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APHIDIUS NEES (HYMENOPTERA, BRACONIDAE, APHIDIINAE) IN SERBIA: KEY TO SPECIES IDENTIFICATION INCLUDING PARASITOID – APHID HOST LIST

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Abstract

This study offers a comprehensive guide to the identification of 34 *Aphidius* species that were found in the territory of Serbia. Also, for all *Aphidius* species, a total of 97 aphid hosts were represented. *Aphidius linosiphonis* Tomanović & Starý and *Aphidius balcanicus* Tomanović & Petrović were described from Serbia. *Aphidius ericaphidis* Pike & Starý and *A. banksae* Kittel are allochthonous species in Serbia of North American and Asian origin, respectively. For both allochthonous species, the first records for the fauna of Europe were from Serbia.

KEY WORDS: Aphid parasitoids, Aphids, taxonomy, trophic associations

Introduction

The genus *Aphidius* Nees is the largest within the subfamily Aphidiinae, with about 120 species described worldwide (Yu *et al*. 2023). According to Fauna Europaea, over 40 species of *Aphidius* are known in Europe. Tomanović *et al*. (2003) studied 26 *Aphidius* species in Serbia and Montenegro and provided a species identification key with the list of trophic relationships. Further, Kavallieratos *et al*. (2004) presented tritrophic associations of 29 species of *Aphidius* in southeastern Europe, while Starý (2006) found 28 species in the Czech Republic. Apart from being the most diverse genus within the subfamily, *Aphidius* taxonomy is challenged by cryptic speciation and overlapping morphological characters between species, leading to

problems in species identification (Tomanović *et al*., 2014; Jamhour *et al*., 2016; Petrović *et al*., 2018). The use of molecular markers has solved many taxonomic problems, although some molecular markers are not informative in some species groups, e.g., *A. absinthii* Marshall, *A. funebris* Mackauer, *A. tanacetarius* Mackauer (Mitrovski-Bogdanović *et al*. 2021). In connection with the previously published key for Serbia and Montenegro (Tomanović *et al*., 2003), we clarified the taxonomic status of some species complexes (Tomanović *et al*., 2007; Jamhour *et al*., 2016) and included a newly described species (Petrović *et al*., 2011) and newly discovered allochthonous species (Petrović *et al*., 2017, 2019) with better resolution of morphological taxonomic characters (Mitrovski-Bogdanović *et al*., 2021). We present here the key for identifying 34 *Aphidius* species found in Serbia with a list of *Aphidius* parasitoid host associations.

Material and Methods

Specimens were collected from many localities in Serbia by rearing plants with aphid colonies consisting of both live and mummified aphids from 1982 to 2021. Live aphids were preserved in 90% ethyl alcohol and 75% lactic acid 2:1 (Eastop & Van Emden, 1972). Mummified aphids of the same species and plant samples with aphid colonies were placed in small plastic boxes. The plastic boxes were then placed in a growth cabinet. A circular opening was cut in the lid of each box and covered with muslin for ventilation to create conditions in the boxes similar to those in the growth cabinet (22.5ºC, 65% relative humidity, 16:8 h L:D photoperiod) (Kavallieratos et al., 2001). Many specimens are dissected and slide-mounted in Canada balsam or Hoyer medium for later identification. The external structure of hatched parasitoids was examined using a ZEIS Discovery V8 stereomicroscope. The dissected specimens were photographed with a Leica DM LS phase contrast microscope (Leica Microsystems GmbH, Wetzlar, Germany). Some specimens were gold-coated with a sputter coater and examined with a Jeol JSM-6460LV scanning electron microscope. The terminology used in this work regarding the diagnostic morphological characters of aphidines is based on Sharkey & Wharton (1997).

Synopsis of characters

Quantitative characters used in the key for identifying *Aphidius* species are given with standard deviation. The key was derived from several series of measurements of specimens.

The following characters are used in the key: antennae – number of antennal segments, shape of antennae, length of flagellomere 1 (ratio between length and width of flagellomere 1 at median level), color of flagellomere 1, number of longitudinal placodes on flagellomeres 1 and 2; number of labial and maxillary palpomeres; tentorial index (ratio between tentoriocular line/intertentorial line); forewing venation (length/width of pterostigma, ratio between length of vein R1 (=metacarpus) and length of pterostigma); petiole – dorsal and anterolateral sculpturation, length of petiole (ratio between length and width of petiole at level of spiracles); propodeal areola (closed or open); shape of ovipositor sheath.

Results

Key to the identification of female *Aphidius* species in Serbia*

1.	Forewing M+m-cu vein only partly developed under r-m vein (Figs. 1, 2).	2.
–	Forewing M+m-cu vein developed throughout (Fig. 3).	3.
2.	Forewing R1 vein (=metacarpus) subequal to pterostigma (Fig. 1); Maxillary palpi with three palpomeres, labial palpi with one palpomere.	*A. arvensis* (Starý)
–	Forewing R1 vein twice shorter than pterostigma (Fig. 2); Maxillary palpi with four palpomeres, labial palpi with two palpomeres.	*A. viaticus* (Sedlag)
3.	Anterolateral area of petiole rugose (Fig. 4).	4.
–	Anterolateral area of petiole costate or costulate (Fig. 5, 6).	5.
4.	Ratio between pterostigma length and width 3.40-3.90 (Fig. 7); first flagellomere brown with narrow yellow ring at the base (Fig. 8).	*A. ervi* Haliday
–	Ratio of pterostigma length and width 4.00-4.50 (Fig. 9); first and second flagellomeres yellow at the basal third (Fig. 10); specialized parasitoid of stinging nettle aphid, *Microlophium carnosum*.	*A. microlophii* Pennacchio & Tremblay
5.	Anterolateral area of petiole costate with 2-5 deep ridges (Fig. 5); body dark in color.	*A. avenae* Haliday
–	Anterolateral area of petiole costulate with larger number (6-20) of narrow and tiny ridges (Fig. 6); body differently colored.	6.
6.	R1 vein twice or at least for a quarter shorter than pterostigma (Figs. 11-13).	7.
–	R1 vein equal or subequal to pterostigma length (Figs. 14-15).	15.
7.	Propodeal areola opened and not clearly defined (Fig. 16); parasitoid of *Titanosiphon* and *Macrosiphoniella* aphids on *Artemisia* spp.	*A. artemisicola* Tizado & Núñez-Pérez
–	Propodeal areola pentagonal and clearly defined (Fig. 17)[1].	8.
8.	Antennae 12-14-segmented (Fig. 18); Forewing M+m-cu vein usually colorless (Fig. 19).	9.
–	Antennae 15-segmented and more (Fig. 20); Forewing M+m-cu vein colored and sclerotized (Figs. 3, 12).	11.
9.	Petiole = T1 (first metasomal tergite) 3-3.5 times as long as wide at spiracles level (Fig. 21); First flagellomere about 3 times as long as wide (Fig. 22); antennae 14-segmented; parasitoid of *Elatobium* aphids on firs.	*A. schimitscheki* (Starý)
–	Petiole 2.4-3 times as long as wide at spiracles level (Fig. 23); First flagellomere 2.2-2.8 times as long as wide (Fig. 18); antennae 12-14-segmented.	10.
10.	Antennae thickened at the apex (Fig. 18); Petiole 2.4-2.5 times as long as wide at spiracles (Fig. 24); mostly parasitized *Cavariella* aphid hosts on willows and Apiaceae plants.	*A. salicis* Haliday
–	Antennae filiform and slightly thickened at the apex (Fig. 25); Petiole 2.6-3 times as long as wide at spiracles (Fig. 23); parasitoid of dendrophilous aphids, especially on birch.	*A. aquilus* Mackauer
11.	Antennae (19)20-21-segmented (Fig. 26); parasitoid of *A. pisum* on legumes.	*A. eadyi* Starý, González & Hall
–	Antennae 15-18-segmented.	12.
12.	Petiole about 4 times as long as wide at spiracles (Fig. 27); parasitoid of *Ericaphis scammelli* on blueberry.	*A. ericaphidis* Pike & Starý
–	Petiole 2.7-3.3 times as long as wide at spiracles (Fig. 28).	13.
13.	Flagellomere 1, 2.3-2.7 times as long as wide (Fig. 29), with 3-6 longitudinal placodes (parasitoid of *Macrosiphum rosae* on Rosaceae plants).	*A. rosae* Haliday
–	Flagellomere 1, 2.8-3.6 times as long as wide (Fig. 30), with 1-2 longitudinal placodes or without them (Figs. 30, 32).	14.
14.	Flagellomere 2 with 3-6 longitudinal placodes (Fig. 30); pterostigma 3.7-4.2 times as long as wide (Fig. 31); parasitoid of *D. junackianum* on *Aconitum* plants.	*A. sussi* Pennacchio & Tremblay
–	Flagellomere 2 with 2 longitudinal placodes (Fig. 32); pterostigma 3.1-3.7 times as long as wide (Fig. 33); parasitoid of *A. malvae* on *Geranium* spp.	*A. balcanicus* Tomanović & Petrović
15.	Head widened, with tentorial index (ratio of tentoriocular line and intertentorial line) 0.7-0.8 (Fig. 34); parasitoid of *Pterocomma* aphids on poplars and willows.	*A. cingulatus* Ruthe
–	Head oval, with tentorial index 0.3-0.6 (Fig. 35).	16.
16.	Antennae (17)18-20-segmented.	17.
–	Antennae 13-17-segmented (Fig. 36).	23.
17.	R1 vein as long as pterostigma (Fig. 37).	18.
–	R1 vein little shorter than pterostigma (Figs. 15, 38).	20.
18.	Petiole with mediodorsal carina (Fig. 39); pterostigma 4.4-5 times as long as wide (Fig. 40); flagellomere 1, 3-3.3 times as long as wide (Fig. 41).	*A. megourae* Starý
–	Mediodorsal carina on petiole not clearly defined (Fig. 42); pterostigma 3.5-4. times as long as wide (Fig. 14); flagellomere 1, 3.3-3.9- times as long as wide (Fig. 43).	19.
19.	Flagellomere 2 with 2-3 longitudinal placodes (Fig. 44); tentorial index 0.45-0.55; parasitoid of *Amphorophora* aphids.	*A. silvaticus* Starý
–	Flagellomere 2 with one longitudinal placode (Fig. 43); tentorial index 0.35-0.4; parasitoid of *Microlophium carnosum*, stinging nettle aphids.	*A. urticae* Haliday

Table I – continued

20.	Flagellomere 1, 2.6-3 times as long as wide (Fig. 45); Petiole, 2.5-2.9 times as long as wide (Fig. 46); parasitoid of *Uroleucon* aphids.	*A. funebris* Mackauer
–	Flagellomere 1, 3-4 times as long as wide (Fig. 47); Petiole, 3.1-3.7 times as long as wide (Fig. 48).	21.
21.	Pterostigma 3-3.55 times as long as wide (Fig. 38); body generally yellow to light brown; parasitoid *Acyrthosiphon* aphids on legumes.	*A. banksae* Kittel
–	Pterostigma 3.6-4.1 times as long as wide (Fig. 49); body generally brown or light brown.	22.
22.	Antennae 20-segmented (Fig. 50); flagellomere 2 with one longitudinal placode (Fig. 50); specific parasitoid of *Macrosiphoniella oblonga*.	*A. phalangomyzi* Starý
–	Antennae 18-19(20)-segmented; flagellomere 2 with 2-3 longitudinal placodes (Fig. 47).	*A. rubi* Starý
23.	Maxillary palpi with 3 palpomeres (Fig. 51).	*A. matricariae* Haliday
–	Maxillary palpi with 4 palpomeres[2].	24.
24.	Labial palps with 2 palpomeres; flagellomere 1 with one or without longitudinal placode (Figs. 52-53).	25.
–	Labial palps with 3 palpomeres[3]; flagellomere 1 with 1-3 or without longitudinal placodes (Fig. 54).	29.
25.	Ovipositor sheaths elongated (Fig. 55); body prevalently yellow or light brown.	*A. absinthii* Marshall
–	Ovipositor sheaths short; body prevalently brown.	26.
26.	Flagellomere 1, 2.6-3.1 times as long as wide (Fig. 56).	27.
–	Flagellomere 1, 3.1-3.6 times as long as wide (Fig. 57).	28.
27.	Antennae thickened at the apex (Fig. 58); long mediodorsal carina on petiole (Fig. 59); parasitoid of *Chaetosiphon* aphids.	*A. eglanteriae* Haliday
–	Antennae filiform (Fig. 60); short mediodorsal carina on petiole (Fig. 61); parasitoid of *Liosomaphis* aphids.	*A. hortensis* Marshall
28.	Tentorial index 0.39-0.49; long mediodorsal carina on petiole (Fig. 62); parasitoid of *C. ribis*.	*A. ribis* Haliday
–	Tentorial index 0.49-0.59; short mediodorsal carina on petiole (Fig. 63); parasitoid of *Metopeurum fuscoviride* aphids.	*A. tanacetarius* Mackauer
29.	Pterostigma elongated, 4.5-4.7 times as long as wide (Fig. 64); parasitoid *Linosiphon* aphid.	*A. linosiphonis* Tomanović & Starý
–	Pterostigma, 3-4.5 times as long as wide (Fig. 65).	30.
30.	Antennae 13-14-segmented, thickened at the apex (Fig. 66); parasitoid of *Periphyllus* aphids.	*A. setiger* (Mackauer)
–	Antennae 15-17(18)-segmented, filiform.	31.
31.	Mediodorsal carina on petiole not prominent (Fig. 67); flagellomere 1 yellow at basal third or whole yellow or light brown (Fig. 68).	*A. rhopalosiphi* de Stefani-Perez
–	Mediodorsal carina on petiole prominent (Fig. 69); flagellomere 1 yellow or light brown at the base.	32.
32.	Pterostigma 3-3.5 times as long as wide (Fig. 70); flagellomere 1 with 1-3 longitudinal placodes (Fig. 71); parasitoid of cereal aphids (preferably *Sitobion* spp.).	*A. uzbekistanicus* Luzhetzki
–	Pterostigma 3.5-4 times as long as wide (Fig. 72); flagellomere 1 without or with one longitudinal placode (Fig. 74).	33.
33.	Flagellomere 1, 3-3.5 times as long as wide (Fig. 73); petiole 2.5-3 times as long as wide (Fig. 74); parasitoid of *Hyperomyzus* aphids.	*A. sonchi* Marshall
–	Flagellomere 1, 2.5-3 times as long as wide (Fig. 75); petiole 3-3.5 times as long as wide (Fig. 76); parasitoids of *Nasonovia* aphids.	*A. hieraciorum* Starý

*Presented taxonomic key is part of a much broader study presented in Tomanović *et al*. (2021) published in Serbian Cyrillic.

[1]Except in dwarf specimens of *A. absinthii* and *A. hortensis*, in which the propodeal areola is open and not clearly defined.

[2]Sometimes fourth palpomere long and undivided or partially divided.

[3]Sometimes the third palpomere long and undivided or partially divided.

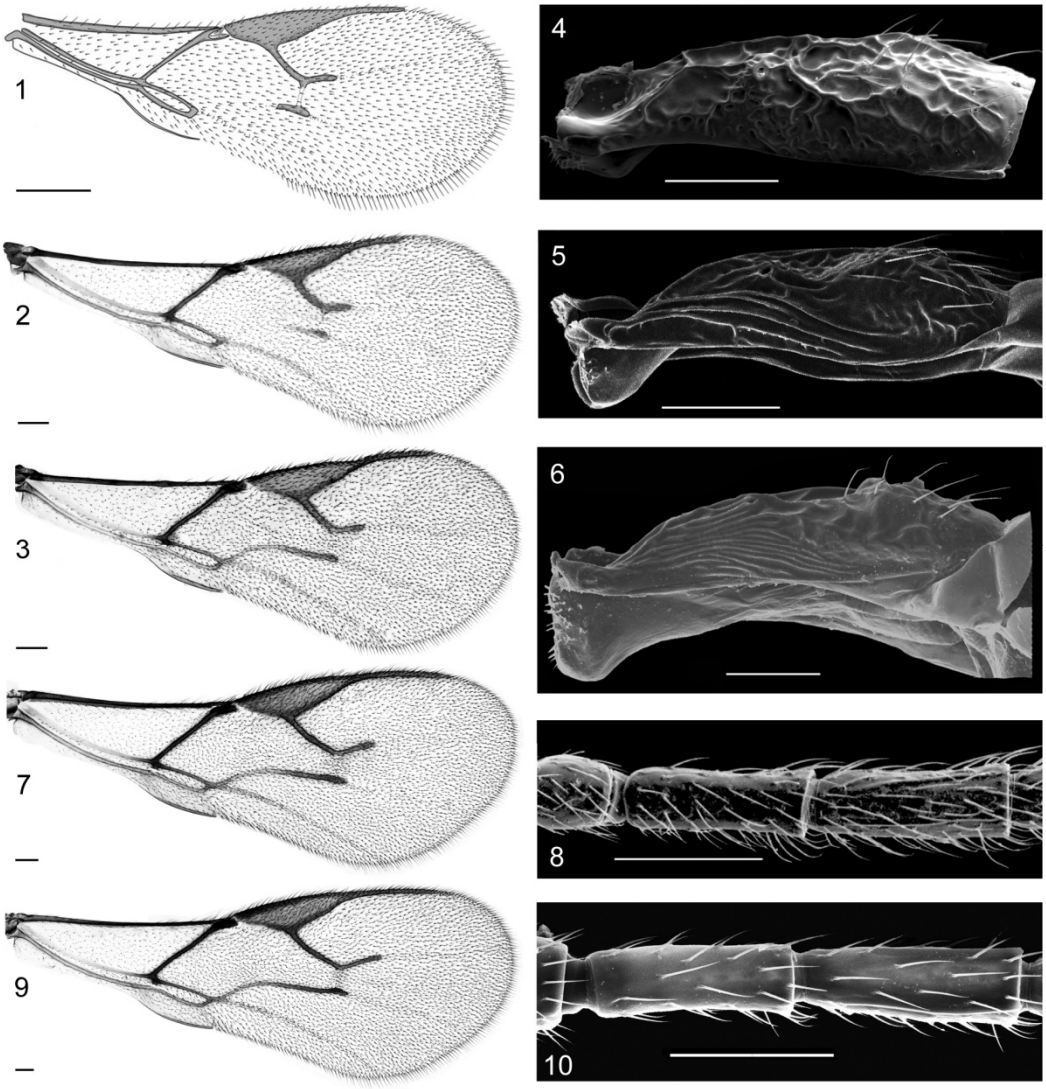

Figure 1– 10. Body parts: 1) *A. arvensis* – forewing; 2) *A.* (*Lysaphidus*) *viaticus* – forewing; 3) *A. absinthii* – forewing; 4) *A. ervi* – petiole, lateral side; 5) *A. avenae* – petiole laterally; 6) *A. eadyi* – anterolateral area of petiole; 7) *A. ervi* – forewing; 8) *A. ervi* – flagellomere 1 and 2 laterally; 9) *A. microlophii* forewing; 10) *A. microlophi* – flagellomere 1 and 2, lateral view.

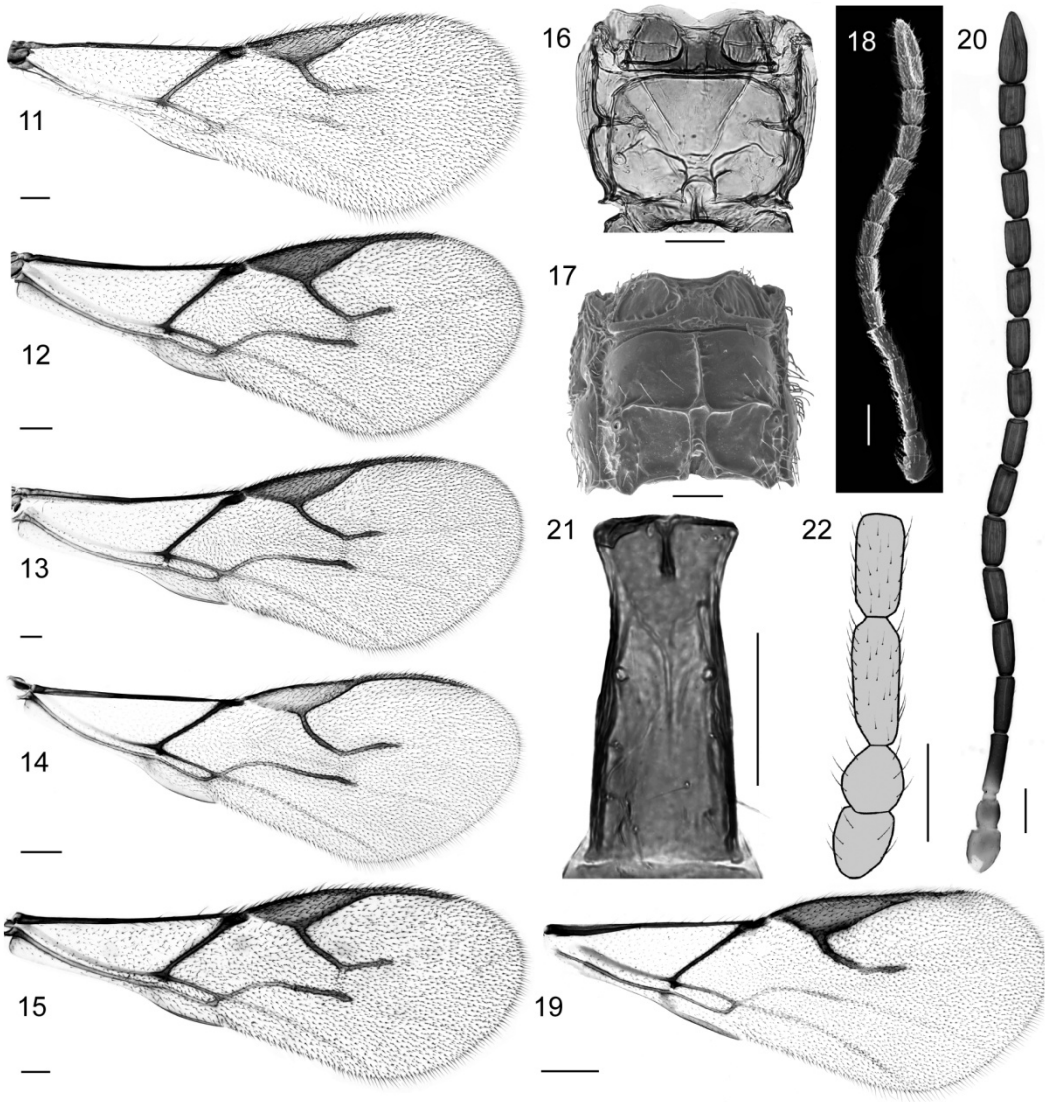

Figure 11– 22. Body parts: 11) *A. artemisicola* – forewing; 12) *A. rosae* – forewing; 13) *A. eadyi* – forewing; 14) *A. urticae* – forewing; 15) *A. funebris* – forewing; 16) *A. artemisicola* – propodeum, dorsal view; 17) *A. eadyi* – propodeum, dorsal view; 18) *A. salicis* – antennae, lateral view; 19) *A. salicis* – forewing; 20) *A. ervi* – antenna, lateral view; 21) *A. schmitscheki* – petiole, dorsal view; 22) *A. schimitscheki* – flagellomere 1 and 2.

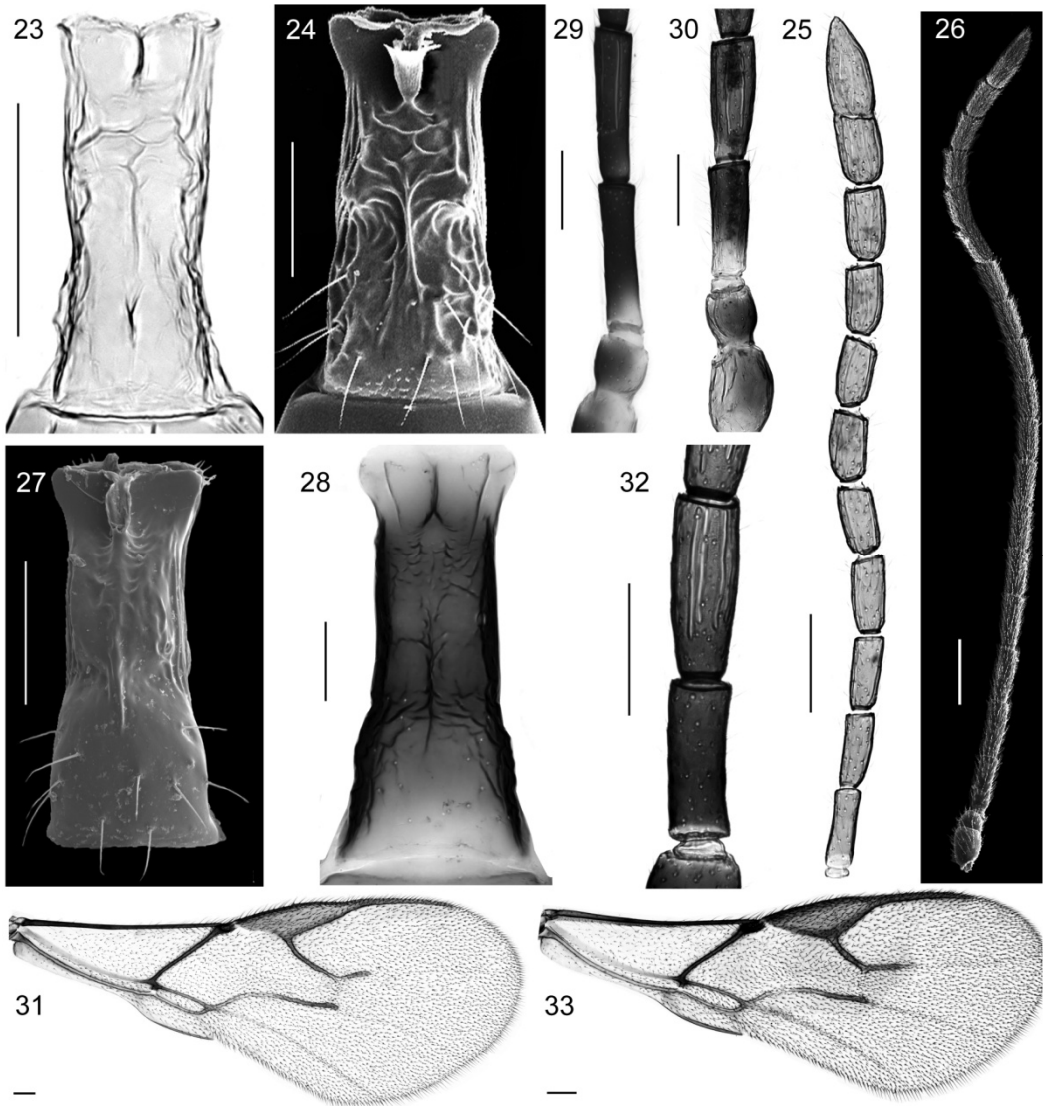

Figure 23– 33. Body parts: 23) *A. aquilus* – petiole, dorsal view; 24) *A.* salicis – petiole, dorsal view; 25) *A. aquilus* – antenna, lateral view; 26) *A. aedyi* – antenna, lateral view; 27) *A. ericaphidis* – petiole, dorsal view; 28) *A. rosae* – petiole, dorsal view; 29) *A. rosae* – flagellomere 1 and 2, lateral view; 31) *A. sussi* – forewing; 32) *A. balcanicus* – flagellomeree 1 and 2, lateral view; 33) *A. balcanicus* – forewing.

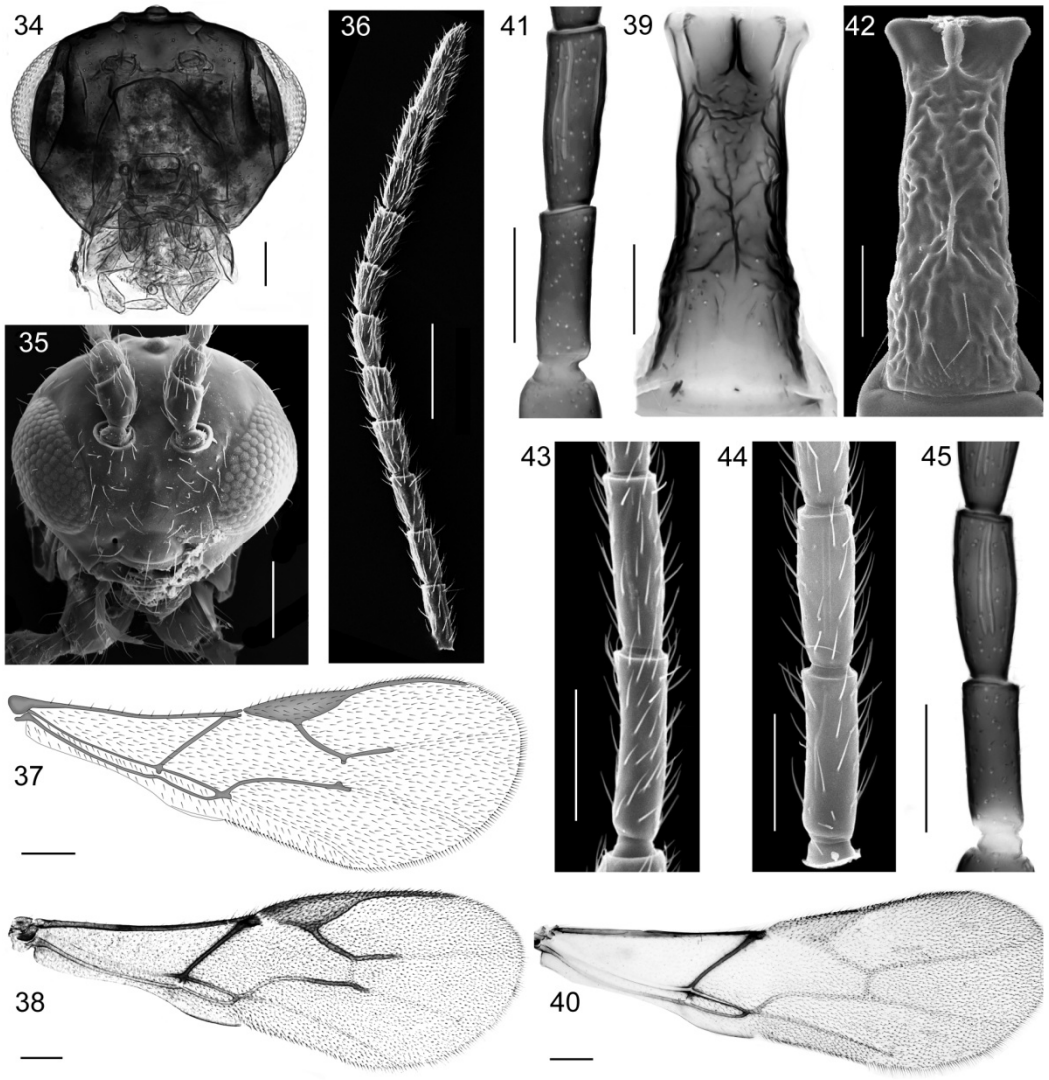

Figure 34– 45. Body parts: 34) *A. cingulatus* – head; 35) *A. matricariae* – head; 36) *A. matricariae* – antenna, lateral view; 37) *A. silvaticus* – forewing; 38) *A. banksae* – forewing; 39) *A. megurae* – petiole, dorsal view; 40) *A. megurae* – forewing; 41) *A. megurae* – flagellomere 1 and 2, lateral view; 42) *A. silvaticus* – petiole, dorsal view; 43) *A. urticae* – flagellomere 1 and 2; 44) *A. silvaticus* – flagellomere 1 and 2; 45) *A. funebris* – flagellomere 1 and 2.

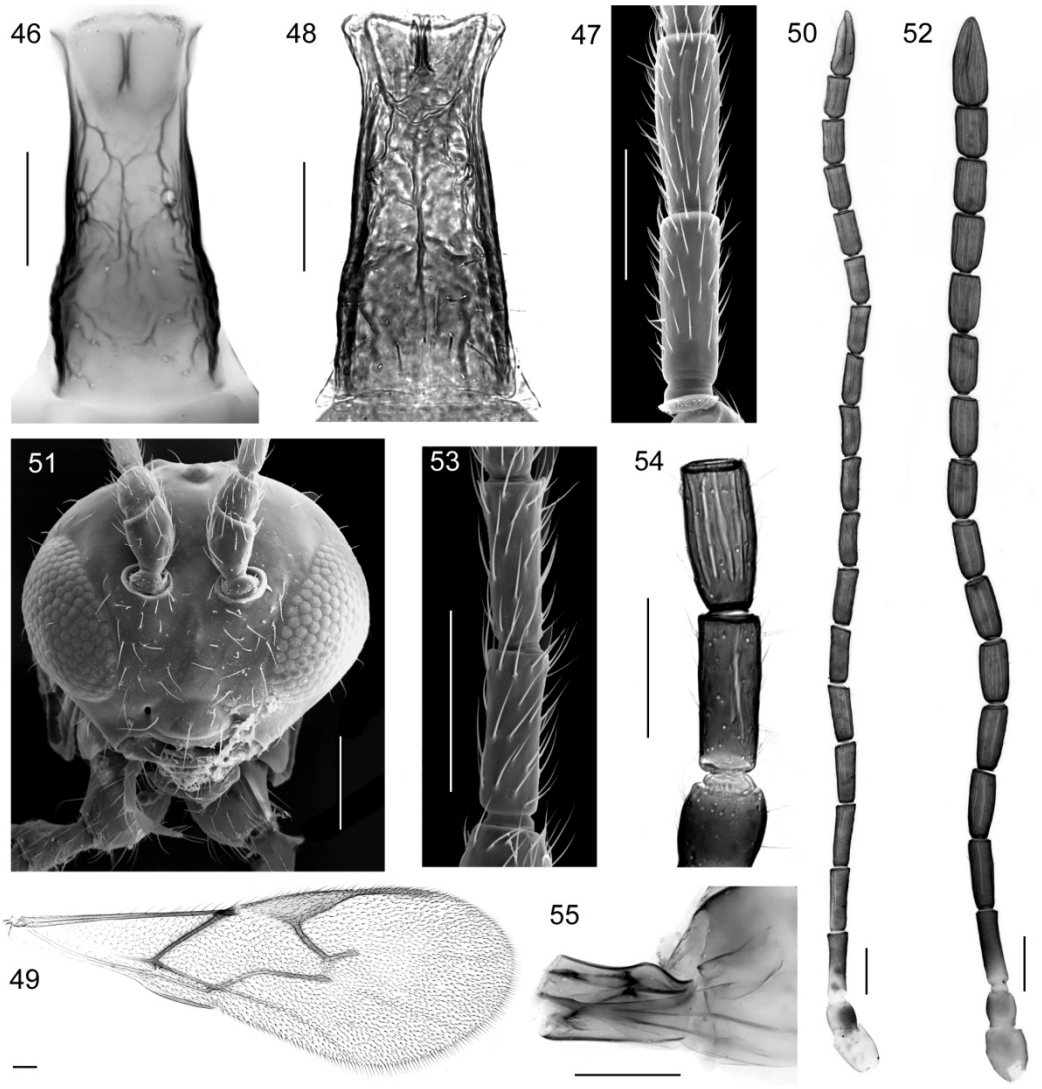

Figure 46– 55. Body parts: 46) *A. funebris* – petiole, dorsal view; 47) *A. rubi* – flagellomere 1 and 2; 48) *A. banksae* – petiole, dorsal view; 49) *A. phalangomyzi* – forewing; 50) *A. phalangomyzi* – antenna, lateral view; 51) *A. matricariae* – head; 52) *A. absinthii* – antenna, lateral view; 53) *A. hortensis* – flagellomere 1 and 2, lateral view; 54) *A. setiger* – flagellomere 1 and 2, lateral view; 55) *A. absinthii* – ovipositor sheaths, lateral view.

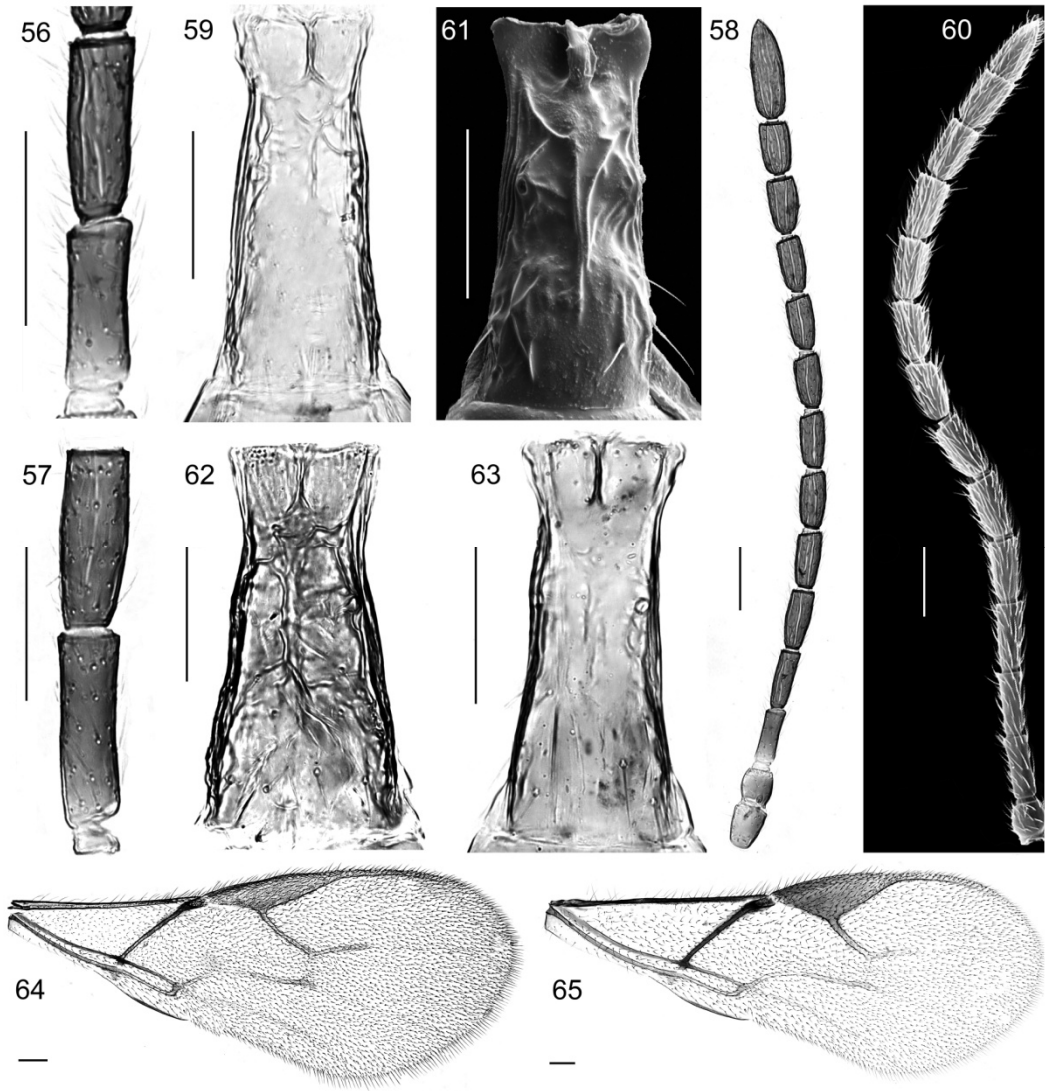

Figure 56– 65. Body parts: 56) *A. hortensis* – flagellomere 1 and 2, lateral view; 57) *A. ribis* – flagellomere 1 and 2, lateral view; 58) *A. eleganteriae* – antenna, lateral view; 59) *A. eleganteriae* – petiole lateral; 60) *A. hortensis* – antenna, lateral view; 61) *A. hortensis* – petiole, dorsal view; 62) *A. ribis* – petiole, dorsal view; 63) *A. tanacetarius* – petiole, dorsal view; 64) *A. linosiphonis* – forewing; 65) *A. setiger* – forewing.

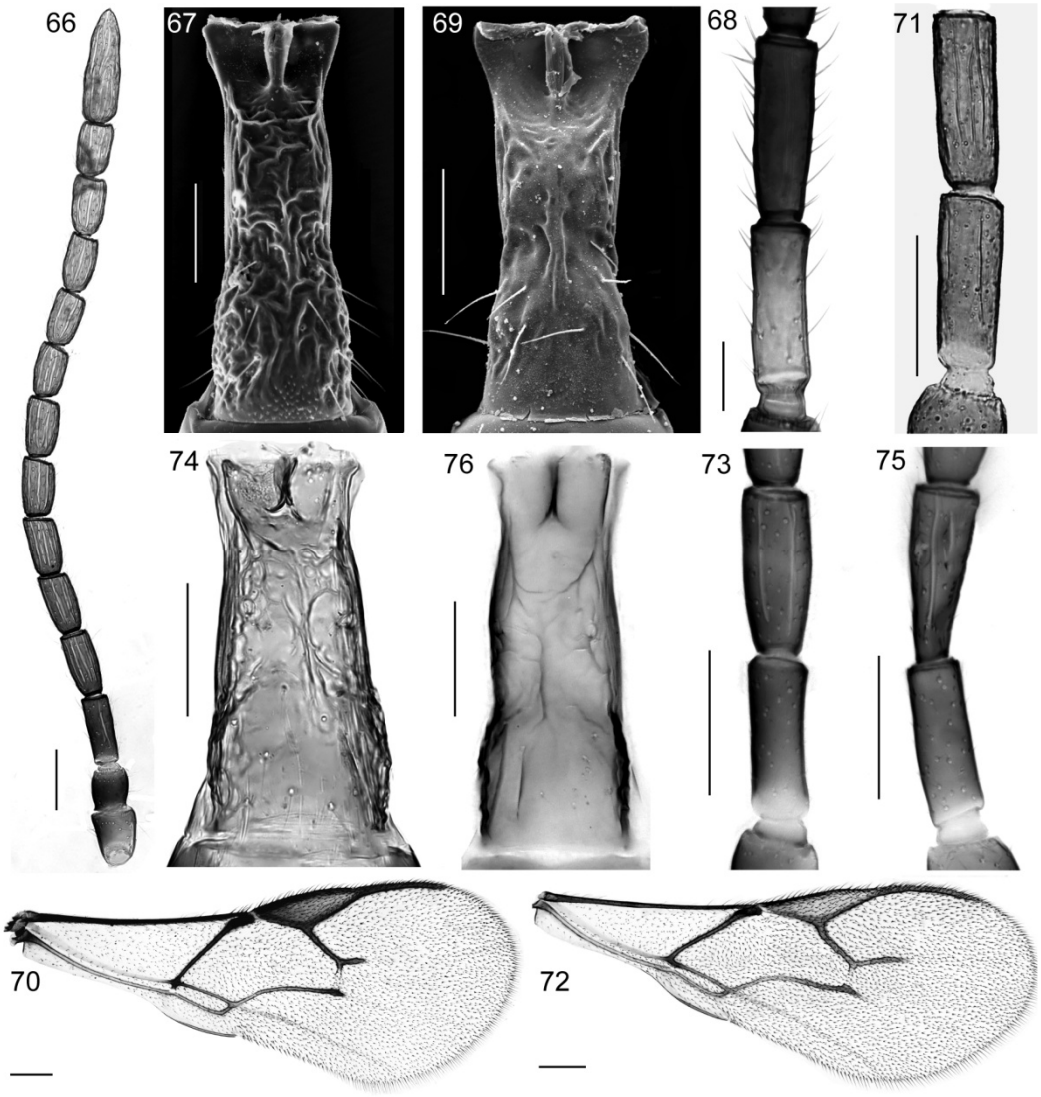

Figure 66– 76. Body parts: 66) *A. setiger* – antenna, lateral view; 67) *A. rhopalosiphi* – petiole, dorsal view; 68) *A. rhopalosiphi* – flagellomere 1 and 2, lateral view; 69) *A. uzbekistanicus* – petiole, dorsal view; 70) *A. uzbekistanicus* – forewing; 71) *A. uzbekistanicus* – flagelomere 1 and 2, lateral view; 72) *A. sonchi* – forewing; 73) *A. sonchi* – flagelomere 1 and 2, lateral view; 74) *A. sonchi* – petiole, dorsal view; 75) *A. hieraciorum* – flagelomere 1 and 2, lateral view; 76) *A. hieraciorum* – petiole, lateral view.

Review of *Aphidius* parasitoid – aphid host associations

Here we present a list of hosts for each studied species of *Aphidius* discovered in Serbia. This list of hosts is presented in detail in a previously published monography (Tomanović *et al*., 2021).

Aphidius (Lysaphidus) arvensis

Macrosiphoniella artemisiae

Aphidius (Lysaphidus) viaticus

Pleotrichophorus duponti
Pleotrichophorus filaginis
Pleotrichophorus glandulosus

Aphidius absinthii

Macrosiphoniella artemisiae
Macrosiphoniella tanacetaria
Macrosiphoniella sp.

Aphidius aquilus

Betulaphis quadrituberculata
Betulaphis sp.
Calaphis flava
Eucallipterus tiliae
Euceraphis punctipennis

Aphidius artemisicola

Macrosiphoniella sp.

Aphidius avenae

Acyrthosiphon malvae
Acyrthosiphon pisum
Macrosiphum sp.
Myzus persicae
Rhopalosiphum padi
Sitobion avenae

Aphidius balcanicus

Acyrthosiphon malvae
Aphidius banksae
Acyrthosiphon caraganae
Acyrthosiphon pisum

Aphidius (Euaphidius) cingulatus

Pterocomma populeum
Pterocomma sp.

Aphidius eadyi

Acyrthosiphon malvae
Acyrthosiphon pisum
Acyrthosiphon sp.

Aphidius eglanteriae

Chaetosiphon chaetosiphon
Chaetosiphon sp.
Aphidius ericaphidis
Ericaphis scammelli

Aphidius ervi

Acyrthosiphon caraganae
Acyrthosiphon malvae
Acyrthosiphon pisum
Acyrthosiphon sp.
Aphis fabae
Aphis sp.
Aulacorthum solani
Diuraphis noxia
Hyperomyzus sp.
Macrosiphum euphorbiae
Metopolophium dirhodum
Myzus persicae
Rhopalosiphum padi
Schizaphis graminum
Sitobion avenae

Aphidius funebris

Uroleucon aeneum
Uroleucon cichorii
Uroleucon cichorii grossum
Uroleucon doronici
Uroleucon jaceae
Uroleucon picridis
Uroleucon solidaginis
Uroleucon sonchi
Uroleucon sp.

Aphidius hieraciorum

Nasonovia ribisnigri
Nasonovia sp.

Aphidius hortensis

Liosomaphis berberidis
Aphidius linosiphonis
Linosiphon sp.

Aphidius matricariae

Aphis affinis
Aphis balloticola
Aphis craccivora
Aphis fabae
Aphis intybi
Aphis hederae
Aphis passeriniana
Aphis umbrella
Aphis sp.
Aulacorthum solani
Brachycaudus amygdalinus
Brachycaudus cardui
Brachycaudus helichrysi
Brachycaudus tragopogonis
Capitophorus carduinus
Capitophorus hippophaes
Capitophorus sp.
Dysaphis plantaginea
Hyalopterus pruni
Hyperomyzus lampsanae
Lipaphis erysimi
Macrosiphum euphorbiae
Myzus cerasi
Myzus cymbalariae
Myzus lythri
Myzus persicae
Myzus sp.
Ovatus mentharius
Phorodon humuli
Rhopalosiphum nymphaeae

Aphidius megourae

Megoura viciae

Aphidius microlophii

Microlophium carnosum

Aphidius phalangomyzi

Macrosiphoniella oblonga
Macrosiphoniella sp.

Aphidius rhopalosiphi

Diuraphis noxia
Metopolophium dirhodum
Metopolophium sp.
Rhopalosiphum maidis
Rhopalosiphum padi
Schizaphis scirpi
Sitobion avenae
Sitobion fragariae
Sitobion sp.

Aphidius ribis

Cryptomyzus ribis

Aphidius rosae

Macrosiphum rosae
Macrosiphum sp.

Aphidius rubi

Aulacorthum solani
Macrosiphum funestum
Macrosiphum sp.

Aphidius salicis

Aphis sp.
Aulacorthum solani
Cavariella aegopodii
Cavariella archangelicae
Cavariella sp.
Dysaphis sp.
Hyadaphis coriandri

Aphidius schimitscheki

Elatobium abietinum

Aphidius setiger

Periphyllus bulgaricus
Periphyllus lyropictus
Periphyllus testudinaceus
Periphyllus sp.

Aphidius silvaticus

Amphorophora rubi
Amphorophora ampullata
Amphorophora sp.

Aphidius sonchi

Hyperomyzus lactucae
Hyperomyzus sp.

Aphidius sussi

Delphiniobium junackianum

Aphidius tanacetarius

Metopeurum fuscoviride

Aphidius urticae

Acyrthosiphon caraganae
Acyrthosiphon pisum
Amphorophora ampullata
Amphorophora sp.
Aulacorthum solani
Macrosiphum euphorbiae
Macrosiphum sp.
Microlophium carnosum
Schizaphis scirpi

Aphidius uzbekistanicus

Anoecia corni
Metopolophium dirhodum
Rhopalosiphum padi
Schizaphis graminum
Sitobion avenae
Sitobion fragariae

Discussion

This comprehensive study was made based on data from a multi-year study of aphidines in Serbia. Previous research efforts identified 34 *Aphidius* species parasitizing a total of 97 aphid hosts. Among these, 24 parasitoid species exclusively parasitize one aphid species or several belonging to a single aphid genus. In contrast, 7 *Aphidius* species (*A. avenae*, *A. ervi*, *A. matricariae*, *A. urticae*, *A. rhopalosiphi*, *A. salicis*, and *A. uzbekistanicus*) parasitized several aphid host species that belong to several aphid genera. Further studies are required to clarify the status of some of these parasitoid species and to uncover the presence of possible cryptic species. Seven species (*A. artemisicola*, *A. arvensis*, *A. balcanicus*, *A. linosiphonis*, *A. megourae*, *A. phalangomyzi*, and *A. sussi*) are rarely found and could be endangered in Serbia. *Aphidius balcanicus* and *A. linosiphonis* were described from Serbia (Petrović *et al*., 2011). We assume that *A. balcanicus* is much more widespread in Europe in association with *Acyrthosiphon malvae*/ of *Geranium* spp. Two allochthonous *Aphidius* species have been recorded in Serbia: *A. ericaphidis* in association with *Ericaphis scammelli/,* and *Vaccinium corymbosum*, which belongs to the North American steppe faunistic complex, and *A. banksae* in association with *Acyrthosiphon pisum*, and *A. caraganae* and various legume host plants (Petrović *et al*., 2019). *A. banksae* belongs to the Eurasian steppe faunistic complex and was originally described from Asia Minor (Chen *et al*., 1990).

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РОД *APHIDIUS* NEES (HYMENOPTERA, BRACONIDAE, APHIDIINAE) У СРБИЈИ: КЉУЧ ЗА ИДЕНТИФИКАЦИЈУ ВРСТА УКЉУЧУЈУЋИ И СПИСАК АСОЦИЈАЦИЈА ПАРАЗИТОИД – ДОМАЋИН

ЖЕЉКО ТОМАНОВИЋ, ВЛАДИМИР ЖИКИЋ И АНЂЕЉКО ПЕТРОВИЋ

Извод

У овој студији дат је кључ за идентификацију 34 врсте рода *Aphidius* забележених у Србији. Такође, за све врсте рода *Aphidius* представљено је укупно 97 афидних домаћина. *Aphidius balcanicus* Tomanović & Petrović и *A. linosiphonis* Tomanović & Starý су описани из Србије. *Aphidius ericaphidis* Pike & Starý и *A. banksae* Kittel су алохтони, пореклом из Северне Америке и Азије.

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