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FIRST RECORD OF *DREPANOSIPHONIELLA FUGANS* REMAUDIÈRE & LECLANT (HEMIPTERA: APHIDIDAE: DREPANOSIPHINAE) ON THE BALKAN PENINSULA

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Abstract

Apterous viviparous females, an alate female, males, and oviparous females of *Drepanosiphoniella fugans* Remaudière & Leclant, 1972 (Hemiptera: Aphididae: Drepanosiphinae) were found in eastern Serbia (Bor, Zaječar, Stara Planina) in 2022. *Drepanosiphoniella* is a new genus for Serbia and the Balkan Peninsula. *D. fugans* is a holocyclic and monoecious species on *Acer monspessulanum* L. Its main morphological and biological characteristics and distribution are given. A photograph of the apterous viviparous female, line drawings, and slide photographs of the apterous viviparous female, alate viviparous female, oviparous female, and male are also included.

KEY WORDS: fauna, Serbia, aphids, *Acer monspessulanum*, Hemiptera, Aphididae

Introduction

Drepanosiphoniella Davatchi, Hille Ris Lambers & Remaudière, 1957 is a Palaearctic genus of aphids associated with *Acer monspessulanum* and its subspecies and is usually found at altitudes higher than 1000 m (Blackman & Eastop, 2023). Up to 2015, only *Drepanosiphoniella aceris* Davatchi, Hille Ris Lambers & Remaudière, 1957 with two subspecies (*D. aceris* subsp. *fugans* Remaudière & Leclant, 1972 and *D. aceris* subsp. *caucasica* Mamontova, 1982) were known (Blackman & Eastop, 1994; Remaudière & Remaudière, 1997). After the detailed revision by Wieczorek *et al*. (2015), it is accepted that *Drepanosiphoniella* comprises three species: *D. aceris* (with subspecies *D. aceris caucasica*), *Drepanosiphoniella fugans*, and *Drepanosiphoniella remaudierei* Wieczorek, 2015 (Wieczorek *et al*., 2015; Blackman & Eastop, 2023; Favret, 2023). According to Wieczorek *et al*. (2015), *Drepanosiphoniella aceris* is distributed in Iraq, Iran, and Turkey; *D. aceris caucasica* is found in Armenia; *D. fugans* in Italy, France, Spain, and Lebanon and *D. remaudierei* is known from Morocco.

They are all monoecious and holocyclic species, and the males are always apterous (Blackman & Eastop, 2023). Morphologically, *Drepanosiphoniella* is distinguishable from other Drepanosiphinae aphids by its long dorsal body setae and lack of a hairy fringe in the primary rhinaria. Also, unlike other Drepanosiphinae, apterous viviparous females are regularly present in colonies with alatae viviparous females.

Materials and Methods

Field research was conducted in 2022 in eastern Serbia by the second author. Aphids were collected from terminal shoots and leaves of different *Acer* species. Upon collection, the aphids and parts of the host plants were transferred to the laboratory. All collected samples were preserved in 70 % ethanol, while some were mounted on microscope slides using standard methods (Eastop & van Emden, 1972). Specimens were identified using a stereomicroscope (Leica, Type: DMLS2) and Olympus BX53 microscope; aphids were measured using the software package cellSens Entry 2 (CS-EN-V2). Drawings were made with camera lucida. The identification keys of Remaudière & Leclant (1972), Wieczorek *et al*. (2015), and Blackman & Eastop (2023) were used. Samples stored in alcohol-filled tubes and microscopic slides were deposited in the first author's collection at the Faculty of Agriculture, University of Belgrade.

Results

Numerous apterous viviparous females, one alata viviparous female, four males, and four oviparous females of *Drepanosiphoniella fugans* have been found for the first time on the Balkan Peninsula (Figs. 1-5). The genus *Drepanosiphoniella* is recorded for the first time in Serbia and on the Balkan Peninsula.

Material examined:

Zaječar, village Mali Izvor (Vetren), 05.06.2022, 4 apterous viviparous females found on *Acer monspessulanum* L., 644 m a.s.l. ($43^0\,42^I\,32.2^{II}$ N, $22^0\,21^I\,11.4^{II}$ E).
Stara Planina, village Topli Do, 08.08.2022, one alata viviparous female (possibly accidentally) on *Acer hyrcanum* subsp. *intermedium* (Panč) Palam., 860 m a.s.l. ($43^0\,20^I\,24.9^{II}$ N, $22^0\,41^I\,27.7^{II}$ E).

Bor, village Zlot (Lazareva Cave), 22.09.2022, 7 apterous viviparous females, 4 apterous males, and 4 oviparous females found on *Acer monspessulanum* L., 306 m a.s.l. ($44^0\,01^I\,44.3^{II}$ N, $21^0\,57^I\,39.3^{II}$ E).

This is the first time *D. fugans* has been found at altitudes less than 1,000 m.

Morphology of *Drepanosiphoniella fugans*

Apterous viviparous female: narrow and somewhat elongated, body length 2-2.2 mm, body width about 1 mm, dark brown with characteristic white wax pattern on thorax and abdomen (Figs. 1-2; Table I). Very long setae, among small ones, are present on the dorsal part of the body, antennae, and legs. Head sclerotized, eyes red. Antennae longer than body (2.2 to 2.5 mm), last antennal segment and articulation dark. Three to 5 secondary rhinaria are present on antennal segment III. There are no hairy fringes in primary and secondary rhinaria. Rostrum reaches the hind coxae. Legs long, coxae, trochanters, and femora rather dark and strong, tibiae pale, with many long setae. Abdomen has many small sclerites on the dorsal side, with setae arising from them.

Large and very visible sclerites are present between siphunculi on the fifth segment. Siphunculi strong and dark; flange very visible. Cauda pale, knobbed, with numerous setae.



Figure 1: *Drepanosiphoniella fugans*: photo of alive apterous viviparous female.

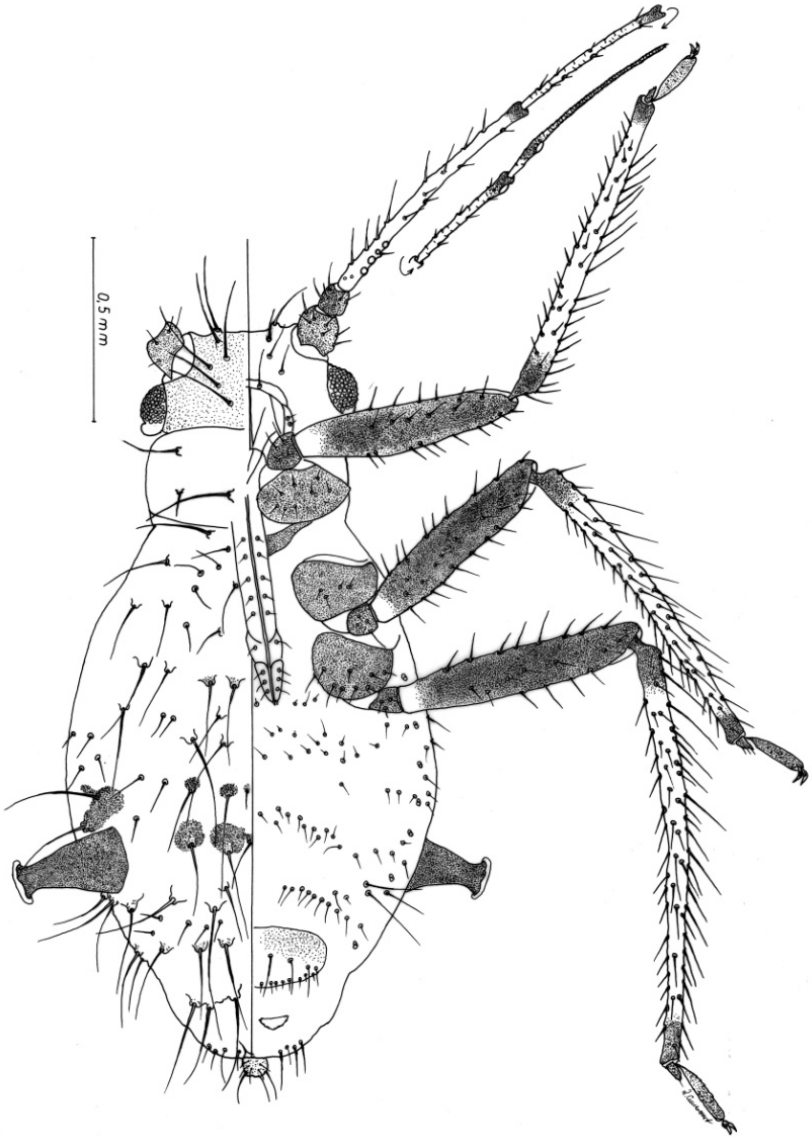


Figure 2: *Drepanosiphoniella fugans*: drawings of apterous viviparous females; left: dorsal side, right: ventral side.

Alata viviparous female (Figs. 3a, 4) is less narrow and darker brown than apterous viviparous female. Fore wings with media twice branched; pterostigma easily visible, brown with pale central part. Abdomen with large marginal sclerites on the dorsal part; many small sclerites from which setae arise. Siphunculi very dark, with flange; cauda is pale.

Table I: *Drepanosiphoniella fugans*: measurements of main morphological characters of three apterous viviparous females (in mm).

Character	No1	No2	No3
Body length	2.242	2.169	2.010
Body width (greatest)	1.021	1.04	1.105
Head width across eyes	0.361	0.306	0.296
Antennae length	2.497	2.367	2.205
Antennal segment III length	0.665	0.667	0.648
Antennal segment IV length	0.540	0.524	0.473
Antennal segment V length	0.357	0.362	0.366
Antennal segment VI length	0.591	0.580	0.550
Basal part of last antennal segment length	0.112	0.111	0.112
Processus terminalis length	0.479	0.469	0.438
Number of secondary rhinaria on ANT III	3 and 5	4 and 5	4 and 3
Apical segment of rostrum length	0.112	0.123	0.129
Hind femur length	0.703	0.709	0.684
Hind tibia length	1.224	1.224	1.112
First segment of hind tarsus length	0.045	0.059	0.661
Second segment of hind tarsus length	0.187	0.217	0.207
Siphunculi length	0.306	0.317	0.292

Oviparous female apterous, spindle-shaped, with end of abdomen elongated in the form of an ovipositor, brown (Figs. 3c, 5c). Antennae with rhinaria distributed on the base of antennal segment III. Hind tibiae thickened, with 25-32 rhinaria (Fig. 5e). Abdominal dorsal setae dark and siphunculi dark brown. Cauda pale.

Males apterous, dark brown, smaller than oviparous and viviparous females (Figs. 3d, 5a, d). Antennae relatively long, with numerous secondary rhinaria present on antennal segments III (20-22), IV (12-15), and V (7-10) (Fig. 5a). Siphunculi very dark and similar in shape to other forms (Fig. 5d).

Fundatrix was not found; authors did not look for the aphid in the spring.

Taxonomic note

Apterous viviparous females of *D. fugans* differ from *D. aceris* by a longer processus terminalis compared to the base of antennal segment VI (in *D. fugans* it is more than 3 times longer; in *D. aceris* it is less than 3 times) and by longer antennal setae in *D. fugans*. From *D. remaudierei* it can be distinguished by the color of the siphunculi (dark in *D. fugans*, pale in *D. remaudierei*), shape of cauda (no constriction in *D. remaudierei*) and pigmentation of pterostigma in alatae: dark in *D. fugans*, pale in *D. remaudierei* (Wieczorek *et al.*, 2015; Blackman & Eastop, 2023).

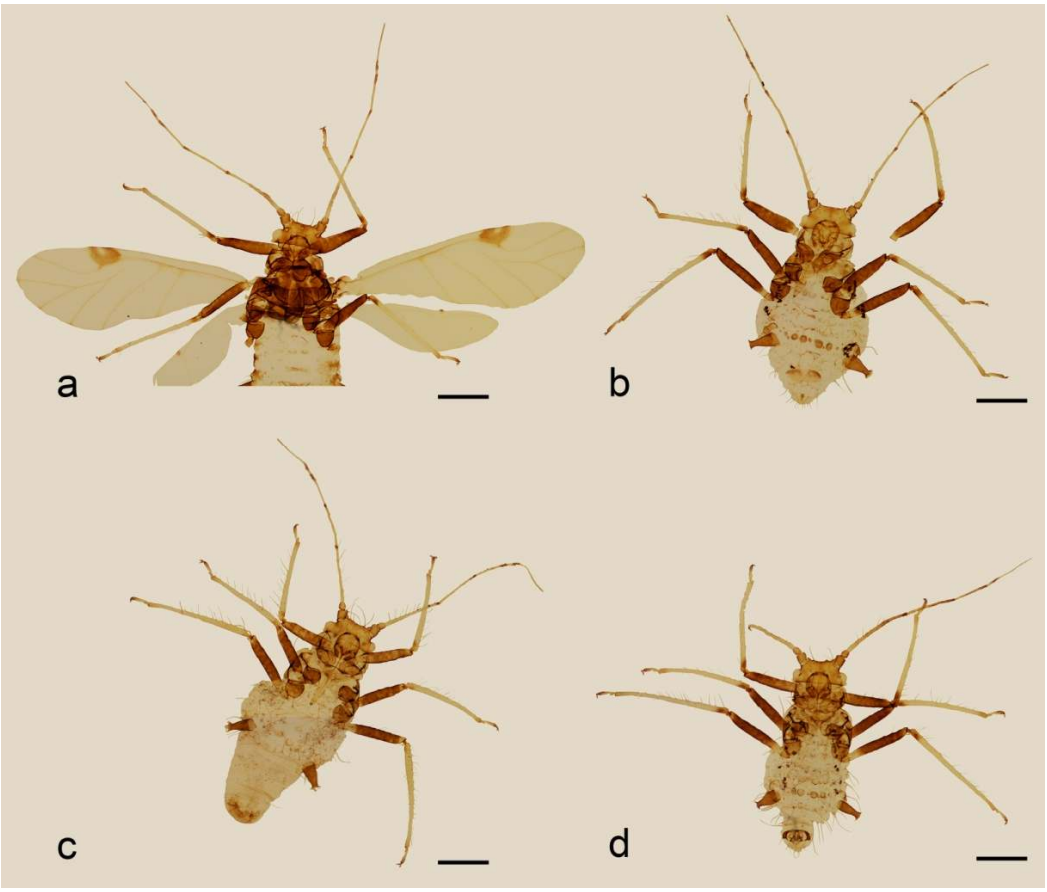


Figure 3: *Drepanosiphoniella fugans*, photo of mounted specimens: a – alata viviparous female, b – apterous viviparous female, c – oviparous female and d – male. Graphic length scale 500µm

Biology

According to this study and the literature, *D. fugans* is a holocyclic species. Apterous males and oviparous females were found in early autumn (22 September). It is a monoecious species; *Acer monspessulanum* is the host plant. One alata found on *Acer hyrcanum* subsp. *intermedium* was probably accidentally present on the tree. Ants (Formicidae, Hymenoptera) were observed visiting the colonies.

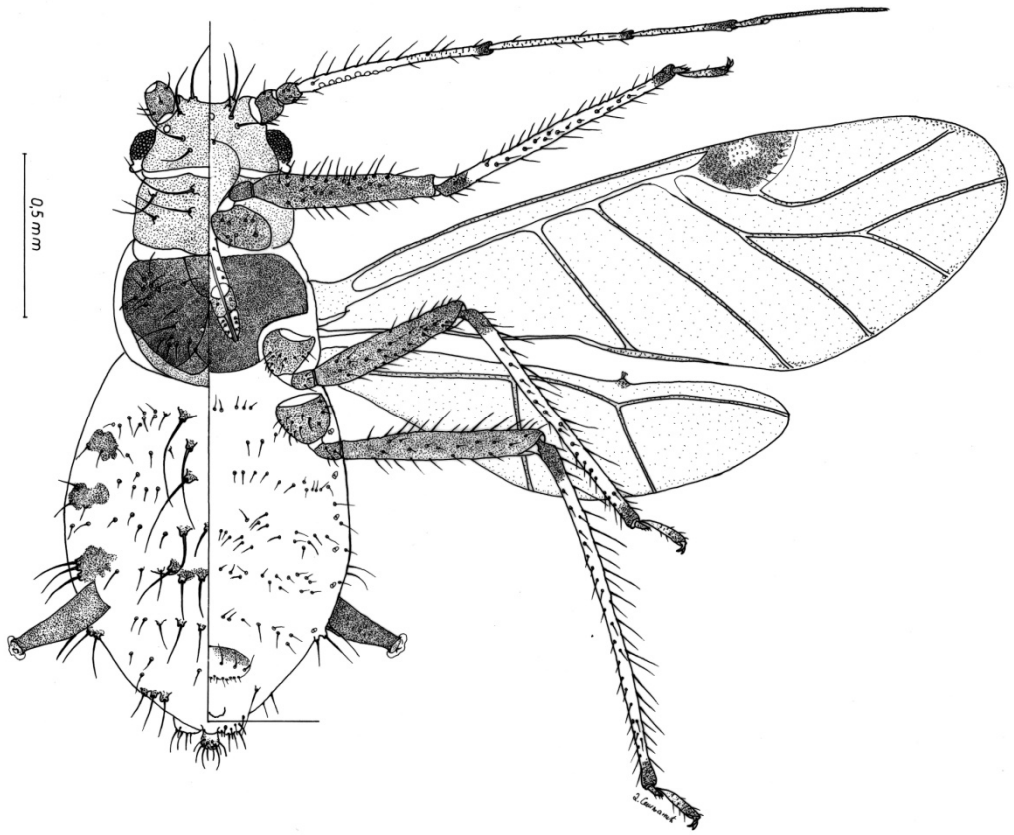


Figure 4: *Drepanosiphoniella fugans*: drawings of alata viviparous female.

Distribution

To date, *D. fugans* is known from France, Spain, Italy, and the Middle East (Lebanon) (Wieczorek *et al*., 2015; Blackman & Eastop, 2023). This is the first record of *D. fugans* in Serbia and the Balkan Peninsula.

Conclusion

This is the first time a *Drepanosiphoniella* species has been found on the Balkan Peninsula and at an altitude less than 1000 m a.s.l. (Blackman & Eastop, 2023). The three localities (Mali Izvor at 644 m, Topli Do at 644 m, and Zlot at only 306 m) are small mountains or hills in the eastern part of Serbia.

With *D. fugans* there are now six species of Drepanosiphinae found in Serbia: *Drepanosiphum aceris* Koch, *Drepanosiphum dixoni* H.R.L., *Drepanosiphum platanoidis* (Schrank), *Drepanosiphum oregonensis* Granovsky, and *Drepanaphis acerifoliae* (Thomas) (Petrović-Obradović *et al*., 2021). There are now 395 registered species of aphids (Hemiptera: Aphididae) in Serbia (Petrović-Obradović *et al*., 2022).

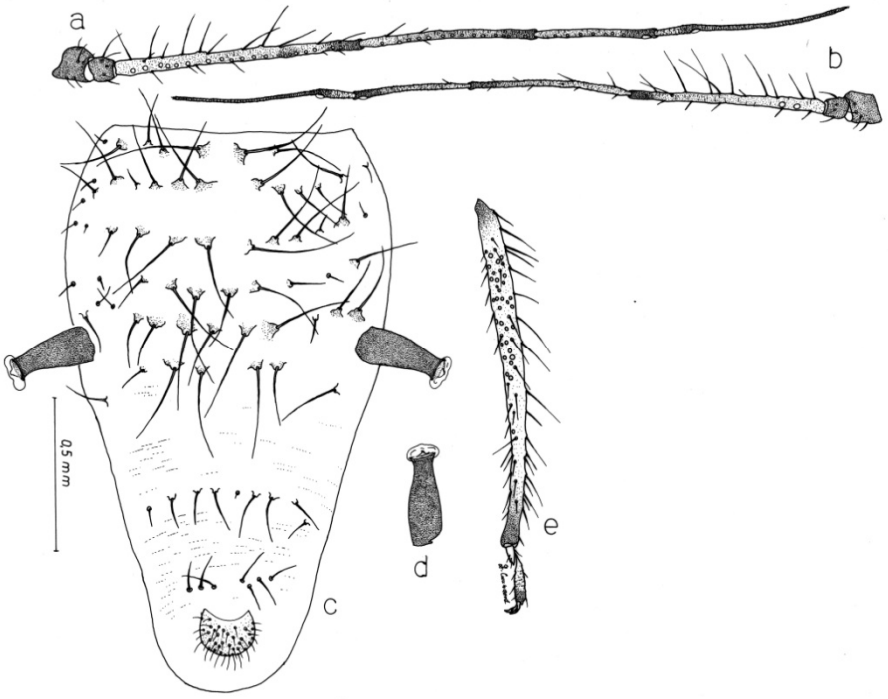


Figure 5: *Drepanosiphoniella fugans*, drawings of: a - antenna of male; b - antenna of oviparous female; c - abdomen of oviparous female, d - siphunculus of male, e - hind leg of oviparous female.

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ПРВИ НАЛАЗ *DREPANOSIPHONIELLA FUGANS* (HEMIPTERA: APHIDIDAE: DREPANOSIPHINAE) НА БАЛКАНСКОМ ПОЛУОСТРВУ

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Извод

Бескрилне вивипарне женке, крилата вивипарна женка, овипарне женке и мужјаци врсте *Drepanosiphoniella fugans* Remaudière & Leclant, 1972 (Hemiptera: Aphididae: Drepanosiphinae) нађени су током 2022. године у источном делу Србије (Бор, Зајечар, Стара планина). *Drepanosiphoniella* је нови род за Србију и Балканско полуострво. *D. fugans* је холоциклична и моноецична врста чија је биљка домаћин *Acer monsspesulanum* L. Наведене су основне морфолошке и биолошке карактеристике врсте као и њено распрострањење. У раду су приказане: фотографија живе бескрилне вивипарне женке, цртежи и фотографије препарата бескрилне вивипарне женке, крилате вивипарне женке, овипарне женке и мужјака.

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