

Original Article 

Additions to the aphid (Hemiptera, Aphididae) fauna of Iran: three new records and their taxonomic significance

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ABSTRACT. Aphids (Hemiptera, Aphidoidea) represent a diverse group of sap-feeding insects of considerable ecological and economic importance. The Iranian aphid fauna has been the subject of numerous studies, yet new records continue to emerge due to the country's diverse climates and habitats. In the present study, three aphid species are recorded from Iran for the first time: *Brachyunguis calotropicus* Menon & Pawar, 1958, *Dysaphis atina* Ghosh, Basu & Raychaudhuri, 1969, and *Metopolophium montanum* Hille Ris Lambers, 1966. Detailed morphological characteristics, host plant associations, and biometric data are provided for each species. A redescription of *B. calotropicus* is presented based on Iranian material, clarifying its morphological features. For *M. montanum*, the biometric data of the Iranian population extend the ranges in the original description, and an amendment to the "Key to apterae on *Rosa*" in Aphids on the World's Plants is proposed. With these additions, the number of aphid species recorded from Iran increases from 576 to 579, further highlighting the underexplored diversity of the Iranian aphid fauna and the importance of continued faunistic and taxonomic research.

KEYWORDS: Biodiversity, Fauna, Species Distribution, Taxonomy, Western Asia**Citation:** Mehrparvar, M. (2026) Additions to the aphid (Hemiptera, Aphididae) fauna of Iran: three new records and their taxonomic significance. *Journal of Insect Biodiversity and Systematics*, 12 (02), 203–212.

INTRODUCTION

Aphids (Hemiptera, Aphidoidea) are a diverse group of sap-sucking insects with significant ecological and agricultural importance due to their roles as pests and vectors of plant diseases (van Emden & Harrington 2007; Hosseini et al. 2017). Iran's varied climatic regions and rich flora provide a conducive environment for a wide array of aphid species (Mehrparvar & Mirtadzadini 2024). Comprehensive documentation of the country's aphid fauna is essential for understanding the ecological dynamics within these ecosystems and for effective pest management strategies. Historically, numerous studies have contributed to the knowledge of aphid diversity in Iran. The most recent comprehensive checklist of aphid species in Iran, published in October 2024, documented 572 species across 148 genera (Mehrparvar 2024). Since then, ongoing research and field studies have identified four additional species, bringing the current total to 576 (Mehrparvar 2025a), with further discoveries anticipated as exploration continues. However, the continuous exploration and identification of aphid species remain imperative, as new records can emerge with ongoing research and improved taxonomic methods. The discovery of new species records not only enhances our understanding of aphid biodiversity but also has practical implications for agriculture and conservation. Moreover, documenting these species contributes to global biodiversity records and supports ecological studies related to species distribution and adaptation.

This study aims to report three aphid species previously unrecorded in Iran, thereby enriching the existing inventory of the nation's aphid fauna. In this paper, the morphological characteristics, host plants, and geographical locations of these newly recorded aphid species in Iran are detailed.

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MATERIAL AND METHODS

Aphid samples were collected following the methodology described by Mehrparvar et al. (2024). In the laboratory, the specimens underwent mounting on microscopic slides following the methodology outlined by Mehrparvar et al. (2021) and Mehrparvar (2025b). Aphid specimens have been cataloged and are now deposited in the Aphid Collection of the Aphidology Research Group at Graduate University of Advanced Technology (KGUT) in Kerman, Iran. The measurements were conducted as outlined by Blackman and Eastop (2006). Identification of aphid specimens was conducted utilizing pertinent resources, such as Blackman (2010), Aphids on the World's Plants website (Favret & the Aphid Taxon Community 2025), Heie (1986, 1992, 1994, 1995), and the original descriptions of the aphid species. Plant specimens were identified by Dr. S.M. Mirtadzadini, a plant taxonomist at Shahid Bahonar University of Kerman, Iran. Host plant names follow "Plants of the World Online" (POWO 2025).

The following abbreviations are used throughout the text: BL: body length; ANT: antennae length; ANTIII, ANTIV, ANTV, ANTVI and ANTVIb: antennal segments III, IV, V, VI and the base of antennal segment VI, respectively; PT: processus terminalis; URS: ultimate rostral segment; BWURS: basal width of ultimate rostral segment; HTII: second segment of hind tarsus; SIPH: siphunculus; BWSIPH: basal width of siphunculi; BWCauda: basal width of Cauda; BDANTIII: basal diameter of the third antennal segment; LHANTIII: longest hair on third antennal segment; Rhin.: secondary rhinaria; HF: hind femur length; HT: hind tibia length; ABDT: abdominal tergite; ARG: Aphidology Research Group.

RESULTS

Class Insecta Linnaeus, 1758

Order Hemiptera Linnaeus, 1758

Family Aphididae Latreille, 1802

Subfamily Aphidinae Latreille, 1802

Tribe Aphidini Latreille, 1802

Genus *Brachyunguis* Das, 1918

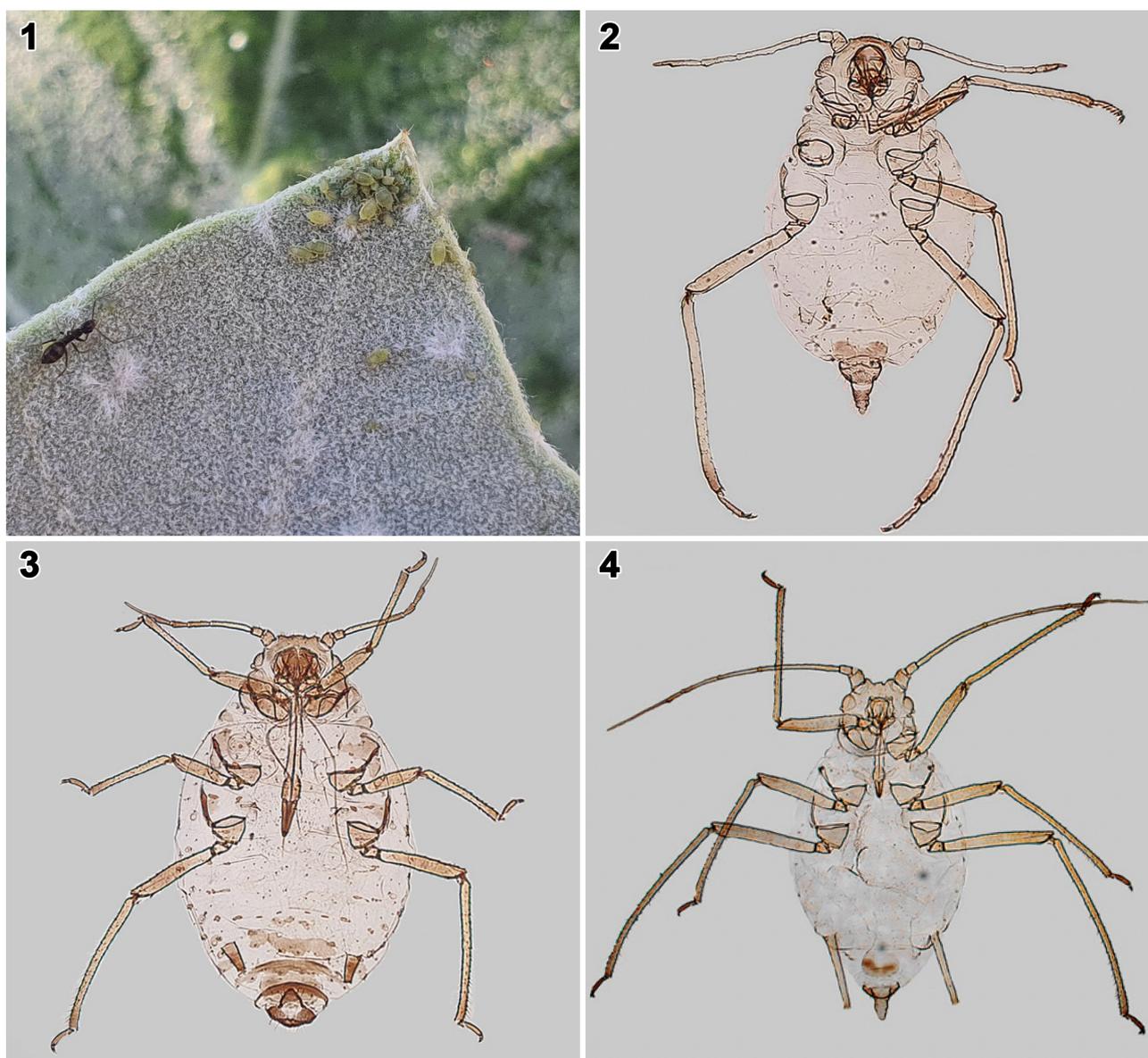
***Brachyunguis calotropicus* Menon & Pawar, 1958**

Figs 1–2, Table 1

Material examined. ARG00647: Iran, Kerman Province, Dow Sari, 28°24'53.2"N, 57°54'36"E, alt. 627 m., on *Calotropis procera* (Apocynaceae), 14.xi.2023, leg. M. Mehrparvar, 2 microscope slides, 8 apt. viv. fem.

This aphid species was observed forming small colonies on the upper side of the leaves of its host plant, *Calotropis procera*. The individuals within these colonies exhibited noticeable color variation, ranging from yellow to pale green and green (Fig. 1). Additionally, the aphids were frequently attended by ants, suggesting a mutualistic relationship. *Brachyunguis calotropicus* has been reported on *Calotropis* spp. and *Abutilon indicum* (Malvaceae) in India, Southwest Asia (Saudi Arabia), and Africa (Algeria, Egypt, and Sudan) (Ghosh 1974; Chakrabarti & Sarkar 2001; Holman 2009; Favret & the Aphid Taxon Community 2025). The first report of this aphid dates back to 1958, when Menon & Pawar recorded it from the Delhi region of India; however, their publication lacked a morphological description, leaving the species insufficiently characterized (Menon & Pawar 1958). Given the absence of a detailed description, this study aims to provide a thorough morphological account of the species based on specimens collected in Iran.

Redescription. — Apterous viviparous females (n=8): Color: Body ranging from yellow to pale green and green. Pigmentation of mounted specimens: Body and appendages predominantly pale; frons, clypeus, processus terminalis (PT), ultimate rostral segment (URS), tips of tibiae, tarsi, genital plate, anal plate, and cauda slightly darker. Body broadly elliptical. Head surface smooth, frons slightly wrinkled. Antennae six-segmented, shorter than body length (BL); antennal tubercles undeveloped and without a median frontal tubercle. Rostrum reaching beyond the metathorax. URS blunt. Body with fine, blunt setae. Cauda elongate-triangular. Metric and meristic features are presented in Table 1. In the present study, only apterous viviparous females were collected.



Figures 1–4. The newly recorded aphids from Iran. **1.** A colony of *Brachyunguis calotropicus* Menon & Pawar, 1958 on the upper side of a *Calotropis procera* (Apocynaceae) leaf; the ants can also be observed tending to the aphids; **2–4.** Apterous viviparous females. **2.** *Brachyunguis calotropicus* (ARG00647_1-1); **3.** *Dysaphis atina* Ghosh, Basu & Raychaudhuri, 1969 collected in Iran on *Cirsium spectabile* (Asteraceae) (ARG00668_2-2); **4.** *Metopolophium montanum* Hille Ris Lambers, 1966 collected in Iran on *Rosa beggeriana* (Rosaceae) (ARG00276_2-2).

Tribe Macrosiphini Wilson, 1910

Dysaphis atina Ghosh, Basu & Raychaudhuri, 1969

Fig. 3, Table 2

Material examined. ARG00668: Iran, Kerman Province, Lalehzar, 29°30'05.7"N, 56°49'31.5"E, alt. 2945 m., on *Cirsium spectabile* (Asteraceae), 16.vi.2006, leg. M. Mehrparvar, 3 microscope slides, 7 apt. viv. fem.

In the present study, only apterous viviparous females were collected. The live individuals exhibited a green body color, and colonies were observed on the collar region of the host plant. Morphologically, this species is characterized by paired spinal tubercles, which are consistently present on the head and abdominal tergite VIII, and one or two tubercles usually occur on abdominal tergite VII. The siphunculi are longer than the cauda, and the longest setae on antennal segment III exceed the basal diameter of this segment (see Table 2 for biometric data).

Table 1. Metric and meristic features of *Brachyunguis calotropicus* apterous viviparous females collected in Iran. The measurements are given in micrometers (μm).

Characteristics	Apterous viviparous females (n = 8)	Characteristics	Apterous viviparous females (n = 8)
BL	1020–1180	URS/ANTVib	0.86–1.04
ANTIII	177–189	HF	343–400
ANTIV	(61)103–119	HF/BL	0.32–0.35
ANTV	115–124	HT	600–691
ANTVib	98–109	HT/BL	0.56–0.61
PT	42–70	HTII	120–127
PT/ANTIII	0.23–0.37	URS/HTII	0.75–0.89
PT/ANTVib	0.39–0.64	SIPH	48–60
PT/ANTIV	0.35–0.62(0.82)	SIPH/BL	0.04–0.06
PT/ANTV	0.36–0.58	SIPH/ANTIII	0.27–0.32
PT/URS	0.38–0.74	SIPH/PT	0.80–0.96(1.43)
ANTIII/ANTIV	1.55–1.74(2.90)	SIPH/URS	0.48–0.60
ANTVI/ANTIII	0.80–0.95	SIPH/ANTVib	0.44–0.56
ANTV/ANTIII	0.63–0.70	SIPH/BWSIPH	0.77–1.02
ANTIV/ANTIII	(0.35)0.58–0.64	BWSIPH	53–78
ANTIV/ANTV	(0.49)0.88–1.02	SIPH/Cauda	0.36–0.43
ANTVib/URS	0.96–1.16	Cauda	129–142
Rhin. ANTIII [number]	0	BWCauda	95–96
Rhin. ANTIV [number]	0	Cauda/BWCauda	1.44–1.48
Rhin. ANTV [number]	0	Cauda/URS	1.30–1.37
URS	94–111	URS accessory setae [number]	2
BWURS	35–46	Cauda hairs [number]	6–7
URS/BWURS	2.14–2.92		

Table 2. Metric and meristic features of *Dysaphis atina* apterous viviparous females collected in Iran. The measurements are given in micrometers (μm).

Characteristics	Apterous viviparous females (n = 7)	Characteristics	Apterous viviparous females (n = 7)
BL	1706–1941	Length of spinal setae on ABDTIII	17.5–20.0
ANTIII	159.0–271.6	HF	373.1–467.3
ANTIV	86.6–135.4	HF/BL	0.21–0.26
ANTV	73.6–107.3	HT	576.5–769.2
ANTVib	72.8–83.4	HT/BL	0.32–0.43
PT	141.1–195.5	HTII	96.9–113.6
PT/ANTIII	0.69–0.91	URS/HTII	1.64–1.86
PT/ANTVib	1.84–2.36	SIPH	119.9–143.0
PT/URS	0.81–1.05	SIPH/BL	0.07–0.08
ANTIII/ANTIV	1.69–2.01	SIPH/ANTIII	0.51–0.90
ANTIV/ANTV	1.10–1.39	SIPH/URS	0.68–0.82
ANTVib/URS	0.40–0.45	SIPH/ANTVib	1.54–1.96
ANTIII/SIPH	1.11–1.98	SIPH/BWSIPH	1.71–2.22
ANT/BL	0.3640–0.50	BWSIPH	63.7–76.1
LHANTIII	15.0–18.8	SIPH/Cauda	1.25–1.55
BDANTIII	13.2–17.3	Cauda	83.2–101.2
LHANTIII/BDANTIII	1.06–1.26	BWCauda	118.9–133.8
Rhin. ANTIII [number]	0	Cauda/BWCauda	0.67–0.82
Rhin. ANTIV [number]	0	Cauda/URS	0.48–0.54
Rhin. ANTV [number]	0	URS accessory setae [number]	2–3
URS	172.2–192.7	Cauda hairs [number]	5
BWURS	57.8–68.9	Setae on anterior half of subgenital plate [number]	2
URS/BWURS	2.57–3.11	Setae on the hind margin of subgenital plate [number]	10–11
URS/ANTVib	2.20–2.47	Setae on ABDTVIII [number]	4–6

When comparing the Iranian population with the original description of the species from India (Ghosh et al. 1969), several minor morphological differences are evident. In the Indian population, the SIPH/cauda ratio was reported as 1.6–2.0, whereas in the Iranian specimens it ranges from 1.25–1.55. The SIPH/BWSIPH ratio was given as 1.67 in the Indian population, while it ranges from 1.71–2.22 in the Iranian material. Furthermore, the URS/HTII ratio was 1.50–1.63 in Indian specimens, compared with 1.64–1.86 in the Iranian samples. These differences, however, fall within the limits of intraspecific variation and are most likely attributable to geographical distribution and/or host plant influence (Madjdzadeh & Mehrparvar 2009; Madjdzadeh et al. 2009). Such variation has been frequently reported in aphid populations and does not warrant taxonomic separation. This species has previously been reported on *Cirsium* spp., *Carduus* spp. and *Anaphalis busua* in northern India (Himachal Pradesh, Uttar Pradesh, Jammu and Kashmir) and Pakistan (Chakrabarti & Medda 1993; Naumann-Etienne & Remaudière 1995; Chakrabarti & Sarkar 2001; Favret & the Aphid Taxon Community 2025). In addition, a specimen identified as *Dysaphis atinus* and collected on *Cirsium arvense* in Iran by R. van den Bosch is deposited in the Natural History Museum, London (NHMUK) (<https://data.nhm.ac.uk/>). In this study, *D. atina* was collected on *Cirsium spectabile* and this represents a new host association for the species globally.

***Metopolophium montanum* Hille Ris Lambers, 1966**

Fig. 4, Table 3

Material examined. ARG00276: Iran, Kerman Province, Mes-e-Sarcheshmeh, 29°59'52.4"N, 55°51'27.3"E, alt. 2564 m., on *Rosa beggeriana* (Rosaceae), 14.iv.2008, leg. M. Mehrparvar, 8 microscope slides, 14 apt. viv. fem.

The body colour of the live individuals collected in this study was green. This species, together with *Metopolophium rogeri* Mehrparvar, 2022, was collected simultaneously from the same host plant. Morphologically, it is closely related to *M. dirhodum* (Walker, 1849) but can be distinguished by a higher SIPH/cauda ratio, a higher URS/HTII ratio, and the presence of a greater number of accessory setae on the URS (see Table 3).

Table 3. Some metric and meristic features of *Metopolophium montanum* apterous viviparous females collected in Iran. The measurements are given in micrometers (µm).

Characteristics	Apterous viviparous females (n = 14)	Characteristics	Apterous viviparous females (n = 14)
BL	1941–2451	HT/BL	0.50–0.65
ANTIII	411–609	HT/URS	8.87–11.11
ANTVIb	120–153	HTII	130–150
PT	300–560	HTII/ANTVIb	0.88–1.25
PT/ANTIII	0.67–1.02	URS/HTII	0.80–0.92
PT/ANTVIb	2.31–4.00	SIPH	390–530
PT/URS	2.61–4.67	SIPH/BL	0.19–0.26
PT/SIPH	0.76–1.14	SIPH/ANTIII	0.81–1.07
ANTIII/URS	3.43–5.08	SIPH/URS	3.50–4.42
ANTIII/Cauda	1.87–2.61	SIPH/ANTVIb	3.00–4.33
ANTVIb/URS	0.96–1.28	SIPH/HT	0.35–0.44
ANTIII/SIPH	0.93–1.24	SIPH/HTII	3.00–3.79
Rhin. ANTIII [number]	0–4	SIPH/Cauda	1.86–2.36
Rhin. ANTIV [number]	0	Cauda	200–250
Rhin. ANTV [number]	0	Cauda/BL	0.09–0.11
URS	110–125	Cauda/URS	1.67–2.08
URS/ANTVIb	0.78–1.04	URS accessory setae [number]	8–13
HF	590–777	Cauda hairs [number]	6–9
HF/BL	0.29–0.37	Length of setae on ABDTVIII	24–29
HT	1020–1333	Setae on ABDTVIII [number]	4–5

In addition, the siphunculi are distinctly imbricated, with coarse sculpturing. The biometric and meristic features of the Iranian population measured in this study extend the ranges given in the original description of the species (Hille Ris Lambers 1966). This aphid species has previously been recorded on wild *Rosa* spp. in montane regions of Switzerland, Austria, France, and Spain (Hille Ris Lambers 1966; Lampel 1976; Leclant 1978; Stroyan 1982; Remaudière et al. 1986; Favret & the Aphid Taxon Community 2025). More recently, it has also been reported from Turkey (Akyıldırım Beğen et al. 2023). Since the biometric data of *M. montanum* obtained from the Iranian population extend the ranges given in the original description of the species, it is appropriate to suggest a modification to the “Key to apterae on *Rosa*” presented in Blackman & Eastop’s *Aphids on the World’s Plants*. The proposed amendments are as follows:

Couplet 60': R IV+V 0.55-0.95 × HT II and bearing 2-12(13) accessory hairs. ANT PT/BASE 2.0-7.5.	61
Couplet 62': SIPH less than 0.65 mm long, 0.15-0.26 × BL.	65
Couplet 65': SIPH 1.8-2.5 × cauda. R IV+V 0.75-0.90 × HT II, with 6-12(13) accessory hairs. SIPH with coarse imbrication.	<i>Metopolophium montanum</i>

DISCUSSION

In the present study, three aphid species are recorded for the first time in Iran: *Brachyunguis calotropicus*, *Dysaphis atina*, and *Metopolophium montanum*. To date, only three aphid species have been reported on *Calotropis* in Iran: *Aphis nerii* Boyer de Fonscolombe, 1841, *Aphis spiraeicola* Patch, 1914, and *Brachyunguis tamaricophilus* (Nevsky, 1928) (Mehrparvar 2024, 2025a). The addition of the new record of *B. calotropicus* increases the number of aphid species associated with *Calotropis* in Iran to four, contributing to the growing knowledge of the region’s aphid fauna. Up to now, 20 aphid species have been reported on *Cirsium* in Iran (Mehrparvar 2024). The present finding of *D. atina* on *Cirsium* represents the 21st species recorded from this host genus in the country. The present record of *M. montanum* from Iran represents the easternmost occurrence of this species to date. So far, 21 aphid species have been recorded from *Rosa* in Iran (Mehrparvar & Lashkari 2021; Mehrparvar et al. 2022; Mehrparvar 2024). With the addition of the present record, the number of known species associated with *Rosa* in the country increases to 22.

These findings not only expand the known aphid diversity of the country but also provide important evidence for the biogeographical distribution patterns of these species across the Palearctic and adjacent regions. *Brachyunguis calotropicus* was previously known from India, Southwest Asia (Saudi Arabia), and Africa (Algeria, Egypt, and Sudan). Its presence in Iran confirms that the species is widely distributed across arid and semi-arid regions from Africa to South Asia. The occurrence in Iran can be interpreted as part of a continuous distributional range across xeric habitats of the Old World, possibly facilitated by the broad distribution of its host plants (*Calotropis* spp.) under dry climatic conditions (Kaur et al. 2021). *Dysaphis atina* has been recorded from northern India (Himachal Pradesh, Uttar Pradesh, Jammu and Kashmir) and Pakistan. The Iranian record bridges the gap between South Asian and Middle Eastern faunas. This suggests that the species may be more widely distributed across western Asia than previously recognized, but was overlooked due to limited sampling of its host plants (*Cirsium* and *Carduus* spp.). *Metopolophium montanum* was earlier reported from montane regions of Switzerland, Austria, France, and Spain, and more recently from Turkey. The Iranian record extends the known distribution eastward into the Irano-Anatolian highlands. Given its association with wild *Rosa* species in montane habitats, it appears that the species follows the mountainous corridors of southern and central Europe into Anatolia and the Iranian plateau. This distribution pattern supports the hypothesis of stepwise dispersal through connected montane systems, possibly facilitated by climatic fluctuations during the Quaternary, which allowed range expansion and contraction along elevational gradients (Hewitt 2000). From a broader zoogeographical perspective, these three new records highlight the role of Iran as a transitional zone between several major biogeographical regions: the Western Palearctic, the Central Asian, and the Afrotropical elements. The geographical position and ecological heterogeneity of Iran, with its combination of deserts, steppes, and mountain ranges, make it a natural corridor for faunal exchange and dispersal. The discovery of these species in Iran thus fills critical gaps in their distributional ranges and supports the hypothesis that the Iranian plateau functions

as a “missing chain” linking the fauna of the Mediterranean, Central Asia, South Asia, and even northern Africa (Noori et al. 2024).

These findings increase the total number of known aphid species in the country from 576 to 579. The documentation of these new records not only refines our knowledge of aphid distribution in Iran but also provides valuable data for taxonomy, ecology, and pest management. Considering the vast geographic extent of Iran, its wide range of climates, and its rich botanical diversity, the actual number of aphid species present is expected to be considerably higher than currently reported. Continued field surveys, combined with detailed morphological and molecular analyses, will be essential for revealing the full extent of Iran’s aphid biodiversity and for integrating this knowledge into global aphid databases and applied agricultural contexts.

AUTHOR’S CONTRIBUTION

The author confirms his contribution to the whole processing steps in the research, collection, preparation, examination, and illustrations of the specimens, as well as preparation of the manuscript, and He read and approved the final version of the manuscript.

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AVAILABILITY OF DATA AND MATERIAL

The specimens examined in this study are deposited in the Aphidology Research Group collection, Kerman, Iran, and are available from the curator upon request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included arthropod material, and all required ethical guidelines for the treatment and use of animals were strictly adhered to in accordance with international, national, and institutional regulations. No human participants were involved in any studies conducted by the authors for this article.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

The author declares that there is no conflict of interest regarding the publication of this paper.

GENERATIVE AI STATEMENT

No generative AI tools were used in the preparation of this paper.

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یافته‌های جدید از فون شته‌ها (Hemiptera, Aphididae) در ایران: سه گزارش جدید و اهمیت رده‌بندی آن‌ها

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چکیده: شته‌ها (Hemiptera, Aphidoidea) گروهی متنوع از حشرات هستند که از شیر گیاهی تغذیه می‌کنند و از نظر بوم‌شناختی و اقتصادی اهمیت قابل توجهی دارند. فون شته‌های ایران موضوع مطالعات متعددی بوده است، با این حال به دلیل تنوع اقلیمی و زیستگاهی کشور، همچنان گزارش‌های جدیدی از این گروه ارایه می‌شود. در پژوهش حاضر، سه گونه شته شامل *Dysaphis atina* Ghosh, Basu & Raychaudhuri, *Brachyunguis calotropicus* Menon & Pawar, 1958 و *Metopolophium montanum* Hille Ris Lambers, 1966 و 1969 برای نخستین بار از ایران گزارش شدند. برای هر گونه، ویژگی‌های ریخت‌شناسی، روابط میزبانی و داده‌های بیومتریکی با ارایه جزئیات ارایه شد. بازتوصیف گونه *B. calotropicus* بر اساس نمونه‌های جمع‌آوری شده از ایران تهیه و ویژگی‌های ریخت‌شناسی آن با جزئیات بیشتری ارایه شد. در مورد *M. montanum*، داده‌های بیومتریکی جمعیت ایرانی دامنه‌های ذکر شده در توصیف اصلی گونه را گسترش داده و اصلاحی برای "کلید شناسایی افراد بی‌بال روی رز در وب سایت Aphids on the World's Plants پیشنهاد شد. با اضافه شدن این گزارش‌ها، تعداد گونه‌های شته ثبت‌شده از ایران از ۵۷۶ به ۵۷۹ گونه افزایش یافت و این امر بر تنوع کمتر شناخته‌شده فون شته‌های ایران و ضرورت تداوم مطالعات فونستیک و رده‌بندی تأکید می‌کند.

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واژگان کلیدی: تنوع زیستی، فون، پراکنش گونه‌ای، رده‌بندی، آسیای غربی