*Евразиатский энтомол. журнал 23(6): 323–330, прил.: 1–5*
*doi 10.15298/euroasentj.23.06.05*



# Crane flies (Diptera: Tipulidae, Limoniidae) of Wrangel Island (Chukotka AO, Russia). 1. An annotated check-list of species

# Типулоидные двукрылые (Diptera: Tipulidae, Limoniidae) острова Врангеля (Чукотский АО, Россия). 1. Аннотированный список видов

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***Key words:*** Tipulidae, Limoniidae, Arctic, tundra zone, checklist, new record.

***Ключевые слова:*** Tipulidae, Limoniidae, Арктика, тундровая зона, список видов, новые находки.

***Abstract.*** The article presents data on Tipuloidea collected on Wrangel Island from 1966 to 2022 and including 14 species of Tipulidae (about 6,650 specimens) and 5 species of Limoniidae (56 specimens). A re-examination of previously published material led to the exclusion of two species from the list: specimens previously assigned to *Tipula* (*Yamatotipula*) *anceps* Savchenko, 1965 belong to *Tipula* (*Savtshenkia*) *convexifrons* Holmgren, 1883, and specimens attributed to *Tipula* (*Arctotipula*) *salicetorum* Siebke, 1870 presumably belong to a new species. For *Tipula* (*Lunatipula*) *subrecticornis* Savchenko, 1964, a brief description of a previously unknown female with photos of terminalia is given. One species, *Ormosia* (*Ormosia*) *fascipennis* (Zetterstedt, 1838), was recorded on the island for the first time. The collected material did not contain six species indicated for Wrangel Island in a number of other publications. It is presumed that *Tipula* (*Pterelachisus*) *cineracea* Coquillett, 1900, *Tipula* (*Pterelachisus*) *katmaiensis* Alexander, 1920, *Tipula* (*Pterelachisus*) *malaisei* Alexander, 1927, and *Molophilus* (*Molophilus*) *pleuralis* de Meijere, 1920 were incorrectly reported for the island. Together with two other species, *Tipula* (*Pterelachisus*) *crawfordi* Alexander, 1927 and *Limnophila* sp., the Wrangel Island fauna currently comprises 15 species of Tipulidae and 6 species of Limoniidae.

***Резюме.*** В статье представлены данные о типулоидных двукрылых, собранных на острове Врангеля с 1966 по 2022 г. и включающие 14 видов Tipulidae (около 6,650 экз.) и 5 видов Limoniidae (56 экз.). Повторное изучение ранее опубликованного материала привело к исключению из списка двух видов: экземпляры, ранее отнесённые к *Tipula* (*Yamatotipula*) *anceps* Savchenko, 1965 принадлежат *Tipula (Savtshenkia) convexifrons* Holmgren, 1883, а экземпляры, относимые к *Tipula* (*Arctotipula*) *salicetorum* Siebke, 1870 предположительно относятся к новому виду. Для *Tipula* (*Lunatipula*) *subrecticornis* Savchenko, 1964 дано краткое описание ранее неизвестной самки с фотографиями терминалий. Один вид, *Ormosia* (*Ormosia*) *fascipennis* (Zetterstedt, 1838), отмечен на о. Врангеля впервые. В собранном материале отсутствовало шесть видов, указанных для острова в ряде других публикаций. Предполагается, что для острова Врангеля были ошибочно указаны *Tipula* (*Pterelachisus*) *cineracea* Coquillett, 1900, *Tipula* (*Pterelachisus*) *katmaiensis* Alexander, 1920, *Tipula* (*Pterelachisus*) *malaisei* Alexander, 1927 и *Molophilus* (*Molophilus*) *pleuralis* de Meijere, 1920. Вместе с двумя другими видами: *Tipula* (*Pterelachisus*) *crawfordi* Alexander, 1927 и *Limnophila* sp., фауна острова Врангеля в настоящее время включает 15 видов Tipulidae и 6 видов Limoniidae.

## Introduction

The superfamily Tipuloidea comprises Tipulidae, Limoniidae, Pediciidae, and Cylindrotomidae families [Oosterbroek, 2024]. Except for Cylindrotomidae, all these families occur in the Arctic, with Tipulidae being especially numerous in tundra ecosystems [MacLean, Pitelka, 1971; MacLean, 1975; Chernov, 1978, 1985, 1995; Danks, 1981; Lantsov, Chernov, 1987].

The first information on Tipuloidea from Wrangel Island (description of *Tipula* (*Pterelachisus*) *crawfordi* Alexander, 1927) is given in Curran and Alexander [1927]. Subsequently, based on collections from the 1930s, *Tipula* (*Vestiplex*) *wrangeliana* Stackelberg, 1944 was described [Stackelberg, 1944], and data on several other tipulid species collected on the island were published [Savchenko, 1961, 1964, 1983]. The first mention of the Limoniidae from the island, the species *Dactylolabis* (*Dactylolabis*) *novaezemblae* (Alexander, 1925), was given by Savchenko [1978]. During aquatic invertebrate surveys on Wrangel Island in the 1970s, several other species of tipuloid dipterans were collected, including three species of Limoniidae, which were identified to the genus level [Makarchenko et al., 1980]. In total, about 10 species of Tipulidae and 4 species of Limoniidae were listed for Wrangel Island in various literature sources by the early 1980s. However, for some species this information was not supported by published data on the location and number of specimens collected.

Between 1983 and 1994 the first author collected a large amount of material on crane flies on the island, of which only data from the first three seasons have been published [Khruleva, 1987; Lantsov, Chernov, 1987]. These studies continued into the 21st century. The data collected during this period were partly published in the Annals of Nature of the «Wrangel Island» State Nature Reserve [Khruleva, Devyatkov, 2019]. They were also included in the article on the tipulids of the subgenus *Arctotipula* Alexander, 1934 on Wrangel Island [Brodo et al., 2022]. In the last few years, the processing of the data on the crane flies of the island was continued, including the use of previously published material. As a result, information on the composition and distribution of Tipuloidea on Wrangel Island has been significantly expanded, and some errors in previous definitions have been corrected. In this article we present an annotated list of Tipuloidea, which summarizes all data obtained by the first author and other collectors on Wrangel Island from 1983 to 2022, as well as previously unpublished material by K.B. Gorodkov collected in 1960–1970s. Compared to previous publications, the list of Tipuloidea species inhabiting the island has been significantly adjusted by excluding species whose presence on Wrangel Island has not been confirmed by specific material.

## Characteristic of the research area, materials and methods

Wrangel Island is located in the Chukotka Autonomous Okrug (Chukotka in the text below), on the border between the East Siberian and Chukchi Seas. Compared with other regions in the High Arctic, the island's biota displays remarkable diversity [Yurtsev, 1987; Stishov, 2004; Khruleva, 2007]. This feature is attributable to the geographical location of the island, the lack of glaciations in the late Pleistocene, and the diversity of landscapes and climate (with average July temperatures ranging from 1 °C on the northern coast to 7–8 °C in the centre of island) [Svatkov 1970; Alfimov 2007; Vartanyan, 2007]. According to S.S. Kholod [2013], the main part of the island territory belongs to the arctic tundra subzone and includes both northern (*nAT*) and southern (*sAT*) variants of this subzone (Fig. 1). The most significant changes in vegetation cover occur at their boundaries, according to which Kholod [2013] distinguishes two zonal strips on the island — northern and southern. The warmest inland areas of the southern strip contain enclaves belonging to the northern variant of the typical tundra zone (*nTT*), while the northern zonal strip contains small strips of the southern variant of the polar desert zone (*sPD*) on the coldest and most foggy northeast and southwest coastlines. Although the zonal division proposed by this author has been

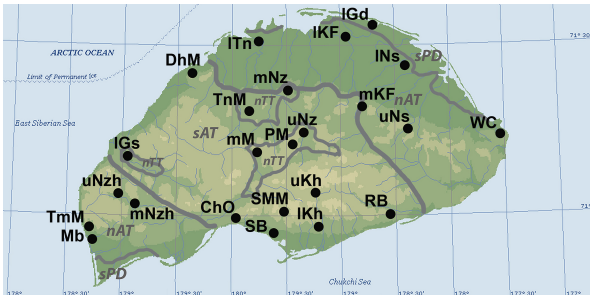



Fig. 1. Map of Wrangel Island showing localities where Tipuloidea were collected. Subzonal differentiation according to Kholod [2013]: *sPD* — southern variant of polar desert zone; *nAT* — northern variant of arctic tundra subzone; *sAT* — southern variant of arctic tundra subzone; *nTT* — northern variant of typical tundra subzone. Bold line marks the boundary between the northern and southern zonal strips. Collection sites: *sPD*: lGd — lower reaches of the Gidrografov River. *nAT*: TmM — Thomas Mt.; Mb — Morzhovy brook; uNzh — upper reaches of the Neozhidannaya River; mNzh — middle reaches of the Neozhidannaya River; lTn — lower reaches of the Tundrovaya River; lKF — lower reaches of the Krasnyi Flag River; lNs — lower reaches of the Naskhok River; uNs — upper reaches of the Naskhok River; WC — Cape Waring; mKF — middle reaches of the Krasnyi Flag River. *sAT*: DhM — Drem-Head Mt.; ChO — Chertov Ovrag; SB — Somnitelnaya Bay environs, plain; SMM — Somnitelnaya Bay environs, mountainous part (Somnitelnye and Mineev Mts); uKh — upper reaches of the Khischnikov River; lKh, lower reaches of the Khischnikov River; RB — Rogers Bay environs. *nTT*: lGs — lower reaches of the Gusinaya River; TnM — environs of Tundrovaya Mt.; mNz — middle reaches of the Neizvestnaya River; mM — middle reaches of the Mamontovaya River; PM — spurs of Pervaya Mt.; uNz — upper reaches of the Neizvestnaya River.

Рис. 1. Карта о. Врангеля с местами сборов Tipuloidea. Подзональная дифференциация (по Kholod [2013]): *sPD* — южный вариант зоны полярных пустынь; *nAT* — северный вариант подзоны арктических тундр; *sAT* — южный вариант подзоны арктических тундр; *nTT* — северный вариант подзоны типичных тундр. Жирная линия — граница между северной и южной зональной полосами. Места сборов: *sPD*: lGd — нижнее течение р. Гидрографов. *n*AT: TmM — гора Томас; Mb —ручей Моржовый; uNzh — верхнее течение р. Неожиданная; mNzh — среднее течение р. Неожиданная; lTn — нижнее течение р. Тундровая; lKF — нижнее течение р. Красный Флаг; lNs — нижнее течение р. Насхок; uNs — верхнее течение р. Насхок; WC — мыс Уэринг; mKF — среднее течение р. Красный Флаг. *s*AT: DhM — гора Дрем-Хед; ChO — Чёртов Овраг; SB — окрестности бухты Сомнительной, равнина; SMM — окрестности бухты Сомнительная, горная часть (горы Сомнительные и Минеева); uKh — верхнее течение р. Хищников; lKh — нижнее течение р. Хищников; RB — окрестности бухты Роджерса. *n*TT: lGs — нижнее течение р. Гусиная; TnM — окрестности горы Тундровая; mNz — среднее течение р. Неизвестная; mM — среднее течение р. Мамонтовая; PM — отроги горы Первая; uNz — верхнее течение р. Неизвестная.

criticised [Matveyeva, 2014], we use it because it best reflects the changes in the natural environment along the climatic gradient of the island. On the Circumpolar Arctic Vegetation Map [CAVM Team, 2003], Wrangel Island is designated as belonging to subzone «B», which corresponds to the arctic tundra subzone.

The map (Fig. 1) shows the crane fly collecting sites on Wrangel Island. Tipulidae species collected by K.B. Gorodkov in 1966 (together with V.F. Shamurin), 1971 and 1972 were identified by N.M. Paramonov and kept in the Zoological Institute of the Russian Academy of Sciences (ZIN RAS), Saint Petersburg, Russia. From 1983 to 1994, material was mainly collected by O.A. Khruleva using pitfall traps and individual trapping. However, data from only a few seasons (1983, 1985, 1988 and 1989) were fully determined; a significant proportion of Tipuloidea specimens collected in pitfall traps in other years were not preserved. In the 21st century, material was collected by O.A. Khruleva (2006, 2015, 2019), as well as by staff of the «Wrangel Island» State Nature Reserve (2011, 2014, 2016–2022). Photos of some habitats from different subzonal variants where crane flies were collected are shown in Figs 2–7. During this period, pitfall traps and yellow pan traps were the main methods used. In 2015 and 2019, net-sweeping and individual trapping were also conducted. With the exception of 2006 (data were only preserved for females of *Tipula* (*Pterelachisus*) *carinifrons carinifrons* Holmgren, 1883 and *Tipula* (*Vestiplex*) *wrangeliana* Stackelberg, 1944, collected in pitfall traps), the collections of these years were almost completely determined. Material collected in 2011 and 2014–2017 was identified by V.I. Devyatkov and is mainly stored in the Siberian Zoological Museum (Novosibirsk, Russia). The remaining material was mainly identified by V.I. Lantsov and is currently stored in his personal collection in Pyatigorsk, Russia. It is intended that all these materials will eventually be transferred to the ZIN RAS in Saint Petersburg.

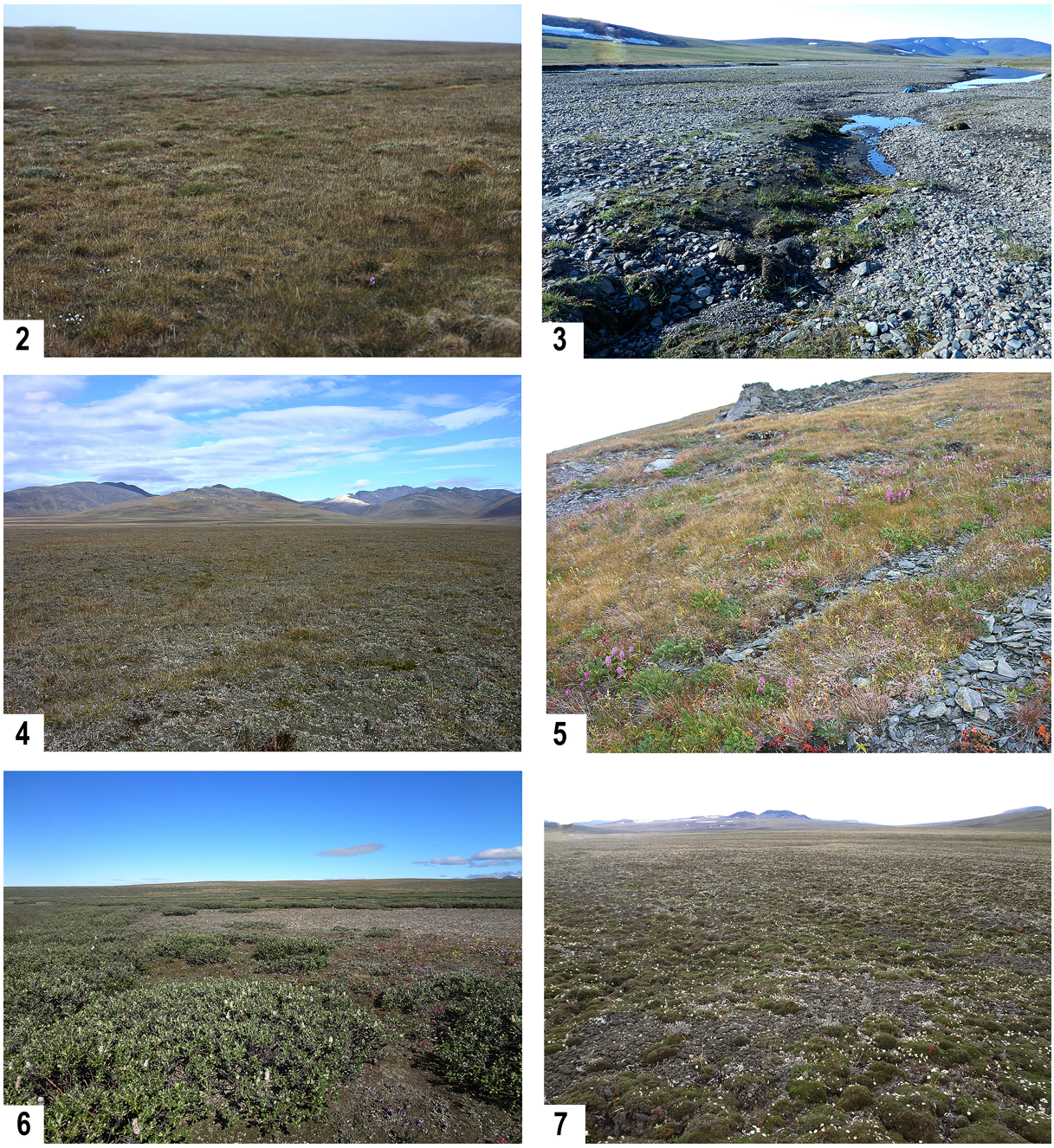
## Results and discussion

In our material, the majority of crane flies belong to the family Tipulidae, which is represented by 14 species (Table 1). Re-examination of the material revealed that specimens previously assigned to *Tipula* (*Arctotipula*) *salicetorum* Siebke, 1870 apparently belong to a species new to science, while specimens previously assigned to *Tipula* (*Yamatotipula*) *anceps* Savchenko, 1965 belong to *T.* (*Savtshenkia*) *convexifrons* Holmgren, 1883. Therefore, these two species, which were previously indicated by us for the fauna of the island [Khruleva, 1987; Lantsov, Chernov, 1987; Khruleva, Devyatkov, 2019; Brodo et al., 2022], are excluded from the list.

For *Tipula* (*Lunatipula*) *subrecticornis* Savchenko, 1964, a bref description of a previosly unknown female (with photos of terminalia) is given (Figs 9–12).

It is important to note that almost all species of Tipulidae have been collected on the island at different times (Table 1). Almost half of them (six species) were present in small (74 specimens) collections of the 1930s [Stackelberg, 1944; Savchenko, 1961, 1964, 1983]. The material of K.B. Gorodkov (71 specimens) added four more species to the fauna (he collected nine species in total); another species was mentioned in the article of Makarchenko et al. [1980]. Our long-term collections, despite the much larger amount of material processed (about 6,580 specimens), added only three species. This suggests that the composition of the island's Tipulidae fauna is now reasonably well known. In this context, it seems strange that our material lacked four species that are reported for the Wrangel Island in a number of literature sources [Curran, Alexander 1927; Savchenko, 1964, 1983]. Following these publications, we also included most of these species in our earlier list of the tipulid fauna of Wrangel Island [Khruleva, 1987; Lantsov, Chernov, 1987; Khruleva, Devyatkov, 2019]. However, closer examination of the literary sources has led us to doubt the correctness of this decision. One species, *Tipula* (*Pterelachisus*) *crawfordi* Alexander, 1927, was actually described from island [Curran, Alexander 1927]. The other three species, *Tipula* (*Pterelachisus*) *cineracea* Coquillett, 1900, *T.* (*Pterelachisus*) *katmaiensis* Alexander, 1920, and *T.* (*Pterelachisus*) *malaisei* Alexander, 1927, are mentioned in Savchenko's monograph [1964] with reference to Alexander, but without citing a specific article by that author and without data on specimens collected on Wrangel Island. In another monograph [Savchenko, 1983] they are repeatedly mentioned (with reference to Alexander's articles [1933, 1934]) as Beringian species inhabiting the extreme north-east of Asia (including Wrangel Island) and Alaska. However, in this or any of Alexander's other articles in this series, we have been unable to find any confirmation of this. Furthermore, in the catalogue of crane flies of North America [Alexander, 1965], one of these species, *Tipula malaisei* Alexander, 1927, is not listed, and for *Tipula cineracea* Coquillett, 1900 and *T. katmaiensis* Alexander, 1920 only Alaska is given as their range. This suggests that E.N. Savchenko's description of these species for Wrangel Island was in error. As for *Tipula crawfordi* Alexander, 1927, it seems to be very rare on the island. Together with it, the fauna of the Tipulidae on Wrangel Island has a total of 15 species. From them, *Tipula crawfordi* Alexander, 1927 was not recorded in other regions, and for *Tipula* (*Vestiplex*) *wrangeliana* Stakelberg, 1944 only two specimens were found in the continental Chukotka (see Appendix, p.1–5). Thas, the last species is the subendemic of Wrangel Island; the external appearance of its male and female is shown in Figs 13–14.

In contrast to Tipulidae, Limoniidae were extremely rare in all periods of collection on island (Table 1). Before our studies began, *Dactylolabis novaezemblae* (Alexander, 1925) was reported from Wrangel Island [Savchenko, 1978], and there was also information about the presence of unidentified species of three other genera here: *Limnophila* Macquart, 1834 (in the Tundrovaya River), *Rhabdomastix* Skuse, 1890 (in the vicinity of RB), and *Symplecta* Meigen, 1830 (in the Khischnikov River) [Makarchenko et al., 1980]. The




Figs 2–7. Photos of different habitats where crane flies were collected. 2 — Mb (*nAT*), wet tundra near the seashore; 3 — mNzh (*nAT*), gravel floodplain; 4 — SB (*sAT*), zonal tundra on the plain; 5 — SMM, tundra-steppe plant community on the south-facing steep slope; 6 — mM (*nTT*), river valley with willow bushes; 7 — dryad tundra in the same area. The abbreviations for area names and subzonal variants are shown in Fig. 1.

Рис. 2–7. Фотографии местообитаний, в которых собраны типулоидные двукрылые. 2 — Mb (*nAT*), сырая тундра у побережья; 3 — mNzh (*nAT*), галечниковая пойма; 4 — SB (*sAT*), зональная тундра на равнине; 5 — SMM, тундростепная группировка на крутом склоне южной экспозиции; 6 — mM (*nTT*), долина реки с пойменными ивняками; 7 — дриадовая тундра в том же районе. Аббревиатура и расположение районов даны на рис. 1.

last two genera were represented in our material by species of *Rhabdomastix borealis* Alexander, 1924 and *Symplecta sheldoni* (Alexander, 1955). We also collected *Dactylolabis novaezemblae* (Alexander, 1925), *Ormosia fascipennis* (Zetterstedt, 1838) (this is the first record of this species for Wrangel Island) and *Arctoconopa f. forcipata* (Lundström, 1915). The latter species was previously reported for the island without identification data [Lantsov, Chernov, 1987]. On the other hand, *Molophilus* (*Molophilus*) *pleuralis* de Meijere, 1920 (also previously reported for Wrangel Island by Lantsov and Chernov [1987]) is excluded from the list because its occurrence here is not supported by specific data. Thus, the limoniid fauna of the island contains at least six spe-

Table 1. The list of crane fly species and number of specimens collected from Wrangel Island
Таблица 1. Видовой состав и число особей типулоидных двукрылых, собранных на о. Врангеля

| Family, subfamily, species | 1966–1972 | 1983–1994 | 2006–2022 | Major publications* |
|---|---|---|---|---|
| **Tipulidae**, Tipulinae | | | | |
| *Prionocera recta* Tjeder, 1948 | 9 | 13 | 1 | As *Prionocera lapponica* Tjeder, 1948: Savchenko, 1983 (RB, 3 exs.); Khruleva, 1987 |
| *Nephrotoma lundbecki lundbecki* (Nielsen, 1907) | – | 4 | 25 | Khruleva, Devyatkov, 2019 |
| *Tipula* (*Arctotipula*) *besselsoides* Alexander, 1919 | – | 9 | 29 | Savchenko, 1961 (RB, 1 ex., as *Tipula ciliata* Lundström, 1915); Khruleva, 1987 (as *Tipula* (*Arctotipula*) sp.); Brodo et al., 2022 |
| *T.* (*A.*) *oklandi* Alexander, 1922 | 2 | – | 7 | Khruleva, Devyatkov, 2019; Brodo et al., 2022 |
| *T.* (*Arctotipula*) sp. | – | 1 | 1 | As *Tipula salicetorum* Siebke, 1870: Khruleva, 1987; Khruleva, Devyatkov, 2019; Brodo et al., 2022 |
| *T.* (*Lunatipula*) *subrecticornis* Savchenko, 1964 | 10 | 19 | 133 | As *Tipula subrecticornis* f. *argurea* Savchenko, 1964: Khruleva, Devyatkov, 2019 |
| *T.* (*Odonatisca*) *pribilofensis* Alexander, 1923 | – | 48 | 8 | Khruleva, 1987; Khruleva, Devyatkov, 2019 |
| *T.* (*Pterelachisus*) *carinifrons carinifrons* Holmgren, 1883 | 11 | ~2245 | ~824 | Savchenko, 1964 (Aterton Mt, RB, 18 exs.); Khruleva, 1987; Khruleva, Devyatkov, 2019 |
| ***T.* (*P.*) *cineracea* Coquillett, 1900 | – | – | – | Savchenko, 1964 (no sample data) |
| *T.* (*P.*) *crawfordi* Alexander, 1927 | – | – | – | Curran, Alexander, 1927 (2 exs., without date and place of collection) |
| ***T.* (*P.*) *katmaiensis* Alexander, 1920 | – | – | – | Savchenko, 1964 (no sample data) |
| ***T.* (*P.*) *malaisei* Alexander, 1927 | – | – | – | Savchenko, 1964 (no sample data) |
| *T.* (*P.*) *middendorffi middendorffi* Lackschewitz, 1936 | – | 21 | 30 | Makarchenko et al., 1980 (mM, as *Tipula* ? *middendorffi* Lackschewitz, 1936); Khruleva, 1987; Khruleva, Devyatkov, 2019 |
| *T.* (*Savtshenkia*) *convexifrons* Holmgren, 1883 | 5 | 19 | 24 | Khruleva, 1987 (as *Tipula* (*Yamatotipula*) *anceps* Savchenko, 1965); Khruleva, Devyatkov, 2019 |
| *T.* (*S.*) *glaucocinerea* Lundström, 1915 | 2 | ~369 | ~403 | Khruleva, 1987; Khruleva, Devyatkov, 2019 |
| *T.* (*Vestiplex*) *arctica* Curtis, 1835 | 8 | 91 | 10 | Savchenko, 1964 (south-eastern part, 1 ex.); Khruleva, 1987; Khruleva, Devyatkov, 2019 |
| *T.* (*V.*) *wrangeliana* Stackelberg, 1944 | 24 | ~1003 | ~1249 | Stackelberg, 1944; Savchenko, 1964 (RB, south-eastern part, 40 exs.); Khruleva, 1987; Khruleva, Devyatkov, 2019 |
| *T.* (*Yamatotipula*) *lionota* Holmgren, 1883 | 2 | 4 | 1 | Savchenko, 1961 (1 ex., without place of collection); Khruleva, 1987 |
| **Limoniidae**, Chioneinae | | | | |
| *Arctoconopa forcipata forcipata* (Lundström, 1915) | 2 | 3 | 1 | Lantsov, Chernov, 1987 (no sample data) |
| ***Molophilus* (*Molophilus*) *pleuralis* de Meijere, 1920 | – | – | – | Lantsov, Chernov, 1987 (no sample data) |
| *Ormosia* (*Ormosia*) *fascipennis* (Zetterstedt, 1838) | – | – | 1 | First record for Wrangel Island |
| *Rhabdomastix* (*Rhabdomastix*) *borealis* Alexander, 1924 | – | – | 15 | Khruleva, Devyatkov, 2019 |
| *Symplecta* (*Symplecta*) *sheldoni* (Alexander, 1955) | – | 6 | 3 | Khruleva, Devyatkov, 2019 |
| Dactylolabinae | | | | |
| *Dactylolabis* (*Dactylolabis*) *novaezemblae* (Alexander, 1925) | – | 14 | 11 | Savchenko, 1978 (no sample data); Khruleva, 1987; Khruleva, Devyatkov, 2019 |
| Limnophilinae | | | | |
| *Limnophila* (s.lat.) sp. | – | – | – | Makarchenko et al., 1980 (Tundrovaya River) |

Note: * — publications with data on specimen collections or where Wrangel Island is mentioned for the first time among the distribution areas of the species; ** — species for which there is no information on material collected on the island.

Примечание: * — публикации, содержащие данные о собранных экземплярах или в которых о. Врангеля впервые указан в числе мест распространения вида; ** — виды, по которым нет информации о собранном на острове материале.

Fig. 8. Male *Prionocera recta* with pollen. Photo by N.V. Paramonov.
Рис. 8. Самец *Prionocera recta* с пыльцой. Фото Н.В. Парамонова.


Figs 9–12. Details of *Tipula* (*Lunatipula*) *subrecticornis* morphology. 9 — male wing, the fringe of bristles on the lower edge of wing removed. 10–12 — female terminalia; 10 — lateral view; 11 — dorsal view; 12 — ventral view. Photos by V.I. Lantsov. Scale bar: 9 — 5 mm, 10–12 — 2.5 mm.

Рис. 9–12. Детали строения *Tipula* (*Lunatipula*) *subrecticornis*. 9 — крыло самца, бахрома из щетинок по нижнему краю крыла удалена; 10–12 — терминалии самки; 10 — вид сбоку; 11 — вид сверху; 12 — вид снизу. Фото В.И. Ланцова. Масштаб: 9 — 5 мм, 10–12 — 2,5 мм.

cies, one of which, *Limnophila* (s.lat.) sp., (see Table 1) is not identified. This list is probably not exhaustive and may be completed in the future.

## Acknowledgements

We are grateful to the Director A.R. Gruzdev and the staff of the State Nature Reserve «Wrangel Island» (Pevek), I.P. Oleinikov, U.V. Babiy, L.F. Volkova (Simon), O.S. Starova, P.S. Kulimeev, N.G. Ovsyannikov, I.E. Menyushina, S.S. Lantsov and A.A. Rodionov, who participated in the collection of Tipuloidea in different years, as well as D.I. Berman (Institute of Biological Problems of North, Magadan) and M.V. Berezin (Moscow Zoo), whose data were also used in the present work. We would also like to honor the memory of K.B. Gorodkov (ZIN RAS, Saint Petersburg), who made a great contribution to the study of Diptera on Wrangel Island and the Arctic as a whole.

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Figs 13–14. External appearance of *Tipula* (*Vestiplex*) *wrangeliana*. 13 — male; 14 — female. Fig 13 by V.I. Lantsov, Fig.14 by N.V. Paramonov.

Рис. 13–14. Внешний вид *Tipula* (*Vestiplex*) *wrangeliana*. 13 — самец; 14 — самка. Рис. 13 — В.И. Ланцова, рис. 14 — Н.В. Парамонова.

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*Поступила в редакцию 15.1.2024*

**Appendix to the article:** O.A. Khruleva, V.I. Lantsov, V.I. Devyatkov, N.M. Paramonov. Crane flies (Diptera: Tipulidae, Limoniidae) of Wrangel Island (Chukotka AO, Russia). 1. An annotated check-list of species (Euroasian Entomological Journal. 2024. Vol.23. No.6. P.323–330).

**Приложение к статье:** О.А. Хрулёва, В.И. Ланцов, В.И. Девятков, Н.М. Парамонов. Типулоидные двукрылые (Diptera: Tipulidae, Limoniidae) острова Врангеля (Чукотский АО, Россия). 1. Аннотированный список видов (Евразиатский энтомологический журнал. 2024. Т.23. Вып.6. С. 323–330).

## The list of sampling localities and dates of stonefly species (Insecta, Plecoptera) from the Putorana Plateau, Russia

The family system is based on The Catalogue of the Crane Flies of the World [Oosterbroek, 2024]. The female description of *Tipula* (*Lunatipula*) *subrecticornis* Savchenko, 1964 is provided by V.I. Lantsov. Photos of the wing and terminalia were captured by placing a Xiaomi Redmi Note 10 Pro smartphone over the eyepiece of an Altami CM0745T binocular stereomicroscope, illuminated with an Olympus Schott KL 200 cold light source. Abbreviations. In the following text, collectors' names are abbreviated as follows: AG — A.R. Gruzdev, AR — A.A. Rodionov, DB — D.I. Berman; KG — K.G. Gorodkov; LV — L.F. Volkova, NO — N.G. Ovsyannikov, MB — M.V. Berezin, OKh — O.A. Khruleva, OS — O.S. Starova, PK — P.S. Kulimeev, SL — S.S. Lantsov, UB — U.V. Babiy; VSh — V.F. Shamurin. Some other abbreviations: exs. — collected specimens; hc — hand trapping; pt — pitfall traps; sw — sweep nets; ypt — yellow pan traps; Mts — mountains; Mt. — mountain. The abbreviations for area names and subzonal variants are shown in Fig. 1.

## Annotated check-list of Tipuloidea collected on Wrangel Island

**Tipulidae:** Tipulinae

*Prionocera recta* Tjeder, 1948

Fig. 8.

***Material.*** **lGd:** 7–15.VII.1985, wet depression near lake with herb-moss cover, pt (OKh), 2♂♂, 1♀. **lTn:** 9–19.VII.1988, wet depression with willow-herb-moss cover, pt (NO), 1♀; 22.VI–19.VII.1989, high floodplain and wet depression, hc, pt (OKh), 2♀♀. **lKF:** 9.VII.1985, river valley with moss-dwarf willow cover, hc (OKh), 2♂, 1♀. **uNs:** 23.VII.1985, wet herb-moss tundra on the foothill plume, hc (OKh), 1♀. **WC:** 16–24.VII.2020, zonal tundra, ypt, 1♀. **SB:** 9.VIII.1972, bug, «few specimens on reachesers» (KG), 5♂♂, 1♀. **SMM:** 9.VII.1972 (KG), 1♂. uKh (9 km ESE Sovetskaya Mt.): 18.VII.1972, northern slope of the Berry Peak, 400 m, bog on the slope (KG), 1♂, 1♀. **mNz:** 31.VII.1983, gravel slope (OKh), 1♀. **mM:** 30.VI.1992, damp plot in river valley with sedge-moss-willow cover, hc (OKh), 1♂, 1♀.

***Distribution and comments.*** Holarctic species with predominantly arctic distribution; in Eurasia it was also found in highlands of southern Siberia and Mongolia. In the insular Arctic, this species has been recorded on Dolgiy, Novaya Zemlya, Vaigach, New Siberian (Great Lyakhovsky), Wrangel, Hershel, Victoria, Baffin and Southampton Islands [Brodo, 1987, 2012; Lantsov, Chernov, 1987; Lantsov, 2011]. On Wrangel Island, it is found in areas with different climatic conditions, mainly in wet habitats. Some collected specimens have pollen on the head and breast (Fig. 8), indicating their role in plant pollination.

*Nephrotoma lundbecki lundbecki*
(Nielsen, 1907)

***Material.*** **mM:** 10–20.VII.1992, dry south-facing slope with tundra-steppe (forbs, xeromorphic sedges) spotted cover and separate creeping willows, pt (OKh), 2♀♀; 30.VI.2015, same habitat, sw (OKh), 1♂; 27.VI.1993, dry willow-herb tundra, hc (OKh), 1♀; 1–4.VII.2015, plots in the river valley with willow thickets and forb-creeping willow cover, ypt, sw (OKh), 12♂♂, 5♀♀. **PM:** 18.VI–7.VII.1992, dry gravelly south-facing slope with spotted legume-dryad cover, pt (OKh), 1♂; 28.VI.2015, stream valley with herb-moss-willow cover, sw (OKh), 1♂; 28.VI.2015, dry gravelly foothill plume with spotted herb-dryad cover, sw (OKh), 1♂, 2♀♀. **uNz:** 8.VII.2015, willow thickets in the river valley, sw, pt (OKh), 3♀♀.

***Distribution.*** Circumpolar species. In Eurasia, it is found mainly on the southern margins of the tundra zone, while in North America it inhabits the entire tundra zone, including various islands of the Canadian Arctic Archipelago and Greenland. It is also widely distributed in the mountainous areas of Central Asia [Lantsov, Chernov, 1987; Oosterbroek et al., 2007]. On Wrangel Island, the species was collected in the warmest areas at the center (*nTT*), mainly in river valleys with willow thickets (Fig. 6), as well as on dry slopes of river terraces and hills.

*Tipula* (*Arctotipula*) *besselsoides*
Alexander, 1919

***Material.*** **mNzh:** 9.VII.2019, pebble floodplain, hc (OKh), 3♂♂, 1♀. **lTn:** 25.VI–19.VII.1989, river valley with forb-dwarf willow cover, pt (OKh), 3♂♂. **RB:** 2.VII.1988, pebble floodplain, hc (OKh), 2♂♂; 12.VII.2019, same habitat, hc (OKh), 14♂♂, 8♀♀. **lGs:** 15.VII.1984, wet plot in river valley with willow-sedge-moss cover (OKh), 1♂; 28.VI–8.VII.1984, above floodplain terrace with willow-legume-dryad cover, pt (OKh), 1♂. **TnM:** 7–11.VII.2019, pebble floodplain, ypt (UB), 1♂. **mNz:** 5.VII, 1.VIII.1983, river valley with spotted legume-dryad cover (OKh), 2♂♂; 5–14.VII.2018, pebble floodplain, ypt (UB), 2♂.

***Distribution.*** The species has a wide distribution in the tundra zone of North America (including islands of the Canadian Arctic Archipelago — Banks, Victoria and Baffin), as well as in adjacent mountainous areas. In Eurasia, it is known only from Wrangel Island [Brodo et al. 2022], in areas with different climatic conditions on gravelly floodplains of large river valleys (Fig. 3).

*Tipula* (*Arctotipula*) *oklandi*
Alexander, 1922

***Material.*** **SB:** 10.VII.1972, 5 km E Somnitelnaya Bay, meadow near stream, sweeping (KG), 1♂. **SMM:** 28.VII.1972, river floodplain in the foothill area (KG), 1♂. **mM:** 1.VII.2015, plots in the river valley with willow thickets and forb-creeping willow cover, sw (OKh), 1♀; 16.VI.2019, upper reaches of Vesely brook, near lake, hc (UB) 2♂♂. **uNz:** 26.VI–6.VII.2015, pebble floodplain, pt (OKh), 1♂; 21.VI–5.VII.2015, extremely dry gravelly edge of river terrace with tundra-steppe (forbs and xeromorphic sedges) community, pt, sw (OKh), 3♂♂.

***Distribution.*** A species with a predominantly arctic distribution, known from Novaya Zemlya, north-west of Taymyr Peninsula (Taymyr in the text below), Putorana Plateau, northern Yakutia, southern Kamchatka, and Wrangel Island [Lantsov, 2014; Brodo et al. 2022]. On the island, it is found in the warmest areas (mountains of *sAT*, *nTT*), mainly in river valleys (Fig. 6).

### *Tipula* (*Arctotipula*) sp.

***Material.*** **lTn:** 25.VI–19.VII.1989, pebble floodplain and above river terrace with forb-dwarf willow cover, pt (OKh), 1♂ (collection of ZIN RAS, Saint Petersburg). **mM:** 26.VI–19.VII.2011, sandy-pebble floodplain with spotty willow-forb cover, pt (AR), 1♂ (collection of V.I. Devyatkov).

***Distribution and comments.*** Specimens of this species were previously assigned to *Tipula* (*Arctotipula*) *salicetorum* Siebke, 1870 [Khruleva, Devyatkov, 2019; Brodo et al., 2022]. Additional studies have shown that this is a presumably new species that was also found in the Altai (message from F. Brodo). It differs from *T. salicetorum* Siebke, 1870 in the reduction or absence of the nose and the different structure of the posterior part of the internal gonostylus. However, both of them have almost the same structure of abdominal tergite IX. One of the males (**lNs:** 23.VII.1985, sandy-pebble floodplain, hc (OKh), 1♂, collection of V.I. Lantsov) previously assigned to *T. salicetorum* [Brodo et al., 2022] remains unclear. Further material is needed to resolve this issue.

### *Tipula* (*Lunatipula*) *subrecticornis* Savchenko, 1964

Figs 9–12.

***Material.*** **SMM:** 6.VII.1966, spotty tundra on the foothill plume and gravel slope with forbs (VSh), 1♂; 27.VII.1966, meadow near river (KG), 2♂♂, 1♀; 22, 24, 26.VII.1966, southern slope of Mineev Mts, 100 m, rubble placer (KG, VSh), 1♂, 2♀♀; 22.VII.1966, Mineev Mts., 150 m, pebble floodplain of the Somnitelnaya River (KG), 1♀; Somnitelnye Mts., south-facing slope with tundra-steppe (forbs, xeromorphic sedges) spotted cover, 4–30.VII.1989, pt (OKh), 4♂♂. **uKh** (9 km ESE Sovetskaya Mt.): 18.VII.1972, northern slope of the Berry Peak, 400 m, bog on the slope (KG), 1♂, 1♀. **TnM:** 14.VII.1991, stream bank, hc (OKh), 1♀; 6–9. VII.2019, river bank with sparse grass-wormwood cover, ypt (UB), 15♂♂; 4–14.VII.2020, same habitat, ypt (UB), 2♂♂, 1♀; 4–14.VII.2020, slope of hill with herb-moss cover, ypt (UB), 1♂. **mNz:** 1.VIII.1983, gravelly top of hill with sparse reticulated moss-shrub cover (OKh), 1♂. **mM:** 10–20. VII.1992, dry south-facing slope with tundra-steppe (forbs, xeromorphic sedges) community and separate creeping willows, pt (OKh), 2♂♂; 20–27. VII.2014, dry foothill plume with willow-herb cover, pt (OS), 1♂, 1♀; 1–23.VII.2015, dampish river terrace with herb-willow-moss cover and sparse willow thickets, pt (OKh), 6♀♀; 1.VII.2015, zoogenic wormwood-cereal meadow on the arctic fox burrow, sw (OKh), 1♀; 3.VII.2015, dry edge of terrace with tundra-steppe (forbs and xeromorphic sedges) cover, sw (OKh), 1♂, 4♀♀; 21.VI.2019, stream valley, hc (UB), 3♂♂. **uNz:** 8.VII.1991, dryad tundra, hc (OKh), 1♂; 26.VI–6.VII.2015, pebble floodplain, pt (OKh), 1♀; 23.VI–10.VII.2015 different habitats with moderate moisture and spotted herb-dryad and herb-willow cover, pt, sw (OKh), 5♀♀; 23.VI–15.VII.2015, south-facing edge of river terrace with tundra-steppe (forbs and xeromorphic sedges) cover, ypt, pt, sw (OKh), 80♂♂, 11♀♀.

***Distribution and comments.*** Eastern Palearctic (Siberian) species have a disjunctive distribution mainly in mountainous areas. The typical form has been described from Altai [Savchenko, 1964], and the *argyrea* form (distinguished by the typical colouring of the abdominal tergites) has been collected in Tuva, the Magadan region (Omolon) and the central part of the Taymyr (Tareya). In total, 11 males have been collected in all these regions [Savchenko, Violovich, 1967; Savthenko et al., 1972; Savchenko, Theischinger, 1978]. In the catalogue of crane flies [Oosterbroek, 2024], the *argyrea* form was initially classified as a subspecies, then a species, before eventually being reassigned as a synonym for the typical form. The specimens from Wrangel Island belong to the *argyrea* form [Khruleva, Devyatkov, 2019]. On the island, the species is regularly found in the warmest areas (mountains of *sAT*, *nTT*) in various dry habitats, more often on the south-facing slopes (Fig. 5). As the females of this species have not been previously known, a brief description is given below.

***Description of female.*** The female is habitually similar to the male. Head gray with a silvery coating. Vertex is dark grey. The nose is clear. Rostrum with semiadhering setae. Head ventrally (peropharyngeal ridge) with long setae. Thorax grey. Prescutum and scutum dorsally with two pronounced longitudinal dark wide stripes separated by a light interval. Thoracic sclerites gray with weak silvery coating, glabrous, except for metacatepisternum which have long setae. Legs. Coxae gray with silvery coating and with long setae, trochanters dark brown with shorter setae, bases of femora yellow, dirty yellow in middle, apices of femora darkened. Tibiae and tarsi rusty brown. Wings (Fig. 9) transparent, one-colored with a distinct brown pterostigma and a reduced hole in the form of two translucent sections in front and behind pterostigma. Abdomen grayish brownish with a slight silvery coating. Female terminalia. General view of the ovipositor in Figures 10–12. Cercus dark brown obtuse, inner surface and lower margin with numerous setae. Body length 12.4–16.2 mm, wing length 10.2–12.6 mm, cercus length 1.3–1.5 mm.

### *Tipula* (*Odonatisca*) *pribilofensis* Alexander, 1923

***Material.*** **lTn:** 8–18.VII.1988, sandy-pebble floodplain with herb-willow cover, pt (NO), 2♂♂, 1♀; 25.VI–19.VII.1989, different habitats in the river valley, pt (OKh), 13♂♂, 19♀♀. **lKF:** 9–10.VII.1985, river valley with moss-dwarf willow cover, hc (OKh), 2♂♂, 1♀. **mKF:** 17.VII.1985, sandy floodplain with curtain forbs, hc (OKh), 2♂♂, 1♀. **mNz:** 17–31.VII.1983, pebble floodplain (OKh), 4♂♂, 3♀♀. **mM:** 26.VI–19.VII.2011, sandy-pebble floodplain with spotty wormwood-grass cover, pt (AR), 1♀; 2–27.VII.2014, wet plot in river valley with herb-moss cover, pt (OS), 2♂♂, 4♀♀; 2–4.VII.2015 river valley with willow-forb cover, ypt (OKh), 1♀.

***Distribution.*** Species with predominantly hypoarctic distribution occur in southern Yamal, southern and central Taymyr, the Indigirka Delta, Kamchatka, Pribilof Islands [Lantsov, Chernov, 1987], and the northern Alaska [MacLean, 1975]. In the insular Arctic, it is known only from Wrangel Island Here it occurs locally in areas with different climatic conditions, mainly on sandy-pebbly floodplains of large rivers.

### *Tipula* (*Pterelachisus*) *carinifrons carinifrons* Holmgren, 1883

***Material.*** **lGd:** 23.VI–2.VII.1985, different habitats, pt, hc (OKh), ~120 exs. **lTn:** 21.VI–9.VII.1986, zonal tundra, pt (NO), 12♂♂, 13♀♀; 24.VI–29.VII.1988, different habitats, pt (NO), 260 exs.; 23.VI–19. VII.1989, different habitats, hc, pt (OKh), 1509 exs. **lKF:** 9.VII.1985, hc (OKh), 2♂♂, 2♀♀. **lNs:** 27.VII.1985, zonal tundra, hc (OKh), 2♂♂. **uNs:** 22–23.VII.1985, different habitats, hc (OKh), 2♂♂, 3♀♀. **Mb:** 11–31.VII.2016, bank of valley with spotty lichen-herb-moss cover, pt (LV), 1♂, 2♀. **uNzh:** 8.VII–1.VIII.2016, different habitats, pt (LV), 13♀♀. **mNzh:** 10.VI–27.VII.2006, different habitats, pt (AG), 43♀♀; 8–9. VII.2019, zonal tundra, ypt (OKh), 1♂. **mKF:** 18–20.VII.1985, habitats with moderate moisture, hc (OKh), 2♂♂, 2♀♀; 16–27.VI.2011, wet tundra on the foothill plume, pt (SL), 9♂♂, 35♀♀. **DhM:** 8–22.VII.1986, wet base of hill with herb-moss cover, pt (NO), 2♀♀. **SB:** 9.VIII.1972, spotty tundra (KG), 2♂♂; 5 km E Somnitelnaya Bay, 10.VII.1972 (KG), 4♂♂; 21.VI–4.VIII.1986, different habitats, pt, hc (OKh), 14♂♂, 3♀♀; 9.VII–2.VIII.1989, different habitats, hc, pt (OKh), 174 exs.; 15.VI–16. VII.2006, different habitats, pt (OKh), 26 ♀♀; 17.VI–19.VII.2015, different habitats, pt (Okh), ~ 180 exs.; 26.VI–1.VII.2019, different habitats, ypt (PK), 7♂♂, 1♀. **SMM:** foothill plume and gravel slope with forbs, 6.VII.1966 (VSh), 1♂; 5–6.VII.1972 (KG), 3♂♂; 15–25.VI.1986, base of foothill with spotted willow-herb cover, pt (OKh), 1♀; 19–31.VII.1988, pt (MB), 3♀♀; 17.VII–1.VIII.1989, pebble floodplain, pt (OKh), 7♂♂, 2♀♀; 13.VI–16.VII.2006, mainly in wet habitats, pt (OKh), 12 ♀♀; 17.VI–19. VII.2015, different habitats, mainly in the river valley and wet foothill base, pt (OKh), 63 exs. uKh (8 km SE Sovetskaya Mt.): west slope of the Berry Peak, 300 m, 13.VII.1972 (KG), 1♂. **RB:** 6.VII.1983 (DB), 9♂♂, 3♀♀; 6.VII–5.VIII.1988, dry tundra on foothill plume, pt, hc (OKh), 11♂♂, 3♀♀; 10–13.VII.2019, ypt (OKh), 2♂♂. **lGs:** 28.VI–8.VII.1984, different habitats, pt, hc (OKh), 13♂♂, 16♀♀. **TnM:** 1–19.VII.2015, different

habitats, pt (LV), 3♂, 22♀♀; 4–14.VII.2020, different habitats, pt (UB), 8♀♀; 8–17.VII.2021, northern slope, pt (UB), 1♀. **mNz:** 5.VII–2.VIII.1983, different habitats, pt, hc (OKh), 86 exs. **mM:** 12–13.VII.1983, hc (OKh), 3♂♂, 4♀♀; 28.VI.1991, hc (OKh), 1♂; 5–6.VII.1992 (OKh), 10♂♂, 5♀♀; 26–28.VI.1993 dry tundra (OKh), 5♂♂, 11♀♀; 17, 24.VII.1994, hc (OKh), 2♂♂, 1♀♀; 23.VI–19.VII.2006, different habitats except floodplain and most driest, pt (OKh), 59♀♀; 26.VI–19.VII.2011, dry tundra, pt (AR), 5♂♂, 7♀♀; 2–27.VII.2014, different habitats, pt (OS), ~ 140 exs.; 29.VI–5.VIII.2015, different habitats, pt (OKh), 11♀♀. **PM:** 18.VI–7.VII.1992, dry south-facing slope with spotted forb-dryad cover, pt (OKh), 2♂♂. **uNz:** 3.VII–3.VIII.2006, river valley, pt (OKh), 7♀♀; 22.VI–10.VII.2015, different habitats with high abundance in wet and zonal tundra, pt, hc, (OKh), ~ 75 exs.

***Distribution and comments.*** The arctic subspecies is widely distributed in the tundra zone of Eurasia from Novaya Zemlya to the Chukchi Peninsula, and also known from Alaska (Cape Barrow) [Lantsov, Chernov, 1987]. The ecology, life cycle and all developmental stages of the species have been studied in detail in the arctic tundra of Taymyr [Chernov, Savchenko, 1965; Lantsov, 1982a]. On Wrangel Island, it occurs everywhere and inhabits a wide range of habitats; it is most abundant in zonal habitats on the plains (Fig. 4).

### *Tipula* (*Pterelachisus*) *middendorffi middendorffi* Lackschewitz, 1936

***Material.*** **SMM:** 14.VI–18.VII.2015, wet base of hill with spotty dryad-moss cover, pt (OKh), 3♂♂, 1♀. **TnM:** 16–22.VII.2018, damp river terrace with dryad-moss cover, ypt (UB), 1♀; 6–9.VII.2019, river bank with sparse grass-wormwood cover, ypt, (UB), 1♂; 4–14.VII.2020, slope of hill with herb-moss cover, ypt (UB), 1♂; 8–17.VII.2021, northern slope of hill with herb-moss cover, pt (UB), 4♀♀; 13–21.VII.2022, damp plot in the stream valley, pt (PK), 1♀. **mM:** 12–13.VII.1983 (OKh), 2♂♂; 6–9.VII.1992, dry gravelly plots with forb-willow and forb-sedge cover, hc (OKh), 1♂, 2♀♀; 27–29.VI.1993, zonal and dry tundra, hc (OKh), 4♂♂, 6♀♀; 2.VIII.1994, dry tundra, hc (OKh), 1♂; 5♀♀, 2–27.VII.2014, different dry habitats, pt, (OS), 7♀♀; 1–23.VII.2015, different habitats including zonal tundra, pt, sw, ypt (OKh), 4♂♂, 4♀♀. **uNz:** 24.VI.2015, south-facing slope of river terrace with dryad-grass-forb meadow, sw (OKh), 1♂; 25.VI–10.VII.2015, intermountain basin with spotted moss-willow-grass cover, pt (OKh), 2♀♀.

***Distribution.*** Eurasian species, widely distributed in the Arctic (found from northern Norway to Chukotka, including Dolgiy and Wrangel Islands); it is also recorded in Tuva and the Amur region [Lantsov, Chernov, 1987; Lantsov, 2011]. On Wrangel Island, it is regularly found only in the warmest areas (*nTT*), mainly in mesophytic and dry habitats (Fig. 7).

### *Tipula* (*Savtshenkia*) *convexifrons* Holmgren, 1883

***Material.*** **mKF:** 19.VII.1985, damp foothill plume with spotty sedge-moss cover, hc (OKh), 1♂, 1♀. **SB:** 10.VII.1989, edge of river bank with spotted moss-willow-dryad cover, hc (OKh), 1♀. **SMM:** river valley, 150 m, 25.VII.1971 (KG), 2♂♂; 8.VII.1972, bog on the southern slope in the river valley, hc (KG), 1♂, 1♀. **lKh:** foothills of Mineev Mts, swamp river valley, 11.VII.1972 (KG), 1♂. **lGs:** 15.VII.1984, damp river terrace with willow-sedge-moss cover, hc (OKh), 2♂♂. **TnM:** 30.VI.2019, wet runoff strip on foothill plume, hc, (UB), 1♀; 8–17.VII.2021, northern slope of hill with herb-moss cover, pt, ypt (UB), 2♂♂. **mNz:** 5.VII–1.VIII.1983, wet and dry plots in the river valley, wet mountain terrace with sedge-moss tussocks, pt (OKh), 2♂♂, 5♀♀; 13–14.VII.2018 pebble floodplain, ypt (UB) 6♂♂; 4–5.VII.2019, same habitat, ypt (UB), 2♂♂. **mM:** 9.VII.1992, high floodplain, hc (OKh), 1♂, 1♀; 26.VI–19.VII.2011, wet plot in the river valley with herb-moss cover, pt (AR), 7♂♂, 2♀♀; 1–4.VII.2015, same habitat, sw, ypt (OKh), 2♂♂, 2♀♀.

***Distribution and comments.*** Arctic species with predominantly Siberian distribution, it is known from Novaya Zemlya, southern and central Taymyr, Anabar Bay, New Siberian Islands, and the Lena Delta [Lantsov, Chernov, 1987]. For Wrangel Island, the species was first listed in 2019 [Khruleva, Devyatkov, 2019]; specimens collected from the mKF and the lGs were previously listed as *Tipula* (*Yamatotipula*) *anceps* Savchenko, 1965 [Khruleva, 1987]. On the island, it occurs mainly in the warmest areas (mountains of *sAT*, *nTT*), in wet habitats in the valleys of large river (Fig. 6).

### *Tipula* (*Savtshenkia*) *glaucocinerea* Lundström, 1915

***Material.*** **lGd:** 5.VII–2.VIII.1985, mainly in the wet depressions near lakes, pt, hc (OKh), ~110 exs. **lTn:** 9.VII–8.VIII.1988, wet habitats, pt (NO), 152 exs.; 25.VI–19.VII.1989, wet habitats, pt (OKh), 5♂♂, 17♀♀. **lNs:** 26.VII.1985, zonal tundra, hc (OKh), 1 ex.; 27–28.VII.1985, wet habitats, hc (OKh), 15 exs. **uNs:** 23.VII.1985, damp habitats on the foothill plume, hc (OKh), 6♂♂, 1♀. **WC:** 16–24.VII.2020, wet tundra, ypt, 3♂♂, 1♀; 16–24.VII.2020, zonal tundra, ypt, 1♀. **mKF:** 16–27.VII.2011, wet plot in the river valley with herb-moss cover, pt (SL), ~310 exs.; 16–27.VII.2011, river valley with lichen-sedge-moss cover, pt (SL), 2♂♂, 2♀♀; 16–27.VII.2011, zonal tundra, pt (SL), 4♂♂, 8♀♀. **Mb:** 11–31.VII.2016, wet shore of the lagoon with grass-moss cover, pt (LV), 39 exs. **uNzh:** 8.VII–1.VIII.2016, wet foothill plumes, pt (LV), 1♂, 2♀♀. **mNzh:** 8–9.VII. 2019, zonal tundra, sw, ypt (OKh), 2♂♂. **SB:** 16.VI–19.VII.2015 moss-dryad spotted tundra, pt (OKh), 1♀. **SMM:** 25.VII.1971, river valley (KG), 1♂; 28.VII.1972, floodplain, (KG), 1♂; 19–31.VII.1988, pt (MB), 1♀; 14.VI–18.VII.2015, pebble floodplain and wet base of hill, pt (OKh), 4♀♀. **RB:** damp tundra, 24.VII.1988, hc (OKh), 1♀; 11–13.VII.2019, damp tundra, pt (OKh), 1♀. **lGs:** 15–17.VII.1984, damp river terrace with willow-sedge-moss cover, sw (OKh), 6♂♂, 8♀♀. **TnM:** 1–19.VII.2015, damp habitats in the stream valley and in the northern slopes of hill, pt (LV), 19♀♀. **mNz:** 25.VII–23.VIII.1983, mainly in the wet habitats, pt (OKh), 24♂♂, 20♀♀; 9–12.VII.2022, willow thickets in the river valley, ypt (PK), 1♂. **mM:** 26.VI–19.VII.2011, wet plot in the river valley, pt (AR), 1♂; 22–24.VII.2015, same habitat, ypt (OKh), 1♂.

***Distribution and comments.*** Arctic species with predominantly Siberian distribution. In the mainland part it occurs from Yamal to Chukotka, in the insular Arctic it is known from Dolgiy (the only locality of the species in the European part), Bolshevik (Severnaya Zemlya), New Siberian (Kotelny, Little Lyakhovsky), and Wrangel Islands [Lantsov, Chernov, 1987; Lantsov, 2011]. The ecology, life cycle and all developmental stages of the species have been studied in detail in the arctic tundra of Taymyr [Lantsov, 1982b]. On Wrangel Island, *T. glaucocinerea* Lundström, 1915 is found in wet habitats; the species is most common in the areas with the most severe climatic conditions (*sPD*, *nAT*, Fig. 2) and occurs sporadically in similar habitats in the warmest areas (*sAT*, *nTT*).

### *Tipula* (*Vestiplex*) *arctica* Curtis, 1835

***Material.*** **lTn:** 8–18.VII.1988, above river terrace with forb-herb cover, pt (NO), 2♂♂, 2♀♀; 25.VI–19.VII.1989, different dry habitats, mainly in the river valley, pt (OKh), 42♂♂, 10♀♀. T**mM:** 10–31.VII.2016, south-facing slope with spotted grassy-forb cover, pt (LV), 1♀. **SB:** 20.VII.1966, hc (KG), 1♀; 12.VII.1972, camp (KG), 1♂; 12.VI–17.VII.2015, edge of river bank with spotted moss-willow-dryad cover, pt (OKh), 1♀. **SMM:** 27.VII.1966, meadow near river (KG), 1♀; 5–6.VII.1972 (KG), 1♂, 1♀; 9.VII.1972, river valley and spotty tundra (KG), 3♂♂; 7.VII.1989, gravelly steep slope with sparse herb cover, hc (OKh), 1♂. **RB:** 7.VII.1988, southern slope with spotted tundra-steppe (forbs, xeromorphic sedges) community, hc (OKh), 5♀♀. **lGs:** 15–16.VII.1984, wet plot in river valley with willow-sedge-moss cover, sw (OKh), 3♀♀. **TnM:** 14.VII.1991, stream bank, hc (OKh), 1♀; 16–22.VII.2018, stream valley with hummocky herb-moss cover, ypt, (UB), 1♂, 1♀. **mNz:** 26.VII–1.VIII.1983, extremely dry gravelly slopes with sparse lichen-forb cover, pt, hc (OKh), 1♂, 2♀♀. **mM:** 12–13.VII.1983, hc (Okh), 2♂♂; 29.VI.1991, hc (OKh), 1♀; 29.VI.1992, dry tundra, hc (OKh), 1♂; 16.VI.1993, dry south-facing slope with tundra-steppe (forbs, xeromorphic sedges) spotted cover, hc (OKh), 1♂; 26.VI–2.VIII.1994, different dry habitats including tundra-steppe ones, pt (OKh), 5♂♂, 2♀♀; 26.VI–19.VII.2011, wet plot in the river valley with grass-moss cover, pt (AR), 1♂; 20–27.VII.2014, dry tundra, pt (OS), 1♀. **PM:** 18.VI–7.VII.1992, dry south facing slope with spotted legume-dryad cover, pt (OKh), 1♀; 28.VI–13.VII.2015, stream valley with

herb-moss-willow cover, pt (OKh), 1♂. **uNz:** 22.VI–8.VII.2015, willow thickets in a river valley, pt, sw (OKh), 4♀♀.

***Distribution.*** A circumpolar arctic species, it is widespread in the tundra zone and also known from isolated mountain systems in the south (Altai, Colorado). In the insular Arctic, it is found on from Novaya Zemlya, Vaigach, Wrangel, Greenland, and various islands of the Canadian Arctic Archipelago. On Wrangel Island, the species is widespread in the mesophytic and dry habitats in the warmest areas (mountains of *sAT*, *nTT*), but the largest series of the species was collected in one season in the northern plain (*nAT*).

### *Tipula* (*Vestiplex*) *wrangeliana* Stackelberg, 1944

Fig. 13–14.

***Material.*** **lTn:** 21.VI–20.VII.1986, zonal tundra, pt (NO), 2♂♂, 8♀♀; 24.VI–29.VII.1988, different habitats, pt (NO), 132 exs.; 23.VI–19.VII.1989, different habitats, hc, pt (OKh), 618 exs. **TmM:** 10–31.VII.2016, the base of the hill with spotted sedge-moss cover, pt (LV), 1♂. **mNzh:** 10.VI–27.VII.2006, mainly in damp hummocks on the slope of southern exposure, pt (AG), 49♀♀. **mKF:** 18.VII.1985, different dry habitats, hc (OKh), 4♂♂, 3♀♀; 16–27.VI.2011, different habitats, pt (SL), 8♂♂, 12♀♀. **ChO:** 25.VI–16.VII.2006, dry foothill plume with spotty forbs and xeromorphic sedges, pt (OKh), 7♀♀. **SB:** 25.VII.1966, spotty tundra (KG), 1♀; 9.VIII.1972 (KG), 2♂♂; 25.VI–4.VIII.1986, habitats with dry and moderate moisture, pt, hc (OKh), 8♂♂, 3♀♀; 9–30.VII.1989, same habitats, pt, hc (OKh), 82 exs.; 15.VI–16.VII.2006, same habitats, pt (OKh), 32♀♀; 17.VI–19.VII.2015, same habitats, pt (Okh), ~300 exs. **SMM:** 6.VII.1966, spotty tundra on the foothill and gravelly slopes with forbs (VSh), 3♂♂; 22.VII.1966, Mineev Mts, 250 m (KG), 1♀; 5–6.VII.1972 (KG), 8♂♂; 9.VII.1972, same locality, different habitats (KG), 7♂♂; 9.VIII.1972, spotty tundra (KG), 2♂♂; 15–25.VI.1986, dry gravelly south-facing slope, pt (OKh), 1♀; 19–31.VII.1988, pt (MB), 1♂; 4.VIII.1989, same habitat, hc (OKh), 1♀; 13.VI–16.VII.2006, different habitats, pt (OKh), 7♀♀; 14.VI–19.VII.2015, different habitats, pt (Okh), 21♀♀. **RB:** 6.VII.1983 (DB), 29♂♂, 3♀♀; 6.VII–5.VIII.1988, dry plots on the foothill plumes and south-facing slopes, pt, hc (OKh), 29♂♂, 2♀♀. **lGs:** 28.VI–8.VII.1984, river valley with willow-forb-dryad cover, pt (OKh), 2♂♂. **TnM:** 1–19.VII.2015, mainly in dry habitats, pt (LV), 6♂♂, 8♀♀; 30.VI–27.VII.2018, damp plots in the river valley, ypt (UB), 6♂♂, 1♀; 30.VI–9.VII.2019, different plots in the river valley, ypt, hc (UB), 7♂♂; 4–14.VII.2020, different habitats, ypt, pt (UB), 3♂♂, 2♀♀; 8–17.VII.2021, spotty dryad tundra on the foothill slope, pt, ypt (UB), 21♂♂, 7♀. **mNz:** 17.VII–2.VIII.1983, different habitats, pt, hc (OKh), 25♂♂, 3♀♀; 13–14.VII.2018, foothill plume with spotted moss-dryad cover, ypt (UB), 1♂. **mM:** 12–13.VII.1983 (OKh), 4♂♂; 28–29.VI.1991, hc (OKh), 3♂♂, 1♀; 6–9.VII.1992, different habitats, hc (OKh), 6♂♂, 1♀; 20–30.VI.1993, habitats with dry and moderate moisture, pt (OKh), 2♂♂, 1♀; 17.VII–2.VIII.1994, dry plots in the river valley, pt, hc (OKh), 3♂♂, 1♀; 23.VI–19.VII.2006, different habitats, pt (OKh), 93♀♀; 26.VI–19.VII.2011, dry tundra, pt (AR), 15♂♂, 6♀♀; 2–27.VII.2014, different habitats, pt (OS), ~ 520 exs.; 29.VI–5.VIII.2015, different habitats with high abundance in dampish plots in river valley, pt (OKh), ~30 exs.; 16.VI.2019, upper reaches of Vesely brook, near lake, hc (UB) 1♂. **PM:** 28.VI–13.VII.2015, dry south-facing slope with tundra-steppe (willows, forbs, xeromorphic sedges) spotted cover, pt (OKh), 1♀. **uNz:** 8.VII.1991, hc (OKh), 1♂; 3.VII–3.VIII.2006, willow thickets in river valley, pt (OKh), 3♀♀; 22.VI–10.VII.2015, different habitats, pt (OKh), ~ 80 exs.

***Distribution.*** Subendemic of Wrangel Island; only two specimens of this species were collected on the continental Chukotka: in the central part, Amguema River (male) and in the south of the Chukchi Peninsula, Tkachen Bay (female) [Stackelberg, 1944; Savchenko, 1964]. On Wrangel Island, the species occurs sporadically in climatically harsh areas of the northern zonal strip (completely absent in the *sPD*). In most areas of the southern zonal strip it is common in mesophytic and dry (except on steep mountain slopes) habitats (Fig. 4, 7), and in the warmest central part (*nTT*) it is also regularly found in damp habitats. Photos of male and female of *T. wrangeliana* Stackelberg, 1944 are given (Fig. 13–14).

### *Tipula* (*Yamatotipula*) *lionota* Holmgren, 1883

***Material.*** **lKF:** 9.VII.1985, brook Vrezany, dry hillock with sedge-moss cover, hc (OKh), 3♂♂. **SMM:** 9.VII.1972 (KG), 2♂♂. **TnM:** 8–11.VII.2021, northern slope of hill with herb-moss cover, ypt (UB), 1♀. **mNz:** 26.VII.1983, above terrace with moss-legume-dryad cover, (OKh), 1♀.

***Distribution.*** The species is widespread in the tundras of Eurasia (from Novaya Zemlya to the Chukchi Peninsula), and is also known from northern Alaska (Cape Barrow) [Oosterbroek, 2024]. On Wrangel Island, single specimens of this species have been collected in areas with different climatic conditions.

## **Limoniidae:** Chioneinae

### *Arctoconopa forcipata forcipata* (Lundström, 1915)

***Material.*** **lGs:** 16.VII.1984, willow thickets in river valley, hc (OKh), 1♂, 2♀♀. **mM:** 21.VII.1972, N Perkatkun, willow thickets in river valley (KG), 1♂; 21.VII.1972, the mouth of the Crystalny stream (KG), 1♀; 9.VII.2006, willow thickets in river floodplain, sw (OKh), 1♀.

***Distribution.*** Holarctic (possibly circumpolar) species. It is known across Eurasia from northern Fennoscandia to Kamchatka, Alaska and northern Canada [Savchenko, 1980, 1989], and in the insular Arctic — from Vaigach and Wrangel Islands [Lantsov, Chernov, 1987]. On Wrangel Island it is a rare species, collected in the warmest areas (enclaves of *nTT*), in river valleys with willow thickets (Fig. 6).

### *Ormosia* (*Ormosia*) *fascipennis* (Zetterstedt, 1838)

***Material.*** **RB:** 12.VII.2019, pebble floodplain of Nasha River, hc (OKh), 1♀.

***Distribution.*** Holarctic species with arcto-boreo-montane distribution [Savchenko, 1989]. In the Arctic, it is known from Greenland, Novaya Zemlya, northeastern Taymyr, Queen Elizabeth Islands (Ellesmere, Axel-Heiberg) [Lantsov, Chernov, 1987; Oosterbroek et al., 2015]. For the Wrangel Island, this species is reported for the first time.

### *Rhabdomastix* (*Rhabdomastix*) *borealis* Alexander, 1924

***Material.*** **mNzh:** 9.VII.2019, sandy-pebble floodplain (Fig. 3), hc (OKh), 9♂♂, 3♀♀. **uNz:** 6–13.VII.2015, pebble floodplain, ypt (OKh), 3♂♂.

***Distribution.*** Holarctic species with a predominantly hypoarctic distribution. It is known from northern Fennoscandia, Chukotka, Kuril Islands, Alaska and northern Canada (NWT) [Starý, 2004].

### *Symplecta* (*Symplecta*) *sheldoni* (Alexander, 1955)

***Material.*** **lNs:** 27.VII.1985, pebble floodplain, near water, hc (OKh), 2♂♂, 1♀. **TnM:** 7–11.VII.2019, pebble floodplain, ypt (UB), 2♂♂. **mM:** 9.VII.1992, pebble floodplain, hc (Okh), 1♂, 1♀; 17.VII.1994, river valley with spotted willow-herb cover, hc (OKh), 1♂. **uNz:** 26.VI–6.VII.2015, pebble floodplain, pt (OKh), 1♂.

***Distribution.*** The species is found in Mongolia, Chukotka, Alaska, and the Yukon [Starý, Brodo, 2009]. On Wrangel Island, it was collected on gravel floodplains in areas with different climatic conditions.

## Dactylolabinae

### *Dactylolabis* (*Dactylolabis*) *novaezemblae* (Alexander, 1925)

***Material.*** **lTn:** 27.VI–6.VIII.1986, zonal tundra, pt (NO), 1♂, 1♀; 8–18.VII.1988, same habitat, pt (NO), 1♀; 25.VI–19.VII.1989, different habitats, pt (OKh), 3♂♂, 2♀♀. **lNs:** 15–20.VII.1985, hc (OKh), 1 ex.; 26–28.VII.1985, hc (OKh), 2♂♂, 1♀. **Mb:** 11–31.VII.2016, zonal tundra,

pt (LV), 1♂. **mNzh:** 28.VII–3.VIII.2017, river valley with moss-herb cover, pt (MB), 1♂; 8–9.VII.2019, zonal tundra, sw, ypt (OKh), 2♂♂. **RB:** 11–13.VII.2019, zonal tundra, pt (OKh), 1♂. **mNz:** 1.VIII.1983, gravelly top of hill with a sparse reticulated moss-shrub cover (OKh), 1♀. **mM:** 17.VII.1994, high floodplain with forb-willow cover, hc (OKh), 1♂; 1.VII.2015, willow thickets in river bed, sw (OKh), 1♂, 2♀♀; 3–23.VII.2015, high sandy-pebble floodplain with spotty herb-willow cover, pt (OKh), 1♂, 1♀; 23.VII–5.VIII.2015, zonal tundra, pt (OKh), 1♀.

***Distribution.*** Species with predominantly arctic distribution. It is known from Arkhangelsk region (Pechora Basin, Novaya Zemlya), Taymyr, northern Yakutia (lower Lena River), Chukotka (vicinity of Bilibino, Wrangel Island) [Savchenko, 1978, Lantsov, Chernov, 1987; Verves et al., 1990]. It is quite rare on Wrangel Island, collected in areas with different climatic conditions, occurs in both river valleys and zonal habitats.