First data on Sciomyzidae (Diptera) of Iturup Island (Kuril Islands)

Первые указания Sciomyzidae (Diptera) для острова Итуруп (Курильские острова)

A.A. Przhiboro

А.А. Пржиборо

A.A. Przhiboro, Zoological Institute, Russian Academy of Sciences, 1 Universitetskaya Emb., St Petersburg 199034, Russia; Tyumen State University, Tyumen 652003, Russia. E-mail: dipteran@mail.ru

The first data are presented about the Sciomyzidae of Iturup, the largest of the Kuril Islands. A total of ten species are recorded. *Limnia setosa* Yano is recorded for the first time from Russia; *Tetanocera montana* Day and *T. phyllophora* Melander are recorded for the first time from the Kuril Islands. Photographs, comments on diagnostic characters and adult habitats of poorly known species are given.

В статье приводятся первые данные о двукрылых семейства Sciomyzidae для острова Итуруп – самого крупного из островов Курильской гряды. Всего отмечено 10 видов Sciomyzidae. *Limnia setosa* Yano впервые отмечен для России; *Tetanocera montana* Day и *T. phyllophora* Melander впервые отмечены для Курильских островов. Для малоизученных видов приводятся фотографии, замечания по диагностическим признакам и биотопам имаго.

Key words: snail-killing flies, distribution, Iturup Island, Kuril Islands, Diptera, Sciomyzidae, new records

Ключевые слова: мухи-моллюскоеды, распространение, остров Итуруп, Курильские острова, Diptera, Sciomyzidae, новые находки

INTRODUCTION

Snail-killing flies (Diptera: Sciomyzidae) is a relatively small and well-studied family including about 550 species worldwide, with larvae feeding mostly on terrestrial and freshwater molluscs as predators or parasitioids (Knutson & Vala, 2011; Vala et al., 2013). Over 170 species are known from the Palaearctic Region. However, Sciomyzidae of the eastern parts of Russia are still insufficiently known, especially in the insular parts of the Russian Far East. There are only few published records of Sciomyzidae from the Kuril Islands, all from the southernmost Kunashir Island (Elberg, 1965, 1968; Elberg & Remm, 1974; Knutson & Orth, 1984; Rozkošný & Elberg, 1991; Rozkošný, 1992; Sueyoshi, 2010), including two new species described from the material collected on Kunashir, *Colobaea eos* Rozkošný et Elberg, 1991and *Limnia pacifica* Elberg, 1965. Several species were mentioned from "Kuril Islands" (and also from "Chishima Islands" = southern Kuril Islands) without indication of islands or localities in the reviews and catalogues (Rozkošný, 1979, 1987; Rozkošný & Elberg, 1984; Sidorenko, 2004; Sueyoshi, 2014), mostly based on the above-mentioned publications. No published records of Sciomyzidae from Iturup could be found, and no Sciomyzidae speci-

mens collected from Iturup were located in the large collection of the Zoological Institute (St Petersburg) containing rich material from the East Palaearctic. The paper is based on the material collected by the author in 2011.

Iturup Island (or Etorofu in Japanese publications; at present, Sakhalin Province of Russia) belongs to the Greater Kuril Ridge stretching between Kamchatka and Hokkaido Island of Japan; it is situated in the southern part of the ridge, between Kunashir (to the South-West) and Urup (to the North-East) islands. Iturup is the largest of the Kuril Islands, about 200 km long and 7–27 km wide. The island consists of eight volcanic massifs/mountain ridges connected by lowlands. Most of the island territory is covered by forests; at the same time, there is a diversity of non-forested landscapes including grasslands, bogs, alpine meadows, sand dunes etc. Different-type streams, rivers and lakes maintain the diversity of aquatic and semiaquatic habitats, including shore marshes and wet meadows.

MATERIAL AND METHODS

In late July–August 2011, the author collected adults of Diptera in various habitats and localities in different parts of Iturup. Most of sampling sites were situated in the valleys of rivers and streams, at shorelines of various freshwaters and in other wet and semiaquatic habitats, mostly at altitudes less than 200 m above the sea level. Collecting was made mostly with net-sweeping over vegetation, above the water and along the shorelines. Adult flies (Diptera) were collected from 58 localities; Sciomyzidae have been obtained from 15 localities. The specimens are kept in ca. 80% ethanol and deposited at the Zoological Institute, St Petersburg, Russia (ZIN). Sampled localities, habitats and collecting dates are listed below with the original expedition numbering. These numbers of localities are used for listing the material under each species. The collecting technique was net-sweeping, unless otherwise specified. When identifying the material, the terminalia of all males were dissected and compared with the published data and, when possible, with specimens from the ZIN collection. In addition, the paratype of *Colobaea eos* Rozkošný et Elberg, 1991 kept at the Zoological Museum of the Moscow State University (ZMMU), was examined. Morphological terminology follows Rozkošný (1998).

The photos of the holotype of *Limnia pacifica* Elberg, 1965 (dry specimen) and the wings of other *Limnia* specimens (in ethanol) were taken under a LOMO MSP-2 stereomicroscope with a Canon EOS 60D digital camera. The structures of the male terminalia were photographed after detachment, treating in hot 10% KOH, washing in water and dissection of the postabdomen in a drop of glycerol; the images were taken from temporary slides under a Leica DFC320 microscope with a LOMO MC-6.3 digital camera using Nomarski contrast. In all the cases, the series of images were taken, then z-stacked using Helicon Focus 5.1 software and edited using Adobe Photoshop CS software.

List of localities (where Sciomyzidae were collected; references are given to the published illustrations of the localities/habitats)

10. Vicinity of village Rybaki, River Rybaki, lower reach upstream of bridge, 45°12.322′N 147°50.647′E, 23.vii.2011 (Roháček & Przhiboro, 2016: 211, Fig. 8).

14. Vicinity of Vetrovoy Isthmus, stream near the Black Rocks and marshy meadow 200 m upstream of its mouth, 45°15.55′N 148°10.63′E, 3–15 m, 26.vii.2011.

15. Vicinity of Odesskiy Bay, stream no. 3 N of field base, lower reach 100–300 m upstream of mouth (in tallgrass meadow), 44°48.68′N 147°14.81′E, 5–13 m, 27. and 30.vii.2011.

18. Vicinity of Odesskiy Bay, NE shore of Lake Lesozavodskoe, swampy mixed for-

est with grass stands and pools, 44°47.130′N 147°13.744′E, 15 m, 28.vii.2011 (Roháček & Przhiboro, 2016: 209, Fig. 6).

20. Vicinity of Odesskiy Bay, NNE vicinity of Lake Lesozavodskoe (ca. 1 km of lake shore), wet mixed forest with grass stands and pools, 28.VII.2011.

23. Vicinity of Dobroe Nachalo Bay, River Tikhaya, lower reach, tallgrass meadows at banks, 44°43.367′N 147°12.074′E, 5 m, 31.vii.2011 (Roháček & Przhiboro, 2016: 209, Fig. 7).

24. Vicinity of Dobroe Nachalo Bay, marshy meadow/bog ca. 1 km SW of Lake Dobroe (River Tikhaya valley), 44°44.027′N 147°13.333′E, <5 m, 31.vii.2011 (Roháček & Przhiboro, 2016: 209, Fig. 5).

26. Odesskiy Bay, stream at field base, lower reach, Malaise trap, 27.vii.–3.viii.2011 (V. Pilipenko and A. Przhiboro leg.).

33. Western shore of Chirip Peninsula, stream Nezhnyy, lower reach, tallgrass stands at banks, 45°17.791′N 147°52.417′E, 21 m, 9.vii.2011.

40. Vicinity of vill. Reidovo, River Udobnaya, lower reach, wet meadows at banks, 45°15.868′N 148°01.738′E, 12 m, 18.viii.2011 (Roháček & Przhiboro, 2016: 211, Fig. 9).

41. Vicinity of vill. Reidovo, left tributary of Mineral'nyy stream near road to vill. Zharkie Vody, at banks, 45°14.778′N 148°00.836′E, 12 m, 18.VIII.2011.

44. High seashore terrace at the Sea of Okhotsk, tallgrass meadow in ravine with a stream between mouth of Chistaya River and Gromkiy Cape, 45°25.233′N 148°29.706′E, 38 m, 20.VIII.2011.

49. Upland at the Sea of Okhotsk side, marshy pools at pass on road between Sofia Bay and Dobrynin Bay, 22.VIII.2011.

58. Low seashore terrace S of vill. Burevestnik, lower reach of stream E of River Otlivnaya, 44°48.978′N 147°32.587′E, 9 m, 29.viii.2011.

59. Low seashore terrace S of vill. Burevestnik, environs of River Gruntovaya mouth, sedge bog and pools on road, 29.viii.2011.

LIST OF SPECIES

Subfamily **SCIOMYZINAE**

Tribe **SCIOMYZINI**

Colobaea eos Rozkošný et Elberg, 1991 (Figs 1–3)

New material. Locality 15, 1 female; locality 20, 1 male and 2 females; locality 44, 1 female.

Paratype. Male; **Russia**, *Primorie Terr.*, Ussuriysk distr., Kamenushka, 4 June 1984 (A. Shatalkin leg.; ZMMU).

Notes. The Far Eastern species known only from the South Kuril Islands, Japan, southern Primorie Terr. and Korea (Rozkošný & Elberg, 1991; Sueyoshi, 2001, 2010, 2014; Rozkošný et al., 2010).

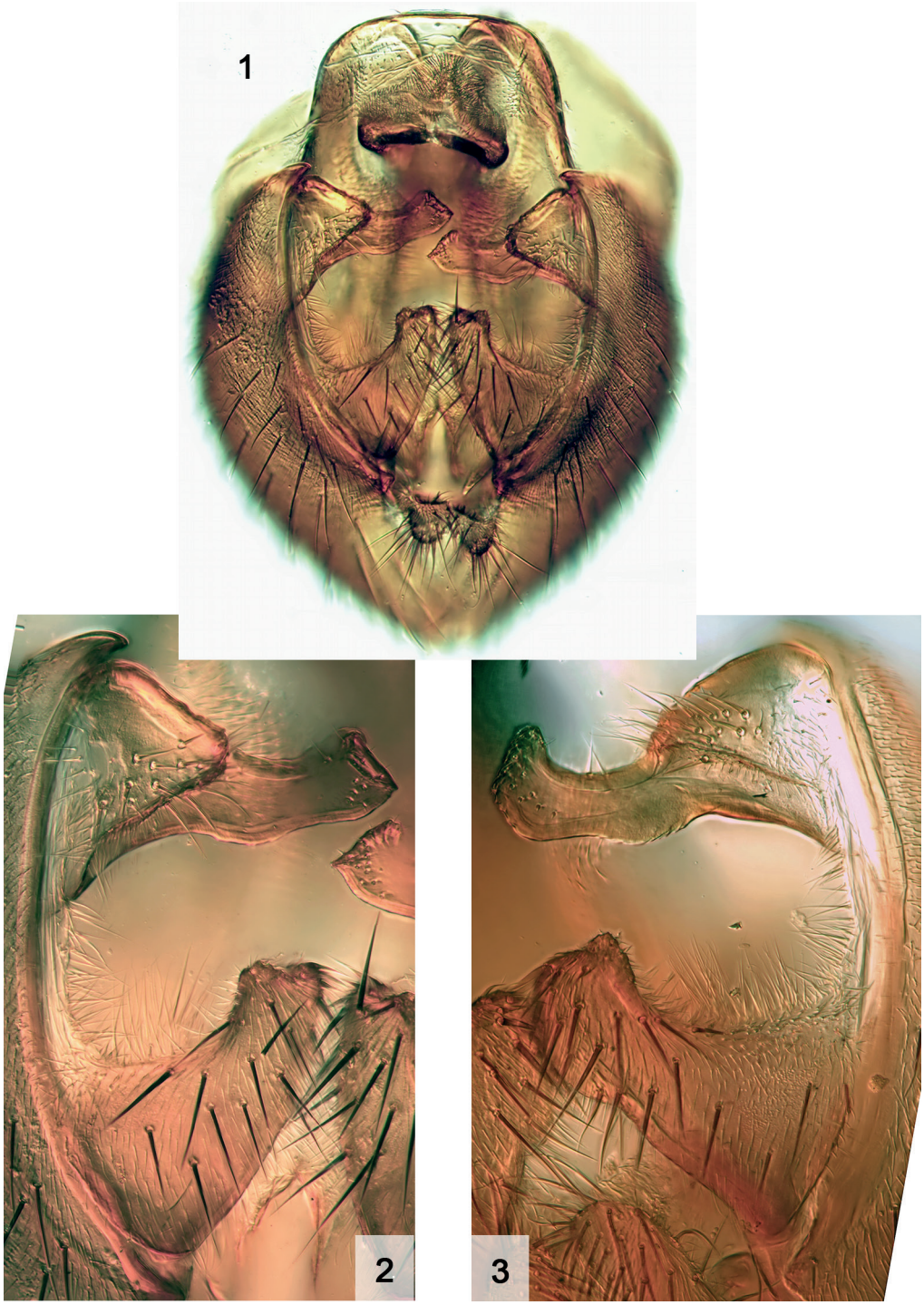
Characters of the specimens from Iturup including the male genitalia fit well to the original description (Rozkošný & Elberg, 1991), but the strap-like inner process of anterior surstylus is curved anteriorly and widened at apex (in the original description, nearly straight and not widened: Rozkošný & Elberg, 1991: 58, Figs 1–2). The examination of the paratype of *C. eos* has confirmed that the shape of inner process is subject to some variability (Figs 1–3). The body length of our specimens is 4.5–5 mm, which is somewhat larger than indicated in the original description but similar to that given by Sueyoshi (2001) for the Japanese exemplars.

Considering the previous records (see above references) and the new data, *C. eos* adults occur both in forested and in open grassy habitats, near small standing or running waters. The bionomics of this species immatures is unknown. However, the larvae in all other species of the genus with known bionomics (no less than 5 spp.) are parasitoids in aquatic Lymnaeidae or Planorbidae (Rozkošný & Elberg, 1991; Knutson & Vala, 2011; Murphy et al., 2012; and references therein).

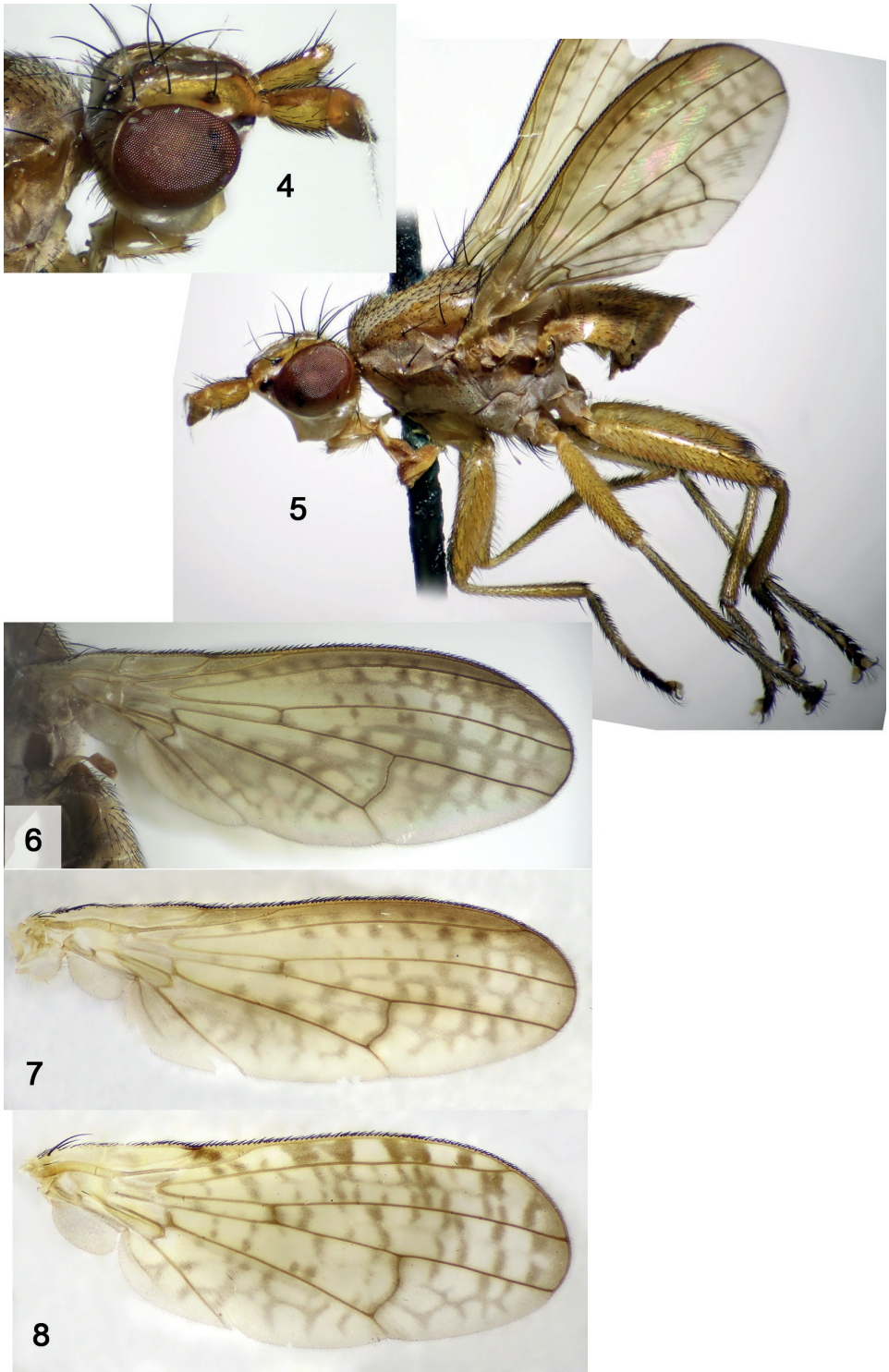
Pherbellia dubia (Fallén, 1820)

Material. Locality 14, 1 male.

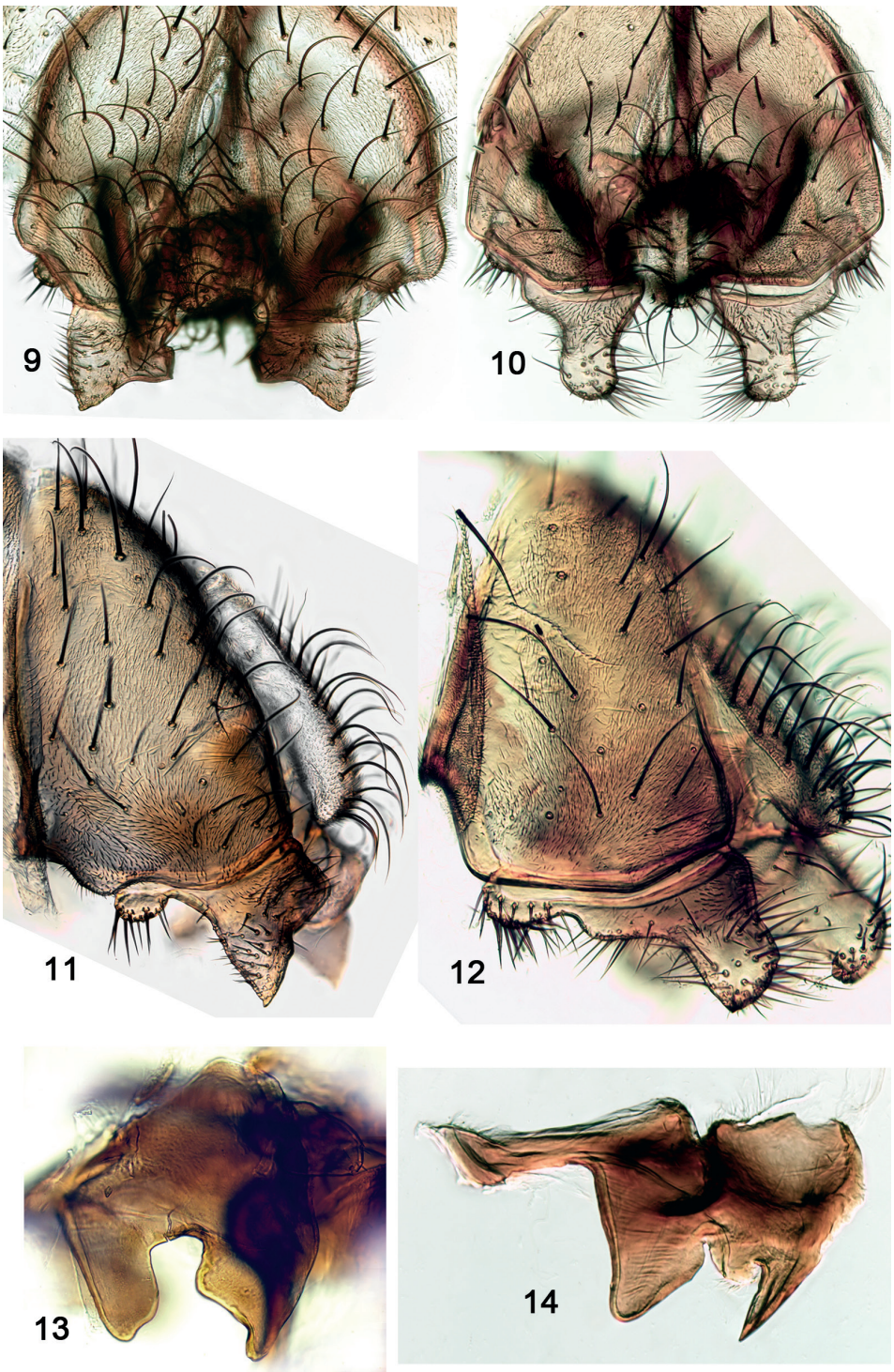
Notes. Widely distributed Palaearctic species, known from Kunashir (Elberg & Remm, 1974).



Figs 1–3. *Colobaea eos*, male terminalia in ventral view. **1**, total view of male terminalia (paratype); **2**, right anterior and posterior surstyli (paratype); **3**, left anterior and posterior surstyli (specimen from Iturup).



Figs 4–8. *Limnia* spp. **4–7**, *L. pacifica*: 4, head in dorsolateral view (holotype); 5, total view (holotype); 6, wing (holotype); 7, wing (male from Iturup). **8**, *L. setosa*: wing of male from Iturup.



Figs 9–14. *Limnia* spp., male terminalia. **9–10**, epandrium, surstyli and proctiger in posterior view; **11–12**, same in left lateral view; **13–14**, hypandrium, pregonite and postgonite in left lateral view. 9, 11, 13, *L. pacifica* (specimen from Iturup); 10, 12, 14, *L. setosa* (specimen from Iturup).

Tribe **TETANOCERINI**

Hydromya dorsalis (Fabricius, 1775)

Material. Locality 14, 1 male; locality 23, 3 males and 1 female.

Notes. Widely distributed Palaearctic species, known from Kunashir (Elberg & Remm, 1974).

Limnia pacifica Elberg, 1965
(Figs 4–7, 9, 11, 13)

New material. Locality 59, 1 male.

Holotype. Male; **Russia**, *Sakhalin Prov.*, Kunashir I., Goryachiy Plyazh, 31 July 1955 (N. Violovich leg.; ZIN).

Other material examined. **Russia**, *Sakhalin Prov.*, Kunashir I., Tret'yakovo, 1 July 1968, 9 specimens (E. Narchuk leg.; ZIN).

Notes. A poorly known species described from Kunashir (Elberg, 1965) and later recorded from Sakhalin Island (Elberg & Remm, 1974) and Japan (Honshu, Hokkaido) (Sueyoshi, 2010, 2014).

The genitalia and other characters of our specimen (Figs 7, 9, 11, 13) fit well to the original description by Elberg (1965) and to the characters of the holotype (re-examined; Figs 4–6; I have found that most structures of the terminalia are strongly cleared, so they are not illustrated here). Contrary to that proposed in the key by Rozkošný (1987: 66), in the holotype, the non-type material from ZIN collection, and in our specimen the apices of fore tibiae are not darkened or very slightly, indistinctly darkened (Fig. 5); reticulation in anal cell is poorly distinct (Figs 6, 7); anepisternum at posterior margin with up to 4 fine short but distinct setae and 1–2 minute hairs; anepimeron with or without short setae (holotype: anepisternum on left side with 4 setae, on right side without setae, anepimeron with 3 and 2 setae, respectively).

Sueyoshi (2010) suggested that "the northern form" of *Limnia japonica* Jano, 1978 is conspecific with *L. pacifica*, but "the southern form" of *L. japonica* differs from the latter in the body coloration (mostly bluish grey and dark brown in *L. japonica* vs. predominantly yellow-brown and brown in *L. pacifica*) and in the black markings "on the frons and parafacial of the head" (distinct in *L. japonica*, indistinct in *L. pacifica*). The coloration of the holotype and the non-type material of *L. pacifica* generally fits with Sueyoshi (2010), but the black markings on the head are distinct as described by Elberg (1965) (Figs 4, 5) and intensity of grey tinge on the thorax varies among the specimens.

Limnia setosa Yano, 1978
(Figs 8, 10, 12, 14)

Material. Locality 24, 2 males.

Notes. New record for Russia. This poorly known species was previously recorded only from Honshu and Hokkaido, Japan (Yano, 1978; Sueyoshi, 2001, 2010, 2014).

The genitalia of our specimen (Figs 10, 12, 14) fit well to those in the original description by Yano (1978). In our specimens, some external characters differ from those given by Yano (1978: 7–8, 22–23), Rozkošný (1987: 66, 68) and Sueyoshi (2001: 498, 503; 2010: 5): anepisternum at posterior margin with 1–3 distinct setae varying from fine short to medium-sized, anepimeron with one medium-sized seta and without hairs.

The habitat of *L. setosa* on Iturup differs markedly from all other localities from which the Sciomyzidae have been collected – it is a large open marshy meadow turning into unforested sedge bog (Roháček & Przhiboro, 2016: 207, Fig. 5).

Tetanocera arrogans Meigen, 1830

Material. Locality 18, 1 female; locality 23, 1 male and 3 females; locality 24, 1 female.

Notes. Widely distributed Palaearctic species, known from Kunashir (Elberg, 1968; Elberg & Remm, 1974).

Tetanocera elata (Fabricius, 1781)

Material. Locality 10, 1 male; locality 20, 1 female; locality 40, 2 males.

Notes. Widely distributed Palaearctic species, known from Kunashir (Elberg, 1968).

Tetanocera ferruginea Fallén, 1820

Material. Locality 18, 6 males and 5 females; locality 23, 5 males and 1 female; locality 24, 1 male; locality 33, 2 males; locality 41, 1 female; locality 58, 1 male.

Notes. Holarctic species, known from Kunashir (Elberg, 1968).

Tetanocera montana Day, 1881

Material. Locality 24, 3 males.

Notes. Holarctic species. First record from the Kuril Islands.

Tetanocera phyllophora Melander, 1920

Material. Locality 14, 1 male; locality 58, 2 females.

Notes. Holarctic species. First record from the Kuril Islands.

DISCUSSION

According to our preliminary results, ten species of Sciomyzidae are now recorded from Iturup Island. Of these species, three are unknown from the adjacent Kunashir Island, which received much more attention of dipterists. *Limnia setosa* is recorded for the first time from Russia; *Tetanocera montana* and *T. phyllophora* are recorded for the first time for the Kuril Islands. Previously, 11 species were listed from Kunashir (including *Pherbellia alpina* (Frey, 1930), *Sepedon aenescens* Wiedemann, 1830, *Tetanocera plebeja* Loew, 1862 and *T. silvatica* Meigen, 1830, which were not found in our samples; see references in the Introduction), and one species, *Pteromicra angustipennis* (Staeger, 1845), was mentioned from "Kuril Islands" without locality given (Rozkošný, 1979, 1987). Hence, the Sciomyzidae of the Kuril Islands now count 15 species, which is twice as low as in the much better studied Japan (30 species: Sueyoshi, 2014). However, *Tetanocera montana* is still unknown from Japan, while the record of *Pherbellia dubia* is considered unconfirmed (Sueyoshi, 2001, 2014). Most of species recorded from Iturup are broadly distributed, i.e. widely Palaearctic (7) or Holarctic (4). A Holarctic *Tetanocera ferruginea* was the most common species taken from six localities. The three Far Eastern species, poorly studied *Colobaea eos* and *Limnia* spp. are most interesting records.

ACKNOWLEDGEMENTS

The author is grateful to the following persons: Yu.A. Dunaeva (St Petersburg), M.A. Kashlina and V.E. Pilipenko (Moscow), P.P. Ktitorov and D.V. Zavarzin (Yuzhno-Sakhalinsk), A.N. Korablev, V.A. Streltsov and T.V. Avetyan (Kurilsk) for the help in organizing the expedition to Iturup, to the stuff of "Ostrovnoi" Wildlife Reserve, the companies "Gidrostroy" and "Bug" for the help with transport, to the stuff of Kurilskaya earthquake detection station for hosting our research group in Kurilsk, to N.E. Vikhrev and A.L. Ozerov (Moscow) for loaning the paratype of *Colobaea eos*, to J. Mortelmans (Gent) and an anonymous reviewer for useful comments to the first version of the MS. The research of A. Przhiboro was partially supported by the grants from the Russian Foundation for Basic Research (no. 15-54-53038; data analysis) and the Russian Scientific Foundation (no. 14-14-01134; processing of samples).

REFERENCES

Elberg K.J. 1965. New palaearctic genera and species of flies of the family Sciomyzidae (Diptera, Acalyptrata). *Entomologicheskoe Obozrenie*, **44**(1): 189–196. (In Russian; English translation: *Entomological Review*, **44**(1): 104–109).

Elberg K.J. 1968. To the fauna of Sciomyzidae flies (Diptera) of the USSR. *Izvestiya Akademii Nauk Estonskoy SSR*, **17**(2): 217–222. (In Russian with Estonian and German summaries).

Elberg K.J. & Remm H. 1974. New data on the distribution of the flies of the family Sciomyzidae (Diptera) in the Soviet Union. *Turtu Riikliku Ülikooli Toimetised* (*Acta et Commentationes Universitatis Tartuensis*), **327** (Zoolo-

gia–Alaseid Töid, VIII): 59–64. (In Estonian with Russian and German summaries).

Knutson L. & Orth R.E. 1984. The *Sepedon sphegea* complex in the Palaearctic and Oriental regions: identity, variation and distribution (Diptera: Sciomyzidae). *Annals of the entomological Society of America*, **77**(6): 687–701.

Knutson L.V. & Vala J-C. 2011. *Biology of snail-killing Sciomyzidae flies*. Cambridge: Cambridge University Press. xix, 506 p.

Murphy W.L., Knutson L.V., Chapman E.G., McDonnell R.J., Williams C.D., Foote B.A. & Vala J-C. 2012. Key aspects of the biology of snail-killing Sciomyzidae flies. *Annual Review of Entomology*, **57**: 425–447.

Roháček J. & Przhiboro A. 2016. Anthomyzidae (Diptera) of Iturup Island (Russia: Kuril Islands). *Acta Musei Silesiae*, *Scientiae naturales*, **65**(3): 203–213.

Rozkošný R. 1979. *Pteromicra nigripalpis* sp. n. from Mongolia and a world catalogue of the genus (Diptera, Sciomyzidae). *Acta entomologica Bohemoslovaca*, **76**(3): 181–187.

Rozkošný R. 1987. A review of the Palaearctic Sciomyzidae (Diptera). *Folia Facultatis scientiarum naturalium Universitatis Purkynianae Brunensis*, *Biologia*, **86**: 1–100.

Rozkošný R. 1992. Additions to the taxonomy, morphology and distribution of Palaearctic Sciomyzidae (Diptera). *Scripta Facultatis scientiarum naturalium Universitatis Masarykianae Brunensis*, *Biologia*, **21**(1991): 37–46.

Rozkošný R. 1998. Family Sciomyzidae. *In*: **Papp L. & Darvas B.** (Eds). *Contributions to a manual of Palaearctic Diptera (with special reference to flies of economic importance)*, **3**. Higher Brachycera: 359–376. Budapest: Science Herald.

Rozkošný R. & Elberg K. 1984. Family Sciomyzidae (Tetanoceridae). *In*: **Soós A. & Papp L.** (Eds). *Catalogue of Palaearctic Diptera*, *Micropezidae – Agromyzidae*, **9**: 167–193. Budapest: Akadémiai Kiadó.

Rozkošný R. & Elberg K. 1991. Two new species of *Colobaea* Zetterstedt (Diptera, Sciomyzidae) from Palaearctic Asia. *Aquatic Insects*, **13**(1): 55–63.

Rozkošný R., Knutson L. & Merz B. 2010. A review of the Korean Sciomyzidae (Diptera) with taxonomic and distributional notes. *Acta zoologica Academiae scientiarum Hungaricae*, **56**(4): 79–90.

Sidorenko V.S. 2004. Fam. Sciomyzidae. *In*: **Lehr P.A.** (Ed.). *Opredelitel' nasekomykh Dal'nego Vostoka Rossii* [Key to the insects of the Russian Far East], **6**(3): 98–118. Vladivostok: Dal'nauka. (In Russian).

Sueyoshi M. 2001. A revision of Japanese Sciomyzidae (Diptera), with description of three new species. *Entomological Science*, **4**(4): 485–506.

Sueyoshi M. 2010. New records of sciomyzid flies from Japan. *Makunagi / Acta dipterologica*, **22**: 1–6.

Sueyoshi M. 2014. Family Sciomyzidae. *In*: **Nakamura T., Saigusa T. & Suwa M.** (Eds). *Catalogue of the insects of Japan*, **8**(2): 609–613. Entomological Society of Japan.

Vala J-C., Murphy W.L., Knutson L. & Rozkošný R. 2013. A cornucopia for Sciomyzidae (Diptera). *Studia dipterologica*, **19**(1/2): 67–137.

Yano K. 1978. Faunal and biological studies on the insects of paddy fields in Asia. Part I. Introduction and Sciomyzidae from Asia (Diptera). *Esakia*, **11**: 1–27.

Received 15 Oct. 2016 / Accepted 19 Dec. 2016
Editorial responsibility: D.A. Gapon