Kondostrov, 20.VIII.2002, Humala (FRIP); *Kon*: 1 male, Vegoruksy, 24–29.VI.2013, Polevoi (FRIP); *Kol*: 1 male, Lososinnoe, 28–31.V.2013, Polevoi (FRIP); 1 female, Petrozavodsk, Frey (NHMH). **Published records: Karelia.** *Kol*: Petrozavodsk (Frey 1934, as *Conioscinella cinctella* Zetterstedt, 1848; misidentification).

**Distribution:** Holarctic boreal species.

**Biological notes:** Meadows and wetlands, including the sea intertidal and supralittoral zones. In pitfall traps of a dune ecosystem in Denmark (Nielsen et al. 2019) it was the second abundant chloropid after *Conioscinella zetterstedti* Andersson 1966. Larvae develop in stems of plants damaged by other insects. Hibernates as adults. Adults were collected on and reared from stems of cereals.

### *Aphanotrigonum trilineatum* (Meigen, 1830)

**Material examined: Murmansk Province.** *Lim*: 1 female, Kandalaksha (NHMH). **Karelia.** *Ks*: 2 males, 2 females, Paanajärvi, Frey (NHMH); *Kon*: 1 male, Island Bukol'nikov, 25.VI.2003, Polevoi (FRIP); *Kol*: 1 female, Lososinnoe, 28–31.V.2013, Polevoi (FRIP); 3 males, 2 females, Petrozavodsk; 1 female, Sheltozero, 29.VIII.1942, Tiensuu (NHMH).

**Distribution:** Holarctic boreal species.

**Biological notes:** Meadows and wetlands, sometimes agricultural fields. Larvae develop in stems of Poaceae including plants damaged by other insects. Hibernates as adults.

### \**Calamoncosis aprica* (Meigen, 1830)

**Material examined: Karelia.** *Kon*: 1 female, Gomsel'ga, 9.VIII.2018, Polevoi (FRIP).

**Distribution:** European species.

**Biological notes:** Wet meadows and wetlands. Larvae phytophagous or phytosaprophagous, living as inquilines in stems of *Phragmites australis* (Cav.) Trin. ex Steud. damaged by larvae of *Platycephala planifrons* (Fabricius 1798) or rarely by caterpillars of *Archanara geminipuncta* (Haworth 1809) (Lepidoptera, Noctuidae) (Tschirnhaus 1981; Grochowska 2002). Grochowska (2002) studied the life cycle of the species in Poland.

### *Calamoncosis glyceriae* Nartshuk, 1958

**Published records: Karelia.** Without locality name (Nartshuk & Andersson 2013).

**Distribution:** Eurasian species.

**Biological notes:** Wet habitats near lakes and rivers. Larvae phytophagous, feed gregariously in unsheathed inflorescences of *Glyceria* spp.

### \**Calamoncosis oscinella* (Becker, 1910)

**Material examined: Karelia.** *Kon*: 1 female, Gomsel'ga, 6.VI.2013, Polevoi; 1 female, Polya, 26.VI.2013, Polevoi (FRIP).

**Distribution:** Rare European species. Few specimens are known from Finland, Sweden, Norway and Germany. This is the first record from Russia.

### *Conioscinella frontella* (Fallén, 1820)

**Material examined: Murmansk Province.** *Lps*: 1 male, Trifonovo, 1 female, Pechenga (NHMH); *Lim*: 2 females, Lake Bolshoi Vudjavr, 13.VIII.1931, Fridolin; 21.VIII.1931, Belyakova; (ZISP). **Karelia.** *Kk*: 1 female, Kartesh, 22.VII.1975, Gorodkov (ZISP); *Kon*: 2 females, Semchezero (NHMH); 1 male, Nizhnee Myagrozero, 20–24.VII.2012, Polevoi; *Kl*: 1 male, Valaam, 31.VII.2009, Polevoi; *Kol*: 1 male, Lososinnoe, 28–31.V.2013, Polevoi (FRIP).

**Published records: Murmansk Province.** *Li*: Kola (Frey 1934).

**Distribution:** Widely distributed in the Palaearctic, ranges from Europe to Mongolia and Israel.

**Biological notes:** Meadows and agricultural fields. Larvae phytophagous, develop in different species of Poaceae, hibernates in the basal tillers of grasses and pupate next spring. Kleptoparasite of predaceous insects and spiders (Tschirnhaus et al. 2015).

### \**Conioscinella gallarum* (Duda, 1933)

**Material examined: Karelia.** *Kl*: 5 males, Harlu, 9–10.VI.1933, reared from *Cirsium* inflorescences, Tiensuu (NHMH).

**Distribution:** Euro-Caucasian species. Nartshuk & Andersson (2013) mention Karelia in the “Biology” section, but do not indicate it formally in the catalogue. We hence consider this species new for the region.

**Biological notes:** The species was earlier reared from galls of *Andricus* sp. and *Biorhiza pallida* Olivier 1791 (Hymenoptera, Cynipidae) on *Quercus*, from cones of *Larix decidua* Mill., buds of *Populus tremula* L. and inflorescences of *Cirsium* (Duda 1933; Nartshuk & Andersson 2013).

### *Conioscinella livida* Nartshuk, 1970.

**Material examined: Murmansk Province.** *Lps*: 1 female, Yläluostari, Hellen; 1 male, Pechenga; 1 male, Lotta River, Platonoff (NHMH).

**Distribution:** European species, known from Estonia, Leningrad Province and Germany (Bavaria).

**Biological notes:** Bogs.

### \**Conioscinella mimula* Collin, 1946

**Material examined: Karelia.** *Kon*: 1 female, Island Radkol'e, 30.VII.2018, Polevoi (FRIP).

**Distribution:** Eurasian species.

**Biological notes:** Meadows. Larvae phytophagous, live in shoots of *Anthoxanthum odoratum* L., *Bromus* sp., *Lolium perenne* L., hibernate in shoots of host plant and pupate in the next spring (Nye 1958, 1959; Tschirnhaus 1981).

### *Conioscinella sordidella* (Zetterstedt, 1848)

**Material examined:** Karelia. *Kk*: 1 female, Syrovatka, 16.VII.2003, Polevoi (FRIP).

**Distribution:** European species.

**Biological notes:** Dry meadows. Larvae phytophagous, live in shoots of Poaceae.

### *Conioscinella zetterstedti* Andersson, 1966

**Material examined:** Karelia. *Kl*: 1 female, Sortavala (NHMH).

**Published records:** Karelia. *Kl*: Kirjavalhti (Frey 1934, as *C. brachyptera* Zetterstedt 1848; misidentification).

**Distribution:** Holarctic species.

**Biological notes:** Inland and coastal dunes or sandy beaches, among grasses and sedges. The most abundant chloropid in pitfall traps in Danish dunes (Nielsen et al. 2019). Flies are wingless or brachypterous, but the size of wings and halteres is variable (Brauns 1938). Flies are excellent jumpers and run rapidly on plants and on the sand surface. Larvae phytophagous in shoots of Poaceae.

### *Dicraeus fennicus* Duda, 1933

**Material examined:** Karelia. *Kk*: 1 male, Gridino, 14.VII.2007, Humala (FRIP); 1 female, Kartesh, 16–29.VII.1966, Tanasijtshuk; 1 male, Island Sidorov, 23–24.VII.1966, Tanasijtshuk (ZISP); *Kpoc*: 1 male, Island Nemetskii Kuzov, 17.VII.2001, Humala; 1 male, Island Russkii Kuzov, 18.VII.2001, Humala; *Kpor*: 1 male, Island Pechak, 24.VII.2001, Humala (FRIP); *Kon*: 1 male, Konchezero, 6.VII.1942, Tiensuu (NHMH); 1 female, Kurgenitsy, 18.VII.2000, Polevoi; *Kl*: 1 female, Kirjavalhti, 4.VII.2005, Polevoi (FRIP).

**Distribution:** Holarctic species.

**Biological notes:** Meadows. Larvae phytophagous, develop in unripe seeds of *Elymus* spp., more commonly of *E. repens* (L.) Gould.

### *Dicraeus rossicus* Stackelberg, 1955

**Material examined:** Murmansk Province. *Lim*: 1 female, Kandalaksha (NHMH). **Karelia.** *Kk*: 1 male, Sonostrov (NHMH); *Kpoc*: 1 male, 1 female, Island Nemetskii Kuzov, 17.VII.2001, Humala (FRIP).

**Distribution:** Transpalearctic species, distributed from Europe to Japan.

**Biological notes:** Meadows. Larvae phytophagous, feed in developing seeds of *Elymus caninus* (L.) L.

### *Dicraeus tibialis* (Macquart, 1835)

**Published records:** Murmansk Province. *Lim*: Kandalaksha (Frey 1934, as *D. pallidiventris* Macquart, 1835). **Karelia.** Without locality name (Nartshuk & Andersson 2013); *Kl*: Kirjavalhti (Frey 1934, as

*D. pallidiventris*).

**Distribution:** Holarctic species, but recently found in New Zealand (Ismay 1991).

**Biological notes:** Meadows. Larvae phytophagous, feed in developing seeds of *Bromopsis* spp., *Helictotrichon pubescens* (Huds.) Pilg. and probably in other grasses.

### \*\* *Elachiptera breviscutellata* Nartshuk, 1964

**Material examined:** Murmansk Province. *Lim*: 1 male, 3 females, Island Berezhnoi Vlasov, 15–16.VIII.1993, Przhiboro (ZISP).

**Distribution:** New record for European Russia and northern Europe. The species is known from Austria, Germany, Hungary, Lithuania, Asian Russia (West Siberia), Kazakhstan and Mongolia (Nartshuk 1984).

**Biological notes:** Our specimens were collected in the supralittoral zone of the White sea shore (meadow with halophytic vegetation). Tschirnhaus (1981) caught it from May to October in yellow pan traps in salt-influenced *Phragmites* stands in Germany.

### *Elachiptera cornuta* (Fallén, 1820), sensu lato

**Taxonomic notes:** Here, we consider the species in the broad sense, including the specimens with thin and broad arista and with some variability in the male genitalia.

**Material examined:** Murmansk Province. *Lps*: 3 females, Pechenga (NHMH); *Lim*: 1 female, Lake Vudjarv, 19.VI.1930, Fridolin (ZISP); 1 male, 3 females, Kandalaksha (NHMH); 1 male, Kolvitsa, 9.VIII.1995, Gorodkov (ZISP). **Karelia.** *Kk*: 1 female, Vartolambina, 22.VI.1998, Polevoi (FRIP); 7 males, 5 females, Primorskii, 17.VIII.1996, Przhiboro; 1 male, Chupa, 30.VI.2000, Przhiboro; 35 males, 43 females, Kartesh, 9–16.VIII.1989, Sugonyaev; 15.VII–21.VIII.1996, 5.VII.1997, 3–20.VII.2000, 12.VI.2002, 20.VI.2002, 4.IX.2005, Przhiboro; 22–26.VII.2010, Nartshuk; 1 pupa (reared to adult), Kartesh, 25.VIII.1996, Przhiboro; 1 male, Nikol'skaya Bay, 28.VII.1996, Przhiboro (ZISP); 3 females, Island Malyi Andronin, 20.VII.2010, Nartshuk (ZISP); 1 female, Gridino, 9.VIII.2006, Polevoi; 1 female, Gridino, cape Purnavolok, 7.VIII.2007, Humala; 1 female, Island Pezhostrov, southern shore, 7.VIII.2006, Polevoi; *Kpoc*: 1 female, Island Nemetskii Kuzov, 22.VIII.2002, Humala; 1 male, Belomorsk, 10.VIII.2018, Grichanov; *Kpor*: 1 female, Island Kondostrov, 20.VIII.2002, Humala; 1 male, Segezha, 5.VI.2019, Polevoi (FRIP); *Kon*: 1 male, 1 female, Shaidoma, 10–11.VIII.2018, Polevoi; 1 female, Girvas, 7.IX.2003, Polevoi; 2 females, Belaya Gora, 7.IX.2003, Polevoi (FRIP); 5 males, 5 females, Kivach, 30.IX.1923, Fridolin (ZISP); 22–26.X.1990, Kutenkova, 15.V.1997, 3.IX.2002, 27.V–31.VII.2003, 25.IV–23.VI.2016, Polevoi; 1 female, Myagrozero, 5.IX.2003, Polevoi; 1 female, Pod'el'niki, 22.VII.2011, Polevoi; 1 female, Island Bukol'nikov, 30.VII.2018, Polevoi; 2 females, Island Bol'shoi Lelikovskii 31.VII.2001, Polevoi; 1 female, Lelikovo, 26.VI.2003, Polevoi; 2 females, Island Lyudskoi, 24.VI.2003, Polevoi; 1 male, 1 female, Island Bukol'nikov, 25.VI.2003, Polevoi; 1 female, Island Eglov, 26.VI.2014, Polevoi; 1 female, Island Ernitskii, 26.VI.2003, Polevoi (FRIP); *Kpoc*: 1 female, Lake Kuzharvi, 21.VI.2000, Polevoi (FRIP); *Kl*: 1 female, Island Kilpola, 12–17.VI.2011, Polevoi; 4 males, 2 females, Puikkola, 15.V–29.IX.1991, Polevoi (FRIP); 1 female, Sortavala, 11.VI.1933, Frey (NHMH); *Kol*: 1 female, Vidlitsa, 3.IX.2018, Polevoi (FRIP); *Kton*: 2 females, Shoikapolda River, 22.VIII.2006, Polevoi; 1 male, Sukhaya Vodla River, 7.VI.2002, Polevoi; 1 female, Koskosalma, 7.VI.2002, Polevoi

(FRIP); *Kp*: 1 female, Ust'-Reka, 23.VI.2009, Humala; 1 male, Korbozero, 22.VI.1996, Polevoi (FRIP).

**Published records:** **Karelia.** *Ks*: Paanajärvi (Krogerus 1960).

**Distribution:** Transpalaeartic polyzonal species.

**Biological notes:** Meadows and wetlands, including the White sea intertidal and supralittoral zone, also agricultural fields. Larvae saprophagous, secondary invaders, develop in rotting tissues of plants: Poaceae including cereals, Cyperaceae and some other mono- and dicotyledons damaged by other insects. Hibernates as adults, e.g. under litter, in empty *Lipara* galls, plant stems or old bird nests.

### \*\**Elachiptera diastema* Collin, 1946

**Material examined:** **Murmansk Province.** *Lim*: 1 female, Laplandskii Nature Reserve, Vtoroi Stream, 29.V.2014, Polevoi (FRIP); 1 male, Umba, 13.VIII.1995, Gorodkov (ZISP). **Karelia.** *Kk*: 2 males, 1 female, Kartesh, 4.VIII.1996, 8.VII.1997, 4.IX.2005, Przhiboro (ZISP); 1 female, Gridino, 9.VIII.2006, Polevoi; *Kpoc*: 1 female, Island Russkii Kuzov, 19.VII.2001, Humala; *Kon*: 1 female, Kivach, 15.V.1997, Polevoi; 1 female, Kurgenitsy, 18.VII.2000, Polevoi; 1 male, Gomsel'ga, 4–6.VII.2012, Polevoi; 1 male, Pin'guba, 17.VI.2007, Polevoi; *Kton*: 1 male, Sukhaya Vodla River, 24.VIII.2006, Polevoi (FRIP).

**Distribution:** Euro-Mediterranean polyzonal species.

**Biological notes:** Meadows and agricultural fields. Larvae phytosaprophagous, develop in stems of plants damaged by other insects. Hibernates as adults.

### \**Elachiptera scrobiculata* (Strobl, 1901)

**Material examined:** **Karelia.** *Kk*: 1 female, Island Malyi Andronin, 20.VII.2010, Nartshuk (ZISP); *Kol*: 2 females, Lososinnoe, 28–31.V.2013, Polevoi (FRIP).

**Distribution:** Transpalaeartic boreal species, distributed from the British Islands to the Far East of Russia, but not common everywhere.

**Biological notes:** Wet habitats with sedges.

### *Elachiptera tuberculifera* (Corti, 1909)

**Material examined:** **Karelia.** *Kk*: 6 males, 8 females, Kartesh, 9–16.VIII.1989, Sugonyaev; 21.VIII.1996, 6–25.VII.2000, 12.VI.2002, Przhiboro; 22–26.VII.2010, Nartshuk; 4 males, 4 females, Island Malyi Andronin, 29.VII.2010, Nartshuk (ZISP); 1 male, Chupa, 30.VI.2000, Przhiboro (ZISP); *Kpor*: 1 male, Segezha, 5.VI.2019, Polevoi (FRIP); *Kon*: 3 females, Shaidoma, 10–11.VIII.2018, Polevoi; 1 male, 2 females, Girvas, 7.IX.2003, Polevoi; 2 males, 1 female, Kivach, 27.V.2003, Polevoi; 1 female, Kosalma, 10.IX.2003, Polevoi; 1 female, Island Lyudskoi, 24.VI.2003, Polevoi; 2 females, Lelikovo, 24.VI.2003, Polevoi; 1 female, Myagrozero, 5.IX.2003, Polevoi; 2 males, Nizhnee Myagrozero, 20–24.VII.2012, Polevoi (FRIP); 1 female, Konchezero (NHMH); *Kol*: 1 male, Petrozavodsk; 2 females, Sheltozero (NHMH); 1 male, 1 female, Mayachino, 25.VI.2012, Polevoi (ZISP); *Kl*: 1 male, Impilahti (NHMH); 1 female, Niemelänhovi, 16.VI.2015, Polevoi (FRIP); *Kp*: 1 female, Korbozero, 22.VI.1996, Polevoi (FRIP); *Kton*: 2 males, Sukhaya Vodla River, 7–8.VI.2002, Polevoi (FRIP); **Leningrad Province:** *Kol*: 1 female, Gumbaritsy (NHMH).

**Published records:** **Murmansk Province.** Kola Peninsula, without locality name (Nartshuk & Andersson 2013).

**Distribution:** Transpalaeartic polyzonal species.

**Biological notes:** Wetlands and meadows, including the White sea intertidal and supralittoral zone. Larvae phytosaprophagous, develop in decaying plant tissues; secondary invaders of grasses including cereals, also in stems of Liliaceae, Iridaceae and Typhaceae damaged by other insects. Hibernates as adults and occurs as adults already in the earliest spring time.

### \**Eriolus hungaricus* Becker, 1910

**Material examined:** **Karelia.** *Kk*: 1 female, Kartesh, 18.VI.1997, Przhiboro (ZISP).

**Distribution:** European species; known from southern Fennoscandia (Denmark, southern provinces of Finland, Sweden and Norway) (Nartshuk & Andersson 2013). Our record extends the species range far north.

**Biological notes:** Our specimen was collected in the upper intertidal zone of the White sea shore (meadow with halophytic vegetation).

### *Eriolus nana* (Zetterstedt, 1838)

**Taxonomic notes:** Here we retain the species name according to the International Codex of Zoological Nomenclature (Art. 31.2.2) and following Sabrosky (1967), who considered specific epithet *nana* in *Oscinis nana* Zetterstedt, 1838 as a noun.

**Material examined:** **Karelia.** *Ks*: 1 male, 3 females, Paanajärvi, Frey (NHMH); *Kon*: 1 female, Island Bukol'nikov, 25.VI.2003, Polevoi (FRIP); 1 male, Konchezero, 19.VI.1936, Frey (NHMH); *Kl*: 1 female, Sortavala, Hellen (NHMH); 1 female, Ladoga, Nordquist (NHMH).

**Published record:** **Leningrad Province.** *Kol*: Svir' (Frey 1934, as *E. sudeticus* Becker, 1910).

**Distribution:** Holarctic species, widely distributed in the Palaeartic.

**Biological notes:** Wetlands, especially those with reeds. Larvae develop in shoots and stems of hygrophilous monocotyledons damaged by other insects.

### \**Eriolus slesvicensis* Becker, 1910

**Material examined:** **Karelia.** *Kk*: 5 males, 11 females, Kartesh, 15.VII.1996, 18.VI.1997, 2.VII.1997, Przhiboro (ZISP).

**Distribution:** Eurasian species, eastward to Mongolia. In Fennoscandia, it was recorded only from few southern provinces of Sweden and Norway (Nartshuk & Andersson 2013). Our record extends the species range far north.

**Biological notes:** Wetlands, associated with reed beds (*Phragmites australis*) especially at the sea and lake shores. Tschirnhaus (1981) listed *Carex* and *Bolboschoenus maritimus* (L.) Palla as host plants. Ismay (1980) recorded the species from saline habitats in England. Our specimens were collected only in *Phragmites* stands at the White sea shore (upper intertidal zone).

### *Gaurax borealis* (Duda, 1933)

**Material examined:** **Karelia.** *Ks*: 1 female, Paanajärvi, Frey (NHMH).

**Published record:** **Karelia.** *Ks*: Paanajärvi (Frey 1934, as *Tropidoscinis gallarum* Duda, 1933; misidentification).

**Distribution:** Eurasian species, distributed from Europe to Mongolia.

**Biological notes:** Forests.

### \*\**Gaurax dubius* (Macquart, 1835)

**Material examined: Murmansk Province.** *Lim*: 1 female, Laplandskii Nature Reserve, Vtoroi Stream, 23.VII–2.VIII.2013, Polevoi (FRIP).

**Karelia:** *Kon*: 1 female, Lelikovo, 24.VI.2003, Polevoi (FRIP); *Kol*: 1 female, Kaskesruchi, 19–22.VII.2004, Polevoi (FRIP). **Arkhangelsk Province:** *Kton*: 1 female, Vozhosel'ga, 8.VII–2.VIII.2014, Polevoi (FRIP).

**Published record: Karelia.** *Ks*: Paanajärvi (Frey 1934).

**Distribution:** Holarctic species.

**Biological notes:** Forests. Larvae fungivorous, develop in bracket fungi, including old dry fungi, under bark of trees infested by dendrophilous Coleoptera. Adults also visit fungi.

### *Gaurax leucarista* Nartshuk, 1962

**Material examined: Karelia.** *Kon*: 1 female, Kivach, 12–20.VI.1989, Polevoi (ZISP).

**Distribution:** European species.

**Biological notes:** Forests. Collected on young aspens and reared from larvae collected under bark of beech (material by V.G. Kovalev from Moscow Province).

### *Gaurax venustus* Czerny, 1906, stat. rev.

**Taxonomic notes:** Kanmiya (1983) transferred this species to the genus *Pseudogaurax* Malloch, based on the elongated scutellum. Other important characters of *Pseudogaurax* are as follows: ocellar triangle reaching anterior margin of frons, outer vertical seta much longer than inner vertical seta, first flagellomere obliquely elongate, arista thickened and densely pubescent. With more available materials of *P. venustus* it has become clear that all characters, except the elongated scutellum, correspond well with the genus *Gaurax* (ocellar triangle reaching about the middle of frons, outer vertical seta subequal to inner vertical seta, first flagellomere rounded or reniform, arista pubescent but not thickened, wing membrane covered by rather long trichiae). We consider this as sufficient basis to reinstate the original combination.

**Material examined: Karelia.** *Kon*: 3 females, Kivach, 12.VI–20.VII.1989, Polevoi; 1 male, Kondopoga, 4.VIII.2012, A. Kainelainen (ZISP).

**Published records: Karelia.** *Kon*: Kivach (Nartshuk 1999c, as *Pseudogaurax venustus* (Czerny, 1906)).

**Distribution:** European species.

**Biological notes:** Forests.

### *Hapleginella laevifrons* (Loew, 1858)

**Material examined: Murmansk Province.** *Lim*: 1 male, Monchegorsk, 24.VII.1995, Kozlov (ZISP); 1 male, Kandalaksha (NHMH); 1 female, Island Ryashkov, 15.VII.1992 (ZISP). **Karelia.** *Kl*: 1 male, Kirjavalhti (NHMH); 1 male, Sortavala (NHMH); *Kon*: 1 female, Tereki, 21.VII.2017, Polevoi; 1 female, Kivach, 4.VII.2001, Polevoi (FRIP).

**Distribution:** Transpalaeartic species distributed from the British Isles to the Far East of Russia, also known in Greece (Kailidis & Georgevits 1972), Morocco (El-Hassani & Messaoudi 1986) and Portugal (Ebejer & Andrade 2015).

**Biological notes:** Forests. Larvae develop in cones of different coniferous trees (*Pinus*, *Picea*, *Abies*, *Larix*) infested by other insects and can develop in other parts of coniferous trees, e.g. in rotting top buds of *Pinus sibirica* Du Tour. Larvae are saprophagous or/and necrophagous, feed on excrements of other inhabitants, dead insects or rotting plant tissues, do not cause primary damage of coniferous cones and seeds (Gaidene & Nartshuk 1963). Hibernate as larvae or/and pupae.

### *Incertella albipalpis* (Meigen, 1830)

**Material examined: Murmansk Province.** *Lps*: 2 males, Pechenga; 1 female, Trifonovo; 1 male, 3 females, Lotta River, Poppius, Platonoff (NHMH); *Lim*: Kirovsk, 1.VIII.1974, Kasparyan (ZISP). **Karelia.** *Kk*: 3 males, 1 female, Nikol'skaya Bay, 28.VII.1996, Przhiboro (ZISP); *Kon*: 1 female, 1 male, Konchezero, 8.VII.1942, Tiensuu (NHMH); 2 males, 2 females, Lisitsyno, 4.VII.2004, Polevoi (FRIP); *Kol*: 1 male, Gizhino (NHMH).

**Distribution:** Transpalaeartic polyzonal species, ranges from the British Isles to Japan.

**Biological notes:** Common species of various meadows, forest edges and agricultural fields. Larvae phytophagous or saprophagous, develop in shoots of different grasses including cereals.

### *Incertella karteshensis* Nartshuk & Przhiboro, 2009

**Material examined: Karelia.** *Kk*: 2 males, 1 female, Kartesh, 3–5.VII.2000, Przhiboro (ZISP).

**Distribution:** Described and so far only known from Karelia (Nartshuk & Przhiboro 2009).

**Biological notes:** Known only from the upper intertidal zone at the sea shore, covered with grassy vegetation (tidal meadow). Collected only with yellow plate traps.

### *Incertella kerteszi* (Becker, 1910)

**Material examined: Murmansk Province.** *Lim*: 1 female, Monchegorsk, 20–24.VII.1995, Kozlov (ZISP). **Karelia.** *Kol*: 1 male, Lososinnoe, 12.VII.2012, Polevoi (FRIP); *Kl*: 1 male, Lake Iso-Iijärvi, 5.VII.2005, Polevoi (FRIP).

**Distribution:** Transpalaeartic boreal species, distributed from the British Islands to Kamchatka.

**Biological notes:** Wet meadows and forest edges.

### *Incertella nigrifrons* (Duda, 1933)

**Material examined: Murmansk Province.** *Lps*: 1 male, Lotta River, Platonoff (NHMH). **Karelia.** *Kk*: 1 female, Primorskii, 17.VIII.1996, Przhiboro (ZISP); *Kon*: 1 male, Konchezero, 4–6.VII.2012, Polevoi (FRIP).

**Distribution:** Eurasian species.

**Biological notes:** Wetlands. Hygrophilous species.

*\*Incertella scotica* (Collin, 1946)

**Material examined:** Karelia. *Kk*: 1 male, Kartesh, 3.VII.2000, Przhiboro (ZISP).

**Published record:** Murmansk Province. Lotta River (Nartshuk & Andersson 2013).

**Distribution:** European species.

**Biological notes:** Wetlands. Hygrophilous species.

*Incertella zuercheri* (Duda, 1933)

**Published record:** Karelia. Without locality name (Nartshuk & Andersson 2013).

**Distribution:** Eurasian species.

**Biological notes:** *Phragmites* beds. Larvae develop as inquilines in galls of *Lipara* (Diptera, Chloropidae).

*Lasiambia coxalis* (von Roser, 1840)

**Published record:** Karelia. Without locality name (Nartshuk & Andersson 2013).

**Distribution:** Eurasian species.

**Biological notes:** Meadows, *Phragmites* beds. Larvae carnivorous, feed on eggs of Acrididae (Nartshuk 2015).

*Lasiambia palposa* (Fallén, 1820)

**Material examined:** Karelia. *Kpor*: 1 female, Nadvoitsy (NHMH); *Kon*: 1 female, Kondopoga, 22.VIII.2012, A. Kainelainen (ZISP); 2 males, 2 females, Vorob'i, 6–8.VIII.1996, Polevoi (ZISP); 1 male, Solommenoe, Sahlberg (NHMH); *Kol*: 2 males, 1 female, Gizhino, 15.IX.1941, Tiensuu; 1 male, 2 females, Sheltozero, 25–29.VIII.1942, Tiensuu (NHMH). Leningrad Province. *Kol*: 3 males, 4 females, Vazhiny, 14.06–28.IX.1942, Tiensuu (NHMH).

**Published records:** Karelia. Surroundings of Ladoga Lake (Chydenius & Furuhjelm 1859); *Kol*: Petrozavodsk (Frey 1934).

**Distribution:** Widely distributed Palaearctic species, distributed from Europe to Mongolia and Israel.

**Biological notes:** Meadows and forest edges. Larvae carnivorous, live in and may feed on egg pods of Acrididae. It is possible that larvae will feed on other food too.

*Microcercis kroeberi* (Duda, 1935)

**Material examined:** Karelia. *Kk*: 5 males, 8 females, Kartesh, 21–25.VII.1973, Sugonyaev, 20.VIII.1996, 3–5.VII.2000, Przhiboro; 1 male, Primorskii, 17.VIII.1996, Przhiboro (ZISP).

**Distribution:** European species.

**Biological notes:** Wet meadows and wetlands, including the sea intertidal and supralittoral zone.

*Microcercis trigonella* (Duda, 1933)

**Material examined:** Murmansk Province. *Lps*: 1 female, Yläluostari (NHMH); 1 female, Pasvik Nature Reserve, Langvatn, 4.VIII.2008, Polevoi (FRIP); 65 females, Lotta River, Poppus (NHMH). Karelia.

*Ks*: 1 male, Paanajärvi (NHMH); *Kk*: 3 males, 4 females, Primorskii, 17.VIII.1996, Przhiboro; 2 males, 2 females, +22 specimens, Kartesh, 4.VIII.1996, 3–5.VII.2000, Przhiboro, 26.VII.2010, Nartshuk (ZISP); *Kpoc*: 1 female, Lake Kuzharvi, 21.VI.2000, Polevoi (FRIP); *Kon*: 1 female, Konchezero (NHMH); *Kl*: 1 female, Sortavala (NHMH); *Kton*: 1 male, Kolgostrov, 10.VIII.1995, Polevoi (ZISP).

**Distribution:** Eurasian species.

**Biological notes:** Wet meadows and wetlands including the intertidal and supralittoral zone. Larvae live in stems of *Juncus effusus* L. and *J. gerardii* Loisel. (Tschirnhaus 1981).

*\*\*Oscinella alopecuri*

Mesnil in Balachovsky & Mesnil, 1935

**Material examined:** Murmansk Province. *Lmur*: 1 male, Dal'nie Zelentsy, 6.VIII.1981, Gorodkov (ZISP).

**Distribution:** Euroasian species.

**Biological notes:** Meadows. Larvae phytophagous, develop in shoots of *Alopecurus* spp.

*Oscinella cariciphila* Collin, 1946

**Material examined:** Karelia. *Kk*: 3 males, 1 female, Kartesh, 16–20.VII.1966, Tanasijtshuk; 21–25.VII.1973, 9–16.VIII.1989, Sugonyaev; 1 pupa (reared to adult), Kartesh, 15.VII.1996, Przhiboro (ZISP); *Kon*: 2 males, Island Bukol'nikov, 25.VI.2003, Polevoi (FRIP).

**Distribution:** Eurasian species.

**Biological notes:** Wet habitats with sedges. Larvae probably live in shoots of *Carex* spp.

*Oscinella frit* (Linnaeus, 1758)

**Material examined:** Murmansk Province. *Lt*: 1 female, Mishukovo, 7.VIII.1997, Przhiboro (ZISP); *Lmur*: 1 male, +4 specimens, Dal'nie Zelentsy, 10.VIII.1981, Gorodkov; 4.VIII.1997, Przhiboro (ZISP); *Lim*: 1 male, 1 female, Monchegorsk, 20–24.VII.1995, Kozlov; 1 female, Island Bereznoi Vlasov, 16.VIII.1993, Przhiboro (ZISP). Karelia. *Kk*: 13 males, 9 females, +48 specimens, Kartesh, 16–20.VII.1966, Tanasijtshuk; 23.VII.1975, Gorodkov; 27.VII–16.VIII.1989, Sugonyaev; 23.VII.1975, Gorodkov; 15.VII.1996, 21.VIII.1996, 2.VII.1997, 3–5.VII.2000, Przhiboro; 26.VII.2010, Nartshuk; 3 females, Primorskii, 17.VIII.1996, Przhiboro; 1 male, 2 females, Nikol'skaya Bay, 28.VII.1996, Przhiboro; 12 specimens, Chupa, 30.VI.2000, Przhiboro (ZISP); 1 female, Island Malyi Andronin, 20.VII.2010, Nartshuk (ZISP); 2 females, Syrovatka, 18.VII.2003, Polevoi (FRIP); *Kpoc*: 1 male, Island Nemetskii Kuzov, 17.VII.2001, Humala; 1 male, Island Lodeinyi, 21.VII.2001, Humala (FRIP); *Kpor*: 1 female, Segezha, 29.VII.1996, Gorodkov (ZISP); *Kon*: 2 males, 1 female, Shaidoma, 11.VIII.2018, Polevoi; 1 male, 10 females, Konchezero, 4–6.VII.2012, Polevoi; 1 male, 1 female, Kizhi, 15.VI.1994, Polevoi; 1 male, Island Radkol'e, 30.VII.2018, Polevoi; 1 male, Lelikovo, 24.VI.2003, Polevoi (FRIP); *Kol*: 5 males, 2 females, Vidlitsa, 3–4.IX.2018, Polevoi; 2 males, Ust'e Tuloksy, 5.IX.2018, Polevoi; *Kton*: 1 male, Besov Nos, 18.VII.2006, Polevoi (FRIP).

**Published records:** Karelia. Surroundings of Ladoga Lake (Chydenius & Furuhjelm 1859); *Ks*: Paanajärvi (Krogerus 1960); *Kton*: Besov Nos (Humala & Polevoi 2009, as *O. vindicata* Meigen, 1830; misidentification).

**Distribution:** One of the commonest species of the family, possibly representing a group of closely related species. Widely distributed species, recorded from all zoogeographical regions of the World.

**Biological notes:** Meadows, forest edges and agricultural fields. Two or three generations in a year. Larvae phytophagous, develop in shoots and in spikelets of cereals (wheat, barley, rye, oat) and many wild grasses. The species may seriously damage cereals and fodder grasses.

### *Oscinella maura* (Fallén, 1820)

**Material examined: Karelia.** *Kon:* 1 female, Shaidoma, 10.VIII.2018, Polevoi (FRIP).

**Published records: Karelia.** Surroundings of Ladoga Lake (Chydenius & Furuhjelm 1859).

**Distribution:** Known from Europe, Siberia, Caucasus and Iran. Nartshuk & Andersson (2013) mention Karelia in the “Distribution” section, but not in the catalogue, probably by mistake.

**Biological notes:** Meadows, forest edges and pastures. Two–three generations in a year. Larvae phytophagous, live in shoots of *Dactylis glomerata* L.

### \* \*\**Oscinella nigerrima* (Macquart, 1935)

**Material examined: Murmansk Province.** *Lim:* 1 female, Kolvitsa, 8.VIII.1995, Gorodkov (ZISP). **Karelia.** *Kpor:* 1 male, 1 female, Segezha, 29.VII.1996, Gorodkov (ZISP).

**Distribution:** Eurasian species.

**Biological notes:** Meadows. Larvae phytophagous, live in shoots of Poaceae.

### *Oscinella nitidissima* (Meigen, 1838)

**Material examined: Murmansk Province.** *Lps:* 1 male, 2 females, Lotta River, Poppius (NHMH). **Karelia.** *Kk:* 1 female, Kartesh, 25.VII.1996, Polevoi (FRIP); 1 male, Kartesh, 21.VIII.1996, Przhiboro (ZISP); *Kon:* 1 male, Island Bukol’nikov, 30.VII.2018, Polevoi (FRIP); *Kl:* 1 male, Impilahti (NHMH); 1 female, Kirjavalahiti, 4.VII.2005, Polevoi; 1 female, Niva, 7.VII.2005, Polevoi (FRIP); *Kol:* 2 females, Vidlitsa, 4.IX.2018, Polevoi (FRIP).

**Distribution:** Holarctic species, widely distributed in the Palaearctic.

**Biological notes:** Meadows, forest edges and agricultural fields. Larvae phytophagous, develop in shoots of *Agrostis* spp. and probably of other grasses.

### *Oscinella pusilla* (Meigen, 1830)

**Material examined: Karelia.** *Kk:* 22 males, 3 females, Kartesh, 9–20.VII.1966, Tanasijtshuk, 21–25.VII.1983, 27.07–16.VIII.1989, Sugonyaev, 6.VI.1993, Przhiboro; 2 pupae (reared to adults), Kartesh, 3.VII.2000, Przhiboro (ZISP); 1 female, Syrovatka, 19.VII.2003, Polevoi (FRIP); *Kon:* 1 female, Myagrozero, 18.VII.2002, Polevoi; 2 males, 1 female, Vegoruksy, 24–29.VI.2013, Polevoi; 1 female, Kosalma, 15.VII.2002, Polevoi; 1 female, Island Bukol’nikov, 25.VI.2003, Polevoi; 1 female, Pin’guba, 6.VII.1997, Polevoi (FRIP).

**Published records: Murmansk Province.** Kola Peninsula, without locality name (Nartshuk & Andersson 2013).

**Distribution:** Widely distributed in the Palaearctic.

**Biological notes:** Meadows and agricultural fields. Larvae phytophagous, live in shoots and (more rarely) in spikelets of cereals (usually avoid oats), as well in shoots of different wild grasses, preferably of the tribe Hordeae. A well-known serious pest of cereals in many European countries.

### \**Oscinella trochanterata* Collin, 1946

**Material examined: Karelia.** 1 female, Sukhaya Vodla, 24.VIII.2006, Polevoi (FRIP).

**Published records: Karelia.** *Kton:* Sukhaya Vodla (Humala & Polevoi, 2009, as *O. vindicata*; misidentification).

**Distribution:** European species.

**Biological notes:** Wet meadows, edges of ponds and other marshy habitats. Probably, two generations in a year. Larvae phytophagous, develop in unshelled inflorescence of *Phalaris arundinacea* L. The tissues of the infested plant turn brown above the larvae placement.

### \**Oscinella ventricosi* Nartshuk, 1956

**Material examined: Karelia.** *Kon:* 1 male, Lisitsyno, 4.VII.2004, Polevoi (FRIP).

**Distribution:** Euroasian species.

**Biological notes:** Meadows. Larvae phytophagous in shoots of Poaceae.

### \**Oscinella vindicata* (Meigen, 1830)

**Taxonomic notes:** Nartshuk & Andersson (2013) used the junior synonym *O. hortensis* Collin, 1946 for this species. However, Nartshuk (2006) already formally synonymised these names.

**Material examined: Karelia.** *Kl:* 1 male, 1 female, Valaam, 31.VII.2009, Polevoi (FRIP).

**Distribution:** Euroasian species.

**Biological notes:** Meadows. Larvae probably phytophagous in stems of Poaceae as other species of *Oscinella*.

### \**Oscinimorpha minutissima* (Strobl, 1900)

**Material examined: Murmansk Province.** *Lim:* 1 female, Khibiny, 16.VIII.1928, Cheburova (ZISP). **Karelia.** *Kon:* 1 female, Island Radkol’e, 30.VII.2018, Polevoi (FRIP).

**Distribution:** Euroasian species.

**Biological notes:** Meadows and forest edges. Larvae phytophagous. Plant genera *Salvia*, *Secale* and *Oryza* as well as *Melandrium dioicum* (L.) Coss. et Germ. were listed as hosts (Tschirnhaus 1981).

### \**Oscinimorpha sordidissima* (Strobl, 1893)

**Material examined: Karelia.** *Kk:* 2 males, 1 female, Kartesh, 3–5.VII.2000, Przhiboro (ZISP).

**Distribution:** Euroasian species. In Fennoscandia, the species was known only from some southern provinces of Sweden and Finland (Nartshuk & Andersson 2013). Our record extends its range far north.

**Biological notes:** Wet meadows; our material was collected in the White sea intertidal and supralittoral zone.



*Oscinisoma cognatum* (Meigen, 1830)

**Material examined:** **Karelia.** *Kk*: 1 male, Kartesh, 28.VII.2004, Przhiboro; 1 pupa (reared to adult), Kartesh, 22.VII.2004, Przhiboro (ZISP); *Kon*: 1 male, Bukol'nikov, 30.VII.2018, Polevoi (FRIP); *Kol*: 1 male, 1 female, Vidlitsa, 3.IX.2018, Polevoi (FRIP); 1 female, Petrozavodsk, 4.VI.1942, Tiensuu (NHMH). **Leningrad Province.** *Kol*: 1 male, Vazhiny, 2.V.1942, Tiensuu (NHMH).

**Distribution:** Transpalaeartic boreal species.

**Biological notes:** Common in wetlands. Flies live near the ground in deep litter. Larvae develop in different monocotyledones. Hibernates as adults.

*Polyodaspis ruficornis* (Macquart, 1835)

**Taxonomic notes:** Cherian (2012) considered *Polyodaspis* Duda, 1933 a junior synonym of *Anacamptoneurum* Becker, 1903. However, Ebejer & Andrade (2015) considered this synonymy questionable due to intermediate character states in these and some other related genera. Thus, we prefer to retain the name *Polyodaspis* until this issue is clarified.

**Material examined:** **Murmansk Province.** *Lps*: 1 male, 1 female, Yläluostari, Hellen; *Lt*: 1 female, Kola; *Lim*: 2 females, Kandalaksha (all in ZMNH). **Karelia.** *Kon*: 1 male, Konchezero, 10.VII.1942, Tiensuu; *Kol*: 1 female, Petrozavodsk (all in ZMNH).

**Distribution:** Widely distributed in the Palaearctic and recorded in the Oriental Region as well.

**Biological notes:** Dry habitats. Larvae feed on different organic matters, usually rich in proteins, and exhibit very wide ecological plasticity in relation to food substrate and environmental conditions. They may be saprophagous, phytophagous, necrophagous or parasitic (Kiauka & Nartshuk 1973).

*Rhopalopteron anthracinum* (Meigen, 1830)

**Material examined:** **Karelia.** *Kon*: 1 male, Martysal'nye Vody, Sahlberg (NHMH).

**Published records:** **Murmansk Province.** Without locality name (Nartshuk & Andersson 2013).

**Distribution:** Eurasian boreal species. Nartshuk & Andersson (2013) mention Murmansk Province in the catalogue, but not in the "Distribution" section, probably by mistake.

**Biological notes:** Wetlands with sedges. Species of *Carex* are probable host plants.

*Rhopalopteron atricillum* (Zetterstedt, 1838)

**Material examined:** **Murmansk Province.** *Lps*: 1 male, Lotta River, Poppius (NHMH); *Lmur*: 1 specimen, Gavrilovo, 21.VII.1913, Frey; 1 specimen, Voron'ya River, 21.VII.1913, Frey (NHMH); *Lp*: 1 specimen, Ponoj, 18.VII.1913, Frey (NHMH); *Lim*: 4 males, 10 females, Monchegorsk, 20–24.VII.1995, Kozlov; 2 females, Lake Vudjarv, 15.VII.1931, Fridolin (ZISP). **Karelia.** *Ks*: 1 specimen, Paanajärvi, Frey (NHMH).

**Distribution:** Euroasian boreal species.

**Biological notes:** Wetlands with sedges. Species of *Carex* are probable host plants.

*Rhopalopteron atricorne* (Zetterstedt, 1838)

**Material examined:** **Karelia.** 1 female, Karelia, without locality name (NHMH).

**Distribution:** Eurasian boreal species.

**Biological notes:** Wetlands with sedges. Species of *Carex* are probable host plants.

*Rhopalopteron brunneipenne*

Beschovski & Lansbury, 1987

**Material examined:** **Karelia.** *Kk*: 2 males, 1 female, Kartesh, 8.VII.1997, Przhiboro (ZISP).

**Distribution:** European species. Described from England and elsewhere only known from Lithuania and Russian Karelia (Nartshuk & Przhiboro 2003; Nartshuk & Andersson 2013).

**Biological notes:** In northern Karelia, the species was collected from a lake shore.

*Rhopalopteron fasciola* (Meigen, 1830)

**Material examined:** **Karelia.** *Kon*: 1 male, Kurgenitsy, 18.VII.2000, Polevoi; *Kton*: 1 female, Sukhaya Vodla River, 24.VIII.2006, Polevoi (FRIP).

**Distribution:** Eurasian boreal species.

**Biological notes:** Wetlands with sedges. Species of *Carex* are probable host plants.

*\*\*Rhopalopteron femorale* (Collin, 1946)

**Material examined:** **Murmansk Province.** *Lim*: 1 female, Monchegorsk, 20–24.VII.1995, Kozlov; 2 females, Lake Vudjarv, 13–30.VII.1931, Fridolin (ZISP). **Karelia.** *Kk*: 1 male, 1 female, Syrovatka, 18.VII.2003, Polevoi (FRIP); *Kon*: 3 females, Island Lyudskoi, 24.VI.2003, Polevoi; 1 female, Lelikovo, 24.VI.2003, Polevoi (FRIP).

**Distribution:** Eurasian boreal species.

**Biological notes:** Wetlands with sedges. Species of *Carex* are probable host plants.

*Siphonella oscinina* (Fallén, 1820)

**Material examined:** **Murmansk Province.** *Lps*: 1 female, Pechenga; 1 male, 1 female, Yläluostari (NHMH); *Lt*: 1 male, Kola (NHMH). *Lim*: 1 female, Monchegorsk, 20–24.VII.1995, Kozlov; 1 female, Khibiny, 16.VIII.1928, Cheburova (ZISP); 1 female, Kandalaksha (NHMH). **Karelia.** *Kk*: 1 female, Kartesh, 22–24.VII.2010, Nartshuk (ZISP); 1 female, Sonostrov, 6.VIII.2006, Polevoi; 1 male, Syrovatka, 19.VII.2003, Polevoi (FRIP); *Kpoc*: 1 female, Island Nemetskii Kuzov, 22.VIII.2002, Humala; 1 female, Island Zhiloi, 22.VII.2001, Humala (FRIP); *Kon*: 1 male, Vorob'i, 6–8.VIII.1996, Polevoi (ZISP); 1 female, Vorob'i, 20.VIII.2008, Polevoi (FRIP); 1 female, Gomsel'ga, 3–5.VI.2013, Polevoi; 1 male, Island Bukol'nikov, 30.VII.2018, Polevoi; 1 male, Island Radkol'e, 30.VII.2018, Polevoi (FRIP); *Kt*: 1 female, Valaam, 30.VII.2009, Polevoi (FRIP); *Kol*: 1 female, Kolatsel'ga; 2 females, Petrozavodsk (NHMH); 1 female, Vidlitsa, 3.IX.2018, Polevoi; 1 female, Zales'e, 26.VIII.2004, Polevoi (FRIP); 1 male,

Sändeba (NHMH); *Kton*: 1 female, Kolgostrov, 10.VIII.1995, Polevoi (ZISP).

**Published records: Karelia.** Surroundings of Ladoga Lake (Chydenius & Furuhjelm 1859); *Ks*: Paanajärvi (Krogerus 1960).

**Distribution:** Holarctic species.

**Biological notes:** Dry meadows. The data on bionomics of the species are controversial. Larvae are predators in egg cocoons of Aranei or feed on coccids *Greenisca glyceriae* (Green) living on *Agrostis capillaris* L. Both sexes of this species are highly attracted by white pan traps in late summer and autumn which may mirror the attractivity of spider cocoons as a source of oviposition and rendezvous strategy (Tschirnhaus 1992).

### *Speccafrons halophila* (Duda, 1933)

**Material examined: Karelia.** *Kon*: 1 male, 2 females, Konchezero, 7.VII.1942, Tiensuu (NHMH); 1 female, Island Bukol'nikov, 25.VI.2003, Polevoi (FRIP).

**Distribution:** Transpalaeartic species, distributed from the British Islands to the Far East of Russia.

**Biological notes:** Meadows and wetlands with *Phragmites australis*. Larvae carnivorous, develop in egg cocoons of Araneae, which was studied in detail by Rollard (1987, 1992).

### \**Trachysiphonella ruficeps* (Macquart, 1835)

**Material examined: Karelia.** *Kon*: 2 males, Gomsel'ga, 4–6.VI.2013, Polevoi (FRIP).

**Distribution:** Euroasian species.

**Biological notes:** Dry meadows. The larval substrate is completely unknown.

### *Trachysiphonella scutellata* (von Roser, 1840)

**Material examined: Karelia.** *Kon*: 2 females, Kivach, 4.VII.2001, 3.IX.2002, Polevoi; 1 female, Island Radkol'e, 30.VII.2018, Polevoi; 1 female, Konchezero, 15.VII.2002, Polevoi (FRIP).

**Distribution:** Eurasian species, occurring from Europe to Mongolia and Israel.

**Biological notes:** Dry meadows and forest edges.

### *Tricimba cincta* (Meigen, 1830)

**Material examined: Murmansk Province.** *Lps*: 1 male, Lotta River, Poppius; *Lt*: 2 males, Kola; *Lim*: 2 males, Kandalaksha (all in ZMNH). **Karelia.** *Kk*: 1 female, Kartesh, 21.VIII.1996, Przhiboro; 1 female, Kartesh, 22–24.VII.2010, Nartshuk (ZISP); *Kon*: 2 females, Semchezero (NHMH); 1 female, Girvas, 16.VII.2002, Polevoi; 1 female, Ar'koila, 20–21.VI.2018, Polevoi; 3 females, Vendery, 29–31.VIII.2017, Polevoi; 1 male, 5 females, Kivach, 26.VI–10.VII.1990, 26.VI–7.VII.2000, 1.VIII.2003, 26.V–23.VI.2016, Polevoi (FRIP); 2 females, Konchezero, 4–6.VII.2012, Polevoi; 1 female, Vorob'i, 20.VIII.2008, Humala (FRIP); 1 female, Yalguba (NHMH); *Kl*: 1 male, Sortavala (NHMH); *Kol*: 1 female, Kolatselga; 1 female, Sändeba; 2 females, Petrozavodsk (NHMH); 1 female, Sheltozero, 13.VII.2004, Polevoi (FRIP). **Arkhangelsk Province.** *Kton*: 1 female, Vozhosel'ga, 8.VII–2.VIII.2014, Polevoi (FRIP).

**Published records: Karelia.** Surroundings of Ladoga Lake (Chydenius & Furuhjelm 1859).

**Distribution:** Holarctic species.

**Biological notes:** Meadows, forests and agricultural fields. Recorded within houses in autumn together with *Thaumatomyia notata* (Meigen, 1830). The species exhibits a wide ecological plasticity in relation to food substrate. It was reared from stems of cereals infested by other insects, from mushrooms, berries of *Sambucus racemosa* L., dead molluscs, caterpillars. Hibernates as adults.

## Subfamily Chloropinae

### *Cetema cereris* (Fallén, 1820)

**Material examined: Murmansk Province.** *Lt*: 1 male, Murmansk, 19.VIII.1923, Kuznetsov (ZISP); *Kk*: 1 female, Kovda, 25.VII.1870, Sahlberg (NHMH). **Karelia.** *Ks*: 2 specimens, Paanajärvi, 22–27.VII.1934, Ekman; *Kk*: 1 male, Kartesh, 16–20.VII.1966, Tanasijtsjuk (ZISP); *Kon*: 1 male, Island Bukol'nikov, 30.VII.2018, Polevoi; 1 female, Kivach, 3.IX.2002, Polevoi; 1 female, Kosalma, 15.VII.2002, Polevoi; 1 female, Nizhnee Myagrozzero, 20–24.VII.2012, Polevoi; 1 male, 3 females, Pod'el'niki, 18–22.VII.2011, Polevoi (FRIP); 3 males, 1 female, Vorob'i, 6–8.VIII.1996, Polevoi (ZISP), 18–22.VIII.2008, Polevoi, Humala; 1 female, Pin'guba, 30.VI.1991, Polevoi (FRIP); *Kol*: 1 specimen, Kolatselga, 30.VIII.1943, Tiensuu (NHMH); 1 male, Sudalitsa, 30.VII.1994, Polevoi; 1 male, Kaskesruchej, 20.VII.2004, Polevoi; 1 male, Shoksha, 13.VII.2004, Polevoi (FRIP).

**Published records: Murmansk Province.** *Lt*: Murmansk (Nartshuk 1999a). **Karelia.** Surroundings of Ladoga Lake (Chydenius & Furuhjelm 1859); *Ks*: Paanajärvi; *Kol*: Kolatsel'ga (Nartshuk 1999a).

**Distribution:** Transpalaeartic boreo-nemoral species, distributed from the Great Britain to Sakhalin and Japan.

**Biological notes:** Meadows, forest edges and clearings. Larvae phytophagous, develop in shoots of Poaceae.

### *Cetema elongatum* (Meigen, 1830)

**Material examined: Karelia.** 1 female, without locality name, Tengström (NHMH); *Kk*: 1 male, 1 female, Kartesh, 17–22.VII.2010, Nartshuk (ZISP); *Kl*: 1 male, Salmi, 11.VIII.1941, Tiensuu; 1 male, 1 female, Sortavala, Tiensuu, Woldstedt; 1 female, Valaam, Suomalainen; *Kol*: 1 female, Derevyannoe, 2.VII.1942, Tiensuu; 1 female, Vedlozero, 18.VII.1942, Tiensuu; 1 female, Vidlitsa, 23.VII.1942, Tiensuu (all in ZMNH); *Kon*: 1 male, Island Bukol'nikov, 30.VII.2018, Polevoi (FRIP).

**Distribution:** European species.

**Biological notes:** Meadows, forest edges. Larvae phytophagous, develop in shoots of Poaceae. Univoltine species, overwinters as larvae.

### *Cetema myopinum* (Loew, 1866)

**Material examined: Karelia.** *Kk*: 1 male, Syrovatka, 20–22.VII.2003, Polevoi (FRIP); *Kpoc*: 1 male, Kostomuksha, 31.VII.1996, Gorodkov (ZISP); *Kpor*: 1 male, Segezha, 28.VII.1996, Gorodkov (ZISP); *Kl*: 1 male, Puikkola, 27.VII–21.VIII.1991, Polevoi; 1 male, Haapalampi, 2.VII.2010, Polevoi; 1 male, Reuskula, 6.VII.2010, Polevoi; 1 male, Sukopohja, 7.VII.2005, Polevoi; 3 males, 1 female, Niva, 7.VII.2005,

Polevoi; 1 male, Kurkijoki, 6.VII.2005, Polevoi; (FRIP); 1 male, Valaam, Suomalainen (NHMH); *Kon*: 1 male, Lake Nizhnii Myarat, 6.VII.2006, Polevoi; 1 male, Tipinity, 4.VII.2004, Polevoi; 1 male, Konchezero, 4.VII.2012, Polevoi; 1 female, Vorob'i, 27–28.VII.1994; 1 male, 1 female, Oyatevshina, 21.VII.2011, Polevoi; 1 male, Vegoruksy, 25–28.VI.2013, Polevoi (FRIP); *Kol*: 1 male, Derevyannoe, 2.VII.1942, Tiensuu (NHMH).

**Published records:** Karelia. Without locality name (Nartshuk & Andersson 2013).

**Distribution:** Eurasian species, distributed from the Great Britain to Lake Baikal and northern Mongolia.

**Biological notes:** Meadows. Larvae phytophagous, develop in shoots of different grasses, but prefer species of the genus *Agrostis*.

### *Cetema simile* Ismay, 1985

**Taxonomic notes:** There are different opinions on the identity of *C. simile*. Some authors treat it as a junior synonym of *C. elongatum* (Savage & Wheeler 1999; Nartshuk & Andersson 2013), others consider it as a distinct species (Merz 2012; Nartshuk & Kahanpää 2014). Here we follow the latter authors, accepting that these species are reliably differentiated at least in the shape of hypandrium (see Ismay 1985; Nartshuk 1999b).

**Material examined:** Karelia. *Kl*: 1 male, Valaam, 30.VII.2009, Polevoi (FRIP).

**Published records:** Karelia. *Kl*: Sortavala, Vidlitsa (Nartshuk 1999a).

**Distribution:** European species.

**Biological notes:** Meadows. Larvae probably phytophagous as other species of *Cetema*.

### *Chlorops anthracophagoides* Strobl, 1901

**Material examined:** Karelia. *Kl*: 1 female, Impilahti, Suomalainen; *Kol*: 1 male, Gizhino, Platonoff (NHMH); 1 male, Kolatsel'ga, 18.VI.1942, Tiensuu (all in ZMNH).

**Distribution:** Euro-Caucasian species.

**Biological notes:** Meadows. Larvae probably phytophagous as other species of *Chlorops*.

### \*\**Chlorops calceatus* Meigen, 1830

**Material examined:** Murmansk Province. *Lps*: 1 female, Korablekk Mountain, 30.VII.2008, Polevoi (FRIP); *Lm*: 1 female, Lovozero, 16.VIII.1981, Gorodkov (ZISP). Karelia. *Kon*: 1 male, Lizhma, 3.VIII.1936, Cheburova (ZISP); *Kl*: 1 female, Impilahti, Suomalainen (NHMH); *Kol*: 1 male, Derevyannoe, 2.VII.1942, Tiensuu (NHMH).

**Distribution:** Euroasian species.

**Biological notes:** Meadows and forest edges. Larvae phytophagous, host plant *Festuca rubra* L. (Tschirnhaus 1981).

### \**Chlorops centromaculatus* (Duda, 1933)

**Material examined:** Karelia. *Kon*: 1 male, 1 female, Island Sychevets, 1.VIII.2018, Polevoi (FRIP).

**Distribution:** Rare European species.

**Biological notes:** Meadows. Autumnal species.

### *Chlorops figuratus* (Zetterstedt, 1848)

**Material examined:** Karelia. *Ks*: 1 male, Paanajärvi, Frey (NHMH).

**Distribution:** Eurasian species.

**Biological notes:** Meadows. Larvae probably phytophagous as other species of *Chlorops*.

### *Chlorops frontosus* Meigen, 1830

**Material examined:** Karelia. *Kon*: 1 male, Lelikovo, 24.VI.2003, Polevoi (FRIP).

**Distribution:** European species.

**Biological notes:** Fens and marshes with sedges. Larvae phytophagous, develop in shoots of large species of *Carex* (Cyperaceae).

### *Chlorops geminatus* Meigen, 1830

**Material examined:** Karelia. *Kk*: 1 female, Syrovatka, 16.VII.2003, Polevoi (FRIP); *Kl*: 1 male, Ruskeala, 28.VII.1949, Nyland (NHMH).

**Distribution:** Eurasian species.

**Biological notes:** Meadows. The species was reared from *Hierochloa odorata* (L.) P. Beauv. (Karpova 1972).

### *Chlorops gracilis* Meigen, 1830

**Material examined:** Karelia. *Kon*: 1 male, Tivdiya, 22.VI.1943, Hellen (NHMH); 1 male, Konchezero, 4.VII.2012, Polevoi (FRIP); *Kol*: 1 male, Shoksha, 13.VII.2004, Polevoi; 1 male, Mayachino, 22.VI.2012, Humala (FRIP).

**Distribution:** Eurasian species.

**Biological notes:** Dry meadows. One generation in a year. Hibernates as larvae in shoots of *Calamagrostis epigejos* (L.) Roth.

### *Chlorops hypostigma* Meigen, 1830

**Material examined:** Karelia. *Kpoc*: 1 female, Island Taparukha, 17.VIII.2002, Humala (FRIP); *Kon*: 1 male, Oyatevshina, 21.VII.2011, Polevoi (FRIP); *Kl*: 1 female, Ruskeala, 28.VII.1949, Nyland (NHMH); *Kol*: 1 female, Kolatsel'ga, 2.VIII.1942, Tiensuu; 2 males, 1 female, Olonets, 25.VII.1942, Tiensuu (NHMH); 1 female, Sheltozero, 24.VIII.2004, Polevoi; 1 male, 1 female, Kaskesruchi, 19–20.VII.2004, Polevoi (FRIP).

**Distribution:** Euro-Caucasian species.

**Biological notes:** Meadows and forest edges. Univoltine species, overwinters as the third instar larvae in shoots of Poaceae.

### *Chlorops kirigaminensis* Kanmiya, 1978

**Material examined:** Karelia. *Ks*: 1 male, Paanajärvi (NHMH).

**Published records:** Karelia. *Ks*: Paanajärvi (Nartshuk 1998, as *C. zonulatus* auct. non Wahlgren, 1913).

**Distribution:** Widely distributed in the Palaearctic Region eastwards to Japan. More common in the Asian part of the range.

**Biological notes:** Meadows. Larvae probably phytophagous as other species of *Chlorops*.

*Chlorops laetus* Meigen, 1830

**Material examined: Karelia.** *Kol*: 1 female, Sheltozero, 3.IX.1942, Tiensuu (NHMH); 1 female, Matveeva Sel'ga, 26.VIII.2004, Polevoi (ZISP).

**Distribution:** The species is known from Europe and Kazakhstan.

**Biological notes:** Meadows. Autumnal species.

*Chlorops limbatus* Meigen, 1830

**Material examined: Karelia.** *Kk*: 1 male, 2 females, Kartesh, 26.VII.2010, Nartshuk; 1 female, Kuzema, 13.V.1935, Cheburova (ZISP); *Kpor*: 2 males, Valdai, 29.VI.2010, Polevoi (FRIP); *Kon*: 1 female, Lake Nizhnii Myarat, 6.VII.2006, Polevoi; 1 female, Lipovitsy, 25.VI.2013, Polevoi; 2 males, Polya, 26.VI.2013, Polevoi; 1 male, Tipinitsy, 4.VII.2004, Polevoi; 1 female, Gomsel'ga, 5.VII.2012, Polevoi; 1 female, Kurgenitsy, 19.VII.2000, Polevoi; 1 female, Island Bukol'nikov, 25.VI.2003, Polevoi; 1 female, Island Ernitskii, 24–27.VI.2003, Polevoi; 3 males, 1 female, Klimentitsy, 12.VII.1997, Polevoi (FRIP); *Kl*: 1 female, Sortavala, Suomalainen; 1 male, 1 female, Valaam, Suomalainen (NHMH), 31.VII.2009, Polevoi (FRIP); 2 females, Island Kilpola, 12–16.VI.2011, Polevoi (FRIP); *Kol*: 1 female, Ust'e Obzhanki, 23.VI.2012, Polevoi; 3 females, Mayachino, 21–22.VI.2012, Polevoi; 1 male, Sheltozero, 13.VII.2004, Polevoi; 5 males, 2 females, Vidlitsa, 3–4.IX.2018, Polevoi; 5 females, Ust'e Tuloksy, 5.IX.2018, Polevoi (FRIP); *Kon*: 1 female, Island Bukol'nikov, 30.VII.2018, Polevoi; 1 male, Shaidoma, 11.VIII.2018, Polevoi (FRIP); *Kton*: 1 male, Vodlozerskii National Park, Novguda River, 20.VIII.2007, Polevoi (FRIP). *Kp*: 2 females, Ust'-Reka, 25.VI.2009, Polevoi (FRIP).

**Published records: Murmansk Province.** *Ks*: Kuolajärvi (Nartshuk 1998). **Karelia.** *Kk*: Kuzema (Nartshuk 1998); *Kl*: Sortavala (Frey 1934, as *Oscinis brevimana* Loew, 1866); Salmi (Nartshuk 1998).

**Distribution:** Transpalaeartic species, distributed from the British Isles to Japan.

**Biological notes:** Wet meadows at river banks and lake shores. Two generations in a year. Larvae phytophagous, develop in shoots of *Phalaroides arundinacea* (L.) Rauschert; larvae of the summer generation develop in exposed panicles. Tissues of leaves above the larva turn brown, and central leaf dries out. Larvae hibernate in basal and aerial shoots and pupate next spring.

*Chlorops meigenii* Loew, 1866

**Material examined: Murmansk Province.** *Lps*: 1 female, Borisoglebskii, Hellen; 1 male, 1 female, Kuvernöörikoski, Hellen; 1 female, Zemlyanoe, Frey; 1 male, 2 females, Salmijärvi, Frey, Hellen; 7 males, Trifonovo, 11.VII.1929, Hellen, Lindberg; 5 males, 2 females, Yläluostari, 8.VII.1929, Lindberg (NHMH); *Lt*: 1 male, Kola, Frey (NHMH); 1 female, Murmansk, 18.VII.1923, Kapustin (ZISP); *Lmur*: 1 male, 1 female, Lake Seidozero, Palmen (NHMH); *Lim*: 10 females, Monchegorsk, 20–24.VII.1995, Kozlov (ZISP); 1 male, 2 females, Laplandskii Nature Reserve, Lisii Stream, 25.VII.2013, Polevoi (FRIP); 1 female, Apatity, 7.VII.1998, Anufriev, Mokrousov (ZISP); 2 males, Kandalaksha, Hellen (NHMH); *Lp*: 1 female, Ponoï, Frey (NHMH). **Karelia.** *Ks*: 2 males, 2 females, Leppyalä, 1.VII.2000, Polevoi (FRIP); 1 male, 1 female, Paanajärvi, Frey (NHMH); *Kk*: 1 male, 6 females, Kartesh, 18–22.VII.1975, Gorodkov (ZISP), 24–25.VII.1996, Polevoi (FRIP); 3 females, Keret', 13.VIII.1966,

Tanasijtsjuk (ZISP); 1 female, Gridino, 2.VIII.2007, Polevoi (FRIP); 5 males, 3 females, Kyatka River, 5.VII–4.VIII.2007, Polevoi; 30 males, 8 females, Syrovatka, 16–22.VII.2003, Polevoi (FRIP); *Kpor*: 1 female, Kostomuksha, 1.VI.1996, Gorodkov; 2 females, Kostomukshskii Nature Reserve, 1.VIII.1996, Gorodkov (ZISP); 1 female, Ladvozero, 9.VII.1996, Polevoi (ZISP); 1 male, 2 females, Island Lodeinyi, 21.VII.2001, Humala; 1 female, Island Nemetskii Kuzov, 17.VII.2001, Humala; 1 male, Murdojoki River, 6.VII.2009, Polevoi; 3 females, Nesterova Mountain, 23.VI.2000, Polevoi (FRIP); *Kpor*: 1 female, Island Bol'shoi Zhuzhmuï, 23.VII.2001, Humala; 1 male, 6 females, Island Malyii Zhuzhmuï, 25.VII.2001, Humala; 1 female, Island Myagostrov, 14.VIII.2002, Polevoi; 1 female, Island Pechak, 24.VII.2001, Humala (FRIP); 1 female, Sumskii Posad, 24.VII.1996, Gorodkov (ZISP); 2 males, Ladozero, 29.VI.2010, Polevoi; 2 males, 1 female, Valdai, 29.VI.2010, Polevoi (FRIP); *Kon*: 1 male, Medvezh'egorsk, Carpelan (NHMH); 1 female, Ar'koila, 20.VI.2018, Polevoi; 1 female, Raiguba, 11.VII.2002, Polevoi; 2 males, Lake Vikshezero, 28.VI.2007, Polevoi; 4 males, 9 females, Tereki, 21.VII.2017, 25.VI.2018, Polevoi; 2 males, 2 females, Island Paleostrov, 3.VII.2004, Polevoi; 2 males, Polya, 26.VI.2013, Polevoi; 2 males, Kivach, 31.VII–13.VIII.1990, Polevoi; 1 female, Gomsel'ga, 5.VII.2012, Polevoi (FRIP); 3 females, Konchezero, 10.VII.1942, Tiensuu (NHMH); 1 female, Island Eglöv, 26.VI.2014, Polevoi; 2 females, Island Ernitskii, 26.VI.2003, Polevoi; 1 male, 2 females, Island Khvost, 27.VI.2014, Polevoi; 2 males, Island Kuivakhda, 24.VI.2003, Polevoi; 1 female, Island Lyudskoi, 24.VI.2003, Polevoi; 1 female, Island Myal', 2.VII.2017, Polevoi; 1 female, Klimentitsy, 12.VII.1997, Polevoi (FRIP); *Kl*: 1 female, Ruskeala, Sahlberg; 1 male, Sortavala, Suomalainen; 1 male, Harlu, Tiensuu; 4 males, Impilahti, Forsius, Suomalainen (NHMH); 2 males, Lake Iso-Iijärvi, 5.VII.2005, Polevoi; 1 male, Meijeri, 3.VII.2010, Humala; 1 male, 1 female, Niva, 7–8.VII.2005, Polevoi (FRIP); 2 females, Salmi, 2–3.VI.1910, Tuomikoski, 2.VIII.1941, Tiensuu (NHMH); *Kol*: 1 female, Kindasovo, 9.VII–5.IX.1996, Polevoi (ZISP); 2 males, Lososinnoe, 9.VII.2012, Polevoi (FRIP); 1 female, Petrozavodsk, 7.VIII.1923, Fridolin; 2 females, Sheltozero, 13.VII.2004, Polevoi; 3 males, 5 females, Vidlitsa, 4.IX.2018, Polevoi; 1 male, Mayachino, 22.VI.2012, Polevoi; 4 males, 1 female, Novikovo, 2.VII.2008, Polevoi (FRIP); 1 male, Gizhino, Platonoff (NHMH); 1 male, Karelia, Tengstrom (NHMH).

**Published records: Murmansk Province.** *Ks*: Kuolajärvi; *Lmur*: Voroninsk (Nartshuk 1998). **Karelia.** *Kon*: Velikaya Niva (Nartshuk 1998).

**Distribution:** Transpalaeartic species, distributed eastwards to Kamchatka.

**Biological notes:** Wet meadows, wet clearings in the forests. Host plants are probably some species of *Calamagrostis* other than *C. epigejos*.

*Chlorops nigripalpis* (Duda, 1933)

**Material examined: Karelia.** 1 female, without locality name, Tengström (NHMH).

**Distribution:** The species is known from Europe and Kazakhstan.

**Biological notes:** Bionomics unknown.

*Chlorops planifrons* Loew, 1866

**Material examined: Murmansk Province.** *Lps*: 1 female, Lotta River, Poppius; 1 female, Pechenga, Frey; 1 female, Salmijärvi, 28.VI.1937, Nordman; 2 males, 1 female, Yläluostari, Frey (NHMH); *Lt*: 1 male, 1 female, Kola, Frey (NHMH); 1 female, Kola, 4.VII.1906, Soldatov (ZISP); *Lm*: 1 female, Lovozero, 16.VIII.1981, Gorodkov (ZISP). **Karelia.** *Kpoc*: 1 female, Kem', Sahlberg (NHMH); *Kpor*: 1 female, Segezha, 20.VII.1996, Gorodkov (ZISP); *Kon*: 1 male, Tipinitsy, 4.VII.2004, Polevoi; 1 female, Island Khvost, 27.VI.2014, Polevoi (FRIP); *Kl*: 1 female, Valaam, 28.VII.2009, Polevoi (FRIP); *Kton*: 3 females, Sheltoporog, 2.VIII.2002, Polevoi; *Kton*: 1 female, Vozritsy, 1.VIII.2002, Polevoi (FRIP).

**Distribution:** Widely distributed transpalaeartic polyzonal species, distributed from the British Islands to the Far East of Russia, in Europe occurs southwards to Spain.

**Biological notes:** Fens and marshes with large species of sedges. One generation in a year. Larvae phytophagous, develop in shoots of *Carex rostrata* Stokes. Larvae of the first instar hibernate in shoots of host plant and continue feeding in the next spring, make a furrow on stem, starting below inflorescence and going down gradually widening until suddenly interrupts. Interruption most likely corresponds to the period of larvae moulting, as furrow becomes wider after interruption. Larvae pupate within stem below. Some larvae leave the stem and continue feeding in another one (Nartshuk 1962).

*Chlorops pumilionis* (Bjerkander, 1778)

**Material examined: Karelia.** *Kpor*: 1 male, island Nemetskii Kuzov, 17.VII.2001, Humala; 1 female, Island Myagostrov, 14.VIII.2002, Humala (FRIP). **Leningrad Province.** *Kol*: 1 male, Vazhiny, 9.IX.1942, Tiensuu (NHMH); 1 male, Gimreka, 2.VI.2007, Polevoi (FRIP).

**Published records: Karelia.** *Ks*: Paanajärvi (Krogerus 1960); *Kl*: Salmi, Sortavala, Yakkima; *Kol*: Gizhino, Olonets, Petrozavodsk, Sheltozero, Sändeba (Nartshuk 1998).

**Distribution:** Eurasian temperate species, distributed from Europe to Iran, Israel, West Siberia and Mongolia.

**Biological notes:** Meadows and agricultural fields. Two generation in a year. Well-known pest of cereals (predominantly wheat, more rarely, barley and rye), but does not develop on oats. Larvae of winter generation develop in shoots of cereals causing thickening of the attacked shoots ("gout swelling"), while larvae of summer generation feed on exposed ear, lower spikelets and stem below the spike, gnawing a furrow. Different authors also list many species of wild grasses as possible host plants, but most likely only *Elymus repens* and some other species of closely related genera are genuine ones.

*Chlorops ringens* Loew, 1866

**Material examined: Karelia.** *Kon*: 1 male, Polya, 26.VI.2013, Polevoi; 1 male, Vorob'i, 19.VIII.2008, Polevoi (FRIP); *Kol*: 1 female, Ust'e Tuloksy, 5.IX.2018, Polevoi; 2 females, Vidlitsa, 4.IX.2018, Polevoi; 2 females, Matveeva Sel'ga, 26.VIII.2004, Polevoi; 1 female, Zales'e, 26.VIII.2004, Polevoi (FRIP).

**Distribution:** Eurasian temperate species, distributed from southern Sweden and Finland southwards to Bulgaria and eastwards to Yakutia.

**Biological notes:** Meadows. Autumnal species.

*\*Chlorops rossicus* Smirnov, 1955

**Material examined: Murmansk Province.** *Lps*: 1 male, Salmijärvi, 28.VI.1937, Nordman; 1 male, Yläluostari, 8.VII.1929, Lindberg (NHMH). *Lmur*: 1 male, Voron'ya River, Hayren (NHMH). **Karelia.** *Kon*: 1 female, Vottovaara Mountain, 18.VII.2008, Polevoi (ZISP); 1 female, Island Ernitskii, 26.VI.2003, Polevoi; 1 female, Polya, 26.VI.2013, Polevoi (FRIP).

**Distribution:** East European species. Repeatedly collected in Germany (Tschirnhaus 1992).

**Biological notes:** Meadows, forest edges and clearings.

*Chlorops rufinus* (Zetterstedt, 1848)

**Material examined: Karelia.** *Ks*: 1 female, Paanajärvi, Hellen (NHMH).

**Distribution:** Widespread transpalaeartic species, distributed southwards to Bulgaria and eastwards to Mongolia and Japan, but everywhere rare.

**Biological notes:** Meadows.

*Chlorops scalaris* Meigen, 1830

**Material examined: Karelia.** *Kpoc*: 7 males, 2 females, Ladvozero, 11.VII.1996, Polevoi (ZISP); 1 male, Nesterova Mountain, 23.VI.2000, Polevoi (FRIP); *Kon*: 2 females, Padany, 17.VI.1921, Olonets Expedition (ZISP); 1 female, Lisitsyno, 4.VII.2004, Polevoi (FRIP); 1 female, Konchezero, 10.VII.1942, Tiensuu (NHMH); 2 females, Island Bukol'nikov, 25.VI.2003, Polevoi (FRIP); 1 female, Yalguba, Sahlberg (NHMH); *Kl*: 1 female, Sortavala, Suomalainen (NHMH); 1 female, Haapalampi, 2.VII.2010, Polevoi (FRIP); *Kol*: 2 males, 1 female, Kolatset'ga, 29.VI.1942, Tiensuu (NHMH); *Kp*: 1 female, Korbozero, 24.VI.1996, Polevoi (FRIP).

**Published records: Karelia.** Surroundings of Ladoga Lake (Chydenius & Furuhielm 1859); *Kl*: Impilahti, Valaam (Nartshuk 1998); *Kpoc*: Voknavolok (Nartshuk 1998).

**Distribution:** Eurasian polyzonal species, distributed southwards to Italy and Bulgaria, and eastwards to East Siberia and Mongolia.

**Biological notes:** Rather common on meadows. Larvae phytophagous, host plants *Holcus lanatus* L. and *Poa pratensis* L. (Tschirnhaus 1981).

*Chlorops scutellaris* (Zetterstedt, 1838)

**Material examined: Murmansk Province.** *Lt*: 1 male, Kola, Frey (NHMH). *Ks*: 1 specimen, Kuolajärvi, 23.VII.1934, Krogerus (NHMH). *Lim*: 1 female, Lake Bolshoi Vudjavr, 21.VII.1934, Fridolin; 15 females, Khibiny, 15.VIII.1928, Cheburova, 14.VII.1934, Fridolin (ZISP). **Karelia.** *Kk*: 1 female, Kartesh, 17.VII.2010, Nartshuk (ZISP).

**Published records: Murmansk Province.** *Lt*: Kola (Frey 1934, as *Oscinis freyi* Duda, 1933). **Karelia.** *Ks*: Paanajärvi (Krogerus 1960, as *O. freyi*). This record most probably corresponds to the specimen from Kuolajärvi listed in the examined material.

**Distribution:** North Eurasian species, distributed from North Europe eastwards to Yakutia.

**Biological notes:** Wet meadows and fens.

*\*Chlorops serenus* Loew, 1866

**Karelia:** *Kol*: 1 female, Ust'e Tuloksy, 5.IX.2018, Polevoi (FRIP).

**Distribution:** Transpalaeartic species, known from Europe, Israel and Algeria. Also reported from Morocco (Ebejer & Kettani 2016), Turkey (Kubik & Barták 2014), Iran (Khaghaninia & Gharajedaghi 2013) and Korea (Ryu 1994).

**Biological notes:** Meadows. Probably, two generations.

*Chlorops speciosus* Meigen, 1830

**Material examined: Murmansk Province.** *Lps*: 1 male, 1 female, Zemlyanoe, Frey; 1 female, Pechenga, Hellen; 2 males, 3 females, Salmijärvi, 28.VI.1937, Nordman; 5 males, 5 females, Yläluostari, Frey, Hellen (NHMH); 1 female, Pasvik Nature Reserve, Island Niilansaari, 29.VII.2008, Polevoi (ZISP); *Lt*: 2 females, Polyarnyi, 10.VIII.1923, Kuznetsov; 2 females, Murmansk, 22.VIII.1923, Fridolin (ZISP); 1 male, Kola, Frey (NHMH); *Lim*: 5 females, Monchegorsk, 20–24.VII.1995, Kozlov; 1 female, Apatity, 7.VII.1998, Anufriev, Mokrousov (ZISP); 1 male, Kandalaksha, Sahlberg (NHMH); *Lv*: 1 female, Varzuga, 16.VIII.1995, Gorodkov (ZISP). **Karelia.** *Ks*: 5 males, 5 females, Paanajärvi, Frey (NHMH); 2 males, Nuorunen Mountain, 12.VII.1990, Jakovlev (FRIP); *Kk*: 5 males, 3 females, Kartesh, 16–20.VII.1966, Tanasijtshuk, 27.VII.1989, Sugonyaev (ZISP), 22–25.VII.1996, Polevoi (FRIP); 9 males, 5 females, Gridino, 9.VIII.2006, 2–13.VII.2007, Polevoi; 1 female, Kyatka River, 4.VIII.2007, Polevoi; 2 males, Syrovatka, 16–18.VII.2003, Polevoi (FRIP); *Kpoc*: 8 males, 2 females, Ladvozero, 11.VII.1996, Polevoi (ZISP); 2 females, Voknavolok, Hellen (NHMH); 8 females, Nesterova Mountain, 23.VI.2000, Polevoi (FRIP); *Kpor*: 2 males, 2 females, Valdai, 29.VI.2010, Polevoi (FRIP); *Kon*: 1 female, Lake Nizhnii Myarat, 6.VII.2006, Polevoi (FRIP); 3 females, Padany, 17.VI.1921, Olonets Expedition (ZISP); 1 male, Shaidoma, 10.VIII.2018, Polevoi; 1 female, Girvas, 16.VII.2002, Polevoi; 1 male, 1 female, Ar'koila, 19–20.VI.2018, Polevoi; 1 male, 1 female, Vikshezero, 28.VI.2007, Polevoi; 1 female, Nizhnee Myagrozzero, 20.VII.2012, Polevoi; 1 male, 1 female, Kivach, 29.VI.1993, 4.VII.2001, Polevoi; 1 female, Gomsel'ga, 5.VII.2012, Polevoi (FRIP); 1 male, Konchezero, 10.VII.1942, Tiensuu (NHMH); 1 female, Pod'elniki, 21.VII.2011, Polevoi; 1 male, Island Bol'shoi Klimenetskii, 7.VIII.1996, Polevoi; 1 female, Island Bukol'nikov, 30.VII.2018, Polevoi; 1 female, Island Sychevets, 1.VIII.2018, Polevoi; 1 male, 1 female, Lelikovo, 28.VII.2018, Polevoi; 1 male, Klimenitsy, 11.VII.1997, Polevoi; 2 females, Island Eglöv, 26–29.VI.2014, Polevoi; 1 male, Gomsel'ga, 9.VIII.2018, Polevoi; 2 females, Pin'guba, 29.VI.1997, 16.VII.2000, Polevoi (FRIP); *Kl*: 2 males, 1 female, Sortavala, Tiensuu; 1 female, Kirjavalhti, Poppius; 1 female, Harlu, Tiensuu; 1 male, 1 female, Impilahti, Suomalainen, Woldstedt (NHMH); 2 females, Meijeri, 3.VII.2010, 11.VI.2015, Polevoi; 1 male, 1 female, Valaam, Suomalainen (NHMH), 31.VII.2009, Polevoi (FRIP); 1 female, Jakkima, Forsius (NHMH); *Kol*: 1 female, Kolatset'ga, 3.VIII.1942, Tiensuu; 1 female, Vedlozero, 18.VII.1942, Tiensuu; 1 male, 2 females, Vidlitsa, 22.VII.1942, Tiensuu (NHMH), 4.IX.2018, Polevoi (FRIP); 2 females, Olonets, 27.VII.1942, Tiensuu; 1 male, 2 females, Petrozavodsk, 1.VI–24.VIII.1942, Tiensuu (NHMH), 25.VII.2015, Humala (FRIP); 2 males, 3 females, Sheltozero, 26–31.VIII.1942, Tiensuu (NHMH); *Kton*: 1 female, Sheltoporog, 2.VIII.2002, Polevoi; *Kton*: 2 females, Vozritsy, 1.VIII.2002, Polevoi (FRIP); *Kp*: 2 females, Korbozero, 22–24.VI.1996, Polevoi (FRIP). **Leningrad Province.** *Kol*: 1 male, Lahta, 10.VII.1992, Polevoi; 1 male, Moshnich'e, 3.VII.2008, Polevoi (FRIP); 1 female, Vazhiny, 20.VII.1942, Tiensuu (NHMH).

**Published records: Murmansk Province.** *Lps*: Vuoremijärvi; *Lt*: Notozero, Tuloma River; *Lp*: Ponoï (Nartshuk 1998). **Karelia.** Surroundings of Ladoga Lake (Chydenius & Furuhejm 1859); *Kk*: Chupa, Keret' (Nartshuk 1998).

**Distribution:** Eurasian species, southwards to Spain and Bulgaria, eastwards to West Siberia (Altai).

**Biological notes.** Wet meadows. Larvae phytophagous, live in stems of *Deschampsia cespitosa* (L.) P. Beauv. Hibernates as larvae in the basal tillers.

*Chlorops troglodytes* (Zetterstedt, 1848)

**Material examined: Murmansk Province.** *Lim*: 1 female, Khibiny, 23.VIII.1928, Cheburova (ZISP); 1 female, Kokorin Stream, 26.VII.2013, Polevoi (FRIP); 1 female, Apatity, 17.VII.1998, Anufriev; 8 females, Umba, 27.VII.1966, Tanasijtshuk (ZISP). **Karelia.** *Ks*: 2 males, 2 females, Paanajärvi, 22–27.VII.1934, Ehman (NHMH); *Kk*: 10 males, 11 females, Kartesh, 16–20.VII.1966, Tanasijtshuk, 6.VIII.1982, Zaitzev, 27.VII–16.VIII.1989, Sugonyaev (ZISP), 28.VII.1996, Polevoi (FRIP); 2 males, 5 females, Gridino, 5–9.VIII.2006 (ZISP), Polevoi, 7.VIII.2007, Humala (FRIP); *Kpoc*: 1 male, Island Lodeinyi, 21.VII.2001, Humala (ZISP); *Kpor*: 3 females, Island Bol'shoi Zhuzhmuï, 23.VII.2001, Humala (ZISP); 1 female, Island Malyii Zhuzhmuï, 25.VII.2001, Humala; 4 males, 3 females, Island Pechak, 24.VII.2001, Humala (FRIP); *Kon*: 1 male, Vottovaara Mountain, 18.VII.2008, Polevoi; 1 male, Kivach, 29.VI.1993, Polevoi; 1 male, 3 females, Gomsel'ga, 9.VIII.2018, Polevoi; 1 male, Kosalma, 15.VII.2002, Polevoi; 1 female, Pod'elniki, 20.VII.2011, Polevoi; 2 males, Vorob'i, 7.VIII.1996, Polevoi (ZISP), 3 males, 1 female, Vorob'i, 19.VIII.2008, Polevoi; 1 female, Island Sychevets, 1.VIII.2018, Polevoi; 3 males, 1 female, Island Radkol'e, 30.VII.2018, Polevoi; 2 males, 2 females, Island Karel'skii, 31.VII.2018, Polevoi (FRIP); *Kl*: 1 male, 3 females, Valaam, 27–31.VII.2009, Polevoi (FRIP); *Kol*: 1 male, Sheltozero, 28.VII.1942, Tiensuu (NHMH).

**Published records: Murmansk Province.** *Ks*: Kuolajärvi (Nartshuk 1998). **Karelia.** *Kk*: Chupa (Nartshuk 1998).

**Distribution:** Eurasian polyzonal species, distributed from the Great Britain to East Siberia and Mongolia.

**Biological notes:** Meadows.

*Chlorops varsoviensis* Becker, 1910

**Material examined: Karelia.** *Kk*: 1 male, Kartesh, 21–25.VII.1973, Sugonyaev (ZISP); *Kl*: 1 male, Ruskeala, Sahlberg; 2 females, Salmi, Tuomikoski (NHMH); *Kol*: 1 male, Lososinnoe, 9.VII.2012, Polevoi (FRIP).

**Published records: Murmansk Province.** *Ks*: Kuolajärvi (Nartshuk 1998).

**Distribution:** Transpalaeartic species, distributed from France to Mongolia and Japan, southwards to Spain, northern Italy and Bulgaria.

**Biological notes:** Wet habitats with sedges. Larvae phytophagous, develop in stems of *Carex* spp.

*Cryptonevra flavitarsis* (Meigen, 1830)

**Published records: Karelia.** Without locality name (Nartshuk & Andersson 2013).

**Distribution:** Transpalaeartic species.

**Biological notes:** *Phragmites* beds. Larvae usually develop as inquiline in galls of *Lipara* spp., probably also in damaged stems of *Phragmites*.

*Diptotoxa messoria* (Fallén, 1820)

**Material examined:** **Karelia.** *Kk*: 1 male, Kartesh, 4.IX.2005, Przhiboro (ZISP); *Kton*: 3 males, Vozritsy, 1.VIII.2002, Polevoi (FRIP).

**Published records:** **Karelia.** Surroundings of Ladoga Lake (Chydenius & Furuhjelm 1859); *Kl*: Sortavala, Jaakkima (Nartshuk 1999a).

**Distribution:** Holarctic species, widely distributed in the Palaearctic from the Great Britain to the Far East of Russia.

**Biological notes:** Wet habitats with spike sedges. Larvae develop in *Eleocharis* spp.

*Diptotoxa dalmatina* Strobl, 1900

**Material examined:** **Karelia.** *Kton*: 1 female, Vozritsy, 1.VIII.2002, Polevoi (FRIP).

**Published records:** **Karelia.** *Kol*: Bol'shie Gory (Nartshuk 1999a).

**Distribution:** Transpalaearctic species, distributed from Europe to the Far East of Russia.

**Biological notes:** Wetlands.

*Epichlorops puncticollis* (Zetterstedt, 1848)

**Material examined:** **Karelia.** *Kl*: 1 female, Suistamo, Tuomikoski (NHMH).

**Distribution:** Holarctic species.

**Biological notes:** Wet meadows and marshes with sedges. Larvae develop in *Carex* spp.

\**Lasiosina albipila* (Loew, 1866)

**Material examined:** **Karelia.** *Kol*: 1 male, Vidlitsa, 4.IX.2018, Polevoi (FRIP).

**Distribution:** European species with a record from Turkey (Kubík & Barták 2014)

**Biological notes:** Meadows. It was found in Switzerland that adults feed on secretia of *Agelastica alni* (Linnaeus, 1758) larvae (Pschorn-Walcher 1956).

*Lasiosina herpini* (Guérin-Ménéville, 1843)

**Material examined:** **Karelia.** *Kon*: 1 female, Konchezero, 24–26.VIII.2011, Polevoi (FRIP); *Kol*: 1 male, Gizhino, 15.IX.1941, Tiensuu; 1 female, Kolatsel'ga, 9.V.1942, Tiensuu (NHMH); *Kton*: 1 female, Sukhaya Vodla River, 24.VIII.2006, Polevoi (FRIP).

**Published records:** **Karelia.** *Kton*: Sukhaya Vodla (Humala & Polevoi 2009, as *L. cinctipes* (Meigen, 1830)). **Leningrad Province.** *Kol*: Gubaritsy (Nartshuk 1999a).

**Distribution:** Transpalaearctic species.

**Biological notes:** Dry meadows and agricultural fields. Larvae develop in shoots of different grasses, including cereals rye, wheat, oats, barley, as secondary invaders. In applied literature usually given as *L. cinctipes* due to misidentification.

*Lasiosina parvipennis* Duda, 1933

**Published record:** **Karelia.** Without locality name (Nartshuk & Andersson 2013).

**Distribution:** Eurasian species.

**Biological notes:** Bogs and marshes.

*Melanum laterale* (Haliday, 1833)

**Material examined:** **Murmansk Province.** *Lp*: 1 female, Ponoï, Frey (NHMH). *Lim*: 2 females, Island Berezhnoi Vlasov, 16.VIII.1993; 1 female, Luvenga, 2.IX.1993, Przhiboro (ZISP). **Karelia.** *Kk*: 40 males, 13 females, Kartesh, 21–25.VII.1973, 27.VII–16.VIII.1989, Sugonyaev; 15.VII–21.VIII.1996, 3–5.VII.2000, Przhiboro, 22–24.VII.2010, Nartshuk; 1 pupa (reared to adult), Kartesh, 13.VII.1996, Przhiboro; 1 male, 2 females, Island Malyi Andronin, 29.VII.2010, Nartshuk; 1 female, Primorskii, 17.VIII.1996, Przhiboro (ZISP); 7 males, 11 females, Gridino, 5–9.VIII.2006, Polevoi; 7 males, 3 females, Island Luda Lesovata, 9.VIII.2006, Polevoi; 3 females, Sonostrov, 6.VIII.2006, Polevoi; 1 female, Syrovatka, 19.VII.2003, Polevoi (FRIP); *Kpoc*: 1 female, Island Lodeinyi, 21.VII.2001, Humala; 3 males, 4 females, Island Nemetskii Kuzov, 22.VIII.2002, Humala; 2 females, Island Taparukha, 17.VIII.2002, Humala (FRIP); *Kpor*: 3 males, 2 females, Island Kondostrov, 20–21.VIII.2002, Humala; 2 males, 6 females, Island Myagostrov, 14.VIII.2002, Humala; 2 males, Perkhlyudy, Island Yuzhnyi, 16.VIII.2002, Humala (FRIP).

**Published records:** **Karelia.** *Ks*: Paanajärvi (Krogerus 1960); *Kon*: Shueretskoe (Frey 1934; Nartshuk 1998).

**Distribution:** Transpalaearctic species.

**Biological notes:** Wetlands, especially salt marshes along the sea coasts, but also at lake shores and river banks. Not uncommon in the upper intertidal and supralittoral zones (sea shore meadows) of the White Sea. Reared from *Juncus gerardii* Loisel. (Tschirnhaus 1981; Przhiboro unpubl. data).

*Meromyza mosquensis* Fedoseeva, 1960

**Material examined:** **Murmansk Province.** *Lt*: 1 male, 1 female, Murmansk, 19.VIII.1923, Kuznetsov (ZISP). **Karelia.** *Kol*: 2 females, Pai, 7.VIII.1923, Kuznetsov (ZISP).

**Distribution:** Distributed over Europe except the southernmost parts.

**Biological notes:** Meadows. Larvae phytophagous, develop in different species of Poaceae. Hibernates as the third instar larva in shoots of host plants.

\**Meromyza nigriseta* Fedoseeva, 1960

**Material examined:** **Karelia.** *Kl*: 1 male, Reuskula, 6.VII.2010, Polevoi (FRIP).

**Distribution:** Euroasian species, distributed from the British Islands to Malta and Mongolia.

**Biological notes:** Meadows. Larvae develop in several species of Poaceae, rarely in cereals.

*Meromyza nigriventris* Macquart, 1835

**Material examined:** **Karelia.** *Kpor*: 1 male, Island Nemetskii Kuzov, 17.VII.2001, Humala; 1 male, 2 females, Island Russkii Kuzov, 18.VII.2001, Humala (FRIP); *Kpor*: 1 male, Island Bolshoi Zhuzhmui, 23.VII.2001, Humala (FRIP); *Kon*: 1 male, Raiguba, 17.VII.2002, Polevoi (FRIP).

**Distribution:** Holarctic species, widely distributed in the Palaearctic from the British Isles to Japan.

**Biological notes:** Meadows and agricultural fields. Two generations in a year. Larvae phytophagous, develop in different grasses including cereals (wheat, barley, rye). Hibernate as the third instar larvae in shoots of host plants. Namely this species (not *M. saltatrix* (Linnaeus, 1761)) is a pest of cereals.

*Meromyza ornata* (Wiedemann, 1817)

**Material examined:** **Karelia.** *Kk*: 1 female, Kartesh, 16–20.VII.1966, Tanasijtshuk (ZISP); 3 females, Syrovatka, 18–22.VII.2003, Polevoi (FRIP); *Kon*: 1 female, Lelikovo, 26.VI.2003, Polevoi (FRIP); *Kol*: 1 male, Sheltozero, 15.VII.2006, Polevoi (FRIP); *Kton*: 1 male, Sheltoporog, 2.VIII.2002, Polevoi; 2 males, 4 females, Vozritsy, 1.VIII.2002, Polevoi (FRIP).

**Published records:** **Karelia.** *Kol*: Svir', Vidlitsa (Nartshuk 1992, as *M. sororcula* Fedoseeva 1962).

**Distribution:** Euroasian species, ranging from the British Isles to Mongolia.

**Biological notes:** Wet meadows. Larvae phytophagous, live in shoots of *Deschampsia cespitosa*. The first instar larvae hibernate and in spring move to another plant to continue developing.

*Meromyza plurisetata* Péterfi, 1961

**Material examined:** **Murmansk Province.** *Lim*: 1 female, Khibiny, 23.VIII.1928, Cheburova (ZISP). **Karelia.** *Kon*: 1 female, Island Bukol'nikov, 25.VI.2003, Polevoi (FRIP).

**Published records:** **Karelia.** *Kl*: Valaam (Nartshuk 1992).

**Distribution:** Euroasian species, ranging from the British Isles to Mongolia.

**Biological notes:** Meadows. Larvae develop in shoots of *Hierochloa odorata* and probably in other Poaceae.

*Meromyza pratorum* Meigen, 1830

**Material examined:** **Karelia.** *Kpor*: 2 males, Island Russkii Kuzov, 18.VII.2001, Humala (FRIP); *Kol*: 1 male, Lososinnoe, 9–13.VII.2012, Polevoi (FRIP); **Leningrad Province.** *Kol*: 1 male, Gimreka, 25.VII.2008, Polevoi (FRIP).

**Published records:** **Karelia.** Surroundings of Ladoga Lake (Chydenius & Furuhjelm 1859); *Ks*: Paanajärvi (Krogerus 1960).

**Distribution:** Holarctic species, widely distributed in the Palaearctic from the British Isles to Japan.

**Biological notes:** Dry meadows and sandy dunes on the sea coasts. Larvae phytophagous, develop in shoots of *Calamagrostis epigejos* and *Ammophila arenaria* (L.) Link.

*Meromyza saltatrix* (Linnaeus, 1761)

**Material examined:** **Murmansk Province.** *Lt*: 3 males, Murmansk, 23.VIII.1928, Kuznetsov (ZISP). **Karelia.** *Kk*: 2 males, 1 female, Kartesh, 16–20.VII.1966, Tanasijtshuk (ZISP); 1 male, Gridino, 14.VII.2007, Humala (FRIP); *Kpor*: 1 male, Island Bolshoi Zhuzhmui, 23.VII.2001, Humala (FRIP); *Kon*: 3 males, 3 females, Island Lambaznik, 25.VI.2003, Polevoi; 1 female, Lelikovo, 26.VI.2003, Polevoi (FRIP); *Kol*: 1 male, Mayachino, 22.VI.2012, Polevoi (FRIP); 1 male, Pai, 7.VIII.1923, Kuznetsov (ZISP).

**Published records:** **Murmansk Province.** Kandalaksha (Nartshuk 1992). **Karelia.** Surroundings of Ladoga Lake (Chydenius & Furuhjelm 1859); *Kpor*: Vuokkiniemi; *Kon*: Konchezero; *Kl*: Valamo, Impilahti, Kirjavaltahti (Nartshuk 1992).

**Distribution:** Holarctic species, widely distributed in the Palaearctic.

**Biological notes:** Meadows. Larvae phytophagous, in different grasses (Poaceae). Hibernate as the third instar larva. The species has been recorded as a pest of cereals by different authors, but in fact, it does not live in cereals, all these records refer to *M. nigriventris*.

*Meromyza triangulina Fedoseeva, 1960*

**Material examined:** **Karelia.** *Kol*: 1 female, Shoksha, 13.VII.2004, Polevoi (FRIP).

**Published records:** **Karelia.** *Kon*: Tivdia (Nartshuk 1992).

**Distribution:** European species.

**Biological notes:** Meadows. Probably two generations in a year. Larvae phytophagous, develop in different grasses (Poaceae), especially *Festuca* spp. Hibernate as the third instar larva in shoots of host plants.

*Neohaplegis tarsata* (Fallén, 1820)

**Material examined:** **Karelia.** *Kk*: 1 male, Syrovatka, 17.VII.2003, Polevoi (FRIP); *Kl*: 1 female, Impilahti, Forsius (NHMH); *Kon*: 1 female, Vottovaara Mountain, 18.VII.2008, Polevoi; 1 male, Tipinitsy, 4.VII.2004, Polevoi (FRIP); *Kpor*: 1 female, Valdai, 29.VI.2010, Polevoi (FRIP).

**Distribution:** Transpalaearctic species.

**Biological notes:** Wetlands with sedges. Larvae live in shoots of *Carex* spp.

*Platycephala planifrons* (Fabricius, 1798)

**Material examined:** **Karelia.** *Kl*: 3 females, Salmi, Tuomikoski (NHMH), 29.VII.1994, Humala (FRIP); 1 female, Jakkima, Sahlberg (NHMH); 1 female, Ladoga Lake, Nordqvist (NHMH). *Kpor*: 2 females, Island Myagostrov, 14.VIII.2002, Humala (FRIP).

**Published records:** **Karelia.** Surroundings of Ladoga Lake (Chydenius & Furuhjelm 1859); *Kon*: Shueretskoe (Nartshuk 1999a).

**Distribution:** Euroasian species, distributed from the British Isles to Mongolia.

**Biological notes:** Common reed (*Phragmites australis*) beds. Larvae phytophagous, live in stems of common reed, destroying the vegetation point with the result that the upper leaves wilt.



*Pseudopachychaeta approximatonervis*  
(Zetterstedt, 1848)

**Material examined: Karelia.** *Kon*: 1 female, Solomennoe, Sahlberg (NHMH); *Kl*: 1 male, Yakkima, Forsius (NHMH); *Kol*: 1 male, Petrozavodsk, Sahlberg (NHMH).

**Published records: Karelia.** Surroundings of Ladoga Lake (Chydenius & Furuhejm 1859); *Ks*: Paanajärvi (Krogerus 1960).

**Distribution:** Holarctic species.

**Biological notes:** Wetlands. Larvae phytophagous, live in inflorescences of *Eriophorum* spp. except *E. vaginatum* L., feeding on unripe seeds. Hibernates as adults.

*Pseudopachychaeta ruficeps* (Zetterstedt, 1838)

**Material examined: Murmansk Province.** *Lps*: 1 male, Trifonovo, Hellen (NHMH); *Lt*: 5 males, 3 females, Kola, Frey; 1 male, Polyarnyi, Frey (NHMH); *Lim*: 1 male, 1 female, Belaya Guba, Frey (NHMH); *Lim*: 4 males, 2 females, Lake Bolshoi Vudjavr, 14.IX.1930, 18.VI–24.VIII.1931, Fridolin; 3 males, 1 female, Khibiny, 7–28.VIII.1928, Cheburova; 1 female, Island Bereznoi Vlasov, 16.VIII.1993, Przhiboro (ZISP); 1 male, Lisii Stream, 28.V.2014, Polevoi (FRIP); 1 male, Kandalaksha, Hellen (NHMH); *Lp*: 3 males, Ponoj, Frey (NHMH). **Karelia.** *Kk*: 2 females, Kartesh, 20.VIII.1996, 4.IX.2005, Przhiboro (ZISP); *Kon*: 3 females, Shaidoma, 10–11.VIII.2018, Polevoi; 1 female, Vendery, 30.VIII.2017, Polevoi; 1 male, 3 females, Kivach, 2.IX.2002, 1.VIII.2003, Polevoi (FRIP); *Kol*: 1 male, Sheltozero, 15.VII.2006, Polevoi (FRIP).

**Published records: Murmansk Province.** *Ks*: Kuolajärvi. **Karelia.** *Ks*: Paanajärvi (Nartshuk 1999a).

**Distribution:** Transpalearctic arcto-boreal species.

**Biological notes:** Bogs. Females lay eggs early in spring into inflorescences of *Eriophorum vaginatum*, where phytophagous larvae then develop. Up to 4–6 larvae may live in one inflorescence. Adults appear in July and hibernate.

*Thaumatomyia glabra* (Meigen, 1830)

**Material examined: Murmansk Province.** *Lmur*: 1 male, Gavrilovo, Enwald River (NHMH). **Karelia.** *Kk*: 3 males, 2 females, Kartesh, 9–16.VIII.1989, Sugonyaev (ZISP), 28.VII.1996, Polevoi (FRIP); 17–26.VII.2010, Nartshuk (ZISP); 6 males, 9 females, Gridino, 7.VIII.2007, Polevoi, Humala, 14.VII.2007, Humala (FRIP); *Kpor*: 3 females, Island Myagostrov, 14.VIII.2002, Humala; 1 female, Island Pechak, 24.VII.2001, Humala (FRIP); 2 females, Segezha, 29.VII.1996, Gorodkov (ZISP); *Kb*: 1 female, Tolvojärvi, 27.VII.1998, Polevoi (FRIP); *Kon*: 1 male, 4 females, Shaidoma, 10–11.VIII.2018, Polevoi; 7 males, 2 females, Lisitsyno, 4.VII.2004, Polevoi; 1 male, Island Bukol'nikov, 25.VI.2003, Polevoi (FRIP); 1 female, Konchezero, 7.VII.1942, Tiensuu (NHMH); *Kl*: 1 female, Sukopohja, 7.VII.2005, Polevoi (FRIP); *Kol*: 1 male, 1 female, Petrozavodsk, Sahlberg, Tiensuu (NHMH); *Kton*: 1 female, Kolovo, 14.VI.2003, Polevoi (FRIP).

**Published records: Karelia.** *Kpoc*: Segozero (Frey 1934).

**Distribution:** Holarctic species.

**Biological notes:** Abundant everywhere and found in a variety of habitats. Larvae carnivorous, live between the plant roots, feeding on root aphids. The fly larvae occur between the root aphids and their white wax, partly also with the *Lasius flavus* ants, which visit the aphids to collect their sugar excretions or the aphids themselves (M. von Tschirnhaus, pers. comm.).

*Thaumatomyia hallandica* Anderson, 1966

**Material examined: Karelia.** *Kk*: 3 males, 2 females, Kartesh, 20.VII.1966, Tanasijtshuk, 23.VII.1975, Gorodkov, 20.VIII.1996, Przhiboro (ZISP); *Kpoc*: 1 female, Island Lodeinyi, 21.VII.2001, Humala; 1 female, Island Nemetskii Kuzov, 17.VII.2001, Humala; 8 males, 14 females, Island Russkii Kuzov, 18–19.VII.2001, Humala (FRIP); *Kpor*: 1 female, Island Bol'shoi Zhuzhmui, 23.VII.2001, Humala; 2 females, Island Kondostrov, 20.VIII.2002, Humala; 3 males, 5 females, Perkhlyudy, Island Yuzhnyi, 16.VIII.2002, Humala (FRIP); *Kpor*: 1 male, Segezha, 29.VII.1996, Gorodkov (ZISP); *Kon*: 2 males, 2 females, Lisitsyno, 4.VII.2004, Polevoi; 1 female, Lelikovo, 25.VI.2003, Polevoi; 1 female, Island Radkol'e, 25.VI.2003, Polevoi; 1 male, 2 females, Konchezero, 8.VII.1942, Tiensuu (NHMH), 24–26.VIII.2011, 4–6.VII.2012, Polevoi (FRIP); *Kol*: 1 male, Sheltozero, 29.VIII.1942, Tiensuu (NHMH).

**Published records: Karelia.** *Kol*: Petrozavodsk; *Kpoc*: Segozero (Frey 1934); *Kk*: Chupa (Nartshuk 1999a).

**Distribution:** Eurasian species, distributed from the British Isles to Mongolia and Central Asia.

**Biological notes:** Dry meadows and sandy dunes. Larvae carnivorous, live between plant roots, feeding on root aphids. Prefers permanent wet ground (*Festucetum rubrae litoralis*, *Puccinellietum maritimae* in salt marshes, also wet grass stands along small high alpine streams). In dune systems they fly around but prefer the wet depressions (M. von Tschirnhaus, pers. comm.).

*Thaumatomyia notata* (Meigen, 1830)

**Material examined: Murmansk Province.** *Lim*: 10 males, 19 females, Island Ryashkov, 5.IX.1984, Gorodkov (ZISP). **Karelia.** *Ks*: 1 male, Paanajärvi, Platonoff (NHMH); *Kk*: 1 male, Kartesh, 20.VII.2010, Nartshuk (ZISP); 1 female, Gridino, 14.VII.2007, Humala (FRIP); *Kpor*: 1 female, Segezha, 29.VII.1996, Gorodkov (ZISP); *Kon*: 1 female, Medvezh'egorsk, 7.VI.2000, Polevoi; *Kon*: 2 females, Shaidoma, 10.VIII.2018, Polevoi; 1 female, Lisitsyno, 4.VII.2004, Polevoi; 1 male, 1 female, Kondopoga, 30.VIII–6.IX.2011, Kainelainen; 1 female, Konchezero, 4.VI.2013, Polevoi (FRIP); *Kl*: 1 female, Salmi, Woldstedt (NHMH); *Kol*: 2 males, 1 female, Petrozavodsk, Günther, Tiensuu (NHMH), 17.V.2019, Polevoi (FRIP); 5 males, 12 females, Ust'e Tuloksy, 5.IX.2018, Polevoi; 1 female, Shoksha, 13.VII.2004, Polevoi; 1 male, Sheltozero, 14–15.VII.2006, Polevoi (FRIP); *Kton*: 1 female, Sukhaya Vodla River, 7.VI.2002, Polevoi (FRIP); *Kp*: 1 female, Schanikovskaya, 23.VI.2009, Humala (FRIP).

**Published records: Karelia.** *Kl*: Sortavala (Nartshuk 1999a).

**Distribution:** Palaearctic, Afrotropical and Oriental regions. In the Palaearctic, distributed from the British Isles to Japan.

**Biological notes:** Found in a variety of habitats, often visit flowers. Larvae carnivorous, live between the plant roots, feeding on root aphids. Hibernates as adults. Flies aggregate before hibernation (sometimes up to several millions of specimens), in autumn may penetrate into houses. This phenomenon was recorded nearly every 10–11 years (Nartshuk 2000; Kotrba & Nartshuk 2008).

*Thaumatomyia rufa* (Macquart, 1835)

**Material examined: Karelia.** *Kpoc*: 1 female, Belomorsk, Sahlberg; 1 female, Shueretskoe, Sahlberg (NHMH); *Kon*: 1 female, Shaidoma, 11.VIII.2018, Polevoi; 3 females, Island Lambaznik, 25.VI.2003,

Polevoi; 1 female, Lelikovo, 25.VI.2003, Polevoi (FRIP); 2 males, Konchezzero, 6.VII.1942, Tiensuu (NHMH); *Kl*: 1 male, Sortavala, 30.VII.1935, Tiensuu; 1 male, Salmi, 7.VIII.1941, Tiensuu (NHMH); *Kol*: 1 male, Kolatseľ'ga, 7.VIII.1943, Tiensuu; 1 male, 1 female, Petrozavodsk, Sahlberg (NHMH).

**Distribution:** Transpalaeartic species, distributed from the British Isles to Japan.

**Biological notes:** Meadows. Larvae carnivorous, live between the plant roots, feeding on root aphids.

### *Thaumatomyia trifasciata* (Zetterstedt, 1848)

**Material examined: Murmansk Province.** *Lps*: 1 female, Borisoglebskii, Hellen; 1 female, Kuvernöörkoski, Hellen; 1 female, Trifonovo, Hellen; 2 males, 3 females, Yläluostari, 8.VII.1929, Lindberg (NHMH); 3 females, Langvatn, 4.VIII.2008, Humala (FRIP); 2 females, Lotta River, Platonoff; *Lt*: 3 females, Polyarnyi, 17.VI.1926, Barovskii (ZISP), Hellen (NHMH); 1 female, Tyuva-Guba, 23.VIII.1923, Fridolin; 1 female, Murmansk, 15.VI.1910, Fedotov (ZISP); 2 females, Kola, Hellen; 1 male, 50 km W of Verhnetulomskii, 9.VIII.1967, Meinander (NHMH); *Lmur*: 2 males, Gavrilovo, Hellen (NHMH); 1 female, Tumannyi, 14.VII.1974, Kasparyan (ZISP); 1 male, 2 females, Voroninsk, Palmen (NHMH); 1 female, Lake Seidozero, 31.VII.1974, Kasparyan (ZISP); *Lim*: about 20 specimens, Island Telyachii and Luvenga, VII–VIII.1987–1993, Przhiboro; 1 male, 1 female, Island Berezhnoi Vlasov, 16.VIII.1993, Przhiboro (ZISP); 12 females, Monchegorsk, 20–24.VII.1995, Kozlov (ZISP); 1 male, Belaya Guba, Frey (NHMH); 2 females, Lake Malyi Vudjavr, 4–30.VII.1974, Kasparyan; 7 females, Lake Bolshoi Vudjavr, 14.IX.1930, 30.VI.1931, 9–25.VII.1934, Fridolin; 6 females, Yuksporjok River, 24.VII.1974, Kasparyan; 2 females, Khibiny, 17.VII.1926, Barovskii (ZISP); 2 females, Kandalaksha, Frey & Hellen (NHMH); 1 female, Kolvitsa, 9.VIII.1995, Gorodkov (ZISP); *Lp*: 1 male, 2 females, Ponoï, Frey (NHMH). **Karelia.** *Ks*: 1 male, Nuorunen Mountain, 12.VII.1990, Jakovlev (FRIP); *Kk*: 1 male, 2 females, Primorskii, 17.VIII.1996, Przhiboro; 1 female, Nikol'skaya Bay, 28.VII.1996, Przhiboro; 22 males, 35 females, Kartesh, 16–20.VII.1966, Tanasijshuk, 23.VII.1975, Gorodkov, 6.VIII.1982, Zaitzev, 27.VII–16.VIII.1989, Sugonyaev, 14.VII.1992, 4.VIII–21.VIII.1996, 18.VI.1997, 28.VI–23.VII.2000, 16–27.VI.2002, 4.IX.2005, Przhiboro, 20–24.VII.2010, Nartshuk; 2 larvae, 17 pupae (reared to adults), 21.VIII.1996, 2.X.1996, 6–8.VII.2000, 3.X.2003, 22.V.2004, 4.IX.2005, Kartesh, Przhiboro (ZISP); 20–25.VII.1996, Polevoi (FRIP); 2 females, Keret', 13.VIII.1966, Tanasijshuk (ZISP); 1 female, Chupa, 30.VI.2000, Przhiboro (ZISP); 11 females, Gridino, 7.VII–5.VIII.2007, Polevoi; 1 female, Island Pezhostrov, 7.VIII.2006, Polevoi; 1 female, Sonostrov, 6.VIII.2006, Polevoi; 23 males, 45 females, Syrovatka, 16–22.VII.2003, Polevoi (FRIP); *Kpoc*: 3 females, Lake Levi, 4.VII.1998, Polevoi; 2 females, Ladvozero, 11.VII.1996, Polevoi; 1 female, Nesterova Mountain, 23.VI.2000, Polevoi; 2 females, Island Lodeinyi, 21.VII.2001, Humala; 7 females, Island Nemetskii Kuzov, 17.VII.2001, 22.VIII.2002, Humala; 1 female, Island Russkii Kuzov, 18.VII.2001, Humala (FRIP); *Kpor*: 1 female, Island Myagostrov, 14.VIII.2002, Humala (FRIP); 2 males, 4 females, Segezha, 4.VII.1921, Olonets Expedition, 29.VII.1996, Gorodkov (ZISP); *Kon*: 1 male, 5 females, Shaidoma, 10–11.VIII.2018, Polevoi; 1 male, 3 females, Lake Shuyal, 8–9.VII.2006, Polevoi; 1 male, 2 females, Kurgenitsy, 18.VII.2000, Polevoi; 1 male, 4 females, Konchezzero, 24–26.VIII.2011, 4.VII.2012, Polevoi (FRIP); *Kl*: 1 male, Salmi, Westerlund (NHMH); *Kol*: 2 males, 2 females, Vidlitsa, 4.IX.2018, Polevoi; 1 female, Ust'e

Tuloksy, 5.IX.2018, Polevoi; 3 females, Lososinnoe, 9–13.VII.2012, Polevoi (FRIP); 1 female, Petrozavodsk, Günther; 1 female, Olonets, 27.VII.1942, Tiensuu (NHMH); 2 females, Sheltozero, 15.VII.2006, Polevoi (FRIP); *Kton*: 2 females, Shoikapolda River, 22.VIII.2006, Polevoi; 1 female, Vozritsy, 1.VIII.2002, Polevoi (FRIP).

**Published records: Murmansk Province.** *Lps*: Pechenga, Vuoremijärvi; *Ks*: Kuolajärvi (Nartshuk 1999a). **Karelia.** *Ks*: Paanajärvi; *Kk*: Chupa; *Kpoc*: Segozero (Krogerus 1960; Nartshuk 1999a).

**Distribution:** Holarctic arcto-boreal species.

**Biological notes:** Wetlands and the sea intertidal zone (mostly tidal meadows). Larvae carnivorous, live between the plant roots, feeding on root aphids. The only *Thaumatomyia* species, which is common at the White Sea shores as adults. Larvae of only this *Thaumatomyia* species are common in the upper intertidal zone of the White Sea, where they are associated mostly with the aphid species *Colopha compressa* (Koch, 1856) and, more rarely, with *Pemphigus bursarius* (Linnaeus, 1758) (Przhiboro unpubl. data).

### Distribution and Zoogeography

The study region is extending for nearly 10 degrees from the southern border of Karelia to the coast of the Arctic Ocean and basically lies in the limits of Southern, Middle and Northern boreal vegetation zones. Boreal forests cover most of this territory leaving only a relatively narrow stripe along the Barents Sea coast occupied by tundra. This territory was covered by glaciation during the Riss period and recolonization started after the retreat of the glaciers, nearly 10–12 thousand years ago. The main route of colonization was from south to north. Certain species have acclimatized in different parts of the territory probably due to individual tolerance to the climatic condition, first of all, to low temperature.

In the boreal zone, only a few species of Chloropidae are associated with forests. Larvae of the genus *Gaurax* develop in rotting wood, larvae of *Hapleginella laevifrons*, in damaged coniferous cones. *Tricimba cincta* is often reared from fungi. There are no exact data on food substrates of these species, but these may include mycelia, macerated wood or dead insects occurring in the same microhabitats. Other species of Chloropidae occurring in the boreal zone inhabit different meadows, forest edges, and clearings with grasses as well as bogs, fens and marshes with sedges.

Northern melanism is known in some light-coloured species of Chloropidae occurring on the Kola Peninsula. Specimens of *Gaurax*, especially females, collected in northern localities, have nearly all body black. Specimens of *Chlorops speciosus*, *C. meigenii*, *Diplotoxa messoria*, *Thaumatomyia trifasciata*, *Pseudopachychaeta ruficeps* from northern localities have their black stripes on the thorax wide and nearly fused, basal segment of antennae black and legs partly black.

The recent fauna of Chloropidae of Karelia and Murmansk Province includes species having various range types: species with multiregional distribution, including Afrotropical and/or Oriental regions besides the Palaeartic, account for 3.7%, Holarctic species – 16.5%, Transpalaeartic boreal – 24.8%, Eurasian – 33%, European (including Euro-Caucasian-Kazakhstanian) – 22%. A higher percentage of Holarctic species in the regional fauna (16.5%) in comparison with that in the fauna of the entire Palaeartic (no more than 10%) agrees well with the zoogeographical structure of the Chloropidae fauna in other northern countries.

The distribution of frit flies in the study territory is still inadequately known; many species are recorded only from one or two

localities. Probably some of them are rare or stenotopic, e.g. *Incertella karteshensis*, *Chlorops centromaculatus*, *C. serenus*, *Diplotoxa dalmatina*, *Lasiosina albipila*, *Eribolus hungaricus*, *E. slesvicensis*, *Gaurax leucarista*, *G. venustus*, *Calamoncosis oscinella* (the three last ones are known only from one-two localities in the other parts of Europe). The remaining species may appear to be more common in the future. All recorded species can be tentatively divided into four main groups characterized by different distribution patterns according to the northern border of their ranges on the study territory. These groups may be characterized as follows.

1. Widely distributed species recorded from the whole study territory, including the extreme North. These are species with the widest, holarctic and transpalaeartic boreal ranges. Many of them (e.g., most of the phytophagous species of the subfamily Chloropinae and even *Thaumatomyia* spp. with carnivorous larvae) are associated predominantly with Cyperaceae. Most of these species reach the northern limits of the Northern Boreal zone but some (*Oscinella frit*, *Chlorops planifrons*, *C. scutellaris*, *Melanum laterale*, *Pseudopachychaeta ruficeps*, *Thaumatomyia trifasciata*) occur in the tundra zone as well (Nartshuk 2005).

The following species belong to this group. Subfamily Oscinellinae: *Aphanotrigonum trilineatum*, *Conioscinella frontella*, *C. livida*, *Elachiptera cornuta*, *E. diastema*, *Hapleginella laevifrons*, *Incertella albipalpis*, *I. kerteszi*, *I. nigrifrons*, *Microcercis trigonella*, *Oscinella frit*, *O. nitidissima*, *Polyodaspis ruficornis*, *Rhopalopterum atricillum*, *R. femorale*, *Siphonella oscinina*, *Tricimba cincta*. Subfamily Chloropinae: *Cetema cereris*, *Chlorops meigenii*, *C. planifrons*, *C. rossicus*, *C. scutellaris*, *C. speciosus*, *C. troglodytes*, *Melanum laterale*, *Meromyza mosquensis*, *M. saltatrix*, *Pseudopachychaeta ruficeps*, *Thaumatomyia glabra*, *T. trifasciata*.

2. Species widely distributed in Karelia, but reaching the southern border of Murmansk Province at the most. With some exceptions, this assemblage includes common meadow species predominantly associated with grasses (Poaceae). In more northern localities, these species are gradually substituted by wetland species associated with sedges (Cyperaceae). Subfamily Oscinellinae: *Aphanotrigonum nigripes*, *Conioscinella sordidella*, *Elachiptera tuberculifera*, *Eribolus nana*, *Oscinella cariciphila*, *O. pusilla*, *Dicraeus fennicus*. Subfamily Chloropinae: *Chlorops limbatus*, *C. hypostigma*, *C. varsoviensis*, *C. geminatus*, *C. figuratus*, *C. pumilionis*, *Diplotoxa messoria*, *Meromyza ornata*, *M. pratorum*, *Neohaplegis tarsata*, *Pseudopachychaeta approximatonervis*, *Thaumatomyia hallandica*, *T. notata*.

3. Species distributed up to the northern border of the biogeographical province *Karelia pomorica occidentalis* (approximately the latitude of the Solovetsk Islands). This group includes a few species associated with cereals and one species associated with reed (*Phragmites australis*), its northern border accords well with the northern border of the host plant range (Hultén 1971). Subfamily Oscinellinae: *Lasiambia palposa*, *Oscinella nigerrima*. Subfamily Chloropinae: *Platycephala planifrons*, *Meromyza nigriiventris*, *Chlorops scalaris*, *C. hypostigma*, *Thaumatomyia rufa*.

4. Species found only in the southern part of Karelia, reaching approximately the northern border of the Boreonemoral zone. This group includes species with European, Euro-Caucasian and Euro-Mediterranean ranges possibly representing a nemoral element of the fauna. Although some of these species are found only in one or two localities in southern Karelia, they all are included here based on

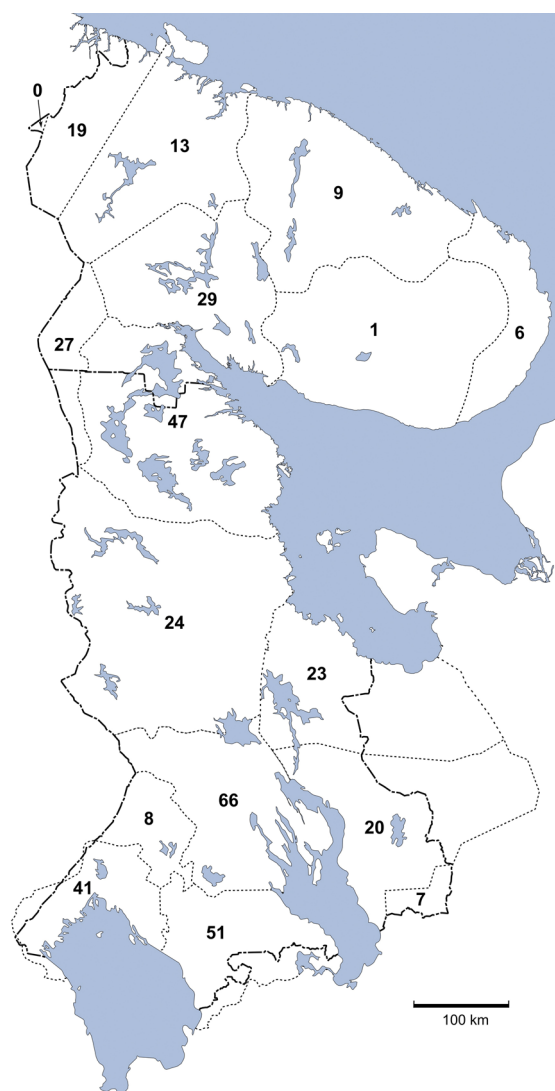


Figure 2. The number of Chloropidae species recorded in biogeographical provinces of the Russian part of Fennoscandia.

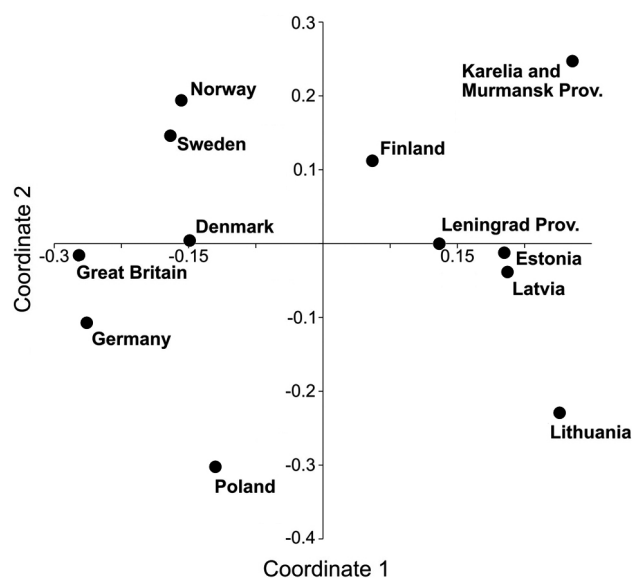


Figure 3. NMDS diagram (stress=0.15), showing similarity (Dice measure) between the Chloropidae fauna of north-European regions.

their distributions in the neighboring regions. Subfamily Oscinellinae: *Aphanotrigonum cincitellum*, *Calamoncosis aprica*, *Conioscinella gallarum*, *C. mimula*, *Oscinella maura*, *O. trochanterata*, *Speccafrons halophila*, *Trachysiphonella ruficeps*, *T. scutellata*. Subfamily Chloropinae: *Cetema simile*, *Chlorops anthracophagoides*, *C. frontosus*, *C. gracilis*, *C. laetus*, *C. ringens*, *Lasiosina herpini*, *Meromyza nigriseta*, *M. triangulina*.

As in many other groups of insects, the number of Chloropidae species in Fennoscandia gradually decreases northwards (Nartshuk & Andersson 2013). In Karelia and Murmansk Province this trend is less distinct due to unequal knowledge of the territory (Figure 2), however, the species composition is significantly impoverished north of latitude 64–65°N, which approximately coincides with the northern border of the Middle boreal zone. Hence, a large number of species reaches the northern limit of their distribution in Karelia while only 38 species (35.2%) were found north of the Arctic Circle (66°33'N). It is clearly seen that species occurring throughout Karelia and those reaching the northern part of the Kola Peninsula mainly have wide holarctic and transpalaeartic ranges, while species recorded only in the southern part of Karelia mostly have a European and Euro-Mediterranean distribution.

The similarity between the Chloropidae fauna of the north-European regions is displayed in the NMDS diagram (Figure 3), which almost perfectly mirrors the geographical position of the countries under comparison. The first and second axes in this case approximately coincide with the directions South-North and West-East. The Russian part of Fennoscandia (Karelia and Murmansk Province) is more similar to Leningrad Province, Estonia, Latvia and Finland. This result indicates that the study territory has been recolonized mainly from the south and partly from the south-east. Thus, the species groups discussed above reflect the rate of colonization by different species and, probably, their tolerance to low temperatures. Only the following species are most likely of eastern origin: *Polyodaspis ruficornis*, *Chlorops kirigaminensis* and *Lasiosina parvipennis*. They are common and abundant in the East Palaeartic but are rather rare or absent in the western part of Europe. On the other hand, Norway and especially Sweden share many species with Germany and Great Britain. Such southern elements probably penetrated into the Scandinavian Peninsula via Denmark and, to date, they are not expanding further than its southern part (*Aphanotrigonum inerme* Collin, 1946, *Dicraeus raptus* (Haliday, 1838), *Gaurax flavomaculatus* (Duda, 1933), *Incertella antennata* (Collin, 1946), *Oscinimorpha albisetosa* (Duda, 1932), *Oscinisoma gilvipes* (Loew, 1858), *Chlorops dasycerus* Loew, 1866, *Eurina lurida* Meigen, 1830, *Meromyza bohémica* Fedoseeva, 1962, *M. femorata* Macquart, 1835, *Parectecephala longicornis* (Fallén, 1820)). Some of the southern (nemoral) species are recorded only on islands (Öland, Gotland, Bornholm): *Dicraeus raptus*, *D. ingratus* (Loew, 1866), *Chlorops finitimus* Becker, 1910, *C. pallidiventris* (Duda, 1933), *C. pannonicus* Strobl, 1893, *Chloropsina distinguenda* (Frey, 1909), *C. rohaceki* Nartshuk, 2000, *Neohaplegis glabra* Duda, 1933. These species are probably a remnant of the fauna of the interglacial xerothermic period and preserved due to a warmer present-day climate on islands compared to the mainland Scandinavia. Finland occupies an intermediate position on the diagram and is situated a little closer to the “eastern” group of countries. This may indicate the primarily south-eastern origin of its fauna with an admixture of south-western species.

A number of species has been described from the northern parts of Fennoscandia. Probably they are examples of relatively

late speciation in the northern boreal zone: *Conioscinella abisko* Nartshuk & Andersson, 2013, *C. tornensis* Nartshuk & Andersson, 2013, *C. messaurea* Nartshuk & Andersson, 2013, *Aphanotrigonum norrbotticum* Nartshuk & Andersson, 2013 (from northern Sweden) and *Incertella karteshensis* (from northern Karelia). Two dendrophilous species of *Gaurax* demonstrate a curious pattern of distribution: *G. venustus* is associated with aspen wood and found in Karelia and *G. flavomaculatus* is associated with broad-leaved trees and found in Norway (Nartshuk, 2008). Both species are not recorded in adjacent territories of Fennoscandia but are known from Central Europe (Austria and Hungary, Germany and Switzerland, respectively). However, taking into account the principal rarity of *Gaurax* spp., these species may really be more widely distributed.

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Appendix 1. Collecting localities of Chloropidae in the Russian part of Fennoscandia. See Figure 1 for abbreviations of provinces.

Province	Locality name	Outdated and label names	Position (WGS84)	Comment
<b>Murmansk province</b>				
<i>Lps</i>	Borisoglebskii	Kolttaköngäs	N69.654:E30.134	
<i>Lps</i>	Korablekk Mt.		N69.239:E29.468	
<i>Lps</i>	Kuvernöörikoski	Kuvernööri	N69.510:E30.423	
<i>Lps</i>	Langvatn		N69.365:E29.746	Expansion (lake) of the Paz (Paatsjoki) River (Pasvik Nature Reserve)
<i>Lps</i>	Lotta River	Fl. Lutto, Lutto	N68.475:E28.512 N68.576:E29.408	B. Poppius and S. Platonoff collected in several localities along the river (all in <i>Lps</i> ). We give rough coordinates approximately corresponding to the middle point of each collector's route.
<i>Lps</i>	Niilansaari Isl.	Varlama Isl., Varlamsaari	N69.141:E29.241	
<i>Lps</i>	Pechenga	Petsamo	N69.547:E31.209	
<i>Lps</i>	Salmijärvi		N69.437:E30.118	
<i>Lps</i>	Trifonovo	Trifona	N69.595:E31.266	
<i>Lps</i>	Vuoremijärvi	Vuoremi	N69.553:E30.916	
<i>Lps</i>	Yläluostari		N69.423:E31.049	
<i>Lps</i>	Zemlyanoe	Pummanki	N69.786:E31.961	
<i>Lt</i>	Kola		N68.881:E33.015	
<i>Lt</i>	Murmansk		N68.968:E33.078	
<i>Lt</i>	Notozero	Nuortijärvi, Lac. Nuorti	N68.429:E30.994	Nowadays flooded by Verkhnetulomskoe dam lake
<i>Lt</i>	Polyarnyi	Aleksandrovsk	N69.199:E33.444	
<i>Lt</i>	Tuloma River		N68.881:E33.006	Location inside modern limits of the Kola township
<i>Lt</i>	Tyuva-Guba		N69.185:E33.635	
<i>Lt</i>	Verhnetulomskii (50 km W of)		N68.595:E30.526	
<i>Lmur</i>	Dal'nie Zelentsy		N69.114:E36.063	
<i>Lmur</i>	Gavrilovo	Gavrilova	N69.177:E35.845	
<i>Lmur</i>	Lovozero		N67.998: E35.024	
<i>Lmur</i>	Mishukovo		N69.045:E33.037	
<i>Lmur</i>	Seidozero Lake	Seidjaur	N67.825:E34.853	
<i>Lmur</i>	Tumannyi		N68.883:E35.692	
<i>Lmur</i>	Voron'ya River	Fl. Voron	N68.860:E35.601	12-50 km from the mouth of river
<i>Lmur</i>	Voroninsk	Pg. Voron, Voroninskii pogost	N68.455:E35.344	Nowadays flooded by Serebryanskoe dam lake
<i>Lim</i>	Apatity		N67.563:E33.367	
<i>Lim</i>	Belaya Guba	Bjälöguba	N67.675:E33.235	Bay of Imandra Lake near Apatity. Materials with this label were collected along the Malaya Belaya (Lutarmajok) River
<i>Lim</i>	Berezhnoi Vlasov Isl.		N67.084:E32.689	
<i>Lim</i>	Bolshoi Vudjavr Lake		N67.636:E33.652	
<i>Lim</i>	Kandalaksha	Kantalaks, Kantalahti, Kandalahiti	N67.155:E32.412	
<i>Lim</i>	Khibiny	Chibinä	N67.674:E33.210	
<i>Lim</i>	Kirovsk		N67.616:E 33.667	
<i>Lim</i>	Kokorin Stream		N67.635:E32.687	Small river in Laplandskii Nature Reserve
<i>Lim</i>	Kolvitsa		N67.086:E32.983	
<i>Lim</i>	Lisii Stream		N67.653:E32.595 N67.651:E32.599	Small river in Laplandskii Nature Reserve

## Appendix 1. Continued.

Province	Locality name	Outdated and label names	Position (WGS84)	Comment
<i>Lim</i>	Luven'ga		N67.105:E32.697 N67.102:E32.713 N67.097:E32.709	
<i>Lim</i>	Malyi Vudjavr Lake		N67.667:E33.619	
<i>Lim</i>	Monchegorsk		N67.938:E32.935	
<i>Lim</i>	Ryashkov Isl.		N67.017:E32.557	
<i>Lim</i>	Telyachii Isl.		N67.115:E32.315	
<i>Lim</i>	Umba		N66.679:E34.344	
<i>Lim</i>	Vtoroi Stream		N67.654:E32.637	Small river in Laplandskii Nature Reserve
<i>Lim</i>	Yuksporjok River		N67.638:E33.718	
<i>Lv</i>	Varzuga		N66.407:E36.584	
<i>Lp</i>	Ponoi	Ponoi	N67.076:E41.126	
<i>Ks</i>	Kuolajärvi	Kuolajärvi (Salla)	N66.975:E29.252	
<i>Kk</i>	Kovda	Kouta	N66.691:E32.868	Village south-east of Zelenoborskii
<b>Karelia</b>				
<i>Ks</i>	Leppälä		N66.272:E30.088	Abandoned village in the Paanajärvi area
<i>Ks</i>	Nuurunen Mt.		N66.144:E30.235	
<i>Ks</i>	Paanajärvi		N66.262:E29.812	Average coordinates for Paanajärvi area to allow mapping of the published data
<i>Ks</i>	Vartolambina	Vartiolampi	N66.242:E30.576	Abandoned village in the Paanajärvi area
<i>Kk</i>	Chupa		N66.275:E33.056	
<i>Kk</i>	Gridino		N65.982:E34.696 N65.966:E34.716 N65.924:E34.688 N65.918:E34.661 N65.906:E34.599 N65.869:E34.605	
<i>Kk</i>	Kartesh		N66.366:E33.735 N66.365:E33.603 N66.350:E33.592 N66.348:E33.616 N66.346:E33.623 N66.344:E33.621 N66.341:E33.669 N66.339:E33.635 N66.339:E33.659 N66.337:E33.649 N66.335:E33.615	Localities in the vicinity of the White Sea Biological Station of the Zoological Institute of Russian Academy of Sciences (St Petersburg)
<i>Kk</i>	Keret'		N66.273:E33.552	
<i>Kk</i>	Kuzema		N65.358:E34.253	
<i>Kk</i>	Malyi Andronin Isl.		N66.334:E33.763	
<i>Kk</i>	Nicol'skaya Bay		N66.206:E33.912	
<i>Kk</i>	Pezhostrov Isl.		N66.258:E33.887	
<i>Kk</i>	Primorskii		N66.553:E33.093 N66.552:E33.102 N66.552:E33.114	The White Sea Biological Station of Moscow State University and localities on the mainland nearby
<i>Kk</i>	Sidorov Isl.		N66.348:E33.823	
<i>Kk</i>	Sonostrov	Sonostroff	N66.158:E34.223 N66.170:E34.222	Village and neighboring island
<i>Kk</i>	Syrovatka		N65.552:E34.736 N65.539:E34.711 N65.528:E34.730 N65.515:E34.688 N65.512:E34.738	Small island in the White Sea north of Kuzema and localities on the mainland nearby



## Appendix 1. Continued.

Province	Locality name	Outdated and label names	Position (WGS84)	Comment
<i>Kpoc</i>	Belomorsk	Soroka	N64.544:E34.775 N64.529:E34.779	
<i>Kpoc</i>	Kem'		N64.958:E34.603	
<i>Kpoc</i>	Kostomuksha	Kostamus	N64.588:E30.595	
<i>Kpoc</i>	Kuzharvi Lake		N63.615:E32.559	
<i>Kpoc</i>	Ladvozero	Latvajärvi	N64.829:E29.882 N64.890:E29.830	Localities near the lake and homonymic village
<i>Kpoc</i>	Levi Lake		N65.142:E29.948	
<i>Kpoc</i>	Lodeinyi Isl.		N64.918:E35.165	
<i>Kpoc</i>	Murdoioki River		N64.202:E30.866	
<i>Kpoc</i>	Nemetskii Kuzov Isl.		N64.952:E35.162	
<i>Kpoc</i>	Nesterova Mt.		N63.713:E32.505	
<i>Kpoc</i>	Russkii Kuzov Isl.		N64.935:E35.128	
<i>Kpoc</i>	Shueretskoe	Tschuja	N64.751:E34.724	
<i>Kpoc</i>	Taparukha Isl.		N64.986:E35.028	
<i>Kpoc</i>	Voknavolok	Vuokiniemi	N64.952:E30.542	
<i>Kpoc</i>	Zhiloi Isl.		N64.945:E35.239	
<i>Kpor</i>	Bolshoi Zhuzhmuï Isl.		N64.677:E35.560	
<i>Kpor</i>	Kondostrov Isl.		N64.224:E36.622	
<i>Kpor</i>	Ladozero Lake		N63.563:E35.691	
<i>Kpor</i>	Malyi Zhuzhmuï Isl.		N64.619:E35.669	
<i>Kpor</i>	Myagostrov Isl.		N64.372:E35.960	
<i>Kpor</i>	Nadvoitsy	Wojatsch	N63.880:E34.261	
<i>Kpor</i>	Pechak Isl.		N64.626:E35.629	
<i>Kpor</i>	Perkhlydy Archipelago. Yuzhnyi Isl.		N64.324:E36.479	
<i>Kpor</i>	Segezha	Sekehen, Säkehä	N63.744:E34.299 N63.727:E34.249	
<i>Kpor</i>	Sumskii Posad		N64.255:E 35.410	
<i>Kpor</i>	Valdai		N63.547:E35.563	
<i>Kb</i>	Tolvajärvi		N62.317:E31.435	
<i>Kon</i>	Ar'koila		N61.935:N32.842	
<i>Kon</i>	Belaya Gora		N62.582:E33.959	
<i>Kon</i>	Bolshoi Lelikovskii Isl.		N61.935:E35.141	
<i>Kon</i>	Bukol'nikov Isl.		N62.005:E35.199	
<i>Kon</i>	Eglov Isl.		N62.129:E35.170	
<i>Kon</i>	Ernitskii Isl.		N61.979:E35.176	
<i>Kon</i>	Girvas		N62.501:E33.681 N62.456:E33.687	
<i>Kon</i>	Gomsel'ga		N62.060:E33.992	
<i>Kon</i>	Karel'skii Isl.		N62.014:E35.209	
<i>Kon</i>	Khvost Isl.		N62.149:E35.150	
<i>Kon</i>	Kivach		N62.281:E33.967 N62.272:E33.986 N62.272:E33.986	Three localities in the central part of Kivach Nature Reserve
<i>Kon</i>	Kizhi Isl.		N62.082:E35.224	
<i>Kon</i>	Klimenitsy		N61.901:E35.216 N61.890:E35.199	Localities north of abandoned village in the south part of Bolshoi Klimenetskii Island

## Appendix 1. Continued.

Province	Locality name	Outdated and label names	Position (WGS84)	Comment
<i>Kon</i>	Konchezero	Kenjärvi	N62.154:E34.013 N62.129:E34.013 N62.107:E33.993 N62.084:E34.037	
<i>Kon</i>	Kondopoga	Kontupohja	N62.206:E34.266	
<i>Kon</i>	Kosalma		N62.034:E34.102	
<i>Kon</i>	Kuivakhda Isl.		N61.965:E35.168	
<i>Kon</i>	Kurgenitsy		N62.083:E35.321	
<i>Kon</i>	Lambaznik Isl.		N61.995:E35.190	
<i>Kon</i>	Lelikovo		N61.991:E35.148 N61.978:E35.160	Two localities near the village on Malyi Lelikovskii Island
<i>Kon</i>	Lipovitsy		N62.132:E35.093	
<i>Kon</i>	Lisitsyno		N62.356:E35.539	
<i>Kon</i>	Lizhma		N62.420:E34.450	
<i>Kon</i>	Lyudskoi Isl.		N61.970:E35.175 N61.963:E35.179	
<i>Kon</i>	Martsial'nye Vody	Dvortsy, Dvoretz	N62.156:E33.875	
<i>Kon</i>	Medvezh'egorsk	Karhumäki	N62.911:E34.444 N62.893:E34.365	
<i>Kon</i>	Myagrozero		N62.470:E34.815	
<i>Kon</i>	Myal' Isl.		N61.999:E35.148	
<i>Kon</i>	Nizhnee Myagrozero		N62.507:E34.782	
<i>Kon</i>	Nizhnii Myarat Lake		N63.113:E33.058	
<i>Kon</i>	Oyatevshina		N62.076:E35.139	
<i>Kon</i>	Padany	Paadana	N63.286:E33.419	
<i>Kon</i>	Paleostrov Isl.		N62.569:E35.259	
<i>Kon</i>	Pin'guba		N61.865:E34.556	Bay of Onego Lake and a cluster of summer cottages
<i>Kon</i>	Pod'el'niki		N62.106:E35.174 N62.138:E35.130	
<i>Kon</i>	Polya		N62.290:E35.309	
<i>Kon</i>	Radkol'e Isl.		N61.996:E35.186	
<i>Kon</i>	Raiguba		N62.371:E33.770	
<i>Kon</i>	Semchezero	Semsjärvi	N62.949:E33.608	
<i>Kon</i>	Shaidoma		N62.809:E34.192 N62.789:E34.138 N62.757:E34.181 N62.751:E34.107 N62.750:E34.150 N62.734:E34.201	Six localities in Shaidomskii Reserve
<i>Kon</i>	Shuyal Lake		N63.221:E32.888	
<i>Kon</i>	Solommenoe	Solomina	N61.847:E34.346	
<i>Kon</i>	Sychevets Isl.		N62.029:E35.201	
<i>Kon</i>	Tereki		N62.213:E33.875	
<i>Kon</i>	Tipinitsy		N62.158:E35.462	
<i>Kon</i>	Tivdiya	Tiutia, Tivdia, Tiudie, Tjudi	N62.562:E33.956	
<i>Kon</i>	Vegoruksy		N62.221:E34.878	
<i>Kon</i>	Velikaya Niva		N62.359:E35.219	
<i>Kon</i>	Vendery		N62.241:E33.297 N62.249:E33.296	

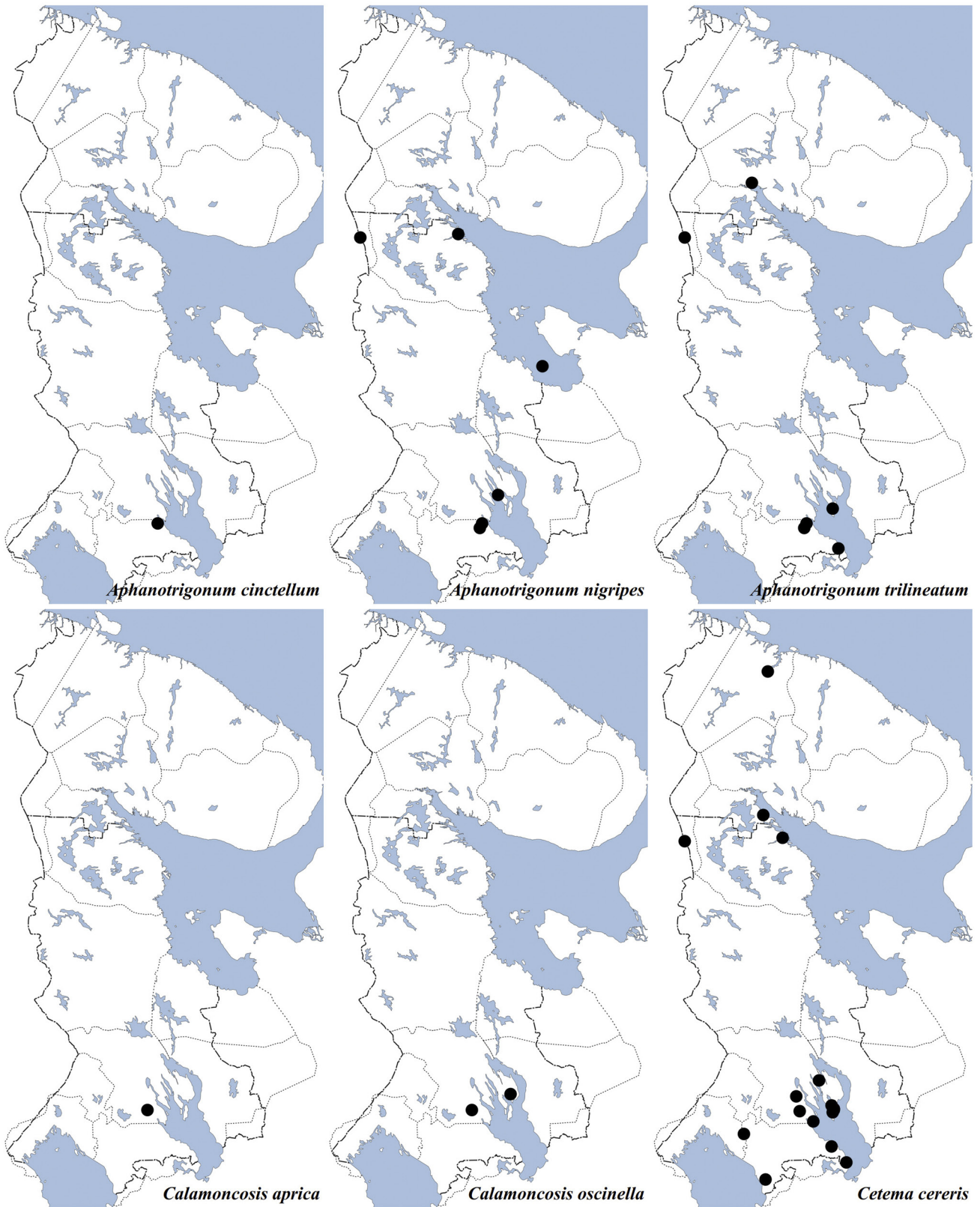
## Appendix I. Continued.

Province	Locality name	Outdated and label names	Position (WGS84)	Comment
<i>Kon</i>	Vikshezzero Lake		N62.582:E34.372 N62.568:E34.353	
<i>Kon</i>	Vorob'i		N62.063:E35.256 N62.046:E35.249	
<i>Kon</i>	Vottovaara Mt.		N63.084:E32.625	
<i>Kon</i>	Yalguba	Jalguba	N61.886:E34.567	
<i>Kton</i>	Besov Nos		N61.672:E36.029	
<i>Kton</i>	Kolgostrov		N62.380:E36.935	Island and abandoned village (Vodlozerskii National Park)
<i>Kton</i>	Kolovo		N61.814:E36.674	
<i>Kton</i>	Koskosalma		N62.401:E36.997	Abandoned village and field base (Vodlozerskii National Park)
<i>Kton</i>	Novguda River		N62.542:E37.007	Field base in the river mouth (Vodlozerskii National Park)
<i>Kton</i>	Sheltoporog		N63.081:E35.632	
<i>Kton</i>	Shoikapolda River		N62.528:E37.377	
<i>Kton</i>	Sukhaya Vodla River		N62.413:E37.110 N62.396:E37.360	Localities along the upper course of the river (partly in Vodlozerskii National Park)
<i>Kton</i>	Vozritsy		N62.659:E35.391	
<i>Kl</i>	Haapalampi		N61.646:E30.581	
<i>Kl</i>	Harlu		N61.805:E30.934	
<i>Kl</i>	Impilahti	Impilaks	N61.675:E31.158	
<i>Kl</i>	Iso-Iijärvi Lake		N61.597:E29.921	
<i>Kl</i>	Jaakkima		N61.512:E30.129	
<i>Kl</i>	Kilpola Isl.		N61.203:E29.960 N61.203:E30.003 N61.182:E29.968	
<i>Kl</i>	Kirjälahahti	Kirjälalaks	N61.781:E30.782	
<i>Kl</i>	Kurkijoki		N61.300:E29.874	
<i>Kl</i>	Meijeri		N61.627:E30.552 N61.620:E30.588	
<i>Kl</i>	Niemelänhovi		N61.608:E30.587	
<i>Kl</i>	Niva		N61.634:E30.252 N61.615:E30.274	
<i>Kl</i>	Puikkola		N62.051:E30.662 N62.046:E30.857	
<i>Kl</i>	Reuskula		N61.621:E30.393 N61.602:E30.443	
<i>Kl</i>	Ruskeala		N61.928:E30.576	
<i>Kl</i>	Salmi		N61.366:E31.857	
<i>Kl</i>	Sortavala	Sordavala	N61.693:E30.670	
<i>Kl</i>	Suistamo		N61.917:E31.143	
<i>Kl</i>	Sukopohja		N61.687:E30.160	
<i>Kl</i>	Valaam	Valamo, Walamo	N61.393:E30.910 N61.389:E30.947 N61.371:E30.958 N61.362:E30.986 N61.350:E30.990	Localities in different parts of the archipelago
<i>Kol</i>	Bol'shie Gory	Suurimäki	N61.312:E32.463	
<i>Kol</i>	Derevyannoe	Puujoki	N61.615:E34.640	
<i>Kol</i>	Gizhino	Kuujärvi	N60.994:E33.788	

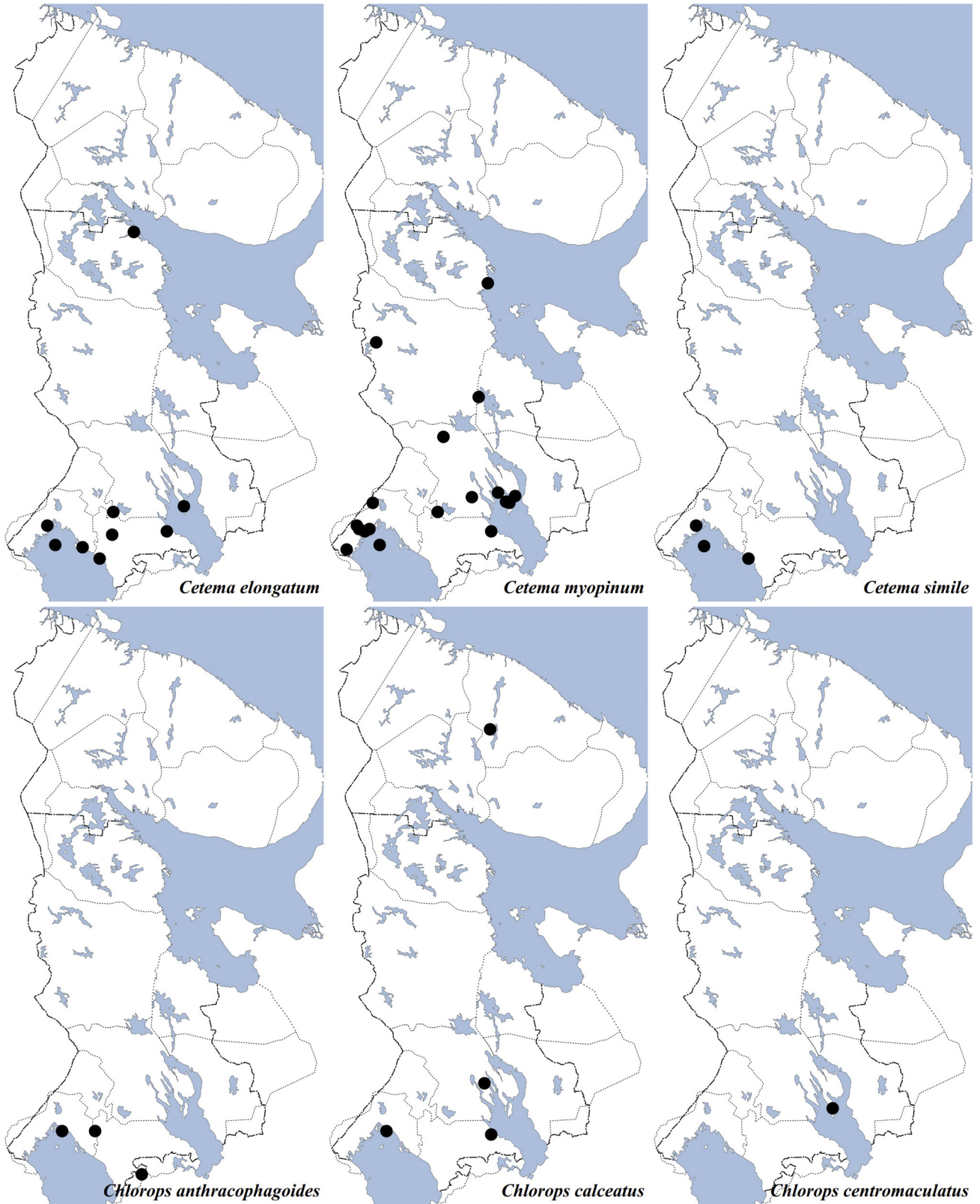
## Appendix I. Continued.

Province	Locality name	Outdated and label names	Position (WGS84)	Comment
<i>Kol</i>	Kaskesruchei		N61.238:E35.591 N61.203:E35.594 N61.194:E35.585	
<i>Kol</i>	Kindasovo		N61.725:E33.468	
<i>Kol</i>	Kolatsel'ga	Kolatselkä	N61.685:E32.231	
<i>Kol</i>	Lososinnoe		N61.708:E34.241	
<i>Kol</i>	Matveeva Sel'ga		N61.295:E35.176	
<i>Kol</i>	Mayachino		N60.777:E32.818 N60.757:E32.816	
<i>Kol</i>	Novikovo		N61.070:E33.777	
<i>Kol</i>	Olonets	Aunus	N60.980:E32.958	
<i>Kol</i>	Pai		N61.210:E34.423	
<i>Kol</i>	Petrozavodsk	Äänislinna. Petrosawodsk	N61.775:E34.341	
<i>Kol</i>	Sändeba	Säntämä	N61.163:E32.765	
<i>Kol</i>	Sheltozero	Soutjärvi	N61.401:E35.335 N61.393:E35.308 N61.370:E35.358 N61.364:E35.422	
<i>Kol</i>	Shoksha		N61.473:E35.141	
<i>Kol</i>	Sudalitsa		N60.964:E32.974	
<i>Kol</i>	Ust'e Obzhanki		N60.822:E32.819	
<i>Kol</i>	Ust'e Tuloksy		N61.129:E32.524 N61.113:E32.552	
<i>Kol</i>	Vedlozero	Vielijärvi	N61.579:E32.832	
<i>Kol</i>	Vidlitsa	Viitele	N61.190:E32.393 N61.193:E32.314 N61.179:E32.429 N61.177:E32.370 N61.156:E32.457	
<i>Kol</i>	Zales'e		N61.331:E35.369	
<i>Kol</i>	Yalguba	Jalolahti	N61.886:E34.567	
<i>Kp</i>	Korbozero		N61.908:E37.767	
<i>Kp</i>	Ust'-Reka		N61.793:E37.511 N61.708:E37.705	
<b>Arkhangelsk province</b>				
<i>Kton</i>	Vozhosel'ga		N62.774:E37.159	Locality in the mouth of Vyzhiga River (Vodlozerskii National Park)
<b>Leningrad province</b>				
<i>Kol</i>	Gimreka		N61.153:E35.618 N61.151:E35.640	
<i>Kol</i>	Gumbaritsy	Gumbaritsa	N60.684:E32.931	
<i>Kol</i>	Lahta	Kutlahta	N60.643:E33.086	
<i>Kol</i>	Moshnich'e		N61.149:E33.854	
<i>Kol</i>	Svir' River	Fl. Swir	N60.946:E34.096	
<i>Kol</i>	Vazhiny	Vaaseni, Vaašeni	N60.963:E34.024	

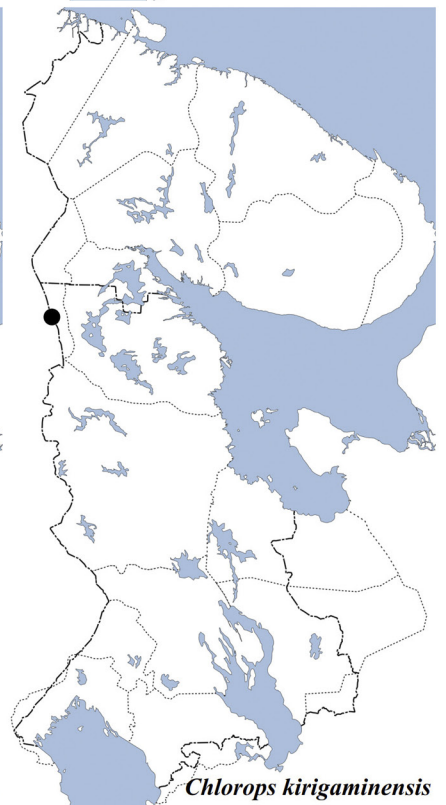
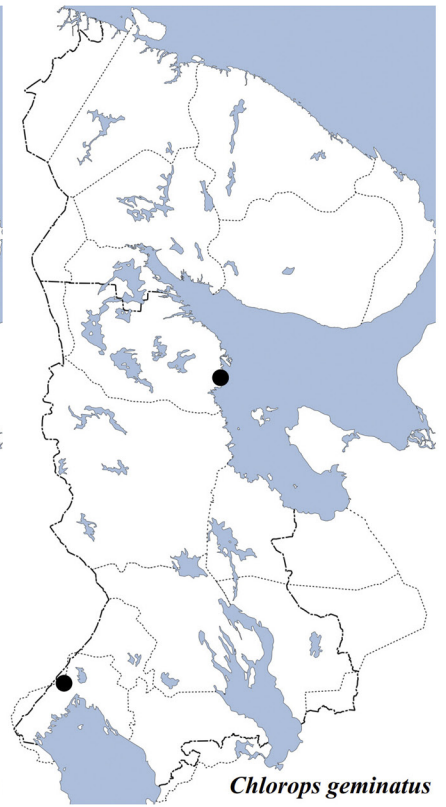
Appendix 2. Distribution maps of Chloropidae species, occurring in the Russian part of Fennoscandia.



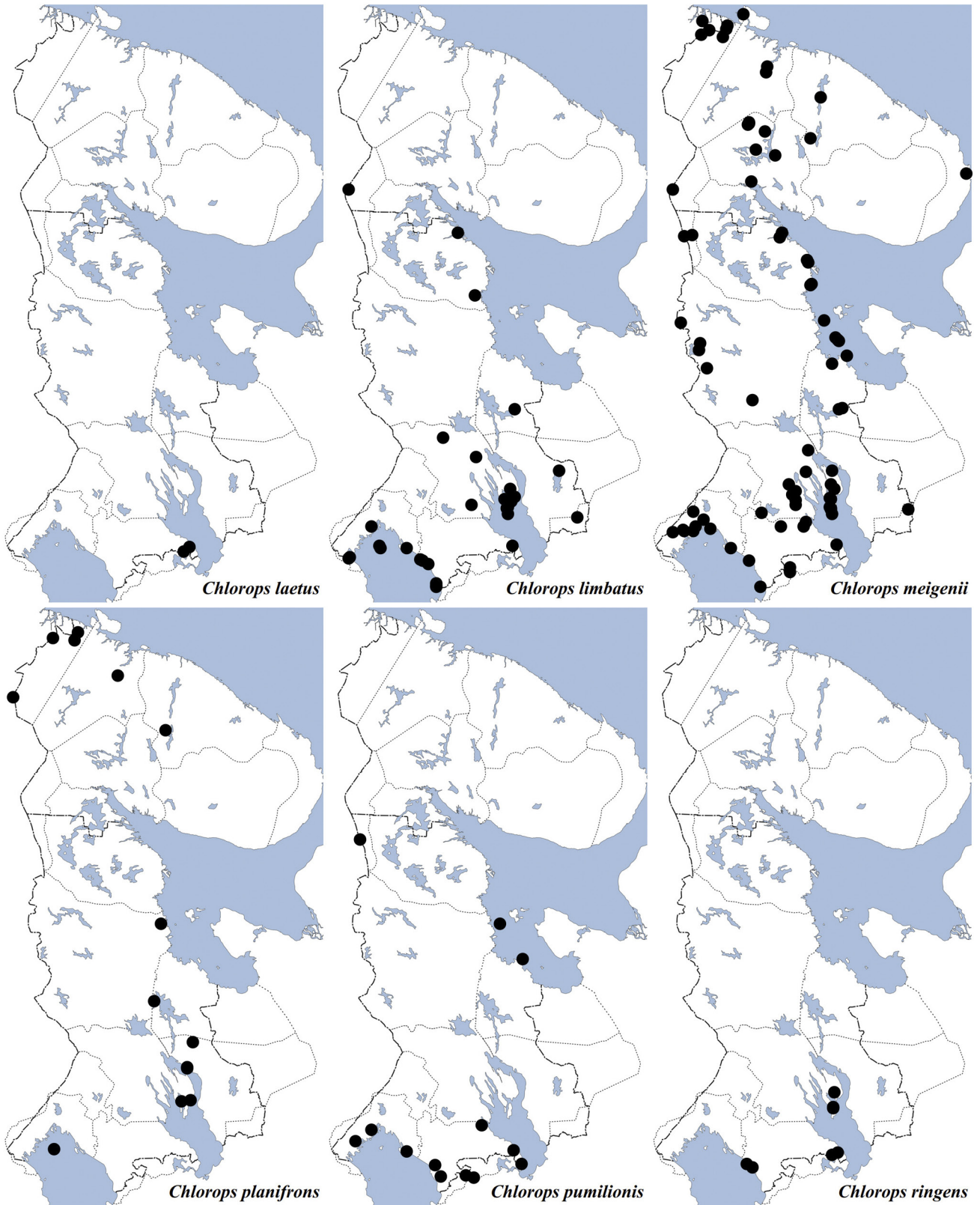
Appendix 2. Continued.



Appendix 2. Continued.

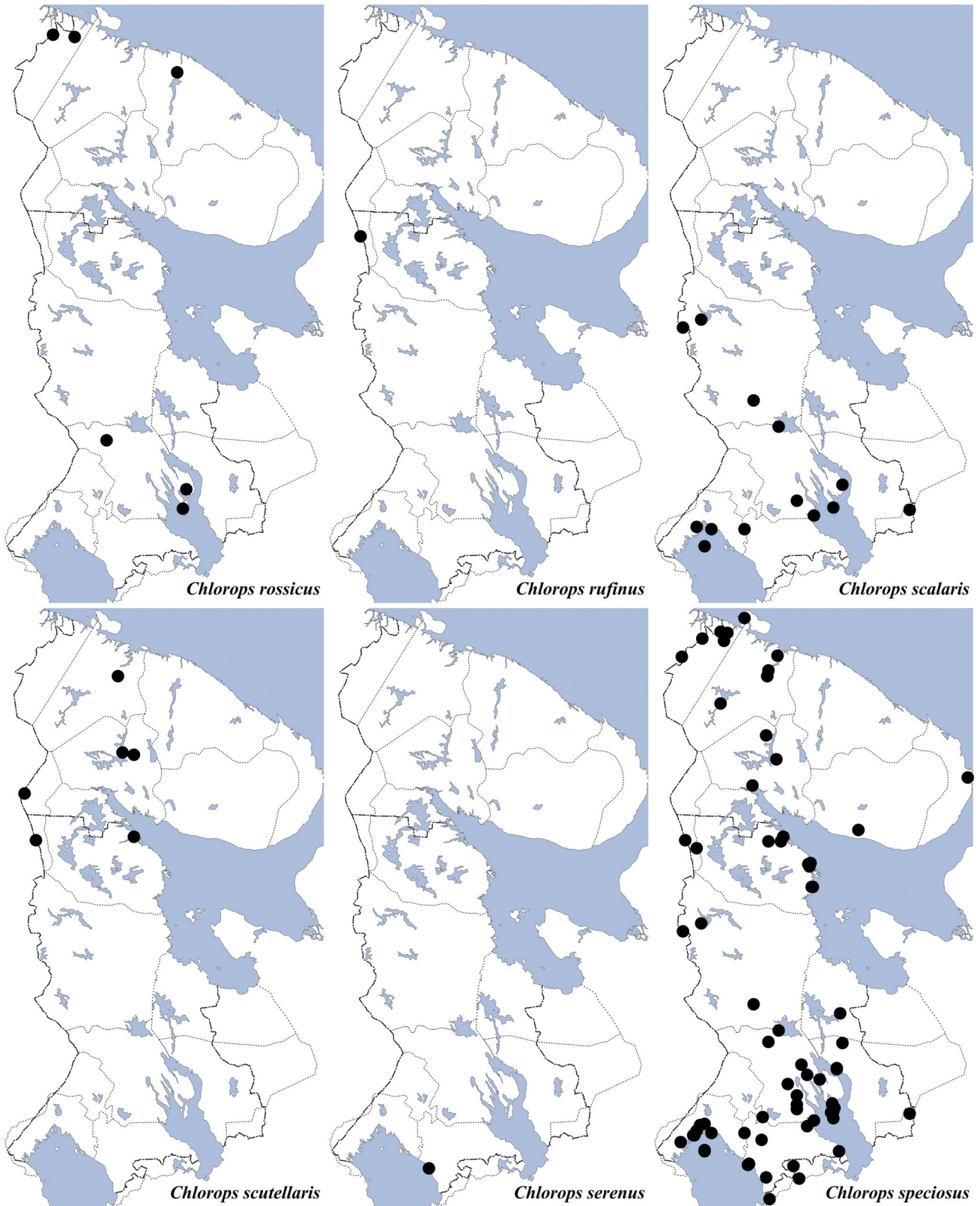


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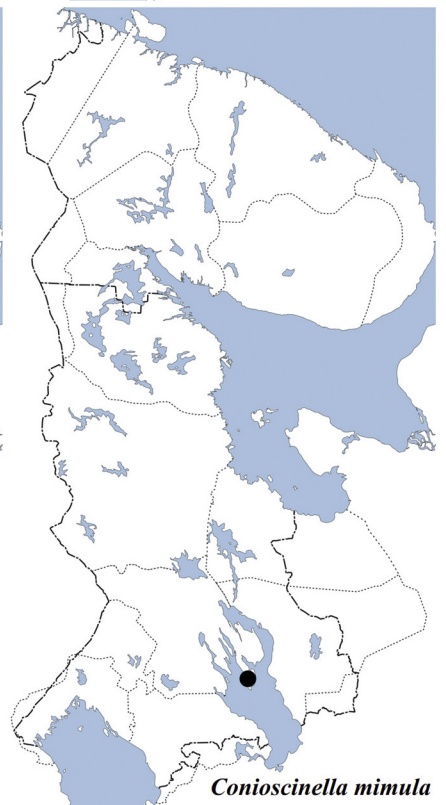
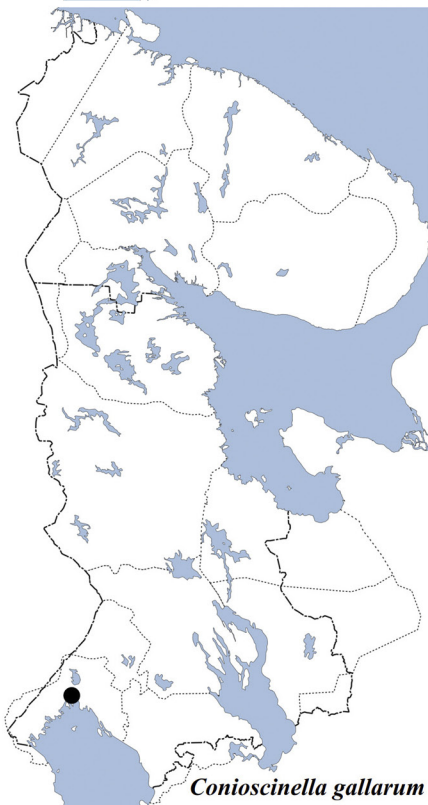
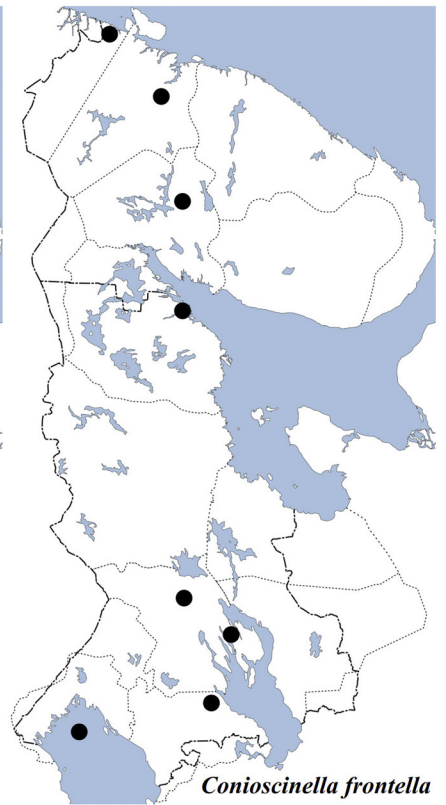
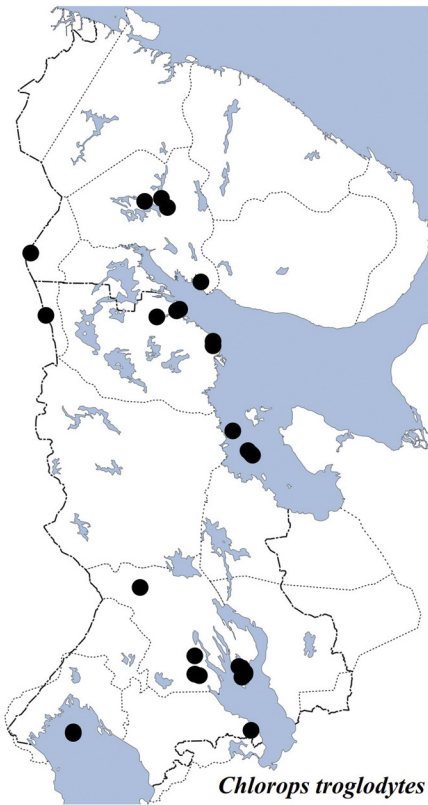




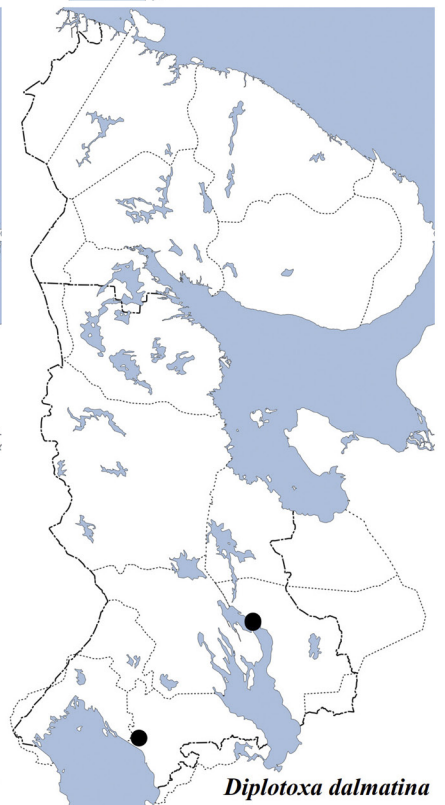
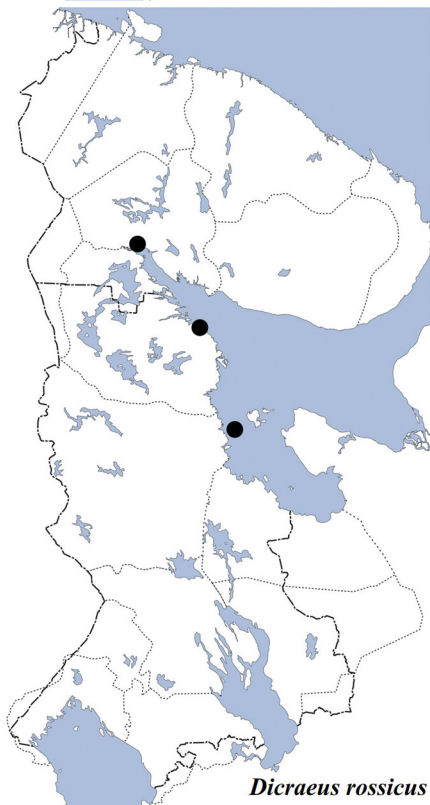
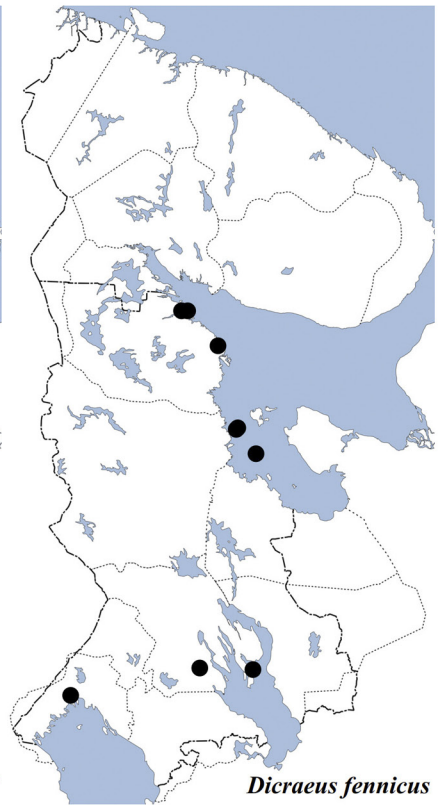
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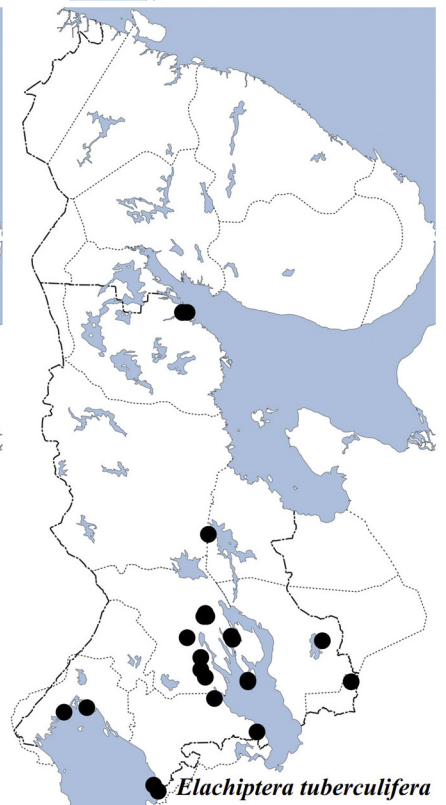
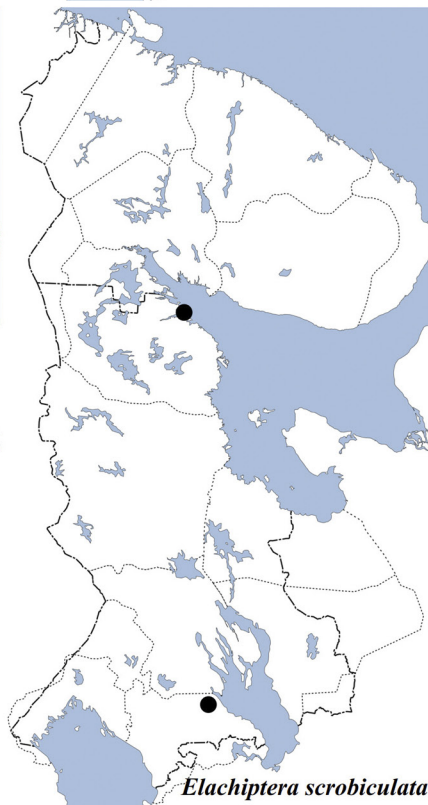
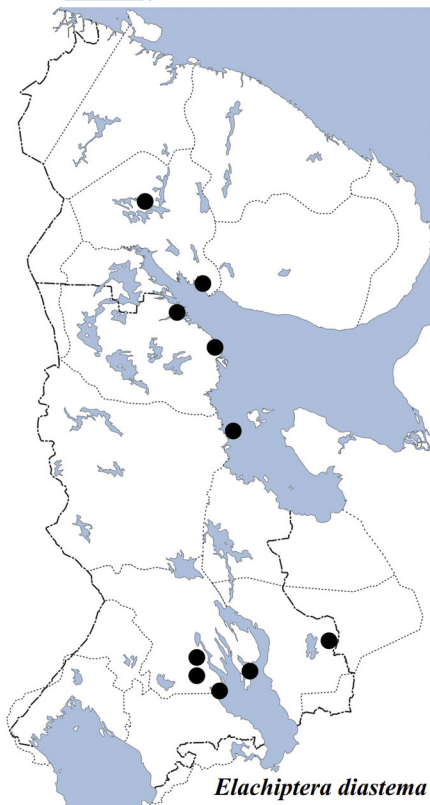
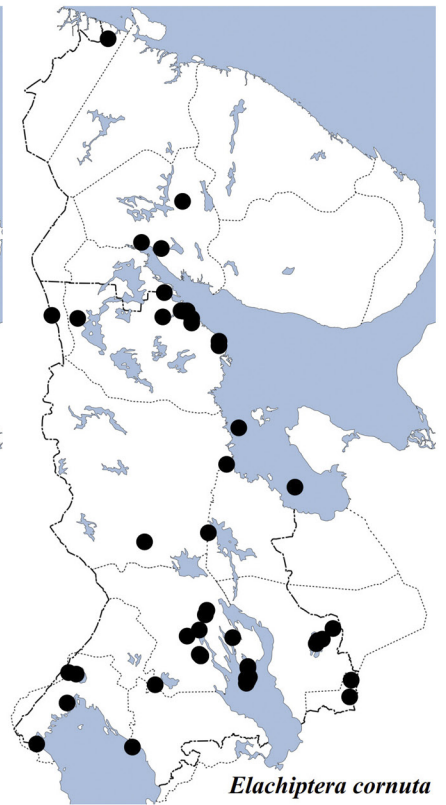
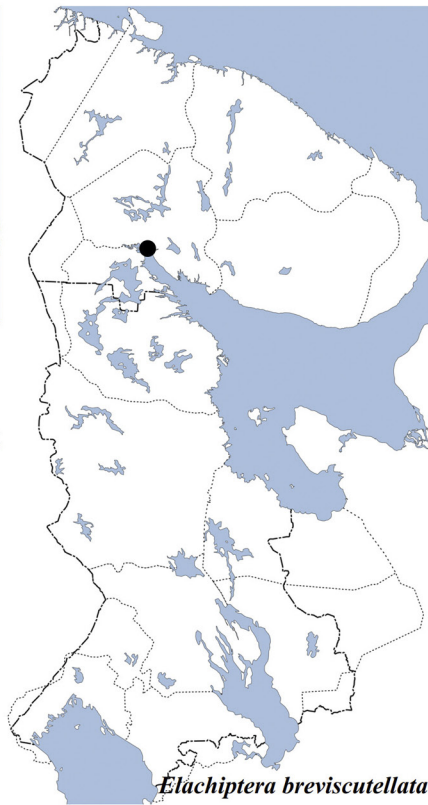
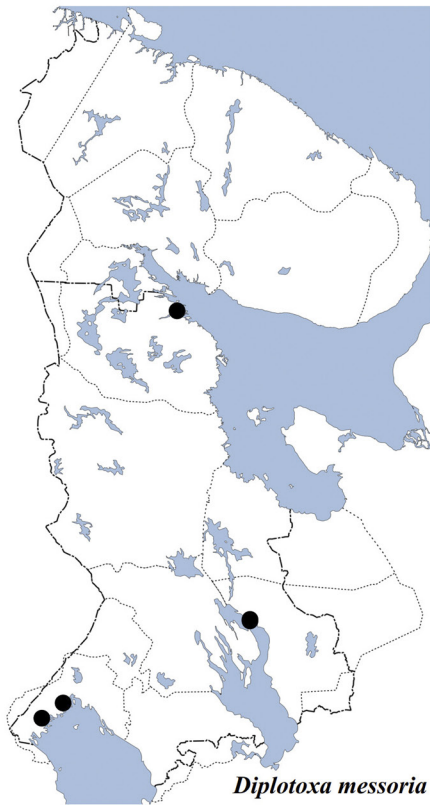
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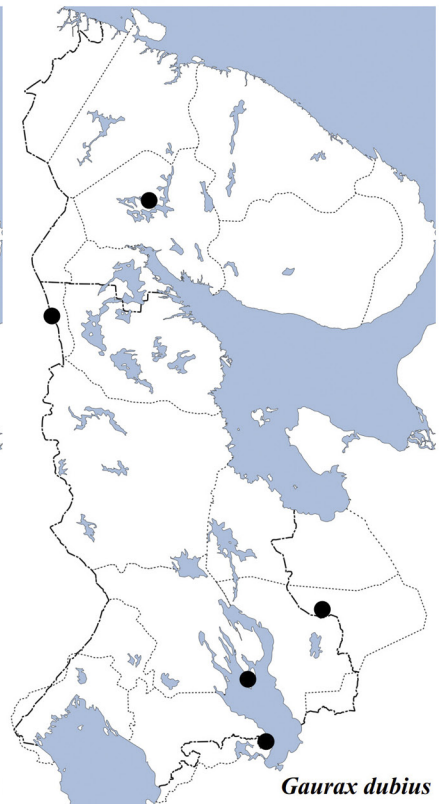
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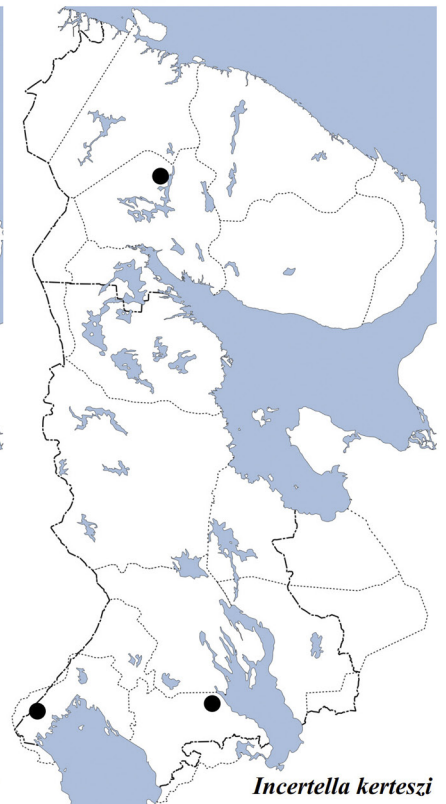
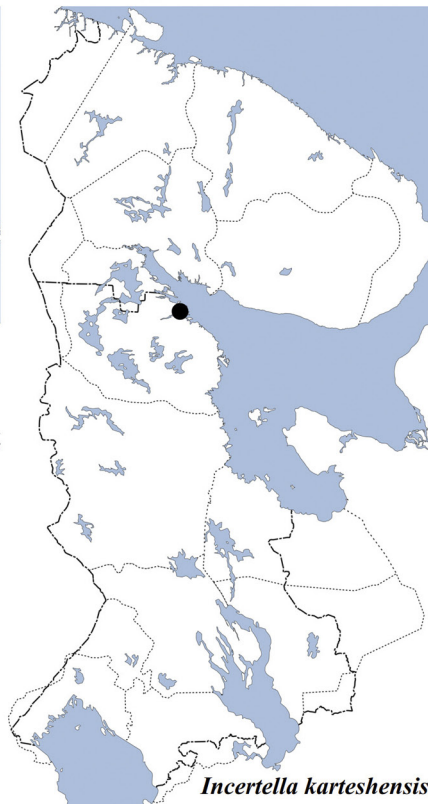
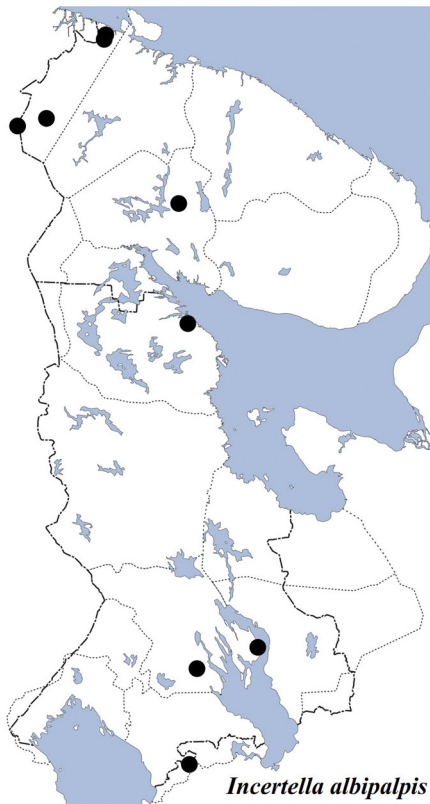
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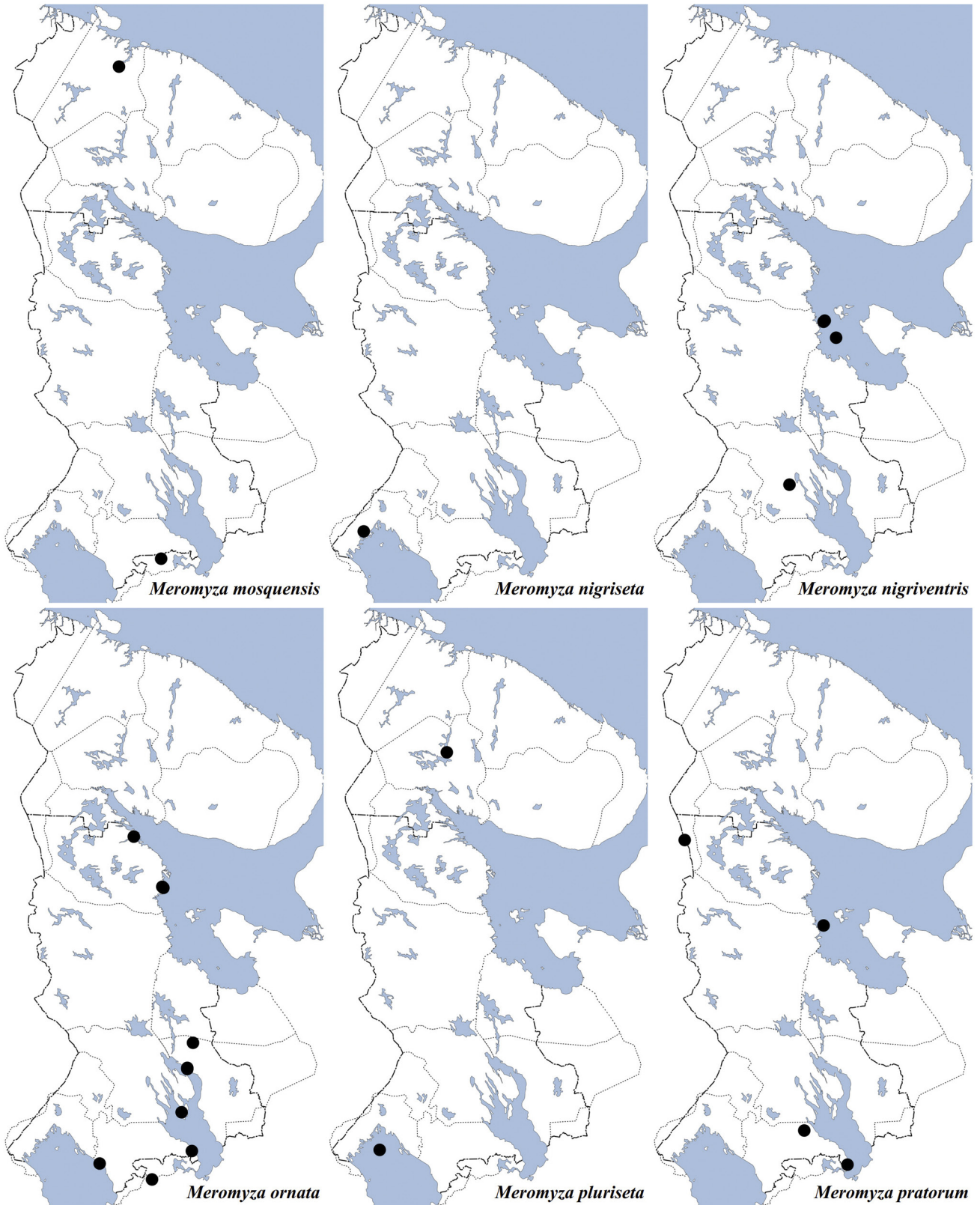
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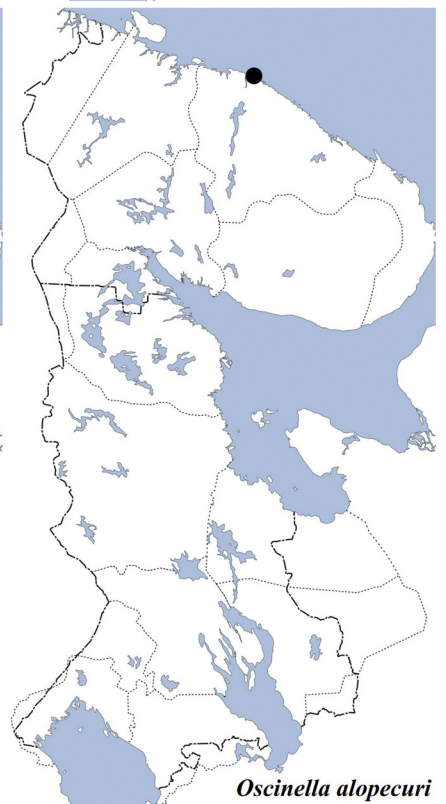
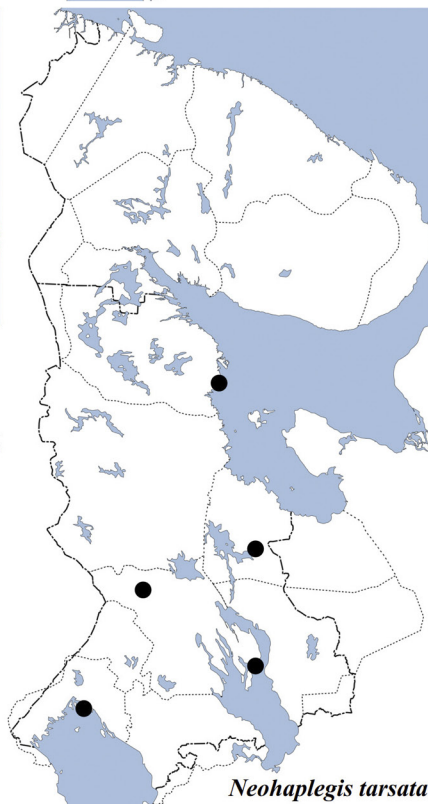
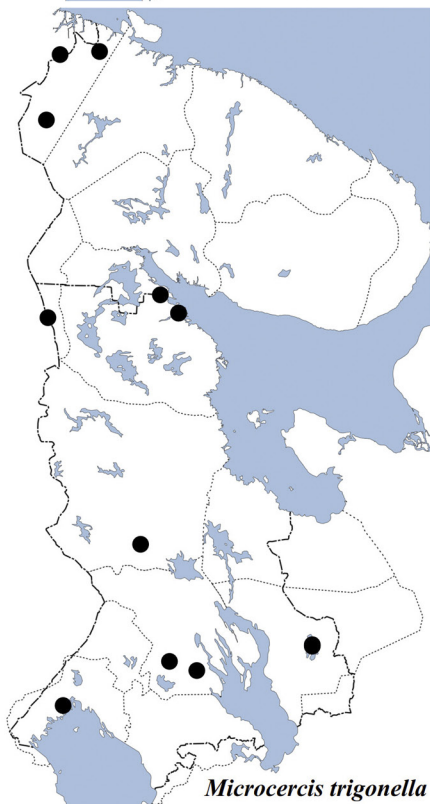
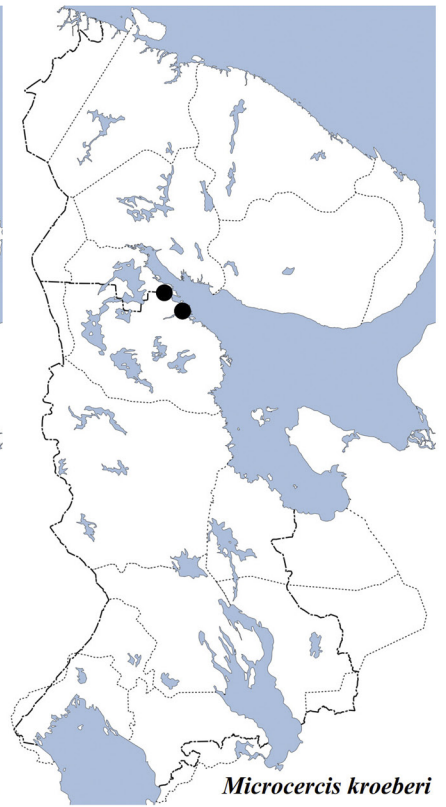
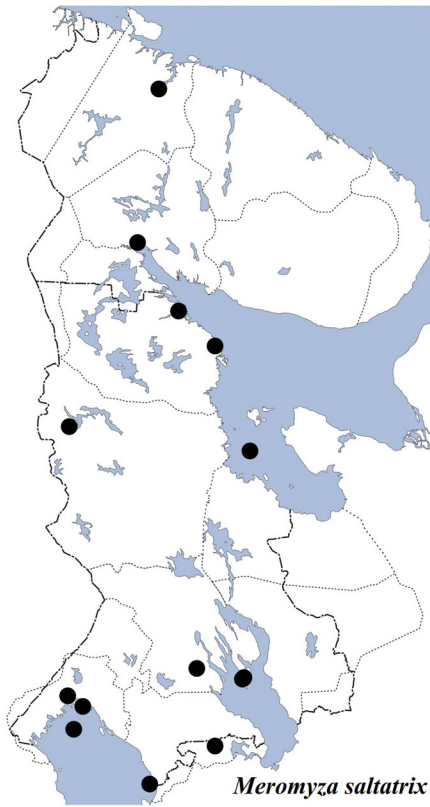
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Appendix 2. Continued.

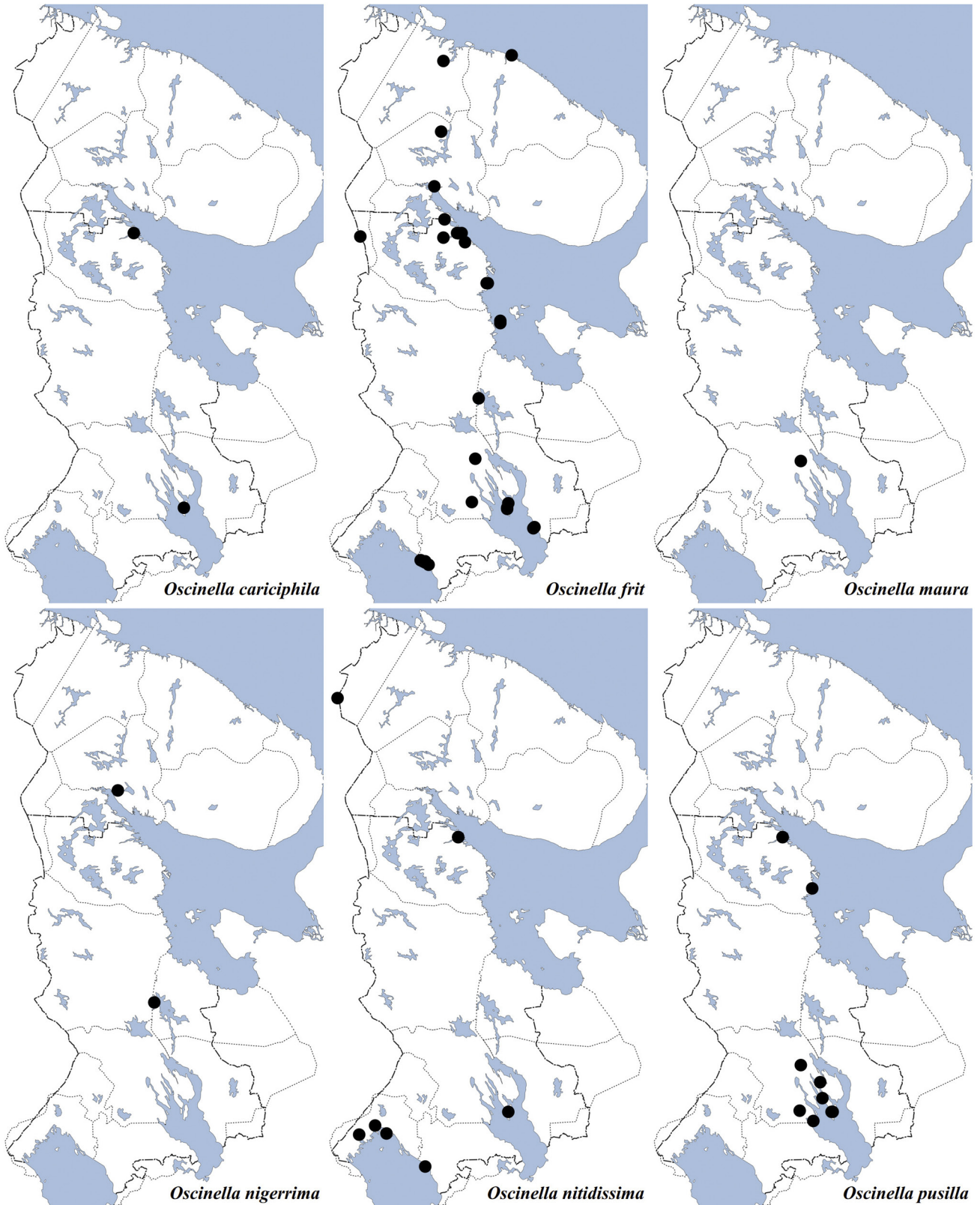


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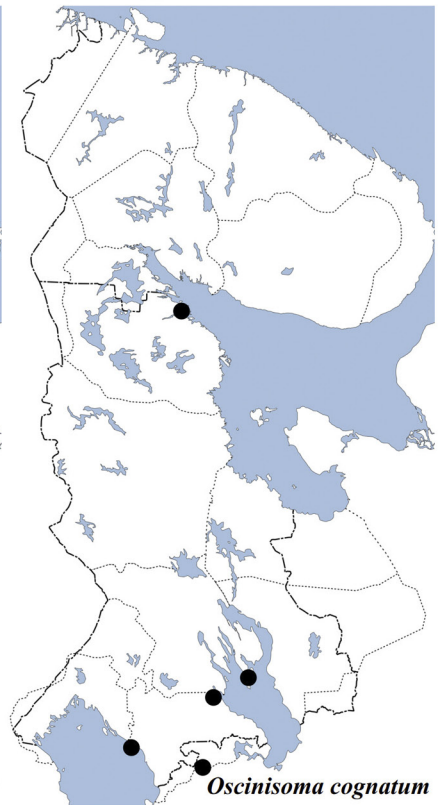
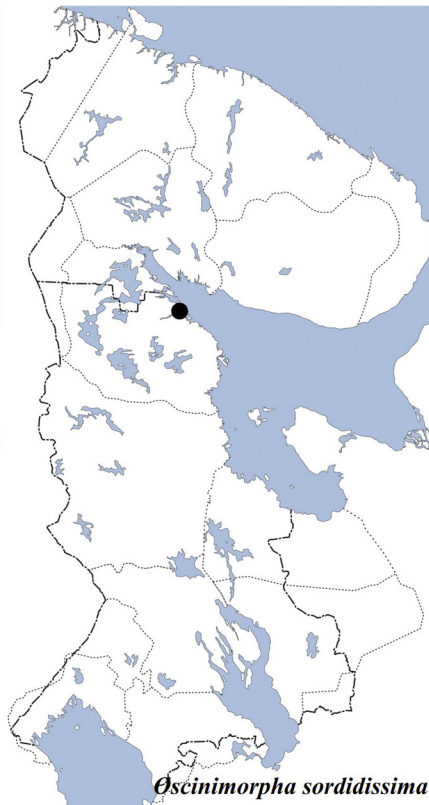
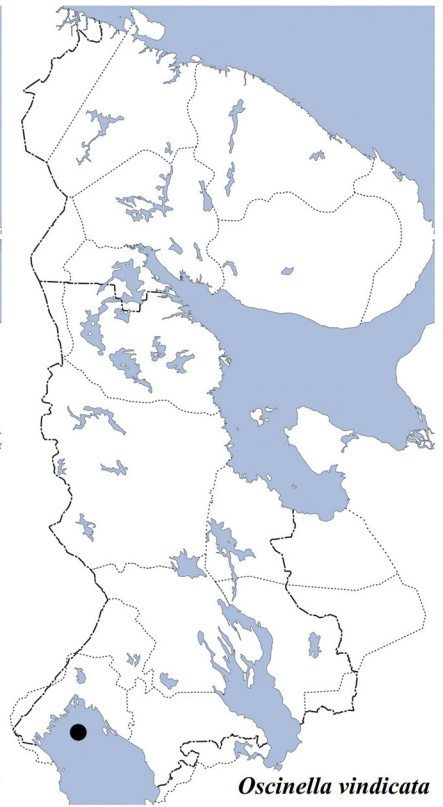
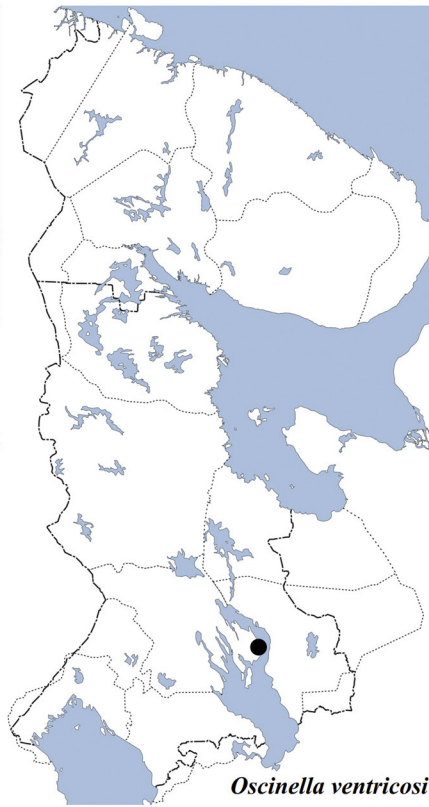




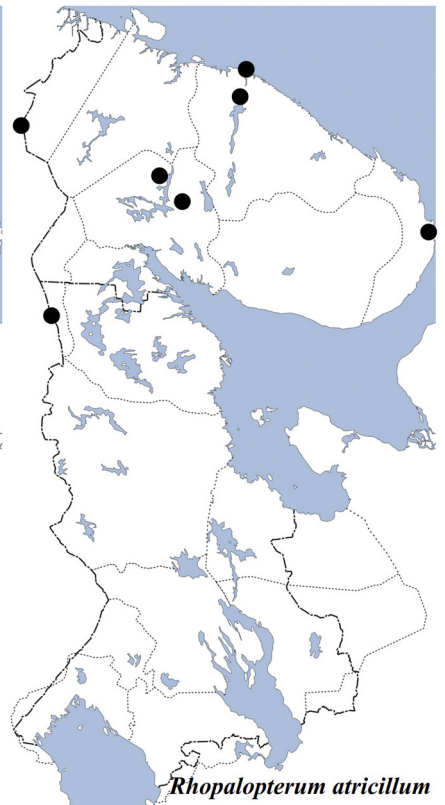
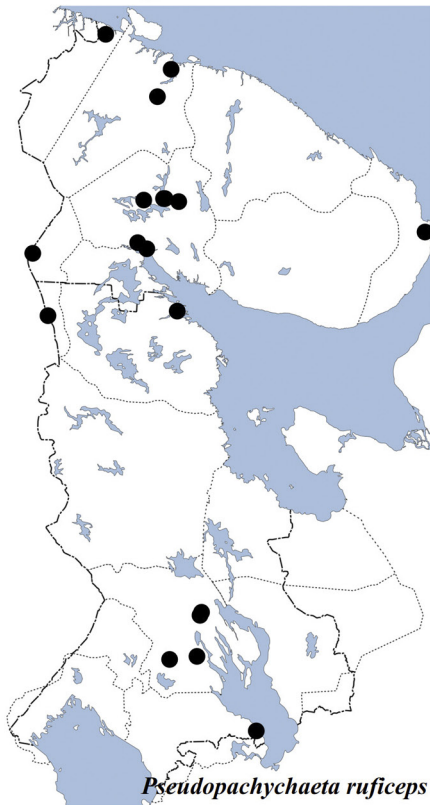
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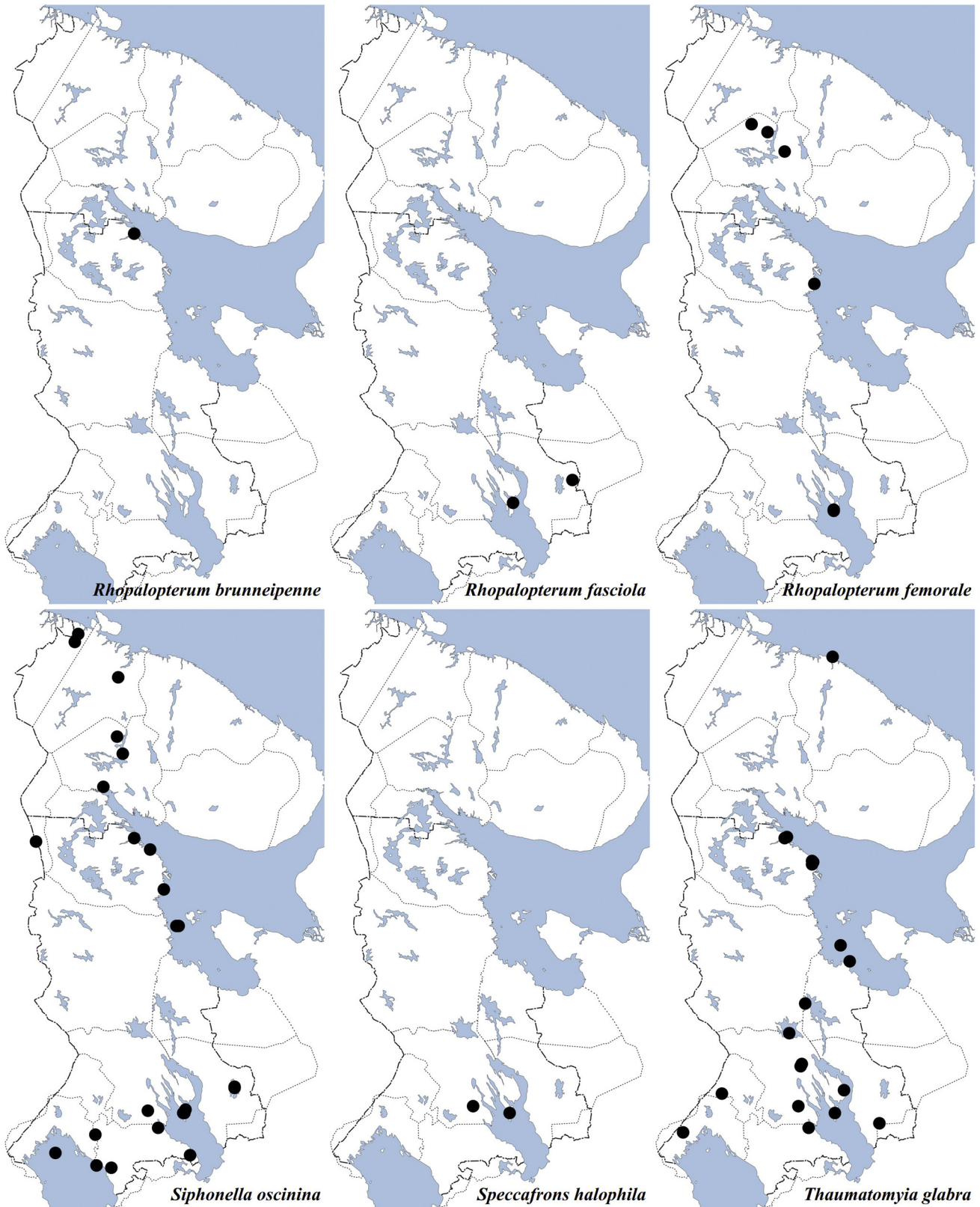
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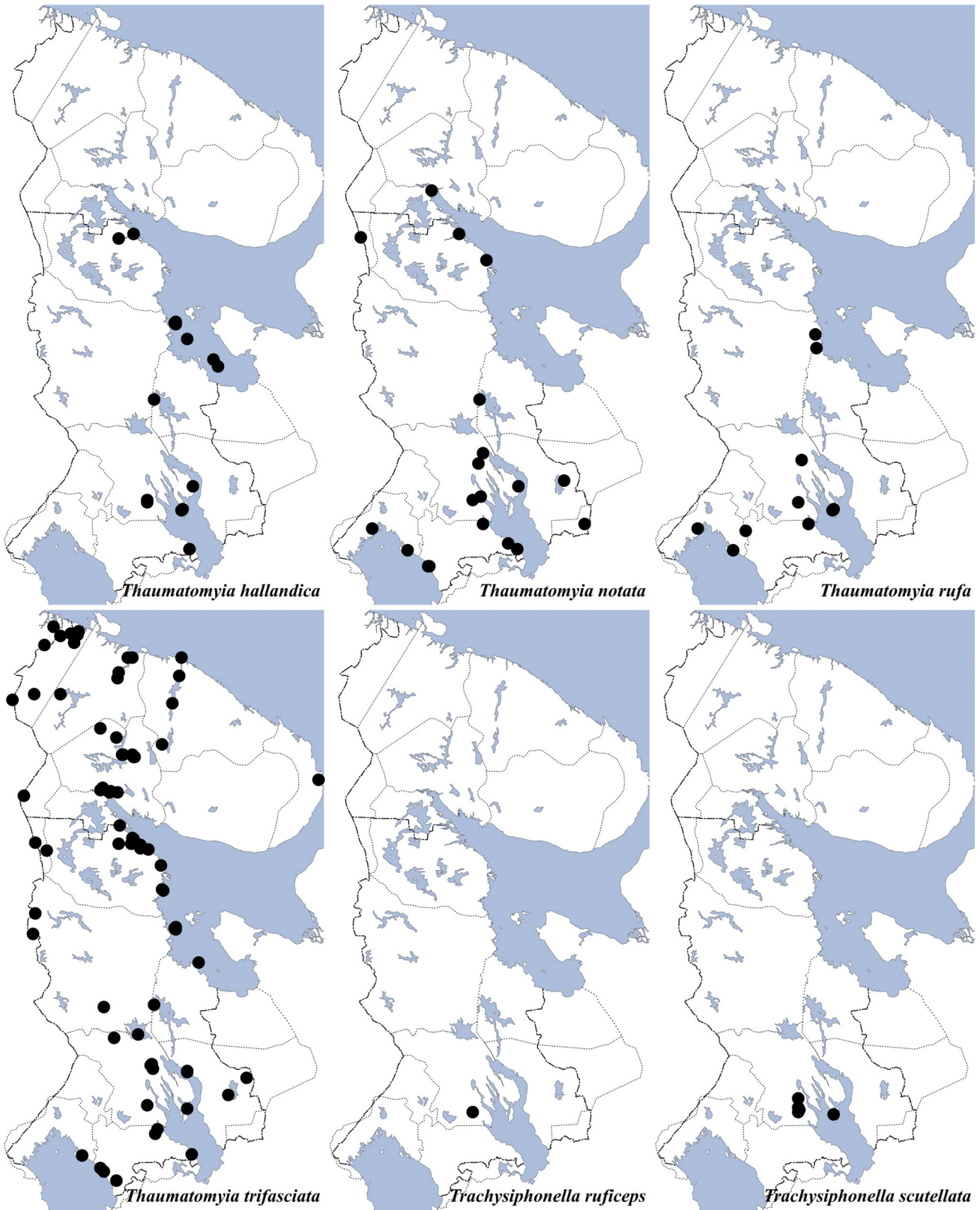
Appendix 2. Continued.



Appendix 2. Continued.



Appendix 2. Continued.



Appendix 2. Continued.

