

## A Checklist of Iranian Tarsonemid Mites (Acari: Trombidiformes) with a New Record for Iran

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**Abstract:** Surveys and collecting of the Iranian Tarsonemidae fauna over the last 40 years have resulted in a collective list of 29 species of subfamilies Acarapinae, Tarsoneminae and Pseudotarsoneminae. The checklist given here includes a new record made by the author, supplemented by those reported in the literature prior to 2013 and information regarding provincial distribution in Iran and habitats and associations of the collected species. The species *Steneotarsonemus phragmitidis* Schlectendal, 1898 was identified as a new record for Iranian fauna from Razavi Khorasan province. Clearly, more species are to be expected after more extensive collecting.

**Key words:** Acari, Checklist, Fauna, Tarsonemidae

### INTRODUCTION

Tarsonemids are among the smallest mites, with average length of about one-fifth of a millimetre. Female tarsonemids are easily distinguished from mites of other families by their 3-segmented leg IV in which femur and genu fused to form femorogenu, and tibia and tarsus fused to form tibiotarsus. In male, leg IV has 3 or 4 segments-tibia and tarsus separate or fused.

The family Tarsonemidae comprises a relatively highly derived group of mites having a greater diversity of feeding habits than any other family of Acari including fungus feeders, plant feeders, and parasitic/symbiont associates of insects. Having such diversity of habits cause to a comparable difference in body structure, including form of mouthparts and specialization of tactile organs, particularly setae of the body and legs (Lindquist, 1986). Phytophagous species feed on leaves, flowers, fruits and soft stems (Ochoa et al., 1991) that some of them are important pests of agricultural crops. Several species, notably *Polyphagotarsonemus latus*, *Steneotarsonemus bancrofti* and *Phytonemus pallidus*, are important pests of agricultural crops. Some species such as those belonging to the genus *Acaronemus* predaceous on tetranychoid mite eggs (Lindquist and Smiley, 1978).

This family comprises more than 530 described species belonging to 40 genera worldwide (Krantz and Walter, 2009). Members of this family have been reported from all parts of the world except Antarctic, large deserts and water habitats (Lindquist, 1986).

Information regarding Iranian fauna of the family Tarsonemidae is limited to Khalil Manesh (1973); Sepasgozarian (1977); Ghasemi and Targari (1991); Soroush (1994); Faraji and Kamali (1993); Faraji (1993); Bahreini (1993); Mosaddegh and Bahreini (1994); Sadeghi Namaghi, and Kamali (1993); Khanjani (1996); Barimani-Varandi and Kamali (1998); Ostovan and Kamali (1997); Mosaddegh (1997); Taghavi et al. (1998); Abbasipour et al. (2006); Magowski et al. (2007); Mirjamali et al. (2008); Hajiqanbar (2009); Lotfollahi and Irani-Nejad (2010); Beyzavi et al. (2012).

To the best of our knowledge there is no previous study of Tarsonemidae fauna in Razavi Khorasan province. The aim of this work is to present a preliminary list of tarsonemid mites known to occur in Iran in order to encourage and facilitate taxonomic work on Iranian tarsonemids.

### MATERIAL and METHOD

During a biodiversity study on mites associated with wild plants in Razavi Khorasan province, NE Iran, a variety of plants was sampled. Plant samples were brought to the laboratory and mite specimens hand collected from the plant material using a dissecting microscope. Soil samples were transferred to the acarological Laboratory of Plant Protection Department, Faculty of Agriculture, Ferdowsi University of Mashhad and mite specimens extracted using the Berlese-Tullgreen funnel. Collected mites were preserved in 70% ethyl alcohol for subsequent slide mounting. Mite specimens were cleared by using Lactic acid (Krantz and Walter, 2009). Cleared mites were slide mounted in Hoyer's medium. Generic and specific identifications were made by Dr. W. L. Magowski in Poland. Type specimens are held in the Acarological Collection, Department of Plant Protection, Faculty of Agriculture, Ferdowsi University of Mashhad, Iran. Also, a few paratypes are deposited as slide mounted specimens in A. Mickiewicz University, Department of Animal Taxonomy & Ecology in Poland.

### RESULTS and DISCUSSION

29 species belonging to seven genera and three subfamilies of the family Tarsonemidae known from Iran to now. The following list includes a new record made by the author, supplemented by those reported in the literature and includes information regarding provincial distribution in Iran and plant/host association from which the material was collected.

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**Sub family Acarapinae Schaarschmidt**

**Acarapis Hirst, 1921**

**Acarapis dorsalis Morgenthaler, 1931**

**Distribution and association:** Chaharmahal and Bakhtiari, Khozestan, Khorasan, Tehran, Lorestan, Mazandaran and East Azerbaijan provinces, from honey bee, *Apis mellifera* (Bahreini, 1993; Mosaddegh and Bahreini, 1994).

**Acarapis externus Morgenthaler, 1931**

**Distribution and association:** Char Mahal and Bakhtiari, Tehran, Lorestan, Mazandaran and Hamedan provinces, from honey bee, *Apis mellifera* (Bahreini, 1993; Mossadegh and Bahreini, 1994).

**Acarapis woodi (Rennie 1921)**

**Distribution and association:** Throughout Iran, from honey bee, *Apis mellifera* (Sepasgozarian, 1977; Bahreini, 1993; Ghasemi and Tirgari, 1991; Mosadegh, 1997).

**Genus Dendroptus Kramer 1876**

**Dendroptus sp.**

**Distribution and association:** Shahriyar (Tehran province), Apple (*Malus* sp.) and Plum (*Prunus* sp.) trees (Nozari, 1992).

**Genus Neotarsonemoides Kaliszewski, 1986**

**Neotarsonemoides lucifer (Schaarschmidt, 1959)**

**Distribution and association:** Soofian (East Azerbaijan province), alfalfa (*Medicago sativa* L.) fields (Lotfollahi and Irani-Nejad, 2010). An unidentified species belonging to this genus was collected by author from bermudagrass (*Cynodon dactylon* (L.) Pers.) in Mashhad (Razavi Khorasan Province) which is probably new to science (Magowski, Pers. communication).

**Subfamily Pseudotarsoneminae Lindquist**

**Polyphagotarsonemus Beer and Nucifora, 1965**

**Polyphagotarsonemus latus (Banks, 1904)**

Syns.: *Tarsonemus latus* Banks, *Hemitarsonemus latus* (Banks)

**Distribution and association:** Jiroft (Kerman province), potato (*Solanum tuberosum* L.) fields (Arbabi et al., 2002).

**Genus Pseudotarsonemoides von Vitzthum, 1921**

**Pseudotarsonemoides innumerabilis Vitzthum, 1923**

**Distribution and association:** Tehran province, bark beetle (*Scolytus multistriatus* (Marsh) (Col.: Scolytidae)) on Elm (*Ulmus campestris* L.) tree (Ostovan and Kamali, 1997).

**Subfamily Tarsoneminae Canestrini & Fanzago**

**Genus Steneotarsonemus Beer, 1954**

**Steneotarsonemus acuticlavus Wainstein, 1979**

**Distribution and association:** Jolfa (East Azerbaijan province), soil from alfalfa fields (Lotfollahi and Irani-Nejad, 2010).

**Steneotarsonemus arcuatus Livshitz, Mitrofanov & Sharonov, 1979**

**Distribution and association:** Soofian, Zenooz, Shabestar (East Azerbaijan province), soil of alfalfa fields (Lotfollahi and Irani-Nejad, 2010).

**Steneotarsonemus bancrofti Michael, 1890**

**Distribution and association:** Haftapeh (Khuzestan), sugarcane (*Saccharum officinarum* L.) fields (Khalil Manesh, 1973); Sepasgozarian, 1977; Sadeghi and Kamali, 1993).

**Steneotarsonemus phragmitidis Schlectendal, 1898**

**Material examined:** Five males and seven females from reed, *Phragmitidis* sp. as well as two males and five females from Bermuda grass, *Cynodon dactylon* (L.) Pers. were collected in Ferdowsi University campus in Mashhad (Razavi Khorasan province). This is the first record of the occurrence of this species in Iran.

**Genus Tarsonemus Canestrini & Fanzago, 1876**

**Tarsonemus amygdali Magowski, Diduszko & Ahdiyati 2007**

**Distribution and association:** Shahriyar (Tehran Province), *Scolytus amygdali* (Insecta, Coleoptera, Scolytidae) in apricot (*Prunus armeniaca*) orchards (Magowski, et al. 2007).

**Tarsonemus annotatus Livshitz, Mitrofanov & Sharonov, 1979**

**Distribution and association:** Soofian (East Azerbaijan province), soil from alfalfa fields (Lotfollahi and Irani-Nejad, 2010).

**Tarsonemus bilobatus Suski, 1965**

**Distribution and association:** Shabestar (East Azerbaijan), Tehran and Mazandaran provinces, soil from alfalfa (*Medicago sativa* L.) fields, scotch pine (*Pinus sylvaticus* L. (Lotfollahi and Irani-Nejad, 2010; Barimani-Varandi and Kamali, 1998; Mirjamali et al., 2008).

**Tarsonemus destructor Smiley & Landwer, 1976**

**Distribution and association:** Hamedan province, Bean (*Phaseolus vulgaris* L.) (Khanjani, 1996).

**Tarsonemus fusarii Cooreman, 1941**

**Distribution and association:** Hamedan, Mazandaran, Khorasan and East Azerbaijan provinces, Citrus (*Citrus* spp.), apple (*Malus* sp.), clover (*Trifolium* sp.) and alfalfa soil (Khanjani, 1996; Faraji and Kamali, 1993; Hajiqanbar, 2009; Lotfollahi and Irani-Nejad, 2010).

**Tarsonemus granaries Lindquist, 1972**

**Distribution and association:** Mazandaran province, Rice (*Oryza sativa* L.) (Faraji, 1993).

**Tarsonemus hermes Suski, 1966**

**Distribution and association:** Mazandaran province, Fir (*Abies alba*) (Barimani-Varandi and Kamali, 1998).

**Tarsonemus intextus Kaliszewski, 1993**

**Distribution and association:** Soofian (East Azerbaijan province) (Lotfollahi and Irani-Nejad, 2010).

**Tarsonemus ips Lindquist, 1969**

**Distribution and association:** Tehran province, elm (*Ulmus campestris* L.) trees (Ostovan and Kamali, 1997).

**Tarsonemus limitatus Kaliszewski, 1993**

**Distribution and association:** Soofian, Marand, Zenooz (East Azerbaijan province), alfalfa (*Medicago sativa* L.) fields (Lotfollahi and Irani-Nejad, 2010).

**Tarsonemus mazandarani Abbasipour, Taghavi, Kamali, & Sahragard, 2006**

**Distribution and association:** Ramsar (Mazandaran province, tea (*Thea sinensis* Link.) garden (Abbasipour et al., 2006).

***Tarsonemus mixtus* Kaliszewski, 1993**

**Distribution and association:** Soofian and Shabestar in East Azerbaijan province, alfalfa fields (Lotfollahi and Irani-Nejad, 2010).

***Tarsonemus monoporus* Weis-Fogh, 1947**

**Distribution and association:** Fars province, soil (Beyzavi et al., 2012).

***Tarsonemus* sp. nr. *aegualis* Livshits et al., 1976**

**Distribution and association:** Kordestan province, from honey bee hives (Mosaddegh, 1997).

***Tarsonemus* sp. nr. *nodusus* Schaarschmidt, 1959**

**Distribution and association:** Mazandaran province, Citrus trees (Faraji and Kamali, 1993).

***Tarsonemus subcorticalis* Lindquist, 1969**

**Distribution and association:** Tehran province, elm (*Ulmus campestris* L.) trees (Ostovan and Kamali, 1997).

***Tarsonemus triarcus* Lindquist, 1969**

**Distribution and association:** Tehran, elm (*Ulmus campestris* L.) trees (Ostovan and Kamali, 1997).

***Tarsonemus waitei* Banks, 1912**

**Distribution and association:** Markazi province, pomegranate (*Punica granatum* Var. *Sativa* K. & M.) orchards (Soroush, 1994); Tehran, elm trees (*Ulmus campestris* L.) (Ostovan and Kamali, 1997; Mirjamali et al. 2008; Soofian (East Azerbaijan) province, soil (Lotfollahi and Irani-Nejad, 2010).

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