

The dung flies (Scathophagidae, Diptera) of the Dolgii Island, Barents Sea, Russia

Мухи семейства Scathophagidae (Diptera) арктического острова
Долгий, Баренцево море, Россия

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КЛЮЧЕВЫЕ СЛОВА: Diptera, Scathophagidae, Арктика, тундра, Баренцево море, Ненецкий государственный природный заповедник.

ABSTRACT. Using soil pitfall trapping or netting of vegetation during July 2004, 11 species of dung flies were revealed on the Dolgii Island (69°12'N, 59°13'E), Barents Sea, Russian Arctic. Thus, the scathophagid fauna of the Nenets State Nature Reserve and adjacent areas currently includes 15 species. Seven species were not previously recorded from that area: *Allomyella albipennis* (Zetterstedt, 1838), *Cosmetopus dentimanus* (Zetterstedt, 1838), *Microprosopa lacteipennis* Ringdahl, 1920, *M. pallidicauda* (Zetterstedt, 1838), *Scathophaga litorea* (Fallén, 1819), *S. obscurinervis* (Becker, 1900), *S. varipes* (Holmgren, 1883). Half of the fauna (5 species) belong to the genus *Scathophaga* Meigen, 1803. The geographic distributions of three species are confined to tundra landscapes.

РЕЗЮМЕ. На острове Долгий (69°12'N, 59°13'E), Баренцево море, в почвенных ловушках и при кошении сачком в июле 2004 г. обнаружено 11 видов мух-скатофагид. Таким образом, фауна Ненецкого государственного природного заповедника и прилегающих территорий насчитывает теперь 15 видов. Семь видов отмечаются впервые: *Allomyella albipennis* (Zetterstedt, 1838), *Cosmetopus dentimanus* (Zetterstedt, 1838), *Microprosopa lacteipennis* Ringdahl, 1920, *M. pallidicauda* (Zetterstedt, 1838), *Scathophaga litorea* (Fallén, 1819), *S. obscurinervis* (Becker, 1900), *S. varipes* (Holmgren, 1883). Почти половина из найденных видов принадлежат к роду *Scathophaga* Meigen, 1803. Ареалы трех видов ограничены тундровыми ландшафтами.

Introduction

The order Diptera generally constitutes half of the insect species richness in the tundra zone [Chernov,

1995]. The family Scathophagidae is a relatively small group of dipterans (about 400 species) whose members dwell mainly in the temperate and arctic belts of the Holarctic. The local tundra faunas are thereby characterized by the same species diversity as the taiga ones [Chernov, 1978]. The Arctic fauna in toto comprises about 40 species [Gorodkov, 1970; Danks, 1981; Chernov, 1995]. The dung flies are sometimes considered as being “undoubtedly, the most boreal of all families of Diptera”, as about 20% of the Nearctic fly species are confined to arctic landscapes [McAlpine *et al.*, 1979].

Special information on the Scathophagidae in the Russian Arctic is restricted to a geographical analysis of the boreal members of the genus *Scathophaga* Meigen, 1803 [Gorodkov, 1976], as well as to records and distribution maps of individual species [Gorodkov, 1970, 1976, 1978, 1980, 1981, 1984]. The present paper is based on the collections of dipterans taken by O.L. Makarova and V.V. Gorbatsky on the Dolgii Island (Nenets State Nature Reserve), now transferred to the Zoological Institute, Russian Academy of Sciences. Earlier, K.B. Gorodkov [1978, 1980, 1981, 1984] and A.L. Ozerov [2010a, 2012] recorded 8 species and 4 genera from the mainland part of the Nenets Nature Reserve and adjacent territories: *Okeniella caudata* (Zetterstedt, 1838), *O. dasyprocta* (Loew, 1864), *Scathophaga furcata* (Say, 1823), *S. spurca* (Meigen, 1826)[=*suilla* (Fabricius, 1794)], *S. stercoraria* (Linnaeus, 1758), *Neochirosia pechorica* Ozerov, 2010, *N. veratri* (Hendel, 1925), *Spaziphora hydromyzina* (Fallén, 1819). Other collections of Scathophagidae (6 species) from the region were published by Engelmark [1999] and contains points on the map without distinguished localities.



Map 1. Schematic map of the Pechora Sea (the southeastern sector of the Barents Sea). The star marks the Dolgii Island.

Карта 1. Схематическая карта Печорского моря (юго-восточный сектор Баренцева моря). Звездочкой отмечен о-ов Долгий.

Material and methods

The Dolgii Island, located 10 km off the mainland (Map 1), is a small (39 km long and up to 4 km wide) and low (up to 18.5 m a.s.l.) shelf island. It is attributed to the southern tundra subzone (N.V. Matveyeva, pers. comm.). The climate is marine Arctic, the mean July temperature is +8°C, the annual precipitation is about 350 mm. The prevalent landscape forms are tiny lakes with boggy sides, low hummocky peatbogs, different willow shrub assemblages, lichen-cassiope and moss-sedge-dryas tundras. The sea coast of the island is either flat and silted, occupied by sea marsh, or rocky, with varying slopes.

In July 2004, we prospected 21 habitats belonging to 4 groups: three landscape series (“sea marsh”, “steep sea coast” and “lakeside to ridge top” profiles) and the specific meadow habitats including zoogenic ones.

Flies were collected manually, with an entomological net, and using soil pitfall traps (plastic beakers 65 mm in diameter, containing a 0.3–0.5% formaldehyde solution). The whole survey (3–28 July, 2004) comprised 3080 trap-days. Altogether, 72 specimens were

collected (now kept in the Entomological Division of the Zoological Institute, Russian Academy of Sciences).

Distributional characteristics of the species are given, according to Gorodkov [1986], the check-list by Ovchinnikov [2013] and certain data by Engelmark [1999], Ozerov [2010a, b] and Ozerov & Krivosheina [2014].

List of species

Allomyella albipennis (Zetterstedt, 1838)

MATERIAL EXAMINED. Barents Sea, Dolgii Island (eastern), 69°12' N, 59°13' E, sea marsh of upper level, 7–17.VII.2004, 1 ♂, 5 ♀, Makarova leg.; edge of boggy depression, polar fox hill, 10–18.VII.2004, 1 ♀, Makarova leg.

DISTRIBUTION. Euro-West Siberian boreal species.

Cosmetopus dentimanus (Zetterstedt, 1838)

MATERIAL EXAMINED. Barents Sea, Dolgii Island (eastern), 69°19' N, 58°45' E, northern part of island, near “Izba”, 18.VII.2004, 2 ♂♂, Gorbatsky leg.

DISTRIBUTION. European boreal species.

Microprosopa lacteipennis Ringdahl, 1920

MATERIAL EXAMINED. Barents Sea, Dolgii Island (eastern), 69°12' N, 59°13' E, edge of boggy depression, polar fox hill, 10–18.VII.2004, 1 ♀, Makarova leg.

DISTRIBUTION. The species was earlier known from Scandinavian Lapland and Kola Peninsula (Gorodkov, 1986). The present arctic record is much more easterly. One can predict this species to show a palae-arctic distribution.

Microprosopa pallidicauda (Zetterstedt, 1838)

MATERIAL EXAMINED. Barents Sea, Dolgii Island (eastern), 69°12' N, 59°13' E, edge of boggy depression, polar fox hill, 10–25.VII.2004, 3 ♀♀, Makarova leg.; sea marsh of middle level, 7–17.VII.2004, 1 ♂, 2 ♀♀, Makarova leg.; sea marsh of upper level, 7–17.VII.2004, 2 ♂♂, 2 ♀♀, Makarova leg.

DISTRIBUTION. Circum-boreal Holartic boreo-montane species.

Okeniella caudata (Zetterstedt, 1838)

MATERIAL EXAMINED. Barents Sea, Dolgii Island (eastern), 69°19' N, 58°45' E, northern part of island, near "Izba", 18.VII.2004, 1 ♂, Gorbatovsky leg.

DISTRIBUTION. Euro-Siberian boreal species.

Okeniella dasyprocta (Loew, 1864)

MATERIAL EXAMINED. Barents Sea, Dolgii Island (eastern), 69°12' N, 59°13' E, sea marsh of low level, 7–18.VII.2004, 1 ♂, Makarova leg.; central part of island, west coast near Nenets cultic cross, 10.VII.2004, 2 ♂♂, Gorbatovsky leg.; 69°19' N, 58°45' E, northern part of island, near "Izba", 18.VII.2004, 1 ♂, Gorbatovsky leg.

DISTRIBUTION. Circumpolar arcto-alpine species.

Scathophaga furcata (Say, 1823)

MATERIAL EXAMINED. Barents Sea, Dolgii Island (eastern), 69°12' N, 59°13' E, central part of island, west coast near Nenets cultic cross, 10.VII.2004, 2 ♂♂, Gorbatovsky leg.; 69°19' N, 58°45' E, northern part of island, near "Izba", 18.VII.2004, 3 ♀♀, Gorbatovsky leg.; edge of boggy depression, polar fox hill, 10–25.VII.2004, 1 ♂, Makarova leg.

DISTRIBUTION. American-Eurasian, polyzonal, facultatively synanthropic species.

Scathophaga litorea (Fallén, 1819)

MATERIAL EXAMINED. Barents Sea, Dolgii Island (eastern), 69°12' N, 59°13' E, pebbly sea coast, carpet of *Honckenya peploides*, 17–27.VII.2004, 1 ♀, Makarova leg.; sea marsh of low level, 7–18.VII.2004, 1 ♂, 5 ♀♀, Makarova leg.; 69°19' N, 58°45' E, northern part of island, near "Izba", 18.VII.2004, 1 ♂, 1 ♀, Gorbatovsky leg.; west coast of island, seaweeds, 19.VII.2004, 25 ♂♂, Makarova leg.

DISTRIBUTION. Palaearctic littoral with continental (Eurasian and North American) disjunctions species.

Scathophaga obscurinervis (Becker, 1900)

MATERIAL EXAMINED. Barents Sea, Dolgii Island (eastern), 69°12' N, 59°13' E, sea marsh of low level, 7–18.VII.2004, 1

♀, Makarova leg.; edge of boggy depression, polar fox hill, 10–18.VII.2004, 2 ♂♂, 1 ♀, Makarova leg.

DISTRIBUTION. Circumpolar arcto-boreal species.

Scathophaga stercoraria (Linnaeus, 1758)

MATERIAL EXAMINED. Barents Sea, Dolgii Island (eastern), 69°12' N, 59°13' E, central part of island, west coast near Nenets cultic cross, 4.VII.2004, 1 ♂, Gorbatovsky leg.

DISTRIBUTION. Subcosmopolite. Facultative synanthropic species distributed everywhere except Antarctica, Australia, the Afrotropical Region and South America.

Scathophaga varipes (Holmgren, 1883)

MATERIAL EXAMINED. Barents Sea, Dolgii Island (eastern), 69°12' N, 59°13' E, edge of boggy depression, polar fox hill, 10–18.VII.2004, 1 ♂, 1 ♀, Makarova leg.

DISTRIBUTION. Circumpolar arctic species.

Discussion

The Dolgii Island appears to support 11 species of dung flies belonging to 5 genera. Seven species are recorded in the Nenets Nature Reserve and its environs for the first time: *Allomyella albipennis*, *Cosmetopus dentimanus*, *Microprosopa lacteipennis*, *M. pallidicauda*, *Scathophaga litorea*, *S. obscurinervis*, *S. varipes*. Consequently, the fauna of that area amounts to 15 species, thus constitutes almost half of the Scathophagidae species list of the Russian Arctic [Gorodkov, 1970]. The genus *Scathophaga* undoubtedly dominates, being represented by 5 species. This is characteristic of the tundra dung fly fauna of North America [Danks, 1981], as well as the arctic fauna in toto [Chernov, 1995].

Geographically, the fauna yielded can be considered as mainly Holarctic. Five species groups can be recognized based on their distribution patterns, namely: (1) with sectoral unizonal geographical ranges — *Okeniella caudata*, *Cosmetopus dentimanus*, *Allomyella albipennis*, *Scathophaga litorea*; (2) with circum-arctic ranges — *S. varipes*, *S. obscurinervis*; (3) with Holarctic polyzonal distributions — *Okeniella dasyprocta*, *Microprosopa pallidicauda*, *Scathophaga furcata*; (4) subcosmopolitan — *S. stercoraria*; (5) with a local range — *Microprosopa lacteipennis*.

The presence of *Scathophaga litorea* on the island seems to be accounted for its association with decaying seaweeds. In the Arctic, some widely distributed species, *Allomyella albipennis*, *Microprosopa pallidicauda*, *Scathophaga furcata*, *S. obscurinervis*, *S. varipes*, inhabit burrows of mammals where they find an appropriate microclimate and possibly some other conditions necessary for their normal development. This tendency is confirmed in the present material from the Dolgii Island as well. As lemmings are lost from the island, almost all records of Scathophagidae are associated with the polar fox hills (98 trap-days), with the sea coast, where animal excrements and remnants are

often numerous (483 trap-days) or with temporary human habitations (manual collecting). In 16 other habitats (various tundra and swampy communities, meadows, peatbogs *etc.*), where intense collecting by pitfall traps (about 2300 trap-days) and net sweeping were both conducted, no members of Scathophagidae were found.

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