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Correspondence

Eriophyoid mite fauna (Acari: Eriophyoidea) of Sari county in Iran with seven new records for Mazandaran province

Forough Ranjbar-Varandi[1], Karim Haddad Irani-Nejad[1] and Parisa Lotfollahi[2*]

1. Department of Plant Protection, Faculty of Agriculture, University of Tabriz, Tabriz, Iran; E-mails: Forough.ranjbar.varandi@gmail.com, khaddad@tabrizu.ac.ir
2. Department of Plant Protection, Faculty of Agriculture, Azarbaijan Shahid Madani University, Tabriz, Iran; E-mail: prslotfollahy@yahoo.com

* Corresponding author

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Eriophyoid mites are economically rendered as the second most important mite species after tetranychid mites (Van Leeuwen *et al.* 2010). These ancient tiny creatures are very diverse due to their high host specialization (de Lillo *et al*. 2018) with more than 5000 species in the world which have been classified into three families Phytoptidae, Eriophyidae and Diptilomiopidae (Chetverikov *et al.* 2015; Bolton *et al.* 2017; Xue *et al.* 2017; Zhang 2017). Many of them are major pests and some are vectors of plant pathogens. Therefore, because of their high importance, the eriophyoid mite fauna was surveyed in Sari county, Mazandaran province, North of Iran, from 2017 to 2021. Samplings were done on most abundant plant species by first author and the sampling details have been listed in Table 1. The mites were recovered from the plant material by means of a modified washing method developed by Monfreda *et al.* (2007). We applied the methodology described in Mehri-Heyran *et al.* (2020) for slide mounting. The genera classification follows Amrine *et al.* (2003) and comparisons were also made with new genera of Eriophyoidea described since that publication. Host plant names and their synonymies are in accordance with "*The World Flora Online*" (2022).

In total two families, five subfamilies, eight tribes, 24 genera and 42 species were collected and identified, and here the information about the collected specimens is provided. The examined materials are deposited at the Acarology Laboratory, Department of Plant Protection, Faculty of Agriculture, University of Tabriz (Iran), and at the Acarology Laboratory, Department of Plant Protection, Faculty of Agriculture, Azarbaijan Shahid Madani University, Tabriz (Iran).

Family Eriophyidae Nalepa
Subfamily Cecidophyinae Keifer
Tribe Cecidophyini Keifer

***Cecidophyes aliabadi* Gol, Sadeghi & de Lillo, 2018 –** 12 females and 5 males collected in Haft khal forest on 30 August; 1 male collected in Alamdardeh village on 23 July; and 1 male collected in Dolvash forest on 30 June, 2017, from *Quercus castaneifolia* C.A. Mey., 1831 (Fagaceae). This

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species is a new record for Mazandaran province.

Table 1. List of sampling localities, their geographic location and altitude.

Sampling Locality	Longitude	Latitude	Altitude (m a.s.l.)
Dolvash forest	53° 12' 29.6"	36° 21' 18.8"	600
Shahid Zaree forest	53° 09' 04.4"	36° 33' 03.0"	248
Aroos-damad forest	53° 13' 42.6"	36° 07' 21.2"	1368
Varand village	53° 12' 24.8"	36° 21' 52.9"	697
Alamdardeh village	53° 15' 25.3"	36° 21' 33.3"	641
Afrachal village 1	53° 14' 40.2"	36° 14' 08.2"	738
Afrachal village 2	53° 13' 41.8"	36° 14' 07.1"	628
Miyanrood village 1	53° 03' 11.4"	36° 31' 04.3"	252
Miyanrood village 2	53° 03' 07.8"	36° 32' 06.4"	152
Amreh village 1	53° 08' 25.5"	36° 24' 26.0"	457
Amreh village 2	53° 08' 37.7"	36° 24' 55.2"	293
Mashhadikola village 1	53° 00' 26.0"	36° 33' 31.1"	145
Mashhadikola village 2	53° 00' 13.5"	36° 33' 32.4"	120
Haft khal forest	53° 53' 50.0"	36° 19' 20.3"	1085
Mahforuzmahaleh sofla village	53° 04' 42.9"	36° 39' 26.0"	135
Esfandan village	53° 06' 56.8"	36° 44' 38.4"	68
Golourd village	53° 11' 23.6"	36° 24' 15.3"	372
Sari city	53° 01' 32.9"	36° 33' 12.4"	40

***Cecidophyes digephyrus* Keifer, 1966 –** 14 females, 2 males and 1 nymph from *Q. castaneifolia* in Miyanrood village 1 on 6 August, 2017.

Tribe Colomerini Newkirk & Keifer

***Ectomerus triquetrus* Flechtmann & Etienne, 2002 –** 17 females and 1 male from *Lantana camara* L. (Verbenaceae) in Sari city on 26 August, 2017. This species is a new record for Mazandaran province.

Subfamily Eriophyinae Nalepa
Tribe Eriophyini Nalepa

***Eriophyes parrotiae* Ranjbar, Haddad & Lotfollahi, 2019 –** 33 females and 1 male from *Parrotia persica* C.A.Mey (Hamamelidaceae) in Alamdardeh village on 15 October, 2017 (Ranjbar-Varandi *et al.* 2019).

Tribe Aceriini Amrine & Stasny

***Aceria cynodonis* Wilson, 1959 –** 5 females from *Amaranthus retroflexus* L.)Amaranthaceae) (non-elective plant species) in Varand village on 19 July, 2017.

***Aceria cichorii* Petanovic, Boczek & Shi, 2002 –** 19 females and 3 nymphs collected in Shahid Zaree forest on 6 July; 3 females and 1 male collected in Afrachal village 1 on 30 July; 5 females collected in Varand village on 30 June; and 1 male collected in Miyanrood village 1 on 6 August, 2017, from *Cichorium intybus* L. (Asteraceae).

***Aceria ficus* (Essig, 1926) –** 9 females and 2 males collected in Amreh village 2 on 20 August; 2 females and 2 males collected in Esfandan village on 17 September; and 2 females and 1 male collected in Varand village on 19 July, 2017, from *Ficus carica* L. (Moraceae).

***Aceria granati* (Canestrini & Massalongo, 1894) –** 6 females collected in Amreh village 2 on 20 August; 2 females, 1 male and 1 nymph collected in Afrachal village 2 on 30 July; 2 females collected in Miyanrood village 2 on 20 September; and 1 female collected in Varand village on 30 June, 2017, from *Punica granatum* L. (Lythraceae).

***Aceria ulmosimilis* Lotfollahi & Haddad, 2016 –** 5 females collected in Dolvash forest on 30 June; 2 females collected in Alamdardeh village on 23 July; 1 female collected in Miyanrood village 1 on 6 August, 2017, from *Zelkova carpinifolia* (Pall.) K. Koch (Ulmaceae(.

***Aceria punicae* Ranjbar, Haddad & Lotfollahi, 2020 –** 21 females from *P. granatum* in Varand village on 19 July, 2017 (Ranjbar-Varandi *et al*. 2020).

***Acalitus essigi* (Hassan, 1928) –** 5 females from *Rubus* sp. (Rosaceae) in Aroos-damad forest on 16 July, 2017.

Subfamily Phyllocoptinae Nalepa

Tribe Acaricalini Amrine & Stasny

***Acaricalus rubrifoliae* Labanowski, 2002 –** 5 females and 2 males collected in Afrachal village 1 on 30 July; 3 females and 1 male collected in Haft khal forest on 30 August; 2 females and 1 male collected in Dolvash forest on 30 June; and 1 male collected in Alamdardeh village on 23 July, 2017, from *Q. castaneifolia*.

Tribe Tegonotini Bagdasarian

***Shevtchenkella juglandis* (Keifer, 1951) –** 10 females, 3 males and 2 nymphs collected in Varand village on 19 July; 2 females and 1 male collected in Miyanrood village 2 on 20 September; and 1 female collected in Mashhadikola village 2 on 28 August, 2017, from *Juglans regia* L. (Juglandaceae).

***Shevtchenkella ulmi* (Farkas, 1960) –** 5 females collected in Miyanrood village 1 on 6 August; 2 females collected in Esfandan village on 17 September; and 1 female, 5 males and 1 nymph collected in Varand village on 27 July, 2017, from *Ulmus minor* Mill (Ulmaceae).

***Shevtchenkella acerutinis* Ranjbar, Haddad & Lotfollahi, 2023 –** 9 females and 1 male from *Acer velutinum* Boiss. (Sapindaceae) in Aroos-damad forest on 16 July, 2017 (Ranjbar-Varandi *et al*. 2023a).

***Shevtchenkella pseudoobtusa* (Petanovic, 1987) –** 5 females and 2 males collected in Haft khal forest on 30 August; 1 female and 1 male collected in Afrachal village 1 on 30 July; 1 female collected in Golourd village on 25 September; and 1 male collected in Amreh village 1 on 10 August, 2017, from *A. velutinum*.

***Tegnacus unicornutus* Pye, 2012 –** 6 females collected in Dolvash forest on 30 June; 7 females collected in Amreh village 1 on 10 August; 4 females and 1 male collected in Alamdardeh village on 23 July; 1 female and 1 male collected in Haft khal forest on 30 August; and 1 female collected in Golourd village on 25 September, 2017, from *Carpinus betulus* L. (Betulaceae).

***Tegonotus simus* (Keifer, 1940) –** 7 females and 2 males collected in Afrachal village 1 on 30 July; and 4 females collected in Haft khal forest on 30 August, 2017, from *Alnus subcordata* C.A. Mey. (Betulaceae). This species is a new record for Mazandaran province.

***Tegonotus trouessarti* Nalepa, 1892 –** 9 females, 3 males and 2 nymphs from *A. subcordata* in Afrachal village 1 on 30 July, 2017.

Tribe Phyllocoptini Nalepa

***Leipothrix pterisfolii* Lotfollahi & de Lillo, 2017 –** 10 females, 4 males and 1 nymph from *Polypodium vulgare* L. (Polypodiaceae) in Aroos-damad forest on 16 July, 2017.

***Leipothrix mazandaranicus* Ranjbar, Haddad & Lotfollahi, 2020 –** 14 females, 4 males and 3 nymphs from *Urtica dioica* L. (Urticaceae) in Varand village on 27 July, 2017 (Ranjbar-Varandi *et al*. 2020).

***Epitrimerus cupresservirens* Ranjbar, Haddad & Lotfollahi, 2023 –** 7 females and 8 males from *Cupressus sempervirens* L. (Cupressaceae) in Amreh village on 10 August 2017 (Ranjbar-Varandi *et al*. 2023a).

***Phyllocoptes khazariensis* Ranjbar, Haddad & Lotfollahi, 2023 –** 12 females and 11 males from *C. sempervirens* in Amreh village on 10 August, 2017 (Ranjbar-Varandi *et al*. 2023b).

***Phyllocoptes abaenus* Keifer, 1940 –** 20 females, 1 male and 8 nymphs collected in Aroos-damad forest on 16 July; 6 females, 2 males and 4 nymphs collected in Mashhadikola village 1 on 28 August; and 5 females and 4 nymphs collected in Afrachal village 1 on 30 July, 2017, from *Prunus domestica* L. (Rosaceae).

***Phyllocoptes pteridii* Petanovic, 2001 –** 6 females, 2 males and 1 nymph collected in Golourd village on 25 September; 1 female and 2 males collected in Amreh village 2 on 20 August; and 1 nymph collected in Miyanrood village 1 on 6 August, 2017, from *Pteridium aquilinum* (L.) Kuhn (Dennstaedtiaceae).

Tribe Anthocoptini Amrine & Stasny

***Heterotergum sariensis* Ranjbar, Haddad & Lotfollahi, 2022 –** 11 females, 1 male, and 1 nymph from *Q. castaneifolia* in Dolvaash forest on 30 June, 2017 (Ranjbar-Varandi *et al*. 2022a).

***Anthocoptes salicis* (Nalepa, 1894) –** 13 females, 3 males and 15 nymphs collected in Mashhadikola village 2 on 28 August; 6 females, 1 male and 8 nymphs collected in Mahforuzmahaleh sofla village on 6 September; and 2 females and 1 male collected in Esfandan village on 17 September, 2017, from *Salix alba* L. (Salicaceae). This species is a new record for Mazandaran province.

***Aculus carpitulus* Ranjbar, Haddad & Lotfollahi, 2022 –** 10 females, 9 males, and 1 nymph from *C. betulus* in Alamdaardeh village on 23 July, 2017 (Ranjbar-Varandi *et al*. 2022a).

***Aculus lydii* Denizhan & Bromberek, 2016 –** 10 females, 2 males and 6 nymphs from *Hypericum perforatum* L. (Hypericaceae) in Aroos-damad forest on 16 July, 2017.

***Aculops lycopersici* (Tryon, 1917) –** 11 females, 1male and 3 nymphs collected in Esfandan village on 17 September; and 8 females, 1male and 4 nymphs collected in Mashhadikola village 1 on 24 August, 2017, from *Lycopersicon esculentum* Mill. (Solanaceae). This species is a new record for Mazandaran province.

***Abacarus sporoboli* Keifer, 1965 –** 5 females and 1 nymph collected in Esfandan village on 17 September; 1 female and 4 nymphs collected in Mashhadikola village 1 on 24 August; and 1 nymph collected in Mahforuzmahaleh sofla village on 6 September, 2017, from *Sorghum halepense* (L.) Perse. (Poaceae).

***Abacarus* cf. *hystrix* (Nalepa, 1896) –** 5 females from *Diospyros lotus* L. (Ebenaceae) (non-host plant species) in Varand village on 19 July, 2017.

***Rectalox dorsoenodis* Gol, Sadeghi & de Lillo, 2018 –** 10 females and 2 nymphs collected in Alamdardeh village on 23 July; 6 females and 1 nymph collected in Dolvash forest on 30 June; 5 females and 1 nymph collected in Amreh village 2 on 20 August; and 2 females and 1 nymph collected in Miyanrood village 1 on 6 August, 2017, from *Z. carpinifolia*. This species is a new record for Mazandaran province.

***Tetra hyrcanica* Ranjbar, Haddad & Lotfollahi, 2019 –** 8 females, 1 male and 1 nymph from *Pterocarya fraxinifolia* (Poir.) Spach (Juglandaceae) in Golourd village on 25 September, 2017 (Ranjbar-Varandi *et al*. 2019).

Family Diptilomiopidae Keifer
Subfamily Diptilomiopinae Keifer

***Diptacus longiscatuber* Gol, Sadeghi & de Lillo, 2018 –** 13 females, 1 male and 1 nymph collected in Alamdardeh village on 23 July; and 4 females and 2 nymphs collected in Amreh village 2 on 20 August, 2017, from *Cornus sanguinea* L. (Cornaceae(.

***Diptacus gigantorhynchus* (Nalepa, 1892) –** 8 females and 1 male collected in Amreh village 2 on 20 August; 5 females, 1 male and 3 nymphs collected in Aroos-damad forest on 16 July; and 2 females, 1 male and 4 nymphs collected in Mashhadikola village 1 on 28 August, 2017, from *Mespilus germanica* L. (Rosaceae). 4 females and 3 nymphs collected in Miyanrood village 1 on 6 August, 2017, from *Crataegus* sp. (Rosaceae). 5 females and 5 nymphs collected in Afrachal village 1 on 30 July; 2 males and 1 nymph collected in Mashhadikola village 1 on 28 August; 1 female collected in Alamdardeh village on 23 July; and 2 nymphs collected in Aroos-damad forest on 16 July, 2017, from *P. domestica*. This species is a new record for Mazandaran province.

***Apodiptacus cordiformis* Keifer, 1960 –** 10 females and 4 males collected in Varand village on 19 July; 2 females, 3 males and 1 nymph collected in Mashhadikola village 1 on 28 August; 3 females, 2 males and 1 nymph collected in Alamdardeh village on 23 July; and 4 nymphs collected in Miyanrood village 2 on 20 September, 2017, from *F. carica*; 3 females and 3 nymphs collected in Dolvash forest on 30 June; 1 female collected in Miyanrood village 2 on 20 September; 1 female collected in Golourd village on 25 September; and 1 female collected in Alamdardeh village on 23 July, 2017, from *P. persica*; 2 females, 2 males and 1 nymph collected in Alamdardeh village on 23 July; and 1 female and 1 male collected in Dolvash forest on 30 June, 2017, from *C. betulus*.

Subfamily Rhyncaphytoptinae Roivainen

***Quadracus urticae* Keifer, 1944 –** 5 females, 3 males and 3 nymphs collected in Varand village on 27 July; and 1 female collected in Mashhadikola village 1 on 24 August, 2017, from *U. dioica*.

***Rhinophytoptus nemalobos* Lotfollahi & de Lillo, 2014 –** 6 females collected in Varand village on 30 June; and 2 females collected in Afrachal village 1 on 30 July, 2017, from *P. domestica*.

***Rhyncaphytoptus fagientalis* Ranjbar, Haddad & Lotfollahi, 2022 –** 20 females, 11 males and 8 nymphs from *Fagus orientalis* Lipsky. (Fagaceae) in Aroos-damad forest on 16 July, 2017 (Ranjbar-Varandi *et al*. 2022b).

***Rhyncaphytoptus quercivagrans* Ranjbar, Haddad & Lotfollahi, 2022 –** 7 females, 4 males and 2 nymphs from *Q. castaneifolia* in Alamdaardeh village on 23 July, 2017 (Ranjbar-Varandi *et al*. 2022b).

***Rhyncaphytoptus ficifoliae* Keifer, 1939 –** 12 females from *F. carica* in Miyanrood village 2 on 20 September, 2017.

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