

## First record of *Melanaphis donacis* (Passerini) (Hemiptera: Aphididae) from Quetta, Balochistan: westernmost range in Pakistan

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### Abstract

*Melanaphis donacis* (Passerini) is reported on *Arundo donax* L., for the first time from Quetta (Balochistan). The species was collected during spring 2018; its presence signifies the westernmost locality/range for this species in Pakistan and the subcontinent. Detailed diagnostic features, morphometric data and comparison with type specimens of the species hitherto-described from the subcontinent, distribution and ecology with supportive photograph of the colony is presented in this manuscript.

**Keywords:** *Melanaphis donacis* (Passerini), Quetta, Westernmost range, Pakistan

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## Introduction

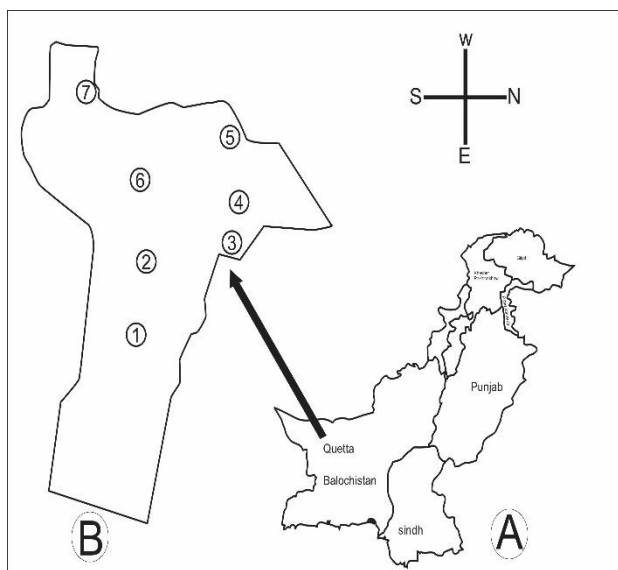
The genus *Melanaphis* (van der Goot) comprises 25 Palaearctic species, living holo-cyclically mainly on Arundaceae, except few species that alternate host with Rosaceae and Poaceae (Blackman and Eastop, 2018). These species are predominantly distributed in East Asia with only three European representatives. Up till now, this genus has been represented by two species in Pakistan viz. *M. donacis* (Passerini) and *M. sacchari* (Zehntner). The former species was reported from Islamabad (Alam et al., 1969; Naumann-Etienne and Remaudiere, 1995) and Murree (Bodlah et al., 2017) on *A. donax* L., while *M. sacchari* was described by Das (1918) from Lahore. *M. donacis* (Passerini) is a pest on primary hosts of Poaceae *A. donax* (Poaceae) and *Phragmites* spp. and secondary hosts in the family Rosaceae (Blackman and Eastop, 2018). This species has rather broad distribution

range, encompassing regions of Far East, Middle east, Central Asia, South Asia, East Asia, South and Central America and Mediterranean region. It has been documented from Iraq (Hayder et al., 2012), Iran (Rakhshani et al., 2015), Georgia (Japoshvili and Karaca, 2009), France (Tomanovic et al., 2012), Portugal (Japoshvili and Abrantes, 2006), Spain (Pons et al., 2015), Northern Africa (Hidalgo et al., 2012), Argentina (Ortego, 2017), Chile (Ortego, 2004), Japan (Takada, 1998), India (Chaudhary et al., 2009) and Nepal (Thapa, 1997). Naumann-Etienne and Remaudiere (1995) mentioned distribution of *M. donacis* only from Islamabad (Capital territory of Pakistan). These authors reported many species of aphids from Quetta and rest of Balochistan except *M. donacis*. This bibliographic evidence suggests that the species has invaded and established in Quetta during the last decade (in the post 1990s era). Here we report *M. donacis* for the first time from Quetta (Balochistan).



## Material and Methods

Colonies of *M. donacis* were found infesting *Arundo donax* plants in various localities of Quetta (30° 10' 59.7720" N and 66° 59' 47.2272" E; Alt. 1676 m) metropolitan (Fig. 1) viz., University of Balochistan, main campus (30°9'56.52" N and 66°59'26.166" E), Joint road, near Railway Station (30° 11' 29.4" N and 67° 0' 3.24" E), Gulistan road (30°12'10" N and 67°2'1" E), Chiltan road, near Quetta Golf Club (30°15'27" N and 66°58'13" E), Kach mor (30°12'38" N and 67°2'7" E), Chaman Housing scheme (30°13'17" N and 67°0'6" E) and Chiltan Housing Scheme (30°15'25" N and 66°58'40" E).



**Fig. 1. A Map of Pakistan , B Map of Quetta, Surveyed localities in Quetta, Balochistan: 1 University of Balochistan, Campus, 2 Joint road, 3 Gulistan road, 4 Chiltan road, 5 Kach mor, 6 Chaman Housing Scheme, 7 Chiltan Housing scheme.**

Aphids were collected with the help of an ordinary camel-hair brush from underside of leaf-blades of infested plants and were transferred into transparent plastic vials (10 cm<sup>3</sup>) containing 70% ethanol. Adult female apterae were retrieved from ethanol for morphological evaluation under Olympus microscope (40-100X magnification) in the Entomology laboratory of Balochistan Agriculture College Quetta and identified using Blackman and Eastop (2018). The morphological features of identified specimens were compared with descriptions of *M. donacis* specimens

reported from India (Raychaudhuri and Banerjee, 1974) and Pakistan (Bodlah et al., 2017). Measurements of key taxonomic characters were taken with the help of an ocular-stage micrometer. The colony photograph (Plate A) was shot *in situ* (Chiltan road) with camera Nikon Coolpix A10 Compact (16 MP CCD Sensor with 5x optical zoom).

## Results and Discussion

1860 *Longiunguis donacis* Passerini.

1974 *Melanaphis donacis* (Passerini): Raychaudhuri and Banerjee,

1980 *Melanaphis donacis* (Passerini): Raychaudhuri, D. N. (ed.),

1995 *Melanaphis donacis* (Passerini): Naumann-Etienne and Remaudiere

1997 *Melanaphis donacis* (Passerini): Remaudiere and Remaudiere

### Diagnostic features

**Adult female aptera:** Live adult female aptera (Plate A: 1) purple, pear shaped, convex and medium to large sized; dorsum covered with transverse wax-bands. Newly hatched nymph bright pale to light brown (Plate A: 5); wax bands light in younger individuals but thick and more pronounced in adults (Plate A: 2); 2 transverse and 2 longitudinal wax-bands form a distinct rectangle, with an anterior mid-notch (Plate A: 3), this wax rectangle extends from second abdominal segment to the basis of siphunculi. In adult female apterae cephalic, thoracic and post-siphuncular regions are completely covered by thick wax; frons medially plane. Antennal tubercles poorly developed and not extended beyond frons. ANT 6-segmented, approximately half as long as body length; processes terminalis about 2X the base of ANT VI; RIV+V with 4 secondary hairs and about 4X shorter than HT II. Hairs on abdominal terga sparsely distributed and with acute to slightly blunt ends. SIPH dark purple, wax absent on and around the bases, stumpy, imbricated, broader at base and shorter than cauda. Cauda pale to greyish, long, finger shaped and having about 20 long hairs.

**Alata:** The alata (Plate A: 4) is rather dark purple with purplish tinge in the wings and has few thin transverse wax-linings on dorsum. Rest of the features are common with aptera.

**Table 1. Measurements (in mm) of adult female aptera: n=4; ± S.E.**

n	Body size		Lengths of antennal segments					URS	HT II	SIPH	Cauda	
	L ±0.31	W ±0.17	III ±0.05	IV ±0.03	V ±0.02	BVI ±0.02	PT ±0.03				L ±0.02	W ±0.02
n1	1.68	0.78	0.15	0.11	0.11	0.10	0.23	0.02	0.07	0.06	0.13	0.07
n2	2.00	0.98	0.23	0.15	0.15	0.13	0.27	0.04	0.09	0.08	0.16	0.10
n3	1.82	0.91	0.18	0.13	0.13	0.13	0.26	0.04	0.07	0.08	0.14	0.10
n4	2.47	1.25	0.27	0.18	0.15	0.15	0.32	0.06	0.10	0.10	0.18	0.12

**Abbreviations:** L, length; W, width; URS ultimate rostral segment; HT II 2<sup>nd</sup> segment of hind tarsus; SIPH siphunculi; B VI base of 6<sup>th</sup> antennal segment; PT processus terminalis; III-V antennal segments 3-5.



**Plate A.** *Melanphis donacis* colony on the underside of leaf-blade of *Arundo donax* L. in Quetta (Chiltan road): 1 Adult female aptera; 2 Head and thorax covered with thick wax 3. Dorsal waxy-rectangle with anterior notch; 4 Adult alata (with few thin wax linings) 5. Young nymph (without wax coating). 6. Eggs.

**Ecological comments:** Infestation was milder to moderate in the neighborhood of Joint road but relatively heavier infestation was observed in Chaman Housing scheme and Chiltan Housing schemes along the Airport road. However, it was severe in the neighborhoods of Chilton road, Gulistan road and Kuchmor. All stages viz., adult apterous female viviparae, alatae, nymphs and eggs (plate A) were found on the underside of leaf-blades of the infested canes. Droplets of exuded honey dew sailed in the air making a sticky-sheet upon landing on the ground below the infested plants. Mild ant attendance was noticed but coccinelids or green lacewings were not seen on the sampled plants. Similarly parasitized individuals (mummies) were not found among the evaluated material. On the contrary Bodlah et al.

(2017) observed parasitized apterae in samples collected from Murree. *M. donacis* is mainly distributed in the hot climatic zones. Incidence of this species synchronizes with drastically increasing dry and hot climatic conditions of Quetta, the town has been witnessing for the past 15-20 years.

**Comparison with hitherto-reported Pakistani and Indian specimens of *M. donacis***

We compared our specimen with the descriptions of *M. donacis* provided by Raychaudhury and Banerjee (1974) and Bodlah et al. (2017). Diagnostic features of our specimen were found compatible to those described for the species in these studies. However minor variations in morphometric data (Table 1), body color, wax density over dorsum were observed between our specimens and that of two studies referred above. Following variations were observed:

1. Adult female apterae of *M. donacis* in our study are light purple to dark purple whereas the same reported from Murree are expressively pale to brown and those from India are reportedly dark brown to nearly black.
2. Wax-lining in our adult female apterae is thick and more pronounced, particularly the dorsal wax-rectangle (Plate A: 3), vis-a-vis Murree specimen while the two Indian authors described scanty wax secretions on their specimen.
3. The head in our adult female apterae is completely covered with thick wax (Plate A: 2). In Murree specimens half of head is dark brown while in Indian specimen it has been described as brown to dark brown.
3. Our specimens appear more robust, particularly adult female apterae are broadly pear shaped (Plate A: 1) while adult female apterae from Murree are slightly longer and rather tapered at both ends.

**Westernmost locality/range of *M. donacis* in Pakistan and subcontinent**

Alam et al. (1969) provided first record of *M. donacis* from Islamabad. Naumann-Etienne and Remaudiere



(1995) also reported *M. donacis* around Islamabad (Pakistan). Latter two authors described many aphid species from Quetta excepting *M. donacis*. It implies that this species probably invaded Quetta (Balochistan) during the last decade. Bodlah et al., (2017) reported this species from seven new localities from Murree. Thus, present study while giving first record of *M. donacis* from Quetta, lying at the western border of Pakistan, also determines westernmost range for this species in Pakistan and the subcontinent.

## Conclusion

The study provides first occurrence of *M. donacis* in Quetta (Balochistan) along with morphology, morphometric data and ecological remarks. The study also describes minor morphological discriminations vis-a-vis specimens of the species from Murree, Pakistan and India in addition to determining westernmost range for the species in Pakistan and the subcontinent. The study warrants further investigations to assess the presence of *M. donacis* in other localities of Balochistan as it is regarded an oligophagous pest of Poaceae and Rosaceae.

## Contribution of Authors

Amin M: Conceived idea, designed research methodology, literature review, data collection and Manuscript Writing  
Bodlah I: Data interpretation, statistical analysis and manuscript final reading and approval  
Qasim M: Data collection, literature review and data interpretation  
Jajja NI: Statistical analysis and manuscript writing

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**Conflict of Interest:** None.

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## References

- Alam MM, Beg MN, Syed RA and Shah S, 1969. Survey of parasites of insect pests of cultivated and useful plants and survey of insects destroying weeds and their parasites. Final Report, Pakistan Station, CIBC. 243.
- Blackman RL and Eastop VF, 2018. Aphids on the World's Plants. Available from: <http://www.aphidsonworldsplant.info>.
- Bodlah I, Bodlah MA and Hussain M, 2017. New distributional records of aphid, *Melanaphis donacis* (Passerini) in osia and surrounding areas, Punjab, Pakistan. J. Appl. Agric. Biotech. 2(1): 48-51.
- Chaudhary HC, Singh D and Singh R, 2009. Diversity of aphids (Homoptera: Aphididae) on the field crops in terai of eastern Uttar Pradesh. J. Aphidol. 23 (1-2): 69-76.
- Das B, 1918. The Aphididae of Lahore. Mem. Indian Mas.6, 135-274.
- Hayder B, Agarwala BK and Kaddou IK, 2012. New Records of Aphids of the Subfamily Aphidinae (Homoptera: Aphididae) Infested Herbaceous Plants and Shrubs for Iraqi Aphid Fauna. Adv. Biores. 3 (4): 66-75.
- Hidalgo NP, Bouhraoua RT, Boujreris F, Benia F, Khelil MA and Pujade-Villar J, 2012. New aphid records (Hemiptera: Aphididae) from Algeria and the northern Africa. Redia. 95: 31-34.
- Japoshvili G and Abrantes I, 2006. Aphelinus species (Hymenoptera: Aphelinidae) from the Iberian Peninsula, with the description of one new species from Portugal. J. Nat. Hist. 40(13-14):855-862.
- Japoshvili G and Karaca I, 2009. A review of the species of Aphelinus Dalman, 1820 (Hymenoptera: Aphelinidae) from Georgia. J. Entomol. Res. Soc. 11(3):41-52.
- Naumann-Etienne K and Remaudière G, 1995. A commented preliminary checklist of the aphids (Homoptera: Aphididae) of Pakistan and their host plants. Parasitica. 51(1).
- Ortego J, Difabio ME and Durante MPM, 2004. New records and updating of the fauna list of the aphids (Hemiptera: Aphididae) of Argentina. Rev. Soc. Entomol. Argent.63 (1-2).
- Ortego J, Difabio ME and Durante MPM, 2017. New records and actualized check list of aphids (Hemiptera: Aphididae) from Argentina. Rev. Soc. Entomol. Argent. 63(1-2).
- Pons X, Roca M, Lumbierres B and Lucas É, 2015. Characterization of a newly established aggregation of the invasive ladybeetle Harmonia axyridis and current status of the invader in Spain. Span.J.Agric.Res. (2):1.
- Rakhshani E, Sary P, Tomanovic Z and Mifsud D, 2015. Aphidiinae (Hymenoptera: Braconidae) aphid parasitoids of Malta: review and key to species. Bull. Entomol. Soc. Mal.7: 121-137.
- Ray chadhuri D and Banerjee C, 1974. A study on the genus Melanaphis (Homoptera: Aphididae)



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- with descriptions of new taxa from India. *Orient. Insects*. 8(3): 365-384.
- Takada H, 1998. A review of *Aphidius colemani* (Hymenoptera: Braconidae; Aphidiinae) and closely related species indigenous to Japan. *Appl. Entomol. Zool.* 33(1): 59-66.
- Thapa VK, 1997. *An inventory of Nepal's insects*. IUCN-The World Conservation Union, Nepal.
- Tomanovic Z, Stary P, Kavallieratos NG, Gagic V, Plećas M, Jankovic M and Petrovic A, 2012. Aphid parasitoids (Hymenoptera: Braconidae: Aphidiinae) in wetland habitats in western Palaearctic: key and associated aphid parasitoid guilds. *Ann. Soc. Entomol. Fr.* 48 (1-2): 189-198.

