

## ***Boletina dispectoides* sp.n. and six other species of fungus gnats (Diptera: Mycetophilidae) new to Finland**

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Jakovlev, J. & Penttinen, J. 2007: *Boletina dispectoides* sp.n. and six other species of fungus gnats (Diptera: Mycetophilidae) new to Finland. — Entomol. Fennica 18: 211–217.

*Boletina dispectoides* Jakovlev & Penttinen sp.n., a new species of the *Boletina nitida* group is described. In addition, six other species of fungus gnats are reported from Finland for the first time. *Manota unifurcata* Lundström, 1913 was reared from dead wood. *Exechia bicincta* Staeger, 1840, *Mycetophila forcipata* Lundström, 1913, *M. sumavica* (Lastovka, 1963), *Trichonta tristis* (Strobl, 1898) and *Sciophila plurisetosa* Edwards, 1921 were caught by pit-fall and Malaise traps in southern and central Finland. Detailed information on Finnish records as well as data on the general distribution of the species and their larval microhabitats is given.

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Received 29 Nov 2006, accepted 1 March 2007

### **1. Introduction**

Since the start of the Finnish PUTTE study program for poorly known and threatened species in 2003, altogether 112 species of fungus gnats (Diptera: Bolitophilidae, Diadocidiidae, Dito-myidae, Keroplatidae, Mycetophilidae) have been reported as new to Finland (Jakovlev *et al.* 2006, Polevoi *et al.* 2006) increasing the known Finnish fauna to 699 species.

Further studies have yielded additional seven species of fungus gnats new to the fauna of Finland, including one species new for science. This species, *Boletina dispectoides* sp.n., belongs to the *Boletina nitida* group that was recently revised by Zaitzev *et al.* (2005) on the part of its Palaearctic species. The *B. nitida* group including *B. dispectoides* incorporates ten species, of which

eight present in Finland. The species of the *B. nitida* group can easily be distinguished from the rest of genus *Boletina* by their hairy laterotergite in combination with bare Sc and the presence of Sc2 (Zaitzev *et al.* 2005). In this article a description of the new species is given as well as faunistic and ecological data on the other species new to Finland.

### **2. Material and methods**

The species new to Finland were found studying the fungus-gnat material collected in 2004–2005 by Malaise and pit-fall trapping, sweep-netting and rearing from larvae in southern and central Finland, within the biological provinces of Varsinais-Suomi (*Ab*), Uusimaa (*N*), Etelä-Häme (*Ta*)

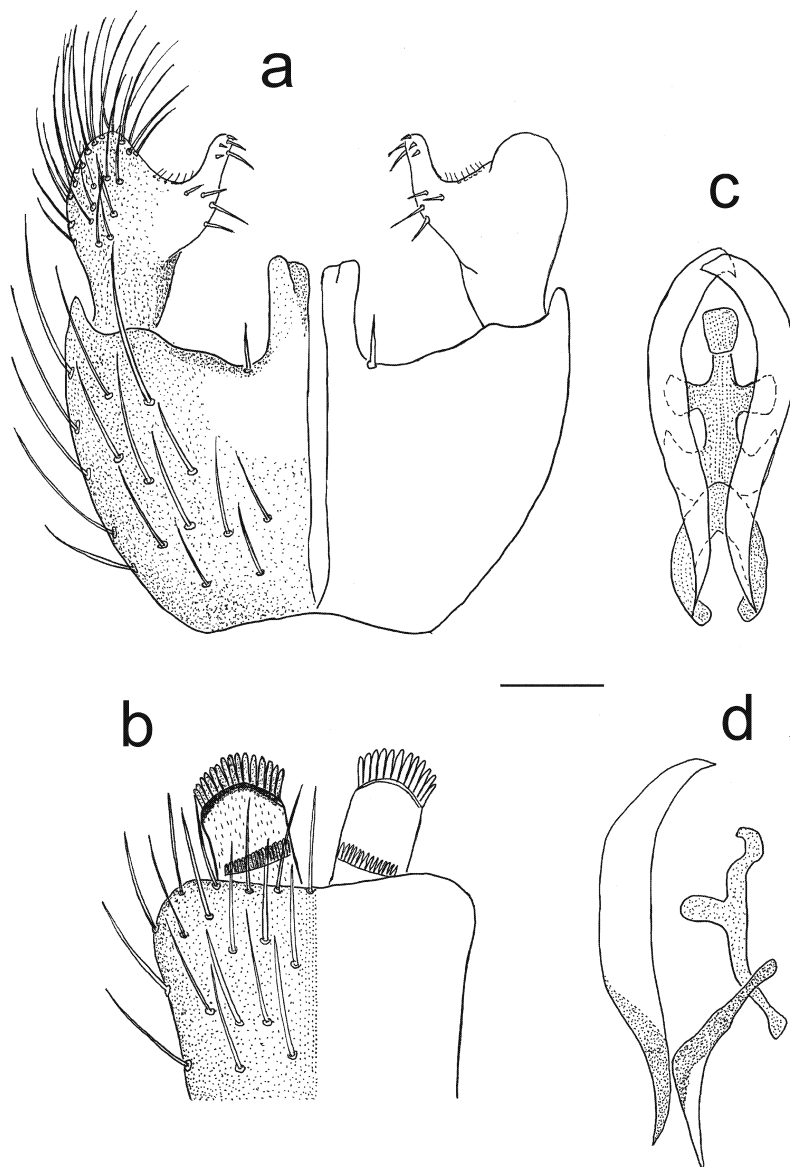


Fig. 1. *Boletina dispectoides* Jakovlev et Penttinen sp. n., male genitalia. – a. Ventral view. – b. Tergite IX. – c. Aedeagus and parameres, dorsal view. – d. Aedeagus and parameres, lateral view. Scale bar 0.1 mm.

and Pohjois-Häme (*Tb*). Detailed information on the collecting localities for each species is given separately.

As pit-fall traps we used plastic mugs (volume 2 dl, diameter of 6.5 cm) buried to the upper edges of the mugs in the debris at the bottom of hollow tree trunks and casserole dishes made of aluminum foil (volume 5 dl, size 13 × 10.5 cm) attached with pins to the barkless trunks.

Malaise and pit-fall traps were operated from mid-May to mid-October and emptied 4–6 times during this interval. 70% alcohol or a 50% ethyl-

ene glycol with some detergent was used as a preserving fluid in the traps. For rearing adult fungus gnats from larvae living in decaying wood we used emergence traps described in detail by Jakovlev (2005).

Additional records of species new to Finland were obtained by reviewing selected parts of the collections of the Zoological Museum, Finnish Museum of Natural History (MZH).

The structure of the records presented below is: number of males, number of females, code for biogeographical province (Heikinheimo & Raati-

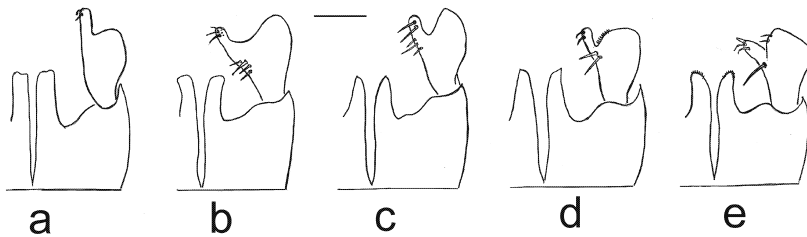


Fig. 2. *Boletina nitida* group, male genitalia in ventral view. – a. *B. bidenticulata* Sasakawa & Kimura, 1974. – b. *B. dispectoides* Jakovlev & Penttinen, sp. n. – c. *B. dispecta* Dziedzicki, 1885. – d. *B. gusakovae* Zaitzev, 1994. – e. *B. rejecta* Edwards, 1941. Scale bar 0.1 mm.

kainen 1971), municipality, location, coordinates (according the Finnish national grid coordinate system), date and collector. The morphological terminology used follows that of Söli (1977).

The specimens are dry-pinned. Genitalia were treated in a standard way (heating in a solution of KOH, neutralization in acetic acid and washing in distilled water) and preserved as glycerine preparations in small vials on the same pin as the rest of the body. The genitalia of the holotype of the new species are mounted in the Euparal slide on transparent insect mounting card on the same pin as the rest of the body.

The holotype, one of the paratypes of the newly described species, *Boletina dispectoides* sp.n., and pinned voucher specimens of all the species new to Finland are deposited in the collections of MZH.

### 3. Description of a new species, *Boletina dispectoides* Jakovlev & Penttinen sp. n. (Fig 1, a–d)

*Type material.* Holotype ♂, Finland, *Tb*: Keuruu, Häntämäki, 6907992:3382482, Malaise trap 10.IX.–16.X.2005, J. Penttinen leg. Paratypes. 2 ♂♂, same data as holotype; 1 ♂, Finland, *Ta*: Lammi, Hattukivenmaa, Malaise trap 28.VIII.–4.X.2004, J. Jakovlev leg.

The collecting locality in Häntämäki is an ordinary clear-cut forest stand. The collecting locality in Hattukivenmaa is a clear-cut with retention trees treated with prescribed burning.

*Additional material.* 1 ♂, Russian Karelia, *Kon*, Kivach Nature Reserve, Malaise trap, 25.IX.–1.X.1990, Jakovlev & Polevoi leg. The

collecting locality is a herb-rich aspen dominated forest.

*Description.* Male. Head dark brown, mouth parts brownish. Palpi brownish, fourth segment yellow with only the tip darkened. Clypeus dark brown. Antennae dark brown, sixth flagellomere two times as long as wide.

*Thorax.* Mesonotum shining dark brown, covered with dense yellowish hairs. Pleurae dark brown, laterotergite hairy.

*Legs.* Coxae and femora yellow, trochanters dark brown, tibiae and tarsi brownish. Leg ratios:  $t1:bt1 = 1.4$ ;  $t2:bt2 = 1.7$ ;  $t3:bt3 = 1.8$ .

*Wings.* Wing length 3.5 mm. Wings hyaline, Sc bare, ending above (in some specimens very slightly before or beyond) base of Rs, Sc2 present, a little beyond the middle of Sc. C extending beyond the tip R4+5 to approximately 1/2 of the distance between R4+5 and M1, stem of M-fork 1.2 times as long as rm. Halteres yellow.

*Abdomen.* Uniformly brown.

*Male genitalia* as in Fig.1, dark brown. Sternal submedian appendages of gonocoxite moderately long, exceeding the bases of gonostyles, and relatively broad with parallel sides, widely rounded apically, almost truncated. Gonostyles with an elongated thumb-like process which bears three short spines and two strong bristles apically and four bristles (two longer and two shorter) at the base, near the middle of gonostylus. Tergite IX rectangular with distal margin slightly concave to almost straight. Cerci elongate with an apical comb of strong spines and one row of shorter spines near the base. Parameres relatively short, do not exceed the level of sternal submedian appendages, pointed to apices and slightly bent in the middle.

*Female.* Unknown.

*Larval biology.* Unknown.

*Etymology.* The species' name indicates its resemblance to *B. dispecta*.

*Diagnostic characters.* There are now five closely related species of the *Boletina nitida*-group characterized with a similar shape of gonostyles bearing a very typical elongated finger-like process (which is 3–4 times as long as wide) armed with strong apical spines, and with moderately long sternal appendages of gonocoxites slightly exceeding the bases of gonostyles (Fig. 2, a–e). The other three species of *Boletina nitida*-group occurring in Europe (*B. nitida* Grzegorzek, 1885, *B. falcata* Polevoi & Hedmark, 2004, and *B. hedstroemi* Polevoi & Hedmark, 2004) have clearly different shape of gonostyles.

The new species, *B. dispectoides*, differs from *B. dispecta* Dziedzicki, 1885, *B. gusakovae* Zaitzev, 1994 and *B. rejecta* Edwards, 1941 in having sternal submedian appendages of gonocoxites widely rounded apically while the three other species have sternal submedian appendages of gonocoxites narrowing apically. According to the key to Palaearctic species of the *Boletina nitida*-group (Zaitzev *et al.* 2005, p.252) the new species, *B. dispectoides*, runs to the couplet 3: “ventral processes of gonocoxites widely rounded apically, almost rectangular” leading to *B. bidenticulata* Sasakawa & Kimura, 1974 from which the new species differs primarily by the shape of gonostyles (Table 1).

The shape of gonostyles of *B. dispectoides* is very similar to that of *B. dispecta*, but in *B. dispectoides* the gonostyles are rounded apically (humpbacked) while in *B. dispecta* they are slightly pointed apically.

*B. dispectoides* can be distinguished from *B. dispecta* also by more dense hair cover on the mesonotum, by the slightly shorter flagellar segments (2 times as long as wide in *B. dispectoides* vs 2.5 times as long as wide in *B. dispecta*) and by the shorter stem of M-fork (1.2 times as long as rm in *B. dispectoides* vs 1.7 times as long as rm in *B. dispecta*).

## 4. New species of Mycetophilidae to Finland

### 4.1. Subfamily Manotinae

*Manota unifurcata* Lundström, 1913

*Material examined.* 1 ♀, *Ta*: Lammi, Lammi biological station, 67731:33946, reared from decaying wood of black alder (*Alnus glutinosa*) bearing fruiting bodies of *Fomitopsis pinicola*. Leg. 1.VII.2005, emergence 27.VII.2005, J. Jakovlev leg. The collecting site is an herb-rich forest on calcareous soil with a big proportion of deciduous trees and hazel (*Corylus avellana*).

*Distribution data.* A rare species belonging to the subfamily Manotinae distributed mainly in tropical areas (Hippa *et al.* 2004, Jaschhof & Hippa 2005). In central and southern Europe *M. unifurcata* is known from several countries, viz. Britain, France, Denmark, Czech Republic, Poland, Hungary (described from there), Romania and Ukraine (Chandler 2005). In the Nordic region recorded only from Russian Karelia (Polevoi 2000) and the neighboring Vologda province of Northwest Russia (Zaitzev 2003).

*Larval biology.* There are only two former rearing records from larvae found in rotten beech

Table 1. Diagnostic characters of the closely related species of the *Boletina nitida*-group.

Species	Gonostylus	Sternal appendages of gonocoxite
1. <i>B. bidenticulata</i> Sasakawa et Kimura	straight apically, fingerlike process arises from the top of gonostyle	widely rounded apically, almost truncated
2. <i>B. dispectoides</i> sp. n. Jakovlev et Penttinen	narrowly rounded apically (humpbacked)	widely rounded apically, almost truncated
3. <i>B. dispecta</i> Dziedzicki	slightly pointed apically	narrowing apically
4. <i>B. gusakovae</i> Zaitzev	widely rounded apically	narrowing apically
5. <i>B. rejecta</i> Edwards	almost truncated apically	narrowing apically

wood bearing an unidentified myxomycete (Chandler 1978) and on the surface of very moist, rotten birch wood covered with a grayish coat of an unidentified fungus (Zaitzev 1990).

## 4.2. Subfamily Mycetophilinae

### 4.2.1. Tribe Exechiini

*Exechia bicincta* Staeger, 1840

*Material examined.* 2 ♂♂, *N*: Espoo, Träskända protected park area, 6682419:3373127, pit-fall traps: a plastic mug inside a hollow lime tree (*Tilia cordata*), 22.VI.–12.VII.2005, and an aluminium casserole dish attached on the barkless trunk of a maple tree (*Acer platanoides*), 13.VII.–3.VIII.2005, J. Mattila & J. Siitonen leg. The collecting locality is an old protected mansion park in the city of Espoo with numerous old hollow deciduous trees, mainly lime trees, oaks and maples. Several red-listed saproxylic beetle species have been found within the park (Mattila & Siitonen, pers. com.).

*Distribution data.* A holarctic species widespread in Central and Southern Europe, Near East (Chandler 2005) and Russian Far East (Zaitzev 2003). In the Nordic region found only in Denmark, Sweden and in the neighboring areas: Estonia, Latvia (Chandler 2005) and Russia: Leningrad district (Krivosheina *et al.* 1986).

*Larval biology.* Larvae live in soft fruiting bodies of a wide range of epigeal and wood-growing fungi. There are rearing records from *Pleurotus ostreatus*, *Hygrophoropsis aurantiaca*, *Tricholoma populinum*, *Collybia acervata*, *Mycena inclinata*, *M. galericulata*, *Tricholomopsis platyphylla* in Hungary (Dely-Draskovits 1974) and Czech Republic (Sedivy & Ševčík 2003), *Omphalotus olearius* in Portugal (Ribeiro 1990), *Gomphidius viscidus* in Germany (Eisfelder 1955), *Pluteus salicinus* in the British Isles (Chandler 1993) and *Russula virescens* in Tatarstan (Khalidov 1984).

### 4.2.2. Tribe Mycetophilini

*Mycetophila forcipata* Lundström, 1913

*Material examined.* 1 ♂, *Ta*: Lammi, Puukkohonka, 6791991:3395557 Malaise trap

28.VII.–28.VIII.2004, J. Jakovlev leg. 1 ♂, *Tb*: Laukaa, Vehmasmäki, 6927436:3435854, Malaise trap 15.–28.VII.2005, J. Penttinen leg. The collecting localities are Norway spruce (*Picea abies*) dominated, *Myrtillus* type forests, Puukkohonka as old-growth forest and Vehmasmäki, a mature managed forest.

*Distribution data.* Transpalaerctic species widely distributed in Europe but in the Nordic region recorded only from Sweden (Chandler 2005). According to the Catalogue of Palaearctic Diptera (Lastovka 1988) *M. forcipata* is also found in Finland, but was not mentioned in the Finnish Diptera check-list (Hackman 1980). We have not found the holotype material indicated by Lundström (1913, p.318) as: “1 ♂, *Laponia suecica*, Muonio, 8/VII.1911. Leg. Frey. (Mus. Univ. Helsingfors)” in the collections of MZH, but only two males of *M. forcipata*, each with the label “Ponoj. R.Frey” recorded by Lundström (1914) from Kola Peninsula (*Laponia rossica*), Russia.

*Larval biology.* All existing rearing records are restricted to wood-growing polypores: *Piptoporus betulinus*: ‘larvae at base of tubes, pupa in soil’ (Edwards 1925; Chandler 1978) and *Polyporus squamosus* (Madwar 1937). These records however could also concern the other species, *Mycetophila pseudoforcipata* Zaitzev 1998, that was described long after *M. forcipata*. Ševčík (2004) reported the true *M. forcipata* from *Piptoporus betulinus*.

*Mycetophila sumavica* (Lastovka, 1963)

*Material examined.* 1 ♂, *Tb*: Rautalampi, Kalajanvuori, 6941603:3484673, Malaise trap, 3.V.–6.VI.2004, J. Penttinen leg. 1 ♂, *Tb*: Toivakka, Huhtalampi, 6883884:3461804, Malaise trap 14.–28.V.2005, J. Penttinen leg. Both collecting localities are Norway spruce dominated, *Myrtillus*-type old-growth forests with a plenty of deciduous and coniferous coarse woody debris.

*Distribution data.* The species is widely distributed in Europe including the Nordic region. Data from Finland are given without finding localities by Chandler (2005).

*Larval biology.* Unknown.

*Trichonta tristis* (Strobl, 1898)

*Material examined.* 1 ♂, *Ab*: Karkali Strict Nature Reserve, 6685084:3322111, Malaise trap 23.VIII.–4.X.2005, J. Jakovlev leg. The collect-

ing locality is a herb-rich forest on calcareous soil with a big proportion of deciduous trees and hazel (*Corylus avellana*). 1 ♂, *Ta*: Lammi, Kotinen Strict Nature Reserve, 6794650:3396561, Malaise trap 10.IX.–3.X.2003, J. Jakovlev leg. The collecting locality is a Norway spruce dominated, *Myrtillus*-type old-growth forests with a plenty of deciduous and coniferous coarse woody debris. 1 ♂, *N*: Sipoo, Käsik-Solbacka, 6705233:3400733, Malaise trap 13.V–13.VI.2005, J. Jakovlev leg. The collecting locality is a young spruce-dominated, unmanaged forest. 1 ♂, *Tb*: Äänekoski, Kylmähauta, 6935631:3432365, sweep net 16.VI.2005, J. Penttinen leg. The collecting locality is a lush, spring-water fed spruce mire forest in a natural state. 1 ♂, *Ta*: Lammi, Leipäsuonaho, 6789920:3395865, reared from a decaying spruce stump bearing resupinate fruiting bodies of the polypore *Antrodia xantha*. Leg. 28.VIII.2004, emergence 5.X.2004, J. Jakovlev leg. The collecting locality is a clear-cut with retention trees treated with prescribed burning.

**Distribution data.** Recorded only from Austria (described from there), Switzerland (Chandler 2005), Russia, Siberia (Krasnoyarsky region) and the Far East (Zaitzev 2003). The species is similar to the more common *Trichonta vulcani* Dziedzicki 1889 and could easily have been overlooked in many studies. Records of *T. vulcani* from Kivach Nature Reserve, Russian Karelia (Polevoi 2000) refer to *T. tristis* (A. Polevoi, pers. comm.).

**Larval biology.** There are no former rearing records.

### 4.3. Subfamily Sciophilinae

*Sciophila plurisetosa* Edwards, 1921

**Material examined.** 1 ♂, *N*: Tuusula, Ruotsinkylä, 6695638:3390934, Malaise trap 13.V–13.VI.2005, J. Jakovlev leg. The collecting locality is a clear-cut forest stand.

**Distribution data.** A rare species with a Holarctic distribution. In Europe reported from Britain, Germany, Austria and Czech Republic (Chandler 2005). In the Nordic region recorded only from southern Sweden (Kurina *et al.* 2004).

**Larval biology.** Reared from *Hydnum repandum* in the British Isles (Chandler 1987) and

*Hirneola auricula-judae* in the Czech Republic (Ševčík 2005).

**Acknowledgements.** The material was collected in PUTTE research program, project “Finnish fungus gnats (Diptera, Mycetophilidae, etc.): faunistics, habitat requirements and threat status”. The financial support from the Finnish Ministry of Environment is hereby acknowledged. Trapping was also partly funded by the Finnish Expert Group for Diptera and Societas pro Fauna et Flora Fennica. Juha Siitonen and Jaakko Mattila (METLA) are provided us with the material collected in Träskända park area. We are indebted to Alexei Polevoi (Petrozavodsk, Russia) and the anonymous referee for comments to the manuscript.

### References

- Chandler, P. J. 1978: Associations with plants. Fungi. — In: Stubbs, A & Chandler, P. I. (eds.), *A Dipterist's Handbook*. Amateur Entomologist 15:199–211. The Amateur Entomologist's Society, Middlesex. 255 pp.
- Chandler, P. J. 1987: Notes on British fungus gnats of the smaller families and sub-families (Diptera, Mycetophiloidea). — *Proc. Trans. Br. Entomol. Nat. Hist. Soc.* 20: 105–118.
- Chandler, P. J. 1993: New rearing records of fungus gnats (Diptera: Mycetophilidae and allied families). — *Dipterists Digest* 13: 29–35.
- Chandler, P. J. 2005: Fauna Europaea: Mycetophilidae. — In: de Jong, H. (ed.), *Fauna Europaea: Diptera, Nematocera*. Fauna Europaea, version 1.2. [www document] URL <http://www.faunaeur.org> (7 March 2005).
- Dely-Draskovitš, A. 1974: Systematische und Ökologische Untersuchungen an den in Ungarn als Schädlinge der Hutpilze auftretenden Fliegen. 6. Mycetophilidae (Diptera). — *Folia Entomol. Hung.* 27: 29–41.
- Edwards, F. W. 1925: British Fungus-Gnats (Diptera, Mycetophilidae) with a revised generic classification of the family. — *Trans. Entomol. Soc. Lond.* 73(1924): 505–670.
- Eisfelder, I. 1955: Die häufigsten Pilzbewohner. — *Zeitschrift für Pilzkunde* 19: 12–20.
- Hackman, W. 1980: A check list of the Finnish Diptera 1. Nematocera and Brachycera (s.str.). — *Not. Entomol.* 60:17–48.
- Heikinheimo, O. & Raatikainen, M. 1971: The recording of localities of biological finds in Finland. — *Ann. Entomol. Fennici* 37 (1a): 9–27.
- Hippa, H., Jaschhof, M. & Vilkamaa, P. 2004: Phylogeny of the Manotinae, with a review of *Eumanota* Edwards, *Paramanota* Tuomikoski and *Promanota* Tuomikoski (Diptera: Mycetophilidae). — *Studia Dipterol.* 11(2): 405–428.
- Jakovlev, J. 2005: A new rearing method for revealing larval microhabitats of saproxylic Diptera. — In: Siitonen, J. (ed.), *Saproxylic species in Fennoscandian forests – gathering ecological knowledge for applied*

- use. 3rd Nordic Saproxylic Network meeting, Lammi Biol. Station, 7–9.12.2005.
- Jakovlev, J., Kjørandsen, J. & Polevoi, A. 2006: Seventy species of fungus gnats new to Finland (Diptera: Mycetophilidae). — *Sahlbergia* 11: 22–39.
- Jaschhof, M. & Hippa H. 2005: The genus *Manota* in Costa-Rica (Diptera, Mycetophilidae). — *Zootaxa* 1011:1–54.
- Khalidov, A. B. 1984: (Insects – destroyers of fungal fruiting bodies.) — Kazan State University, Kazan. 151 p. [In Russian].
- Krivosheina, N. P., Zaitzev, A. I. & Jakovlev, J. B. 1986: (Insects inhabiting fruiting bodies of macrofungi in the forest zone of the European part of USSR.) Nauka, Moscow. 309 pp. [In Russian].
- Kurina, O., Polevoi, A., Götmark, F., Økland, B., Frank, N. & Hedmark, K. 2004: Fungus gnats (Diptera: Sciaroidea excl. Sciaridae) in the Swedish boreonemoral forests. — *Studia Dipterol.* 11(2): 471–488.
- Laštovka, P. 1988: Subfamily Mycetophilinae. Tribe Mycetophilini. — In: Soos, A. & Papp, L. (eds.), *Catalogue of Palaearctic Diptera*. Vol. 3. Ceratopogonidae–Mycetophilidae: 263–280. Budapest, Akadémiai Kiadó.
- Lundström, C. 1913: Neue oder wenig bekannte europäische Mycetophiliden. — *Ann. Mus. Natl. Hung.* 11: 305–322.
- Lundström, C. 1914: Beiträge zur Kenntnis der Dipteren Finlands. IX. Supplement 3. Mycetophilidae. — *Acta Soc. F. Fl. Fenn.* 39: 1–26.
- Madwar, S. 1937: Biology and morphology of the immature stages of Mycetophilidae. — *Phil. Trans. R. Soc. London*. Ser. B 227: 1–110.
- Polevoi, A.V. 2000: Fungus gnats (Diptera: Bolitophilidae, Ditomyiidae, Keroplatidae, Diadocidiidae, Mycetophilidae) in Karelia. — Karelian Research Centre, Russian Academy of Sciences, Petrozavodsk. 84 pp. [In Russian].
- Polevoi, A., Jakovlev, J. & Zaitzev, A. 2006: Fungus gnats (Diptera: Bolitophilidae, Diadocidiidae, Keroplatidae and Mycetophilidae) new to Finland. — *Entomol. Fennica* 17: 161–169.
- Ribeiro, E. 1990: Contribution to the study of Fungus gnats (Diptera, Mycetophiloidea) of Portugal. II. Seven new records. — *Bol. Soc. Portug. Entomol.* 118: 173–196.
- Sedivy, J. & Ševčík, J. 2003: Ichneumonoid (Hymenoptera: Ichneumonidae) parasitoids of fungus gnats (Diptera: Mycetophilidae): rearing records from the Czech Republic. — *Studia Dipterol.* 10 (1): 153–158.
- Ševčík, J. 2004: Diptera associated with fungi in the Poloniny National Park (Bukovské vrchy Mts., Est. Slovakia). — *Dipterol. Bohemoslovaca* 11: 293–304.
- Ševčík, J. 2005: New records of *Sciophila* Meigen from the Czech and Slovak Republics (Diptera: Mycetophilidae). — *Časopis Slezského muzea Opava Série A* 54:69–74.
- Søli, G. E. E. 1997: The adult morphology of Mycetophilidae (s.str.), with a tentative phylogeny of the family (Diptera, Sciaroidea). — *Entomol. Scand., Suppl.* 50: 1–55.
- Zaitzev, A. I. 1990: (On the preimaginal stages of *Manota unifurcata* Lundst. and the systematic position of the subfamily Manotinae.) — *Biologicheskije nauki* 3: 63–71 [In Russian].
- Zaitzev, A. I. 2003: Fungus gnats (Diptera, Sciaroidea) of the fauna of Russia and adjacent regions. Part II. — *Int. J. Dipterol. Res.* 14: 77–386.
- Zaitzev, A. I., Jakovlev, J. & Polevoi, A.V. 2005: Palaearctic species of the *Boletina nitida* group (Diptera: Mycetophilidae) including the description of a new species. — *Studia Dipterol.* 12 (2): 243–253.