



Contributions to the aphid fauna (Hemiptera, Aphidoidea) of Chukotka Autonomous Okrug with descriptions of five new species

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Table of contents

Abstract	1
Introduction	2
Material and methods	2
Synopsis of the species	4
Family Drepanosiphidae	4
<i>Allaphis cyperi cyperi</i> (Walker, 1848)	4
<i>Boernerina occidentalis</i> Hille Ris Lambers and Hottes, 1962	4
<i>Euceraphis borealis</i> Blackman in Blackman and De Boise, 2002	4
Family Aphididae	5
Subfamily Pterocommatinae	5
<i>Plocamaphis amerinae</i> (Hartig, 1841)	5
<i>Pterocomma rufipes</i> (Hartig, 1841)	5
Subfamily Aphidinae	5
Tribe Aphidini	5
<i>Aphis aquilonalis</i> sp. nov.	5
<i>Aphis beringiensis</i> sp. nov.	12
Tribe Macrosiphini	14
<i>Acyrthosiphon boreale</i> Hille Ris Lambers, 1952	14
<i>Acyrthosiphum pisum</i> (Harris, 1776)	20
<i>Aulacorthum solani</i> (Kaltenbach, 1843)	20
<i>Brachycaudus (Thuleaphis) rumexicolens</i> (Patch, 1917)	20
<i>Ericaphis wakibae</i> (Hottes, 1934)	21
<i>Macrosiphoniella (Asterobium) jaroslavi</i> sp. nov.	21
<i>Macrosiphum chukotense</i> sp. nov.	29
<i>Nasonovia (Aconitaphis) wahinkae robinsoni</i> (Richards, 1958)	35
<i>Nasonovia (Kakimia) castelleiae</i> (Sampson, 1939)	35
<i>Pleotrichophorus knowltoni</i> Corpuz-Raros and Cook, 1974	35
<i>Pleotrichophorus tuberculatus</i> sp. nov.	38
Discussion	41
Acknowledgement	43
References	43

Abstract

The first study of the aphid fauna from Chukotka Autonomous Okrug has been made; 18 species are reported from this territory, the most north-eastern of Russia and of the Palaearctic Region. Five new species are described: *Aphis aquilonalis* sp. nov. on *Rumex arcticus* Trautv.; *Aphis beringiensis* sp. nov. were collected by yellow trap; *Macrosiphoniella (Asterobium) jaroslavi* sp. nov. on *Artemisia arctica* Less. and *Artemisia tilesii* Ledeb.; *Macrosiphum chukotense* sp. nov., a polyphagous species found on plants in nine different families; and *Pleotrichophorus tuberculatus* sp. nov. on *Artemisia tilesii* Ledeb. In addition, the male and oviparous female of *Acyrthosiphon boreale* Hille Ris Lambers, 1952 and the fundatrix and male of *Pleotrichophorus knowltoni* Corpuz-Raros and Cook, 1974 are described for the first time.

Key words: Arctic and Subarctic Russia, Tundra zone, Drepanosiphidae, Aphididae, new species, first records, unknown previously morphs

Introduction

Chukotka Autonomous Okrug is located in the extreme north east of Asia and includes the Chukchi Peninsula, neighboring areas on the mainland, and some islands (Wrangel, Ayon, Ratmanova and others). Chukotka AO is bounded by the East-Siberian and Chukchi Seas to the north and the Bering Sea to the east. This territory has diverse climatic conditions due to its geographic position, the influence of two oceans (Arctic and Pacific), the complex atmospherical circulation, and a diverse topographic relief. Chukotka AO is situated in the arctic (along the northern sea coast) and subarctic climate zones. Within the territory, climatic conditions vary from maritime on the north-eastern and eastern coasts to continental in the west coastal and interior sections. The mean January temperature varies from -18°C to -42°C , the mean July temperature from 4 to 14°C , and the annual rainfall precipitation varies from 200 to 500 mm. The winter lasts 10 months and vegetation grows for only 80–100 days, even in the southern part. The permafrost is abundant in most of this area. A mountainous relief predominates, with lowlands only occupying coastal areas and large river valleys (e.g., Anadyr River).

The aphid fauna of Chukotka AO has not previously been investigated. Even in the “Keys to Insects of the Far East of the USSR” (Pashtchenko, 1988) no aphid species from Chukotka AO were recorded. Only from Wrangel Island has a small number of species (4–5) been recorded (Stekolshchikov and Khruleva, 2014). Considering the environmental (northern taiga to the arctic tundra) and floristic diversity (Yurtsev *et al.*, 2010) of the area, it is likely to harbor a high diversity of aphid species (Stekolshchikov and Buga, 2009). The aphid fauna of north-eastern Beringia (i.e., Alaska and Yukon) is relatively well studied. Thus the aphids of Chukotka may present interesting insights regarding the relationship between western (Asiatic) and eastern (North American) segments of Beringia, which were connected about 10–11 thousand years ago by the Bering land bridge.

Material and methods

Aphids discussed here were collected only in tundra landscapes of Chukotka AO, but in widely different environmental conditions. In 2011 in the northwestern coastal locality, aphids were collected with pitfall traps and sweep nets as part of a large terrestrial invertebrate fauna inventory, without any floristic survey. Aphids are difficult to identify in the absence of host plant information. The aphid fauna was more specifically targeted in southern Chukotka in 2012.

Aphid taxonomic research in northern territories is difficult due to low population density. Specimens were often collected singly and, in the absence of material demonstrating the range of intraspecific variation, identification was necessarily difficult. In consequence, a number of specimens were identified only to the genus level.

Collection localities. Material was collected at the following four locations (Fig. 1):

1. Chaunskiy District, in the vicinity of the town Pevek. Invertebrates were collected by O.A. Khruleva from 24 May to 3 August 2011. This territory lies on the eastern coast of Chaun Bay where an isolated mountain group is located. In spite of the vicinity of the coast, the climate in this area is continental. Its floristic division is “western distinct”, which corresponds to continental climate conditions (Yurtsev *et al.*, 2010). In the zonal division this area is placed in the typical (or middle hypoarctic) tundra subzone where hypoarctic dwarf shrubs (*Ledum decumbens* (Ait.) Lodd. ex Steud., *Vaccinium uliginosum* spp. *microphyllum* Lange, *V. vitis-idaea* spp. *minus* (Lodd.) Hultén, *Empetrum subholarcticum* V. Vassil.) and arcto-alpine (*Dryas punctata* Juz., *Cassiope tetragona* (L.) D. Don, *Salix phlebophylla* Andersson, *S. polaris* Wahlenb.) co-dominate the plant cover. Willow thickets are located only in flood-plains, shrubs of *Betula nana exilis* (Sukaczew) Hulten do not exceed 20–30 cm. Polydominant dwarf shrub tundra communities occupy the foothills; on the hill slopes, a moss-herb-dryad, spotty forb-herb-dryad, and forb-herb stepped communities predominate. In the vicinity of Pevek, dry habitats are prevalent, whereas hydromorphic sites are limited in distribution. In the mountain landscape near Pevek, invertebrates were collected in four localities. The most intensive investigation, using pitfall traps and sweep nets, was conducted 1 km north of Pevek, N $69^{\circ} 42'$, E $170^{\circ} 21'$, and 1 km south of Pevek, N $69^{\circ} 40'$, E $170^{\circ} 16'$. In both localities material was collected by