Proc. Estonian Acad. Sci. Biol., 1991, 40, N 2, 84—90
https://doi.org/10.3176/biol.1991.2.04

УДК 595.771

Olavi KURINA *

MYCETOPHILIDAE (*DIPTERA*) REARED FROM MACROFUNGI IN ESTONIA

The fruit bodies of Macrofungi form a special habitat and food for the fungivorous larvae of numerous species of various dipterous families; when decaying the same fruit bodies also serve as the substrate for the saprophagous flies though they can occur also in other decomposing objects. *Mycetophilidae* have a principal position among the families containing fungivorous species. In general the fungus fauna has been studied in several countries of Europe. *Mycetophilidae* have been particularly well investigated in Finland (Hackman, Meinander, 1979), England (Buxton, 1960; Hutson et al., 1980), Germany (Landrock, 1940; Plassmann, 1969), Hungary (Dely-Draskovits, 1974), Karelia (Яковлев, Осипова, 1985), Tataria (Халидов, 1984), the Moscow Region (Сахарова, 1977), and also in Siberia, the Asian part of the USSR (Островерхова, 1979).

In Estonia *Mycetophilidae* have been studied by A. Dampf (1924), K. Landrock (1924) and P. Lackschewitz (1937), but without special rearing of imagines from fruit bodies. The list composed by Lackschewitz is more complete containing 143 species from Estonia, three of the included species being described as new to science. The list by Dampf (1924) contains 39 species from the Estonian raised bogs. The paper by Landrock (1924) includes four species of *Mycetophilidae*, among them two new ones. Some species are also mentioned by H. Remm (1959) in the list of the *Diptera* of the Avaste Fen.

The material for the present work was obtained by breeding the imagines of fungus gnats from fruit bodies collected from 8 sites in Estonia: Revoja in the Lahemaa National Park (1988), Oonga south-east of Haapsalu (1988, 1989, 1990), the Viidumäe State Nature Reserve in the Island of Saaremaa (1988), Kabli (1988, 1990) and Rannametsa (1988), both south of Pärnu, the Nigula State Nature Reserve (1990), the Järvselja Experimental Forestry Enterprise south-east of Tartu (1989), and Apja east of Valga (1988).

Fruit bodies collected for laboratory rearing were placed in plastic and glass containers of the size of 0.2, 0.5 and 1 litre. Pure peat was used as substrate for pupation. The breeding containers were covered with nylon gauze. The emerged imagines were either pinned or preserved in 70% ethanol. The material is deposited at the Institute of Zoology and Botany of the Estonian Academy of Sciences, Tartu.

101 fungus species were infested with insects, and 83% of them, i. e. 84 species, were infested with the larvae of *Mycetophilidae*. All in all 2031 male specimens of fungus gnats and 1056 females of only 4 species (*Rondaniella dimidiata* Mg., *Cordyla fusca* Mg., *Tarnania tarnanii* Dz. and *Mycetophila fungorum* Deg.) were bred and identified. Among them there were 1004♂♂ and 1013♀♀ of *M. fungorum* Deg. The reared material contained altogether 40 species. A new species of the genus *Sciophila* Mg. is described in this paper. 17 species are new to Estonia. Asterisks before their names indicate them in the list. Three species, *Allodia lundstroemi*

* Eesti Teaduste Akadeemia Zooloogia ja Botaanika Instituut (Institute of Zoology and Botany, Estonian Academy of Sciences). 202 400 Tartu, Vanemuise 21. Estonia.

Edw., *Boletina gripha* Dz. and *Exechiopsis fimbriata* Lundst. have been recorded from fungi for the first time. The larvae of *Mycetophila blanda* Winn. were found only on two closely related species of fungi — *Lactarius deterrimus* and *L. deliciosus*. *Cordyla flaviceps* Staeg. was reared only from the species of *Russula*, *Exechia contaminata* Winn. only from *Lactarius*, *Exechia seriata* Mg. only from *Russula*, and *Exechiopsis indecisa* Walk. only from *Suillus*. *Mycetophila fungorum* Deg. was the most abundant species forming approximately 41% of all the registered specimens of the fungus gnats.

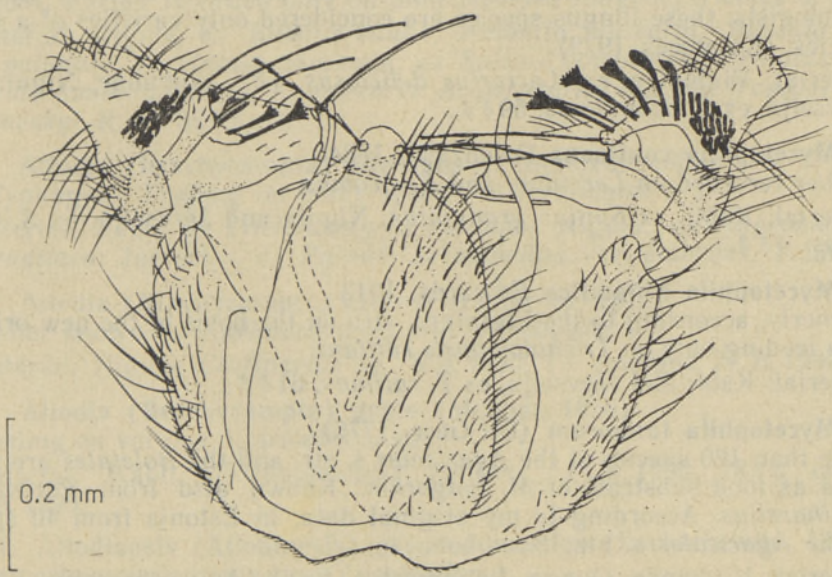
Literature data about the host fungi of Mycetophilid species are given in the following list mainly by Krivosheina et al. (Кривошеина et al., 1986).

Acknowledgements. I am greatly indebted to Ms. M. Reitalu, Director of the Viidumäe State Nature Reserve, to Mr. H. Vilbaste, Director of the Nigula State Nature Reserve and to Mr. G. Ahas, Deputy Director of the Järvselja Experimental Forestry Enterprise for their help during my field work. I express my best thanks to Ms. M. Vaasma and Mr. V. Liiv for their valuable help in the identification of fungi. My very special thanks are due to my scientific supervisor Cand. Biol. K. Elberg for his kind help.

List of species

***1. Sciophila pseudoflexuosa** sp. n.

Male. Body length 4.5 mm, wing length 3.8 mm. Head black. Vertex with long bristles. Mouthparts brownish, palps brownish basally, yellow apically. Antennae bicoloured: scape, pedicel and three first flagellar segments yellow, remainder brown. Flagellum with short hairs. Sternopleuron, mesopleuron, pteropleuron, pleurotergite and mediotergite brown. Propleuron yellowish. Mesonotum dull blackish brown. Wing membrane with micro- and macrotrichia. Veins pale. M petiole subequal rm. Sc_2 ending in R_1 at its beginning. Small cell nearly square, as long as wide. Halteres pale. Legs yellow. Abdomen brownish black with indistinct brown spots. Hypopygium figure.



Sciophila pseudoflexuosa sp. n., hypopygium, dorsal view.

Holotype, male, Estonia, the Nigula State Nature Reserve, emerged from *Lactarius helvus* 7. 9. 1990. Fruit body was collected 6. 8. 1990.

Sciophila pseudoflexuosa sp. n. is very similar to *S. flexuosa* Zaitzev, 1982, described only by the type specimen (♂) from the Primorsk Territory in the Soviet Far East. The new species may be distinguished from *S. flexuosa* by the dull mesonotum, by the short small cell of wing and by the male genitalia (figure; Зайцев, 1982, fig. 6, 6). The basis of the IX tergite is relatively broad. The apex of the IX tergit has two shortly pubescent bristles. The small medial appendage of gonostylus has three long blunt bristles of different lengths. The new species is a little larger as *S. flexuosa*. Body length of *S. flexuosa* is 3.0 mm, wing length 3.1 mm.

Larvae of *S. flexuosa* were recorded on the surface of fruit body of *Pleurotus citrinopileatus*.

2. Boletina gripha Dziedzicki, 1885
The first record from fungus.
Material: Rannametsa, *Suillus bovinus* 17. 9. 1988, 1 ♂ emerged 21. 9. 1988.

3. Rondaniella dimidiata (Meigen, 1804)
The species has been bred frequently from a variety of fungi. My original material not numerous. Also females were determined.
Material: Nigula, ex *Boletus edulis* and *Lactarius helvus*. 2♂♂ 2♀♀.

4. Mycetophila alea Laffoon, 1965
Formerly recorded on *Russula, Lactarius, Collybia, Hebeloma.*
Material: Viidumäe, ex *Russula densifolia*; Järvselja, ex *R. adusta*. 51♂♂.

***5. Mycetophila assimilis** Matile, 1967
Formerly recorded from *Russula, Lactarius, Boletus, Leccinum.*
Material: Oonga, ex *Leccinum scabrum*; Nigula, ex *Xerocomus subtomentosus, Paxillus involutus, Boletus edulis*; Järvselja, ex *Leccinum aurantiacum*. 9♂♂.

6. Mycetophila blanda Winnertz, 1863
Formerly recorded on *Lactarius, Russula, Panus, Hygrophoropsis.*
According to my original data, in Estonia registered only on two very closely related species *Lactarius deterrimus* and *L. deliciosus*. By some mycologists, these fungus species are concidered only varieties of a single species (Kalamees, 1979).
Material: Viidumäe, ex *Lactarius deliciosus*, 1♂; Viidumäe, Nigula and Järvselja, ex *L. deterrimus*, 59♂♂.

7. Mycetophila confluens Dziedzicki, 1884
Earlier recorded on *Leccinum* and *Xerocomus.*
Material: Kabli, ex *Suillus granulatus*; Nigula and Järvselja, ex *S. variegatus*. 4♂♂.

8. Mycetophila finlandica Edwards, 1913
Formerly, according to the literature, also on the basis of the new original data feeding only on *Tricholomopsis rutilans.*
Material: Kabli and Järvselja, ex *T. rutilans*, 61♂♂.

9. Mycetophila fungorum (De Geer, 1776)
More than 120 species of the *Agaricales* s. str. and the *Boletales* are registered as food substrate of *M. fungorum*. Known also from *Peziza* and *Cantharellus*. According to my original data, in Estonia from 40 species of the *Agaricales* s. str.
Material: Viidumäe, Oonga, Rannametsa, Kabli, Apja, Järvselja, 1004♂♂ and 1013♀♀.

10. Mycetophila ichneumonea Say, 1823
Formerly reared from fungi of 13 genera of the *Agaricales s. str.* According to my original material, from 11 species of various genera.
Material: Viidumäe, Kabli, Nigula, Järvselja, 83♂♂.

11. Mycetophila laeta Walker, 1848
Formerly bred from *Fomitopsis*, *Polyporus* and *Lactarius*.
Material: Nigula, *Phellinus igniarius*, 12.10.1990, 8♂♂ emerged 19.10.1990.

12. Mycetophila luctuosa Meigen, 1830
Formerly reared from *Peziza*, *Fomitopsis*, *Stereum*, *Rozites*, *Lactarius*, *Russula*, *Paxillus*, *Tricholoma*.
Material: Viidumäe, ex *Russula densifolia*, 27♂♂; Oonga, ex *Lactarius theiogalus*, 1♂.

*__13. Mycetophila lunata__ Meigen, 1804
Formerly (Халидов, 1984) and, according to my original data, only from *Hygrophoropsis aurantiaca*.
Material: Nigula and Järvselja, ex *H. aurantiaca*, 14♂♂.

*__14. Mycetophila ruficollis__ Meigen, 1818
Earlier reared only from *Armillaria*.
Material: Nigula, ex *Oudemansiella platyphylla*; Järvselja, ex *Entoloma* sp. and *Pholiota aurivella*. 8♂♂.

15. Mycetophila sigillata Dziedzicki, 1884
Formerly registered on *Russula* and *Lactarius*.
Material: Viidumäe, ex *Laccaria laccata*, 1♂; Nigula and Järvselja, ex *Russula delica*, 25♂♂.

*__16. Allodia (Allodia) lundstroemi__ Edwards, 1921
Formerly no records about feeding.
Material: Järvselja, *Laccaria laccata*, 27.8.1989, 2♂♂ emerged 7.9.1989.

*__17. Allodia (Allodia) pyxidiiformis__ A. Zaitzev, 1983
A species closely related to *A. ornaticollis* Mg., distinguished only by the hypopygium. The species is absent in the Catalogue of Palaearcic Diptera (1988). Earlier recorded only on undetermined fungi *Agaricales* s. str.
Material: Nigula, ex *Boletus edulis*, *Amanita muscaria*, *Russula flava*, *R. paludosa*, *R. vinosa*; Järvselja, ex *Suillus bovinus*, *Comphidius glutinosus*, *Amanita citrina*, *A. muscaria*, *A. porphyria*, *Russula fragilis*, *R. velenovskyi*, R. sp. 36♂♂.

18. Allodia (Brachycampta) alternans (Zetterstedt, 1838)
Polyphagous. Feeding on many species of *Agaricales* s. l.
Material: Kabli, ex *Tricholomopsis rutilans*; Nigula, ex *Hygrophoropsis aurantiaca*; Järvselja, ex *Russula xerampelina* var. *elaeodes*. Total 3♂♂.

19. Allodia (Brachycampta) czernyi (Landrock, 1912)
Earlier known on *Kuehneromyces* and *Dermocybe*.
Material: Nigula, *Cortinarius* sp., 8.8.1990. 1♂ emerged 27.8.1990.

20. Allodia (Brachycampta) grata (Meigen, 1830)
Feeding on various *Agaricales* s. str.
Material: Kabli, *Tricholomopsis rutilans*, 15.8.1990, 28♂♂ emerged 4.9.1990.

*__21. Allodiopsis (Allodiopsis) pseudodomestica__ (Lackschewitz, 1937)
Formerly recorded only from *Lycoperdon*.
Material: Järvselja, *Lepista gilva*, 4.9.1989, 2♂♂ emerged 25.9.1989.

*22. **Allodiopsis (Allodiopsis) rustica** (Edwards, 1941)
Earlier recorded on *Tricholoma*, *Lepista* and *Clitocybe*.
Material: Kabli, *Clitocybe clavipes*, 4. 9. 1990, 2♂♂ emerged 31. 8. 1990 and 15. 9. 1990.

*23. **Brachypeza (Brachypeza) radiata** Jenkinson, 1908
Formerly bred from *Pleurotus*.
Material: Nigula, *Armillaria mellea*, 8. 8. 1990, 1♂ emerged 27. 8. 1990.

*24. **Cordyla brevicornis** (Staeger, 1840)
Recorded from various genera of the *Agaricales* s. l. by many authors.
Material: Viidumäe, ex *Russula ochroleuca*; Rannametsa, ex *R. paludosa* and *Rozites caperata*; Nigula, ex *R. caperata*, *Russula paludosa*, *R.* sp.; Apja, ex *R. vesca*; Järvselja, ex *R. emetica* var. *emetica*, *R.* sp., *Amanita virosa*. 30♂♂.

*25. **Cordyla fasciata** Meigen, 1830
Formerly reared from many genera of the *Agaricales* s. l.
Material: Järvselja, *Russula adusta*, 4. 9. 1989, 7♂♂ emerged 14. 9. 1989.

*26. **Cordyla flaviceps** (Staeger, 1840)
Formerly reared from *Hygrophorus*, *Lactarius* and *Russula*. According to my original material, this species was reared from 9 *Russula* species and from *Hygrophorus eburneus* only in one case.
Material: Viidumäe, ex *Hygrophorus eburneus*, *Russula aurata*, *R. delica*, *R. ochroleuca*, *R. paludosa* (51♂♂), *R. vinosa*; Oonga and Nigula, ex *R. flava*; Järvselja, ex *R. aeruginea*, *R. emetica* var. *betularum*, *R. velenovskyi*. Total 93♂♂.

27. **Cordyla fusca** Meigen, 1864
Feeding on *Russula*, *Hypholoma* and *Boletus*. According to my original material, in Estonia found only on *Russula*. Determined also by females.
Material: Nigula, ex *Russula flava*, *R. paludosa*; Järvselja, ex *R. adusta*, *R. cyanoxantha*, *R. paludosa*. 33♂♂ 20♀♀.

*28. **Exechia contaminata** Winnertz, 1863
Formerly recorded from *Russula* and *Lactarius*. According to my original data only on *Lactarius*.
Material: Viidumäe, ex *Lactarius rufus*; Rannametsa and Järvselja, in both ex *L. rufus* and *L. trivialis*. 13♂♂.

29. **Exechia dorsalis** (Staeger, 1840)
Formerly recorded from many genera of the *Agaricales* s. l.
Material: Nigula, ex *Cortinarius armillatus*, *Inocybe* sp.; Järvselja, ex *Cortinarius* sp. 10♂♂.

30. **Exechia fusca** (Meigen, 1804)
Polyphagous. Registered on 23 genera of the *Agaricales* s. str., on *Suillus* and *Boletus* and *Pseudotrametes*.
Material: Viidumäe, ex *Hygrophorus cossus*, *H. eburneus*, *Russula emetica* var. *betularum*; Oonga, ex *Hebeloma crustuliniforme*; Nigula, ex *H. crustuliniforme*, *Amanita rubescens*, *Russula delica*; Järvselja, ex *Boletinus cavipes*, *Xerocomus subtomentosus*, *Stropharia hornemannii*, *Russula emetica* var. *emetica*, *R. flava*, *R. fragilis*, *R. puellaris*. 34♂♂.

31. **Exechia nigroscutellata** Landrock, 1912
Earlier bred from *Lactarius* and *Russula*.
Material: Viidumäe, ex *Lactarius torminosus*, 31♂♂; Oonga, ex *L. theiogalus*; Nigula, ex *L. helvus*, *Russula emetica* var. *emetica*, *R. sanguinea*; Järvselja, ex *Lactarius helvus*, *L. theiogalus*. Total 46♂♂.

32. Exechia parva Lundström, 1909
Earlier found on *Verpa, Armillaria, Hypoloma.*
Material: Järvselja, *Cortinarius* sp., 2. 9. 1989, 1♂ emerged 10. 9. 1989.

***33. Exechia pseudocincta** Strobl, 1910
Feeding on *Lactarius* and *Hebeloma.*
Material: Viidumäe, *Lactarius deliciosus*, 9. 8. 1988, 9♂♂ emerged 17. 8. 1988.

34. Exechia separata Lundström, 1912
Feeding on many genera of the *Agaricales* s. l.
Material: Viidumäe, ex *Boletus edulis, Chroogomphus rutilus*; Kabli, ex *C. rutilus*; Järvselja, ex *Boletinus cavipes, Suillus grevillei, Gomphidius glutinosus* (35♂♂), *Cortinarius* sp. Total 69♂♂.

35. Exechia seriata (Meigen, 1830)
Formerly reared from *Kuechneromyces, Russula, Lactarius, Hygrophorus, Tricholoma.*
Material: Kabli, ex *Tricholomopsis rutilans*, 1♂; Viidumäe, Oonga, Kabli, Nigula and Järvselja, ex *Russula* spp., 102♂♂.

***36. Exechia spinuligera** Lundström, 1912
Earlier recorded from *Amanita, Lactarius, Pluteus, Boletus* and *Suillus.*
Material: Viidumäe, ex *Armillaria mellea*; Oonga, ex *Amanita fulva*; Järvselja, ex *Hebeloma crustuliniforme, Russula velenovskyi.* Total 13♂♂.

***37. Exechiopsis (Exechiopsis) clypeata** (Lundström, 1911)
Feeding on *Suillus bovinus* (Халидов, 1984).
Material: Järvselja, *Mycena galericulata,* 3. 9. 1989, 3♂♂ emerged 12. 9. 1989.

***38. Exechiopsis (Exechiopsis) fimbriata** (Lundström, 1909)
Earlier no remarks about feeding.
Material: Viidumäe and Järvselja, in both ex *Laccaria laccata*, 8♂♂.

39. Exechiopsis (Exechiopsis) indecica (Walker, 1856)
Formerly recorded on *Suillus, Xerocomus* and *Leccinum.* Probably bred on *Amanita* (Островерхова, 1979). Original material only from *Suillus.*
Material: Rannamètsa and Järvselja, in both localities ex *Suillus bovinus* and *S. variegatus*; Kabli, ex *S. granulatus*; Nigula, ex *S. variegatus* and *S. luteus.* Total 99♂♂.

40. Tarnania tarnanii (Dziedzicki, 1910)
Polyphagous. Earlier registered on many species of the *Agaricales* s. l. According to my original material found from 9 species of fungi. Also females were determined.
Material: Viidumäe, ex *Hygrophorus eburneus, H. persicolor, H. russula, Hebeloma edurum, Cortinarius* sp., *Russula* sp.; Oonga, ex *Hebeloma crustuliniforme*; Rannametsa, ex *Cortinarius mucosus, Lactarius trivialis*; Nigula, ex *Rozites caperata*; Järvselja, ex *Cortinarius violaceus.* Total 26♂♂ 21♀♀.

REFERENCES

Buxton, P. A. 1960. British Diptera associated with fungi III. Flies of all families reared from about 150 species of fungi. — Entomol. Monthly Mag., **96**, 61—94.

Dampf, A. 1924. Zur Kenntnis der estländischen Hochmoorfauna, I. — In: Beiträge zur Kunde Estlands. Reval, **10**, 2, 33—49.

Dely-Draskovits, A. 1974. Systematische und ökologische Untersuchungen an den in Ungarn als Schädlinge der Hutpilze auftretenden Fliegen. Part VI. *Mycetophilidae* (*Diptera*). — Folia entomol. hung. **27**, 29—41.

Hackman, W., Meinander, M. 1979. Diptera feedings as larvae on macrofungi in Finland. — Ann. zool. fennici, **16**, 50—83.
Hutson, A. M., Ackland, D. M., Kidd, L. N. 1980. *Mycetophilidae* (*Bolitophilinae, Ditomyiinae, Diadocidiinae, Keroplatinae, Sciophilinae* and *Manotinae*). *Diptera, Nematocera.* — Handb. Ident. Brit. Insects, **9**, pt. 3, 1—111.
Kalamees, K. Eesti riisikad. Tallinn, 1979.
Lackschewitz, P. 1937. Die Fungivoriden des Ostbaltischen Gebietes. Arb. Naturf.-Ver. Riga, N. F., H 21, 1—47.
Landrock, K. 1924. Neue Mycetophiliden aus den Hochmooren von Estland. — Zool. Anz., **58**, 77—81.
Landrock, K. 1940. Pilzmücken oder *Fungivoridae* (*Mycetophilidae*). — In: Die Tierwelt Deutschlands, Bd. 38: Zweiflüger oder Diptera, VI. Jena.
Plassmann, E. 1969. Die Fungivoriden des Naturschutzparkes Hoher Vogelsberg (Ein Beitrag zur Biologie, Ökologie und Taxonomie der Fungivoriden, sowie zur Kenntnis der Larven). Inaugural-Dissertation, Justus-Lieba-Universität Giessen. Giessen.
Remm, H. 1959. Avaste soo kahetiivaliste faunast. — Entomoloogiline kogumik I. Tartu, 102—113.
Зайцев А. И. 1982. Грибные комары рода *Sciophila Meig.* (*Diptera, Mycetophilidae*) Голарктики. Москва.
Кривошеина Н. П., Зайцев А. И., Яковлев Е. Б. 1986. Насекомые-разрушители грибов в лесах Европейской части СССР. Москва.
Островерхова Г. П. 1979. Мицетофилоидные комары (*Diptera, Mycetophilidae*) Сибири. Томск.
Сахарова А. В. 1977. К фауне грибных комаров (*Diptera, Mycetophilidae*) Московской области. — Энтомол. обозрение, **56**, 1, 71—78.
Халидов А. Б. 1984. Насекомые — разрушители грибов. Казань.
Яковлев Е. Б., Осипова Л. Т. 1985. Видовой состав и биологические особенности насекомых — обитателей плодовых тел съедобных грибов в Южной Карелии. — В кн.: Насекомые и фитопатогенные грибы в лесных экосистемах. Петрозаводск, 4—71.

Received
Dec. 18, 1990

Olavi KURINA

EESTIS MAKROSEENTEST VÄLJAKASVATATUD SEENESÄÄSKLASED (*DIPTERA, MYCETOPHILIDAE*)

Senised andmed seenesääsklastest Eestis ei ole saadud nende väljakasvatamise teel seentest. Siinses uurimuses on kindlaks tehtud 40 seenesääsklase liiki 84-st makroseene liigist. Neist 17 on uued liigid Eestile. On kirjeldatud uus liik *Sciophila pseudoflexuosa* sp. n. ühe isase järgi, mis kasvatati välja sooriisikast (*Lactarius helvus*). Kolme liigi vastsed on leitud esmakordselt seentest. Mõnede seenesääsklaste puhul on selgunud uusi substraatseeni. Kõige tavalisemaks ja arvukamaks seenesääsklaseks on *Mycetophila fungorum* Deg.

Олави КУРИНА

ГРИБНЫЕ КОМАРЫ (*DIPTERA, MYCETOPHILIDAE*), ВЫВЕДЕННЫЕ В ЭСТОНИИ ИЗ МАКРОМИЦЕТОВ

Данные о грибных комарах Эстонии, существующие в литературе, не были получены путем выведения имаго из плодовых тел грибов. В настоящей работе изучены 84 вида макромицетов, в которых установлено 40 видов грибных комаров, при этом 17 из них являются новыми для Эстонии. Описывается новый вид *Sciophila pseudoflexuosa* sp. n., выведенный из гриба *Lactarius helvus*. Личинки 3 видов были найдены впервые в грибах. Для некоторых видов грибных комаров установлены новые субстратные грибы. Самым обычным и многочисленным видом оказался *Mycetophila fungorum* Deg.