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# Some new records of aphid species from Georgia and Mongolia and new aphid-plant interactions

(Hemiptera, Aphididae)

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Six aphid species – *Aphis armata* Hausmann, 1802; *Capitophorus bulgaricus* Tashev, 1964; *Macrosiphoniella nikolajevi* Kadyrbekov, 1999; *Macrosiphum cerinthiacum* Börner, 1950; *Uroleucon cirsicola* (Holman, 1962) and *U. rapunculoidis* (Börner, 1939) are recorded for the first time from Georgia, and *Aphis sanguisorbicola* Takahashi, 1966, is recorded for the first time in Mongolia. New aphid-plant interactions for four aphid species are reported. Measurements, ratios and chaetotaxy for apterous viviparous females of *Macrosiphoniella nikolajevi* from Kazakhstan, Iran, and Georgia are provided.

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## Introduction

Aphids are economically important pests in the world because of damage they cause by sucking, and as vectors of plant viral pathogens (Hooks et al. 2009). More than 5660 valid species of Aphidomorpha have been described worldwide (Favret 2021). Aphids are a predominantly northern temperate group, and more than 75 % of the species are known from the Palaearctic region (Holman 2009). About one third of these species are known from Europe (Coeur d'acier et al. 2010). Here, we report new records of six aphid species from Georgia and one from Mongolia based on an investigation of aphid slides deposited at Insect collection of the Biology Centre CAS, Institute of Entomology, České Budějovice, Czech Republic (IECA). New aphid-plant interactions for four aphid species are reported. Measurements, ratios, and chaetotaxy for apterous viviparous females of *Macrosiphoniella nikolajevi* from Kazakhstan, Iran, and Georgia are

provided to show intraspecific variation. Information on biology and geographical distribution for each species also is given.

## Material and methods

Aphid slides were deposited at the insect collection of the Biology Centre CAS, Institute of Entomology, České Budějovice, Czech Republic (IECA). The measurements of the morphological characters of aphid specimens mounted on slides were done according to Blackman & Eastop (2006) using an Accu-Scope-Exc-350 compound microscope. Each character was measured using Capta-Vision Software ver. 3.9. and photographed with a Excelis HDS digital camera. Measurements are given in millimeters (mm). Aphid species were determined using the online identification keys given in Blackman & Eastop (2021) and then relevant species original descriptions and/or redescrptions were checked. Finally, slide-mounted specimens of the conspecific, determined

aphid species from the Holman's collection were compared to slide mounted aphids. All slide-mounted specimens of aphids from the Holman's collection used in this paper were determined on the genus level by Dr. J. Holman. Aphid species identifier was added by us on the label of aphid slides. Aphids host plants' Latin names were determined on the species level on the aphids slides as it is done for more than 90 % of aphids slides in Holman's collection. Actual host plant names are given according to The Plant List (2013).

The following abbreviations are used in the text and tables: ABD TERG – abdominal tergite; ANT – antenna; ANT III, ANT IV, ANT V, ANT VI b – antennal segments III, IV, and V, and the base of antennal segment VI respectively; ANT III BD – basal diameter of antennal segment III; BL – length of body along the midline; FTC – first tarsal chaetotaxy; HT II – second segment of hind tarsus; MSL – maximal setal length; PT – processus terminalis; SIPH – siphunculus; SN – number of setae; URS – ultimate rostral segments IV and V together.

Depositories of material: IECA – Biology Centre CAS, Institute of Entomology, České Budějovice, Czech Republic; IZISU – Institute of Zoology, Ilia State University, Georgia.

## Results

### List of aphids

#### *Aphis (Aphis) armata*

##### Hausmann, 1802 (Aphidinae, Aphidini)

Material examined: Five apterous viviparous females one on one slide, on *Digitalis ciliata* Trautv. (Plantaginaceae), Georgia, Guria region, Chokhatauri municipality, Bakhmaro (41°51'2.73"N, 42°19'42.60"E), altitude 1884 m., 17.VIII.1969, leg. J. Holman, (13394B 1–5), IECA.

**Biology.** It lives on flower stems of *Digitalis* spp. (Plantaginaceae) (Blackman & Eastop 2021). It is a monoeocious holocyclic species (Blackman & Eastop 2021).

**Distribution.** This species is a Holarctic (Blackman & Eastop 2021).

New record for Georgia. New host plant species for this aphid.

#### *Aphis (Aphis) sanguisorbicola*

##### Takahashi, 1966 (Aphidinae, Aphidini)

Material examined: Four apterous viviparous females on two slides, on *Sanguisorba officinalis* L. (Rosaceae), Mongolia, Selenge province, Sum district, Shaamar (50°4'38.50"N, 106°10'39.04"E), altitude 663 m., 05.VIII.1963, leg. H. Szelegiewicz, (121 (2047) 11–12), IECA and (121 (2047) 8–9), IZISU.

**Biology.** It lives on *Sanguisorba* spp. (Rosaceae) (Blackman & Eastop 2021). Life cycle is unknown.

**Distribution.** This species was known from Russian Federation (West and East Siberia), Japan and Korea (Holman 2009, Blackman & Eastop 2021).

New record for Mongolia.

#### *Capitophorus bulgaricus*

##### Tashev 1964 (Aphidinae, Macrosiphini)

Material examined: Six apterous viviparous females one on one slide, on *Cirsium adjaricum* Sommier & Levier (Asteraceae), Georgia, Guria region, Chokhatauri municipality, Bakhmaro (41°51'2.73"N, 42°19'42.60"E), altitude 1884 m., 16.VIII.1969, leg. J. Holman, (13346A 1–6), IECA.

**Biology.** It lives undersides of leaves of *Cirsium* spp. (Asteraceae) (Blackman & Eastop 2021). It is a monoeocious holocyclic species (Barbagallo & Patti 1998).

**Distribution.** This species is distributed in Bulgaria, Romania, Italy and Switzerland (Holman 2009, Blackman & Eastop 2021).

New record for Georgia. New host plant species for this aphid.

#### *Macrosiphoniella (Macrosiphoniella) nikolajevi*

##### Kadyrbekov, 1999 (Aphidinae, Macrosiphini)

Material examined: Eight apterous viviparous females on three slides, on *Helichrysum* sp. (Asteraceae), Georgia, Guria region, Chokhatauri municipality, Bakhmaro (41°51'2.73"N, 42°19'42.60"E), altitude 1884 m., 17.VIII.1969, leg. J. Holman, (13361A 4–8), IECA and (13361A 1–3), IZISU.

**Intraspecific variation.** This species was described based on fifteen apterous viviparous females from a single locality in Kazakhstan (Kadyrbekov 1999). Later it was found in Iran and hitherto unknown alate viviparous females have been described (Kanturski & Barjadze 2018). Slides with eight apterous viviparous females sampled on *Helichrysum* sp. in Georgia were found in the J. Holman's collection (IECA). Species was determined as *Macrosiphoniella nikolajevi* using the online identification key (Blackman & Eastop 2021). However, (1) the MSL on Frons/ANT III BD ratio in the Kazakhstani specimens is higher (2.84–3.85) than in Iranian (2.5–3.2) and Georgian specimens (2.4–3.0) and (2) MLS on ANTI/ANTI BD ratio in the Kazakhstani specimens is higher (1.32–2.06) than in Iranian (0.80–1.12) and Georgian specimens (1.07–1.29) (see Table 1). The abovementioned differences should be considered as geographically and environmentally-induced intraspecific variation.

**Biology.** It lives on flower stalks of *Helichrysum arenarium* (L.) Moench and *H. maracandicum* Popov (Asteraceae) (Kadyrbekov 1999, Kanturski & Barjadze 2018). Life cycle is unknown.

**Distribution.** This species is known from Kazakhstan and Iran (Kadyrbekov 1999, Kanturski & Barjadze 2018, Stekolshchikov & Buga 2022).

New record for Georgia.

***Macrosiphum (Macrosiphum) cerinthiacum*  
Börner, 1950 (Aphidinae, Macrosiphini)**

Material examined: Four apterous viviparous females on one slide, on *Cerinth minor* L. (Boraginaceae), Georgia, Tbilisi Region, Didgori municipality, Betania (41°39'53.03"N, 44°38'32.52"E), altitude 1325 m., 13.VIII.1969, leg. J. Holman, (13330A 1-4), IECA.

**Biology.** It lives on undersides of leaves of *Cerinth minor* L. (Boraginaceae) (Blackman & Eastop 2021). Life cycle is unknown.

**Distribution.** This species was recorded from France, Spain, Austria, Czech Republic, Slovakia, Hungary, Ukraine, Russian Federation (southeast part) and Turkey (Holman 2009, Blackman & Eastop 2021).

New record for Georgia.

***Uroleucon (Uroleucon) cirsicola*  
(Holman, 1962) (Aphidinae, Macrosiphini)**

Material examined: Two apterous viviparous females on one slide, on *Cirsium adjaricum* Sommier & Levier (Asteraceae), Georgia, Guria region, Chokhatauri municipality, Bakhmaro (41°51'2.73"N, 42°19'42.60"E), altitude 1884 m., 16.VIII.1969, leg. J. Holman, (13351 3-4), IECA.

**Table 1.** Metric and meristic characteristics of apterous viviparous females of *Macrosiphoniella nikolajevi*. Data for the specimens from Kazakhstan are provided from Kadyrbekov (1999) and Stekolshchikov & Buga (2022).

	From Kazakhstan n = 15	From Georgia n = 8	From Iran n = 5
<b>Characters in mm</b>			
BL	2.07–2.36	1.90–2.41	1.95–2.30
MSL on abdominal tergites	0.113–0.146	0.105–0.129	0.121–0.125
MSL on frons	0.106–0.132	0.104–0.133	0.100–0.110
MSL on ANT III	0.050–0.067	0.046–0.058	0.040–0.045
<b>Number of secondary rhinaria on</b>			
ANT III	45–76	40–74	43–71
ANT IV	0	0	0
ANT V	0	0	0
<b>Ratios</b>			
MSL on Frons/ANT III BD	2.84–3.85	2.40–3.00	2.50–3.20
MSL on abdominal tergites/ANT III BD	3.50–4.00	2.39–2.91	2.90–3.30
ANT/BL	0.96–1.29	1.20–1.49	1.03–1.30
ANT III/ANTIV	1.60–1.85	1.37–1.61	1.55–1.70
ANT III/PT	1.21–1.30	1.16–1.29	1.18–1.33
PT/ANT VI B	3.22–4.00	3.70–4.30	3.60–4.15
MLS on ANTIII/ANTIII BD	1.32–2.06	1.07–1.29	0.80–1.12
URS/HT II	1.48–1.80	1.52–1.70	1.75–1.80
SIPH/BL	0.16–0.24	0.18–0.24	0.19–0.22
SIPH/cauda	1.00–1.41	0.96–1.12	1.00–1.18
<b>Number of setae on</b>			
SN on ABD TERG III	18–25	21–26	18–23
SN on ABD TERG VI between SIPH	9–11	9–10	9–10
SN on ABD TERG VIII	5–8	5–8	5–7
Number of accessory setae on URS	6–9	8–11	8–10
SN on cauda	13–20	15–21	16–20
SN on anterior disc of subgenital plate	2–8	2–4	2–3
SN on hind margin of subgenital plate	6–10	8–12	9–11
FTC	3:3:3	3:3:3	3:3:3

**Biology.** It lives on upper parts of stems and under-sides of upper leaves of *Cirsium* spp., *Senecio jacobaea* D. Don and *Tragopogon orientalis* L. (Asteraceae) (Holman 1962, Ivanoskaya 1977). Life cycle is unknown.

**Distribution.** This species is distributed in Ukraine (Crimea), Moldova, Turkey and Russian Federation (west Siberia) (Holman 1962, 2009, Ivanoskaya 1977, Blackman & Eastop 2021).

New record for Georgia. New host plant species for this aphid.

***Uroleucon (Uromelan) rapunculoidis*  
(Börner, 1939) (Aphidinae, Macrosiphini)**

Material examined: Eight apterous viviparous females on two slides, on *Campanula collina* Sims (= *C. annae*) (Campanulaceae), Georgia, Guria region, Chokhatauri municipality, Bakhmaro (41°51'2.73"N, 42°19'42.60"E), altitude 1884 m., 16.VIII.1969, leg. J. Holman, (13345B 21–24), IECA and (13345B 13–16), IZISU; three apterous viviparous females on one slide, on *Campanula alliariifolia* Willd. (Campanulaceae), Georgia, Mtskheta-Mtianeti region, Mtskheta municipality, Zedazeni (41°52'8.53"N, 44°45'55.32"E), altitude 1062 m., 12.VIII.1969, leg. J. Holman, (13326 11–13), IECA.

**Biology.** It lives on stems and flowers of *Campanula* spp. (Campanulaceae) (Blackman & Eastop 2021). It is a monoecious holocyclic species (Hille Ris Lambers 1939).

**Distribution.** This species is distributed in Europe, south-west and central Asia (Holman 2009, Blackman & Eastop 2021).

New record for Georgia. New two host plant species for this aphid.

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