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Contribution to the knowledge of the fauna of fungus gnats (Diptera: Bolitophilidae, Keroplatidae, Mycetophilidae) from the Republic of Dagestan

К познанию фауны грибных комаров (Diptera: Bolitophilidae, Keroplatidae, Mycetophilidae) Республики Дагестан

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KEYWORDS: Diptera, Sciaroidea, Bolitophilidae, Keroplatidae, Mycetophilidae, fungus gnats, Republic of Dagestan, Russia, Palaearctic region, faunistics, species list, new records.

КЛЮЧЕВЫЕ СЛОВА: Diptera, Sciaroidea, Bolitophilidae, Keroplatidae, Mycetophilidae, грибные комары, Республика Дагестан, Россия, Палеарктическая область, фаунистика, список видов, новые находки.

ABSTRACT. A list of species of fungus gnats (Diptera: Bolitophilidae, Keroplatidae, Mycetophilidae) from the Republic of Dagestan is provided. The list contains 54 species, all of them newly recorded from this region. Six species, *Mycomya* (*Mycomya*) *matilei* Väisänen, 1984, *Rymosia beaucournui* Matile, 1963, *Tarnania dziedzickii* (Edwards, 1941), *Phronia basalis* Winnertz, 1864, *Sceptonia humerella* Edwards, 1925, and *Trichonta foeda* Loew, 1869, are recorded for the first time from Russia; for most of these, illustrations of male terminalia are given.

РЕЗЮМЕ. Приводится список видов грибных комаров (Diptera: Bolitophilidae, Keroplatidae, Mycetophilidae) из Республики Дагестан. Список содержит 54 вида, все они являются новыми находками для данного региона. Шесть видов, *Mycomya* (*Mycomya*) *matilei* Väisänen, 1984, *Rymosia beaucournui* Matile, 1963, *Tarnania dziedzickii* (Edwards, 1941), *Phronia basalis* Winnertz, 1864, *Sceptonia humerella* Edwards, 1925 и *Trichonta foeda* Loew, 1869, впервые указываются для фауны России; для большинства этих видов даются иллюстации терминалий самцов.

Introduction

The fauna of fungus gnats, the nearly cosmopolitan and diverse group of dipterans, is still poorly known from the territory of Russia. It applies to Southern Russia in general and, more specifically, to Caucasus where species richness of this group is expected to be very high. Proof of this can be found in the excellent paper published recently by Kurina [Kurina, 2021], which quotes as many as 246 species of fungus gnats from Georgia, the neighbouring Transcaucasian country. By comparison, only scattered regional data are included in two major works on the fungus gnats of Russia by Zaitzev [Zaitzev, 1994, 2003]. Anyone who is interested in more detailed information on the number of species known from North Caucasus, the whole of Transcaucasia, or a specific Transcaucasian country should consult the paper mentioned above [Kurina, 2021].

Surprisingly, there's still not a single published record of a fungus gnat's species from the Republic of Dagestan, the second-largest federal subject in the North Caucasian Federal District of Russia (area 50,300 sq. km) and the southernmost part of the country. Even the most important reference source, the Catalogue of Palaearctic Diptera, doesn't contain a single mention of Dagestan [Plassmann, 1988; Krivosheina, Mamaev, 1988; Hackman et al., 1988]. This fact was apparently the main incentive for the author to go on a collecting trip to Dagestan in October of 2021.

Material and methods

All examined material was collected by the author except for a single male provided by Oleg E. Kosterin (Novosibirsk) and is part dried specimens glued to insect pins, part specimens stored in alcohol. Collecting

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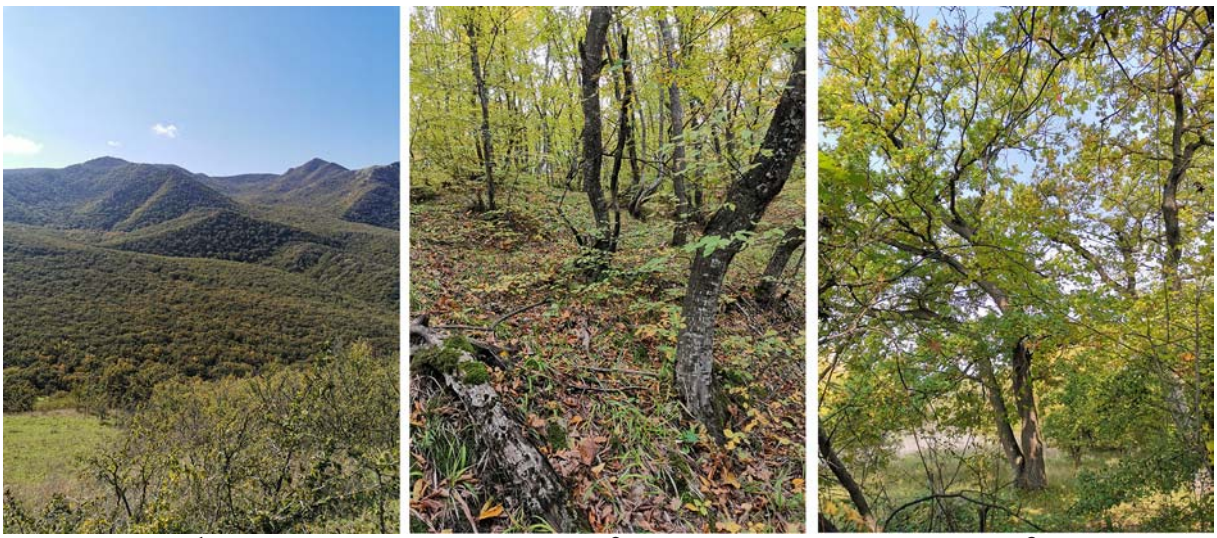

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Figs 1–3. Some collecting localities: 1 — Agachaul env.; 2 — Derbent env.; 3 — Gerga env.
Рис. 1–3. Некоторые места сборов: 1 — окр. Агачаула; 2 — окр. Дербента; 3 — окр. Герги.

was done by sweeping in the period from October 10 to October 19, 2021. Among collected specimens, there were 314 males and comparable number of females, yet only 26 of the latter were used for identification purposes, so the total number of examined specimens amounts to 340. The material is deposited in the Zoological Museum of the Moscow State University (ZMMU). The collecting localities are coded as follows:

[1] = RUSSIA, Dagestan, Kumtorkalinsky district, Buynaksky Pass, 42.936°N, 47.364°E, 520m asl

[2] = RUSSIA, Dagestan, Karabudakhkentsky district, Agachaul env., 42.939°N, 47.423°E, 230m asl

[3] = RUSSIA, Dagestan, Kumtorkalinsky district, Agachaul env., 42.929°N, 47.418°E, 420m asl

[4] = RUSSIA, Dagestan, Buynaksky district, Talgi env., 42.889°N, 47.499°E, 330m asl

[5] = RUSSIA, Dagestan, Derbent env., S slopes of Achigsirt Mt., 42.042°N, 48.263°E, 410m asl

[6] = RUSSIA, Dagestan, Kayakentsky distr., N of Gerga, Kazmalar Forest, 42.362°N, 47.958°E, 40m asl

Collecting was mostly restricted to the environs of Makhachkala and Derbent due to the shortness of the trip and which was more convenient logistically while performing a preliminary study. The examined localities can be briefly characterized as submontane oak forests at elevations not higher than 520m (Figs 1–2); during a single, relatively short period of time fungus gnats were collected in a lowland oak forest (Kazmalar Forest, Gerga env.) (Fig. 3).

To prepare illustrations, male genitalia were boiled in 10% solution of potassium hydroxide (KOH) for 60 to 90s, neutralised by a 10% solution of acetic acid (CH_3COOH), rinsed in water and then stored in glycerol. Dissected male genitalia were examined with a Nikon SMZ645 binocular microscope and then photographed using an eTREK DCM900 camera on MBI-1 microscope; stacked images were obtained using either CombineZP (Alan Hadley, http://www.hadleyweb.pwp.blueyonder.co.uk) or Helicon Focus (https://www.heliconsoft.com) software. Pictures of habitats were taken with a Huawei Honor 20 smart phone.

Results

In total, 340 specimens were identified resulting in 54 species of three families, viz. one species of Bolitophilidae, three species of Keroplatidae, and 50 species of Mycetophilidae, all of them recorded for the first time from Dagestan; among Mycetophilidae, six species represent new records for Russia, *Mycomya* (*Mycomya*) *matilei* Väisänen, 1984, *Rymosia beaucournui* Matile, 1963, *Tarnania dziedzickii* (Edwards, 1941), *Phronia basalis* Winnertz, 1864, *Sceptonia humerella* Edwards, 1925, and *Trichonta foeda* Loew, 1869. The systematic list of species is given below; it mostly follows the classification accepted at the Fungus Gnats Online web site (https://sciaroidea.myspecies.info/), the only exception at the time of writing being *Brachycampta* Winnertz, 1864 treated here as a separate genus rather than a subgenus of *Allodia* Winnertz, 1864 [Magnussen et al., 2021]. More details on distribution of species newly recorded from Russia are mostly according to the Fauna Europaea web site [Chandler, 2013].

The list of species

Family Bolitophilidae Malloch, 1917

Bolitophila (*Cliopisa*) *pseudohybrida* Landrock, 1912

MATERIAL. 1♂, 1♀, [5], 16.X.2021; 1♂, ibidem, 18.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Family Keroplatidae Rondani, 1856
Subfamily Macrocerinae Rondani, 1856

Macrocera crassicornis Winnertz, 1863

MATERIAL. 2♂♂, [6], 17.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Macrocera phalerata Meigen, 1818

MATERIAL. 1♂, [6], 17.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Macrocera stigmoides Edwards, 1925

MATERIAL. 4♂♂, 8♀♀, [1], 10.X.2021; 2♂♂, [2], 11.X.2021; 1♂, [3], 12.X.2021; 3♂♂, [4], 13.X.2021; 1♂, [5], 16.X.2021; 7♂♂, 1♀, [6], 17.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Family Mycetophilidae Newman, 1834
Subfamily Mycomyinae Edwards, 1925

Mycomya (*Mycomya*) *flavicollis* (Zetterstedt, 1852)

MATERIAL. 3♂♂, [5], 18.X.2021; 1♂, [5], 19.X.2021.
GENERAL DISTRIBUTION. Western Palaearctic.

Mycomya (*Mycomya*) *matilei* Väisänen, 1984
Figs 4–8.

MATERIAL. 4♂♂, [2], 11.X.2021; 1♂, [3], 12.X.2021; 1♂, [4], 13.X.2021.
DISTRIBUTION. Europe: France, Russia (first record).

Mycomya (*Mycomya*) *tumida* (Winnertz, 1864)

MATERIAL. 5♂♂, 2♀♀, [1], 10.X.2021; 19♂♂, 5♀♀, [2], 11.X.2021; 3♂♂, [2], 12.X.2021; 2♂♂, [3], 12.X.2021; 12♂♂, 2♀♀, [3], 12.X.2021; 1♂, 1♀, [4], 13.X.2021; 7♂♂, 3♀♀, [4], 14.X.2021; 1♂, [5], 18.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Neoempheria striata (Meigen, 1818)

MATERIAL. 1♂, [2], 11.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Subfamily Sciophilinae Rondani, 1840

Polylepta guttiventris (Zetterstedt, 1852)

MATERIAL. 1♀, [5], 19.X.2021.
GENERAL DISTRIBUTION. Europe.

Sciophila quadriterga Hutson, 1979

MATERIAL. 1♂, [4], 13.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Subfamily Gnoristinae Edwards, 1925
Boletina gripha Dziedzicki, 1885

MATERIAL. 2♂♂, [2], 11.X.2021; 2♂♂, [3], 12.X.2021; 3♂♂, [5], 16.X.2021; 1♂, [5], 18.X.2021; 1♂, [5], 19.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Subfamily Leiinae Edwards, 1925
Leia bimaculata (Meigen, 1804)

MATERIAL. 1♂, [5], 16.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Subfamily Mycetophilinae Newman, 1834
Tribe Exechiini Edwards, 1925

Allodia lugens (Wiedemann, 1817)

MATERIAL. 1♂, [2], 11.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Allodia ornaticollis (Meigen, 1818)

MATERIAL. 1♂, [5], 19.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Brachycampta grata (Meigen, 1830)

MATERIAL. 1♂, [5], 19.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Brevicornu griseicolle (Staeger, 1840)

MATERIAL. 1♂, [5], 18.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Brevicornu sericoma (Meigen, 1830)

MATERIAL. 3♂♂, [5], 18.X.2021; 1♂, [5], 19.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Cordyla nitens Winnertz, 1864

MATERIAL. 1♂, [4], 13.X.2021; 8♂♂, [5], 16.X.2021; 1♂, [5], 18.X.2021; 3♂♂, [5], 19.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Cordyla nitidula Edwards, 1925

MATERIAL. 1♂, [1], 10.X.2021; 1♂, [2], 12.X.2021; 1♂, [3], 12.X.2021; 6♂♂, [4], 13.X.2021; 3♂♂, [4], 14.X.2021; 4♂♂, [5], 16.X.2021; 2♂♂, [5], 18.X.2021; 2♂♂, [5], 19.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Exechia bicincta (Staeger, 1840)

MATERIAL. 1♂, [2], 11.X.2021; 1♂, [3], 12.X.2021; 1♂, [4], 14.X.2021; 1♂, [5], 16.X.2021; 5♂♂, [5], 18.X.2021; 2♂♂, [5], 19.X.2021; 1♂, [6], 17.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Exechia cincta Winnertz, 1864

MATERIAL. 1♂, [4], 14.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Exechia fusca (Meigen, 1804)

MATERIAL. 1♂, [5], 19.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Exechia macula Chandler, 2001

MATERIAL. 1♂, [4], 13.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Exechia repanda Johannsen, 1912

MATERIAL. 1♂, [4], 13.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Exechia seriata (Meigen, 1830)

MATERIAL. 1♀, [2], 12.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Exechia spinuligera Lundström, 1912

MATERIAL. 1♂, [4], 13.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Rymosia affinis Winnertz, 1864

MATERIAL. 1♂, [5], 16.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Rymosia beaucournui Matile, 1963
Figs 9–13.

MATERIAL. 1♂, [1], 10.X.2021; 1♂, [5], 18.X.2021.
DISTRIBUTION. Western Palaearctic: Portugal, Spain, France, Malta, Greece, Cyprus, Switzerland, North Africa, Near East, Russia (first record).

Stigmatomeria crassicornis (Stannius, 1831)

MATERIAL. 2♂♂, [5], 18.X.2021; 1♂, ibidem, 19.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Synplasta gracilis (Winnertz, 1864)

MATERIAL. 1♂, [5], 18.X.2021.
GENERAL DISTRIBUTION. Europe.

Tarnania dziedzickii (Edwards, 1941)
Figs 14–15.

MATERIAL. 2♂♂, [5], 16.X.2021; 2♂♂, ibidem, 18.X.2021; 1♂, ibidem, 19.X.2021.

DISTRIBUTION. Western Palaearctic: Portugal, Spain, UK, Ireland, France, Belgium, Germany, Switzerland, Italy, Norway, Sweden, Slovakia, Serbia, Montenegro, Romania, Bulgaria, Greece, Russia (first record).

Figs 4–12. Male genitalia: 4–8 — *Mycomya* (*Mycomya*) *matilei*; 9–12 — *Rymosia beaucournui*; 4–5 — sternal synsclerite; 6 — tergite 9 and proctiger; 7–11 — hypopygium; 12 — tergite 9, cerci and aedeagus; 4, 6, 9, 12 — dorsal view; 5, 8, 10 — ventral view; 7 — lateral view; 11 — caudal view. Not to the same scale.

Рис. 4–12. Гениталии самцов: 4–8 — *Mycomya* (*Mycomya*) *matilei*; 9–12 — *Rymosia beaucournui*; 4–5 — стернальный синсклерит, сверху; 6 — тергит 9 и проктигер; 7–11 — гипопигий; 12 — тергит 9, церки и эдеагус; 4, 6, 9, 12 — сверху; 5, 8, 10 — снизу; 7 — сбоку; 11 — сзади. Масштаб разный.

Figs 13–21. Male genitalia: 13 — *Rymosia beaucournui*; 14— *Tarnania dziedzickii*; 16–17 — *Phronia basalis*; 18–19 — *Sceptonia tenuis*□20–21 — *Trichonta foeda*; 13, 17 — gonostylus; 14–16, 20–21 — hypopygium; 18–19 — hypopygium (tergite 9 and cerci removed); 13, 17 — inner view; 14, 19–20 — dorsal view; 15, 16, 21 — ventral view; 18 — lateral view. Not to the same scale.

Рис. 13–21. Гениталии самца: 13 — *Rymosia beaucournui*; 14— *Tarnania dziedzickii*; 16–17 — *Phronia basalis*; 18–19 — *Sceptonia tenuis*□20–21 — *Trichonta foeda*; 13, 17 — гоностиль; 14–16, 20–21 — гипопигий; 18–19 — гипопигий (тергит 9 и церки удалены); 13, 17 — изнутри; 14, 19–20 — сверху; 15, 16, 21 — снизу; 18 — сбоку. Масштаб разный.

Tarnania fenestralis (Meigen, 1818)

MATERIAL. 1♂, [5], 18.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Tribe Mycetophilini Edwards, 1925

Mycetophila formosa Lundström, 1911

MATERIAL. 1♂, [5], 16.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Mycetophila idonea Laštovka, 1972

MATERIAL. 1♂, [5], 19.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Mycetophila lastovkai Caspers, 1984

MATERIAL. 1♂, [5], 18.X.2021.
GENERAL DISTRIBUTION. Europe.

Mycetophila luctuosa Meigen, 1830

MATERIAL. 1♂, [3], 12.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Mycetophila lunata Meigen, 1804

MATERIAL. 1♂, [5], 18.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Mycetophila occultans Lundström, 1913

MATERIAL. 1♂, [2], 12.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Mycetophila perpallida Chandler, 1993

MATERIAL. 2♂♂, [4], 13.X.2021; 2♂♂, [5], 16.X.2021; 2♂♂, ibidem, 18.X.2021; 2♂♂, [6], 17.X.2021.
GENERAL DISTRIBUTION. Western Palaearctic.

Mycetophila signatoides Dziedzicki, 1884

MATERIAL. 1♂, [3], 12.X.2021; 4♂♂, 1♀, [4], 13.X.2021; 2♂♂, [5], 16.X.2021; 1♂, ibidem, 18.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Mycetophila trinotata Staeger, 1840

MATERIAL. 1♂, [2], 11.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Phronia basalis Winnertz, 1864
Figs 16–17

MATERIAL. 18♂♂, [4], 13.X.2021; 4♂♂, ibidem, 14.X.2021; 9♂♂, [5], 16.X.2021; 7♂♂, ibidem, 18.X.2021; 21♂♂, ibidem, 19.X.2021.
DISTRIBUTION. Western Palaearctic: UK, Ireland, Portugal, Spain, Belgium, France, the Netherlands, Denmark, Switzerland, Czech Republic, Hungary, Poland, Sweden, Bulgaria, Greece, Cyprus, Russia (first record).

Phronia biarcuata (Becker, 1908)

MATERIAL. 1♂, [5], 18.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Phronia cinerascens Winnertz, 1864

MATERIAL. 1♂, [5], 18.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Phronia conformis (Walker, 1856)

MATERIAL. 1♂, [5], 19.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Phronia forcipata Winnertz, 1864

MATERIAL. 1♂, Dagestan, Kuzhnik, 41.95°N 47.8°E 1300m, 22.VI.2021, Oleg Kosterin leg.
GENERAL DISTRIBUTION. Palaearctic.

Phronia tenuis Winnertz, 1864

MATERIAL. 1♂, [3], 12.X.2021; 1♂, [5], 16.X.2021.
GENERAL DISTRIBUTION. Holarctic, extending to the Oriental region.

Platurocypta testata (Edwards, 1925)

MATERIAL. 1♂, [1], 10.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Sceptonia humerella Edwards, 1925

MATERIAL. 1♂, [5], 19.X.2021.
DISTRIBUTION. Europe: UK, Germany, Czech Republic, Italy, Bulgaria, Russia (first record).

Sceptonia tenuis Edwards, 1925
Figs 18–19.

MATERIAL. 1♂, [2], 11.X.2021; 1♂, [3], 12.X.2021; 1♂, [5], 16.X.2021; 2♂♂, ibidem, 18.X.2021; 1♂, ibidem, 19.X.2021.
GENERAL DISTRIBUTION. Europe.

Trichonta clavigera Lundström, 1913

MATERIAL. 5♂♂, [2], 11.X.2021; 2♂♂, [3], 12.X.2021; 5♂♂, [4], 13.X.2021; 1♂, ibidem, 14.X.2021; 1♂, [5], 16.X.2021; 2♂♂, ibidem, 16.X.2021; 4♂♂, ibidem, 18.X.2021; 2♂♂, ibidem, 19.X.2021; 1♂, [6], 17.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Trichonta foeda Loew, 1869
Figs 20–21.

MATERIAL. 1♂, [2], 11.X.2021; 2♂♂, [5], 16.X.2021; 2♂♂, ibidem, 18.X.2021.
DISTRIBUTION. Europe: UK, Ireland, Germany, Hungary, Portugal, Sweden, Russia (first record); Nearctic.

Trichonta vitta (Meigen, 1830)

MATERIAL. 1♂, [3], 12.X.2021; 1♂, [4], 13.X.2021; 1♂, ibidem, 14.X.2021; 5♂♂, [5], 16.X.2021; 7♂♂, ibidem, 18.X.2021; 9♂♂, ibidem, 19.X.2021.
GENERAL DISTRIBUTION. Holarctic.

Zygomyia notata (Stannius, 1831)

MATERIAL. 1♂, [5], 19.X.2021.
GENERAL DISTRIBUTION. Palaearctic.

Discussion

The number of collected species of fungus gnats was smaller than expected, based on the author's collecting experience in Central Russia and other regions, where the time of the trip (the second 10-day period of October) roughly corresponds to early September when the diversity of fungus gnats is at its highest. This was probably due to heavy rains in Dagestan shortly before the trip which apparently were followed by a significant drop in temperatures. In the identified material, two species were the most numerous, *Mycomya* (*Mycomya*) *tumida* (Winnertz, 1864) (61 specimens, or 17.94% of the total number) and *Phronia basalis* Winnertz, 1864 (59 specimens, 17.35%). Combined with three more of next most numerous species, *Macrocera stigmoides* Edwards, 1925, *Trichonta vitta* (Meigen, 1830), and *Trichonta clavigera Lundstrom*, 1913, these five species comprise nearly three-fifths of the collected speci-

mens (194, or 57.06%). Meanwhile 32 species, or 59.26% of the total number, were represented by a single specimen. The relatively small number of collected species of *Mycetophila*, usually the most abundant genus in early autumn, should be also noted.

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