

Diversity of aphids (Homoptera: Aphididae) in Southeastern Serbia

Original Article

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Received: August 2, 2019

Revised: September 11, 2019

Accepted: September 19, 2019

Abstract:

Aphids represent one of the most significant pest species in agroecosystems. In this study we investigated aphid diversity in Southeastern Serbia. We recorded 132 species, mostly infesting host plants from the families Asteraceae and Rosaceae. The most diverse genus was *Aphis* Linnaeus with 34 species. Within this genus, the most frequently sampled species was *A. fabae* Scopoli. Genera *Uroleucon* Mordvilko, *Brachycaudus* van der Goot and *Dysaphis* Börner were also represented by a large number of species.

Key words:

aphids, Southeastern Serbia, species richness

Apstract:

Raznovrsnost biljnih vaši (Homoptera: Aphididae) u jugoistočnoj Srbiji

Biljne vaši predstavljaju jednu od najznačajnijih grupa štetočina u agroekosistemima. U ovoj studiji istraživali smo raznovrsnost biljnih vaši u jugoistočnoj Srbiji. Zabeležili smo 132 vrste, koje uglavnom zaražavaju biljke domaćine iz porodice Asteraceae i Rosaceae. Najraznovrsniji rod je *Aphis* Linnaeus sa 34 vrste. U ovom rodu, najčešće uzorkovana vrsta je *A. fabae* Scopoli. Rodovi *Uroleucon* Mordvilko, *Brachycaudus* van der Goot i *Disaphis* Börner takođe su predstavljeni velikim brojem vrsta.

Ključne reči:

biljne vaši, jugoistočna Srbija, bogatstvo vrsta

Introduction

Aphids (Homoptera: Aphididae) are one of the most economically important insect group in agriculture. They are significant plant pests, both in cultivated and self-seeding plants. Apart from causing direct damage by sucking plant juices, they also transmit many plant viruses, such as the bean yellow mosaic virus, bean common mosaic virus, cucumber mosaic virus (Gálvez & Morales, 1989). Aphids are distributed worldwide, but usually most common in temperate areas of the Northern hemisphere. Number of described species in world to this date is about 4700, of which about one third have been recorded from Europe (Coeur d'acier et al., 2010). Within the territory of Serbia, 374 species

were found. The research on aphid fauna in Serbia was most contributed by Petrović (1998), Petrović-Obradović (2003), as well as Poljaković-Pajnik et al. (2002), Vučetić et al. (2014) and Petrović-Obradović et al. (2007, 2010, 2018).

The primary aim of this study was to explore the diversity of aphid fauna during the ten-year research period in the region of Southeastern Serbia. The secondary aim was to determine the number of trophic associations between aphid species and their host plants.

Materials and methods

This study was based on material collected during the last ten years in different types of habitats



of Southeastern Serbia. Aphids were collected from plant parts by using a fine thin brush and were transferred to plastic tubes filled with 90% ethanol. The specimens were identified according to keys prepared by Blackman & Eastop (1994, 2000, 2006). All analyzed material has been deposited at the Faculty of Agriculture, University of Belgrade, Serbia. Plants were identified using Josifović, ed. (1970-1976) and deposited in the herbarium of the Faculty of Sciences and Mathematics, University of Niš, Serbia (HMN).

Results

Aphid-host plant associations

Species of Aphididae are listed alphabetically, with the following order: host plant, host plant family in parenthesis, collection site, date of collection and legator (VŽ-Vladimir Žikić, DV-Darija Veličković, SSS-Saša S. Stanković, MR-Milica Ristić, MIM-Marijana Ilić Milošević, MĐ-Maja Đorđević, ML-Maja Lazarević, NS-Nikola Stanković, AS-Aleksandra Stojiljković, MS-Milan Stanisavljević, BZ-Bojan Zlatković, NM-Nikola Mladenović, MM-Majda Mehanović, DN-Danijela Nikolić, ZK-Zorana Kojičić, LjM-Ljubomir Mihajlović).

Acyrtosiphon caraganae (Cholodkovsky, 1908)

on: *Coronilla emerus* (Fabaceae), Niš, Niška Banja, 19.5.2015, VŽ; Pčinja canyon, Prohor Pčinjski, 10.6.2014, VŽ

Acyrtosiphon malvae (Mosley, 1841)

on: *Petunia* sp. (Solanaceae), Prokuplje, 6.6.2017, DV; *Geranium dissectum* (Geraniaceae), Niš, 26.4.2014, VŽ.

Acyrtosiphon pisum (Harris, 1776)

on: *Medicago sativa* (Fabaceae), Lebane, Konjino, 3.5.2014, SSS; *Pisum sativum* (Fabaceae), Prokuplje, Gornja Konjuša, 11.6.2017, MR; *Vicia angustifolia* (Fabaceae), Niš, Popovac, 27.4.2014, VŽ; *Vicia* sp., Vlasinsko jezero (lake), 6.8.2015, VŽ

Acyrtosiphon sp.

on: *Coronilla varia*, Niš, 3.6.2016, VŽ

Anoecia corni (Fabricius, 1775)

on: *Cornus mas* (Cornaceae), Niš, Donji Matejevac, 26.4.2018, MIM; Sićevačka klisura (gorge), Ostrovica, 28.5.2013, MĐ

Aphis acetosae Linnaeus, 1761

on: *Rumex acetosella* (Polygonaceae), Vlasinsko jezero (lake), 19.6.2018, VŽ

Aphis affinis Del Guercio, 1911

on: *Mentha aquatica* (Lamiaceae), Bela Palanka,

Divljana, 6.6.2014, VŽ; Grdelička klisura (gorge), 5.6.2014, SSS; *M. longifolia*, Niš, Niška Banja, 23.5.2014, SSS; Pčinja canyon, Gornji Starac, 10.6.2014, SSS; Sićevačka klisura (gorge), Sićevo, 24.5.2018, ML; Vlasinsko jezero (lake), 6.8.2015, SSS; Vranje, 18.6.2016, NS; *M. piperita*, Niš, Bujanj, 5.6.2013, SSS

Aphis balloticola Szelegiewicz, 1968

on: *Ballota nigra* (Lamiaceae), Niš, 31.5.2011, VŽ

Aphis confusa Walker, 1849

on: *Knautia* sp. (Dipsacaceae), Niš, Niška Banja, 31.5.2017, DV; Sićevačka klisura (gorge), Ostrovica, 28.5.2013, MĐ

Aphis cracca Linnaeus, 1758

on: *Vicia cracca*, Radan planina (mt.), 12.6.2016, VŽ; Vlasinsko jezero (lake), 30.6.2016, SSS

Aphis craccivora Koch, 1854

on: *Cichorium intybus* (Asteraceae), Leskovac, 30.5.2017, AS; Prokuplje, Gornja Konjuša, 11.6.2017, MR; *Coronilla varia*, Niš, 3.6.2015, VŽ; *Crepis biennis* (Asteraceae), Niš, Donji Matejevac, 5.6.2013, VŽ; *C. foetida*, Niš, 1.6.2013, VŽ; *Crepis* sp., Niš, 5.6.2013, VŽ; *Lactuca* sp. (Asteraceae), Lebane, 1.6.2013, SSS; *Medicago sativa*, Aleksinac, Moravac, 18.6.2015, MS; Lebane, 19.6.2011, SSS; Leskovac, 19.5.2017, AS; *Melilotus alba* (Fabaceae), Leskovac, 12.6.2017, AS; *Robinia pseudoacacia* (Fabaceae), Dukat (mt.), 7.8.2011, VŽ; Leskovac, 25.5.2018, AS; Niš, 19.5.2013, VŽ; Vranje, 17.6.2016, NS; Vlasinsko jezero (lake), 7.8.2015, VŽ; *Salvia* sp. (Lamiaceae), Niš, 5.6.2013, VŽ; *Sophora japonica* (Fabaceae), Niš, Niška Banja, 6.6.2013, VŽ; *Trifolium lagopus* (Fabaceae), Pčinja canyon, Prohor Pčinjski, 10.6.2014, BZ; *Vicia cordata*, Niš, 21.5.2013, SSS; Pčinja canyon, Gornji Starac, 10.6.2014, SSS; *V. cracca*, Lebane, Konjino, 31.5.2014, SSS; Prokuplje, Beloljin, 14.5.2016, MR; Prokuplje, Bresničić, 15.6.2014, VŽ; Vlasinsko jezero (lake), 8.8.2015, VŽ; Vranje, 8.6.2016, NS; *V. pannonica*, Radan planina (mt.), 12.6.2016, VŽ

Aphis crepidis (Börner, 1940)

on: *Crepis foetida*, Vlasinsko jezero (lake), 21.7.2013, SSS

Aphis davletshinae Hille Ris Lambers, 1966

on: *Malva sylvestris* (Malvaceae), Prokuplje, Gornja Konjuša, 11.6.2017, MR

Aphis epilobii Kaltenbach, 1843

on: *Epilobium montanum* (Onagraceae), Grdelička klisura (gorge), 5.6.2014, SSS

Aphis fabae Scopoli, 1763

- on: *Achillea millefolium* (Asteraceae), Prokuplje, Gornja Konjuša, 15.6.2016, MR; *Aegopodium podagraria* (Apiaceae), Niš, 11.6.2014, VŽ; *Amaranthus retroflexus* (Amaranthaceae), Niš, 1.7.2011, VŽ; Prokuplje, Gornja Konjuša, 15.6.2016, MR; *Anthriscus* sp. (Apiaceae), Niš, Gornji Matejevac, 25.5.2014, VŽ; Prokuplje, 8.6.2017, DV; Vlasinsko jezero (lake), 30.6.2016, SSS; *A. sylvaticus*, Prokuplje, Gornja Konjuša, 23.4.2016, MR; *A. sylvestris*, Niš, Niška Banja, 14.5.2017, VŽ; Radan planina (mt.), 6.6.2015, VŽ; *Arctium lappa* (Asteraceae), Sićevačka klisura (gorge), Ostrovica, 28.5.2013, MĐ; Vranje, 18.5.2018, NM; *Atriplex patula* (Chenopodiaceae), Vranje, 17.7.2016, NS; *Ballota nigra*, Vranje, 4.5.2016, NS; *Beta vulgaris* (Chenopodiaceae), Leskovac, 26.5.2017, AS; *Bifora radians* (Apiaceae), Niš, 22.5.2013, MĐ; *Carduus acanthoides* (Asteraceae), Leskovac, 25.5.2018, AS; Prokuplje, Gornja Konjuša, 29.5.2016, MR; *Centaurea cyanus* (Asteraceae), Lebane, Konjino, 31.5.2014, SSS; *Chenopodium album* (Chenopodiaceae), Lebane, 1.6.2013, SSS; Niš, 8.6.2015, SSS; Prokuplje, 6.6.2017, DV; Prokuplje, Gornja Konjuša, 21.5.2017, MR; Sićevačka klisura (gorge), 4.6.2011, VŽ; Sićevačka klisura (gorge), Sićevo, 17.7.2013, VŽ; Vranje, 30.10.2016, NS; Prokuplje, Bresničić, 15.6.2014, SSS; *Cichorium intybus*, Niš, 8.6.2015, SSS; *Cirsium acanthoides* (Asteraceae), Lebane, Konjino, 31.5.2015, SSS; *C. arvense*, Leskovac, 18.6.2017, AS; Merošina, Oblačinsko jezero (lake), 15.6.2014, SSS; Niš, 25.5.2014, SSS; Niš, Kamenički vis, 4.6.2017, DV; Sićevačka klisura (gorge), Ravni Do, 24.5.2015, VŽ; Vlasinsko jezero (lake), 15.6.2013, SSS; Vranje, 20.6.2016, NS; *C. vulgare*, Suva planina (mt.), Bojanine vode, 7.7.2015, VŽ; Vlasinsko jezero (lake), 6.8.2015, VŽ; *Coronilla varia*, Niš, 10.7.2014, VŽ; *Digitalis lanata* (Plantaginaceae), Sićevačka klisura (gorge), Sićevo, 24.5.2018, VŽ; *Euonymus japonicus* (Celastraceae), Lebane, Konjino, 31.5.2014, SSS; *Fumaria officinalis* (Papaveraceae), Niš, 22.5.2013, MĐ; *Galium aparine* (Rubiaceae), Lebane, Konjino, 16.5.2015, SSS; Niš, 5.6.2013, MĐ; Niš, Gornji Matejevac, 25.5.2014, VŽ; Niš, Kamenički vis, 4.6.2017, DV; Prokuplje, 8.6.2017, DV; Sićevačka klisura (gorge), 24.5.2015, VŽ; Sićevačka klisura (gorge), Ravni Do, 29.5.2014, VŽ; Vlasinsko jezero (lake), 30.6.2016, SSS; *Hedera helix* (Araliaceae), Niš, 16.5.2015, VŽ; *Malva sylvestris*, Niš, 21.5.2018, NM; *Matricaria chamomilla* (Asteraceae), Grdelička klisura (gorge), 5.6.2014, SSS; Lebane, 1.6.2013, SSS; Prokuplje, Gornja Konjuša, 11.6.2017, MR; Sićevačka klisura (gorge), Ostrovica, 28.5.2013, MĐ; *Onopordum acanthium* (Asteraceae), Niš, Lalinac, 8.6.2013, SSS; *Orlaya grandiflora* (Apiaceae), Niš, Gornji Matejevac, 25.5.2014, VŽ; Prokuplje, Gornja Konjuša, 13.6.2017, MR; *Papaver dubium* (Papaveraceae), Niš, Gornji Matejevac, 25.5.2014, VŽ; *P. rhoeas*, Niš, 5.6.2013, VŽ; Niš, Gornji Matejevac, 25.5.2014, VŽ; Sićevačka klisura (gorge), Sićevo, 24.5.2018, ML; *Pastinaca hirsuta* (Apiaceae), Vlasinsko jezero (lake), 6.8.2015, VŽ; *Philadelphus coronarius* (Hydrangeaceae), Niš, 20.5.2014, SSS; *Plantago major* (Plantaginaceae), Niš, 6.6.2017, MR; *Ranunculus* sp. (Ranunculaceae), Sićevačka klisura (gorge), Ostrovica, 28.5.2013, MĐ; *Rumex acetosella*, Leskovac, 6.5.2018, AS; *R. patientia*, Prokuplje, Gornja Konjuša, 23.4.2016, MR; Vranje, 20.5.2018, NM; *Rumex* sp., Lebane, Konjino, 31.5.2014, SSS; Niš, 22.5.2013, MĐ; Radan planina (mt.), 6.6.2015, VŽ; Sićevačka klisura (gorge), Sićevo, 24.5.2018, MIM; Suva planina (mt.), Bojanine vode, 24.5.2018, ML; Vranje, 7.6.2016, NS; *Solanum nigrum* (Solanaceae), Niš, 8.10.2010, VŽ; Vranje, 21.8.2016, NS; *Tamarix* sp. (Tamaricaceae), Niš, Niška Banja, 29.5.2014, VŽ; *Tanacetum* sp. (Asteraceae), Sićevačka klisura (gorge), Sićevo, 24.5.2018, ML; *Tordylium maximum* (Apiaceae), Niš, 20.5.2015, VŽ; *Torilis* sp. (Apiaceae), Sićevačka klisura (gorge), Sićevo, 7.7.2015, MIM; *Valeriana officinalis* (Valerianaceae), Vlasinsko jezero (lake), 21.7.2013, SSS; *Viburnum lantana* (Viburnaceae), Niš, 18.5.2013, MĐ; *Xeranthemum annuum* (Asteraceae), Prokuplje, Gornja Konjuša, 29.5.2016, MR; *X. cylindraceum*, Sićevačka klisura (gorge), Brljavski kamen, 7.7.2015, VŽ; *Yucca filamentosa* (Asparagaceae), Niš, 2.7.2014, MM
- Aphis galliscabri* Schrank, 1801
on: *Galium aparine*, Niš, 6.6.2017, MR; Sićevačka klisura (gorge), Sićevo, 24.5.2018, ML
- Aphis gossypii* Glover, 1877
on: *Ballota nigra*, Niš, 18.5.2016, MR; Prokuplje, Gornja Konjuša, 1.5.2016, MR; *Chrysanthemum indicum* (Asteraceae), Lebane, Konjino, 22.11.2014, SSS; *Hibiscus syriacus* (Malvaceae), Niš, 12.6.2011, VŽ; Vranje, 9.5.2016, NS
- Aphis grossulariae* Kalténbach, 1843
on: *Lythrum salicaria* (Lythraceae), Sićevačka klisura (gorge), Sićevo, 7.7.2015, VŽ
- Aphis hederæ* Kalténbach, 1843
on: *Hedera helix*, Niš, 1.6.2013, VŽ; Prokuplje, Gornja Konjuša, 21.5.2017, MR
- Aphis hieracii* Schrank, 1801

- on: *Pilosella bauhini* (Asteraceae), Sićevačka klisura (gorge), Sićevo, 24.5.2018, VŽ
- Aphis idaei* van der Goot, 1912
on: *Rubus ideus* (Rosaceae), Suva planina (mt.), Bojanine vode, 21.5.2014, VŽ
- Aphis intybi* Koch, 1855
on: *Cichorium intybus*, Lebane, Konjino, 31.5.2014, SSS; Leskovac, 28.5.2018, AS; Niš, 23.6.2016, MR; Vranje, 28.5.2018, NM
- Aphis nasturtii* Kaltenbach, 1843
on: *Jovibarba* sp. (Crassulaceae), Niš, 20.6.2018, DN
- Aphis nerii* Boyer de Fonscolombe, 1841
on: *Nerium oleander* (Apocynaceae), Leskovac, 5.6.2018, AS
- Aphis newtoni* Theobald, 1927
on: *Iris germanica* (Iridaceae), Niš, 30.5.2013, VŽ
- Aphis polygonata* (Nevsky, 1929)
on: *Polygonum aviculare* (Polygonaceae), Prokuplje, Gornja Konjuša, 29.5.2016, MR
- Aphis pomi* De Geer, 1773
on: *Crataegus monogyna* (Rosaceae), Vlasinsko jezero (lake), 15.6.2013, SSS; *Cydonia oblonga* (Rosaceae), Gadžin Han, Ovsinjinac, 20.5.2015, MR; *Malus pumila* (Rosaceae), Niš, 30.5.2013, VŽ; Niš, Donji Matejevac, 5.6.2013, VŽ; Niš, Pasi Poljana, 27.5.2013, VŽ; Prokuplje, Gornja Konjuša, 23.4.2016, MR; Vranje, 28.5.2018, NM; Vranje, Golemo selo, 21.6.2017, NM; Vranje, Kopanjane, 1.7.2017, NM; *Prunus cerasifera* (Rosaceae), Niš, 18.5.2016, MR; *Pyrus communis* (Rosaceae), Prokuplje, 6.6.2017, DV; *Spiraea japonica* (Rosaceae), Niš, Niška Banja, 3.5.2015, SSS
- Aphis ruborum* (Börner, 1932)
on: *Rubus discolor*, Pčinja canyon, Prohor Pčinjski, 10.6.2014, VŽ; Preševo, Slavujevac, 10.6.2014, SSS; *R. fruticosus*, Niš, Novo Selo, 1.6.2015, MR; Prokuplje, Gornja Konjuša, 23.5.2015, MR; *Rubus* sp., Lebane, Konjino, 31.5.2014, SSS; Niš, 21.5.2013, VŽ; Niš, Niška Banja, 23.5.2014, VŽ; Sićevačka klisura (gorge), 4.6.2011, SSS; Sićevačka klisura (gorge), Sićevo, 28.5.2013, VŽ; Vranje, 4.5.2016, NS; *R. ulmifolium*, Pčinja canyon, Prohor Pčinjski, 10.6.2014, SSS
- Aphis sambuci* Linnaeus, 1758
on: *Sambucus nigra* (Viburnaceae), Merošina, Oblačinsko jezero (lake), 19.4.2018, VŽ; Niš, 15.5.2015, ML; Prokuplje, 6.6.2017, DV; Prokuplje, Gornja Konjuša, 21.5.2017, MR; Sićevačka klisura (gorge), 12.5.2013, SSS; Suva planina (mt.), Bojanine vode, 24.5.2018, ML
- Aphis sanguisorbae* (Schrank, 1801)
on: *Sanguisorba minor* (Rosaceae), Niš, Donji Matejevac, 5.6.2013, VŽ; Pčinja canyon, Gornji Starac, 10.6.2014, SSS; Prokuplje, Gornja Konjuša, 11.6.2017, MR
- Aphis sedi* Kaltenbach, 1843
on: *Jovibarba heuffelii*, Niš, 13.6.2017, DN
- Aphis spiraeicola* Patch, 1914
on: *Chaenomeles japonica* (Rosaceae), Niš, 30.5.2013, VŽ; *Malus pumila*, Leskovac, 7.5.2018, AS; *Scabiosa argentea* (Dipsacaceae), Pčinja canyon, Prohor Pčinjski, 10.6.2014, VŽ; *Campsis radicans* (Bignoniaceae), Niš, 14.5.2013, SSS
- Aphis spiraeophaga* F.P. Muller, 1961
on: *Spiraea japonica*, Niš, Niška Banja, 3.5.2015, SSS
- Aphis taraxacicola* (Börner, 1940)
on: *Taraxacum officinale* (Asteraceae), Prokuplje, Gornja Konjuša, 11.6.2017, MR
- Aphis ulmariae* Schrank, 1801
on: *Filipendula ulmaria* (Rosaceae), Vlasinsko jezero (lake), 27.5.2018, VŽ
- Aphis umbrella* (Börner, 1950)
on: *Malva sylvestris*, Sićevačka klisura (gorge), Ostrovica, 28.5.2013, MD; Grdelička klisura (gorge), 5.6.2014, SSS; Niš, 17.6.2016, MR; Vranje, 26.4.2016, NS
- Aphis urticata* J.F. Gmelin, 1790
on: *Urtica dioica* (Urticaceae), Niš, Niška Banja, 31.5.2017, DV; Niš, 25.5.2014, SSS; Lebane, 1.6.2013, SSS; Niš, Kamenički vis, 26.4.2018, MIM; Pčinja canyon, Gornji Starac, 10.6.2014, SSS; Prokuplje, Gornja Konjuša, 1.5.2016, MR; Sićevačka klisura (gorge), 24.5.2015, VŽ; Sićevačka klisura (gorge), Ostrovica, 29.5.2014, VŽ; Sićevačka klisura (gorge), Sićevo, 28.5.2013, ZK; Vlasinsko jezero (lake), 6.6.2014, VŽ; Vranje, 4.5.2016, NS
- Aphis veratri* Walker, 1852
on: *Veratrum album* (Melanthiaceae), Vlasinsko jezero (lake), 19.6.2018, VŽ
- Aphis verbasci* Schrank, 1801
on: *Verbascum* sp. (Scrophulariaceae), Niš, Popovac, 8.6.2013, VŽ; Vlasinsko jezero (lake), 6.6.2014, SSS
- Aulacorthum solani* Kaltenbach, 1843
on: *Lathyrus tuberosus* (Fabaceae), Prokuplje, Bresničić, 16.6.2014, SSS; *Vinca minor* (Apocynaceae), Niš, 1.5.2014, VŽ

Brachycaudus cardui (Linnaeus, 1758)

on: *Carduus acanthoides*, Leskovac, 25.5.2018, AS; Merošina, Oblačinsko jezero (lake), 15.6.2014, SSS; Niš, 7.7.2013, VŽ; Pčinja canyon, Prohor Pčinjski, 10.6.2014, VŽ; Prokuplje, Gornja Konjuša, 11.6.2017, MR; *Carduus* sp., Pčinja canyon, Prohor Pčinjski, 10.6.2014, VŽ; *Cirsium acanthoides*, Lebane, Konjino, 31.5.2014, SSS; *C. arvense*, Vlasinsko jezero (lake), 6.6.2014, SSS; *C. canddelabrum*, Sićevačka klisura (gorge), Sićevo, 7.7.2015, MIM; *C. eriophorum*, Vlasinsko jezero (lake), 21.7.2013, SSS; *C. palustre*, Vlasinsko jezero (lake), 21.7.2013, SSS; *Hibiscus syriacus*, Niš, 25.5.2013, VŽ; *Onopordum acanthium*, Niš, 3.6.2015, VŽ; Niš, Popovac, 8.6.2013, VŽ; Preševo, Slavujevac, 10.6.2014, SSS; Sićevačka klisura (gorge), Ravni Do, 24.5.2015, SSS; *Prunus cerasifera*, Grdelička klisura (gorge), 5.6.2014, SSS; Niš, 22.5.2018, VŽ; Prokuplje, Gornja Konjuša, 23.4.2016, MR; Vlasinsko jezero (lake), 22.5.2016, VŽ; *P. domestica*, Sićevačka klisura (gorge), 1.5.2013, VŽ; *P. spinosa*, Niš, 23.5.2014, VŽ

Brachycaudus helichrysi (Kaltenbach, 1843)

on: *Matricaria chamomilla* (Asteraceae), Prokuplje, Gornja Konjuša, 11.6.2017, MR; *Cephalaria transsilvanica* (Dipsacaceae), Niš, 15.5.2013, VŽ; *Erigeron annuus* (Asteraceae), Leskovac, 19.5.2017, AS

Brachycaudus persicae Passerini, 1860

on: *Prunus persica*, Niš, 20.5.2014, VŽ

Brachycaudus prunicola (Kaltenbach, 1843)

on: *Prunus cerasifera*, Niš, 3.6.2015, VŽ

Brachycaudus schwartzi (Börner, 1931)

on: *Prunus persica*, Niš, Pasi Poljana, 27.5.2013, VŽ

Brachycaudus sp.

on: *Arctium lappa*, Merošina, Oblačinsko jezero (lake), 15.6.2014, VŽ; *Prunus cerasifera*, Merošina, Vlasinsko jezero (lake), 15.6.2013, VŽ

Brachycaudus tragopogonis (Kaltenbach, 1843)

on: *Scorzonera* sp. (Asteraceae), Radan planina (mt.), 6.6.2015, VŽ; *Tragopogon dubius* (Asteraceae), Niš, 24.5.2017, MR; Prokuplje, Gornja Konjuša, 15.6.2016, MR; *T. major*, Lebane, Konjino, 31.5.2014, SSS; Niš, 23.5.2014, VŽ

Brevicoryne brassicae (Linnaeus, 1758)

on: *Alliaria petiolata* (Brassicaceae), Gadžin Han, Ovsinjinac, 13.4.2016, MR

Calaphis flava Mordvilko, 1928

on: *Betula pubescens* (Betulaceae), Vlasinsko jezero (lake), 21.7.2013, SSS

Capitophorus hippophaes Walker, 1852

on: *Polygonum lapathifolium*, Niš, 13.10.2013, VŽ

Cavariella aegopodii (Scopoli, 1763)

on: *Aegopodium podagraria*, Niš, 2.6.2017, MIM; *Chaerophyllum aureum* (Apiaceae), Sićevačka klisura (gorge), Ravni Do, 24.5.2015, VŽ; *Foeniculum vulgare* (Apiaceae), Sićevačka klisura (gorge), 6.6.2013, VŽ; Sićevačka klisura (gorge), Sićevo, 28.5.2013, ZK

Cavariella theobaldi (Gillette & Bragg, 1918)

on: *Pastinaca hirsuta*, Niš, 3.6.2015; Vlasinsko jezero (lake), 15.6.2013, VŽ

Chaitophorus populeti (Panzer, 1804)

on: *Populus alba* (Salicaceae), Leskovac, 19.5.2017, AS

Chaitophorus sp.

on: *Salix caprea* (Salicaceae), Vlasinsko jezero (lake), 15.6.2013, SSS; *S. matsudana*, Niš, Niška Banja, 6.6.2013, VŽ

Chromaphis juglandicola (Kaltenbach, 1843)

on: *Juglans regia* (Juglandaceae), Leskovac, 1.6.2013, VŽ; Niš, 17.7.2011, VŽ; Niš, Popovac, 8.6.2013, VŽ; Sićevačka klisura (gorge), Ostrovica, 28.5.2013, MĐ

Cinara cuneomaculata (Del Guercio, 1909)

on: *Larix* sp. (Pinaceae), Niš, 6.6.2017, MR

Cinara juniperi (De Geer, 1773)

on: *Juniperus oxicedrus* (Cupressaceae), Pčinja canyon, Gornji Starac, 10.6.2014, SSS

Cinara pilicornis (Hartig, 1841)

on: *Picea pungens* (Pinaceae), Niš, 6.6.2017, MR

Cinara sp.

on: *Pinus nigra* (Pinaceae), Niš, Gornji Matejevac, 25.5.2014, VŽ; *P. sylvestris*, Vlasinsko jezero (lake), 6.6.2014, SSS

Corylobium avellanae (Schrank, 1801)

on: *Corylus avellana* (Corylaceae), Niš, 6.6.2017, MR; Niš, Novo Selo, 1.6.2015, MR

Ctenocallis dobrovljanski Klodnitsky, 1924

on: *Chamaecytisus heuffelii* (Fabaceae), Vlasinsko jezero (lake), 28.9.2017, VŽ

Drepanosiphum platanoidis (Schrank, 1801)

on: *Acer platanoides*, Vlasinsko jezero (lake), 6.8.2015, VŽ

Dysaphis crataegi (Kaltenbach, 1843)

on: *Orlaya grandiflora*, Radan planina (mt.), 12.6.2016, SSS; Vlasinsko jezero (lake), 15.6.2013, SSS

- Dysaphis devectora* (Walker, 1849)
on: *Malus pumila*, Niš, Novo Selo, 17.4.2016, MR
- Dysaphis plantaginea* (Passerini, 1860)
on: *Malus pumila*, Niš, Donji Matejevac, 5.6.2013, VŽ; Niš, Pasi Poljana, 27.5.2013, VŽ; Vranje, 9.5.2016, NS; Vranje, Golemo selo, 3.5.2017, NM; Vranje, Katun, 8.5.2017, NM
- Dysaphis pyri* (Boyer de Fonscolombe, 1841)
on: *Pyrus communis*, Lebane, Konjino, 24.4.2016, SSS; *Pyrus* sp., Vranje, 9.5.2016, NS
- Dysaphis reaumuri* (Mordvilko, 1928)
on: *Pyrus spinosa*, Preševo, Slavujevac, 10.6.2014, SSS
- Dysaphis* sp.
on: *Foeniculum vulgare*, Sićevačka klisura (gorge), Sićevo, 6.6.2013, VŽ; *Malus pumila*, Leskovac, 13.5.2018, AS
- Eucallipterus tiliae* (Linnaeus, 1758)
on: *Tilia* sp. (Malvaceae), Niš, Niška Banja, 6.6.2013, VŽ
- Eulachnus* sp.
on: *Pinus nigra*, Vlasinsko jezero (lake), 7.8.2015, SSS; *P. sylvestris*, Vlasinsko jezero (lake), 6.8.2015, SSS
- Hyadaphis coriandri* (B. Das, 1918)
on: *Foeniculum vulgare*, Niš, Gornji Matejevac, 25.5.2014, VŽ
- Hyalopterus pruni* (Geoffroy, 1762)
on: *Prunus cerasifera*, Niš, 26.4.2014, VŽ; Vranje, 9.6.2016, NS; *P. cerasus*, Vranje, 8.6.2016, NS; *P. domestica*, Prokuplje, Gornja Konjuša, 13.6.2017, MR; Vranje, 30.5.2017, NS; *P. persica*, Niš, Novo Selo, 5.6.2013, VŽ; *P. spinosa*, Niš, 7.5.2014, VŽ; Vranje, 8.6.2016, NS
- Hyperomyzus lactucae* (Linnaeus, 1758)
on: *Sonchus* sp. (Asteraceae), Grdelička klisura (gorge), 5.6.2014, SSS; Niš, 28.5.2014, SSS; Niš, Gornji Matejevac, 25.5.2014, VŽ
- Liosomaphis berberidis* (Kaltenbach, 1843)
on: *Berberis* sp. (Berberidaceae), Vranje, 19.6.2016, NS
- Macrosiphoniella artemisiae* Boyer de Fonscolombe, 1841
on: *Artemisia absinthium* (Asteraceae), Sićevačka klisura (gorge), 4.6.2011, VŽ; Vladičin Han, 2.6.2011, LjM; *A. vulgaris*, Leskovac, 25.5.2018, AS; Niš, Kamenički vis, 4.6.2017, NM
- Macrosiphoniella sanborni* (Gillette, 1908)
on: *Chrysanthemum* sp., Leskovac, 13.5.2018, AS; Niš, 3.11.2017, MR
- Macrosiphoniella* sp.
on: *Achillea millefolium*, Vlasinsko jezero (lake), 8.8.2015, SSS; *Centaurea rhenana*, Vlasinsko jezero (lake), 15.6.2013, VŽ
- Macrosiphum euphorbiae* (Thomas, 1878)
on: *Euphorbia esula* (Euphorbiaceae), Niš, 26.4.2014, VŽ; *Malva sylvestris*, Vranje, 9.6.2016, NS
- Macrosiphum funestum* (Macchiatii, 1885)
on: *Rubus* sp., Radan planina (mt.), 6.6.2015, VŽ
- Macrosiphum rosae* (Linnaeus, 1758)
on: *Dipsacus* sp. (Dipsacaceae), Leskovac, 25.5.2018, AS; *Rosa canina*, Niš, 30.5.2010, VŽ; Prokuplje, Gornja Konjuša, 23.4.2016, MR; *Rosa* sp., Leskovac, 8.6.2018, AS; Niš, 31.5.2011, VŽ; Niš, Donji Matejevac, 5.6.2013, VŽ; Radan planina (mt.), 6.6.2015, VŽ; Vranje, 7.6.2016, NS; *Scabiosa columbaria*, Vlasinsko jezero (lake), 19.6.2018, VŽ
- Melanaphis pyraria* (Passerini, 1862)
on: *Pyrus communis*, Leskovac, 1.6.2013, VŽ; Prokuplje, Gornja Konjuša, 21.5.2017, MR
- Metopeurum fuscoviride* Stroyan, 1950
on: *Tanacetum* sp., Sićevačka klisura (gorge), Sićevo, 24.5.2018, ML; Vranje, 20.6.2016, NS; *T. vulgare*, Suva planina (mt.), Bojanine vode, 7.7.2015, ML; Svodje, 6.6.2014, VŽ; Vlasinsko jezero (lake), 30.6.2016, SSS
- Metopolophium dirhodum* (Walker, 1849)
on: *Triticum aestivum* (Poaceae), Leskovac, 1.6.2013, VŽ
- Microlophium carnosum* (Buckton, 1876)
on: *Urtica dioica*, Niš, 18.5.2016, MR
- Myzocallis carpini* (Koch, 1855)
on: *Carpinus betulus* (Corylaceae), Niš, Niška Banja, 29.5.2013, VŽ
- Myzocallis coryli* (Goeze, 1778)
on: *Corylus avellana*, Niš, Novo Selo, 1.6.2015, MR; *C. colurna*, Niš, 21.5.2013, SSS
- Myzus cerasi* (Fabricius, 1775)
on: *Prunus avium*, Leskovac, 1.6.2013, VŽ; Niš, 30.5.2013, VŽ; Niš, Pasi Poljana, 27.5.2013, VŽ; Vranje, 4.5.2016, NS; *P. cerasifera*, Niš, 18.5.2016, MR; Vranje, 22.8.2016, NS; *P. cerasus*, Leskovac, 18.5.2017, AS; Niš, 15.5.2013, SSS; Vranje, 9.5.2016, NS
- Myzus linariae* Holman, 1965
on: *Linaria genistifolia* (Plantaginaceae), Niš, Gornji Matejevac, 10.5.2015, SSS; (Plantaginaceae), Niš, 2.7.2015, VŽ

Myzus lythri (Schrank, 1801)

on: *Lythrum salicaria*, Niš, 2.7.2013, VŽ; Sićevačka klisura (gorge), 28.5.2013, ZK; Sićevačka klisura (gorge), Ostrovica, 29.5.2014, VŽ; Vlasinsko jezero (lake), 15.6.2013, SSS

Myzus persicae Sulzer, 1776

on: *Capsicum annuum* (Solanaceae), Lebane, 17.10.2011, SSS; Niš, 18.1.2019, VŽ; Niš, Popovac, 26.5.2013, VŽ; *Viola cornuta* (Violaceae), Niš, 10.11.2011, VŽ; Niš, Popovac, 26.10.2011, VŽ

Myzus varians Davidson, 1912

on: *Prunus persica*, Niš, 25.5.2014; Vranje, 28.5.2018, NM

Nasonovia sp.

on: *Pilosella officinarum* (Asteraceae), Vlasinsko jezero (lake), 21.7.2013, SSS

Ovatus insitus (Walker, 1849)

on: *Cydonia oblonga*, Gadžin Han, Ovsinjinac, 20.5.2015, MR

Panaphis juglandis (Goeze, 1778)

on: *Juglans regia*, Niš, 24.5.2017, MR; Sićevačka klisura (gorge), 28.5.2013, MĐ

Periphyllus aceris (Linnaeus, 1761)

on: *Acer campestre*, Niš, Kamenički vis, 4.6.2014, SSS; Niš, Gornji Matejevac, 10.5.2015, VŽ; *A. monspessulanum*, Niš, Gornji Matejevac, 26.4.2018, MIM; Niš, Kamenički vis, 26.4.2018, MIM

Periphyllus sp.

on: *Acer campestre*, Niš, Niška Banja, 11.5.2014, SSS; *A. monspessulanum*, Niš, Niška Banja, 19.5.2015, VŽ; *A. platanoides*, Niš, 22.5.2010, VŽ; *A. pseudoplatanus*, Suva planina (mt.), Bojanine vode, 21.5.2018, ML

Phorodon humuli (Schrank, 1801)

on: *Prunus cerasifera*, Lebane, Konjino, 31.5.2014, SSS; Niš, Niška Banja, 23.5.2014, VŽ; Prokuplje, Gornja Konjuša, 1.5.2016, MR; Niš, 21.5.2013, VŽ; *P. domestica*, Lebane, 1.6.2013, SSS; Niš, 28.5.2015, MR; Niš, Popovac, 20.5.2013, VŽ

Pterocomma pilosum Buckton, 1879

on: *Salix alba*, Niš, Donji Matejevac, 3.6.2010, VŽ; *S. caprea*, Vlasinsko jezero (lake), 18.6.2010, VŽ

Pterocomma populeum (Kaltenbach, 1843)

on: *Populus alba*, Sićevačka klisura (gorge), 29.5.2010, SSS; *P. nigra*, Lebane, Konjino, 3.5.2014, SSS; Sićevačka klisura (gorge), 29.5.2010, SSS

Pterocomma salicis (Linnaeus, 1758)

on: *Salix caprea*, Vlasinsko jezero (lake), 15.6.2013, VŽ

Pterocomma sp.

on: *Populus tremula*, Niš, 25.5.2010, MIM; *Salix caprea*, Stara planina (mt.), Babin zub, 4.7.2010, VŽ

Rhopalosiphum maidis (Fitch, 1856)

on: *Zea mays* (Poaceae), Sićevačka klisura (gorge), Sićevo, 17.7.2013, VŽ

Rhopalosiphum nymphaeae (Linnaeus, 1761)

on: *Typha latifolia* (Typhaceae), Bela Palanka, Divljana, 6.6.2014, VŽ; Niš, Niška Banja, 23.7.2013, VŽ

Rhopalosiphum padi (Linnaeus, 1758)

on: *Hordeum murinum* (Poaceae), Grdelička klisura (gorge), 5.6.2014, SSS

Schizaphis graminum (Rondani, 1852)

on: *Zea mays*, Sićevačka klisura (gorge), Sićevo, 17.7.2013, VŽ

Semiaphis pastinacae Börner, 1950

on: *Pastinaca hirsuta*, Vlasinsko jezero (lake), 19.6.2018, VŽ

Sipha maydis Passerini, 1860

on: *Elytrigia repens* (Poaceae), Sićevačka klisura (gorge), 28.5.2013, ZK; *Arrhenatherum elatius* (Poaceae), Radan planina (mt.), 6.6.2015, VŽ; *Zea mays*, Niš, Lalinac, 8.6.2013, SSS

Sitobion avenae (Fabricius, 1775)

on: *Avena sativa* (Poaceae), Lebane, 19.6.2011, SSS; Prokuplje, Gornja Konjuša, 11.6.2017, MR; *Triticum aestivum*, Leskovac, 1.6.2013, VŽ

Smiela sp.

on: *Berteroa* sp., Leskovac, 21.5.2017, AS

Tetraneura sp.

on: *Ulmus campestris* (Ulmaceae), Lebane, 1.6.2013, SSS; *Ulmus* sp. (Ulmaceae), Sićevačka klisura (gorge), 24.5.2018, VŽ

Thelaxes dryophilus (Schrank, 1801)

on: *Quercus robur* (Fagaceae), Radan planina (mt.), 12.6.2016, SSS

Tuberculatus sp.

on: *Quercus cerris*, Niš, Niška Banja, 29.5.2013, SSS

Uroleucon cichorii (Koch, 1855)

on: *Cichorium intybus*, Leskovac, 31.5.2017, AS; *Crepis biennis*, Prokuplje, 6.6.2017, DV; *C. foetida*, Leskovac, 19.5.2017, AS; Niš, Kamenički vis, 4.6.2017, DV; Prokuplje, Gornja

Konjuša, 11.6.2017, MR; Vlasinsko jezero (lake), 15.6.2013, SSS; *Crepis* sp., Bela Palanka, Divljana, 6.6.2014, VŽ; Vlasinsko jezero (lake), 19.6.2018, VŽ; *Lapsana communis* (Asteraceae), Prokuplje, 6.6.2017, DV

Uroleucon jaceae (Linnaeus, 1758)

on: *Carthamus creticus* (Asteraceae), Preševo, Slavujevac, 10.6.2014, SSS; *C. lanatus*, Merošina, Oblačinsko jezero (lake), 15.6.2014, VŽ; Prokuplje, Bresničić, 15.6.2014, SSS; *Centaurea jacea*, Radan planina (mt.), 12.6.2016, SSS; Vlasinsko jezero (lake), 19.6.2018, VŽ; *C. rhenana*, Radan planina (mt.), 12.6.2016, SSS; Vlasinsko jezero (lake), 15.6.2013, VŽ; *C. salonitana*, Niš, 3.6.2015, VŽ; *C. solstitialis*, Prokuplje, Bresničić, 15.6.2014, SSS

Uroleucon picridis (Fabricius, 1775)

on: *Cichorium intybus*, Vlasinsko jezero (lake), 21.7.2013, SSS; *Crepis paludosa*, Vlasinsko jezero (lake), 21.7.2013, SSS

Uroleucon sonchi (Linnaeus, 1767)

on: *Sonchus oleraceus*, Prokuplje, Gornja Konjuša, 11.6.2017, MR

Uroleucon sp.

on: *Chondrilla juncea* (Asteraceae), Niš, 21.5.2013, VŽ; *Inula* sp. (Asteraceae), Lebane, 1.6.2013, SSS; *Lapsana communis*, Suva planina (mt.), Bojanine vode, 24.5.2018, VŽ

Uroleucon tussilaginis (Walker, 1850)

on: *Tussilago farfara* (Asteraceae), Banja Topilo, 21.4.2018, VŽ

Discussion

In this study we sampled 211 plant species, which were attacked by 118 aphid species within 46 genera and 9 subfamilies, formed 436 bi-trophic associations. Most of the aphid species were collected on plants from the family Asteraceae (105 associations) belonging to 27 genera, followed by the family Rosaceae (88 associations) from 11 genera. Among the aphid genera, *Aphis* Linnaeus was at the same time the most common (211 associations) and the most diverse aphid genus (34 species). Within this genus, species *A. fabae* Scopoli established the largest number of trophic associations (88), usually with plants from families Asteraceae and Rosaceae. *Aphis fabae* has an almost cosmopolitan distribution and represents one of the most important agricultural pests (Blackman & Eastop, 2000, Minks & Harrewijn, 1989). Also, *A. craccivora* Koch formed 27 associations. As well as *A. fabae*, *A. craccivora* is a polyphagous species. However it prefers plants from

family Fabaceae (Blackman & Eastop, 2007). After the genus *Aphis*, the next most diverse genera were *Brachycaudus* van der Goot (7 species), *Dysaphis* Börner (6 species) and *Uroleucon* Mordvilko (6 species). Within the genus *Brachycaudus*, the most frequently recorded species was *B. cardui*. This aphid altered the hosts between various fruit trees of genus *Prunus* L. and usually *Carduus* L. and *Cirsium* Mill. species (InfluentialPoints. 2018). Within the genera *Dysaphis* and *Uroleucon*, *D. plantaginea* (Linnaeus), *U. cichorii* (Passerini) and *U. jaceae* (Linnaeus) formed the largest number of associations. The primary hosts for *D. plantaginea* were species from genus *Malus* Mill (InfluentialPoints. 2018). In our study, we noticed that this aphid caused damage on species *M. pumila* Mill. Species *U. cichorii* Mordvilko was usually collected on *Crepis* L., while *U. jaceae* (Linnaeus) on *Carthamus* L. and *Centaurea* L. Species *Macrosiphum rosae* (Linnaeus) and *Myzus cerasi* (Fabricius) formed nine associations. All other recorded aphid species appeared in lower frequencies.

This research contributes to a better knowledge about diversity of aphids in the territory of Serbia.

Acknowledgements. This study was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (III43001).

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