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**Records of the crane flies collected by
Malaise and Collision traps on Yakushima Island,
Japan, with an update species list of the Island
(Diptera: Tipuloidea)**

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Abstract. Tipuloidea on Yakushima Island were collected by Malaise and Collision traps. Eighty-five species were identified to species, and 58 of them were recorded from the island for the first time. Together with the previous records, a list of tipuloid species of Yakushima Island is updated.

Keywords: Kagoshima, Limoniidae, Pediciidae, Ryukyu Islands, Tipulidae.

Introduction

The superfamily Tipuloidea is one of the most diverse taxa of Diptera (Jong *et al.* 2008) and includes four families, Pediciidae, Limoniidae, Cylindrotomidae, and Tipulidae together comprising 15,686 species worldwide and 779 species in Japan (Oosterbroek 2023). They are considered as key consumers or preys in many ecosystems because of the extreme abundancy in many species and components in aquatic biomonitoring (Jong *et al.* 2008). Regional faunistic studies of this group are very few in Japan, and those of only a few individual prefectures or islands, have been well investigated (e.g. Kanagawa Prefecture: Nakamura & Waki (2004); Kato & Suzuki (2017); Suzuki & Hotta (2021); Suzuki *et al.* (2022); Ehime Prefecture: Alexander (1953); Alexander (1954); Kodakara Island: Kato *et al.* (2016); Ogasawara Islands: Nakamura & Sugiura (2010)). These records were based on identifications of the adults.

Yakushima Island is a granite island (ca. 505 km²) with 11 mountains higher than 1,500 m (max. 1,936 m). The island is located about 70 km south of Kyushu and just north of a biogeographical border, Watase line, bounding between the Palaearctic and Oriental regions (Fig. 1). Due to the unique fauna, flora, and scenery, the island was inscribed on the World Heritage List in 1993. Natural forests of an endemic conifer tree, *Cryptomeria japonica*, are one of the important elements for the inscription, but many of them as well as broad-leaved forests were logged and transformed into conifer plantations for wood productions (Agetsuma 2007). In terms of insect, approximately 1,900 species including many endemic ones are known in the island and the abundance of the biota is extremely high for such a small island (Okano 2013), but the faunistic information is still lacking in many taxa. There has been no faunistic study of Tipuloidea focused on the island other than a general catalog of insects on the island recorded 23 tipuloid species (Okadome 1973).

From 2006 to 2008, a large number of arthropods on Yakushima Island were collected by Malaise and window traps (partly supported by the research project “Sustainability and biodiversity assessment on forest utilization options” launched by the Research Institute for Humanity and Nature, Kyoto (2002–2008)), and the faunistic records of some taxa based on the specimens have been published: e.g. Watanabe & Yamauchi 2014 (Ichneumonidae); Ban & Yamauchi 2016 (Lygaeoidea); Osawa *et al.* 2017 (Araneae). Aggregating the records in different papers on Japanese crane flies, 31 species have been known from the island so far (Alexander 1930a, b; Oosterbroek 1985; Suetsugu *et al.* 2019; Kolcsár *et al.* 2020; Kato & Tachi 2020; Kato 2020, 2021, 2022). In this paper, in order to strengthen the knowledge of the unique fauna, we report the collecting data of Tipuloidea and update a list of the species on Yakushima Island.

Materials and Methods

Specimens were collected from Yakushima Islands using Townes-type Malaise traps (MT, 1.8 m height, 1.8 m width, and 1.8 m length: Fig. 2A) and IBOY-type window traps (WT: Fig. 2B). Locations of the traps and forest types in each location were as in Fig. 1 and Table 1. At each site, three Malaise traps and three window traps (Fig. 2B) were set about 20 m apart from one another from July 2006 to March 2008. The collecting bottles of the Malaise traps were filled with a mixture of 70% ethanol + a small amount of ethylene glycol for preservation, and were replaced about once a month by one of the author (TY), Kenshi Tetsuka, Tatsuko Tetsuka, and Toshihiro Saitou. The window traps were set with a bucket (about 50 cm diameter) containing 1.5 L water + 10 ml neutral detergent + 10% acetic acid solution and with crossed transparent acrylic boards (about 60 cm height) on the bucket and hung about 30 cm above the ground for three days per month (Fig. 2B). The samples were identified by one of the authors (DK) and are deposited in the Biosystematics Laboratory, Kyushu University, Fukuoka, Japan (BLKU). Specimens identified to species were listed below, and those with new records from Yakushima Island were symbolized with an asterisk at the end of the species name. The previous records of species from Yakushima Island were shown below each species name if any.

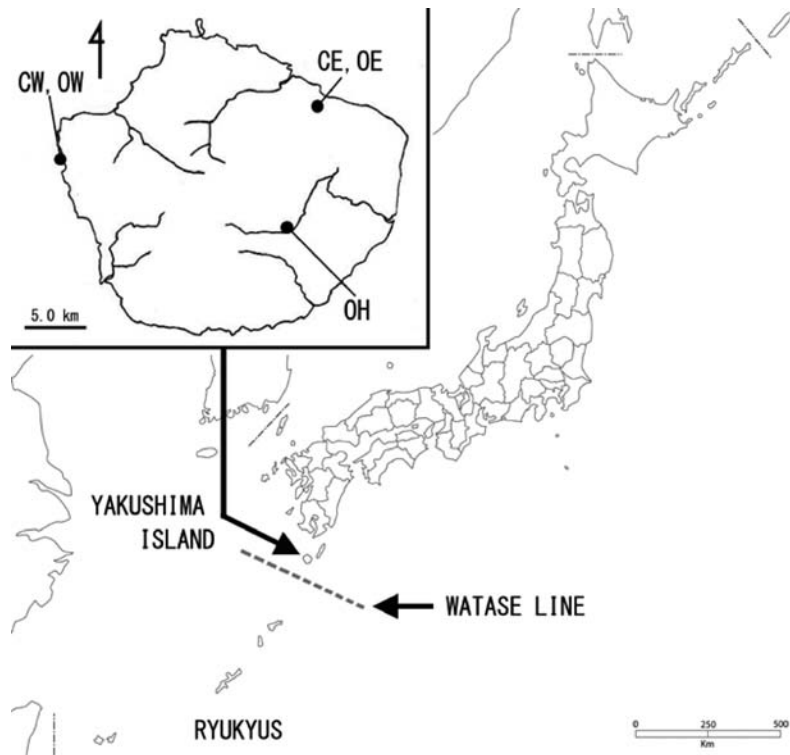


Figure 1. Locations of Yakushima Island, each collecting site, and Watase Line (after Watanabe & Yamauchi 2014).

Table 1. Location and forest type of the investigated sites in Yakushima Island, Japan. The codes of site follow the previous studies (e.g. Watanabe & Yamauchi 2014) and each alphabet means as follow: C, plantation of *Cryptomeria japonica*; E, eastern part of Yakushima Island; H, high elevation; O, old-growth evergreen broad-leaf forest; w, western part of Yakushima Island.

Code of site	Study site	Forest type	Altitude (m)
CE	Aikodake	Plantation of <i>Cryptomeria japonica</i> (40 years)	150
CW	Kankake	Plantation of <i>Cryptomeria japonica</i> (40 years)	220
OE	Aikodake	Old-growth evergreen broad-leaf forest	170
OW	Han-yama	Old-growth evergreen broad-leaf forest	250
OH	Arakawa	Mixed forest of evergreens, conifers, and broad-leaf Old-growth	1,200

Results

As a result of examining 4,550 specimens collected in this study, 4,279 specimens were identified to 84 species and 271 specimens undetermined as at least 14 additional species. Fifty-eight of them were newly recorded from Yakushima Island and were marked with an asterisk. Including the previous records, 92 species have been found on the islands in total and all of them are listed below.



Figure 2. Collecting traps set in the site, plantation of *Cryptomeria japonica* in Kankake (CW). A: Townes-type Malaise traps. B: IBOY-type window trap.

Family Pediciidae
Subfamily Pediciinae

1. *Dicranota (Rhaphidolabis) gibbera* (Alexander, 1921)

Dicranota (Amalopina) gibbera: Alexander 1930b: 508; Okadome 1973: 94.

Specimens examined: [CE] 1♂, 5–8.VI.2007 (MT). [OE] 1♂, 30.III–29.IV.2007 (MT). [OH] 1♀, 22.VII–22.VIII.2006 (MT); 15♂17♀, 25.IX–23.X.2006 (MT); 1♀, 23–26.X.2006 (CT); 1♂1♀, 4–7.VI.2007 (CT); 3♂1♀, 4–7.VI.2007 (MT); 6♂16♀, 7–28.VI.2007 (MT); 13♂41♀, 28.VI–29.VII.2007 (MT); 2♀, 26–29.VII.2007 (CT); 4♂7♀, 29.VII–25.VIII.2007 (MT); 4♂5♀, 28.IX–2.XI.2007 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, Russia, China, and Taiwan (Oosterbroek 2023).

2. *Tricyphona (Tricyphona) insulana* Alexander, 1913*

Specimens examined: [CE] 1♂1♀, 26.X–27.XI.2006 (MT); 1♀, 2.XI–1.XII.2007 (MT). [OW] 1♀, 27.X–28.XI.2006 (MT). [OH] 2♂, 26.X–27.XI.2006 (MT); 1♀, 30.XI–24.XII.2006 (MT); 1♀, 29.IV–2.V.2007 (CT); 1♂, 28.IX–2.XI.2007 (MT); 1♀, 2.XI–1.XII.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, and Russia (Oosterbroek 2023).

3. *Tricyphona (Tricyphona) yakushimana* Alexander, 1930

Tricyphona yakushimana: Alexander 1930b: 508; Okadome 1973: 94.

Distribution: Japan (Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

4. *Nipponomyia yakushimensis* Kolcsár and Kato, 2020*Nipponomyia yakushimensis*; Kolcsár *et al.* 2020: 98.**Specimens examined:** [OH] 1♀, 25.VIII–22.IX.2006 (MT); 1♀, 25.IX–23.X.2006 (MT); 3♂, 4–7.VI.2007 (CT).**Distribution:** Japan (Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).**5. *Pedicia (Amalopsis) seticauda* (Alexander, 1924)*****Specimens examined:** [OH] 2♂1♀, 25.IX–23.X.2006 (MT); 1♂, 29.IV–2.V.2007 (MT); 1♂, 28.IX–2.XI.2007 (MT).**Distribution:** Japan (Hokkaido, Honshu, Shikoku, and Kyushu) and Kuril Islands (Oosterbroek 2023).**Subfamily Uliinae****6. *Ula (Ula) bolitophila* Loew, 1869*****Specimens examined:** [OH] 1♂, 30.X–2.XI.2007 (MT).**Distribution:** Japan (Hokkaido and Ryukyu Islands: Yakushima Is.), Russia, Kazakhstan, and Europe (Oosterbroek 2023).**Family Limoniidae****Subfamily Dactylolabinae****7. *Dactylolabis (Dactylolabis) longicauda* Alexander, 1922***Dactylolabis (Dactylolabis) longicauda megastylata*: Alexander 1930b: 508, 521; Okadome 1973: 94.**Specimens examined:** [OH] 1♂1♀, 4–7.VI.2007 (CT); 1♂1♀, 7–28.VI.2007 (MT).**Distribution:** Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).**Subfamily Limnophilinae****8. *Afrolimnophila dicranophragmoides* (Alexander, 1924)*****Specimens examined:** [OH] 3♀, 22.VII–22.VIII.2006 (MT); 5♂6♀, 28.VI–29.VII.2007 (MT); 1♀, 26–29.VII.2007 (CT).**Distribution:** Japan (Ryukyu Islands: Yakushima Is. and Okinawa Is.) (Oosterbroek 2023).**9. *Austrolimnophila (Austrolimnophila) horii* (Alexander, 1925)***Pseudolimnophila horii*: Alexander 1930b: 508; Okadome 1973: 94.**Specimens examined:** [OE] 1♀, 1–27.III.2007 (MT); 1♀, 2–30.III.2008 (MT). [OW] 2♂, 28–31.III.2007 (CT); 1♂, 27.II–2.III.2008 (CT). [CW] 1♀, 2–28.III.2007 (MT); 2♂, 28–31.III.2007 (CT); 1♂1♀, 2–29.III.2008 (MT). [OH] 1♂, 29.IV–2.V.2007 (MT).**Distribution:** Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) (Suzuki & Hotta 2021; Oosterbroek 2023).

10. *Austrolimnophila (Austrolimnophila) kirishimensis (Alexander, 1925)**

Specimens examined: [OH] 2♂, 23–26.X.2006 (CT); 2♀, 26.X–27.XI.2006 (MT); 1♀, 27–30.XI.2006 (CT); 1♀, 25–38.XII.2006 (CT); 3♂, 30.X–2.XI.2007 (CT); 1♀, 2.XI–1.XII.2007 (MT); 2♀, 28.XI–1.XII.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

11. *Dicranophragma (Brachylimnophila) subnemorale (Alexander, 1924)*

Limnophila subnemoralis: Alexander 1930: 508; Okadome 1973: 94.

Dicranophragma (Brachylimnophila) subnemorale: Kato & Tachi 2018: 30.

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

12. *Dicranophragma (Dicranophragma) formosum (Alexander, 1920)**

Specimens examined: [CE] 1♀, 2.XI–1.XII.2007 (MT). [OH] 5♂1♀, 19–22.VII.2006 (CT); 1♂, 4–7.VI.2007 (MT); 2♂, 7–28.VI.2007 (MT); 14♂11♀, 28.VI–29.VII.2007 (MT); 1♂2♀, 26–29.VII.2007 (MT); 10♂7♀, 29.VII–25.VIII.2007 (MT); 1♂2♀, 25.VIII–28.IX.2007 (MT).

Distribution: Japan (Honshu and Ryukyu Islands: Yakushima Is. and Okinawa Is.), China, and Taiwan (Oosterbroek 2023).

13. *Eloeophila dietziana (Alexander, 1925)*

Eloeophila dietziana: Kato 2021: 432.

Specimens examined: [OW] 1♀, 28.IX–2.XI.2007 (MT). [CW] 1♂, 26.IX–24.X.2006 (MT); 1♂, 31.III–48.IV.2007 (MT); 1♂, 30.VII–25.VIII.2007 (MT). [OH] 1♂, 22.VII–22.VIII.2006 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima and Ishigaki Is.) and Kuril Islands (Oosterbroek 2023).

14. *Eloeophila kintaro (Alexander, 1957)*

Eloeophila kintaro: Kato 2021: 437.

Specimens examined: [OH] 2♂, 4–7.VI.2007 (CT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) (Kato 2021; Oosterbroek 2023).

15. *Epiphragma (Epiphragma) subinsigne Alexander, 1920**

Specimens examined: [CW] 1♂, 25.VIII–28.IX.2007(MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), South Korea, and Russia (Oosterbroek 2023).

16. *Hexatoma (Eriocera) gifuensis Alexander, 1933**

Specimens examined: [CW] 1♂2♀, 22.VII–22.VIII.2006 (MT); 1♀, 25.VIII–23.IX.2006 (MT); 1♂, 27–30.VII.2007 (CT).

Distribution: Japan (Honshu, Shikoku, and Ryukyu Islands) and South Korea (Oosterbroek 2023).

17. *Hexatoma (Hexatoma) japonica* Alexander, 1922*

Specimens examined: [OW] 1♂, 28.IX–2.XI.2007 (MT). [OH] 1♀, 22.VII–22.VIII.2006 (MT).

Distribution: Japan (Honshu, Shikoku, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

18. *Nippolimnophila yakushimensis* Alexander, 1930

Nippolimnophila yakushimensis: Alexander 1930a: 72; Alexander 1930b: 508; Okadome 1973: 94.

Specimens examined: [CE] 13♂, 29.I–26.II.2007 (MT); 12♂, 26.II–1.III.2007 (MT); 137♂, 1–27.III.2007 (MT); 3♂, 27–30.III.2007 (CT); 38♂, 30.III–29.IV.2007 (MT); 1♂, 2–10.V.2007 (MT); 2♂, 8–28.VI.2007 (MT); 1♂, 28.VI–29.VII.2007 (MT); 49♂, 2–30.III.2008 (MT). [OE] 1♂, 1–27.III.2007 (MT); 1♂, 2–30.III.2008 (MT). [CW] 1♂, 27.II–2.III.2007 (MT); 71♂, 2–28.III.2007 (MT); 4♂, 28–31.III.2007 (CT); 6♂, 31.III–28.IV.2007 (MT); 18♂, 2–29.III.2008 (MT). [OH] 4♂, 30.III–29.IV.2007 (MT); 15♂, 29.IV–2.V.2007 (CT); 15♂, 29.IV–2.V.2007 (MT); 8♂, 7–28.VI.2007 (MT).

Distribution: Japan (Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

19. *Paradelphomyia (Oxyrhiza) nipponensis* (Alexander, 1924)*

Specimens examined: [OH] 1♂, 25.IX–23.X.2006 (MT); 1♂, 4–7.VII.2007 (MT); 3♂3♀, 28.IX–2.XI.2007 (MT); 1♂1♀, 2.XI–1.XII.2007 (MT).

Distribution: Japan (Honshu and Ryukyu Islands: Yakushima Is.), Kuril Islands and China (Oosterbroek 2023).

20. *Prionolabis acutistylus* (Alexander, 1925)*

Specimens examined: [CW] 2♂, 2–28.III.2007 (MT); 3♂, 2–29.III.2008 (MT). [OH] 1♂, 27–30.III.2007 (CT); 8♂1♀, 30.III–29.IV.2007 (MT).

Distribution: Japan (Shikoku, Kyushu, and Ryukyu Islands) (Oosterbroek 2023).

21. *Prionolabis lipophleps* (Alexander, 1930)

Prionolabis lipophleps: Alexander 1930b: 508, 522; Okadome 1973: 94.

Specimens examined: [CE] 2♂, 29.I–26.II.2007 (MT); 2♂, 26.II–1.III.2007 (MT); 2♂, 27.II–2.III.2008 (CT). [OE] 1♂1♀, 29.I–26.II.2007 (MT); 1♀, 27.II–2.III.2008 (CT); 3♂2♀, 2–30.III.2008 (MT). [OW] 1♂, 29.I–27.II.2007 (MT); 1♂, 27.II–2.III.2007 (MT); 17♂6♀, 2–28.III.2007 (MT); 4♂1♀, 28–31.III.2007 (MT); 1♂2♀, 31.III–28.IV.2007 (MT); 4♂, 2–29.III.2008 (CT). [CW] 1♂, 29.I–27.II.2007 (MT); 13♂3♀, 2–28.III.2007 (MT); 1♂, 31.III–28.IV.2007 (MT); 17♂4♀, 2–29.III.2008 (MT). [OH] 17♂3♀, 30.III–29.IV.2007 (MT); 5♂4♀, 29.IV–2.V.2007 (MT); 17♂3♀, 30.III–29.IV.2007 (MT); 67♂7♀, 49.IV–2.V.2007 (CT).

Distribution: Japan (Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

22. *Prionolabis submunda* (Alexander, 1918)

Prionolabis submunda: Alexander 1930b: 508; Okadome 1973: 94.

Specimens examined: [CE] 2♂, 1–27.III.2007 (MT). [CW] 1♂, 2–28.III.2007 (MT);

8♂, 28–31.III.2007 (CT); 1♂1♀, 31.III–28.IV.2007 (MT). [OH] 5♂, 29.IV–2.V.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

23. *Taiwanomyia flicornis* (Alexander, 1924)*

Specimens examined: [CW] 1♂, 19–22.VII.2006 (MT); 1♀, 28.IV–1.V.2007 (CT). [OH] 2♀, 22.VII–22.VIII.2006 (MT); 1♀, 26–29.VII.2007 (CT).

Distribution: Japan (Honshu and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

24. *Utomorpha polytricha* Alexander, 1930

Utomorpha polytricha: Alexander 1930a: 72; Alexander 1930b: 508; Okadome 1973: 94; Kato *et al.* 2020: 159.

Specimens examined: [OW] 3♀, 28–31.III.2007 (CT). [CW] 1♀, 31.III–28.IV.2007 (MT); [OH] 5♂, 4–7.VI.2007 (CT).

Distribution: Japan (Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

Subfamily Chioneinae

25. *Atarba (Atarbodes) minuticornis* Alexander, 1930

Atarba (Atarbodes) minuticornis: Alexander 1930b: 508, 526; Okadome 1973: 94.

Specimens examined: [CE] 3♂2♀, 25.VIII–22.IX.2006 (MT); 3♂3♀, 25.IX–23.X.2006 (MT); 1♀, 26.X–27.XI.2006 (MT); 1♂, 30.III–29.IV.2007 (MT); 3♂1♀, 29.IV–2.V.2007 (MT); 6♂, 29.IV–2.V.2007 (CT); 6♂2♀, 2–10.V.2007 (MT); 1♂, 5–8.VI.2007 (CT); 1♂2♀, 8–28.VI.2007 (MT); 3♂, 29.VII–25.VIII.2007 (MT); 5♂, 28.IX–2.XI.2007 (MT); 1♀, 30.X–2.XI.2007 (MT). [OE] 2♂1♀, 22.VII–22.VIII.2006 (MT); 3♀, 25.VIII–22.IX.2006 (MT); 1♀, 23–26.X.2006 (MT); 2♀, 26.X–27.XI.2006 (MT); 1♂, 30.III–29.IV.2007 (MT); 2♂, 29.IV–2.V.2007 (MT); 2♂2♀, 29.IV–2.V.2007 (MT); 1♀, 4–7.VI.2007 (MT); 1♀, 8–28.VI.2007 (MT); 1♀, 28.VI–29.VII.2007 (MT); 1♀, 29.VII–25.VIII.2007 (MT); 1♂1♀, 25.VIII–28.IX.2007 (MT); 2♂3♀, 28.IX–2.XI.2007 (MT). [OW] 3♀, 25.VIII–23.IX.2006 (MT); 1♂1♀, 23–26.IX.2006 (MT); 8♂5♀, 26.IX–24.X.2006 (MT); 1♀, 27.X–28.XI.2006 (MT); 1♂, 28.VI–30.VII.2007 (MT); 1♂1♀, 28.IX–2.XI.2007 (MT); 1♀, 2.XI–1.XII.2007 (MT). [CW] 1♂6♀, 26.IX–24.X.2006 (MT); 1♀, 27.X–28.XI.2006 (MT); 1♂, 31.III–28.IV.2007 (MT); 1♀, 25–28.IX.2007 (CT); 3♀, 28.IX–2.XI.2007 (MT). [OH] 1♀, 23–26.X.2006 (MT); 1♀, 26.X–27.XI.2006 (MT); 3♂2♀, 28.VI–29.VII.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

26. *Cheilotrichia (Empeda) microtrichiata* (Alexander, 1930)

Erioptera (Empeda) microtrichiata: Alexander 1930b: 508, 526; Okadome 1973: 94.

Distribution: Japan (Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

27. *Cladura decemnotata* Alexander, 1925*

Specimens examined: [OH] 6♂, 23–26.X.2006 (CT); 4♀, 26.X–27.XI.2006 (MT); 1♀, 27–30.XI.2006 (MT); 3♂, 30.X–2.XI.2007 (MT); 4♀, 2.XI–1.XII.2007 (MT).

Distribution: Japan (Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

28. *Cladura microphallus* Alexander, 1955*

Specimens examined: [OH] 1♂, 28.XI–1.XII.2007 (CT).

Distribution: Japan (Shikoku and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

29. *Erioptera (Erioptera) alboguttata daisenica* Alexander, 1936*

Specimens examined: [OH] 1♂, 25.VIII–22.IX.2006 (MT); 1♀, 28.VI–29.VII.2007 (MT); 1♀, 29.VII–25.VIII.2007 (MT); 4♀, 25.VIII–28.IX.2007 (MT).

Distribution: Japan (Honshu and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

30. *Erioptera (Tasiocerodes) persessilis* Alexander, 1958*

Specimens examined: [CW] 2♂1♀, 28.VI–30.VII.2007 (MT).

Distribution: Japan (Honshu and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

31. *Gymnastes (Paragymnastes) flavitibia flavitibia* (Alexander, 1919)*

Specimens examined: [CE] 1♀, 19–22.VII.2006 (CT); 3♀, 22.VII–22.VIII.2006 (MT); 5♂3♀, 25.VIII–22.IX.2006 (MT); 1♂, 5–8.VI.2007 (CT); 1♂, 5–8.VI.2007 (MT); 5♂13♀, 8–28.VI.2007 (MT); 10♂7♀, 28.VI–29.VII.2007 (MT); 3♂4♀, 29.VII–25.VIII.2007 (MT); 13♂15♀, 25.VIII–28.IX.2007 (MT). [OE] 2♂3♀, 25.VIII–22.IX.2006 (MT); 1♂, 28.VI–29.VII.2007 (MT); 1♂, 29.VII–25.VIII.2007 (MT); 3♂1♀, 25.VIII–28.IX.2007 (MT). [OW] 3♀, 28.VI–30.VII.2007 (MT); 1♂, 25.VIII–28.IX.2007 (MT). [CW] 1♂, 19–22.VII.2006 (MT); 1♂, 30.VII–25.VIII.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) and Kuril Islands (Oosterbroek 2023).

32. *Molophilus (Molophilus) pegasus* Alexander, 1913*

Specimens examined: [OE] 1♂, 29.I–26.II.2007 (MT); 1♂1♀, 26.II–1.III.2007 (MT); 21♂22♀, 1–27.III.2007 (MT); 1♀, 27–30.III.2007 (CT); 45♂43♀, 2–30.III.2008 (MT). [OH] 2♂, 30.III–29.IV.2007 (MT); 2♂, 49.IV–2.V.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

33. *Molophilus (Molophilus) triflatus* Alexander, 1920*

Specimens examined: [OW] 2♀, 26.IX–24.X.2006 (MT); 1♀, 28.IX–2.XI.2007 (MT). [CW] 2♂3♀, 26.IX–24.X.2006 (MT); 1♂, 28.IV–1.V.2007 (CT); 1♂1♀, 28.IX–2.XI.2007 (MT).

Distribution: Japan (Honshu, Shikoku, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

34. *Ormosia (Ormosia) remissa* Alexander, 1953*

Specimens examined: [OH] 1♂, 25.IX–23.X.2006 (MT); 1♂4♀, 28.IX–2.XI.2007 (MT).

Distribution: Japan (Shikoku and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

35. *Ormosia (Ormosia) takeuchii* Alexander, 1921*

Specimens examined: [CW] 1♂, 26.IX–24.X.2006 (MT);); 1♂, 27.X–28.XI.2006 (MT);); 2♂, 29.I–27.II.2007 (MT); 1♂, 31.III–28.IV.2007 (MT);); 1♂, 2–29.III.2008 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) and Kuril Islands (Oosterbroek 2023).

36. *Ormosia (Parormosia) diversipes* Alexander, 1919*

Specimens examined: [CE] 1♀, 26.X–27.XI.2006 (MT); 1♂, 28.IX–2.XI.2007 (MT); 1♀, 2.XI–1.XII.2007 (MT). [OE] 1♂, 2–30.III.2008 (MT). [OW] 1♂, 26.IX–24.X.2006 (MT); 2♂1♀, 27.X–28.XI.2006 (MT); 1♀, 28.XI–1.XII.2007 (MT). [CW] 2♀, 27.X–28.XI.2006 (MT). [OH] 1♀, 25.VIII–22.IX.2006 (MT); 3♂7♀, 25.IX–23.X.2006 (MT); 2♀, 26.X–27.XI.2006 (MT); 2♀, 30.III–29.IV.2007 (MT); 1♀, 30.III–29.IV.2007 (MT); 1♀, 7–28.VI.2007 (MT); 1♂, 25.VIII–28.IX.2007 (MT); 21♂22♀, 28.IX–2.XI.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, Ryukyu Islands: Yakushima Is.), Kuril Islands, and Russia (Oosterbroek 2023).

37. *Styringomyia digistostylus* Hynes, 1987*

Specimens examined: [CE] 6♂15♀, 19–22.VII.2006 (MT); 73♂161♀, 22.VII–22.VIII.2006 (MT); 11♀, 22–25.VIII.2006 (MT); 24♂32♀, 25.VIII–22.IX.2006 (MT); 1♀, 22–25.IX.2006 (CT); 67♂91♀, 25.IX–23.X.2006 (MT); 4♂5♀, 5–8.VI.2007 (MT); 2♂, 5–8.VI.2007 (CT); 4♂23♀, 8–28.VI.2007 (MT); 42♂30♀, 28.VI–29.VII.2007 (MT); 15♂8♀, 26–29.VII.2007 (CT); 89♂54♀, 29.VII–25.VIII.2007 (MT); 8♂4♀, 22–25.VIII.2007 (CT); 42♂35♀, 25.VIII–28.IX.2007 (MT); 5♂23♀, 28.IX–2.XI.2007 (MT). [OE] 10♂36♀, 19–22.VII.2006 (MT); 14♂95♀, 22.VII–22.VIII.2006 (MT); 6♀, 22–25.VIII.2006 (MT); 3♂32♀, 25.VIII–22.IX.2006 (MT); 6♀, 25.IX–23.X.2006 (MT); 1♂10♀, 8–28.VI.2007 (MT); 1♂11♀, 28.VI–29.VII.2007 (MT); 1♂13♀, 29.VII–25.VIII.2007 (MT); 21♀, 25.VIII–28.IX.2007 (MT); 22♀, 28.IX–2.XI.2007 (MT). [OW] 2♂1♀, 19–22.VII.2006 (CT); 1♂4♀, 19–22.VII.2006 (MT); 3♂29♀, 22.VII–22.VIII.2006 (MT); 2♂8♀, 25.VIII–23.IX.2006 (MT); 1♂1♀, 23–26.IX.2006 (CT); 30♂21♀, 26.IX–24.X.2006 (MT); 1♀, 5–8.VI.2007 (MT); 1♀, 8–28.VI.2007 (MT); 11♂10♀, 28.VI–30.VII.2007 (MT); 1♂2♀, 27–30.VII.2007 (MT); 4♂7♀, 30.VII–25.VIII.2007 (MT); 15♂29♀, 25.VIII–28.IX.2007 (MT); 15♂22♀, 28.IX–2.XI.2007 (MT). [CW] 1♂, 19–22.VII.2006 (CT); 3♂17♀, 19–22.VII.2006 (MT); 3♂39♀, 22.VII–22.VIII.2006 (MT); 2♀, 22–25.VIII.2006 (MT); 2♂17♀, 25.VIII–23.IX.2006 (MT); 1♂5♀, 26.IX–24.X.2006 (MT); 1♀, 8–28.VI.2007 (MT); 1♀, 30.VII–25.VIII.2007 (MT); 1♂, 25.VIII–28.IX.2007 (MT); 2♀, 28.IX–2.XI.2007 (MT).

Distribution: Japan (Ryukyu Islands: Yakushima Is. and Iriomote Is.) and Russia (Oosterbroek 2023).

38. *Styringomyia siberiensis* Alexander, 1935*

Specimens examined: [OE] 2♀, 25.VIII–28.XI.2007 (MT). [OW] 1♀, 19–22.IX.2006 (CT); 1♂, 25.VIII–23.XI.2006 (MT); 1♂3♀, 26.IX–24.X.2006 (MT); 3♂5♀, 28.VI–30.

VII.2007 (MT); 2♂1♀, 30.VII–25.VIII.2007 (MT); 3♂2♀, 25.VIII–28.IX.2007 (MT); 4♂5♀, 28.IX–2.XI.2007 (MT).

Distribution: Japan (Honshu and Ryukyu Islands: Yakushima Is.) and Russia (Oosterbroek 2023; Kato 2023).

39. *Teucholabis (Teucholabis) yezoensis* Alexander, 1924*

Specimens examined: [OE] 1♀, 5–8.VI.2007 (MT); 1♂, 8–28.VI.2007 (MT).

Distribution: Japan (Hokkaido, Honshu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

Subfamily Limoniinae

40. *Achyrolimonia monacantha* (Alexander, 1924)

Limonia (Limonia) monacantha: Alexander 1930b: 508; Okadome 1973: 93.

Specimens examined: [CE] 1♀, 2.XI–1.XII.2007 (MT). [OW] 1♀, 27–30.XII.2007 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), South Korea, China, and Russia (Oosterbroek 2023).

41. *Antocha (Antocha) gracillima* Alexander, 1924*

Specimens examined: [CW] 1♂, 28.XII.2006–26.I.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, South Korea, Russia, China, and Taiwan (Oosterbroek 2023).

42. *Antocha (Orimargula) subconfluenta* Alexander, 1930

Antocha (Antocha) subconfluenta: Alexander 1930b: 508, 516; Okadome 1973: 94.

Specimens examined: [OW] 1♂, 25.VIII–23.IX.2006 (MT); 1♂1♀, 28.IX–2.XI.2007 (MT). [CW] 1♂, 22.VII–22.VIII.2006 (MT); 1♀, 25.VIII–23.IX.2006 (MT); 1♀, 30.VII–25.VIII.2007 (MT).

Distribution: Japan (Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

43. *Atypophthalmus (Atypophthalmus) hymenophallus* Kato, 2022

Atypophthalmus (Atypophthalmus) hymenophallus: Kato 2022: 126.

Specimens examined: [CE] 1♂1♀, 22.VII–22.VIII.2006 (MT). [OE] 1♂, 19–22.VII.2006 (MT); 3♂1♀, 22.VII–22.VIII.2006 (MT); 2♂, 30.III–29.IV.2007 (MT); 1♂, 2–28.VI.2007 (MT); 8♂1♀, 28.VI–29.VII.2007 (MT); 1♂, 29.VII–25.VIII.2007 (MT); 1♂1♀, 25.VIII–28.IX.2007 (MT); 2♂, 28.IX–2.XI.2007 (MT). [OW] 1♂, 25.VIII–23.IX.2006 (MT); 3♂1♀, 2–28.VI.2007 (MT); 4♂, 28.VI–30.VII.2007 (MT); 1♂, 30.VII–25.VIII.2007 (MT); 3♂1♀, 25.VIII–28.IX.2007 (MT); 1♂, 28.IX–2.XI.2007 (MT). [CW] 1♂, 19–22.VII.2006 (MT); 1♂1♀, 22.VII–22.VIII.2006 (MT); 1♀, 25.VIII–23.IX.2006 (MT); 1♀, 27.X–28.XI.2006 (MT); 2♂, 31.III–28.IV.2007 (MT); 2♂, 8–28.VI.2007 (MT); 1♂, 28.VI–30.VII.2007 (MT); 2♂, 30.VII–25.VIII.2007 (MT); 1♂, 25.VIII–28.IX.2007 (MT). [OH] 1♂, 22.VII–22.VIII.2006 (MT); 2♂, 25.VIII–22.IX.2006 (MT); 1♂, 29.VII–25.VIII.2007 (MT); 3♂, 28.VIII–29.IX.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima,

Amami, Tokunoshima, Okinawa, and Iriomote Is.) (Oosterbroek 2023).

44. *Atypophthalmus (Atypophthalmus) stylacanthus (Alexander, 1971)**

Specimens examined: [CE] 1♂, 22.VII–22.VIII.2006 (MT); 1♂, 29.VII–25.VIII.2007 (MT). [OE] 1♀, 22.VII–22.VIII.2006 (MT); 1♂, 25.VIII–28.IX.2007 (MT). [CW] 1♂, 25.VIII–28.IX.2007 (MT).

Distribution: Japan (Honshu, Kyushu, and Ryukyu Islands: Yakushima Is.), North Korea, South Korea, and Russia (Oosterbroek 2023).

45. *Atypophthalmus (Microlimonia) inelegans (Alexander, 1924)**

Specimens examined: [CE] 1♀, 19–22.VII.2006 (MT); 5♂2♀, 22.VII–22.VIII.2006 (MT); 3♂, 22–25.VIII.2006 (MT); 2♂2♀, 25.VIII–22.IX.2006 (MT); 1♂1♀, 25.XI–23.X.2006 (MT); 1♂, 30.III–29.IV.2007 (MT); 1♀, 29.IV–2.V.2007 (MT); 1♂1♀, 2–10.V.2007 (MT); 2♀, 5–8.VI.2007 (CT); 2♂1♀, 8–28.VI.2007 (MT); 4♂, 28.VI–29.VII.2007 (MT); 4♂, 29.VII–25.VIII.2007 (MT); 7♂3♀, 25.VIII–28.IX.2007 (MT); 1♀, 28.IX–2.XI.2007 (MT). [OE] 1♂2♀, 19–22.VII.2006 (MT); 3♂1♀, 22.VII–22.VIII.2006 (MT); 2♂, 25.VIII–22.IX.2006 (MT); 1♀, 25.IX–23.X.2006 (MT); 1♀, 29.IV–2.V.2007 (CT); 3♀, 28.VI–29.VII.2007 (MT); 2♂1♀, 29.VII–25.VIII.2007 (MT); 7♂2♀, 25.VIII–28.IX.2007 (MT); 4♂5♀, 28.IX–2.XI.2007 (MT); 1♀, 2.XI–1.XII.2007 (MT). [OW] 1♀, 19–22.VII.2006 (CT); 4♂1♀, 22.VII–22.VIII.2006 (MT); 2♂, 25.VIII–23.IX.2006 (MT); 1♂1♀, 26.IX–24.X.2006 (MT); 2♂, 31.III–28.IV.2007 (MT); 3♂1♀, 8–28.VI.2007 (MT); 2♂1♀, 28.VI–30.VII.2007 (MT); 2♂2♀, 30.VII–25.VIII.2007 (MT); 9♂3♀, 25.VIII–28.IX.2007 (MT); 12♂2♀, 28.IX–2.XI.2007 (MT). [CW] 2♂2♀, 26.IX–24.X.2006 (MT); 1♂, 8–28.VI.2007 (MT); 2♂1♀, 30.VII–25.VIII.2007 (MT); 1♂2♀, 25.VIII–28.IX.2007 (MT); 1♂3♀, 28.IX–2.XI.2007 (MT). [OH] 2♂2♀, 22.VII–22.VIII.2006 (MT); 2♀, 25.VIII–22.IX.2006 (MT); 7♂3♀, 28.VI–29.VII.2007 (MT); 6♂2♀, 29.VII–25.VIII.2007 (MT); 4♂3♀, 25.VIII–28.IX.2007 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, South Korea, China, and Russia (Oosterbroek 2023).

46. *Atypophthalmus (Microlimonia) jeju Podenas and Podeniene, 2020**

Specimens examined: [CE] 1♀, 25.IX–23.X.2006 (MT); 1♀, 28.VI–29.VII.2007 (MT); 1♂1♀, 28.IX–28.XI.2007 (MT). [OE] 1♀, 25.IX–23.X.2006 (MT); 1♀, 23–26.X.2006 (CT); 2♂, 28.VI–29.VII.2007 (MT); 1♂, 29.VII–25.VIII.2007 (MT); 1♂, 28.IX–2.XI.2007 (MT). [OW] 1♀, 25.VIII–23.IX.2006 (MT); 1♂, 26.IX–24.X.2006 (MT); 1♂, 31.III–28.IV.2007 (MT); 1♂, 28.IV–1.V.2007 (MT); 5♀, 28.VI–30.VII.2007 (MT); 1♀, 25.VIII–28.IX.2007 (MT); 2♀, 28.IX–2.XI.2007 (MT). [CW] 1♀, 22.VII–22.VIII.2006 (MT); 1♀, 26.IX–24.X.2006 (MT); 1♂, 31.III–28.IV.2007 (MT); 1♀, 28.VI–30.VII.2007 (MT); 1♂1♀, 30.VII–25.VIII.2007 (MT); 2♂5♀, 25.VIII–28.IX.2007 (MT). [OH] 1♀, 25.VIII–22.IX.2006 (MT).

Distribution: Japan (Honshu, Kyushu, and Ryukyu Islands: Amami, Tokunoshima, Okinawa, Ishigaki, and Iriomote Is.) and South Korea (Oosterbroek 2023).

47. *Atypophthalmus (Microlimonia) machidai (Alexander, 1921)*

Limonia (Limonia) machidai: Alexander 1930b: 508; Okadome 1973: 93.

Atypophthalmus (Microlimonia) machidai: Kato 2022: 136.

Specimens examined: [CE] 1♀, 28.VI–29.VII.2007 (MT). [OW] 1♀, 27.X–28.XI.2006 (MT). [OH] 1♀, 19–22.VII.2006 (CT); 1♀, 28.VI–29.VII.2007 (MT); 1♂, 29.VII–25.VIII.2007 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, China, North Korea, South Korea, Russia, and Europe (Oosterbroek 2023).

48. *Dicranomyia (Dicranomyia) tristina* (Alexander, 1930)

Limonia (Limonia) tristina: Alexander 1930b: 508, 512; Okadome 1973: 93.

Distribution: Japan (Shikoku and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

49. *Dicranomyia (Dicranomyia) yakushimensis* Alexander, 1930

Limonia (Limonia) yakushimensis: Alexander 1930b: 508, 511; Okadome 1973: 93.

Specimens examined: [CE] 3♂1♀, 25.VIII–22.IX.2006 (MT); 2♀, 25.IX–23.X.2006 (MT); 1♂, 26.X–27.XI.2006 (MT); 2♂, 1–27.III.2007 (MT); 1♀, 30.III–29.IV.2007 (MT); 1♂, 28.VI–29.VII.2007 (MT); 1♂, 29.VII–25.VIII.2007 (MT); 1♂1♀, 25.VIII–28.IX.2007 (MT); 2♀, 29.IX–2.XI.2007 (MT). [OE] 1♂1♀, 25.VIII–28.IX.2007 (MT); 1♂1♀, 22.VII–22.VIII.2006 (MT); 3♂2♀, 30.III–29.IV.2007 (MT); 1♂5♀, 29.IV–2.V.2007 (MT); 2♂5♀, 8–28.VI.2007 (MT); 2♂1♀, 29.VI–29.VII.2007 (MT); 1♂2♀, 29.VII–25.VIII.2007 (MT); 2♂4♀, 25.VIII–28.IX.2007 (MT); 1♂3♀, 28.IX–2.XI.2007 (MT); 2♂2♀, 2.XI–1.XII.2007 (MT); 1♀, 2–30.III.2008 (MT). [CW] 1♂, 8–28.VI.2007 (MT); 1♂1♀, 25.VIII–28.IX.2007 (MT); 1♂, 30.VII–25.VIII.2007 (MT); 1♂, 28.IX–2.XI.2007 (MT). [OH] 1♂, 22.VII–22.VIII.2006 (MT); 1♀, 22.VII–22.VIII.2006 (MT); 1♂, 7–28.VI.2007 (MT).

Distribution: Japan (Honshu, Kyushu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

50. *Dicranomyia (Erostrata) globulithorax* Alexander, 1924*

Specimens examined: [CE] 1♂, 22.VII–22.VIII.2006 (MT); 3♂, 29.VII–25.VIII.2007 (MT). [OE] 1♂, 25.VIII–28.IX.2007 (MT). [OW] 1♂, 30.VII–25.VIII.2007 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, and Ryukyu Islands: Yakushima Is.), Kuril Islands, South Korea, and Russia (Oosterbroek 2023).

51. *Dicranomyia (Erostrata) submelas* Kato, Tachi & Gelhaus, 2018*

Specimens examined: [CE] 1♀, 25.VIII–22.IX.2006 (MT). [OW] 1♂1♀, 22.VII–22.VIII.2006 (MT); 3♂, 25.VIII–28.IX.2007 (MT); 1♂, 28.IX–2.XI.2007 (MT). [CW] 1♂, 26.IX–24.X.2006 (MT). [OH] 1♀, 22.VII–22.VIII.2006 (MT); 4♂, 25.VIII–22.IX.2006 (MT); 1♂, 25.IX–23.X.2006 (MT); 3♂, 28.VI–29.VII.2007 (MT); 5♂1♀, 29.VII–25.VIII.2007 (MT); 21♂2♀, 25.VIII–28.IX.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) and South Korea (Oosterbroek 2023).

52. *Dicranomyia (Erostrata) tabashii* (Alexander, 1934)*

Specimens examined: [OH] 1♂, 22.VII–22.VIII.2006 (MT); 19♂, 25.VIII–22.IX.2006

(MT); 8♂, 25.IX–23.X.2006 (MT); 8♂, 29.VII–25.VIII.2007 (MT); 56♂, 25.VIII–28.IX.2007 (MT); 17♂, 28.IX–2.XI.2007 (MT).

Distribution: Japan (Honshu, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, North Korea, South Korea, and Russia (Oosterbroek 2023).

53. *Dicranomyia (Erostrata) yazuensis* Kato, Tachi & Gelhaus, 2018*

Specimens examined: [OH] 2♂, 22.VII–22.VIII.2006 (MT); 6♂, 25.VIII–22.IX.2006 (MT); 2♂, 28.VI–29.VII.2007 (MT); 1♂, 29.VII–25.VIII.2007 (MT); 2♂, 25.VIII–28.IX.2007 (MT).

Distribution: Japan (Honshu and Ryukyu Islands: Yakushima Is.) and South Korea (Oosterbroek 2023).

54. *Dicranomyia (Glochina) basifusca* Alexander, 1919*

Specimens examined: [CE] 1♀, 30.III–29.IV.2007 (MT); 1♀, 30.VII–25.VIII.2007 (MT). [OW] 1♂, 26.IX–24.X.2006 (MT); 1♂, 27.X–28.XI.2006 (MT); 1♀, 29.VII–25.VIII.2007 (MT); 1♀, 28.XI–1.XII.2006 (MT); 1♂, 28.VI–30.VII.2007 (MT); 1♀, 28.IX–2.XI.2007 (MT); 1♂, 2.XI–1.XII.2007 (MT); 2♂, 28.XI–1.XII.2007 (CT); 1♂1♀, 30.XII–29.I.2008 (MT). [CW] 1♀, 25.VIII–23.IX.2006 (MT).

Distribution: Japan (Honshu, Ogasawara Islands, and Ryukyu Islands: Yakushima and Kodakara Is.) (Suzuki *et al.* 2022; Oosterbroek 2023).

55. *Dicranomyia (Melanolimonia) paramorio* Alexander, 1926

Limonia (Dicranomyia) paramorio: Alexander 1930b: 508; Okadome 1973: 93.

Specimens examined: [CW] 1♂, 28.III–31.IV.2007 (MT).

Distribution: Japan (Kyushu, Ryukyu Islands: Yakushima Is.), South Korea, Russia, China, and Taiwan (Oosterbroek 2023).

56. *Discobola margarita* Alexander, 1924

Limonia (Discobola) margarita: Alexander 1930b: 508; Okadome 1973: 93.

Specimens examined: [CE] 1♂, 27–30.III.2007 (CT); 1♀, 5–8.VI.2007 (CT); 2♂1♀, 30.X–2.XI.2007 (CT). [OE] 1♂, 25.VIII–22.IX.2006 (MT); 1♀, 28.IX–2.XI.2007 (MT); 1♂1♀, 30.X–2.XI.2007 (MT). [OW] 1♂, 23–26.IX.2006 (CT); 1♂, 26.IX–24.X.2006 (MT); 1♂, 28.XI–1.XII.2006 (MT); 1♂, 2–28.III.2007 (MT); 1♂, 28–31.III.2007 (CT); 1♀, 2.XI–1.XII.2007 (MT). [CW] 1♂, 23–26.IX.2006 (CT); 2♂, 27.X–28.XI.2006 (MT); 1♂, 26–29.VII.2007 (CT); 1♂1♀, 29.VII–25.VIII.2007 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, North Korea, South Korea, Russia, Taiwan, and Thailand (Oosterbroek 2023).

57. *Elephantomyia (Elephantomyia) takachihoi* Ito, 1948*

Specimens examined: [CW] 1♀, 27–30.XII.2007 (CT). [OH] 1♀, 28.XI–1.XII.2007 (CT).

Distribution: Japan (Honshu, Kyushu, and Ryukyu Islands: Yakushima Is.) (Suzuki *et al.* 2022; Oosterbroek 2023).

58. *Elephantomyia (Elephantomyodes) sopherarum* Ito, 1948*

Specimens examined: [CE] 3♂2♀, 19–22.VII.2006 (MT); 1♂1♀, 22.VII–22.VIII.2006 (MT); 1♀, 25.VIII–22.IX.2006 (MT); 1♂1♀, 28.VI–29.VII.2007 (MT); 1♀, 26–29.VII.2007 (CT); 1♀, 25.VIII–28.IX.2007 (MT). [OE] 1♂, 19–22.VII.2006 (MT); 1♀, 22.VII–22.VIII.2006 (MT); 1♀, 25.VIII–22.IX.2006 (MT); 2♀, 28.VI–29.VII.2007 (MT); 1♀, 29.VII–25.VIII.2007 (MT); 1♀, 25.VIII–28.IX.2007 (MT). [OW] 1♀, 25.VIII–23.IX.2006 (MT); 1♂, 25–28.VI.2007 (CT); 1♀, 28.VI–30.VII.2007 (MT); 6♂2♀, 30.VII–25.VIII.2007 (MT); 2♂4♀, 25.VIII–28.IX.2007 (MT). [CW] 3♂2♀, 19–22.VII.2006 (MT); 2♂, 22.VII–22.VIII.2006 (MT); 1♀, 25.VIII–23.IX.2006 (MT); 1♀, 8–28.VI.2007 (MT); 1♀, 25.VIII–28.IX.2007 (MT). [OH] 1♂, 28.VI–29.VII.2007 (MT).

Distribution: Japan (Honshu, Kyushu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

59. *Geranomyia avocetta* Alexander, 1913

Geranomyia avocetta: Kato 2021: 188.

Specimens examined: [OW] 1♂1♀, 2.XI–1.XII.2007 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) and Russia (Oosterbroek 2023).

60. *Geranomyia gifuensis* Alexander, 1921*

Specimens examined: [OW] 1♀, 26.IX–24.X.2006 (MT); 1♀, 31.III–28.IV.2007 (MT); 1♂, 28.VI–30.VII.2007 (MT); 2♂1♀, 2.XI–1.XII.2007 (MT); 1♂, 28.XI–1.XII.2007 (CT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, North Korea, South Korea, and Russia (Oosterbroek 2023).

61. *Geranomyia multipuncta* Alexander, 1922

Geranomyia multipuncta: Kato 2021: 192.

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) and South Korea (Oosterbroek 2023).

62. *Geranomyia paucipuncta* Kato, 2021

Geranomyia paucipuncta: Kato 2021: 185.

Specimens examined: [OW] 1♂, 2.XI–1.XII.2007 (MT); 1♂, 2–29.III.2008 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima, Amami, Tokunoshima, and Okinawa Is.) (Oosterbroek 2023).

63. *Geranomyia pictorum* (Alexander, 1929)

Geranomyia pictorum: Kato 2020: 26.

Distribution: Japan (Ryukyu Islands: Yakushima Is.), Taiwan, and India (Oosterbroek 2023).

64. *Geranomyia radialis* (Alexander, 1930)

Geranomyia radialis: Alexander 1930b: 508; Okadome 1973: 93.

Specimens examined: [OW] 1♂, 27.X–28.XI.2006 (MT); 2♂1♀, 2.XI–1.XII.2007 (MT). [OH] 2♀, 25.VIII–22IX.2006 (MT); 1♀, 29.VII–25.VIII.2007 (MT).

Distribution: Japan (Ryukyu Islands: Yakushima, Amami, Tokunoshima, Okinawa, and Iriomote Is.), China, and Taiwan (Oosterbroek 2023).

65. *Geranomyia sparsiguttata* (Alexander, 1937)

Geranomyia sparsiguttata: Kato 2020: 28.

Specimens examined: [OW] 1♀, 26.IX–24.X.2006 (MT); 1♂, 25–28.XII.2006 (CT); 1♂, 28.XII.2006–26.I.2007 (MT); 1♂, 28.IX–2.XI.2007 (MT); 3♂, 2.XI–1.XII.2007 (MT). [OH] 1♀, 22.VII–22.VIII.2006 (MT); 2♂1♀, 2.XI–1.XII.2007 (MT); 1♂, 26.X–27.XI.2006 (MT); 1♂, 29.VII–25.VIII.2007 (MT); 1♂1♀, 25.VIII–28.IX.2007 (MT); 1♀, 28.IX–2.XI.2007 (MT).

Distribution: Japan (Ryukyu Islands: Yakushima Is.) and China (Oosterbroek 2023).

66. *Helius (Helius) liliputanus* Alexander, 1929*

Specimens examined: [OH] 1♀, 22–25.VIII.2007 (CT).

Distribution: Japan (Ryukyu Islands: Yakushima, Amami, and Okinawa Is.) and Taiwan (Oosterbroek 2023).

67. *Helius (Helius) obliteratus* (Alexander, 1920)

Helius (Helius) obliteratus: Alexander 1930b: 508; Okadome 1973: 94.

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, and South Korea (Oosterbroek 2023).

68. *Helius (Helius) tenuirostris* Alexander, 1924*

Specimens examined: [OH] 1♀, 19–22.VII.2006 (CT); 1♀, 25–28.VI.2007 (CT); 1♂, 28.VI–29.VII.2007 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands) (Oosterbroek 2023).

69. *Lechria yamauchii* Kato, 2020

Lechria yamauchii: Kato & Tachi 2020: 274.

Specimens examined: [CE] 1♂, 29.VII–25.VIII.2007 (MT) (Kato & Tachi 2020).

Distribution: Japan (Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

70. *Libnotes (Goniodineura) perparvuloides* (Alexander, 1935)*

Specimens examined: [CW] 1♂, 30.VII–25.VIII.2007 (MT).

Distribution: Japan (Ryukyu Islands: Kodakara and Yakushima Is.) and Taiwan (Oosterbroek 2023).

71. *Libnotes (Libnotes) divaricata* (Alexander, 1924)*

Specimens examined: [CE] 1♂, 2–10.V.2007 (MT). [OE] 1♂, 29.IV–2.V.2007 (MT);

2♀, 29.IV–2.V.2007 (CT); 2♂, 5–8.VI.2007 (MT); 2♂, 8–28.VI.2007 (MT); 1♂1♀, 25.VIII–28.IX.2007 (MT). [OW] 1♂, 28.IV–1.V.2007 (MT); 1♀, 8–28.VI.2007 (MT).

Distribution: Japan (Honshu, Shikoku, and Ryukyu Islands: Yakushima Is.) and South Korea (Oosterbroek 2023).

72. *Libnotes (Libnotes) nohirai* Alexander, 1918*

Specimens examined: [OH] 1♀, 28.XI–1.XII.2007 (CT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, North Korea, South Korea, and Russia (Oosterbroek 2023).

73. *Libnotes (Libnotes) puella* Alexander, 1924

Libnotes (Libnotes) puella: Suetsugu *et al.* 2019: 2.

Specimens examined: [OE] 1♂, 28.VI–29.VII.2007 (MT).

Distribution: Japan (Honshu, Kyushu, and Ryukyu Islands: Yakushima and Kodakara Is.) (Suzuki *et al.* 2022; Oosterbroek 2023).

74. *Limonia anthracina* (Alexander, 1922)

Limonia (Limonia) anthracina: Alexander 1930b: 508; Okadome 1973: 93.

Specimens examined: [OH] 5♂, 29.IV–2.V.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

75. *Limonia japonica* (Alexander, 1913)*

Specimens examined: [CW] 2♂, 31.III–28.IV.2007 (MT).

Distribution: Japan (Honshu and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

76. *Orimarga (Orimarga) yakushimana* Alexander, 1930

Orimarga yakushimana: Alexander 1930b: 508, 517; Okadome 1973: 94.

Distribution: Japan (Honshu, Shikoku, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

77. *Rhipidia (Rhipidia) isospilota* (Alexander, 1936)*

Specimens examined: [CE] 6♀, 22.VII–22.VIII.2006 (MT);); 2♀, 22–25.VIII.2006 (MT); 20♀, 25.VIII–22.IX.2006 (MT); 2♀, 25.IX–23.X.2006 (MT); 2♀, 23–26.X.2006 (MT); 3♂2♀, 26.X–27.XI.2006 (MT); 1♀, 27–30.XI.2006 (MT); 2♀, 30.III–29.IV.2007 (MT); 1♂1♀, 8–28.VI.2007 (MT); 2♂3♀, 28.VI–29.VII.2007 (MT); 7♀, 25.VIII–28.IX.2007 (MT); 1♂3♀, 28.IX–2.XI.2007 (MT); 2♂2♀, 2.XI–1.XII.2007 (MT); 2♀, 26–29.XII.2007 (CT); 7♂, 2–30.III.2008 (MT). [OE] 1♂, 19–22.VII.2006 (MT); 4♀, 22.VII–22.VIII.2006 (MT); 2♀, 25.VIII–22.IX.2006 (MT); 1♀, 25.IX–23.X.2006 (MT); 1♀, 26.X–27.XI.2006 (MT); 2♀, 27–30.XI.2006 (CT); 2♀, 30.XI–25.XII.2006 (MT); 1♂, 1–27.III.2007 (MT); 2♂7♀, 30.III–29.IV.2007 (MT); 1♂1♀, 29.IV–2.V.2007 (MT); 5♀, 29.IV–2.V.2007 (CT); 3♂2♀, 8–28.VI.2007 (MT); 1♂1♀, 28.VI–29.VII.2007 (MT); 3♀, 29.VII–25.VIII.2007 (MT); 5♀, 25.VIII–28.IX.2007 (MT); 4♀, 28.IX–2.XI.2007 (MT); 1♂1♀, 2.XI–1.XII.2007 (MT); 1♂1♀, 2–30.III.2008 (MT). [OW] 2♀,

22.VII–22.VIII.2006 (MT); 1♂5♀, 25.VIII–23.IX.2006 (MT); 1♂5♀, 26.IX–24.X.2006 (MT); 1♂14♀, 27.X–28.XI.2006 (MT); 2♀, 1–25.XII.2006 (MT); 1♂, 25–28.XII.2006 (CT); 1♀, 28.XII.2006–26.I.2007 (MT); 1♀, 29.I–27.II.2007 (MT); 15♂8♀, 2–28.III.2007 (MT); 3♂3♀, 28–31.III.2007 (MT); 22♂18♀, 31.III–28.IV.2007 (MT); 2♂2♀, 28.IV–1.V.2007 (MT); 2♀, 28.IV–1.V.2007 (CT); 1♂2♀, 5–8.VI.2007 (MT); 8♂3♀, 8–28.VI.2007 (MT); 10♂5♀, 28.VI–30.VII.2007 (MT); 1♀, 30.VII–25.VIII.2007 (MT); 1♂5♀, 25.VIII–28.IX.2007 (MT); 4♀, 28.IX–2.XI.2007 (MT); 3♂7♀, 2.XI–1.XII.2007 (MT); 2♂1♀, 28.XI–1.XII.2007 (CT); 2♂, 2–29.III.2008 (MT). [CW] 3♂, 19–22.VII.2006 (MT); 13♀, 22.VII–22.VIII.2006 (MT); 30♀, 25.VIII–23.IX.2006 (MT); 9♀, 26.IX–24.X.2006 (MT); 1♂1♀, 27.X–28.XI.2006 (MT); 1♀, 1–12.XII.2006 (MT); 1♂, 29.I–27.II.2007 (MT); 2♂2♀, 2–28.III.2007 (MT); 4♂6♀, 31.III–28.IV.2007 (MT); 1♂1♀, 28.IV–1.V.2007 (MT); 5♂1♀, 28.VI–30.VII.2007 (MT); 7♀, 30.VII–25.VIII.2007 (MT); 19♀, 25.VIII–28.IX.2007 (MT); 3♀, 28.IX–2.XI.2007 (MT); 1♀, 30.X–2.XI.2007 (CT); 1♀, 28.I–2.III.2008 (MT); 1♀, 27.II–2.III.2008 (CT); 2♀, 2–29.III.2008 (MT); 2♂, 2–29.III.2008 (MT). [OH] 1♀, 22.VII–22.VIII.2006 (MT); 2♀, 22.VII–22.VIII.2006 (MT); 2♀, 25.IX–23.X.2006 (MT); 2♀, 28.VI–29.VII.2007 (MT); 1♀, 26–29.VII.2007 (CT); 4♂, 28.IX–2.XI.2007 (MT);

Distribution: Japan (Honshu and Ryukyu Islands: Yakushima Is.) and Russia.

78. *Rhipidia (Rhipidia) septentrionis* Alexander, 1913*

Specimens examined: [OE] 1♀, 28.VI–29.VII.2007 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, North Korea, South Korea, Russia, and China (Oosterbroek 2023).

79. *Thrypticomysia unisetosa unisetosa* (Alexander, 1929)*

Specimens examined: [CE] 1♀, 25.IX–23.X.2006 (MT); 1♀, 30.III–29.IV.2007 (MT); 1♀, 25.VIII–28.IX.2007 (MT); 1♀, 28.IX–2.XI.2007 (MT). [CW] 1♀, 24–27.X.2006 (MT); 1♀, 30.VII–25.VIII.2007 (MT).

Distribution: Japan (Honshu, Shikoku, and Ryukyu Islands: Yakushima Is.), Kuril Islands, North Korea, South Korea, China, and Taiwan (Oosterbroek 2023).

80. *Trentepohlia (Mongoma) subpennipes* Alexander, 1957*

Specimens examined: [CE] 1♀, 22–25.VIII.2006 (MT); 1♀, 29.VII–25.VIII.2007 (MT); 1♀, 25.VIII–28.IX.2007 (MT).

Distribution: Japan (Honshu and Ryukyu Islands: Yakushima and Kodakara Is.) (Oosterbroek 2023).

Family Tipulidae Subfamily Dolichopezinae

81. *Dolichopeza (Nesopeza) geniculata* (Alexander, 1918)*

Specimens examined: [CE] 1♀, 22.VII–22.VIII.2006 (MT). [OE] 1♀, 8–28.VI.2007 (MT). [CW] 1♀, 22–25.VIII.2006 (MT); 3♀, 25.VIII–23.IX.2006 (MT); 1♀, 26.IX–24.X.2006 (MT); 2♀, 28.IX–2.XI.2007 (MT). [OH] 1♀, 22.VII–22.VIII.2006 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, South Korea, Russia, and Taiwan (Oosterbroek 2023).

Subfamily Tipulinae

82. *Nephrotoma flammeola* Alexander, 1925*

Specimens examined: [CE] 2♀, 22.VII–22.VIII.2006 (MT); 1♀, 8–28.VI.2007 (MT). [OE] 1♀, 25.VIII–28.IX.2007 (MT); 1♂, 28.IX–2.XI.2007 (MT). [OW] 1♂, 25.VIII–23.IX.2006 (MT); 2♂4♀, 26.IX–24.X.2006 (MT); 2♂, 25.VIII–28.IX.2007 (MT); 1♂1♀, 28.IX–2.XI.2007 (MT); 1♂1♀, 2.XI–1.XII.2007 (MT). [CW] 1♂, 22.VII–22.VIII.2006 (MT); 1♂2♀, 25.VIII–23.IX.2006 (MT); 3♀, 26.IX–24.X.2006 (MT); 1♀, 27.X–28.XI.2006 (MT); 2♂, 8–28.VI.2007 (MT); 1♀, 28.IX–2.XI.2007 (MT). [OH] 1♂1♀, 22.VII–22.VIII.2006 (MT); 1♂1♀, 28.IV–1.V.2007 (MT); 1♂1♀, 25.VIII–22.IX.2006 (MT); 1♀, 29.VII–25.VIII.2007 (MT); 4♀, 25.VIII–28.IX.2007 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, South Korea, and Russia (Oosterbroek 2023).

83. *Nephrotoma flavonota* (Alexander, 1914)*

Specimens examined: [OE] 1♂, 5–8.VI.2007 (MT); 1♂1♀, 8–28.VI.2007 (MT). [CW] 1♀, 31.III–28.IV.2007 (MT); 1♀, 8–28.VI.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) and China (Oosterbroek 2023).

84. *Nephrotoma fuscescens* (Riedel, 1910)*

Specimens examined: [CE] 2♀, 30.III–29.IV.2007 (MT). [OE] 1♂1♀, 30.III–29.IV.2007 (MT). [CW] 2♀, 31.III–28.IV.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) and Russia (Oosterbroek 2023).

85. *Nephrotoma pallida* Oosterbroek, 1985

Nephrotoma pallida: Oosterbroek 1985: 261.

Specimens examined: [CE] 1♂, 25.VIII–28.XI.2007 (MT). [OE] 1♂, 25.VIII–22.IX.2006 (MT); 1♂, 25.VIII–28.IX.2007 (MT); 1♂, 28.IX–2.XI.2007 (MT).. [CW] 1♂, 22.VII–22.VIII.2006 (MT); 28♂2♀, 25.VIII–23.IX.2006 (MT); 18♂3♀, 26.IX–24.X.2006 (MT); 3♂, 8–28.VI.2007 (MT); 1♂, 30.VII–25.VIII.2007 (MT); 50♂6♀, 25.VIII–28.IX.2007 (MT); 7♂1♀, 28.IX–2.XI.2007 (MT).

Distribution: Japan (Kyushu and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

86. *Nephrotoma subpallida* Alexander, 1925*

Specimens examined: [CE] 1♂, 8–28.VI.2007 (MT). [OE] 1♀, 8–28.VI.2007 (MT). [OW] 1♀, 8–28.VI.2007 (MT). [OH] 1♀, 22.VII–22.VIII.2006 (MT); 1♂2♀, 7–28.VI.2007 (MT); 2♂, 25–28.VI.2007 (CT); 1♂2♀, 28.VI–29.VII.2007 (MT); 1♂, 29.VII–25.VIII.2007 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

87. *Nephrotoma virgata* (Coquillett, 1898)*

Specimens examined: [CE] 1♂, 22.VII–22.VIII.2006 (MT). [OW] 1♂, 26.IX–24.X.2006 (MT). [CW] 1♀, 27.X–28.XI.2006 (MT).

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), North Korea, South Korea, Russia, and China (Oosterbroek 2023).

88. *Tipula (Platytipula) ecaudata* Alexander, 1924*

Specimens examined: [OH] 1♂, 25.VIII–23.IX.2006 (MT); 1♂, 25.IX–23.X.2006 (MT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), Kuril Islands, South Korea, and Russia (Oosterbroek 2023).

89. *Tipula (Platytipula) insulicola insulicola* Alexander, 1914*

Specimens examined: [OH] 7♂5♀, 19–22.VII.2006 (CT); 1♀, 22.VII–22.VIII.2007 (CT); 2♂, 25–28.VI.2007 (CT); 4♂1♀, 28.VI–29.VII.2007 (MT); 3♂1♀, 26–29.VII.2007 (CT); 1♂, 29.VII–25.VIII.2007 (MT).

Distribution: Japan (Honshu and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

90. *Tipula (Pterelachisus) subfutilis* Alexander, 1929*

Specimens examined: [OH] 1♂1♀, 4–7.VI.2007 (CT).

Distribution: Japan (Kyushu and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

91. *Tipula (Vestiplex) serricauda* Alexander, 1914*

Specimens examined: [OW] 1♂1♀, 26.IX–24.X.2006 (MT); 1♀, 24–27.X.2006 (CT).

Distribution: Japan (Honshu, Shikoku, Kyushu, and Ryukyu Islands: Yakushima Is.), South Korea, and China (Oosterbroek 2023).

92. *Tipula (incertae sedis) otiosa* Alexander, 1924*

Specimens examined: [OH] 1♂, 29.IV–2.V.2007 (CT).

Distribution: Japan (Honshu and Ryukyu Islands: Yakushima Is.) (Oosterbroek 2023).

Discussion

We identified 84 species of Tipuloidea in this study, 58 of them new to Yakushima Island, resulting in 92 species on the island together with the previous records. Of the 92 species, 70 species are distributed in only the Palearctic region, 22 species are distributed in the Oriental and Palearctic regions, and six species, *Nipponomyia yakushimensis*, *Nippolimnophila yakushimensis*, *Prionolabis lipophleps*, *Ulomorpha polytricha*, *Cheilotrichia (Empeda) microtrichiata*, and *Lechria yamauchii* are endemic to the island. Moreover, we recognized at least 21 undetermined species in the material examined for this study, many of them probably undescribed and endemic to the island. From these findings, it is considered that the tipuloid fauna in Yakushima Island comprises mainly Palearctic species, but also includes an Oriental species. Further investigations in under sampled habitats such as higher mountainous areas, wetlands, and sea-coast, along with other sampling methods like light traps would yield more species richness and endemic species, enhancing the value of Yakushima Island as a world natural heritage site. The number of collected species at each site was 33 in CE, 40 in CW, 29 in OE, 34 in OW, and 51 in OH. From the results of both the west (CW and OW)

and east (CE and OE) collecting sites, the species richness was higher in the plantation of *C. japonica* than in the old-growth evergreen forest. Because many tipuloid larvae feed on decaying wood and its associated microflora, such as algae and fungi (de Jong 2008), the higher richness of tipuloid species may be caused by the understory flora and the volume of decaying wood debris, rather than by the plantation of *C. japonica* itself. Biomass of understory vegetation in the forest is affected by the light condition than by tree species composition (Takatsuki & Mochizuki 2022). Moreover, tipuloid species are generally more abundant in riparian zone (Gelhaus & Podenas 2006). Therefore, other environmental factors at each study site, such as light condition and soil moisture, should be examined to clarify what brings the higher species richness of crane flies in the plantation area, and investigations of the immature tipuloid fauna in undergrowth flora and dead wood debris would contribute to understanding that substrate's contribution to overall biodiversity at each site.

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