

## Mites associated with some medicinal plants (Asteraceae) in Hamedan, Iran

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**Abstract:** Medicinal plants have been used from the past to present. Different small arthropods such as Acari were found on these plants. Therefore a study on the Acari fauna associated with some medicinal plants (Family: Asteraceae) in Hamedan region was carried out during 2008–2009. In this survey, 23 species belonging to 18 genera from 15 different families of the subclass Acari were collected and identified. Two spotted spider mite (*Tetranychus urticae* Koch) was determined as an abundant phytophagous mite species in this study.

**Keywords:** fauna, mites, phytophagous, predator, medicinal plants.

### Introduction

Hamadan province, western Iran, is the place where the value of medicinal plants was first discovered. The Bu Ali Sina medicinal plants garden and nursery is located in Hamedan. This garden has many visitors from all over the world every year. Three hundred and ninety four (394) species of medicinal plants are grown in Hamedan province (Kalvandi *et al.*, 2007) among which the Asteraceae is one the most diverse families that hosts various arthropods *e.g.* phytophagous, ectoparasitic and predatory mites. Phytophagous mites, especially tetranychids, can damage medicinal plants. Gupta and Karmakar (2010) reported the Tetranychidae as major pests of medicinal plants in India and *Tetranychus urticae* Koch was regarded by them as a new threat to these plants in the country (Sharma and Agarwal 2010). The present survey was conducted because our

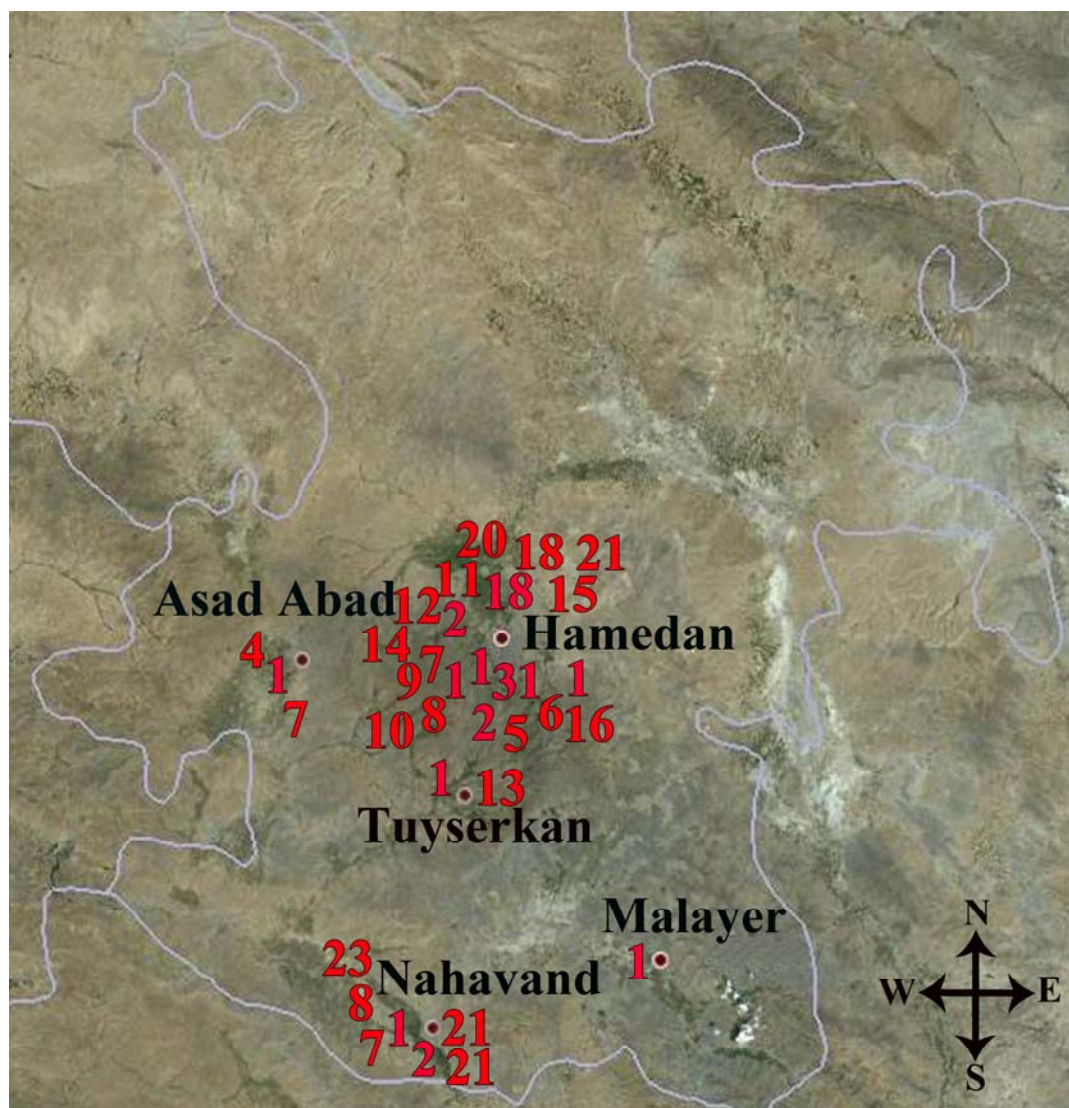
knowledge on the fauna of mites on medicinal plants in Iran is fragmentary and was also aimed at the identification of predatory mites with the potential to manage phytophagous mites and small insect pests on medicinal plants.

### Materials and Methods

The mites were collected from the foliage and other parts of medicinal plants of the family Asteraceae (shaking over a white tray). The specimens were mounted on microscope slides in Hoyer's medium. All specimens were examined under an Olympus BX51 microscope (DIC). A map indicating sampling locations is provided (Figure 1). All specimens were collected by F. Masoudian; the collected and identified slide specimens were deposited in the Mite Collection of the Acarology Laboratory, University of Bu–Ali Sina, Hamedan, Iran.

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**Figure 1** Distribution map of mites collected in this study (Map extracted from Google earth © 2011 Europe Technologies).

List of collected specimens as indicated in map of the study area.

| N  | Species                            | N  | Species                                     |
|----|------------------------------------|----|---|
| 1  | <i>Tetranychus urticae</i>         | 13 | <i>Cunaxa capreolus</i>                     |
| 2  | <i>Tetranychus turkestanii</i>     | 14 | <i>Spinibdella cornini</i>                  |
| 3  | <i>Eutetranychus orientalis</i>    | 15 | <i>Erythraeus (Zaracarus) ueckermanni</i>   |
| 4  | <i>Bryobia mirmoayedii</i>         | 16 | <i>Erythraeus (Erythraeus) mirabi</i>       |
| 5  | <i>Bryobia praetiosa</i>           | 17 | <i>Erythraeus (Erythraeus) garmsaricus</i>  |
| 6  | <i>Aegyptobia salicicola</i>       | 18 | <i>Allothrombium ovatum</i>                 |
| 7  | <i>Anystis baccharum</i>           | 19 | <i>Neoseiulus bicaudus</i>                  |
| 8  | <i>Tydeus caryae</i>               | 20 | <i>Typhlodromus (Anthoseius) iraniensis</i> |
| 9  | <i>Stigmaeus pilatus</i>           | 21 | <i>Lasioseius youcefi</i>                   |
| 10 | <i>Eupalopsellus ueckermanni</i>   | 22 | <i>Veigaia nemorensis</i>                   |
| 11 | <i>Eupalopsellus hamedaniensis</i> | 23 | <i>Alliphis halleri</i>                     |
| 12 | <i>Raphignathus hecmataniensis</i> |    |   |

## Results

### Tetranychidae Donnadieu, 1875

#### *Tetranychus* Dufour, 1832

#### *Tetranychus urticae* Koch, 1836

**Material examined:** Medicinal plants garden in Hamedan vicinity (34° 46' 23.23" N, 48° 30' 56.3" E, 1931 m a.s.l.) 16 vi 2008, 13 (♀♀) 5 (♂♂), Feverfew, *Tanacetum parthenium* (L.) Sch. Bip; 16 vi 2008, 7 (♀♀) 2 (♂♂) Ginger, *Zingiber officinale* Roscoe; 15 vii 2009, 9 (♀♀) 2 (♂♂) on Holy thistle, *Centaurea benedicta* L.; 30 vii 2009, Yarrow, *Achillea millefolium* L., and 20 vii 2008, 6 (♀♀) 1 (♂) on Safflower, *Carthamus tinctorius* L.; Agricultural faculty of Bu–Ali Sina University in Hamedan vicinity (34° 48' 11.30" N, 48° 28' 55.13" E, 1822 m a.s.l.), 26 vi 2008, 7 (♀♀) 3 (♂♂) on Safflower, *Carthamus tinctorius* L.; Abbass Abad in Hamedan vicinity (34° 47' 11.45" N, 48° 27' 57.88" E, 1986 m a.s.l.), 08 viii 2008, 4 (♀♀) 2 (♂♂) on Prickly lettuce, *Lactuca serriola* L.; Ganjnameh in Hamedan vicinity (34° 45' 41.91" N, 48° 26' 46.92" E, 2130 m a.s.l.), 27 vi 2009, 3 (♀♀) 1 (♂) on Safflower, *Carthamus tinctorius* L.; Sarab Gamasiab in Nahavand vicinity from Hamedan Province (34° 02' 47.22" N, 48° 22' 26.39" E, 1840 m a.s.l.), 15 viii 2009, 12 (♀♀) 2 (♂♂) on Cotton thistle, *Onopordum acanthium* L.; Shahrestaneh, Toyserkan vicinity in Hamedan Province (34° 42' 29.76" N, 48° 21' 53.51" E, 2154 m a.s.l.), 15 viii 2009, 9 (♀♀) 3 (♂♂) on Cotton thistle, *Onopordum acanthium* L.; Malayer vicinity from Hamedan Province (34° 19' 14.79" N, 48° 46' 25.51" E, 1724 m a.s.l.), 9 v 2009 on Creeping thistle, *Cirsium arvense* (L.) Scop.; Asadabad vicinity of Hamedan province 34° 46' 21.43" N, 48° 07' 02.45" E, 1577 m a.s.l.); 14 vi 2009, 7 (♀♀) 1 (♂) on Echinops plant, *Echinops orientalis* Trautv. and 17 vii 2009, 13 (♀♀) 5 (♂♂) on Mugwort, *Artemisia aucheri* Boiss; Heydareh village in Hamedan vicinity in Hamedan Province (34° 48' 11.80" N, 48° 28' 23.04" E, 1840 m a.s.l.), 16 x 2009, 10 (♀♀) 2 (♂♂) on Chicory, *Cichorium intybus* L. and 6 (♀♀) 1 (♂); Cornflower, *Centaurea cyanus* L.; Sheverin village of Hamedan vicinity (34° 51'

51.07" N, 48° 35' 42.61" E, 1752 m a.s.l.); 19 vi 2009, 16 (♀♀) 6 (♂♂) on Sunflower, *Helianthus annuus* L. and 14 v 2008 – 08 vi 2009 on Russian knapweed, *Acroptilon repens* (L.); Dare Morad Beigh village in Hamedan vicinity (34° 44' 38.52" N, 48° 30' 10.61" E, 2114 m a.s.l.); 17 vi 2009, 8 (♀♀) 2 (♂♂) on Greater burdock, *Arctium lappa* L.

**Previous records from Iran:** Davachi and Taghizadeh (1955); Khalil Manesh (1973); Sepasgozarian (1977); Khanjani (1996), Modarres Awal (2002), Khanjani and Haddad Irani -Nejad (2006); Sadeghi Namaghi (2010).

**Remarks:** This species was collected frequently in this study.

#### *Tetranychus turkestanii* (Ugarov & Nikolski, 1937)

**Material examined:** Heydareh village of Hamedan Province (34° 48' 04.23" N, 48° 28' 15.95" E, 1855 m a.s.l.), 16 vi 2008, 4 (♀♀) 2 (♂♂) on Yarrow, *Achillea millefolium* L.; Agricultural faculty of Bu–Ali Sina University of Hamedan Province (34° 48' 11.30" N, 48° 28' 55.13" E, 1822 m a.s.l.), 10 viii 2008, 3 (♀♀) 1 (♂) on Russian knapweed, *Acroptilon repens* (L.); Sarab Gamasiab in Nahvand vicinity (34° 02' 47.22" N, 48° 22' 26.39" E, 1840 m a.s.l.), 3 ix 2009, 8 (♀♀) 2 (♂♂) on Prickly lettuce, *Lactuca serriola* L.; Shahrestaneh of Toyserkan vicinity in Hamedan Province, 34° 42' 29.76" N, 48° 21' 53.51" E, 2154 m a.s.l.), 15 viii 2009 3 (♀♀) 1 (♂) on Chicory, *Cichorium intybus* L.

**Previous records from Iran:** Daneshvar (1974); Khalil-Manesh (1973); Sepasgozarian 1977; Khanjani (1996), Khanjani and Haddad Irani-Nejad (2006); Sadeghi Namaghi and Kamali (1993); Sadeghi Namaghi (2010).

#### *Eutetranychus orientalis* (Klein, 1936)

**Material examined:** Abbass Abad of Hamedan Province (34° 47' 11.45" N, 47° 27' 57.88" E, 1986 m a.s.l.), 26 viii 2009, 4 (♀♀) 2 (♂♂) on Prickly lettuce, *Lactuca serriola* L.

**Previous records from Iran:** Farahbakhsh (1961); Khalil Manesh (1973); Sepasgozarian (1977); Khanjani and Haddad Irani-Nejad (2006); Kamali *et al.* (2001); Modarres Awal (2002).

**Bryobia Koch, 1836****Bryobia mirmoayedii Khanjani, Gotoh & Kitashima, 2008**

**Material examined:** Asadabad in vicinity of Hamedan Province (34° 46' 21.43" N, 48° 07' 02.45" E, 1577 m a.s.l.), 06 v 2009, 4 (♀♀) 1 (♂) on Sunflower, *Helianthus annuus* L. and 12 viii 2009, 2 (♀♀), Wild safflower, *Carthamus oxyacantha* M. Bieb.

**Previous record from Iran:** Khanjani *et al.*, 2008.

**Bryobia praetiosa Koch, 1835**

**Material examined:** Faculty of Agriculture, Bu-Ali Sina University of Hamedan Province (34° 48' 12.47" N, 48° 29' 02.67" E, 1821 m a.s.l.), 11 vii 2009, 4 (♀♀) on Echinops plant, *Echinops orientalis* Trautv.

**Previous records from Iran:** Farahbakhsh (1961); Khalil Manesh (1973); Kamali (1990); Mehrnejad and Ueckermann (2001); Modarres Awal (2002); Khanjani and Kamali (1993, 2000); Khanjani and Haddad Irani-Nejad (2006); Izadi *et al.*, (2010).

**Tenuipalpidae Berlese, 1913****Aegyptobia Sayed, 1950****Aegyptobia salicicola Al-Gboory, 1987**

**Material examined:** Ganjnameh region of Hamedan Province (34° 46' 21.26" N, 48° 27' 29.01" E, 2068 m a.s.l.), 28 viii 2009, 3 (♀♀) on Chicory, *Cichorium intybus* L.

**Anystidae, Oudemans, 1936****Anystis von Heyden, 1826****Anystis baccarum (Linnaeus, 1758)**

**Material examined:** Medicinal garden of Jehad Keshavarzi in Hamedan Province (34° 46' 23.23" N, 48° 30' 56.3" E, 1931 m a.s.l.), 17 vi 2008, 6 (♀♀) on Yarrow, *Achillea miliofolium* Miller, infested by two spotted spider mites; Heydareh village of Hamedan vicinity in Hamedan Province (34° 48' 11.80" N, 48° 28' 23.04" E, 1840 m a.s.l.), 18 vii 2009, 2 (♀♀) on Feverfew, *Tanacetum parthenium* (L.) Sch. Bip; Sarab Gamasiab of Nahavand vicinity in Hamedan Province (34° 02' 47.22" N, 48° 22' 26.39" E, 1840 m a.s.l.) 20 vii 2008, 1 (♀) on Chicory foliage, *Cichorium intybus* L., infested with Two spotted spider mite, *Tetranychus urticae* Koch: Tetranychidae; Asadabad vicinity

of Hamedan Province 34° 46' 17.33" N, 48° 06' 59.22" E, 1574 m a.s.l.); 10 viii 2008, 2 (♀♀) on Russian knapweed, *Acroptilon repens* (L.); Abbass Abad of Hamedan Province (34° 47' 11.45" N, 48° 27' 57.88" E, 1986 m a.s.l.) 03, 13 ix 2008, 4 (♀♀) on Holy thistle, *Centaurea benedicta* L.

**Previous records from Iran:** Kamali (1990); Sadeghi Namaghi (1995); Khanjani (1996); Kamali *et al.*, 2001; Modarres Awal (2002).

**Tydeidae Kramer, 1877****Tydeus Koch, 1836****Tydeus caryae Khanjani & Ueckermann, 2003a**

**Material examined:** Heydareh village of Hamedan in Hamedan Province (34° 48' 11.80" N, 48° 28' 23.04" E, 1840 m a.s.l.), 24 vii and 3 viii 2009, 3 (♀♀) on Safflower, *Carthamus oxyacantha* M.S.; Ganjnameh region in Hamedan Province (34° 46' 21.26" N, 48° 27' 29.01" E, 2068 m a.s.l.), 28 viii 2009, 1 (♀) on Yarrow, *Achillea miliofolium* Miller, infested by two spotted spider mites; Sarab Gamasiab of Nahavand vicinity in Hamedan Province (34° 02' 49.42" N, 48° 22' 30.81" E, 1828 m a.s.l.), 12 x 2008, 2 (♀♀) on Chicory, *Cichorium intybus* L.

**Previous records from Iran:** Khanjani and Ueckermann 2003a; Khanjani and Mirab Balou, 2007; Izadi *et al.*, 2010.

**Stigmaeidae Oudemans, 1931****Stigmaeus Koch, 1836****Stigmaeus pilatus Kuznetsov, 1978**

**Material examined:** Ganjnameh region of Hamedan Province (34° 45' 41.91" N, 48° 26' 46.92" E, 2130 m a.s.l.), 28 x 2009, 2 (♀♀) on Chicory, *Cichorium intybus* L., infested with two spotted spider mite.

**Previous records from Iran:** Khanjani *et al.*, 2010; Rostami *et al.*, 2010.

**Eupalopsellidae Willmann, 1952****Eupalopsellus Sellnick, 1949****Eupalopsellus ueckermanni Khanjani, Masoudian & Asali Fayaz, 2011**

**Material examined:** Heydareh village of Hamedan vicinity in Hamedan Province (34° 48' 11.80" N, 48° 28' 23.04" E, 1840 m a.s.l.), 09 ix 2009, 3 (♀♀) on Yarrow, *Achillea*

*millefolium* L., infested by two spotted spider mites.

***Eupalopsellus hamedaniensis* Khanjani & Ueckermann, 2007**

**Material examined:** Heydareh village of Hamedan vicinity in Hamedan Province (34° 48' 11.80" N, 48° 28' 23.04" E, 1840 m a.s.l.), 29 ix 2009, 3 (♀♀) on Yarrow, *Achillea millefolium* L., infested by two spotted spider mites.

**Previous records from Iran:** Khanjani *et al.*, 2007; Khanjani *et al.*, 2011.

**Raphignathidae Kramer 1877**

***Raphignathus* Duges 1834**

***Raphignathus hecmataniensis* Khanjani & Ueckermann, 2003b**

**Material examined:** Abbass Abad of Hamedan Province (34° 47' 11.45" N, 48° 27' 57.88" E, 1986 m a.s.l.), 26 viii 2008, 5 (♀♀) on Echinops plant, *Echinops orientalis* Trautv.

**Previous records from Iran:** Khanjani and Ueckermann 2003b; Rostami *et al.*, 2010.

**Cunaxidae Thor, 1902**

***Cunaxa* von Heyden, 1826**

***Cunaxa capreolus* (Berlese, 1889)**

**Material examined:** Shahrestaneh of Toyserkan vicinity in Hamedan Province (34° 41' 58.65" N, 48° 21' 34.94" E, 2076 m a.s.l.), 15 viii 2009, 9 (♀♀) from soil and litter of Chicory, *Cichorium intybus* L.

**Previous records from Iran:** Khanjani (1996); Den Heyer *et al.*, 2011; Haddad Irani- Nejad *et al.*, 2005; Izadi *et al.*, 2010; Rostami *et al.*, 2010.

**Bdellidae Duges, 1834**

***Spinibdella* Thor, 1930**

***Spinibdella cronini* (Baker & Balock, 1962)**

**Material examined:** Abbass Abad of Hamedan Province (34° 47' 11.45" N, 48° 27' 57.88" E, 1986 m a.s.l.), 27 viii 2008, 2 (♀♀) on Echinops plant, *Echinops orientalis* Trautv.

**Previous records from Iran:** Khanjani (1996); Rostami *et al.*, 2010; Changizi *et al.*, 2011.

**Erythraeidae Oudemans, 1902**

***Erythraeus* Latreille, 1806**

***Erythraeus (Zaracarus)* Southcott, 1995**

***Erythraeus (Zaracarus) ueckermanni* Saboori, Nowzari & Bagheri Zenouz, 2004**

**Material examined:** Sarab Ghamasiab, Nahavand vicinity in Hamedan Province (34° 02' 47.22" N, 48° 22' 26.39" E, 1840 m a.s.l.), 01 x 2009, 1 (Larva) on Cornflower, *Centaurea cyanus* L., infested with unknown aphid; Abbass Abad, Hamedan vicinity (34° 47' 11.45" N, 48° 27' 57.88" E, 1986 m a.s.l.), 06 xiii 2008, 1 (Larva) on Chicory foliage, *Cichorium intybus* L. and 1 (Larva) Yarrow, *Achillea millefolium* Miller.

**Previous record from Iran:** Saboori *et al.*, 2004.

***Erythraeus (Erythraeus)* Latreille 1806**

***Erythraeus (Erythraeus) mirabi* Khanjani *et al.*, 2007**

**Material examined:** Ganjnameh region, Hamedan vicinity (34° 45' 41.91" N, 48° 26' 46.92" E, 2130 m a.s.l.), 27, 28 xiii 2009, 2 (Larva) on Chicory, *Cichorium intybus* L.

**Previous record from Iran:** Khanjani *et al.*, 2007.

***Erythraeus (Erythraeus) garmsaricus* Saboori *et al.*, 2004.**

**Material examined:** Ganjnameh region, Hamedan vicinity (34° 46' 21.26" N, 48° 27' 29.01" E, 2068 m a.s.l.), 28 xiii 2009, 1 (Larva) on Chicory, *Cichorium intybus* L.

**Previous records from Iran:** Saboori *et al.*, 2004; Ardeshir *et al.*, 2008.

**Trombidiidae Leach, 1815**

***Allothrombium* Berlese, 1903**

***Allothrombium ovatum* Zhang & Xin, 1992**

**Material examined:** Faculty of Agriculture of Bu-Ali Sina university in Hamedan vicinity (34° 48' 11.30" N, 48° 28' 55.13" E, 1822 m a.s.l.), 13 vii 2009, 3 (Larvae) on Yarrow, *Achillea millefolium* L.

**Previous record from Iran:** Izadi *et al.*, 2010.

**Phytoseiidae Berlese, 1916**

***Neoseiulus* Hughes, 1948**

***Neoseiulus bicaudus* Wainstein, 1962**

**Material examined:** Ganjnameh region of Hamedan vicinity (34° 46' 21.26" N, 48° 27' 29.01" E, 2068 m a.s.l.), 28 viii 2009, 10 (♀♀) on Chicory, *Cichorium intybus* L. infested with Two spotted spider mite.

**Previous record from Iran:** Kamali *et al.*, 2001; Faraji *et al.*, 2007; Hajizadeh *et al.*,

2010b; Rahmani *et al.*, 2010; Haddad Irani-Nejad *et al.*, 2003; Asali Fayaz *et al.*, 2011.

***Typhlodromus* Scheuten, 1857**

***Typhlodromus (Anthoseius) iraniensis* Daneshvar & Denmark, 1982**

**Material examined:** Ganjnameh region of Hamedan vicinity (34° 46' 21.26" N, 48° 27' 29.01" E, 2068 m a.s.l.), 28 viii 2009, 10 (♀♀) on Chicory, *Cichorium intybus* L. infested with two spotted spider mite.

**Previous records from Iran:** Daneshvar and Denmark 1982, Faraji *et al.*, 2007; Hajizadeh *et al.*, 2010b; Asali Fayaz *et al.*, 2011.

**Ascidae Voigts & Oudemans, 1905**

***Lasioseius* Berlese, 1916**

***Lasioseius youcefi* Athias-Henriot, 1959**

**Material examined:** Sarab Gamasiab of Nahavand vicinity in Hamedan Province (34° 02' 49.42" N, 48° 22' 30.81" E, 1828 m a.s.l.), 17 i 2010, 5 (♀♀) from soil and litter of Russian knapweed, *Acroptilon repens* (L.).

**Previous records from Iran:** Khanjani (1996); Kamali *et al.*, 2001; Khanjani and Mirab Balou (2006); Hajizadeh *et al.*, 2010a; Kazemi and Rajaei (2013).

**Veigaiidae Oudemans, 1939**

***Veigaia* Farrier 1957**

***Veigaia nemorensis* (Koch), 1839**

**Material examined:** Sarab Gamasiab of Nahavand vicinity in Hamedan Province (34° 02' 49.42" N, 48° 22' 30.81" E, 1828 m a.s.l.), 17 i 2010, 2 (♀♀) from soil and litter of Chicory, *Cichorium intybus* L.; Ganjnameh region of Hamedan vicinity (34° 46' 21.26" N, 48° 27' 29.01" E, 2068 m a.s.l.), 13 i 2010, 3 (♀♀) from soil and litter of Chicory, *Cichorium intybus* L.

**Previous records from Iran:** Khanjani (1996); Rostami *et al.*, 2010; Kazemi and Rajaei (2013).

**Eviphididae Berlese, 1913**

***Alliphis* Halbert, 1923**

***Alliphis halleri* (G. & R. Canestrini, 1884)**

**Material examined:** Sarab Gamasiab of Nahavand vicinity in Hamedan Province (34° 02' 49.42" N, 48° 22' 30.81" E, 1828 m a.s.l.), 28 xii 2009, 3 (♀♀) from soil and litter of Chicory, *Cichorium intybus* L.

**Previous records from Iran:** Khanjani (1996); Kazemi (2010); Kazemi and Rajaei (2013).

**Discussion**

According to this study a few species were phytophagous but most species were effective agents in natural equilibrium to the extent that in their presence there would be no need for chemical control. Among the plant feeder mites two spotted spider mite, *T. urticae* was most widely distributed with high populations in certain locations. No considerable damage was noticed on the host plants because the predatory mites are effective in reduction of its population. There is a great diversity of predatory mites on the medicinal plants yet the Phytoseiidae family members play the major role (Masoudian, 2011) as good potential biological control agents.

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## تنوع کنه‌های مرتبط با برخی از گیاهان دارویی (Asteraceae) در همدان

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**چکیده:** گیاهان دارویی از دیرباز تاکنون همواره مورد استفاده قرار می‌گیرند. روی این گروه از گیاهان، بندپایانی همچون کنه‌ها یافت می‌شود. در این مطالعه، فون کنه‌های مرتبط با برخی از گیاهان دارویی (خانواده Asteraceae) در منطقه همدان در طول دوره سال‌های ۲۰۰۸ الی ۲۰۰۹ مورد بررسی قرار گرفت. طی آن ۲۳ گونه (۱۸ جنس از ۱۵ خانواده) از کنه‌ها (زیرراسته پیش‌استیگمایان و راسته میان-استیگمایان) جمع‌آوری و شناسایی شد. در این مطالعه، کنه تارتن دولکه‌ای (*Tetranychus urticae* Koch) به‌عنوان کنه گیاهخوار به میزان بیشتری جمع‌آوری شد.

**واژگان کلیدی:** فون، کنه، گیاهخوار، شکارگر، گیاهان دارویی