The fungus gnats of Iceland (Diptera, Keroplatidae & Mycetophilidae)

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The Icelandic fauna of fungus gnats in the families Keroplatidae and Mycetophilidae is revised based on available material lodged at the Icelandic Institute of Natural History; the Zoological Museum in Copenhagen, Denmark; the Museum of Zoology in Lund, Sweden; and the Museum of Zoology in Amsterdam, the Netherlands. Eight species names previously published from Iceland are removed from the Icelandic fauna due to misidentifications. Three replaced names and 20 new species are added; viz. *Allocotocera pulchella* (Curtis, 1837), *Sciophila hirta* Meigen, 1818, *S. parviareolata* Santos Abreu, 1920, *Boletina basalis* (Meigen, 1818), *B. gripha* Dziedzicki, 1885, *Leia fascipennis* Meigen, 1818, *Anatella* sp., *Brevicornu auriculatum* (Edwards, 1925), *B. verralli* (Edwards, 1925), *Exechia borealis* Lundström, 1912 sp. restit., *E. micans* Laštovka & Matile, 1974, *E. pectinivalva* Stackelberg, 1948, *E. pseudofestiva* Lackschewitz, 1937, E. sp. A, *Exechiopsis ligulata* (Lundström, 1913), *Rymosia speyae* Chandler, 1994, *Mycetophila marginata* Winnertz, 1863, *Phronia bicolor* Dziedzicki, 1889, *P. braueri* Dziedzicki, 1889, *P. taczanowskyi* Dziedzicki, 1889, *Trichonta atricauda* (Zetterstedt, 1852), *T. terminalis* (Walker, 1856) and *Zygomyia pseudohumeralis* Caspers, 1980.
The known fauna now comprises 41 species in 19 genera. Keys to genera and males of all species are provided. Females are associated to males and keyed for all species except for species belonging to genera *Anatella* Winnertz, *Brevicornu* Marshall and *Sciophila* Meigen. One male *Exechia* with rather peculiar but mal-developed terminalia could not be placed in any known species. Hence, it is figured and briefly described here, but left without a scientific name until more material is discovered. *Exechia borealis* is figured and reinstated as a separate species based on studies of Finnish type material and selection of a lectotype. To confirm the identity of *Macrocera nigropicea* Lundström, 1906 the Finnish holotype has been studied and compared with the closely related *M. maculata* Meigen, 1818.
Estimates of the total species richness in Iceland varies between 44 and 52. The Icelandic fauna of fungus gnats is discussed in the context of its relationship to the wider Holarctic fauna, especially to that of the adjacent parts of NW Europe. There is a strong affinity with the rest of NW Europe and a high proportion of the Icelandic species show a Holarctic, seemingly circumpolar distribution. The fauna of fungus gnats in Iceland is regarded to be entirely postglacial in origin. Thus, the dominance of species in the subfamily Mycetophilinae indicates that they are a successful group in the high boreal and arctic regions with a great dispersion potential. The main limiting factor for the diversity of fungus gnats on Iceland is probably lack of highly developed forest environments.

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Introduction

Fungus gnats are small to medium-sized nematocerous flies, comprising altogether seven families (Matile 1997). They are widely distributed and especially diverse in the Holarctic region (Bechev 2000). About 1250 species (including the family Sciaridae) are known from NW Europe (Hedström 1994; Chandler 2004; unpublished). Fungus gnats form an important part of the dipterous fauna of many habitats (Hutson et al. 1980) but the majority of the species show a preference for forest environments (see Økland 1996).

Nielsen et al. (1954) reviewed the Diptera fauna in Iceland in volume 3 of "The Zoology of Iceland". They reported 11 species of Mycetophilidae s. l. known from the country. In ecological studies Lindroth (1965) reported 9 species from Skaftafell, Andersson (1967) and Lindroth et al. (1973) reported 14 species from the southern part of Iceland, and Lindroth et al. (1988) reported 13 species from the southeastern coast of Iceland. Ólafsson (1991) compiled these data in a new checklist of Icelandic insects that reported four species in the family Keroplatidae and 19 species in the family Mycetophilidae.

We seek to increase our knowledge of the terrestrial fauna of Iceland by providing an up to date species list of the Mycetophilidae and Keroplatidae (see also Bengtson 2007). The fam-

ily Sciaridae will not be treated here, and the other families in the superfamily Sciaroidea sensu Matile (1997) are not known to occur in Iceland. We aim to revise all available material from previous records and add new material, present an updated species list, provide keys for all species of the revised fauna, provide distribution maps for the examined material, and illustrate species where necessary. The Icelandic fauna of fungus gnats will then be discussed in the context of its relationship to the wider Palaearctic fauna, especially to that of the adjacent parts of NW Europe.

Material and methods

Parts of the material reported by Nielsen et al. (1954) is kept in the Zoological Museum, University of Copenhagen, Denmark, and was made available for a review by the second author who also studied some previously undetermined material deposited in Museum of Zoology, University of Amsterdam, Netherlands. Most of the material reported by Lindroth (1965), Andersson (1967), Lindroth et al. (1973) and Lindroth et al. (1988) was determined by R. Tuomikoski and W. Hackman at Museum of Zoology in Helsinki, Finland, and then kept in the Museum of Zoology in Lund, Sweden. This material was made available for a review by the first author who also examined all unsorted Diptera material collected with pitfall traps from 54 of the localities described by Bengtson & Hauge (2007). The latter material was collected during the course of a study of dispersal and population ecology of certain terrestrial invertebrates and small mammals in Iceland (see Bengtson 2007). The third author, Erling Ólafsson, is currently the insect curator at the Icelandic Institute of Natural History. He has made parts of the museum's large collection of fungus gnats available for study, carefully selected to cover all species.

All known literature references of fungus gnats from Iceland dating back to Nielsen et al. (1954) are referred to under each species name. Specimens checked in this revision are listed under each name. The majority of the material was collected using pitfall traps (52%), sweep net (36%), light trap (6%), and less than 1 % was obtained with yellow traps or hand picked. For the rest of the material (5%), the sampling method is unknown, but most of it was probably sweep netted.

Altogether 1029 specimens from 356 samples collected at 195 localities from most parts of Iceland have been examined. A 10 x 10 km grid system was used to produce distribution maps for the majority of the species. Hence, some dots represent more than a single locality, and the maps show localities for the examined specimens only. Nevertheless, there is a good representation of collecting sites from most parts of Iceland (Map 1). Further information on distribution may be extracted from the literature (see for instance Nielsen et al. 1954). Some of the material there referred to was avaible for this revision, but there are still old records not confirmed. Also there are several thousand specimens in the NHRI collection not yet checked, mainly of the more common species. These will certainly give more complementary information on the distribution of the species concerned.

Careful examination of terminalia is usually needed for identification of fungus gnats. Specimens stored in alcohol could in most cases be determined under a stereo-microscope, but maceration of the terminalia was needed in some cases, especially for the small species in the genus *Brevicornu* Marshall. For pinned specimens terminalia usually have to be detached and macerated. Hence, for most of the pinned specimens and some alcohol specimens the abdomen was detached, macerated in 10% KOH and neutralized in acetic acid. Most of them where then washed in distilled water and absolute alcohol, and placed in tiny glycerine vials on the same pin as the rest of the body. In some cases permanent slides in Canada balsam were made in order to see specific details and make satisfactory drawings.

All specimens were recorded with unique identification codes in the Biota 2 database software (Colwell 2004a), and the "material examined" lists were extracted from this database. For each species the localities are sorted hierarchically within each province (in bold), district, locality and site respectively. Site information denoted by a "Loc00-xx" code corresponds to Appendix in Bengtson & Hauge (2007). Other site codes are transcribed from the original labels. The following codes of museum collections for depository of the material are used in the species list:

IZBE	Institute of Zool. and Botany, Estonian Agricultural Univ.
MZHF	Museum of Zool., Univ. of Helsinki, Helsinki, Finland.
MZLU	Museum of Zool., Lund Univ., Lund, Sweden.
NHRI	Icelandic Institute of Natural History, Reykjavik, Iceland.
ZMAN	Museum of Zool., Univ. of Amsterdam, The Netherlands.
ZMUC	Zool. Museum, Univ. of Copenhagen, Copenhagen, Denmark.

The sources for number of known species outside Iceland are compiled mainly, if not otherwise stated, from Gagné (1975, 1981), Zaitzev (1994, 2003) and Poole & Gentili (1996) for the Nearctic Region; from Bechev (1999, 2000), Chandler (2004), Hackman et al. (1988) and Zaitzev (1994, 2003) for the Palaearctic region as a whole; from Chandler & Ribeiro (1995) from the Atlantic islands; from Chandler (1998, 2001) for Great

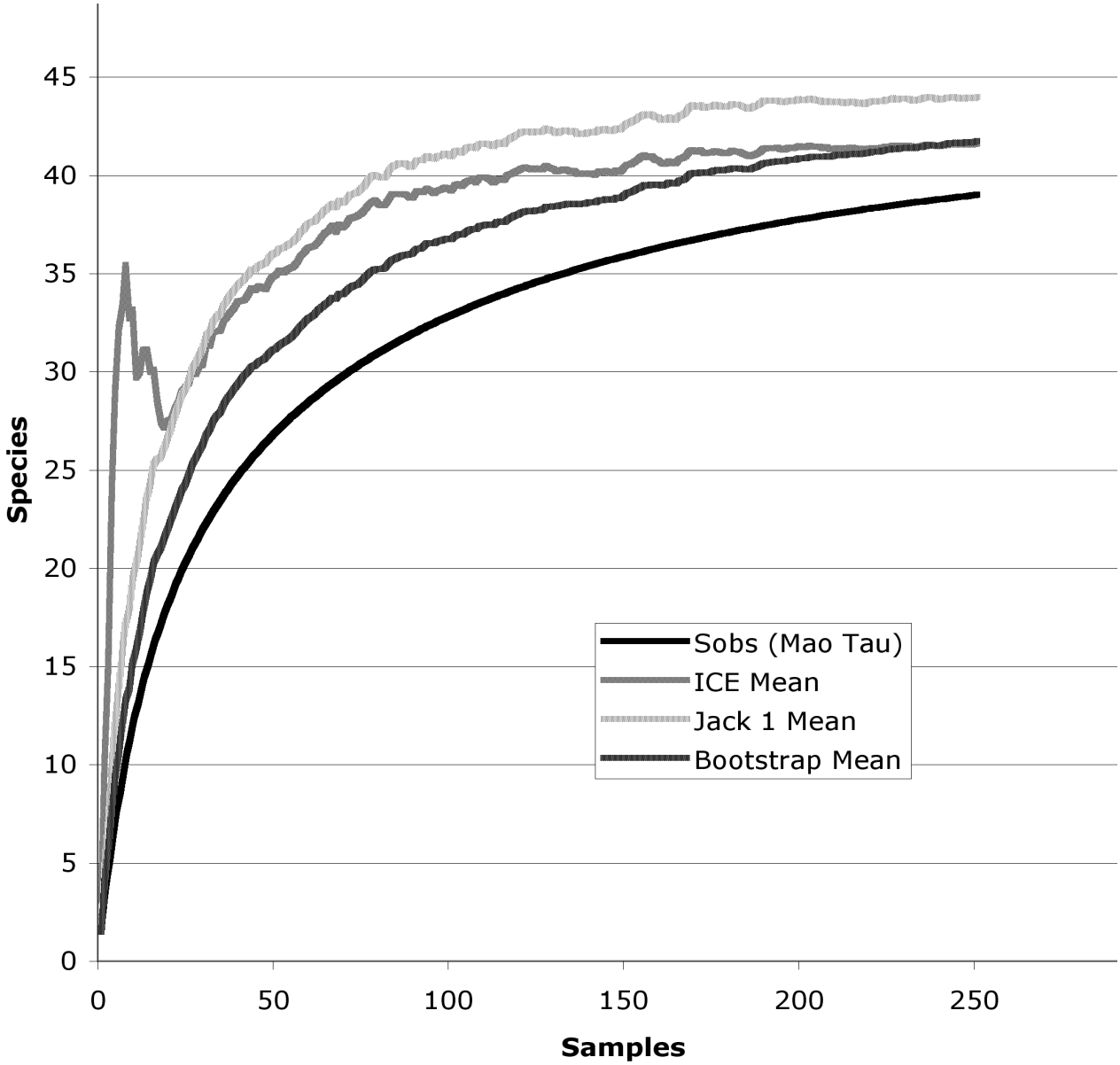


Fig. 1. Collector's curve of fungus gnats (Keroplatidae and Mycetophilidae) in Iceland. In addition to the cumulative number of species observed (Sobs), three estimators of total richness are calculated. See Tab. 2 for further explanation.

Britain; from Kjærandsen & Jørgensen (1992) for the Faroes; and from Hackman (1980), Hedmark (1998, 2000), Kjærandsen (1993, 2005), Økland & Zaitzev (1997), Plassmann (1978, 1979, 1980), Polevoi (2000), Søli (1994), Hackman et al. (1988), and some original unpublished data for Fennoscandia outside Iceland.

Estimates of species richness were calculated following the recommendations given by Colwell & Coddington (1994). A data matrix with presence/absence data of the species in each collection sample was exported from the Biota database to the software Estimate S (Colwell 2004b). Undetermined females were removed from the data matrix before the analysis. Estimate S was then used to calculate some statistical parametres for the total richness of fungus gnats in Iceland.

Morphological terminology in keys and descriptions follows Søli et al. (2000) and Kjærandsen (2006). Classification

Species	NA	AISL	Iceland	FAR	GB	SPB	WNOR	FSCAN	WPAL	EPAL
Keroplatidae										
MACROCERINAE										
Macrocera nigropicea Lundström, 1906			●		●			●	●	
Macrocera parva Lundström, 1914			●		●			●	●	
Mycetophilidae										
MYCOMYINAE										
Mycomya islandica Väisänen, 1984	●		●			●		●	●	
SCIOPHILINAE										
Allocotocera pulchella (Curtis, 1837)	●		●		●		●	●	●	●
Sciophila hirta Meigen, 1818	●		●		●		●	●	●	
Sciophila parviareolata Santos Abreu, 1920		●	●		●			●	●	
GNORISTINAE										
Boletina basalis (Meigen, 1818)			●		●		●	●	●	
Boletina gripha Dziedzicki, 1885		●	●	●	●		●	●	●	
LEIINAE										
Leia fascipennis Meigen, 1818			●		●			●	●	
MYCETOPHILINAE										
Exechiini										
Allodia embla Hackman, 1971	●		●		●		●	●	●	
Allodiopsis domestica (Meigen, 1830)	●		●		●		●	●	●	●
Anatella sp.	+	+	●		+		+	+	+	+
Brevicornu auriculatum (Edwards, 1925)			●		●			●	●	●
Brevicornu griseicolle (Staeger, 1840)	●	●	●	●	●		●	●	●	●
Brevicornu griseolum (Zetterstedt, 1852)			●		●		●	●	●	
Brevicornu kingi (Edwards, 1925)	●		●		●		●	●	●	●
Brevicornu proximum (Staeger, 1840)			●		●			●	●	●
Brevicornu verralli (Edwards, 1925)		●	●		●		●	●	●	●
Cordyla pusilla Edwards, 1925			●		●		●	●	●	●
Exechia borealis Lundström, 1912			●				●	●	●	
Exechia frigida (Boheman, 1865)	●		●	●	●	●	●	●	●	
Exechia fusca (Meigen, 1804)	●	●	●		●		●	●	●	●
Exechia micans Laštovka & Matile, 1974	●		●	●				●	●	●
Exechia nigra Edwards, 1925			●	●	●		●	●	●	
Exechia pectinivalva Stackelberg, 1948			●		●			●	●	
Exechia pseudofestiva Lackschewitz, 1937			●		●		●	●	●	●
Exechia spinuligera Lundström, 1912			●	●	●		●	●	●	●
Exechia sp. A			●							
Exechiopsis ligulata (Lundström, 1913)			●		●		●	●	●	
Rymosia fasciata (Meigen, 1804)			●	●	●		●	●	●	
Rymosia speyae Chandler, 1994			●		●					
Mycetophilini										
Mycetophila marginata Winnertz, 1863			●		●		●	●	●	
Phronia biarcuata (Becker, 1908)	●	●	●		●		●	●	●	●
Phronia bicolor Dziedzicki, 1889	●		●				●	●	●	●
Phronia braueri Dziedzicki, 1889	●		●		●		●	●	●	●
Phronia exigua (Zetterstedt, 1852)	●	●	●		●		●	●	●	●
Phronia taczanowskyi Dziedzicki, 1889	●		●					●	●	●
Sceptonia fumipes Edwards, 1925			●		●		●	●	●	
Trichonta atricauda (Zetterstedt, 1852)	●		●		●		●	●	●	●
Trichonta terminalis (Walker, 1856)	●		●		●		●	●	●	●
Zygomyia pseudohumeralis Caspers, 1980			●		●		●	●	●	●
Number of species	**17**	**7**	**41**	**7**	**34**	**2**	**28**	**38**	**38**	**21**
Proportion of Icelandic fauna	**41%**	**17%**	**100%**	**17%**	**83%**	**5%**	**68%**	**93%**	**93%**	**51%**

Species richness estimator

N (occurrences)	558
n (samples)	343
Species captured	41
Species singletons	7
Species doubletons	3
Sobs ± 95% confidence interval	41 ± 5
ICE Smax	46
Bootstrap Smax	44
Jackknife 2 (second order) Smax	52

Tab. 2. Estimates of total species richness of fungus gnats (Keroplatidae and Mycetophilidae) in Iceland, based on 100 randomizations of 556 occurrences in 341 samples (present/absent data). Undetermined females were removed before the analysis. Species singletons and doubletons are number of species recorded from only one or two of the samples, respectively. Sobs = cumulative number of species observed. Species richness estimates (Smax) are rounded to integers.

and order of taxa follows Bechev (1999).

Results

Ólafsson (1991) listed 23 species of fungus gnats from Iceland, but missed one previously reported species, *Exechia nigra* Edwards, 1925. Having re-examined the majority of the previously published material we find that nine species names very likely should be removed from the Icelandic fauna due to misidentifications; viz.: *Macrocera vittata* Meigen, 1830 [= *Macrocera parva* Lundström, 1914], *Macrocera lutea* Meigen, 1804 [= *Macrocera parva*], *Mycomya brunnea* (Dziedzicki, 1885) [= *Mycomya islandica* Väisänen, 1984], *Leia bimaculata* (Meigen, 1804) [= *Leia fascipennis* Meigen, 1818], *Brevicornu bipartitum* Laštovka & Matile, 1974 [= *Brevicornu griseolum* (Zetterstedt, 1852)], *Brevicornu sericoma* (Meigen, 1830) [= *Brevicornu auriculatum* (Edwards, 1925)], *Cordyla brevicornis* (Staeger, 1840) [= *Cordyla pusilla* Edwards, 1925], *Exechia nitidicollis* Lundström, 1913 [= *Exechia micans* Laštovka & Matile, 1974], and *Exechia spinigera* Winnertz, 1863 [= *Exechia spinuligera* Lundström, 1912]. Three replaced names not previously published are accordingly added, and two previoiusly published names are now regarded as junior synonyms; viz. *Brevicornu boreale* (Lundström, 1914) [= *Brevicornu griseolum* (Zetterstedt, 1852) sensu auctore nec Edwards], and *Phronia johannae* Steenberg, 1924 [= *Phronia biarcuata* (Becker, 1908)]. In addition 20 new species, indicated with a "•" in front of the species name in the following list, are added to the fauna. Among them a single female *Anatella* sp. remains unidentified and one male *Exechia* sp. with rather peculiar but mal-developed terminalia could not be placed in any known species. In sum altogether 41 species are herein accepted as inhabiting Iceland (Tab. 1).

Several methods were used to estimate the total species richness of fungus gnats in the families Keroplatidae and Mycetophilidae in Iceland (Tab. 2). By randomising and extrapolating from the collectors curve (Fig. 1), estimates of the maximum number of species likely to be found in Iceland were calculated to be between 44 (Bootstrap method) and 52 (second order Jackknife method). Seven species were recorded from one sample only (singletons), and three species were recorded from two samples only (doubletons).

Key to genera of Keroplatidae and Mycetophilidae known from Iceland

This simplified key is covering and valid only for the Icelandic fauna as presented in this paper. For a complete key to Palaearctic genera of fungus gnats we recommend Søli et al. (2000).

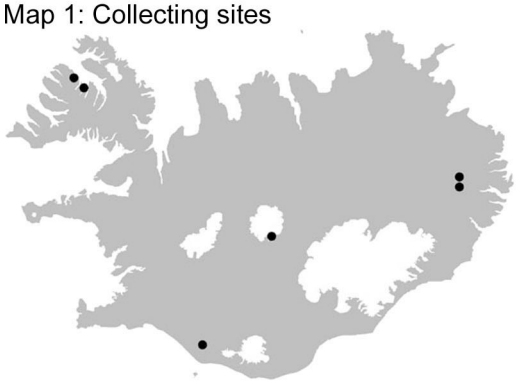
1. Slender gnats with long antenna where each flagellar segment is more than 5x as long as wide; 3 ocelli present, placed centrally on head, widely separated from the eyes; wing veins fused to form a characteristic cross antero-centrally (R and stem of M fused for a short distance, M and Cu connected by cross vein bM-Cu); male terminalia dorsoventrally compressed, with undivided, simple gonostyli .. KEROPLATIDAE, genus *Macrocera* Meigen
— More compact gnats with antenna distinctly shorter than body and each flagellar segment < 5x as long as wide; 2 or 3 ocelli present; wing veins not fused to form a characteristic cross (R and stem of M connected by cross vein R-M, M and Cu not connected by a cross vein); male terminalia not dorsoventrally compressed, with complex gonostyli ..... MYCETOPHILIDAE 2
2. Vein Sc usually short, ending free or in R (if long then always ending in R); microtrichia on wing membrane in

Tab. 1. List of species of fungus gnats in the families Keroplatidae and Mycetophilidae known from Iceland with broad-scaled distribution in the Holarctic region. Abbreviations: NA = Nearctic Region; AISL = Atlantic Islands; FAR = The Faroes; GB = Great Britain; SPB = Spitsbergen; WNOR = Western Norway; FSCAN = Fennoscandia, except Iceland; WPAL = Western Palaearctic Region, except Iceland; EPAL = Eastern Palaearctic Region.

more or less definite rows, especially near wing margin; lateral ocelli touching eye margins ..... Mycetophilinae 7
— Vein Sc long, ending in C; microtrichia on wing membrane irregularly arranged; lateral ocelli not touching eye margins 3
3. Two ocelli, placed close together centrally on head; fine tibial setae arranged in regular rows ..... Mycomyinae, genus *Mycomya* Rondani
— Three ocelli; fine tibial setae irregularly arranged 4
4. Wing membrane covered with macrotrichia ..... Sciophilinae 5
— Wing membrane covered with microtrichia only 6
5. Wing veins forming a small cell anterocentrally (R4 present); base of posterior fork well beyond that of the median fork; wings clear ..... genus *Sciophila* Meigen
— Wing veins without a small cell anterocentrally (R4 absent); base of posterior fork well before that of the median fork; wings with shaded area apically in R-sector ..... genus *Allocotocera* Mik
6. Slender black gnats with yellow legs; wings clear; subcosta long, ending well beyond base of crossvein R-M; laterotergite without bristles ..... Gnoristinae, genus *Boletina* Staeger
— Stout brown to yellow gnats; wings with preapical band; subcosta shorter, ending well before base of crossvein R-M; laterotergite with strong bristles ..... Leiinae, genus *Leia* Meigen
7. Mesanepisternum with strong bristles 8
— Mesanepisternum without strong bristles ..... Tribe Exechiini (in part) 13
8. Palpi with antepenultimate segment enlarged; antenna short, with fewer than 14 flagellar segments ..... Tribe Exechiini (in part), genus *Cordyla* Meigen
— Palpi normal; antenna with 14 flagellar segments ..... Tribe Mycetophilini 9
9. Mesanepimeron without strong bristles; bristles on tibiae short and weak 10
— Mesanepimeron with strong bristles; bristles on tibiae long and strong 11
10. Base of posterior fork below or before that of the median fork; subcosta long, ending in R ..... Genus *Trichonta* Winnertz
— Base of posterior fork well beyond that of the median fork; subcosta short, ending free ..... Genus *Phronia* Winnertz
11. Posterior fork present ..... Genus *Mycetophila* Meigen
— Posterior fork absent (CuA_1 strongly reduced or absent) 12
12. CuA parallel with M_2; mid tibia without ventral bristles ..... Genus *Sceptonia* Winnertz
— CuA slightly divergent from M_2; mid tibia with one or more ventral bristles ..... Genus *Zygomyia* Winnertz
13. Costa extending well beyond apex of R_5 ..... Genus *Anatella* Winnertz
— Costa ending at apex of R_5 14
14. Base of posterior fork well beyond that of the median fork 15
— Base of posterior fork below or before that of the median fork 16
15. Sc ending free; crossvein R-M at least 2x as long as stem of median fork; posterior fork about half the length of median fork; female cerci 2-segmented ..... Genus *Exechia* Winnertz
— Sc ending more or less distinctly in R; crossvein R-M at most 2x as long as stem of median fork; posterior fork about 2/3 the length of median fork; female cerci 1-segmented ..... Genus *Exechiopsis* Tuomikoski
16. Fork veins bearing setae, at least towards apex; male tergite 9 with 2 pairs of extra long bristles ..... Genus *Allodiopsis* Tuomikoski
— Fork veins bare; male tergite 9 without 2 pairs of extra long bristles 17
17. Subcosta ending free; male gonocoxite closed ventrally; female cerci 1-segmented ..... Genus *Rymosia* Winnertz
— Subcosta ending in R_1; male gonocoxite deeply incised ventrally; female cerci 2-segmented 18
18. Scutum with discal bristles intermingled between smaller decumbent setae; male gonostylus with internal structures more sclerotized than dorsal lobe; female cerci long, slender, parallel-sided ..... Genus *Brevicornu* Marshall
— Scutum almost without discal bristles, uniformly covered with small, pale decumbent setae; male gonostylus with dorsal lobe more sclerotized than internal structures; female cerci short, tapered ..... Genus *Allodia* Winnertz

Map 1: Collecting sites

Map 2: *Macrocera parva*



Map 3: *Boletina basalis*

Map 4: *Boletina gripha*

Map 5: *Leia fascipennis*

Map 6: *Allodia embla*

Map 7: *Allodiopsis domestica*

Map 8: *Cordyla pusilla*

Maps 1–8. Collection sites (map 1); distribution of 7 Icelandic fungus gnat species (maps 2–8) = species Nos. 2, 7, 8, 9, 10, 11 & 19.

Revised, annotated list of species with provisional keys to species known from Iceland

Family Keroplatidae

Subfamily Macrocerinae

Genus *Macrocera* Meigen

Macrocera is a large genus with a worldwide distribution, currently placed in family Keroplatidae. There are about 65 species known from the Palaearctic region, 24 are known from Fennoscandia and 23 from Great Britain. Careful examination of wings, body colours and terminalia is needed for secure identification. The most comprehensive keys were provided by Hutson et al. (1980) and Zaitzev (1994).

Provisional key to species known from Iceland

Dark brown to black species with spotted wings; wings and male terminalia as illustrated by Chandler (1989:29, figs. 1, 2) ..... 1. *M. nigropicea* Lundström

Pale, mainly ochraceus yellow species with clear wings; male terminalia as illustrated by Hutson et al. (1980:88, fig. 114) and Zaitzev (1994:71, fig. 35.2) .... 2. *M. parva Lundström*

1. *Macrocera nigropicea* Lundström, 1906

Macrocera nigropicea Lundström, 1906:3: Nielsen et al. 1954:24; Ólafsson 1991:47.

Material examined: Holotype male, **RUSSIA**: Lr, zwischen Kola und Dorf Kildin, 3 Jul 1887 (MZHF, Leg. J. A. Palmén). Original labels: printed label "Pg. Veron"; printed label "Palmen"; small quadrate purple label with number "889"; handwritten label in red ink "*Macrocera nigropicea*"; pale green label "Mus. Zool. H:fors Spec. typ. No 4203. *Macrocera nigropicea* Lun." [Mus. Zool Helsinki Loan Nr. D04-1459]. **ICELAND: S-Mulasysla**, Vellir, Hallormsstadarskogur, S Egilsstadir, Loc 50-Pl, 20 Jun–13 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 2 ♀♀, 1 ♂; Hallormsstadur, 21 Jun–10 Jul 2002 (NHRI, Leg. G. Halldorsson), 1 ♀, 1 ♂; Mjoanes, 21 Jun–14 Jul 2002 (NHRI, Leg. G. Halldorsson), 1 ♂.
Additional material of *M. maculata* Meigen, 1818 examined: **FINLAND**: **Ab**, Karislojo; **Ka**, Vehkalahti; **N**, Esbo, Westend (MZHF), 6 ♂♂; **ESTONIA**: Oonga and Nigula NR (IZBE), 3 ♂♂.

Macrocera nigropicea was described based on a single male specimen collected in Russia "Lapponia rossica, Lt. zwischen Kola und Dorf Kildin" (Lundström 1906:3–5). Lundström characterised the new species as very close to *M. maculata* Meigen, 1818, differing by having a dark body colour. Stackelberg (1945) and Zaitzev (1994) keyed both species without reporting any new material. Chandler (1989) reported the species as new to Great Britain and figured its wing and male genitalia. The species has further been recorded from Finland, Germany, Belgium and Czech Republic (Chandler 2004, Hackman 1980, Kallweit & Plassmann 1999, Martinovský 2001). We have not been able to trace any old material from Iceland as referred to in previous publications neither in the Lund (MZLU) nor Copenhagen (ZMUC) collections.

Based on the studied material and comparison with *M. maculata* we find that body colouration clearly separates the two species, but we are not able to find any reliable differences in their terminalia. *M. nigropicea* has the body entirely dark brown to blackish, with somewhat lighter fore legs only. *M. maculata*, on the other hand, has the body mainly yellow to amber, with 3 shining brownish mesonotal stripes; abdominal segment I–IV yellow with brownish bands basally and segment V–VII uniformly brownish. The type specimen of *M. nigropicea* has the terminalia almost identical to *M. maculata* as figured by Hutson et al. (1980). In comparison with Chandler's (1989) figure of *M. nigropicea* we find the type to have wider cerci and tergite IX more angular apically. We also detected a slight difference in the appearance of the gonocoxal apodeme, which is more sclerotized and slightly longer in *M. nigropicea* than in *M. maculata*. Further, *M. maculata* has a well-developed, rounded incision on the ventroapical margin of the gonocoxite, while it is weak or absent in *M. nigropicea*.

M. nigropicea is rare and local in Iceland. The checked specimens were collected in woodland sites in eastern Iceland. In addition there is an old record from southeast Iceland (Lindroth 1931) and a recent finding in a woodland site in the western part.

2. *parva* Lundström, 1914

Macrocera parva Lundström, 1914:7: Nielsen et al. 1954:24; Lindroth et al. 1973:24; Lindroth et al. 1988:55; Ólafsson 1991:47; Einarsson et al. 2000:215; Ólafsson 2000:57; Magnusson et al. 2001:223.

Macrocera vittata Meigen, 1830:293: Nielsen et al. 1954:24 [misidentification]; Lindroth 1965:132 [?misidentification]; Andersson 1967:103 [?misidentification]; Lindroth et al. 1973:24 [?misidentification]; Ólafsson 1991:47 [misinterpretation].

Macrocera lutea Meigen, 1804:46: Lindroth et al. 1973:24 [misidentification]; Lindroth et al. 1988:38 [misidentification]; Ólafsson 1991:47 [misinterpretation].

Material examined: **ICELAND**: **A-Skaftafellssysla**, Öraefi, Sandfell, 5 km E Svinafell, Loc 54-Gl, 21 Jun–11 Aug 1976 (MZLU, Leg. S.-

A. Bengtson et al.), 4♀♀, 1♂; Skaftafell, site A29, 22 Jul 1962 (Leg. MZLU expedition 1962), 1♀; Nesjar, Hornafjördur, Horn, site 81, 25 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; Krossbaer, site 52, 26 Jun 1966 (MZLU, Leg. C. H. Lindroth), 1♀; Site 71 (E Thveit), 22 Jun 1966 (MZLU, Leg. H. Andersson), 1♀, 1♂; Site 76 (Dynjandi), 24 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; Site 81 (Horn), 25 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; Midfell, site 65, 26 Jun 1966 (MZLU, Leg. H. Andersson), 3♂♂; Nesjar, Svinafell, site 6, 21 Jun 1966 (MZLU, Leg. S. Richter), 1♂; **Gullbringusysla**, Hafnarfjördur, Hafnarfjördur (Midvangur 12), 7 Jul 1988 (NHRI, Leg. E. Ólafsson), 1♀; Grindavik, Krysuvikurhraun, 19 Jun 1987 (NHRI, Leg. E. Ólafsson), 1♂; **Rangarvallasysla**, Vestmannaeyjar, Heimaey, 15 Jun 1966 (MZLU, Leg. H. Andersson), 3♂♂; Alfsey, Site 117A, 28 Jun 1968 (MZLU, Leg. H. Andersson), 1♀; A-Eyjafjallahreppur, Drangshlidardalur, Site 120B, 30 Jun 1968 (MZLU, Leg. H. Andersson), 1♀; **S-Mulasysla**, Vellir, Hallormsstadarskogur, S Egilsstadir, Loc 49-Bw, 20 Jun–12 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 3♀♀; Hallormsstadur, 21 Jun–10 Jul 2002 (NHRI, Leg. G. Halldorsson), 1♂; Jonsskogur, 5–19 Jul 2002 (NHRI, Leg. G. Halldorsson), 1♂; Mjoanes, 21 Jun–14 Jul 2002 (NHRI, Leg. G. Halldorsson), 4♀♀; **S-Thingeyjarsysla**, Fnjoskadalur, Vaglaskogur, 2 km S old bridge across Fnjoska, Loc 25-Bw, 18 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Myvatnssveit, Myvatn, Hrauneyjartjarnir, 1.8 km SW Grimsstadir, Loc 30-Wl, 19 Jun–17 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 32-Wsh (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀, 1♂; Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 34-Gl (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 35-Pl (MZLU, Leg. S.-A. Bengtson et al.), 3♀♀; Austarasel, 10 km E Myvatn, Loc 44-Dsh, 20 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂; **Skagafjardarsysla**, Lytingsstadahreppur, Maelifellsdalur, 30 Jun 1933 (ZMUC, Leg. S. L. Tuxen), 1♀; **Strandasysla**, Baejarhreppur, Laxardalsheidi, 5 km NW Bordeyri, Loc 19-Dsh, 8 Aug–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂; **V-Hunavatnssysla**, Vatnsnes, Hjallholt, 16 Jul 1987 (NHRI, Leg. E. Ólafsson), 1♀; **V-Isafjardarsysla**, Dyrafjördur, Dyrafjördur, 24 Jun 1893 (ZMUC, Leg. Lundbeck), 1♂; **V-Skaftafellssysla**, Kirkjubaejarhreppur, Nya Eldhraun, 13 km SW Kirkjubaejarklaustur, Loc 04-Sd, 21 Jun–9 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 4♀♀, 2♂♂; Medalland, Nya Eldhraun, SW Kirkjubaejarklaustur, Loc 05-Gh, 27 May–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 3♀♀, 2♂♂; Myrdalur, Hjörleifshöfdi, near abandoned farm buildings, Loc 06-Gl, 22 Jun–8 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Vik i Myrdal, 600 m SW village, Loc 09-Sd, 22 Jun–10 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Vik i Myrdal, on Reynisfjall, 120 m a.s.l., Loc 12-Gh (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Illagil, 10 km NE Vik, Site 77, 24 Jun 1968 (MZLU, Leg. C. H. Lindroth), 1♀.

We have not been able to trace any material to confirm *M. vittata* nor *M. lutea* from Iceland, neither in the Lund (MZLU) or Copenhagen (ZMUC) collections. The two females determined as *M. lutea* by W. Hackman in the MZLU collection are rather referable to *M. parva* as they have distinct thoracic stripes and dark scutellar setae. One male and one female determined as *M. vittata* by P. Nielsen in the ZMUC collection are also referable to *M. parva*. All new material was determined as *M. parva*. Hence, we believe that all previous records of these three species in fact only refer to *M. parva. M. parva* is a common species widely reported in Europe and Russia. Nielsen et al. (1954:25, fig. 5) illustrated and briefly described a larva from Iceland possibly referable to *M. parva*.

The species is distributed all over the country, in a variety of lowland and highland habitats (Map 2). There is still a considerable unchecked material at NHRI.

Family Mycetophilidae

Subfamily Mycomyinae

Genus Mycomya Rondani

Mycomya is the largest genus within the Mycomyinae, with a worldwide distribution. There are about 140 species known from the Palaearctic region, 82 of them are known from Fennoscandia and 39 from Great Britain. A fully illustrated Holarctic monograph with keys to species was provided by Väisänen (1984).

3. *Mycomya islandica* Väisänen, 1984

Mycomya islandica Väisänen, 1984:126: Magnusson et al. 2001:223.
Mycomya brunnea (Dziedzicki, 1885:179): Nielsen et al. 1954:26 [misidentification]; Ólafsson 1991:47 [misidentification]; Einarsson et al. 2000:215 [misidentification]; Ólafsson 2000:54 [misidentification].

Material examined: **ICELAND: N-Mulasysla**, Vesturöraefi, Vesturöraefi, 28 Jun–15 Jul 1999 (NHRI, Leg. E. Ólafsson), 1♀; **Rangarvallasysla**, Fljotshlid, Tumastadir, 19–26 Aug 1996 (NHRI, Leg. E. Ólafsson), 1♂; **V-Skaftafellssysla**, Kirkjubaejarhreppur, Nya Eldhraun, 13 km SW Kirkjubaejarklaustur, Loc 04-Sd, 21 Jun–9 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀.

The only known species from Iceland from where it was described. Later the species has also been reported from Karelia, Finland and Sweden. The male terminalia were figured by Väisänen (1984:127, figs 397–402). The female was reported as unknown by Väisänen (1984), although a female from Spitsbergen reported by Tuomikoski (1967) was listed with a question mark under this species. The three females in the present study run according to the key in Väisänen (1984) to sp. gr. *tenuis* and are tentatively associated to *M. islandica* as it is the only known species in Iceland. The species is sparse in

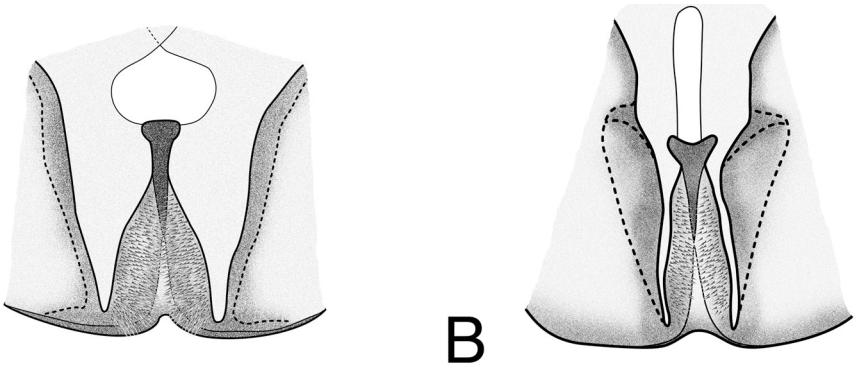


Fig. 2. Dorsal view of medial sternal process of the gonocoxite in *Sciophila* spp. — A. *S. hirta* Meigen, 1818. — B. *S. parviareolata* Santos Abreu, 1920.

Iceland, but more material is available at NHRI, especially from highland localities.

Subfamily Sciophilinae

Genus *Allocotocera* Mik

Allocotocera is a small genus, mainly distributed on the southern continents, with one widely distributed, Holarctic species and a second species recently described from Greece.

• 4. *Allocotocera pulchella* (Curtis, 1837)

Leia pulchella Curtis, 1837:645.

Material examined: **ICELAND**: **Borgarfjardarsysla**, Skorradalur, Selskogur, 16 Jun–15 Jul 2004 (NHRI, Leg. E. Ólafsson & M. Ingimarsdottir), 1♀.

Allocotocera pulchella is a common and widespread species in NW Europe. There is a single Icelandic record from a Sitka spruce plantation in a native birch wood in W Iceland. According to Hutson et al. (1980) adults of this species may be found on umbelliferous flowers or in damp woods.

Genus *Sciophila* Meigen

Sciophila is a large genus with a worldwide distribution. There are about 60 species known from the Palaearctic region (Kurina 2004), 38 of them are known from Fennoscandia and 23 from Great Britain. The most comprehensive key was provided in a monograph by Zaitzev (1982). He regarded *Sciophila parviareolata* Santos Abreu, 1920 as a junior synonym of *S. hirta* Meigen, 1818. Chandler (2001) reinstated *S. parviareolata* and considered small differences from *S. hirta* in the medial sternal process to be the only diagnostic character for the species. Using Chandler (2001) we find that the only two Icelandic males belong to one of each of these species. Yet, neither of them shows the typical differentiation as illustrated by Chandler (2001). Pending on further material we illustrate and report both species from Iceland, but have some doubts about the validity of *S. parviareolata* based on such a vague diagnosis. We are not able to distingush females of the two species.

Provisional key to males known from Iceland

1. Terminalia as illustrated by Chandler (2001:226, figs 24–26); medial sternal process of the gonocoxite narrow and bluntly broadened apically (Fig. 2A) .... 5. *S. hirta* Meigen
— Terminalia as illustrated by Chandler (2001:226, figs 27–29); medial sternal process of the gonocoxite broader and bifurcate apically (Fig. 2B). .... 6. *S. parviareolata* Santos Abreu

• 5. *Sciophila hirta* Meigen, 1818

Fig. 2A.

Sciophila hirta Meigen, 1818:251.

Material examined: **ICELAND: S-Thingeyjarsysla**, Fnjoskadalur, Vaglaskogur, 19 Aug 1984 (NHRI, Leg. E. Ólafsson), 1♂.

In addition to the character given in the key this male has tergite IX rounded, internal lobe of gonostylus with 25 macrochaetae and distal process of gonocoxal apodeme apically sharp. On Iceland the species is known from a single male only, from a birch wood in northern Iceland.

• 6. *Sciophila parviareolata* Santos Abreu, 1920

Fig. 2B.

Sciophila parviareolata Santos Abreu, 1920:28.

Material examined: **ICELAND: Myrasysla**, Stafholtstungur, Munadarnes, 2 Aug 1985 (NHRI, Leg. E. Ólafsson), 1♂.

In addition to the character given in the key this male has

tergite IX rounded, internal lobe of gonostylus with 32 macrochaetae and distal process of gonocoxal apodeme apically blunt. On Iceland the species is known from a single male only, from a birch wood in western Iceland.

Sciophila spp. (females)

Material examined: **ICELAND: Myrasysla**, Stafholtstungur, Munadarnes, 2 Aug 1985 (NHRI, Leg. E. Ólafsson), 3♀♀; **Rangarvallasysla**, Fljotshlid, Tumastadir, 26 Aug–2 Sep 1999 (NHRI, Leg. E. Ólafsson), 1♀; 13–20 Aug 2001 (NHRI, Leg. E. Ólafsson), 1♀; 28 May–4 Jun 2003 (NHRI, Leg. E. Ólafsson), 2♀♀; 18–25 Jun 2003 (NHRI, Leg. E. Ólafsson), 1♀; **S-Mulasysla**, Vellir, Jonsskogur, 5–19 Jul 2002 (NHRI, Leg. G. Halldorsson), 2♀♀.

Subfamily Gnoristinae

Genus *Boletina* Staeger

Boletina is a large genus of mainly boreal and montane distribution in the Holarctic region. There are more than 80 species known from the Palaearctic region, 59 of them are known from Fennoscandia and 27 from Great Britain. The most comprehensive keys are provided by Hutson et al. (1980) and by Zaitzev (1994).

Provisional key to species known from Iceland

1. Larger species, wing length 4.5–4.6 mm; first two flagellars usually all yellow; male terminalia as illustrated by Hutson et al. (1980:101, fig. 251) and Zaitzev (1994:204, figs 68.6, 7); female terminalia with sternite VIII rather pointed and with about 8 bristles apically . ..... 7. *B. basalis* (Meigen)
— Smaller species, wing length 3.2–3.7 mm; first two flagellars usually all dark; male terminalia as illustrated by Hutson et al. (1980:102, fig. 257) and Zaitzev (1994:211, fig. 70.7, 8); female terminalia more slender, without strong setae apically ..... 8. *B. gripha* Dziedzicki

• 7. *Boletina basalis* (Meigen, 1818)

Leia basalis Meigen, 1818:257.
Boletina sp.: Ólafsson 2000:54.

Material examined: **ICELAND: Arnessysla**, Thjorsarver, Arnarfell hid mikla, 22 Jul–23 Aug 1972 (NHRI, Leg. E. Ólafsson), 1♀; **N-Isafjardarsysla**, Hestfjördur, Bolaskogur, 30 Jun 1994 (NHRI, Leg. E. Ólafsson), 1♀; Skutulsfjördur, Tungudalur, 1 Jul 1994 (NHRI, Leg. E. Ólafsson), 1♂; **Rangarvallasysla**, Fljotshlid, Tumastadir, 18–25 Jun 2003 (NHRI, Leg. E. Ólafsson), 1♂; **S-Mulasysla**, Vellir, Hallormsstadarskogur, S Egilsstadir, Loc 50-Pl, 20 Jun–13 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀; Mjoanes, 5–21 Jun 2002 (NHRI, Leg. G. Halldorsson), 1♂.

Boletina basalis is a common species widely reported in Europe and Russia. In Iceland it is a rare species, found in various parts of the country (Map 3). The females associated here are running to *B. basalis* in the key provided by Hutson et al. (1980), and to couplet 56 in the key provided by Zaitzev (1994).

• 8. *Boletina gripha* Dziedzicki, 1885

Boletina gripha Dziedzicki, 1885:172.

Material examined: **ICELAND: A-Skaftafellssysla**, Nesjar, Hornafjördur, Site 69 (Svinafell), 21 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; Midfell, site 65, 26 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; Öraefi, Kvisker, 9 Jun 1986 (NHRI, Leg. E. Ólafsson), 4♀♀; Nesjar, Svinafell, site 6, 21 Jun 1966 (MZLU, Leg. S. Richter), 2♀♀; **Arnessysla**, Thjorsarver, Nautalda, 23–26 Aug 1972 (NHRI, Leg. E. Ólafsson), 1♂; Kjölur, Blanipuver, 29 Jul–1 Aug 2002 (NHRI, Leg. E. Ólafsson), 1♂; 17 Aug 2002 (NHRI, Leg. E. Ólafsson), 1♂; Ölfus, Fremstidalur, 13 Jun–12 Jul 2002 (NHRI, Leg. M. Ingimarsdottir), 1♀; **Gullbringusysla**, Hafnarfjördur, Hafnarfjördur (Hraunbrun 14), 20–21 Sep 1999 (NHRI, Leg. E. Ólafsson), 1♀; 24–25 Sep 2000 (NHRI, Leg. E. Ólafsson), 1♀; Grindavik, Vigdisarvellir, 15 Jul 1983 (NHRI, Leg. E. Ólafsson), 1♀; **S-Mulasysla**, Vellir, Budlungavellir, 6–24 Jul 2002 (NHRI, Leg. G. Halldorsson), 1♀; **Strandasysla**, Baejarhreppur, Laxardalsheidi, 5 km NW Bordeyri, Loc 19-Dsh, 8 Aug–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 3♀♀; Laxardalsheidi, 5 km NW Bordeyri, Loc 20-Wl, 7 Jun–8 Aug 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂.

Boletina gripha is a common species widely reported in Europe and Russia. In Iceland it is rare, found in various habitats in many parts of the country (Map 4). The association of females is tentative as we are not able to determine females of the smaller species in this genus. They are however clearly different from females of *B. basalis* and run to couplet 16 in the key provided by Hutson et al. (1980), and to couplet 92 in the key provided by Zaitzev (1994).

Subfamily Leiinae

Genus *Leia* Meigen

Leia is a large, but mainly tropical genus. There are about 30 species known from the Palaearctic region, 9 of them are known from Fennoscandia and 9 from Great Britain. A review of the

genus in Europe was provided by Plassmann (1973), and Hutson et al. (1980) illustrated many species.

9. *Leia fascipennis* Meigen, 1818

Leia fascipennis Meigen, 1818:255.

Leia bimaculata (Meigen, 1804:92): Nielsen et al. 1954:26 [misidentification]; Lindroth 1965:132 [misidentification]; Andersson 1967:103 [misidentification]; Lindroth et al. 1973:24 [misidentification]; Lindroth et al. 1988:55 [misidentification]; Ólafsson 1991:47 [misidentification].

Material examined: **ICELAND: A-Skaftafellssysla**, Öraefi, Sandfell, 5 km E Svinafell, Loc 54-Gl, 21 Jun–11 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀; Skaftafell, site A12, 7 Aug 1962 (Leg. MZLU expedition 1962), 1♂; site A18, 18 Jul 1962 (Leg. MZLU expedition 1962), 1♂; site A20 (Leg. MZLU expedition 1962), 2♀♀; site A22 (Leg. MZLU expedition 1962), 1♀; 30 Jul 1962 (Leg. MZLU expedition 1962), 2♀♀, 3♂♂; 8 Aug 1962 (Leg. MZLU expedition 1962), 4♀♀, 1♂; site A27, 19 Jul 1962 (Leg. MZLU expedition 1962), 1♀; site A30, 29 Jul 1962 (Leg. MZLU expedition 1962), 1♂; site A33, 25 Jul 1962 (Leg. MZLU expedition 1962), 1♀, 2♂♂; site A35, 29 Jul 1962 (Leg. MZLU expedition 1962), 1♀; site A46, 30 Jul 1962 (Leg. MZLU expedition 1962), 1♀, 1♂; site A49, 1 Aug 1962 (Leg. MZLU expedition 1962), 1♀; site A9, 25 Jul 1962 (Leg. MZLU expedition 1962), 1♀; site D:E, 2 Aug 1962 (Leg. MZLU expedition 1962), 1♀; Nesjar, Drifandifoss, site 87D, 24 Aug 1967 (MZLU, Leg. H. Andersson), 1♀; Hornafjördur, site A60, 12 Aug 1962 (Leg. MZLU expedition 1962), 1♂; site A64, 13 Aug 1962 (Leg. MZLU expedition 1962), 2♀♀, 11♂♂; Öraefi, Skaftafell, 12–19 Aug 1999 (NHRI, Leg. R.F. Kristjansson), 1♀, 1♂; Ingolfshöfdi, 28 Jul 1985 (NHRI, Leg. E. Ólafsson), 1♂; Sudursveit, Reynivellir, 13 Aug 1988 (NHRI, Leg. E. Ólafsson), 3♀♀; **Arnessysla**, Ölfus, Gljufur, 14 Aug 1985 (NHRI, Leg. E. Ólafsson), 1♀, 1♂; Borgarfjardarsysla, Andakill, Hvanneyri, 27 Aug 1986 (NHRI, Leg. E. Ólafsson), 2♀♀; Reykjadalur, Reykholt, 8 Aug 1937 (ZMUC, Leg. L. Harinsen), 1♂; **Dalasysla**, Fellsströnd, Kjallaksstadir, 17 Aug 1988 (NHRI, Leg. E. Ólafsson), 1♂; **Eyjafjardarsysla**, Eyjafjördur, Finnastadir, 21 Jul 1985 (NHRI, Leg. E. Ólafsson), 1♂; **Gullbringusysla**, Grindavik, Mölvik, 31 Jul 1984 (NHRI, Leg. E. Ólafsson), 6♀♀, 5♂♂; Reykjanesviti, 14 Aug 1986 (NHRI, Leg. E. Ólafsson), 1♀; **Kjosarsysla**, Mosfellsbaer, Stardalur, 22 Jul 1985 (NHRI, Leg. E. Ólafsson), 1♀; **Rangarvallasysla**, V-Eyjafjallahreppur, Markarfljot, E Markarfljot, 2 km NW Storidalur, Loc 14-Gl, 9 Jun–9 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Holt, Hallstun, 1 Aug 1986 (NHRI, Leg. E. Ólafsson), 1♂; Fljotshlid, Tumastadir, 13–20 Aug 2001 (NHRI, Leg. E. Ólafsson), 1♀; 30 Jul–6 Aug 2002 (NHRI, Leg. E. Ólafsson), 1♀; Landssveit, Laekjarbotnar, 30 Jul 1986 (NHRI, Leg. E. Ólafsson), 1♀; V-Landeyjar, Grimsstadir, 18 Jul 1986 (NHRI, Leg. E. Ólafsson), 1♀; Reykjavik, Reykjavik (Laugarnes), 21 Jul 1931 (ZMUC, Leg. R. Spärck), 1♂; **Skagafjardarsysla**, Lytingsstadahreppur, Maelifell, 24 Jul 1933 (ZMUC, Leg. S. L. Tuxen), 1♂; (ZMUC, Leg. S. L. Tuxen), 1♀, 2♂♂; Skidastadalaug, 27 Jul 1932 (ZMUC, Leg. S. L. Tuxen), 1♀; Svarta, 12 Aug 1932 (ZMUC, Leg. S. L. Tuxen), 1♀; Tungusveit, 16 Aug 1932 (ZMUC, Leg. S. L. Tuxen), 1♀; **Snaefellsnessysla**, Miklholtshreppur, Sydra-Lagafell, 18 Aug 1988 (NHRI, Leg. E. Ólafsson), 1♂; Vegamot (NHRI, Leg. E. Ólafsson), 1♀; **V-Hunavatnssysla**, Midfjordur, Hvammstangi, 15 Jul 1987 (NHRI, Leg. E. Ólafsson), 1♀.

Leia fascipennis is a common species widely reported in Europe and also from Algeria in North Africa. The species is widely distributed in a variety of habitats in Icelandic lowlands (Map 5). It has not been found at higher altitudes in the interior parts of Iceland. All material in the Lund (MZLU) or Copenhagen (ZMUC) collections was previously determined as *Leia bimaculata* (Meigen, 1804). Using the keys in Hutson et al. (1980) and Plassmann (1973) we find that they all belong to *L. fascipennis*, as does all new material examined. Terminalia of the male was figured by Hutson et al. (1980:103, fig. 267) and Plassmann (1973:137, fig. 12), and the terminalia of the female was figured by Hutson et al. (1980:83, fig. 60) and Plassmann (1973:137, fig. 13).

Subfamily Mycetophilinae

Tribe Exechiini

Genus *Allodia* Winnertz

Allodia is a large, mainly Holarctic genus divided into two subgenera. There are some 40 species known from the Palaearctic region, 28 of them are known from Fennoscandia and 18 from Great Britain. The most comprehensive key was provided by Zaitzev (2003).

10. *Allodia (Allodia) embla* Hackman, 1971

Allodia sp. n.; Lindroth 1965:132.

Allodia embla Hackman, 1971:6: Lindroth et al. 1988:55; Ólafsson 1991:46; Einarsson et al. 2000:215; Ólafsson 2000:56; Magnusson et al., 2001:223.

Material examined: **ICELAND: A-Skaftafellssysla**, Öraefi, Skaftafell, site A10, 20 Jul 1962 (Leg. MZLU expedition 1962), 2♂♂; 8 Aug 1962 (Leg. MZLU expedition 1962), 1♀; site A22 (Leg. MZLU expedition 1962), 1♀; Nesjar, Hornafjördur, Site 69 (Svinafell), 21 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; Midfell, site 65, 19 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; **Rangarvallasysla**, Emstrur, Litla-Graenafjall, 9 Jul 1982 (NHRI, Leg. E. Ólafsson), 1♀; S-Mulasysla, Breiddalsvik, Breiddalsvik, 16 Jun 1989 (NHRI, Leg. E. Ólafsson), 1♂; **S-Thingeyjarsysla**, Myvatnssveit, Myvatn, Geirastadir, Loc 29-Dsh, 19 Jun–17 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Myvatn, Djupadokk, 1.5 km NNW Grimsstadir, Loc 31-Dsh, 17 Jun–15 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 32-

Wsh, 19 Jun–17 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Myvatn, 5 km NV Reynihllid, site 55, 23 Jun–30 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Skagafjardarsysla, Lytingsstadahreppur, Maelifell, S Sydri-Maelifellsa, along small stream, Loc 22-Gl, 6 Jun–1 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; **Strandasysla**, Baejarhreppur, Laxardalsheidi, 5 km NW Bordeyri, Loc 20-Wl, 8 Aug–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 2♂♂; **V-Skaftafellssysla**, Kirkjubaejarhreppur, Nya Eldhraun, 13 km SW Kirkjubaejarklaustur, Loc 03-Mlh, 21 Jun–9 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 6♀♀, 4♂♂; Nya Eldhraun, 13 km SW Kirkjubaejarklaustur, Loc 04-Sd (MZLU, Leg. S.-A. Bengtson et al.), 3♀♀, 1♂; Medalland, Nya Eldhraun, SW Kirkjubaejarklaustur, Loc 05-Gh, 27 May–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂.

Allodia embla was described based on type material from Iceland (Hackman 1971:6, figs 13–16). It has later been found in Great Britain, Germany and all Nordic countries, except on The Faroes where only *A. lugens* (Wiedemann, 1817) is reported (Kjærandsen & Jørgensen 1992). According to Chandler (2001; 2004) the species has rather boreal distribution, also including North America. *Allodia embla* is distributed all over Iceland (Map 6). There is a considerable unchecked material at NHRI showing a wide distribution in the interior highlands, where the species seems to be more common than in lowland habitats. Bogs above 400 m seem to be the ideal habitat.

Genus *Allodiopsis* Tuomikoski

Allodiopsis s. str. is a small genus of 6 Palaearctic and one Holarctic species. Five species are known from Fennoscandia and 3 from Great Britain. Zaitzev (2003) treated *Allodiopsis* as a subgenus and provided a key to 5 of the species.

11. *Allodiopsis domestica* (Meigen, 1830)

Mycetophila domestica Meigen, 1830:303.
Rhymosia domestica: Lindroth 1965:132; Andersson 1967:103
Allodiopsis domestica: Lindroth et al. 1973:25; Lindroth et al. 1988:55; Magnusson et al., 2001:223.
Synplasta (Allodiopsis) domestica: Ólafsson 1991:46.
Synplasta domestica: Ólafsson 2000:54.

Material examined: **ICELAND: A-Skaftafellssysla**, Öraefi, Sandfell, 5 km E Svinafell, Loc 54-Gl, 21 Jun–11 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 3♂♂; Skaftafell, site A17, 18 Jul 1962 (Leg. MZLU expedition 1962), 1♂; Nesjar, Hornafjördur, Horn, site 81, 25 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; Site 14, 23 Jun 1966 (MZLU, Leg. S. Richter), 2♀♀; Midfell, site 65, 19 Jun 1966 (MZLU, Leg. H. Andersson), 2♂♂; 20 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; 26 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; **Arnessysla**, Kjölur, Blanipuver, 29 Jul–1 Aug 2002 (NHRI, Leg. E. Ólafsson), 1♀; **Dalasysla**, Hvammssveit, Asgardur, 21 Jun 1987 (NHRI, Leg. E. Ólafsson), 1♀, 1♂; **Gullbringusysla**, Hafnarfjördur, Hafnarfjördur (Midvangur 12), 22 Jul 1996 (NHRI, Leg. E. Ólafsson), 1♀; **Myrasysla**, Stafholtstungur, Stafholtstungur, 5 km N Stafholt, Loc 17-Wl, 8 Jun–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; **N-Mulasysla**, Bruardalir, Saudafell, 22 Jul 2000 (NHRI, Leg. E. Ólafsson), 1♂; **Rangarvallasysla**, A-Eyjafjallahreppur, Skogar, Site 69, 29 Jun 1968 (MZLU, Leg. H. Andersson), 1♂; Fljotshlid, Tumastadir, 28 Aug–4 Sep 2000 (NHRI, Leg. E. Ólafsson), 1♀; 25 Jun–2 Jul 2003 (NHRI, Leg. E. Ólafsson), 1♂; **S-Mulasysla**, Vellir, Jonsskogur, 29 Jul–12 Aug 2002 (NHRI, Leg. G. Halldorsson), 1♀; **S-Thingeyjarsysla**, Myvatnssveit, Myvatn, Vogahraun, 1 km S Reykjahlid, Loc 39-Bw, 17 Jun–14 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂.

Allodiopsis domestica is a common species widely reported in the Holarctic region. Also widely distributed in Iceland, though rare in the central highlands (Map 7). The male terminalia was figured by Zaitzev (2003:101, fig 5.2 & 102 fig. 6.6). Female terminalia conform well to figures presented by Dziedzicki (1910: Taf. V, figs 85–87) and females are also conspecific with reared material from Estonia associated to males of this species (O. Kurina *unpublished*).

Genus *Anatella* Winnertz

Anatella is a mainly Holarctic genus with about 50 species. There are some 40 species known from the Palaearctic region, 25 of them are known from Fennoscandia and 15 from Great Britain. The most comprehensive key was provided by Zaitzev (2003).

• 12. *Anatella* sp.

Material examined: **ICELAND: Strandasysla**, Baejarhreppur, Laxardalsheidi, 5 km NW Bordeyri, Loc 20-Wl, 8 Aug–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀.

At present it is not possible for us to determine females of the genus *Anatella*. There are probably good enough characters in their terminalia to enable determination to species level, but only a few females have so far been associated with males and illustrated in the literature. The sole locality is in western Iceland.

Genus *Brevicornu* Marshall

Brevicornu is a large, probably cosmopolitan genus with more than 70 known species. There are about 40 species known from the Palaearctic region, 34 of them are known from

Fennoscandia and 20 from Great Britain. The most comprehensive key was provided by Zaitzev (2003). Reference to detailed figures of male terminalia, especially the internal view of the gonostylus, is essential for determination. Females apparently look very similar with respect to terminalia and for most species they are not associated nor figured in the literature. Hence, we are not able to determine females of this genus.

Provisional key to males known from Iceland

1 Terminalia as illustrated by Zaitzev (2003:123, figs. 13.4 & 13.6); dorsal lobe of gonostylus possessing an internally directed narrow process .... 13. *B. auriculatum* (Edwards)
— Dorsal lobe of gonostylus without an internally directed narrow process 2
2. Terminalia as illustrated by Kjærandsen (2005:20, figs. 5A–D); ventral lobe of gonostylus broadest apically ... . 15. *B. griseolum* (Zetterstedt)
— Ventral lobe of gonostylus tapered apically 3
3. Dorsal lobe of gonostylus long ovate, 2/3 to subequal to length of gonocoxite 4
— Dorsal lobe of gonostylus short ovate, less than 1/2 length of the gonocoxite 5
4. Scutellum with 4 long medial setae; terminalia as illustrated by Zaitzev (1988:392, figs. 1.9, 10); ventral lobe of gonostylus terminates distinctly before termination of dorsal lobe ..... 16. *B. kingi* (Edwards)
— Scutellum with 2 long medial setae; terminalia as illustrated by Zaitzev (1988:395, figs. 2.1, 2); ventral lobe of gonostylus terminates approximately at same level as termination of dorsal lobe .... 14. *B. griseicolle* (Staeger)
5. Dorsal lobe of gonostylus distinctly broadest apically; terminalia as illustrated by Zaitzev (2003:138, figs. 21.1, 2); ventral lobe of gonostylus bent ventrally midway, shorter than dorsal lobe ..... 18. *B. verralli* (Edwards)
— Dorsal lobe of gonostylus small, ovate; terminalia as illustrated by Zaitzev (1985:44, figs. 2.3, 2.9); ventral lobe of gonostylus nearly straight, longer than dorsal lobe ..... 17. *B. proximum* (Staeger)

13. *Brevicornu auriculatum* (Edwards, 1925)

Allodia auriculata Edwards, 1925:610.
Brevicornu sericoma (Meigen, 1830:302): Ólafsson 1991:46 [misidentification]; Einarsson et al. 2000:215 [misidentification]; Ólafsson 2000:57 [misidentification]; Magnusson et al. 2001:223 [misidentification].

Material examined: **ICELAND: Arnessysla**, Kjölur, Svartarbotnar, 28 Jul–16 Aug 2002 (NHRI, Leg. E. Ólafsson), 1♂; **N-Mulasysla**, Vesturöraefi, Hals, 29 Jun–20 Jul 1999 (NHRI, Leg. E. Ólafsson), 2♂♂; Vesturöraefi, 28 Jun–15 Jul 1999 (NHRI, Leg. E. Ólafsson), 1♂; 29 Jun–17 Jul 1999 (NHRI, Leg. E. Ólafsson), 1♂; **Rangarvallasysla**, Veidivötn, Litla-Fossvatn, 16 Jul 1988 (NHRI, Leg. E. Ólafsson), 1♂.

Brevicornu auriculatum is a rare but widespread species in Europe, originally described from Great Britain. Also reported from the Far East region of Russia. The species is rare in Iceland, found in humid habitats, only in the central highlands (Map 9). Further material is available at NHRI, from highland areas as well.

14. *Brevicornu griseicolle* (Staeger, 1840)

Mycetophila griseicolle Staeger, 1840:258.
Brevicornu griseicollis: Lindroth et al. 1973:25; Lindroth et al. 1988:55; Ólafsson 1991:46; Einarsson et al. 2000:215; Ólafsson 2000:56; Magnusson et al. 2001:223.

Material examined: **ICELAND: A-Skaftafellssysla**, Nesjar, Hornafjördur, Hoffell, site 66, 19 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; **Arnessysla**, Ölfus, Gljufur, 14 Aug 1985 (NHRI, Leg. E. Ólafsson), 8♂♂; Floi, Önundarholt, 30 Jul 1986 (NHRI, Leg. E. Ólafsson), 1♂; Grafningur, Ölkelduhals, 8–22 Aug 2001 (NHRI, Leg. M. Ingimarsdottir), 2♂♂; 22 Aug–7 Sep 2001 (NHRI, Leg. M. Ingimarsdottir), 1♂; Hrunamannahreppur, Nupstun, 9 Jul 1986 (NHRI, Leg. E. Ólafsson), 1♂; Ölfus, Fremstidalur, 12 Jul–14 Aug 2002 (NHRI, Leg. M. Ingimarsdottir), 3♂♂; **Borgarfjardarsysla**, Andakill, Hvanneyri, 27 Aug 1986 (NHRI, Leg. E. Ólafsson), 1♂; **Dalasysla**, Fellsströnd, Ytrafell, 23 Jun 1987 (NHRI, Leg. E. Ólafsson), 1♂; **Gullbringusysla**, Hafnarfjördur, Hafnarfjördur (Hraunbrun 14), 12–13 Sep 2002 (NHRI, Leg. E. Ólafsson), 2♂♂; 12–13 Oct 2003 (NHRI, Leg. E. Ólafsson), 1♂; Hafnir, Gunnuhver, 23 Aug–5 Sep 2001 (NHRI, Leg. M. Ingimarsdottir), 1♂; 5 Oct–8 Nov 2001 (NHRI, Leg. M. Ingimarsdottir), 1♂; Njardvik, Seltjörn, 8 Jul 1986 (NHRI, Leg. E. Ólafsson), 1♂; **N-Isafjardarsysla**, Holshreppur, Skalavik, 1 Jul 1994 (NHRI, Leg. E. Ólafsson), 1♂; **Rangarvallasysla**, V-Eyjafjallahreppur, Markarfljot, E Markarfljot, 2 km NW Storidalur, Loc 14-Gl, 9 Jun–9 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Vestmannaeyjar, Heimaey, Site 11, 26 Jul 1965 (MZLU, Leg. H. Andersson), 1♂; Site 5, 13 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; Site 6, 23 Jul 1965 (MZLU, Leg. H. Andersson), 1♂; 29 Jul 1965 (MZLU, Leg. H. Andersson), 1♂; V-Eyjafjallahreppur, Vomulastadir, Réttasandur, Site I22, 1 Jul 1968 (MZLU, Leg. H. Andersson), 1♂; A-Eyjafjallahreppur, Skogar, Site 17, 29 Aug 1967 (MZLU, Leg. S. Richter), 4♂♂; V-Eyjafjallahreppur, Asolfsskali, Moldnupur, Site 109, 25 Jun 1968 (MZLU, Leg. H. Andersson), 1♂; Fljotshlid, Tumastadir, 6–13 Jul 1995 (NHRI, Leg. E. Ólafsson), 1♂; 4–11 Jun 2002 (NHRI, Leg. E. Ólafsson), 1♂; Reykjavik, Reykjavik

(Brunavegur), 9 Aug 1978 (NHRI, Leg. E. Ólafsson), 1♂; **S-Mulasysla**, Vellir, Mjoanes, 21 Jun–14 Jul 2002 (NHRI, Leg. G. Halldorsson), 1♂; **S-Thingeyjarsysla**, Fnjoskadalur, Vaglaskogur, 19 Jul 1984 (NHRI, Leg. E. Ólafsson), 1♂; **V-Skaftafellssysla**, Hörgslandshreppur, Varmardalur, 17 Jul–14 Aug 2001 (NHRI, Leg. E. Ólafsson), 3♂♂; Lakagigar, 16 Jul–13 Aug 2001 (NHRI, Leg. E. Ólafsson), 1♂; 2–17 Jul 2002 (NHRI, Leg. E. Ólafsson), 1♂; Laki, 17 Jul–13 Aug 2001 (NHRI, Leg. E. Ólafsson), 1♂.

Brevicornu griseicolle is a common species widely reported in Europe and Russia. The species is found in a variety of habitats all around Iceland, also at higher altitudes in the central parts (Map 10). Further unchecked material is available at NHRI.

15. *Brevicornu griseolum* (Zetterstedt, 1852) sensu auctore

Mycetophila griseola Zetterstedt, 1852:4225.
Brevicornu boreale (Lundström, 1914:17) syn. by Kjærandsen (2005: 19): Ólafsson 1991:46; Einarsson et al. 2000:215; Ólafsson 2000:56; Magnusson et al. 2001:223.
Brevicornu bipartitum Lastovka & Matile, 1974:127; Magnusson et al. 2001:223 [misidentification].

Material examined: **ICELAND: A-Skaftafellssysla**, Sudursveit, Breidamerkursandur, 30 Jul 1985 (NHRI, Leg. E. Ólafsson), 1♂; **Arnessysla**, Ölfus, Gljufur, 14 Aug 1985 (NHRI, Leg. E. Ólafsson), 2♂♂; Floi, Önundarholt, 30 Jul 1986 (NHRI, Leg. E. Ólafsson), 1♂; **Eyjafjardarsysla**, Ufsaströnd, Ripill, 8 Jul 1989 (NHRI, Leg. E. Ólafsson), 1♂; **N-Mulasysla**, Vesturöraefi, Hals, 29 Jun–20 Jul 1999 (NHRI, Leg. E. Ólafsson), 1♂; 20 Jul 1999 (NHRI, Leg. E. Ólafsson), 1♂; Vesturöraefi, 29 Jun–17 Jul 1999 (NHRI, Leg. E. Ólafsson), 1♂; Burfellsfloi, 16 Jul–15 Aug 1999 (NHRI, Leg. E. Ólafsson), 1♂; Tunga, 1–16 Jul 1999 (NHRI, Leg. E. Ólafsson), 1♂; 1♀ Jul–15 Aug 1999 (NHRI, Leg. E. Ólafsson), 1♂; **Rangarvallasysla**, Landssveit, Laekjarbotnar, 30 Jul 1986 (NHRI, Leg. E. Ólafsson), 2♂♂; **Strandasysla**, Baejarhreppur, Laxardalsheidi, 5 km NW Bordeyri, Loc 19-Dsh, 8 Aug–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; **V-Skaftafellssysla**, Hörgslandshreppur, Hellisarbotnar, 3–18 Jul 2001 (NHRI, Leg. E. Ólafsson), 1♂; 18 Jul–16 Aug 2001 (NHRI, Leg. E. Ólafsson), 1♂; Lakagigar, 17 Jul–14 Aug 2001 (NHRI, Leg. E. Ólafsson), 1♂.

Kjærandsen (2005) recently found that Edwards (1924) misinterpreted and mixed *Brevicornu griseolum* (Zetterstedt, 1852) and *B. canescens* (Zetterstedt, 1852), where the first name has been widely but erroneously used for the latter species following Edwards (1924). *B. griseolum* sensu auctore was further found to be a senior synonym of *B. boreale* (Lundström, 1914). *B. griseolum* is a common species widely reported in northern Europe under the name *B. boreale*. The species is widely distributed in Iceland but sparse, both in lowland and highland habitats (Map 11). Further material is available at NHRI.

16. *Brevicornu kingi* (Edwards, 1925)

Allodia kingi Edwards, 1925:611.
Brevicornu kingi: Lindroth et al. 1973:25; Ólafsson 1991:46; Magnusson et al. 2001:223.

Material examined: **ICELAND: A-Skaftafellssysla**, Sudursveit, Reynivellir, 6–14 Aug 2000 (NHRI, Leg. E. Ólafsson), 1♂; **Arnessysla**, Kjölur, Fossrofulaekur, 1–28 Jul 2002 (NHRI, Leg. E. Ólafsson), 1♂; Kjalhraun, 2–31 Jul 2002 (NHRI, Leg. E. Ólafsson), 3♂♂; **Rangarvallasysla**, V-Eyjafjallahreppur, Vomulastadir, Réttasandur, Site I22, 1 Jul 1968 (MZLU, Leg. H. Andersson), 1♂; Emstrur, Markarfljotsgljufur, 9 Jul 1982 (NHRI, Leg. E. Ólafsson), 2♂♂; S-Mulasysla, Vellir, Mjoanes, 21 Jun–14 Jul 2002 (NHRI, Leg. G. Halldorsson), 2♂♂; **S-Thingeyjarsysla**, Reykjadalur, Masvatn, 10 km W Myvatn, near brook, Loc 28-Wl, 18 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Myvatnssveit, Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 34-Gl, 19 Jun–17 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 35-Pl (MZLU, Leg. S.-A. Bengtson et al.), 3♂♂; **Strandasysla**, Baejarhreppur, Laxardalsheidi, 5 km NW Bordeyri, Loc 19-Dsh, 8 Aug–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 3♂♂; Laxardalsheidi, 5 km NW Bordeyri, Loc 20-Wl (MZLU, Leg. S.-A. Bengtson et al.), 2♂♂; **V-Skaftafellssysla**, Myrdalur, Vik i Myrdal, 600 m SW village, Loc 09-Sd, 25 Mar–7 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Skaftartunga, Gaesatungur, 14 Jul–11 Aug 2001 (NHRI, Leg. E. Ólafsson), 1♂; 14 Jul 2001 (NHRI, Leg. E. Ólafsson), 1♂; Ljotarsstadaheidi, 14 Jul–11 Aug 2001 (NHRI, Leg. E. Ólafsson), 1♂.

Brevicornu kingi is a common northern Holarctic species widely distributed in Europe, Russia and North America. In Iceland the species is widely distributed, but very sparse in the higher interior parts (Map 12).

17. *Brevicornu proximum* (Staeger, 1840)

Mycetophila proxima Staeger, 1840:258.
Brevicornu proximum: Lindroth et al. 1973:25; Ólafsson 1991:46; Einarsson et al. 2000:215; Ólafsson 2000:56; Magnusson et al. 2001:223.

Material examined: **ICELAND: A-Skaftafellssysla**, Myrar, Vidbord, 8 Jun 1987 (NHRI, Leg. E. Ólafsson), 1♂; **Arnessysla**, Kjölur, Kjalhraun, 30 Jun–29 Jul 2002 (NHRI, Leg. E. Ólafsson), 1♂; **Gullbringusysla**, Hafnarfjördur, Hafnarfjördur (Hraunbrun 14), 15–16 Aug 2003 (NHRI, Leg. E. Ólafsson), 1♂; **Rangarvallasysla**, Vestmannaeyjar, Heimaey, Site 11, 26 Jul 1965 (MZLU, Leg. H. Andersson), 1♂; Site 2, 20 Jul 1965 (MZLU, Leg. H. Andersson),

1♂; Site 5, 13 Jun 1966 (MZLU, Leg. H. Andersson), 2♂♂; Site 6, 23 Jul 1965 (MZLU, Leg. H. Andersson), 3♂♂; V-Eyjafjallahreppur, Asolfsskali, Moldnupur, Site 109, 25 Jun 1968 (MZLU, Leg. H. Andersson), 1♂; Site 7 (MZLU, Leg. S. Richter), 1♂; A-Eyjafjallahreppur, Skogasandur, 2 Aug 1984 (NHRI, Leg. E. Ólafsson), 1♂; Fljotshlid, Tumastadir, 10–17 Jul 2000 (NHRI, Leg. E. Ólafsson), 1♂; 7–13 Aug 2002 (NHRI, Leg. E. Ólafsson), 1♂; 9–16 Jul 2002 (NHRI, Leg. E. Ólafsson), 1♂; **V-Hunavatnssysla**, Midfjordur, Hvammstangi, 15 Jul 1987 (NHRI, Leg. E. Ólafsson), 1♂; **V-Skaftafellssysla**, Myrdalur, Vik i Myrdal, 2 km E village on S slope, Loc 08-Gl, 25 Mar–7 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 4♂♂; Vik i Myrdal, 800 m SW village, Loc 10-Hm, 27 May–7 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂.

Brevicornu proximum is a widely distributed species in Europe and Siberia. The species is found in all parts of Iceland (Map 13). A considerable material in the NHRI collection is still unchecked.

• 18. *Brevicornu verralli* (Edwards, 1925)

Allodia verralli Edwards, 1925:610.

Material examined: **ICELAND: A-Hunavatnssysla**, Vindhaelishreppur, Nupur, 17 Jul 1985 (NHRI, Leg. E. Ólafsson), 1♂; **A-Skaftafellssysla**, Öraefi, Fagurholsmyri, 8 Jun 1987 (NHRI, Leg. E. Ólafsson), 1♂; **Gullbringusysla**, Hafnir, Gunnuhver, 23 Aug–5 Sep 2001 (NHRI, Leg. M. Ingimarsdottir), 1♂; Njardvik, Seltjörn, 8 Jul 1986 (NHRI, Leg. E. Ólafsson), 1♂; **Rangarvallasysla**, Fljotshlid, Tumastadir, 15–22 Oct 2003 (NHRI, Leg. E. Ólafsson), 1♂.

Brevicornu verralli is a widely distributed species in Europe and Siberia. In Iceland it is a rare species, found at a few sites in the western and southern parts (Map 14). A male from Korea, figured by Zaitzev (1985) under the name *B. verralli*, has recently been separated as a new species, *B. koreaiense* Zaitzev, 2003, by Zaitzev (2003).

Brevicornu spp. (females)

Material examined: **ICELAND: A-Skaftafellssysla**, Öraefi, Sandfell, 5 km E Svinafell, Loc 54-Gl, 21 Jun–11 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Nesjar, Drifandifoss, Site 87E, 24 Aug 1967 (MZLU, Leg. H. Andersson), 1♀; Öraefi, Skaftafell, 17–24 Jul 2000 (NHRI, Leg. E. Ólafsson), 1♀; 3–10 Sep 2002 (NHRI, Leg. E. Ólafsson), 1♀; **Arnessysla**, Thingvellir, Stiflisdalsvatn, 3 km S Stiflisdalsvatn at Litla-Saudafell, Loc 16-Dsh, 8 Jun–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Floi, Baugsstadir, 29 Jul 1986 (NHRI, Leg. E. Ólafsson), 1♀; Kjölur, Fossrofulaekur, 1–28 Jul 2002 (NHRI, Leg. E. Ólafsson), 1♀; Kjalhraun, 2–31 Jul 2002 (NHRI, Leg. E. Ólafsson), 1♀; Svartarbotnar, 1–28 Jul 2002 (NHRI, Leg. E. Ólafsson), 1♀; **Dalasysla**, Haukadalur, Haukadalur, 500 m NW eastern end of Haukadalsvatn, Loc 18-Hm, 7 Jun–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; **Myrasysla**, Stafholtstungur, Munadarnes, 4 Jul 1985 (NHRI, Leg. E. Ólafsson), 1♀; **N-Mulasysla**, Jökulsarhlid, Sledbrjotur, 2 km S 7 km NW Kirkjubaer, N Egilsstadi, Loc 45-Wl, 16 Jun–1 Aug 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; **Rangarvallasysla**, V-Eyjafjallahreppur, Markarfljot, E Markarfljot, 2 km NW Storidalur, Loc 14-Gl, 9 Jun–9 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀; Vestmannaeyjar, Heimaey, Site 10, 25 Jul 1965 (MZLU, Leg. H. Andersson), 1♀; Fljotshlid, Tumastadir, 21–28 Aug 2000 (NHRI, Leg. E. Ólafsson), 1♀; **S-Mulasysla**, Vellir, Hallormsstadarskogur, S Egilsstadir, Loc 49-Bw, 20 Jun–12 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀; Mjoanes, 14–29 Jul 2002 (NHRI, Leg. G. Halldorsson), 3♀♀; **S-Thingeyjarsysla**, Reykjadalur, Masvatn, 10 km W Myvatn, near brook, Loc 28-Wl, 18 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Myvatnssveit, Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 32-Wsh, 19 Jun–17 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 4♀♀; Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 34-Gl (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀; Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 35-Pl (MZLU, Leg. S.-A. Bengtson et al.), 7♀♀; Austarasel, 10 km E Myvatn, Loc 44-Dsh, 20 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; **Strandasysla**, Baejarhreppur, Laxardalsheidi, 5 km NW Bordeyri, Loc 19-Dsh, 8 Aug–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 5♀♀; Laxardalsheidi, 5 km NW Bordeyri, Loc 20-Wl, 7 Jun–8 Aug 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; **V-Skaftafellssysla**, Medalland, Nya Eldhraun, SW Kirkjubaejarklaustur, Loc 05-Gh, 27 May–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Myrdalur, Vik i Myrdal, 2 km E village on S slope, Loc 08-Gl, 25 Mar–7 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 4♀♀; Vik i Myrdal, 800 m SW village, Loc 10-Hm, 27 May–7 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀; Vik i Myrdal, on Reynisfjall, 120 m a.s.l., Loc 12-Gh, 22 Jun–10 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Skaftartunga, Hrifunes, 28 Jun 1988 (NHRI, Leg. E. Ólafsson), 1♀; Myrdalur, Vik i Myrdal, 14 Jun 1988 (NHRI, Leg. E. Ólafsson), 1♀.

Genus *Cordyla* Meigen

Cordyla is a well-defined, easily recognized genus currently with 38 species in the Holarctic and Oriental regions. There are 23 species known from the Palaearctic region, 15 of them are known from Fennoscandia and 12 from Great Britain. A revision of the genus in the Palaearctic region is in preparation by the second author (see also Kurina 2001) and will include several new species.

19. *Cordyla pusilla* Edwards, 1925

Cordyla pusilla Edwards, 1925:615: Ólafsson 1991:46.

Cordyla brevicornis (Staeger, 1840:269): Lindroth 1965:132 [misidentification]; Andersson 1967:103 [misidentification]; Ólafsson 1991:46 [misidentification].

Brevicornu brevicornis: Einarsson et al. 2000:215 [misidentification];

Map 9: *Brevicornu auriculatum*

Map 10: *Brevicornu griseicolle*

Map 11: *Brevicornu griseolum*

Map 12: *Brevicornu kingi*

Map 13: *Brevicornu proximum*

Map 14: *Brevicornu verralli*

Map 15: *Sceptonia fumipes*

Map 16: *Zygomyia pseudohumeralis*

Distribution maps Nos. 9–16 = species 13, 14, 15, 16, 17, 18, 38 & 41.

Ólafsson 2000:57 [misidentification].
Brevicornu pusilla: Magnusson et al. 2001:223.

Material examined: **ICELAND**: ?, Midfellsvatn (a common name), 27 Jul 1955 (ZMUC, Leg. unknown), 1♂; **A-Skaftafellssysla**, Öraefi, Skaftafell, site A10, 8 Aug 1962 (Leg. MZLU expedition 1962), 1♂; site A12, 7 Aug 1962 (Leg. MZLU expedition 1962), 1♂; site A18, 18 Jul 1962 (Leg. MZLU expedition 1962), 1♂; site A31, 13 Jul 1962 (Leg. MZLU expedition 1962), 1♂; site A35, 2 Aug 1962 (Leg. MZLU expedition 1962), 1♂; Nesjar, Hornafjördur, Site 76 (Dynjandi), 24 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; **Arnessysla**, Floi, Vatnsendi, 30 Jul 1986 (NHRI, Leg. E. Ólafsson), 1♂; Kjölur, Blanipuver, 30 Jun–29 Jul 2002 (NHRI, Leg. E. Ólafsson), 1♀; Fossrofulaekur, 1–28 Jul 2002 (NHRI, Leg. E. Ólafsson), 1♂; **Gullbringusysla**, Grindavik, Thorbjarnarfell, 20 Jul 1985 (NHRI, Leg. E. Ólafsson), 1♂; Hafnarfjördur, Hafnarfjördur (Hraunbrun 14), 20–21 Sep 2000 (NHRI, Leg. E. Ólafsson), 1♀; 17–18 Aug 2003 (NHRI, Leg. E. Ólafsson), 1♂; **N-Mulasysla**, Vesturöraefi, Burfell, 26 Jun–16 Jul 1999 (NHRI, Leg. E. Ólafsson), 1♂; 16 Jul 1999 (NHRI, Leg. E. Ólafsson), 1♀; Hals, 27 Jun–20 Jul 2000 (NHRI, Leg. E. Ólafsson), 2♂♂; 20 Jul–11 Aug 2000 (NHRI, Leg. E. Ólafsson), 1♂; Lindur, 26 Jun–16 Jul 1999 (NHRI, Leg. E. Ólafsson), 1♀; **Rangarvallasysla**, V-Eyjafjallahreppur, Markarfljot, E Markarfljot, 2 km NW Storidalur, Loc 14-Gl, 9 Jun–9 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Vomulastadir, Réttasandur, Site I22, 1 Jul 1968 (MZLU, Leg. H. Andersson), 1♂; Fljotshlid, Tumastadir, 7–21 Aug 2000 (NHRI, Leg. E. Ólafsson), 2♂♂; 14–21 Aug 2000 (NHRI, Leg. E. Ólafsson), 1♂; 4–11 Jun 2002 (NHRI, Leg. E. Ólafsson), 2♂♂; 16–23 Jul 2002 (NHRI, Leg. E. Ólafsson), 2♂♂; 30 Jul–6 Aug 2002 (NHRI, Leg. E. Ólafsson), 17, 5♂♂; 20–27 Aug 2002 (NHRI, Leg. E. Ólafsson), 1♂; 18–25 Jun 2003 (NHRI, Leg. E. Ólafsson), 1♂; 25 Jun–2 Jul 2003 (NHRI, Leg. E. Ólafsson), 1♂; **S-Thingeyjarsysla**, Myvatnssveit, Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 32-Wsh, 19 Jun–17 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀, 6♂♂; **Strandasysla**, Baejarhreppur, Laxardalsheidi, 5 km NW Bordeyri, Loc 20-Wl, 7 Jun–8 Aug 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂; V-**Skaftafellssysla**, Kirkjubaejarhreppur, Nya Eldhraun, 13 km SW Kirkjubaejarklaustur, Loc 03-Mlh, 25 Mar–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Nya Eldhraun, 13 km SW Kirkjubaejarklaustur, Loc 04-Sd, 21 Jun–9 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; 25 Mar–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂.

Cordyla pusilla is a common species widely distributed in Europe. The species is found in all kinds of habitats in all parts of the country, sometimes abundant (Map 8). A considerable material in the NHRI collection is still unchecked.

Genus *Exechia* Winnertz

Exechia is a large, worldwide genus. There are about 70 species known from the Palaearctic region, 40 of them are known from Fennoscandia and 27 from Great Britain. The most comprehensive key was provided by Zaitzev (2003). The majority of the females also show distinctive characters in terminalia and are so far associated and illustrated for about half of the Palaearctic species.

Provisional key to males of species known from Iceland

1. Gonocoxite rather closed apicoventrally, without a long spatula-shaped hypandrial lobe 2
— Gonocoxite apicoventrally with a deep u-shaped emargination in which a long spatula-shaped hypandrial lobe is situated 5
2. Small species (wing length less than 2.5 mm); terminalia as illustrated by Stackelberg (1948:95, figs. 4, 5) and Zaitzev (2003:161, fig. 30.4); dorsal lobe of gonostylus externally with a row of about 5 strong, truncated setae; aedeagal guides not prominent ..... 25. *E. pectinivalva* Stackelberg
— Larger species (wing length more than 3 mm); dorsal lobe of gonostylus without external row of strong, truncate setae; aedeagal guides present as prominent plates ventromedially 3
3. Terminalia as illustrated by Lackschewitz (1937:25, figs. 8a–c); dorsal lobe of gonostylus large, ovate, without furcations; aedeagal guides large, thin, subrectangular plates ..... 26. *E. pseudofestiva* Lackschewitz
— Dorsal lobe of gonostylus apically forked, with at least one pointed lobe; aedeagal guides smaller, distinctly sclerotized 4
4. Terminalia as illustrated by Laštovka & Matile (1974:109, figs. 20, 22); ventral lobe of gonostylus apically with 8 short, strong setae in one row ..... 23. *E. micans* Laštovka & Matile
— Terminalia as in Fig. 3; dorsal and ventral lobe of gonostylus partly fused, without short, strong setae apically ..... 28. *E.* sp. A (see text)
5. Terminalia as illustrated by Edwards (1925: Plate LII, fig. 63); dorsal lobe of gonostylus short, ovate, hypandrial lobe with pair of strong setae basally ..... 24. *E. nigra* Edwards
— Dorsal lobe of gonostylus elongated; hypandrial lobe without setae, but small distinctly separated setal lobe present at its attachment base towards the gonocoxite .. 6
6. Dorsal lobe of gonostylus apically furcated 7
— Terminalia as illustrated by Kurina (1999:54, figs. 1, 3) and Zaitzev (2003:154, figs. 27.5, 27.6); dorsal lobe of gonostylus not furcated, extended into long narrow pro-

cess devoid of setae ..... 22. *E. fusca* (Meigen)
7. Terminalia as illustrated by Laštovka & Matile (1974:110, figs. 27, 29) and Zaitzev (2003:167, fig. 32.2); dorsal lobe of gonostylus apically with a deep split; ventral lobe of gonostylus short, apically covered with setae .... 27. *E. spinuligera* Lundström
— Dorsal lobe of gonostylus apically with a small to tiny split; ventral lobe of gonostylus longer, with or without setae apically 8
8. Terminalia as illustrated by Laštovka & Matile (1974:112, figs. 31 & 33) and Zaitzev (2003:154, fig. 27.2 & 27.3); ventral lobe of gonostylus with setae apically; hypandrial lobe apically evenly rounded ... 21. *E. frigida* (Boheman)
— Terminalia as in Fig. 4; ventral lobe of gonostylus without setae except at base; hypandrial lobe apically with small emargination .. 20. *E. borealis* Lundström sp. restit.

Provisional key to females of species known from Iceland

1. Terminalia as illustrated by Edwards (1925: Plate LII, fig. 63a); tergite VII apicolaterally sinusoid, with a prolongation apicodorsally ..... 24. *E. nigra* Edwards
— Tergite VII either straight or slightly excavated apicodorsally 2
2. Terminalia as illustrated by Laštovka & Matile (1974:109, fig. 24); apical segment of cercus tiny, ovate .... 23. *E. micans* Laštovka & Matile
— Apical segment of cercus larger, slender 3
3. Terminalia as illustrated by Chandler (1977:79, fig. 33); basal segment of cercus shorter than its height ..... 25. *E. pseudofestiva* Lackschewitz
— Basal segment of cercus longer than its height 4
4. All abdominal tergites with distinct yellow patches laterally; terminalia as illustrated by Chandler (1977:77, fig. 28) and Kurina (1999:55, fig. 7); apical segment of cercus long, slender (about five times as long as wide) ..... 22. *E. fusca* (Meigen)
— Abdominal tergites usually all dark or with lateral yellow patches small or confined to basal segments; apical segment of cercus shorter (about 3x as long as wide) 5
5. Small species (wing length usually less than 2.5 mm); terminalia somewhat compressed longitudinally as illustrated by Stackelberg (1948:96, fig. 7) .... 25. *E. pectinivalva* Stackelberg
— Larger species (wing length usually more than 3 mm); terminalia elongated, with tapered sternite VIII .... *E. spinigera*-group 6
6. The females in the *spinigera* group are very similar and difficult to separate. The following characters have been used to tentatively distinguish the species found in Iceland:

Apicoventral corner of tergite VII with an angular, only slightly rounded corner; apicolateral edge slightly concave; abdominal tergites often with small yellow patches laterally ..... 20. *E. borealis* Lundström

Apicoventral corner of tergite VII somewhat truncated forming an inclined corner; apicolateral edge slightly concave; abdominal tergites usually all dark .... 21. *E. frigida* (Boheman)

Terminalia as illustrated by Chandler (1977:79, fig. 30); apicoventral corner of tergite VII distinctly notched; apicolateral edge straight; abdominal tergites sometimes with small yellow patches laterally .... 27. *E. spinuligera* Lundström

• 20. *Exechia borealis* Lundström, 1912 sp. restit.

Fig. 3.

Exechia borealis Lundström, 1912:33.

Diagnosis. E. borealis is very close to *E. frigida* (Boheman, 1865), *E. subfrigida* Laštovka & Matile, 1974 and *E. kunashirensis* Zaitzev, 1996, and can be safely separated only by reference to details of the male terminalia. It has a small to tiny apical split of the dorsal branch of gonostylus, very similar to *E. frigida, E. subfrigida* and *E. kunashirensis* but unlike *E. spinuligera* and *E. spinigera*. The hypandrial lobe is shorter and broader than in *E. frigida* and has a distinct excavation apically unlike both *E. frigida* and *E. subfrigida*. The medial branch of gonostylus is distinctly more slender and concave dorsally compared to *E. subfrigida*, somewhat in between *E. frigida* and *E. subfrigida*. The ventral branch of the gonostylus is rather long and devoid of setae on apical half, like in *E. subfrigida* and *E. kunashirensis* but unlike in *E. frigida* and other species in the complex that always have some setae apically; *E. spinuligera* and *E. spinigera* have the ventral branch shorter and covered with many setae. The medioventral setose lobe on the gonocoxite is small, uni- or bilobed, and with (at most?) four setae; while it is long, narrow with many setae in *E. frigida* and *E. subfrigida*.

Material examined: Lectotype male [herein designated], **FINLAND**: **Le**, Enontekis, above Palojoki, "vid några sidvägar", 12 Jul 1911 (MZHF, Leg. R. Frey). Mounted on slide marked "Lectotype, MZHF-0412, prep. by. J. Kjærandsen (MZLU)" [Mus. Zool. Helsinki Loan nr. D04-1243]. Original labels: On pale green label "Mus. Zool. H:fors Spec. typ. No. 4299 E. spinuligera v. borealis Lun."; on separate handwritten offwhite label in red ink "Ex. borealis"; on

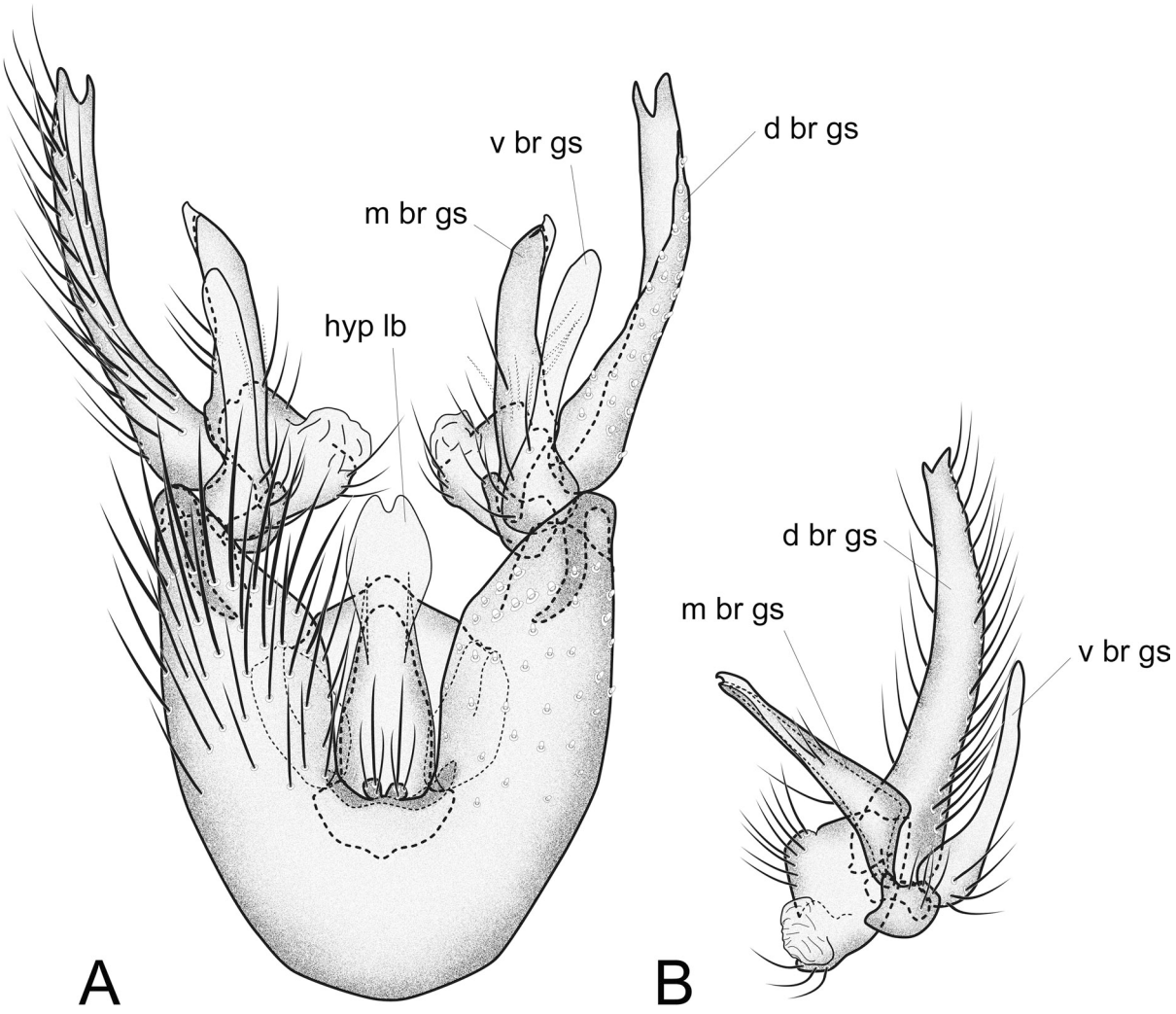
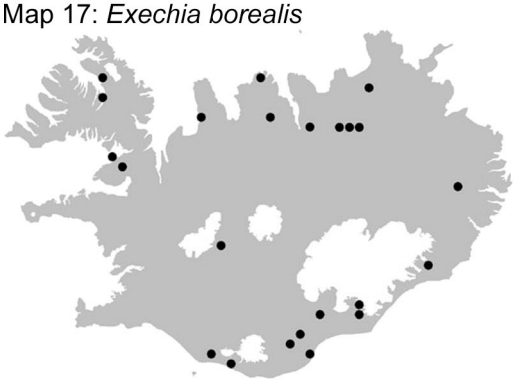


Fig. 3. *Exechia borealis* Lundström, 1912 sp. restit. — A. Male lectotype, remounted, ventral view. — B. Gonostylus of specimen from Iceland, internal view. Abbreviations: d br gs = dorsal branch of gonostylus, m br gs = medial branch of gonostylus, v br gs = ventral branch of gonostylus, hyp lb = hypandrial lobe.

separate white printed label "Enontekis"; and on separate white printed label "R. Frey"; and on separate small green label "4085". **ICELAND: A-Hunavatnssysla**, Vindhaelishreppur, Nupur, 17 Jul 1985 (NHRI, Leg. E. Ólafsson), 1♀; **A-Skaftafellssysla**, Nesjar, Husadalstindur, 9 km NE Höfn, Loc 52-Gl, 15 Jun–5 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Hagi, 5 km NE Höfn, Loc 53-Gl, 1 Jan–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Öraefi, Sandfell, 5 km E Svinafell, Loc 54-Gl, 21 Jun–11 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂; Skaftafell, site A35, 22 Jul 1962 (Leg. MZLU expedition 1962), 1♂; site A41, 29 Jul 1962 (Leg. MZLU expedition 1962), 2♀♀; site A17, 18 Jul 1962 (Leg. MZLU expedition 1962), 1♂; site A30, 29 Jul 1962 (Leg. MZLU expedition 1962), 1♀; site A32, 23 Jul 1962 (Leg. MZLU expedition 1962), 2♂♂; site A34 (Leg. MZLU expedition 1962), 3♂♂; site A35, 2 Aug 1962 (Leg. MZLU expedition 1962), 1♀, 1♂; site A45, 29 Jul 1962 (Leg. MZLU expedition 1962), 1♀, 1♂; site A50, 2 Aug 1962 (Leg. MZLU expedition 1962), 1♂; site D:M, 24 Jul 1962 (Leg. MZLU expedition 1962), 1♀, 1♂; Nesjar, Hornafjördur, Site 1, 19 Jun 1966 (MZLU, Leg. S. Richter), 1♀; Site 16, 24 Jun 1966 (MZLU, Leg. S. Richter), 1♂; Site 69 (Svinafell), 21 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; Site 76 (Dynjandi), 24 Jun 1966 (MZLU, Leg. H. Andersson), 3♀♀, 2♂♂; Site 81 (Horn), 25 Jun 1966 (MZLU, Leg. H. Andersson), 3♀♀, 1♂; Midfell, site 65, 19 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; 20 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; Myrar, Vidbord, 8 Jun 1987 (NHRI, Leg. E. Ólafsson), 1♀; Hellisholt, 12 Jun 1989 (NHRI, Leg. E. Ólafsson), 1♀; Lon, Papos, Site 79, 25

Map 17: *Exechia borealis*

Map 18: *Exechia frigida*



Map 19: *Exechia fusca*

Map 20: *Exechia micans*

Map 21: *Exechia nigra*

Map 22: *Exechia pectinivalva*

Map 23: *Exechia spinuligera*

Map 24: *Rymosia fasciata*

Maps 17–24 = species Nos. 20–25, 27, 30.

Jun 1966 (MZLU, Leg. H. Andersson), 1♂; **Arnessysla**, Thingvellir, Stiflisdalsvatn, 3 km S Stiflisdalsvatn at Litla-Saudafell, Loc 16-Dsh, 8 Jun–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 3♀♀; **Dalasysla**, Haukadalur, Haukadalur, 500 m NW eastern end of Haukadalsvatn, Loc 18-Hm, 7 Jun–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 2♂♂; Hvammssveit, Akur, 22 Jun 1987 (NHRI, Leg. E. Ólafsson), 1♂; **Eyjafjardarsysla**, Siglufjordur, Siglufjordur, 7 Jul 1989 (NHRI, Leg. E. Ólafsson), 1♀; **Kjosarsysla**, Mosfellsbaer, Varma, 20 Jun 1986 (NHRI, Leg. E. Ólafsson), 1♀; **N-Isafjardarsysla**, Isafjördur, Arngerdareyri, 12 Aug 1933 (ZMUC, Leg. S. Heding), 1♂; **N-Mulasysla**, Jökulsarhlid, Surtsstadir, 500 m E 5 km NW Kirkjubaer, N Egilsstadir, Loc 46-Dsh, 16 Jun–1 Aug 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Seydisfjördur, Seydisfjördur, 4 km SW Seydisfjördur, Loc 47-Dsh, 18 Jun–5 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂; **Rangarvallasysla**, V-Eyjafjallahreppur, Markarfljot, E Markarfljot, 2 km NW Storidalur, Loc 14-Gl, 9 Jun–9 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂; Vestmannaeyjar, Heimaey, Site 7, 23 Jul 1965 (MZLU, Leg. H. Andersson), 2♂♂; Site 8, 14 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; V-Eyjafjallahreppur, Asolfsskali, Moldnupur, Site 109, 25 Jun 1968 (MZLU, Leg. H. Andersson), 1♀; Site 7 (MZLU, Leg. S. Richter), 2♂♂; Paradisarhellir, Site 32, 24 Aug 1967 (MZLU, Leg. H. Bödvarsson), 1♂; Fljotshlid, Tumastadir, 6–13 Jul 1995 (NHRI, Leg. E. Ólafsson), 1♂; Landssveit, Skard, 31 Jul 1986 (NHRI, Leg. E. Ólafsson), 1♂; V-Eyjafjallahreppur, Asolfsskali, Ysti-Skali, Site IIIB, 15–30 Jul 2002 (MZLU, Leg. H. Andersson), 1♀; **S-Thingeyjarsysla**, Reykjadalur, Masvatn, 10 km W Myvatn, near brook, Loc 28-Wl, 18 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Myvatnssveit, Myvatn, Djupadokk, 1.5 km NNW Grimsstadir, Loc 31-Dsh, 17 Jun–15 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Austarasel, 10 km E Myvatn, Loc 44-Dsh, 20 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂; **Skagafjardarsysla**, Akrahreppur, Öxnadalsheidi, 8 km W Bakkasel, Loc 23-Wl, 6 Jun–1 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; **Strandasysla**, Baejarhreppur, Laxardalsheidi, 5 km NW Bordeyri, Loc 20-Wl, 7 Jun–8 Aug 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂; **V-Skaftafellssysla**, Kirkjubaejarhreppur, Kirkjubaejarklaustur, in birch wood on S slope, Loc 02-Bw, 21 Jun–11 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Nya Eldhraun, 13 km SW Kirkjubaejarklaustur, Loc 04-Sd, 21 Jun–9 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 4♀♀, 2♂♂; 25 Mar–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Medalland, Nya Eldhraun, SW Kirkjubaejarklaustur, Loc 05-Gh, 27 May–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀; Myrdalur, Hjörleifshöfdi, below cliffs, Loc 07-Gl, 25 Mar–8 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Vik i Myrdal, 2 km E village on S slope, Loc 08-Gl, 22 Jun–10 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂.

Lundström (1909) reported and illustrated a species determined as *E. spinigera* Winnertz, 1863. Later he was informed by Dr. H. Dziedzicki that his specimens were not identical with *E. spinigera* sensu Winnertz (Dziedzicki worked with Coll. Winnertz at that time (see Lundström 1912:33). Thus, Lundström (1912) described them as *E. spinuligera* and also reported a variety he called *E. spinuligera* var. *borealis*. Nevertheless, several authors later treated *E. spinuligera* as a junior synonym of *E. spinigera* until Hackman et al. (1988) reinstated *E. spinuligera* and regarded *E. spinuligera* var. *borealis* as a junior synonym of *E. spinigera*. As a part of revisionary work of Fennoscandian *Exechia* the first author has studied Lundström's type material of *E. spinuligera* and *E. spinuligera* var. *borealis*. The type series of *E. spinuligera* var. *borealis* is not recognized as *E. spinigera* sensu Dziedzicki (1915: Tab. XVII, figs. 271 & 272). Neither does it fit with Zaitzev's (2003) interpretation of *E. spinigera*. The type series consists of two other species, both with a very small apical split of the dorsal lobe of the gonostylus, and the ventral branch of gonostylus without setae except at base. Two type specimens are referable to *E. subfrigida* Laštovka & Matile, 1974 while five type specimens belong to a unique species very close to *E. frigida* (Boheman, 1865). We therefore reinstate *E. borealis* as a separate species by selecting a lectotype.

Exechia borealis is surprisingly well represented from a wide range of localities on Iceland (Map 17). No doubt further specimens will later be extracted from a large unchecked material of *E. frigida* in the NHRI collection. Probably this species is more confind to lowland habitats than *E. frigida*. Outside Iceland we have already confirmed further material of this species from Norway, Sweden and Finland. Thus, it is probably a rather common but totally overlooked species in northern Europe, sometimes interpretated as *Exechia spinigera* Winnertz, 1863.

21. *Exechia frigida* (Boheman, 1865)

Mycetophila frigida Boheman, 1865:576.

Exechia frigida: Nielsen et al. 1954:26; Lindroth 1965:132; Andersson 1967:103; Lindroth et al. 1973:24; Lindroth et al. 1988:55; Ólafsson 1991:46; Einarsson et al. 2000:215; Ólafsson 2000:54; Magnusson et al. 2001:223.

Material examined: **ICELAND: A-Skaftafellssysla**, Öraefi, Sandfell, 5 km E Svinafell, Loc 54-Gl, 21 Jun–11 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 3♀♀; Nesjar, Hornafjördur, Horn, site 81, 25 Jun 1966 (MZLU, Leg. H. Andersson), 2♀♀; Site 76 (Dynjandi), 24 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; Rimavatn, site 73, 23 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; Nesjar, Svinafell, site 6, 21 Jun 1966 (MZLU, Leg. S. Richter), 1♂; **Eyjafjardarsysla**, Eyjafjördur, Eyjafjördur (?=Öfjord), Jul 1881 (ZMUC, Leg. Steinake), 1♂; N-**Isafjardarsysla**, Isafjördur, Arngerdareyri, 11 Aug 1933 (ZMUC, Leg. S. Heding), 1♂; 12 Aug 1933 (ZMUC, Leg. S. Heding), 2♂♂; **Rangarvallasysla**, A-Eyjafjallahreppur, Skogar, Site 69, 29 Jun 1968 (MZLU, Leg. H. Andersson), 1♂; V-Eyjafjallahreppur, Asolfsskali, Moldnupur, Site 109, 25 Jun 1968 (MZLU, Leg. H. Andersson), 1♂; Paradisarhellir, Site 32, 24 Aug

1967 (MZLU, Leg. H. Bödvarsson), 1♀; Fljotshlid, Tumastadir, 15–22 May 2000 (NHRI, Leg. E. Ólafsson), 1♀; A-Eyjafjallahreppur, Lambafell, 4.5 km SW Eyvindarholar, Site 113B, 26 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; **S-Mulasysla**, Egilsstadir, Egilsstadir, 4 Aug 1931 (ZMUC, Leg. M. Jörgensen), 1♂; 8 Aug 1931 (ZMUC, Leg. M. Jörgensen), 1♀; 11 Aug 1931 (ZMUC, Leg. M. Jörgensen), 1♀; **S-Thingeyjarsysla**, Reykjadalur, Masvatn, 10 km W Myvatn, near brook, Loc 28-Wl, 18 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 2♂♂; Myvatnssveit, Myvatn, Geirastadir, Loc 29-Dsh, 19 Jun–17 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Austarasel, 10 km E Myvatn, Loc 44-Dsh, 20 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 3♀♀; Myvatn, 5 km NV Reynihllid, site 55, 23 Jun–30 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; **Skagafjardarsysla**, Lytingsstadahreppur, Maelifell, S Sydri-Maelifellsa, along small stream, Loc 22-Gl, 6 Jun–1 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀; Akrahreppur, Öxnadalsheidi, 8 km W Bakkasel, Loc 23-Wl (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂; Lytingsstadahreppur, Goddalir, 22 Aug 1932 (ZMUC, Leg. S. L. Tuxen), 1♂; Maelifell, 24 Jul 1933 (ZMUC, Leg. S. L. Tuxen), 1♀; **Strandasysla**, Baejarhreppur, Laxardalsheidi, 5 km NW Bordeyri, Loc 20-Wl, 7 Jun–8 Aug 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; 8 Aug–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 6♀♀, 1♂; V-**Bardastrandarsysla**, Talknafjördur, Talknafjördur, 9 Jul 1896 (ZMUC, Leg. Lundbeck), 1♂; **V-Skaftafellssysla**, Kirkjubaejarhreppur, Nya Eldhraun, 13 km SW Kirkjubaejarklaustur, Loc 03-Mlh, 21 Jun–9 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Nya Eldhraun, 13 km SW Kirkjubaejarklaustur, Loc 04-Sd (MZLU, Leg. S.-A. Bengtson et al.), 84♀♀, 24♂♂; Medalland, Nya Eldhraun, SW Kirkjubaejarklaustur, Loc 05-Gh, 27 May–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 7♀♀; Myrdalur, Hjörleifshöfdi, near abandoned farm buildings, Loc 06-Gl, 22 Jun–8 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Vik i Myrdal, 2 km E village on S slope, Loc 08-Gl, 25 Mar–7 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Vik i Myrdal, 800 m SW village, Loc 10-Gl, 22 Jun–10 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Vik i Myrdal, on Reynisfjall, 120 m a.s.l., Loc 12-Gh (MZLU, Leg. S.-A. Bengtson et al.), 1♀.

Exechia frigida is a common, northern Holarctic species widely distributed in Europe, Russia and North America. However, parts of the material previously referred to this species probably refer to *E. borealis*. Nielsen et al. (1954:27, fig. 6) illustrated and briefly described a larva from Iceland possibly referable to *E. frigida*. The species is common all over the country (Map 18), no doubt being the far most common species around the interior highlands, sometimes appearing in great numbers in bogs and other humid habitats. There is a large unchecked material (some 14,000 specimens) in the collection of HNRI, mostly from the central highlands.

22. *Exechia fusca* (Meigen, 1804)

Mycetophila fusca Meigen, 1804:91.

Exechia fusca: Nielsen et al. 1954:28; Lindroth 1965:132; Andersson 1967:103; Lindroth et al. 1973:24; Lindroth et al. 1988:55; Ólafsson 1991:46; Einarsson et al. 2000:215; Ólafsson 2000:55; Magnusson et al. 2001:223.

Material examined: **ICELAND: A-Hunavatnssysla**, Vindhaelishreppur, Skrapatunga, 18 Jul 1985 (NHRI, Leg. E. Ólafsson), 1♀; A-**Skaftafellssysla**, Öraefi, Sandfell, 5 km E Svinafell, Loc 54-Gl, 21 Jun–11 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 4♀♀, 1♂; Skaftafell, site A10, 20 Jul 1962 (Leg. MZLU expedition 1962), 3♀♀, 1♂; 8 Aug 1962 (Leg. MZLU expedition 1962), 2♀♀, 3♂♂; site A12, 7 Aug 1962 (Leg. MZLU expedition 1962), 1♀; site A22, 8 Aug 1962 (Leg. MZLU expedition 1962), 2♀♀; site A34, 23 Jul 1962 (Leg. MZLU expedition 1962), 1♂; site A35, 29 Jul 1962 (Leg. MZLU expedition 1962), 1♂; 2 Aug 1962 (Leg. MZLU expedition 1962), 1♂; site A49, 1 Aug 1962 (Leg. MZLU expedition 1962), 2♀♀, 1♂; site A50, 2 Aug 1962 (Leg. MZLU expedition 1962), 1♀; site D:F, 30 Jul 1962 (Leg. MZLU expedition 1962), 1♀; Site A7, 17 Jul 1962 (Leg. MZLU expedition 1962), 3♀♀, 2♂♂; Nesjar, Hornafjördur, Midfell, site 65, 19 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; 26 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; Öraefi, Fagurholsmyri, 9 Jun 1987 (NHRI, Leg. E. Ólafsson), 1♀; **Arnessysla**, Kjölur, Hvitarvatn, 5 Aug 1934 (ZMUC, Leg. S. L. Tuxen), 1♂; **Dalasysla**, Hvammssveit, Saelingsdalur, 16 Aug 1988 (NHRI, Leg. E. Ólafsson), 1♀; Saurbaer, Innri-Fagridalur, 17 Aug 1988 (NHRI, Leg. E. Ólafsson), 1♀; **Eyjafjardarsysla**, Svarfadardalur, Kongsstadir, 8 Jul 1989 (NHRI, Leg. E. Ólafsson), 1♀; Siglufjordur, Siglufjordur, 7 Jul 1989 (NHRI, Leg. E. Ólafsson), 1♀; **N-Isafjardarsysla**, Isafjördur, Arngerdareyri, 12 Aug 1933 (ZMUC, Leg. S. Heding), 1♀, 1♂; Kaldalon, 15 Aug 1933 (ZMUC, Leg. S. Heding), 1♀; **Rangarvallasysla**, A-Eyjafjallahreppur, Skogar, Site 17, 29 Aug 1967 (MZLU, Leg. S. Richter), 1♂; V-Eyjafjallahreppur, Paradisarhellir, Site 32, 24 Aug 1967 (MZLU, Leg. H. Bödvarsson), 1♀; **S-Mulasysla**, Vellir, Hallormsstadarskogur, S Egilsstadir, Loc 48-Pl, 20 Jun–12 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Hallormsstadarskogur, S Egilsstadir, Loc 49-Bw (MZLU, Leg. S.-A. Bengtson et al.), 1♀; **S-Thingeyjarsysla**, Fnjoskadalur, Vaglaskogur, 2 km S old bridge across Fnjoska, Loc 26-Bw, 18 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 3♀♀; Reykjadalur, Masvatn, 10 km W Myvatn, near brook, Loc 28-Wl (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Myvatnssveit, Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 32-Wsh, 19 Jun–17 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 4♀♀; Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 34-Gl (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 35-Pl (MZLU, Leg. S.-A. Bengtson et al.), 4♀♀, 2♂♂; Myvatn, Vogahraun, 1 km S Reykjahlid, Loc 39-Bw, 17 Jun–14 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Austarasel, 10 km E Myvatn, Loc 44-Dsh, 20 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Fnjoskadalur, Vaglaskogur, 1 Jun 1985 (ZMAN, Leg. R. Schoon), 1♀, 2♂♂; **V-Skaftafellssysla**, Kirkjubaejarhreppur, Kirkjubaejarklaustur, in birch wood on S slope, Loc 02-Bw, 21 Jun–11 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Medalland, Nya Eldhraun, SW Kirkjubaejarklaustur, Loc 05-Gh, 27 May–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 5♀♀, 1♂; Fljotshverfi, Raudaberg, 12 Aug 1988 (NHRI, Leg. E. Ólafsson), 1♀; Medalland, Sydri-

Steinsmyri, 23 Jun 1985 (NHRI, Leg. E. Ólafsson), 1♀.

Exechia fusca is a common Holarctic species widely distributed in Europe, North Africa, Russia and North America. This is probably the most common mycetophilid in Icelandic lowland habitats, also found sparsely in the central highlands (Map 19). Woodlands are the preferred habitats. A considerable material in the NHRI collection is still unchecked.

23. *Exechia micans* Laštovka & Matile, 1974

Exechia micans Laštovka & Matile, 1974:108.

Exechia nitidicollis Lundström, 1913:311: Nielsen et al. 1954:29 [misidentification]; Lindroth 1965:132 [misidentification]; Andersson 1967:103 [misidentification]; Lindroth et al. 1973:24 [misidentification]; Ólafsson 1991:46 [misidentification]; Einarsson et al. 2000:215 [misidentification]; Ólafsson 2000:55 [misidentification]; Magnusson et al., 2001:223 [misidentification]

Material examined: **ICELAND: A-Skaftafellssysla**, Öraefi, Skaftafell, site A20, 18 Jul 1962 (Leg. MZLU expedition 1962), 1♀; site A38, 25 Jul 1962 (Leg. MZLU expedition 1962), 1♂; site A45, 29 Jul 1962 (Leg. MZLU expedition 1962), 2♂♂; site A8, 18 Jul 1962 (Leg. MZLU expedition 1962), 1♀; Site A7, 17 Jul 1962 (Leg. MZLU expedition 1962), 1♂; **Arnessysla**, Kjölur, Kjalhraun, 2–31 Jul 2002 (NHRI, Leg. E. Ólafsson), 1♀, 1♂; **Eyjafjardarsysla**, Glaesibaejarhreppur, Hörgardalur, 5 km W Glaesibaer, Loc 24-Dsh, 6 Jun–1 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; **N-Mulasysla**, Vesturöraefi, Burfell, 16 Jul–19 Aug 1999 (NHRI, Leg. E. Ólafsson), 1♀; Lindur, 26 Jun–19 Jul 2000 (NHRI, Leg. E. Ólafsson), 1♂; Bruardalir, Saudafell, 22 Jul 2000 (NHRI, Leg. E. Ólafsson), 1♀; Vesturöraefi, Smjörtungufell, 18 Jul–19 Aug 1999 (NHRI, Leg. E. Ólafsson), 1♀; 19 Jul–19 Aug 1999 (NHRI, Leg. E. Ólafsson), 1♀, 1♂; **Rangarvallasysla**, Holt, Hallstun, 1 Aug 1986 (NHRI, Leg. E. Ólafsson), 2♂♂; Emstrur, Litla-Graenafjall, 9 Jul 1982 (NHRI, Leg. E. Ólafsson), 1♀, 1♂; Markarfljotsgljufur (NHRI, Leg. E. Ólafsson), 1♂; **S-Mulasysla**, Vellir, Hallormsstadur, 10 Jun 1986 (NHRI, Leg. G. Halldorsson), 1♂; Mjoanes, 21 Jun–14 Jul 2002 (NHRI, Leg. G. Halldorsson), 1♀; 14–29 Jul 2002 (NHRI, Leg. G. Halldorsson), 1♀; 29 Jul–12 Aug 2002 (NHRI, Leg. G. Halldorsson), 1♀; Egilsstadir, Egilsstadir, 12 Aug 1931 (ZMUC, Leg. M. Jörgensen), 1♂; **S-Thingeyjarsysla**, Reykjadalur, Masvatn, 10 km W Myvatn, near brook, Loc 28-Wl, 18 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀, 1♂; Myvatnssveit, Myvatn, Djupadokk, 1.5 km NNW Grimsstadir, Loc 31-Dsh, 17 Jun–15 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Austarasel, 10 km E Myvatn, Loc 44-Dsh, 20 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 6♀♀, 6♂♂; Hvitholaklif, 18 Jul–13 Aug 2002 (NHRI, Leg. M. Ingimarsdottir), 2♀♀, 2♂♂; **Skagafjardarsysla**, Akrahreppur, Öxnadalsheidi, 8 km W Bakkasel, Loc 23-Wl, 6 Jun–1 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; **Strandasysla**, Baejarhreppur, Laxardalsheidi, 5 km NW Bordeyri, Loc 19-Dsh, 8 Aug–31 Oct 1977 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀; **V-Skaftafellssysla**, Medalland, Nya Eldhraun, SW Kirkjubaejarklaustur, Loc 05-Gh, 27 May–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀, 1♂; Myrdalur, Vik i Myrdal, on Reynisfjall, 120 m a.s.l., Loc 12-Gh, 25 Mar–9 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Sida, Sléttabol, 29 Jun 1988 (NHRI, Leg. E. Ólafsson), 1♀; Hörgslandshreppur, Varmardalur, 3–17 Jul 2001 (NHRI, Leg. E. Ólafsson), 1♂; Landbrot, Asgardur, 22 Jun 1985 (NHRI, Leg. E. Ólafsson), 1♂; Medalland, Fljotakrokur, 23 Jun 1985 (NHRI, Leg. E. Ólafsson), 1♂; Skaftartunga, Gaesatungur, 14 Jul–11 Aug 2001 (NHRI, Leg. E. Ólafsson), 1♂.

Using Laštovka & Matile (1974) we have not been able to confirm *E. nitidicollis* Lundström, 1913 from Iceland. All new material and all material previously determined as *E. nitidicollis* by R. Tuomikoski in the MZLU collection and by P. Nielsen in the ZMUC collection are rather referable to *E. micans*. There are few records of *E. micans* and it has been regarded as a rare species. It was described from Mongolian caves and has later been reported only with a few specimens from Germany, Sweden and Karelia. A male from Greenland in The Natural History Museum in London determined as *E. nitidicollis* also refers to *E. micans* (studied by the first author). Hence, it seems that *E. micans* is a widespread but uncommon Holarctic species that is common and widespread in Iceland (Map 20).

24. *Exechia nigra* Edwards, 1925

Exechia nigra Edwards, 1925:595: Nielsen et al. 1954:28; Lindroth 1965:132; Andersson 1967:103; Lindroth et al. 1973:25; Lindroth et al. 1988:55; Einarsson et al. 2000:215; Ólafsson 2000:55; Magnusson et al., 2001:223.

Material examined: **ICELAND: A-Skaftafellssysla**, Öraefi, Sandfell, 5 km E Svinafell, Loc 54-Gl, 21 Jun–11 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂; Skaftafell, site A11, 7 Aug 1962 (Leg. MZLU expedition 1962), 1♂; site A35, 2 Aug 1962 (Leg. MZLU expedition 1962), 2♀♀; site A42, 29 Jul 1962 (Leg. MZLU expedition 1962), 1♂; site A9, 25 Jul 1962 (Leg. MZLU expedition 1962), 1♂; Nesjar, Hornafjördur, site A60, 12 Aug 1962 (Leg. MZLU expedition 1962), 1♂; Öraefi, Skaftafell, 2–9 Oct 2000 (NHRI, Leg. R.F. Kristjansson), 1♀; **Arnessysla**, Kjölur, Hvitarvatn, 5 Aug 1934 (ZMUC, Leg. S. L. Tuxen), 1♀; Ölfus, Fremstidalur, 12 Jul–14 Aug 2002 (NHRI, Leg. M. Ingimarsdottir), 1♂; **Gullbringusysla**, Hafnarfjördur, Hafnarfjördur (Hraunbrun 14), 13–14 Oct 2002 (NHRI, Leg. E. Ólafsson), 1♀; **N-Isafjardarsysla**, Isafjördur, Arngerdareyri, 11 Aug 1933 (ZMUC, Leg. S. Heding), 1♀; Reykjanes, 8 Aug 1933 (ZMUC, Leg. S. Heding), 2♂♂; Laugaböl, 9 Aug 1933 (ZMUC, Leg. S. Heding), 1♀; **N-Mulasysla**, Seydisfjördur, Seydisfjördur, 30 Jul 1933 (ZMUC, Leg. S. Heding), 1♂; **Rangarvallasysla**, Vestmannaeyjar, Heimaey, Site 11, 26 Jul 1965 (MZLU, Leg. H. Andersson), 1♀; Site 5, 13 Jun 1966 (MZLU, Leg. H. Andersson), 2♀♀; Site 7, 23 Jul 1965 (MZLU, Leg. H. Andersson), 1♀; V-Eyjafjallahreppur, Vomulastadir, Réttasandur, Site I22, 1 Jul 1968 (MZLU, Leg. H. Andersson), 1♂; Asolfsskali, Moldnupur, Site 109,

25 Jun 1968 (MZLU, Leg. H. Andersson), 1♀, 2♂♂; Site 7 (MZLU, Leg. S. Richter), 1♀, 1♂; Fljotshlid, Tumastadir, 8–15 Oct 2002 (NHRI, Leg. E. Ólafsson), 1♂; Veidivötn, Ampapollur, 17 Jul 1988 (NHRI, Leg. E. Ólafsson), 1♂; A-Eyjafjallahreppur, Drangshlidardalur, Site 120A, 30 Jun 1968 (MZLU, Leg. H. Andersson), 1♀, 1♂; S-Mulasysla, Egilsstadir, Egilsstadir, 14 Aug 1931 (ZMUC, Leg. M. Jörgensen), 1♂; **S-Thingeyjarsysla**, Myvatnssveit, Myvatn, Djupadokk, 1.5 km NNW Grimsstadir, Loc 31-Dsh, 17 Jun–15 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀; **Skagafjardarsysla**, Lytingsstadahreppur, Maelifell, 13 Aug 1932 (ZMUC, Leg. S. L. Tuxen), 1♀; Snaefellsnessysla, Skogarströnd, Emmuberg, 18 Aug 1988 (NHRI, Leg. E. Ólafsson), 1♀; **V-Skaftafellssysla**, Kirkjubaejarhreppur, Nya Eldhraun, 13 km SW Kirkjubaejarklaustur, Loc 04-Sd, 21 Jun–9 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂; Medalland, Nya Eldhraun, SW Kirkjubaejarklaustur, Loc 05-Gh, 27 May–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Myrdalur, Vik i Myrdal, 2 km E village on S slope, Loc 08-Gl, 22 Jun–10 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Vik i Myrdal, 800 m SW village, Loc 10-Gl (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Dyrholaey, Site 96, 28 Aug 1967 (MZLU, Leg. H. Andersson), 1♂.

Exechia nigra is a widespread but rather uncommon species in Europe, also known from Russia and Mongolia. The species is widely distributed in Iceland, but not common (Map 21). There is a considerable unchecked material at NHRI.

• 25. *Exechia pectinivalva* Stackelberg, 1948

Exechia pectinivalva Stackelberg, 1948:96.
Exechia sp.: Magnusson et al. 2001:223.

Material examined: **ICELAND: A-Hunavatnssysla**, Hunafjördur, Hop, 15 km S Blönduos, Loc 21-Gl, 7 Jun–8 Aug 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; **A-Skaftafellssysla**, Nesjar, Hagi, 5 km NE Höfn, Loc 53-Gl, 1 Jan–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Hornafjördur, Midfell, site 65, 26 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; **Eyjafjardarsysla**, Glaesibaejarhreppur, Hörgardalur, 5 km W Glaesibaer, Loc 24-Dsh, 6 Jun–1 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀; **Gullbringusysla**, Hafnarfjördur, Hafnarfjördur, 31 May 2002 (NHRI, Leg. E. Ólafsson), 1♂; Grindavik, Mölvik, 31 Jul 1984 (NHRI, Leg. E. Ólafsson), 1♂; **N-Mulasysla**, Jökulsarhlid, Sledbrjotur, 2 km S 7 km NW Kirkjubaer, N Egilsstadi, Loc 45-Wl, 16 Jun–1 Aug 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Vesturöraefi, Lindur, 20 Aug 1999 (NHRI, Leg. E. Ólafsson), 1♂; Sauda, 27 Jun–20 Jul 2000 (NHRI, Leg. E. Ólafsson), 1♂; **Rangarvallasysla**, Vestmannaeyjar, Heimaey, Site 6A, 17 Aug 1967 (MZLU, Leg. H. Andersson), 1♂; A-Eyjafjallahreppur, Skogar, 4 Oct 2002 (NHRI, Leg. E. Ólafsson), 1♂; Fljotshlid, Tumastadir, 28 Aug–4 Sep 2000 (NHRI, Leg. E. Ólafsson), 1♂; 18–25 Sep 2000 (NHRI, Leg. E. Ólafsson), 1♂; **S-Mulasysla**, Vellir, Hallormsstadur, 10 Jun 1986 (NHRI, Leg. E. Ólafsson), 1♂; Nordfjördur, Neskaupstadur, 15 Jun 1989 (NHRI, Leg. E. Ólafsson), 1♂; Vellir, Hafursa, (7047), 15–30 Jul 2002 (NHRI, Leg. G. Halldorsson), 1♀; **S-Thingeyjarsysla**, Reykjadalur, Masvatn, 10 km W Myvatn, near brook, Loc 28-Wl, 18 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 2♀♀, 1♂; Myvatnssveit, Myvatn, Djupadokk, 1.5 km NNW Grimsstadir, Loc 31-Dsh, 17 Jun–15 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 34-Gl, 19 Jun–17 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Myvatn, Höfdi, peninsula (ca. 5 ha) E shore of the lake, Loc 40-Mlh, 1♀ Jun–15 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Austarasel, 10 km E Myvatn, Loc 44-Dsh, 20 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 4♀♀, 4♂♂; Fnjoskadalur, Vaglaskogur, 19 Jul 1984 (NHRI, Leg. E. Ólafsson), 2♂♂; Myvatnssveit, Hvitholaklif, 18 Jul–13 Aug 2002 (NHRI, Leg. M. Ingimarsdottir), 2♀♀, 2♂♂; V-**Skaftafellssysla**, Hörgslandshreppur, Varmardalur, 16 Jul–13 Aug 2001 (NHRI, Leg. E. Ólafsson), 1♀; Landbrot, Asgardur, 22 Jun 1985 (NHRI, Leg. E. Ólafsson), 1♂; Fossar, 23 Jun 1985 (NHRI, Leg. E. Ólafsson), 1♂.

Exechia pectinivalva is a widespread but rather uncommon species in Europe, also known from Russia and Mongolia. The species is widely distributed in Iceland, surprisingly not discovered earlier (Map 22).

• 26. *Exechia pseudofestiva* Lackschewitz, 1937

Exechia pseudofestiva Lackschewitz, 1937:24.

Material examined: **ICELAND: S-Thingeyjarsysla**, Fnjoskadalur, Vaglaskogur, 19 Jul 1984 (NHRI, Leg. E. Ólafsson), 1♂.

Exechia pseudofestiva is a widespread but rare species in Europe and Russia. It is known from Great Britain and western Norway (unpublished). This is the sole Icelandic record, from a birchwood in northern Iceland.

27. *Exechia spinuligera* Lundström, 1912

Exechia spinuligera Lundström, 1912:33: Nielsen et al. 1954:29.
Exechia spinigera Winnertz, 1863:890: Lindroth et al. 1973:24 [misinterpretation]; Ólafsson 1991:46 [misinterpretation].

Material examined: **ICELAND: A-Skaftafellssysla**, Nesjar, Hornafjördur, Site 1, 19 Jun 1966 (MZLU, Leg. S. Richter), 1♀; Site 70, 22 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; Site 71 (E Thveit) (MZLU, Leg. H. Andersson), 1♀; Lon, Papos, Site 79, 25 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; **Arnessysla**, Villingaholtshreppur, Suluholt, 30 Jul 1986 (NHRI, Leg. E. Ólafsson), 1♂; **Dalasysla**, Hvammssveit, Asgardur, 21 Jun 1987 (NHRI, Leg. E. Ólafsson), 1♂; **Rangarvallasysla**, Vestmannaeyjar, Heimaey, Site 8, 23 Jul 1965 (MZLU, Leg. H. Andersson), 1♀; **S-Mulasysla**, Nordfjördur, Skorrastadur, 15 Jun 1989 (NHRI, Leg. E. Ólafsson), 1♂; Egilsstadir, Egilsstadir, 8 Aug 1931 (ZMUC, Leg. M. Jörgensen), 1♀; 12 Aug

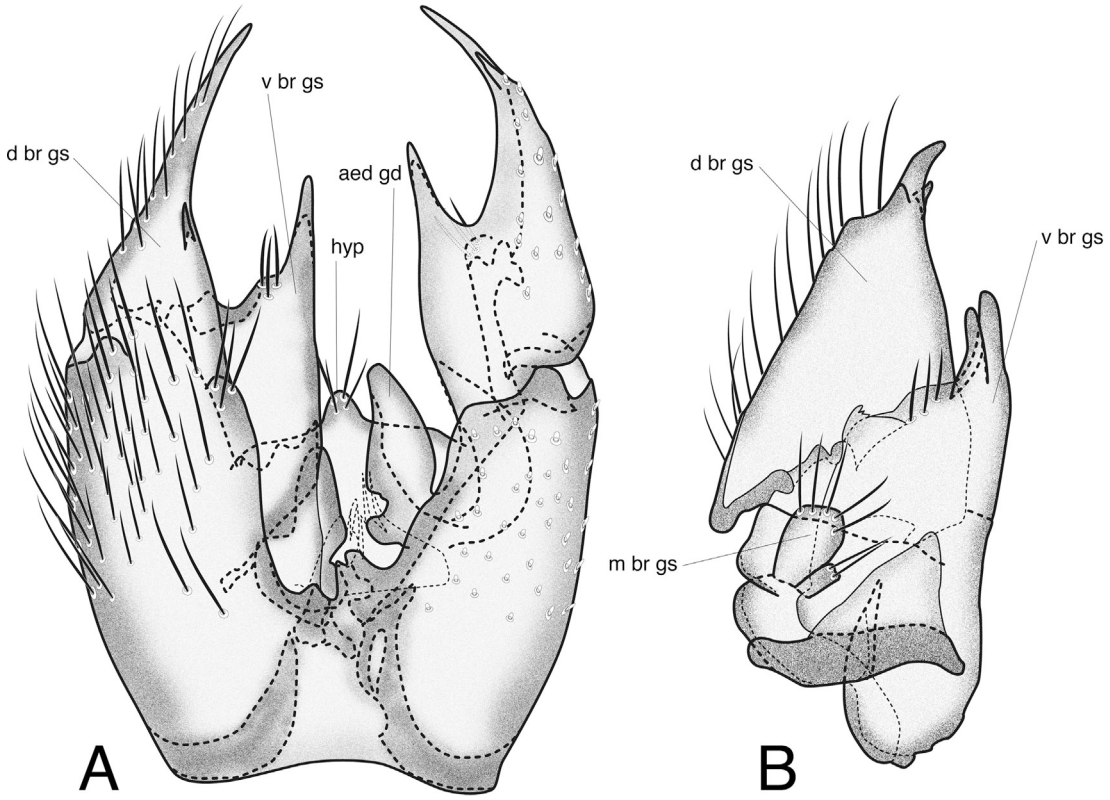


Fig. 4. *Exechia* sp. A. — A. Male terminalia, ventral view. — B. Gonostylus, internal view. Abbreviations: aed gd = aedeagal guide, d br gs = dorsal branch of gonostylus, hyp = hypoproct, m br gs = medial branch of gonostylus, v br gs = ventral branch of gonostylus.

1931 (ZMUC, Leg. M. Jörgensen), 1♀; **S-Thingeyjarsysla**, Myvatnssveit, Myvatn, 27 Jul 1884 (ZMUC, Leg. A. Fridriksson), 1♂; **Skagafjardarsysla**, Lytingsstadahreppur, Maelifell, 24 Jun 1933 (ZMUC, Leg. S. L. Tuxen), 1♂; 15 Jul 1933 (ZMUC, Leg. S. L. Tuxen), 1♂.

Exechia spinuligera is a common Holarctic species widely distributed in Europe, Russia and Ukraine. In Iceland the species is rare but widely distributed around the Icelandic lowlands, not found at higher altitudes in the interior parts (Map 23).

28. *Exechia* sp. A

Fig. 4.

Material examined: **ICELAND: V-Skaftafellssysla**, Hörgslandshreppur, Varmardalur, 17 Jul–14 Aug 2001 (NHRI, Leg. E. Ólafsson), 1♂.

This single male with asymmetrical and apparently partly mal-developed terminalia cannot be assigned to any known species of *Exechia*. Right and left side of the terminalia is rather different, the left side being less developed than the right side (Fig. 4A). On the left side the gonostylus is even partly continuous with the gonocoxite. Some structures like the hypandrial lobe are seemingly lacking and the aedeagal apparature is also asymmetrical. The right side gonostylus seems to be more or less fully developed with a unique structure (Fig. 4B). It associates best with species in the *E. lucidula* species group, mostly resembling *E. nigrofusca* Lundström, 1909 due to the rather open gonocoxite ventrally and somewhat similar, trifurcated dorsal branch of gonostylus. The gonostylus is, nevertheless, larger and unique in several respects. Until further material is available for study one can only speculate whether it actually is a new species.

Genus *Exechiopsis* Tuomikoski

Exechiopsis is a large, mainly Holarctic genus with about 85 species in two subgenera. There are more than 70 species

known from the Palaearctic region, 36 of them are known from Fennoscandia and 19 from Great Britain. The most comprehensive key was provided by Zaitzev (2003). The majority of the females also show distinctive characters in their terminalia and are so far associated and illustrated for about one third of the Palaearctic species.

29. *Exechiopsis (E.) ligulata* (Lundström, 1913)

Exechia ligulata Lundström, 1913:312.

Material examined: **ICELAND: S-Thingeyjarsysla**, Myvatnssveit, Myvatn, Slutnes, ungrazed island (7.7 ha) in the lake, Loc 35-Pl, 19 Jun–17 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀.

Exechiopsis (E.) ligulata is a rather uncommon species widely distributed in Europe, and western Russia. There is a single Icelandic record from a small luxuriantly vegetated island in a lake in northern Iceland. The male terminalia was figured by Zaitzev (2003:180, fig. 37.2), and the female terminalia was figured by Edwards (1925: Pl. LII, fig. 66).

Genus *Rymosia* Winnertz

Rymosia is a large, mainly Holarctic genus with about 80 species. There are about 45 species known from the Palaearctic region, 19 of them from Fennoscandia and 16 from Great Britain. The most comprehensive keys were provided by Chandler (1994) and Zaitzev (2003). The majority of the females also show distinctive characters in terminalia and are so far associated and illustrated for about half of the Palaearctic species.

Provisional key to species known from Iceland

1. Abdominal tergites 2–5 with distinct, complete yellow basal bands; male terminalia as illustrated by Engel (1915:99, figs. A, B) and Dziedzicki (1915: tab. VIII, figs. 104, 105); female terminalia as illustrated by Dziedzicki (1915: tab. VIII, fig. 106) ..... 30. *R. fasciata* (Meigen)
— Abdominal tergites 2–5 at most with small indistinct yellow basal lateral patches; male terminalia as illustrated by Chandler (1994:210, figs. 8a–d) ..... 31. *R. speyae* Chandler, 1994

30. *Rymosia fasciata* (Meigen, 1804)

Mycetophila fasciata Meigen, 1804:131.
Rymosia fasciata: Ólafsson 1991:46.
Rymosia sp.: Einarsson et al. 2000:215.

Material examined: **ICELAND: Gullbringusysla**, Hafnir, Gunnuhver, 11–25 Jul 2001 (NHRI, Leg. M. Ingimarsdottir), 1♂; **Rangarvallasysla**, Fljotshlid, Tumastadir, 11–18 Jun 2003 (NHRI, Leg. E. Ólafsson), 1♂; **S-Mulasysla**, Vellir, Jonsskogur, 5–19 Jul 2002 (NHRI, Leg. G. Halldorsson), 1♂; **S-Thingeyjarsysla**, Reykjadalur, Masvatn, 10 km W Myvatn, near brook, Loc 28-Wl, 18 Jun–16 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♂; Myvatnssveit, Myvatn, Höfdi, peninsula (ca. 5 ha) E shore of the lake, Loc 40-Mlh, 16 Jun–15 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; **V-Skaftafellssysla**, Kirkjubaejarhreppur, Nya Eldhraun, 13 km SW Kirkjubaejarklaustur, Loc 04-Sd, 21 Jun–9 Nov 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; 25 Mar–6 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; Myrdalur, Hjörleifshöfdi, below cliffs, Loc 07-Gl, 25 Mar–8 Nov 1977 (MZLU, Leg. S.-A. Bengtson et al.), 1♀.

Rymosia fasciata is a common, widespread species in Europe. It has also been recorded from the Near East Region, but not east of the European part of Russia. The species is rare but videly distributed in Iceland (Map 24). Further unchecked material is present in the NHRI collection.

• 31. *Rymosia speyae* Chandler, 1994

Rymosia speyae Chandler, 1994:216.
Rymosia fasciata (Meigen, 1804:131): Nielsen et al. 1954:29 [misidentification]

Material examined: **ICELAND: S-Thingeyjarsysla**, Myvatnssveit, Myvatn, Hrauneyjartjarnir, 1.8 km SW Grimsstadir, Loc 30-Wl, 19 Jun–17 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀; **Skagafjardarsysla**, Lytingsstadahreppur, Maelifell, 24 Jun 1933 (ZMUC, Leg. S. L. Tuxen), 1♂.

Rymosia speyae was described from two floodplain fenland sites in Scotland. The Icelandic records, both localities in northern Iceland, represent the first finding outside the type localities. The female from Iceland was also taken at a wetland site and is tentatively associated to this species. It is a small dark female with genitalia mostly resembling but slightly different from *R. armata* Lackschewitz, 1937 as drawn by Chandler (1994). However, in the key provided by Chandler (1994), it clearly runs to *R. speyae*. *R. lacki* Edwards, 1935 from Greenland also appears closely related according to Chandler (1994).

Tribe Mycetophilini

Genus *Mycetophila* (Meigen)

Mycetophila is the largest genus of fungus gnats, known

worldwide with several hundred species. There are more than 160 species known from the Palaearctic region, 100 of them are from Fennoscandia and 73 from Great Britain. The most comprehensive key was provided by Zaitzev (2003). Males are determined mainly based on wing pattern, setal vestiture on legs and reference to figures of their terminalia. The majority of the females also show distinctive characters in terminalia but are so far only associated and illustrated for a small fraction of the Palaearctic species.

• 32. *Mycetophila marginata* Winnertz, 1863

Mycetophila marginata Winnertz, 1863:934.

Material examined: **ICELAND: Rangarvallasysla**, Fljotshlid, Tumastadir, 16–23 Apr 2001 (NHRI, Leg. E. Ólafsson), 1♂; 15–22 Oct 2004 (NHRI, Leg. E. Ólafsson), 1♂.

Mycetophila marginata is a common, widespread but mainly westerly distributed species in Europe. It is not known from Russia east of the European part. There is a single Icelandic locality, a wood plantation in southernmost Iceland.

Genus *Phronia* Winnertz

Phronia is a large, mainly Holarctic genus with about 110 species. There are about 80 species known from the Palaearctic region, 60 of them are from Fennoscandia and 31 from Great Britain. This was the first genus to be revised in a European perspective already in the 19th century by H. Dziedzicki (1889). The excellent figures of genitalia in his monograph continue to be very useful. Hackman (1970) revised the Finnish species and Gagné (1975) revised the Nearctic fauna. The most comprehensive key was provided by Zaitzev (2003). Males are determined mainly with reference to figures of their terminalia. The majority of the females also show distinctive characters in terminalia and are so far associated and illustrated for about two thirds of the Palaearctic species.

Provisional key to males of species known from Iceland

1. Lateral portion of male gonostylus deeply split into two lobes 2
   Lateral portion of male gonostylus not deeply split into two lobes 3
2. Terminalia as illustrated by Chandler (1992:248–249, figs. 7 & 11–12); lobes of lateral portion of male gonostylus ending in long but narrow and tapered projections ..... 34. *P. bicolor* Dziedzicki
— Terminalia as illustrated by Gagné (1975:312, figs. 66, 67); lobes of lateral portion of male gonostylus ending in broad, blunt projections ..... 35. *P. braueri* Dziedzicki
3. Terminalia as illustrated by Dziedzicki (1915:Tab. XII, figs. 182–184) and Gagné (1975:308, figs. 17–18); lateral portion of male gonostylus large, broadly ovate ..... 36. *P. exigua* (Zetterstedt)
— Lateral portion of male gonostylus narrow ovate 4
4. Terminalia as illustrated by Steenberg (1924:43–45, figs 9–11) and Chandler & Ribeiro (1995:157, fig. 52); lateral portion of male gonostylus with a sharp projection apicodorsally ..... 33. *P. biarcuata* (Becker)
— Terminalia as illustrated by Dziedzicki (1889:Tab. XIII, figs. 34–36) and Gagné (1975:311, figs. 47–49); lateral portion of male gonostylus with a blunt projection apicoventrally ..... 37. *P. taczanowskyi* Dziedzicki

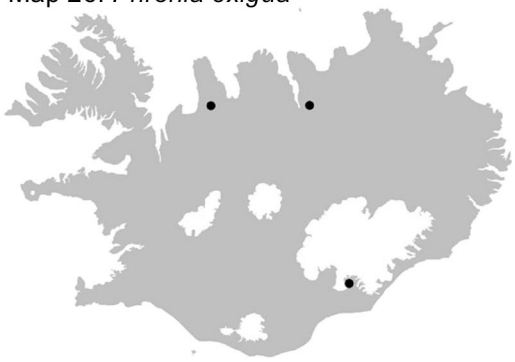
Provisional key to females of species known from Iceland

1. Wings with large central spot and apical shading; terminalia as illustrated by Steenberg (1924:46–47, figs. 12–13); basal segment of cercus about as wide as its length ..... 33. *P. biarcuata* (Becker)
— Wings clear, basal segment of cercus longer than wide...2
2. Vivid coloured, with distinct thoracic stripes and broad yellow bands on abdominal tergites; terminalia as illustrated by Hackman (1970:49, fig. 52); sternite VIII with 4–5 strong setae apically .. 35. *P. braueri* Dziedzicki
— Dull coloured, with indistinct thoracic stripes and dark abdominal tergites; abdominal sternite VIII without strong setae apically 3
3. Fore tarsi enlarged; cerci very thin and parallel-sided, about 6x as long as wide; treminalia very close to those of *P. crassitarsus* Hackman, 1970 as illustrated by Dziedzicki (1889: Tab. XVIII, figs. 138–141) and Hackman (1970:49, fig. 45)... cf. 34. *P. bicolor* Dziedzicki
— Fore tarsi not enlarged; cerci broader, shorter and tapered 4
4. Terminalia as illustrated by Dziedzicki (1889: tab. XIX, figs. 163–166) and Gagné (1975:318, fig. 136); tergite VII with extra long setae subapically and tergite VIII covered with short spiniform setae ..... 37. *P. taczanowskyi* Dziedzicki
— Terminalia as illustrated by Dziedzicki (1915: tab. XIII,

Map 25: *Phronia biarcuata*

Map 26: *Phronia exigua*

Map 27: *Trichonta atricauda*



Map 28: *Trichonta terminalis*

Maps Nos 26–28 = species Nos 33, 36, 39 & 40.

figs. 185–188); tergites without specialized setae, sternite VIII with 8 strong setae apically .... 36. *P. exigua* (Zetterstedt)

33. *Phronia biarcuata* (Becker, 1908)

Telmaphilus biarcuata Becker, 1908:67.
Phronia johannae Steenberg, 1924:41: Lindroth et al. 1988:55.
Phronia biarcuata: Ólafsson 1991:47.

Material examined: **ICELAND: A-Skaftafellssysla**, Öraefi, Sandfell, 5 km E Svinafell, Loc54-Gl, 21 Jun–11 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀, 1♂; Nesjar, Hornafjördur, Hoffell, site 66, 19 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; **Dalasysla**, Fellsströnd, Ytrafell, 23 Jun 1987 (NHRI, Leg. E. Ólafsson), 1♀; **Gullbringusysla**, Hafnarfjördur, Hafnarfjördur (Hraunbrun 14), 28–29 Aug 2003 (NHRI, Leg. E. Ólafsson), 1♂; **Rangarvallasysla**, Fljotshlid, Tumastadir, 27 Aug–3 Sep 2002 (NHRI, Leg. E. Ólafsson), 1♂; **S-Mulasysla**, Vellir, Hallormsstadarskogur, S Egilsstadir, Loc50-Pl, 20 Jun–13 Aug 1976 (MZLU, Leg. S.-A. Bengtson et al.), 1♀.

Phronia biarcuata is a common species, widespread in the Palaearctic region, also reported from North Africa and the Near East Region. The species is rare in Iceland, not found in the northern or interior parts (Map 25).

• 34. *Phronia bicolor* Dziedzicki, 1889

Phronia bicolor Dziedzicki, 1889:510 sensu Chandler (1992) nec. Gagné (= *Phronia fusciventris* van Duzee, 1928:52).

Material examined: **ICELAND: Gullbringusysla**, Hafnarfjördur, Hafnarfjördur (Hraunbrun 14), 27–28 Aug 2002 (NHRI, Leg. E. Ólafsson), 1♂; 14–15 Sep 2002 (NHRI, Leg. E. Ólafsson), 1♂; Gardabaer, Heidmörk (Hjallar), 29 May 1979 (NHRI, Leg. E. Ólafsson), 1♂. **S-Mulasysla**, Vellir, Budlungavellir, 5–23 Jul 2002 (NHRI, Leg. G. Halldorsson), 1♀.

Chandler (1992) revised the *P. tarsata* group and distinguished four species. *Phronia bicolor* is widely reported in the Holarctic region, but several old reports of this species may rather refer to other species in the *P. tarsata* group. A single female from Iceland belongs to the *P. tarsata* group by having enlarged fore tarsi and very thin, long and parallel-sided cerci. We tentatively associate it to *P. bicolor* as it is the sole member of this species group in Iceland. *P. bicolor* is very rare in Iceland, found in birch scrub and a house garden in SW and in

a Siberian larch plantation in E Iceland.

• 35. *Phronia braueri* Dziedzicki, 1889

Phronia braueri Dziedzicki, 1889:466.

Material examined: **ICELAND: S-Mulasysla**, Vellir, Hallormsstadarskogur, 13 Jun 1989 (NHRI, Leg. E. Ólafsson), 1♂; Jonsskogur, 5–19 Jul 2002 (NHRI, Leg. G. Halldorsson), 9♀♀.

Phronia braueri is a common species, widely reported in the Holarctic region. The two Icelandic records are from adjacent woodland localities in E Iceland.

36. *Phronia exigua* (Zetterstedt, 1852)

Mycetophila exigua Zetterstedt, 1852:4246.
Phronia exigua: Nielsen et al. 1954:30; Lindroth et al. 1988:55; Ólafsson 1991:47; Magnusson et al., 2001:223
Phronia sp.: Einarsson et al. 2000:215; Ólafsson 2000:57.

Material examined: **ICELAND: A-Skaftafellssysla**, Nesjar, Hornafjördur, Hoffell, site 66, 19 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; Horn, site 81, 25 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; Midfell, site 65, 26 Jun 1966 (MZLU, Leg. H. Andersson), 1♂; **Dalasysla**, Hvammssveit, Asgardur, 21 Jun 1987 (NHRI, Leg. E. Ólafsson), 1♀; **Gullbringusysla**, Hafnarfjördur, Hafnarfjördur (Hraunbrun 14), 29–30 Aug 2000 (NHRI, Leg. E. Ólafsson), 1♂; 6–7 Sep 2003 (NHRI, Leg. E. Ólafsson), 1♂; N-Isafjardarsysla, Skutulsfjördur, Tungufjall, 10 Aug 1933 (ZMUC, Leg. S. Heding), 1♂; S-Mulasysla, Faskrudsfjördur, Budir, 16 Jun 1989 (NHRI, Leg. E. Ólafsson), 1♀; Vellir, Jonsskogur, 29 Jul–12 Aug 2002 (NHRI, Leg. G. Halldorsson), 1♀; S-Thingeyjarsysla, Fnjoskadalur, Vaglaskogur, 19 Jul 1984 (NHRI, Leg. E. Ólafsson), 1♂; Strandasysla, Steingrimsfjördur, Stadardalur, 2 Jul 1994 (NHRI, Leg. E. Ólafsson), 1♂.

Phronia exigua is a common species, widely reported in the Holarctic region. The species is distributed all over Iceland (Map 26) and found in various habitats. There is a considerable unchecked material in the NHRI collection, especially from interior highland areas.

• 37. *Phronia taczanowskyi* Dziedzicki, 1889

Phronia taczanowskyi Dziedzicki, 1889:462.

Material examined: **ICELAND: A-Skaftafellssysla**, Nesjar, Hornafjördur, Site 69 (Svinafell), 21 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; Nesjar, Svinafell, site 6 (MZLU, Leg. S. Richter), 1♂; **S-Mulasysla**, Vellir, Hallormsstadur, 5–17 Aug 2002 (NHRI, Leg. G. Halldorsson), 1♀; Vellir, Mjoanes, 29 Jul–12 Aug 2002 (NHRI, Leg. G. Halldorsson), 1♀.

Phronia taczanowskyi is an uncommon species, but widely reported in the Holarctic region. In Fennoscandia outside Iceland it is so far reported from Finland only. The species is rare and local in Iceland, found in the eastern and southeastern parts.

Genus *Sceptonia* Winnertz

Sceptonia is a mainly Holarctic genus with about 30 species. There are 21 species known from the Palaearctic region, 16 of them are known from Fennoscandia and 13 from Great Britain. Bechev (1995) reviewed the Palaearctic species and the most comprehensive keys are provided by Bechev (1995) and Zaitzev (2003). Males are determined mainly with reference to figures of their terminalia. Females apparently look very similar with respect to terminalia and for most species they are not associated nor figured in the literature.

38. *Sceptonia fumipes* Edwards, 1925

Sceptonia fumipes Edwards, 1925:647: Lindroth et al. 1988:55; Ólafsson 1991:47.

Material examined: **ICELAND: A-Skaftafellssysla**, Lon, Hvalnes, 14 Aug 1988 (NHRI, Leg. E. Ólafsson), 1♂; Nesjar, Svinafell, site 6, 21 Jun 1966 (MZLU, Leg. S. Richter), 1♂; **S-Mulasysla**, Vellir, Mjoanes, 21 Jun–14 Jul 2002 (NHRI, Leg. G. Halldorsson), 1♀; 29 Jul–12 Aug 2002 (NHRI, Leg. G. Halldorsson), 1♀; S-**Thingeyjarsysla**, Fnjoskadalur, Vaglaskogur, 20 Jul 1984 (NHRI, Leg. E. Ólafsson), 1♂; **Skagafjardarsysla**, Hjaltadalur, Holar, 6 Jul 1989 (NHRI, Leg. E. Ólafsson), 2♂♂.

Sceptonia fumipes is a common and widespread species in NW Europe. In Iceland it is a rare species, found in the northern, eastern and southeastern parts (Map 15). The female is tentatively associated to this species as it is the only one known from Iceland.

Genus *Trichonta* Winnertz

Trichonta is a large, mainly Holarctic genus. There are about 60 species known from the Palaearctic region, 45 of them from Fennoscandia and 21 from Great Britain. A fully illustrated Holarctic monograph with keys to species was provided by Gagné (1981), and a new key to Russian species was provided by Zaitzev (2003). Males are determined mainly with reference to figures of their terminalia. The majority of the females also show distinctive characters in terminalia and are so far associ-

ated and illustrated for about one third of the Palaearctic species.

Provisional key to species known from Iceland

1. Hind coxa without strong, posterobasal seta; male terminalia as illustrated by Gagné (1981:43, figs. 61–64); cerci long, slender, gonostylus large, prominent, with long anteriodorsal lobe .... 39. *T. atricauda* (Zetterstedt)
— Hind coxa with 1–2 strong, posterobasal seta; male terminalia as illustrated by Gagné (1981:48, figs 93 – 95); cerci short, subquadrate, gonostylus small with largest lobe projected caudal; female terminalia as illustrated by Gagné (1981:63, fig. 179) .... 40. *T. terminalis* (Walker)

• 39. *Trichonta atricauda* (Zetterstedt, 1852)

Mycetophila atricauda Zetterstedt, 1852:4219.

Material examined: **ICELAND: A-Skaftafellssysla**, Nesjar, Hornafjördur, Midfell, site 65, 20 Jun 1966 (MZLU, Leg. H. Andersson), 1♀; Lon, Hvammur, 14 Aug 1988 (NHRI, Leg. E. Ólafsson), 1♀; **Myrasysla**, Stafholtstungur, Munadarnes, 30 Jun 1985 (NHRI, Leg. E. Ólafsson), 1♂; **N-Thingeyjarsysla**, Kelduhverfi, Asbyrgi, 6 Jul 1979 (NHRI, Leg. E. Ólafsson), 1♀**; S-Mulasysla**, Stödvarfjördur, Stödvarfjördur, 12 Jun 1994 (NHRI, Leg. E. Ólafsson), 1♀, 1♂; **S-Thingeyjarsysla**, Fnjoskadalur, Vaglaskogur, 20 Jul 1984 (NHRI, Leg. E. Ólafsson), 1♀.

Trichonta atricauda is a common species, widespread in the Holarctic Region. In Iceland it is rare, found in lowland habitats in different parts of the country (Map 27). Using the key in Gagne (1981) the females run to the *T. melanura* (Staeger, 1840) group, not further separated by Gagné, and terminalia of Icelandic females are rather similar to those figured for *T. melanura*. Thus, we tentatively associate them to *T. atricauda* as it is a member of this species group.

• 40. *Trichonta terminalis* (Walker, 1856)

Mycetophila terminalis Walker, 1856:21.

Material examined:**ICELAND: A-Skaftafellssysla**, Öraefi, Skaftafell, 4–11 Sep 2000 (NHRI, Leg. R.F. Kristjansson), 1♂; **Rangarvallasysla**, Fljotshlid, Tumastadir, 20–27 Jul 1995 (NHRI, Leg. E. Ólafsson), 1♂; 19–26 Aug 1996 (NHRI, Leg. E. Ólafsson), 1♂; 28 May–4 Jun 2002 (NHRI, Leg. E. Ólafsson), 2♂♂; 4–11 Jun 2002 (NHRI, Leg. E. Ólafsson), 1♂; 30 Jul–6 Aug 2002 (NHRI, Leg. E. Ólafsson), 1♂; 10–17 Sep 2002 (NHRI, Leg. E. Ólafsson), 1♂; 17–24 Sep 2002 (NHRI, Leg. E. Ólafsson), 1♂; 4–11 Jun 2004 (NHRI, Leg. E. Ólafsson), 1♀; **S-Thingeyjarsysla**, Fnjoskadalur, Vaglaskogur, 1 Jun 1985 (ZMAN, Leg. R. Schoon), 1♂.

Trichonta terminalis is a common species, widespread in the Holarctic Region. In Iceland it is rare, found in three woodland localities in different parts of the country (Map 28).

Genus *Zygomyia* Winnertz

Zygomyia is a large genus with about 75 species, mainly distributed on the southern continents. It is rather poorly represented with only 17 species known from the Palaearctic region, 13 of them from Fennoscandia and 9 from Great Britain. The most comprehensive key was provided by Zaitzev (2003). Males are determined mainly based on wing pattern, setal vestiture on legs and reference to figures of their terminalia. The females apparently look very similar with respect to terminalia but are associated for several species based on non-genitalic characters.

• 41. *Zygomyia pseudohumeralis* Caspers, 1980.

Zygomyia pseudohumeralis Caspers, 1980:144.

Material examined: **ICELAND: Arnessysla**, Ölfus, Gljufur, 14 Aug 1985 (NHRI, Leg. E. Ólafsson), 1♀; Biskupstungur, Sydrireykir, 30 Jul 1988 (NHRI, Leg. E. Ólafsson), 1♂; **Rangarvallasysla**, V-Landeyjar, Bergthorshvoll, 18 Jul 1986 (NHRI, Leg. E. Ólafsson), 1♀.

Zygomyia pseudohumeralis is a common and widespread species in NW Europe. It is very rare in Iceland, the three localities are all in the southern parts (Map 16). Using Chandler (1991) we find the females to belong to the *Z. humeralis* (Wiedemann, 1817) species group, and they are tentatively associated to *Z. pseudohumeralis* as the only known species from Iceland. Many early records of *Z. humeralis* and *Z. notata* probably refer to this species and all three species occur together in Fennoscandia.

Discussion

The species estimates obtained by the collector's curve method indicate that we have covered the majority of the species likely to be found in Iceland, the total number of expected species lying between 44 and 52. The samples used to

calculate the statistics are, however, very heterogeneous and dominated by pitfall trap and sweep net collections. As such they hardly represent true pseudoreplicates, one of the assumptions for statistics of this kind (see Colwell & Coddington 1994). Moreover, as different collecting methods can yield very different species compositions it will also greatly affect the results of such species estimates (see Andersen & Kjærandsen 2001 for a comparison of Malaise traps with light traps). Malaise traps were not used to obtain fungus gnats in Iceland, mainly due to lack of shelter in the harsh climate. Yet, this method is widely used and proven efficient for sampling of fungus gnats in forest environments (e.g. Søli 1994; Økland 1996; Økland et al. 2005). Hence, these results should be used only as an indication of the true diversity of fungus gnats in Iceland.

Many insect species show marked distribution patterns in Iceland, but this seems not to be the case for the majority of the fungus gnats. All common species are generally widely distributed, the more sparse ones often found in different and far apart localities of the island. The sampling localities (Map 1) covers the majority of Iceland, except most of the interior highlands and the northeast that are poorly sampled, but again, it is important to emphasize that the sampling efforts are not equal between the localities, some samples and localities being represented by a single or a few specimens only. As such, species like *Allodia embla* and *Exechia frigida* are probably more common in the interior highland areas than are shown on their respective maps. Yet, some general patterns are indicated by the distribution maps: *Brevicornu auriculatum* is the only species that seems to have distribution confined to the interior districts, while *Phronia biarcuata* and *P. exigua* display a typical coastal distribution. The distribution of *Brevicornu proximum, B. verralli* and *Zygomyia pseudohumeralis* seems to have a southwestern dominance, while *Sceptonia fumipes*, *Trichonta atricauda* and *T. terminalis* seems to have a northeastern dominance.

The composition of the fauna is dominated by species in the tribes Exechiini and to a lesser degree Mycetophilini. With the possible exception of the enigmatic male *Exechia* sp. A, there are no endemic species of fungus gnats known from Iceland. Rather, there is a strong affinity of the Icelandic fauna of fungus gnats with the mainland of NW Europe. Altogether 38 (93%) species are known from Fennoscandia outside Iceland, and 34 (83%) are known from Great Britain, and 28 species (68%) are known from Western Norway (see Tab. 1). This may indicate that the major postglacial immigrant route has been from Great Britain rather than from Western Norway, but it may also reflect that Western Norway is still rather poorly investigated compared to Great Britain. The diversity of fungus gnats in Great Britain is fairly well known (Chandler 1998, 2001), while Norway and Fennoscandia is still rather poorly investigated (Hedström 1994). Yet, several recent projects (e.g. Økland & Zaitzev 1997; Hedmark 1998, 2000; Polevoi 2000; Økland et al. 2005; Kjærandsen 2005) have improved the situation, and we are now locking at a figure approaching 900 species in Fennoscandia (unpublished), exclusive of the family Sciaridae. With that in mind Iceland has only about 4.6% (41/900*100) of the diversity in Fennoscandia and 7.7% (41/533*100) of the diversity in Great Britain, respectively. Kjærandsen & Jørgensen (1992) reported 18 species from The Faroes of which only 7 species (17%) are in common with Iceland. This is a surprisingly low figure, considering that the dispersal route both from Great Britain and from Western Norway more or less passes over the Faroes. Tuomikoski (1967) reported five species from Spitsbergen of which *Exechia frigida* and an uncertain female *Mycomya islandica* (see Väisänen 1984) are in common with Iceland. Chandler & Ribeiro (1995) reported 75 species in 27 genera known from the Atlantic islands NW of Africa (Canary islands, Madeira and the Azores). Altogether 16 of the genera from the Atlantic islands are shared with Iceland, but only 7 species (17%) are in common between the two. Greenland is poorly investigated and we were not able to find any updated list of known fungus gnats for comparison.

There is also rather a strong Holarctic element of the Icelandic fungus gnats, where 15 (37%) species show a wide, seemingly circumpolar distribution. Gagné (1975; 1981) found a high proportion of Holarctic species in his revisions of *Phronia* and *Trichonta*, 50% and 43% respectively. A considerably lower proportion of Holarctic species was found in revisionary works of *Mycomya* (Väisänen 1984) and *Coelosia* (Søli 1997), 18% and 12% respectively. Gagné (1978) predicted the Eastern Nearctic fauna to be more similar to the European fauna than to the Western Nearctic fauna. Bechev (1999) suggested that the greater part of the genera of fungus gnats is of Holarctic boreal origin, and that a western and an eastern Palaearctic centre of endemism could be discerned. These considerations were influenced by the large impediment of data from the Eastern Palaearctic Region, only very recently covered in detail by Zaitzev (1999, 2003). Thus, many of the European species now seem to have a wide Palaearctic distribution, but see Sanmartin et al. (2001) for a discussion of general biogeographical patterns in the Holarctic. The main pattern seems to be that the northern boreal fauna of fungus gnats, at least with respect to the subfamily Mycetophilinae, is very rich and dominated by a

large proportion of widespread Palaearctic and a smaller proportion of circumpolar species. The Nearctic fauna of the family Mycetophilidae is still rather poorly investigated, and the distribution of taxa and taxonomic sister-group pattern between the two regions might change in the future when more revisionary work is carried out.

At this point it is interesting to note that Iceland seemingly has most species in common with NW Europe, and even more species in common with the Eastern Palaearctic region (51%) than with the Nearctic Region (37%). This follows naturally as the majority, if not all of the Icelandic species must be considered postglacial in origin, and the main postglacial dispersal route would then be from mainland Europe. Lindroth et al. (1988) found indications of old faunal centres on the south cost of Iceland but no conclusive evidence of the existence of glacial refugia. In their study of the faunal development on the newborn volcanic island Surtsey, Lindroth et al. (1973) found a surprisingly high rate of overseas dispersal, and even reported three species of *Exechia* only seven years after the emergence of the new island. The dominance of Exechiini species on mainland Iceland conforms well to the known fauna of the Faroes and indicate that many boreal species in this tribe have a great dispersal potential and are not dependent upon forest habitats. In conclusion, it seems that the subfamily Mycetophilinae is a successful group in the high boreal and arctic regions with a great dispersion potential, and that the main limiting factor for the diversity of fungus gnats on Iceland probably is lack of highly developed forest environments.

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References

Andersen, T. & Kjærandsen, J. 2000. Adult caddisfly diversity along a headwater stream in southeastern Ghana (Insecta: Trichoptera). — Verh. Int. Verein. Theor. Angew. Limnol. 27:3613–3618.

Andersson, H. 1967. Faunistic, ecological and taxonomic notes on Icelandic Diptera. — Opusc. Entomol. 32:101–120.

Bechev, D. 1995. The Palaearctic species of the genus *Sceptonia* Winnertz (Diptera: Mycetophilidae). — Trav. Sci. Univ. Plovdiv, Animalia 31:7–21.

Bechev, D. N. 1999. The zoogeographic classification of the Palaearctic genera of fungus gnats (Diptera: Sciaroidea, excluding Sciaridae). — Studia Dipterol. 6:321–326.

Bechev, D. N. 2000. World distribution of the genera of fungus gnats (Diptera: Sciaroidea, excluding Sciaridae). — Studia Dipterol. 7:543–552.

Becker, T. 1908. Dipteren der Kanarischen Inseln. — Mitt. Zool. Mus. Berl. 4: 1–180.

Bengtson, S.-A. 2007. On Icelandic terrestrial arthropods and soil fauna — Introduction. — Insect. Syst. & Evol. Suppl. 64:1–2.

Bengtson, S.-A. & Hauge, E. 2007. Spiders in Iceland: distributions, species richness, and faunal changes. — Insect. Syst. & Evol. Suppl. 64:97–120.

Boheman, C. H. 1865. Spetsbergens Insekt-Fauna. — Øfvers. K. Vetensk.-acad. Föhr. (Stockholm) 22: 563–577.

Caspers, N. 1980. Drei neue Mycetophiliden aus der deutschen Mittelgebirgsregion. — Spixiana 3: 141–145.

Chandler, P. J. 1977. Studies of some fungus gnats (Diptera: Mycetophilidae) including nine additions to the British list. — Syst. Entomol. 2:67–93.

Chandler, P. J. 1989. Notes on *Macrocera* Meigen (Mycetophiloidea, Keroplatidae) including *M. nigropicea* Lundström new to Britain. — Dipterist Digest 3:27–31.

Chandler, P. J. 1991. New species and additions to the British list of the fungus gnats genera *Zygomyia* Winnertz and *Sceptonia* Winnertz (Diptera, Mycetophilidae). — Br. J. Ent. Nat. Hist. 4:143–155.

Chandler, P. J. 1992. A review of the British *Phronia* Winnertz, and *Trichonta* (Dipt., Mycetophilidae). — Entomol. Mon. Mag. 128:237–254.

Chandler, P. J. 1994. *Rymosia* Winnertz, (Diptera: Mycetophilidae), a newly recognized element of wetland faunas, with five species new to Britain and key to species. — Entomol. Gaz. 45:199–220.

Chandler, P. J. 1998. Checklists of Insects of the British Isles, 1: Diptera. — Royal Entomological Society, 234pp.

Chandler, P. J. 2001. Fungus gnats (Diptera: Sciaroidea) new to Britain. — Br. J. Ent. Nat. Hist. 13:215–243.

Chandler, P. J. 2004. Fauna Europaea: Mycetophilidae. *In*: de Jong, H. (Ed.) Fauna Europaea: Diptera, Nematocera. Fauna Europaea version 1.1. Available from: http://www.faunaeur.org (February 2005).

Chandler, P. J. & Ribeiro, E. 1995. The Sciaroidea (Diptera) (excluding Sciaridae) of the Atlantic Islands (Canary Islands, Madeira and the Azores). — Bolm. Mus. Munic. Funchal (Hist. Nat.), Supl. No. 3:1–170.

Colwell, R. K. 2004a. Biota 2 — the biodiversity database manager, version 2.02. Sunderland, MA: Sinauer Associates.

Colwell, R. K. 2004b. EstimateS: Statistical estimation of species richness and shared species from samples. Version 7. User's Guide and application published at: http://purl.oclc.org/estimates.

Colwell, R. K. & Coddington, J. A. 1994. Estimating terrestrial biodiversity through extrapolation. — Philos. Trans. R. Soc. Lond., Ser. B. 345, 101–118.

Curtis, J. 1837. British entomology. London, 14. Pp. 626–674.

Dziedzicki, H. 1885. Przyczynek do fauny oadow dwuskrzydlych. Rodzaje nowe: *Hertwigia* nov. gen., *Eurycera* nov. gen. I gatunki rodzajow: *Boletina, Sciophila*. — Pamietnik fizjograficzny 5: 164–194.

Dziedzicki, H. 1889. Revue des espèces européennes du genre *Phronia* Winnertz avec la description de deux genres nouveaux: *Macrobrachius* et *Megoaphthalmidia*. — Horae Soc. Ent. Ross. 23:404–532.

Dziedzicki, H. 1910. Zur Monographie der Gattung *Rymosia* Winn. — Horae Soc. Ent. Ross. 77:89–104.

Dziedzicki, H. 1915. Atlas des organes génitaux (Hypopygium) des types de Winnertz et des genres de sa collection de Mycetophiles. — Publ. Soc. Sciences Varsovie 3:1–16 + 21 plates.

Edwards, F. W. 1924. Notes on the types of Mycetophilidae (Diptera) described by Staeger and Zetterstedt. — Entomol. Tidskr. 45:160–168.

Edwards, F. W. 1925. British fungus-gnats (Diptera, Mycetophilidae). With a revised generic classification of the family. — Trans Ent. Soc. Lond. 73(1924):505–670.

Einarsson, S., Magnusson, S.H., Ólafsson, E., Skarphedinsson, K.H., Gudjonsson, G., Egilsson, K. & Ottosson, J.G. 2000. Natturuverndargildi a virkjunarsvaedum nordan jökla. — Icelandic Institute of Natural History, NI–00009, 1–221.

Engel, E. O. 1915. Fauna Faeroensis. VI. Dipteren. 1. Lycoriidae, Fungivoridae, Bibionidae, Melusinidae, Orphnephilidae, Phryneidae, Limoniidae und Tipulidae. — Zool. Jahrb. (Abt. Syst.) 39:95–102.

Gagné, R. J. 1975. A revision of the Nearctic species of the genus *Phronia* (Diptera: Mycetophilidae). — Trans. Amer. Ent. Soc. 101:227–318.

Gagné, R. J. 1978. A hypothesis for the distribution of Holarctic groups of fungus gnats (Diptera, Mycetophilidae). — J. N. Y. Entomol. Soc. 86:289.

Gagné, R. J. 1981. A Monograph of *Trichonta* with a Model for the Distribution of Holarctic Mycetophilidae (Diptera). — Techn. Bull. U. S. Dept. Agric. 1638:1–64.

Hackman, W. 1970. New species of the genus *Phronia* Winnertz (Diptera, Mycetophilidae) from Eastern Fennoscandia and notes on the synonymies in this genus. — Notulae Ent. 50:41–60.

Hackman, W. 1971. Three new species of the *Allodia lugens* group from Northern Europe (Dipt., Mycetophilidae). — Ann. Ent. Fenn. 37:3–7.

Hackman, W. 1980. A check list of the Finnish Diptera I. Nematocera and Brachycera (s. str.). — Notulae Ent. 60:17–48.

Hackman, W., Las˘tovka, P., Matile, L. & Väisänen, R. 1988. Family Mycetophilidae. Pp. 220–327. *In*: Soos, A. & Papp, L. (eds.) Catalogue of Palaearctic Diptera. Vol. 3. Ceratopogonidae – Mycetophilidae. Akadémia Kiadó, Budapest.

Hedmark, K. 1998. Fungus gnats — new species to Sweden and Finland (Diptera: Mycetophilidae s. lat.). — Entomol. Tidskr. 119:1–12. [in Swedish].

Hedmark, K. 2000. Fungus gnats in the taiga — new species from Sweden in a Fennoscandian perspective (Diptera: Sciaroidea excl. Sciaridae). — Entomol. Tidskr. 121:73–89. [in Swedish].

Hedström, L. 1994. How many species of midges and flies are there in Sweden? — Entomol. Tidskr. 115:11–22. [in Swedish].

Hutson, A. M., Ackland, D. M. & Kidd, L. N. 1980. Mycetophilidae (Bolitophilinae, Ditomyiinae, Diadocidiinae, Keroplatinae, Sciophilinae and Manotinae) Diptera, Nematocera. — Handb. Ident. Brit. Insects. London Vol. 9, Part 3, 111 pp.

Kallweit, U. & Plassmann, E. 1999. Mycetophilidae. Checkliste der Dipteren Deutschlands (Schumann, H., Bährmann, R. & Stark, A. eds.) — Studia Dipterol. Suppl. 2:61–69.

Kjærandsen, J. 1993. Diptera in mines and cave systems in southern Norway. — Entomol. Fenn. 4:151–160.

Kjærandsen, J. 2005. A review of fungus gnats in the tribe Exechiini (Diptera, Mycetophilidae) from the J. W. Zetterstedt collection at the Museum of Zoology in Lund, Sweden. — Zootaxa 856:1–35.

Kjærandsen, J. 2006. Review of fungus gnats of the genus *Tarnania* Tuomikoski, with a phylogeny of the *Rymosia* s. l. genus group (Diptera: Mycetophilidae). — *Insect Syst.Evol.* 37: 121–148.

Kjærandsen, J. & Jørgensen L. L. 1992. Fungus-gnats from the Faroes (Diptera, Mycetophilidae). — Entomol. Medd. 60:85–87.

Kurina, O. 1999. Morphological differences between *Exechia fusca* (Meigen, 1804) and *Exechia confinis* Winnertz, 1863 (Diptera, Mycetophilidae). — Int. J. Dipt. Res. 10:53–57.

Kurina, O. 2001. On the identification of Palaearctic species in the genus *Cordyla* Meigen (Diptera, Mycetophilidae); preliminary results. — Norw. J. Entomol. 48:231–235.

Kurina, O. 2004. Redescription of *Sciophila nitens* Winnertz (Diptera: Mycetophilidae) with a new synonymization. — Entomol. Fenn. 15:193–197.

Lackschewitz, P. 1937. Die Fungivoriden des Ostbaltischen Gebites. — Arb. Naturf.-Ver.Riga. N.F. 21:1–47.

Laštovka, P. & Matile, L. 1974. Mycetophilidae (Diptera) de Mongolie. — Acta Zool. Hung. 20:93–135.

Lindroth, C. H. 1931. Die Insektenfauna Islands und ihre Probleme. — Zool. Bidr. Uppsala 13(1930–31):(1),105–599 [Inagural-dissertation in German].

Lindroth, C. H. 1965. Skaftafell, Iceland a living glacial refugium. — OIKOS Acta Oecol. Scand. Suppl. 6:1–142.

Lindroth, C. H., Andersson, H., Bödvarsson, H. & Richter, S. H. 1973. Surtsey, Iceland. The development of a new fauna, 1963–1970. Terrestrial Invertebrates. — Entomol. Scand. Suppl. 5:1–280.

Lindroth C. H., Bengtson, S.-A. & Enckell, P. H. 1988. Terrestrial faunas of four isolated areas: A study in tracing old fauna centres. — Entomol. Scand. Suppl. 32:31–65.

Lundström, C. 1906. Beiträge zur Kenntnis der Dipteren Finlands. I. Mycetophilidae. — Acta Soc. Fauna Flora Fenn. 29: 1–50.

Lundström, C. 1909. Beiträge zur Kenntnis der Dipteren Finlands. IV. Supplement Mycetophilidae. — Acta Soc. Fauna Flora Fenn. 32:1–63.

Lundström, C. 1912. Beiträge zur Kenntnis der Dipteren Finland.

VIII. Supplement 2. Mycetophilidae, Tipulidae, Cylindrotomidae, und Limnobiidea. — Acta Soc. Fauna Flora Fenn. 36:1–70.

Lundström, C. 1913. Neue oder wenig bekannte europäische Mycetophiliden. III. — Ann. Mus. Nat. Hung. 11:305–322.

Lundström, C. 1914. Beiträge zur Kenntnis der Dipteren Finland. IX. Supplement 3. Mycetophilidae. — Acta Soc. Fauna Flora Fenn. 39:1–26.

Magnusson, S. H., Ólafsson, E., Gudmundsson, G. A., Gudjonsson, G., Egilsson, K., Kristinsson, H. & Skarphedinsson, K.H. 2001. Karahnjukavirkjun. Ahrif Halslons a grodur, smadyr og fugla. — Icelandic Institute of Natural History, NI-01004, pp. 1–231.

Martinovský, J. 2001. New records on little-known western Palaearctic *Macrocera* Meigen, with a description of *M. jonica* sp.n. from Greece (Diptera: Keroplatidae). — Acta Univ. Carol. Biol. 45:109–114.

Matile, L. 1997. Phylogeny and evolution of the larval diet in the Sciaroidea (Diptera, Bibionomorpha) since the Mesozoic. *In*: Grandcolas, P. (ed.), The origin of biodiversity in insects: Phylogenetic tests of evolutionay scenarios. — Mem. Mus. Natn. Hist. Nat. 173:273–303.

Meigen, J. W. 1804. Klassifikazion und Beschreibung der europäischen zweiflügeligen Insecten (Diptera Linn.). 152 pp., Braunschweig.

Meigen, J. W. 1818. Systematische Beschreibung der bekannten europäischen zweiflügeligen Insekten. 333 pp., Aachen.

Meigen, J. W. 1830. Systematische Beschreibung der bekannten europäischen zweiflügeligen Insekten. 401 pp., Hamm.

Miller, G. 2005. Linnaeus's Legacy Carries On. — Science 307: 1038–1039.

Nielsen, P., Ringdahl, O. & Tuxen, S. L. 1954. Diptera I (exclusive of Ceratopogonidae and Chironomidae). Pp 1–189. *In*: Fredriksson, Å. & Tuxen, S. L. (eds) The Zoology of Iceland Volume III, Part 48a. Einar Munksgaard, Copenhagen and Reykjarvik.

Økland, B. 1996. Unlogged forests: Important sites for preserving the diversity of Mycetophilids (Diptera: Sciaroidea). — Biol. Conserv. 76:297–310.

Økland, B. & Zaitzev, A. I. 1997. Mycetophilids (Diptera, Sciaroidea) from southeastern Norway. — Fauna Norv. Ser. B. 44:27–37.

Økland, B., Götmark, F., Nordén, B., Franc, N., Kurina, O. & Polevoi, A. 2005. Regional diversity of mycetophilids (Diptera: Sciaroidea) in Scandinavian oak-dominated forest. — Biol. Conserv. 121:9–20.

Ólafsson, E. 1991. Islenskt skordyratal. — Fjölrit Natturufrædistofnunar 17:1–69.

Ólafsson, E. 2000. Landliddyr i Thjorsarverum. Rannsoknir 1972–1973. — Fjölrit Natturufrædistofnunar 40:1–159.

Plassmann, E. 1973. Die Pilzmückengattung *Leia* (Diptera: Mycetophilidae). — Senckenb. Biol. 54:131–140.

Plassmann, E. 1978. Pilzmücken aus Messaure in Schweden. I. Barberfallenfänge (Insecta: Diptera: Mycetophilidae). — Senckenb. Biol. 58:147–156.

Plassmann, E. 1979. Pilzmücken aus Messaure in Schweden. II. Luftstrom-Fallenfänge (Insecta: Diptera: Mycetophilidae). — Senckenb. Biol. 59:371–388.

Plassmann, E. 1980. Pilzmücken aus Messaure in Schweden. III. Lichtfallenfänge (Insecta: Diptera: Mycetophilidae). — Senckenb. Biol. 60:175–189.

Polevoi, A. I. 2000. Fungus gnats (Diptera: Bolitophilidae, Ditomyiidae, Keroplatidae, Diadocidiidae, Mycetophilidae) of Karelia. 84 pp., Petrozavodsk. [in Russian]

Poole, R. & Gentili, P. (eds.) 1996. Nomina Insecta Nearctica. A Check List of the Insects of North America. — Entomological Information Services, Rockville, Maryland.

Sanmartin, I., Enghoff, H. & Rognquist, F. 2001. Patterns of animal dispersal, vicariance and diversification in the Holarctic. — Biol. J. Linn. Soc. 73:345–390.

Santos Abreu, E. S. 1920. Monografia de los Fungivoridos de las Islas Canarias. — Memorias de la Real Academia de Ciencias y Artes de Barcelona 16: 1–152.

Søli, G. E. E. 1994. Fungus gnats from Jostedalen, West Norway (Diptera; Diadocidiidae and Mycetophilidae). — Fauna Norv. Ser B 41:1–12.

Søli, G. E. E. 1997. The systematics and phylogeny of *Coelosia* Winnertz, 1863 (Diptera, Mycetophilidae). — *Entomol. Scand. Suppl.* 50:57–139.

Søli, G. E. E., Vockeroth, J. R. & Matile, L. 2000. Chapter A4: Families of Sciaroidea. Pp. 49–92. *In*: Papp, L. & Darvas, B. (eds), Contributions to a manual of Palaearctic Diptera. Appendix. Budapest: Science Herald.

Stackelberg, A. A. 1945. European species of the family Macroceratidae (Diptera, Nematocera). — Entomol. Oboz. 28:17–29. [in Russian, with English summary].

Stackelberg, A. A. 1948. New and poorly known species of Fungivoridae (Diptera) from Leningrad District. — Entomol. Oboz. 30:94–102. [in Russian].

Staeger, R. C. 1840. Systematisk fortegnelse over de i Danmark hidtil fundne Diptera. — Naturhist. Tidskr. 3: 228–288. [in Danish]

Steenberg, C. M. 1924. Étude sur deux espèces don't les larves se forment de leurs excréments une couche protectrice: la *Phronia strenua* Winn. et la *P. johannae* n. sp. (Diptera Nematocera). — Vidensk. Medd. Danske Naturhist. For. 78:1–51.

Tuomikoski, R. 1967. Mycetophilidae and Sciaridae from Spitsbergen, collected by Dr. J. Kaisila in 1965. — Ann. Ent. Fenn. 33:43–51.

Väisänen, R. 1984. A monograph of the genus *Mycomya* Rondani in the Holarctic region (Diptera, Mycetophilidae). — Acta Zool. Fennica 177, 1–346.

Van Duzee, M. C. 1928. New Mycetophilidae taken in California and Alaska. — Proc. Calif. Acad. Sci. 17: 31–65.

Walker, F. 1856. Insecta Britannica. Diptera. 352 pp., London, 3.

Winnertz, J. 1863. Beitrag zu einer Monografie der Pilzmücken (Mycetophilidae). — Verh. Zool.-bot. Ges. Wien 13: 637–964.

Zaitzev, A. I. 1982. Fungus gnats of the genus *Sciophila* Meig. of the Holarctic. Moscow, 75 pp. [in Russian].

Zaitzev, A. I. 1985. Holarctic species of fungus gnats of the genus *Brevicornu*, groups *fissicauda* and *proximum* (Diptera, Mycetophilidae). — Vestn. Zool. 5, 40–47. [in Russian].

Zaitzev, A. I. 1988. Fungus gnats of the *sericoma, griseicolle* and *ruficorne* species groups of the genus *Brevicornu* Marshall (Diptera, Mycetophilidae) of the Holarctic fauna. — Entomol. Obozr. 67:391–404. [in Russian].

Zaitzev, A. I. 1994. Fungus gnats of the fauna of Russia and adjacent

regions. Part 1. Moscow, 288 pp. [in Russian].

Zaitzev, A. I. 1999. 15. Family Bolitophilidae.; 16. Family Diadocidiidae.; 17. Family Ditomyiidae.; 18–19. Family Keroplatidae.; 20. Family Mycetophilidae. Pp. 134–239. *In*: Ler, P. A. (ed.) Key to the insects of Russian Far East. Vol 6. Diptera and Siphonaptera. Part 1. Vladivostok, 666 pp. [in Russian].

Zaitzev, A. I. 2003. Fungus gnats (Diptera, Sciaroidea) of the fauna of Russia and adjacent regions. Part II. — Int. J. Dipt. Res. 14:77–386.

Zetterstedt, J. W. (1852) Diptera scandinaviae disposita et descripta. — Lundae 11: xii + 4091–4545.