Mite Diversity (Acari) from Ornamental Plants in Erzurum in Turkey

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ABSTRACT
Mite species belongs to Tetraychychidae (3); Tenupalpidae (2), Stigmaeidae (1), Tydeiidae (2), (Acari: Prostigmata); Phytoseiidae (10) (Acari: Mesostigmata) and Acaridae (1) (Astigmata) were identified on woody ornamental plants and shrubs in Erzurum (Eastern part of Turkey). The samples were collected from Erzurum (Centrum, Pasinler, Köprüköy, Horasan, Aziziye-Ilıca, Aşkale, Tortum, Uzundere and Çat districts) with a weekly interval between April to October during 2015 and 2016. Five species were phytophagous mites (belong to Tenuipalpidae and Tetranychidae), while the others are considered as predators or feed on microorganisms, neutral in their habitats. Nineteen mite species representing in three orders: Amblyseius andersoni (Chant), Kampimodromus aberrans (Oudemans), Euseius finlandicus (Oudemans), Typhlodromus cotoneastri (Wainstein), Neoseiulus astutus (Beglyarov), Phytoseiulus finitimus Ribaga, Typhlodromus (Anthosius) kerkirae Swirski and Ragusa, Typhlodromus (Anthosius) recki (Wainstein), Paraseiulus soleiger (Ribaga), Neoseiella tilianum (Oudemans), Zetzellia malii (Ewing), Tydeus kochi Oudemans, Tydeus californicus (Banks), Tetranychus urticae Koch, Bryobia rubrioculus (Scheuten), Bryobia praetiosa Koch, Cenopalpus pulcher (Canestini & Fanzago) Brevipalpus californicus (Banks), Tyrophagus putrescentiae. These results showed that Erzurum has rich biodiversity especially concerning predatory mite fauna. T. urticae (Schrank), was the most abundant and common phytophagous species (53.11%) while some other species were represented only one specimen (Neoseiulus astutus (Beglyarov) (Phytoseiidae). Most preferred hosts plants were Philadelphus coronarius L. (Hydrangeaceae) (8), Malus coronaria L. (Rosaceae) (7) and Rosa canina L. (Rosaceae) (6) while Syringa vulgaris L. (Oleaceae), Salix sp. (Salicaceae) and Rosa pisiformis (Christ) (Rosaceae) were populated by only (2) and (1) mite species respectively.

Keywords: Acari; Erzurum; Ornamental plants; Phytoseiidae; Tetranychidae

1. Introduction
Ecological condition in Erzurum and its neighbourhoods area are not suitable for several exotic outdoor ornamental plants to grow. However, the area is located phytogeographically in ancient Mesopotamian area. Therefore, plant species which can grow naturally in these areas can provide a rich ecological diversity. Erzurum is located at 2000 m altitude. Ornamental plants have several functional and aesthetic landscape values by being a native tree and small tree species of the region (Irmak 2013).

Several surveys were conducted to determine the mite species associated with woody ornamentals and shrubs of World-wide. It was reported several new mite species for the Hungary (Ripka et al 2002; 2005; Szabó et al 2009). In Turkey, some mites especially belong to Tetranychidae, Tenuipalpidae, Eriophyidae and Phytoseiidae

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species were identified on ornamental and park plants (Alaoğlu 1991; 1996; Faraji et al 2011; Çobanoğlu et al 2016).

There are limited numbers of the study exists on agricultural and park areas in Erzurum. Some plant-parasitic and phytoseid species were reported in Erzurum and Erzincan previously: Bryobia rubrioculus Scheuten, Tetranychus urticae Koch, Typhlodromus kazachstanicus Wainstein (Ecevit 1981); Euseius finlandicus (Oudemans), Kampimodromus aberrans Oudemans, Paraseiulus soleiger (Ribaga), Paraseiulus talbii (Athias-Henriot), Phytoseius echinus Wainstein & Arutunjan, Neoseiulella tiliarum (Oudemans) and Typhlodromus (Anthoseius) rhenanus (Oudemans) (Alaoğlu 1996). Beside this Neoseiulus zwoelferi (Dosse) and Proprioseiopsis okanagensis (Chant) species were reported in that region (Çobanoğlu 1989).

Therefore, it is a major necessitates a thorough investigation into the mites associated with ornamental plants for determination of the mite biodiversity in Erzurum. Survey studies can provide detection of predatory species are rich which are potential for biological control of economical important pests on ornamental plants.

The goal of the study is to determine mite species on shrubs and woody ornamental plants in Erzurum plateau during 2015-2016.

2. Material and Methods

The surveys were carried out on woody ornamentals and shrubs in Erzurum. The samples were collected 11 different host plants: 1. Rosa canina L. (Rosaceae), 2. Rosa dumalis Bechst. (Rosaceae), 3. Rosa pisiformis (Christ) (Rosaceae), 4. Ribes aureum Pursh. (Grossulariaceae), 5. Philadelphia coronarius L. (Hydrangeaceae), 6. Robinia pseudoacacia L. (Fabaceae), 7. Hippophae salicifolia Robert (Elaeagnaceae), 8. Syringa vulgaris L. (Olaceae), 9. Malus coronaria L. (Rosaceae), 10. Malus floribunda L. (Rosaceae), 11. Salix sp. with 9 different districts of Erzurum (Centrum, Pasinler, Köprüköy, Horasan, Aziziye (Ilica), Aşkale, Tortum, Uzundere, and Çat), which is located Eastern part of Turkey, during 2015 and 2016 (Figure 1; Table 1).

Figure 1. Sampling localities: Erzurum (Eastern Part of Turkey) (★)

The samples were deposited in the mite collection at Ankara University and Atatürk University Plant Protection Department of Turkey. The samples were collected from April to October of each year (2015 and 2016) with a weekly interval. The mites were collected randomly from the different height of the plants. The sampling was conducted from ornamental plants in landscape areas such as parks, gardens, roadsides, school and home gardens.
All the mite samples were extracted by Berlese funnel. The mites were kept in 70% ethanol and afterwards, cleared in Lacto-phenol solution and prepared in Hoyer’s medium, later they dried for 15-20 days at 50 °C (Henderson 2001).

The collections were made by K. Akçakoyunluoğlu (Atatürk University).

All the identification of the samples were made by S. Çobanoğlu, according to; Jeppson et al (1975), Kolodochka (1978), Papadoulis et al (2009), Faraji et al (2011), Seeman & Beard (2011) and Çobanoğlu et al (2016). World distribution and host range are considered, according to Migeon & Dorkeld (2006-2016); Moraes et al (2004) and Demite et al (2015). GPS data of the collection sites are shown in Table (1).

### Table 1 - Coordinates of the sampling localities

| Location                  | GPS                                      |
|---------------------------|------------------------------------------|
| Atatürk University Campus | N 39° 53′ 59.1″, 041° 14′ 19.0″ E 1880 m |
| Pasinler                  | 40° 02′ 56.0″ N, 41° 35′ 21.7″ E 1660 m   |
| Uzundere                  | 40° 32′ 52.7″ N, 41° 34′ 23.6″ E, 1089 m |
| Çat                       | 39° 35′ 42.4″ N, 40° 57′ 59.6″ E, 1918 m |
| Aziziye                   | 39° 55′ 09.3″ N, 41° 12′ 20.7″ E, 1800 m |
| Aziziye-Dadaşkent         | 39° 55′ 09.3″ N, 41′ 12′ 20.7″ E, 1806 m |
| Tortum                    | 40° 18′ 35″ N, 41° 31′ 33″ E, 1637 m     |
| Tortum Chelles area,      | 40° 33′ 55.6″ N, 41° 35′ 46.2″ E, 1009 m |
| Aşkale                    | 39° 56′ 03.1″ N, 40° 43′ 32.8″ E, 1662 m |
| Aşkale-Çayköy             | 39° 56′ 44.2″ N, 040° 48′ 18.5″ E, 1720 m |
| Abdurrahman Gazi Forest   | 39° 52′ 36.0″ N, 41° 18′ 35.2″E, 2170 m  |
| Erzurum centrum,          | 39° 48′ 59.7″ N, 41° 04′ 32.8″ E, 1880 m |
| Palandöken                | 39° 48′ 41.2″ N, 041° 07′ 10.0″ E, 1990 m |

### Table 2 - List of identified mite species in Erzurum-Turkey

| Order          | Family     | Mite species                                      |
|----------------|------------|---------------------------------------------------|
| Mesostigmata   | Phytoseiida| Amblyseius andersoni (Chant)                      |
|                |            | Kampimodromus aberrans (Oudemans)                |
|                |            | Euseius finlandicus (Oudemans)                   |
|                |            | Typhlodromus cotoneastri (Wainstein)             |
|                |            | Neoseiulus astatus (Beglyarov)                   |
|                |            | Phytoseius finitimus Ribaga                       |
|                |            | Typhlodromus (Anthoseius) kerkrar Swirski and Ragusa |
|                |            | Typhlodromus (Anthoseius) recki (Wainstein)      |
|                |            | Parasaisius soleiger (Ribaga)                    |
|                |            | Neoseiulella tiliarum (Oudemans)                 |
| Prostigmata    | Stigmaeida | Zetcellia mali (Ewing)                            |
| Tydeida        |            | Tydeus kochi Oudemans                            |
|                |            | Tydeus californicus (Banks)                      |
| Tetranychidae  |            | Tetranychus urticae Koch                         |
|                |            | Bryobia rubrioculus (Scheuten)                   |
|                |            | Bryobia praetiosa Koch                           |
| Teuipalpidae   |            | Cenopalpus pulcher (Canestini & Fanzago)         |
|                |            | Brevipalpus californicus (Banks)                 |
| Astigmata      | Acaridae   | Tyrophagus putrescentsiae (Schrank)               |
3.1. Phytoseiidae berlese

During surveys, 10 Phytoseiidae species were identified.

*Amblyseius andersoni* (Chant) 1957

Material examined - Pasinler, 11.VII.2015 (2♂♂) (*Rosa dumalis* subsp. *bossieri*). Uzundere, 12.VII.2015 (2♀♀, 1♂); 15.08.2015 (2♂♂); 05.IX.2015 (5♀♀, 3♂♂) (*P. coronarius*); Tortum, 15.VIII.2015 (1♂) (*R. aureum*); (1♀) (*R. dumalis*).

Comments: *Amblyseius andersoni* is a common predatory mite species in Turkey; It was reported on *Citrus* spp. *Convolvulus* sp., *Corylus*, *Fagus*, *Fragaria*, *Juglans*, *Lycopersicum*, *Malus*, *Populus*, *Prunus*, *Pyracantha*, *Rubus*, *Sambucus*, *Solanum* and *Tilia* sp. from Ankara, Adana, Adapazarı, Antalya, Bartın, Bolu, Bursa, Edirne, Giresun, Hatay, İstanbul, Kırklareli, Rize, Sakarya, Tekirdağ, Tokat and Trabzon (Faraji et al 2011; Kumral & Çobanoğlu 2015 ). *A. andersoni* was collected in Erzurum as 16 specimen 7.05% (Table 3).

**Table 3 - Mite species and host plants range**

| Family         | Mite species | Host plants | Number of specimens | Ratio (%) |
|----------------|--------------|-------------|---------------------|-----------|
|                |              | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |                  |
| **Tetranychidae** |              |   |   |   | + | + | + | + | - | - | + | - | 128 | 53.11 |
| T. urticae      |              |   |   |   | + | + | + | + | - | - | + | - |      |        |
| B. rubrosculus  |              | - | - | - | - | + | - | + | - | - | - | - |      | 3     | 1.24 |
| B. praetiosa    |              | - | + | - | - | - | - | - | - | - | - | - |      | 1     | 0.41 |
| **Phytoseiidae** |              |   |   |   |   |   |   |   |   |   |   |   |      |        |
| A. andersoni    |              | - | + | - | + | - | - | - | - | - | - | - | 17   | 7.05 |
| N. astatus      |              | - | - | - | - | + | - | - | - | - | - | - |      | 1     | 0.41 |
| T. cotoneastri  |              | - | - | + | - | - | - | - | - | - | - | - |      | 1     | 0.41 |
| T. (A.) kerkira |              | + | - | - | + | - | - | - | - | - | - | - |      | 5     | 2.07 |
| T. (A.). recki  |              | - | - | - | - | + | - | - | - | - | - | - |      | 1     | 0.41 |
| P. finitimus    |              | - | - | + | - | - | - | - | - | - | - | - |      | 5     | 2.07 |
| E. finlandicus  |              | + | + | - | + | - | - | + | + | - | - | - |      | 45    | 18.67 |
| K. aberrans     |              | - | - | - | - | - | - | - | + | - | - | - |      | 9     | 3.73 |
| K. soleiger     |              | - | - | - | - | - | - | - | - | - | - | - |      | 2     | 0.82 |
| **Tydeidae**    |              |   |   |   |   |   |   |   |   |   |   |   |      |        |
| N. tiliarum     |              | + | - | - | - | + | - | - | - | - | - | - |      | 4     | 1.65 |
| T. kochi        |              | - | - | - | - | + | - | - | - | - | - | - |      | 2     | 0.82 |
| T. californicus |              | - | + | - | - | - | - | - | - | + | - | - |      | 11    | 4.56 |
| **Tenopalpidae** |              |   |   |   |   |   |   |   |   |   |   |   |      |        |
| B. californicus |              | - | - | - | + | - | - | - | - | - | - | - |      | 1     | 0.41 |
| C. pulcher      |              | - | - | + | - | - | - | - | - | - | - | - |      | 3     | 1.25 |
| **Stigmaeidae** |              |   |   |   |   |   |   |   |   |   |   |   |      |        |
| Z. mali         |              | - | - | - | - | - | - | - | - | - | - | - |      | 1     | 0.41 |
| **Acaridae**    |              |   |   |   |   |   |   |   |   |   |   |   |      |        |
| T. putrescensia |              | - | - | - | - | - | - | - | - | - | - | - |      | 1     | 0.41 |
| In total        |              |   |   |   |   |   |   |   |   |   |   |   |      | 241   | 100.00 |

*: 1. *Rosa canina* L. 4. Ribes aureum 7. *Hippophae salicifolia*
2. *Rosa dumalis* 5. *Philadelphus coronaria* 8. *Syringa vulgaris*
3. *Rosa pisiformis* 6. *Robinia pseudoacacia* 9. *Malus coronaria*

10. *Malus floribunda* 11. Salix sp.

*Euseius finlandicus* (Oudemans 1915)

Material examined - Atatürk University, 02.VII.2015 (10♂♂) (*P. coronarius*); Aşkale, 11.VI.2015 (3♀♀, 5♂♂) (*R. dumalis*); Pasinler, 11.VII.2015 (3♂♂) (*R. aureum*); S. vulgaris L., M. hybrida; Uzundere, 05.IX.2015 (2♂♂) (*R. pseudoacacia*) (*R. canina*); Azizyie, (1♀, 2♂♂) 16.VIII.2015. (R. canina); Azizyie-Dadaşkent,
14.VIII.2015 (1♂) (*R. dumalis*); Tortum Falls, 12.VII.2015 (5♀♀, 8♂♂) (*M. communis*); Tortum, 12.VII.2015 (5♂♂) (*R. aureum*).

Comments: *Euseius finlandicus* is common on different plants throughout Turkey (Faraji et al 2011). It was recorded from eggplants, tomatoes, pepper, nightshade plants and *Datura stramonium* L. (Rosaceae) from Ankara, Bursa and Yalova Region of Turkey (Çobanoğlu & Kumral 2014; 2016; Kumral & Çobanoğlu 2016). It was identified from Erzurum (Alaoğlu 1996). It is abundant in Erzurum on parks and ornamental plant at 18.67%.

*Kampimodromus aberrans* (Oudemans 1930)

Material examined - Uzundere, 07.VI.2015 (1♀) (*M. cronoria*); Tortum Falls, 07.VI.2015; 12.VIII.2015 (8♀♀) (*M. floribunda*).

Comments: *Kampimodromus aberrans* is abundant on various plants, throughout Turkey. It was mentioned from different orchards, park plants, woody ornamentals and shrubs in Turkey (Alaoğlu 1996; Faraji et al 2011). It was collected in Erzurum at 3.73% (Table 3).

*Neoseiulus astutus* (Beglyarov 1960)

Material examined - Aşkale-Çayköy, 05.IX.2015, (1♀) (*H. salicifolia*)

Comments: *Neoseiulus astutus* was recorded in Ankara on *Salix babylonica* L. (Salicaceae) by Çobanoğlu (2002). It is a rare species and presented by only one specimen.

*Paraseiulus soleiger* (Ribaga1904)

Material examined - Aşkale-Çayköy, 06.VI.2016 (2♀♀) (*Salix sp.*)

Comments: *P. soleiger* was found on *M. communis*, stone fruits; *Prunus avium* L., *Prunus. persica* L., *Prunus domestica* L. (Rosaceae), *Ulmus sp.* and *Vitis vinifera* L. (*Vitaceae*), from Adana, Ankara, Amasya, Erzincan, Erzurum, Gümüşhane, Isparta, Istanbul, Kastamonu, Manisa, Nevşehir, Niğde, Tekirdağ, Tokat and Van Lake Basin (Alaoğlu 1996; Faraji et al 2011). It was represented only two specimens.

*Phytoseius finitimus* Ribaga (1904)

Material examined - Aziziye- Dadaşkent, (2♀♀) (*R. aureum*) Tortum, 05.IX.2015 (2♀♀); Tortum Falls, 05.IX.2015 (1♀♀) (*M. oronaria* (L)).

Comments: *P. finitimus* is a very common species throughout Turkey. This species was reported on *Ailanthus* sp., *Citrus* spp., *Clematis vitalba*, *Cornus mas*, *Corylus avellana*, *Cydonia vulgaris*, *Ficus carica*, *Malus communis*, *Morus nigra*, *Prunus communis*, *Prunus domestica*, *Prunus spinosa*, *Rhamnus sp.*, *Ribes sp.*, *Rosa sp.*, *Solanum melongena*, *Rubus sp.*, *Ulmus campestris*, *Ulmus sp.*, *Vitis vinifera* (Çobanoğlu & Kumral 2014; Faraji et al 2011). It is collected at 2.07% (Table 3).

*Typlodromus cotoneastri* Wainstein (1961)

Material examined - Tortum, 05.IX.2015, (1♀♀) (*R. aureum*).

Comments: *T. cotoneastri* was reported on Betulaceae, Cornaceae, Rosaceae, Fagaceae, Moraceae, Pinaceae, Ulmaceae, Caprifoliaceae and Vitaceae. It is distributed Ankara, Antalya, Bitlis, Edirne, Erzincan, Karabük, Kirkareli, Tekirdağ (Faraji et al 2011). It is collected in Erzurum at 0.41%.

*Typhlodromus* (*Anthoseius*) *kerkirae* Swirski & Ragusa (1976)

Material examined - Uzundere- Centrum, 05.IX.2015 (5♀♀) (*R.canina*).
Comments: It was collected on *Quercus* sp in Adana (Döker et al 2016). It s collected at 2.07% in Erzurum.

*Typhlodromus (Anthoseius) recki* Wainstein (1958).

Material examined - Aşkale-Çayköy, (1 ♀) (*H. salicifolia*).

Comments: This species was collected from *Citrus* spp., *Clematis vitalba* L. (Ranunculaceae), *M. communis*, *Pinus nigra* J. F. Arnold, *Pyrus elaeagnifolia* Kotschyan (Rosaceae), *Ribes* sp., *V. vinifera* in Adapazarı, Amasya, Ankara, , Burdur, Bursa, Edirne, Gümüşhane, İzci, Isparta, İstanbul, İzmir, Kars, Kastamonu, Konya, Muğla, Nevşehir, Niğde, Tekirdağ, Tokat, Zonguldak (Faraji et al 2011). It is collected as one specimen.

*Neoseiulella tiliarum* (Oudemans 1930).

Material examined - Aşkale-Centrum, 11.VII.2015 (2♂♂) (*R. canina*), Tortum Falls, 12.VII.2015 (1 ♀) (*M. cronoria*); Uzundere-centrum, 05.IX.2015 (1♂) (*P. coronarius*).

Comments: It was reported; *C. avellana*, *Crataegus* sp., *Juglans regia* L. (Juglandaceae), *M. communis*, *Prunus cerasus* L. (Rosaceae), *P. domestica*, from; Ankara, Amasya, Burdur, Bursa, Edirne, Erzincan, Erzurum, Gümüşhane, Isparta, Konya, Niğde, Samsun and Tokat from pome and stone fruits (Çobanoğlu et al 2016). It is presented at 1.25%.

*Brevipalpus californicus* (Banks 1904)

Material examined - Uzundere, 05.IX.2015 (1 ♀) (*P. coronarius*).

Comments: This species was collected on Citrus trees in Mersin and from Aegean vineyards (Göven et al 1999). *B. californicus* is rare species and collected as only one specimen.

3.3. Family tetranychidae donnadieu

*Tetranychus urticae* Koch (1836)

Material examined - Atatürk Univ. Campus, 27.V.2015 (1♀) (*R. aureum*), 05.VII.2015 (38 ♀♀) (*R. canina*), Pasinler, 06.VI.2015 (1♀), 11.VI.2015 (1♀), 16.VIII.2015 (4♀♀) (*R. aureum*), (1♂) (*M. hybrida*); 16.VIII.2015 (6♀♀, 1♂) (*R. pisiformis*). Uzundere, 07.VI.2015 (1♀) (*R. canina*); 12.VII.2015 (1♀) (*R. pseudococciae*); 12.VII.2015 (9♀♀) (*P. coronarius*); 12.VII.2015 (1♀ 1♂) (*R. dumalis*); 05.IX.2015 (2♀♀) (*R. canina*), 05.IX.2015 (9♀♀) (*P. coronarius*); 12.VII.2015 (3♀♀, 8♂♂) (*R. canina*). Aziziye, 11.VI.2015 (6♀♀) (*R. aureum*). Aziziye-Dadaşkent, 14.VIII.2015 (1♀); 15.VIII.2015 (2♀♀) (*R. aureum*), Tortum, 12.VII.2015 (1♂) (*R. canina*); 12.VII.2015 (3♀♀) (*R. aureum*); 15.VIII.2015 (1♀) (*M. communis*); 05.IX.2015 (1♀) (*R. pisiformis*); 05.IX.2015 (3♀♀) (*R. aureum*). Tortum Falls area, 15.VIII.2015 (1♀) (*M. communis*). Aşkale, 16.VIII.2015, (2♀♀) (*R. dumalis*); 16.VIII.2015 (5♀♀, 1♂) (*R. aureum*). Abdurrahman Gazi Forest, 30.VIII.2015, (1♀), (R. aureum); Erzurum centrum, 30.VIII.2015 (1♀) (*P. coronarius*); (5♀♀, 3♂♂) (*R. pisiformis*); Palandöken, 30.VIII.2015 (2♀♀) (*R. dumalis*).
Comments: *T. urticae* is an important plant parasitic mite species which has distributed world-wide with more than 150 host plants and distributed all around Turkey (Ecevit 1981; Çobanoğlu & Kumral 2014; Kumral & Çobanoğlu 2015; 2016). It is very common on the ornamental plants in Erzurum. It was found 53.11% of the identified samples. It was collected from eight host plant species in Erzurum (Table 3).

*Bryobia rubrioculus* (Scheuten 1857)

Material examined - University Campus-Erzurum, 27.V.2015 (2♀♂) (M. hybrida); Uzundere- Centrum, 05.IX.2015 (1♀) (P. coronarius).

Comments: *Bryobia* is belongs of Bryobiinae and present several important species worldwide (Migeon & Dorkeld 2006-2016). It is a serious pests on apple, apricot, plum, each and walnut trees. It was reported on *Corylus avellana*, *citrus*, *Cotoneaster horizontalis* Decne. (Rosaceae), *Lonicera tatarica* L. (Caprifoliaceae), *Mahonia aquifolium* (Pursh) (Berberidaceae), *M. floribunda*, *Prunus cerasus*, *Thuja orientalis* L. (Cupressaceae), *V. vinifera* from, Adana, Amasya, Ankara, Denizli, Çanakkale, Erzurum, İzmir, Manisa, Niğde Van and Black Sea region (Ecevit 1981; Göven et al 1999; Uysal et al 2001; Özman & Çobanoğlu 2001). *Bryobia* species collected mostly on neglected trees. It was found (1.24%) among the other mite species on *P. coronoria* and *M. coronoria* (Table 3).

*Bryobia praetiosa* Koch (1836)

Material examined - Aziziye-Dadaşkent; 29.VI.2015, (1♀) *R. dumalis*.

Comments: This species was reported Ankara on *Fragaria ananassa*, *M.communis* and *Ficus carica* (Uysal et al 2001). It was found 0.41% in Erzurum.

3.4. Family stigmaeidae oude mans

Zettellia mali Ewing (1917)

Material examined - Aşkale-Centrum, 11.VII.2015 (1♀) (*Rosa canina*)

Comments: Zettellia mali is important predacious mite, it was reported from Ankara, Bilecik, Bursa, Samsun Van and Tokat (Doğan 2007; Çobanoğlu & Kaźmierski 1999; Kumral & Çobanoğlu 2015). It is not very common in Erzurum and identified on *R. canina* as 0.41% (Table 3)

3.5. Family tydeidae kramer

*Tydeus californicus* (Banks 1904)

Material examined – Aşkale-Çayköy, 06.VI.2015 (11♀♂) (*R. damalis*, *M. cronoria*, *Salix* sp.)

Comments: This is very small soft bodied mites and mostly feed on mites eggs. *Tydeus californicus* is a cosmopolitan species. It is also accepted as neutral species. *T. californicus* reported on hazelnut, pome and stone fruit trees all around Turkey (Çobanoğlu & Kaźmierski 1999). It was represented by 4.56 % in this region (Table 3)

*Tydeus kochi* Oudemans (1928)

Material examined – Pasinler, 11.VII.2015, (1♀), (S.vulgaris); Uzundere, 05.IX.2015, (1♀) (*R. pseudoacacia*).

Comments: *Tydeus kochi* is a common species and reported on *Fragaria ananassa* Duchesne (Rosaceae) from Aydın (Çobanoğlu & Kaźmierski 1999). We identified 0.82% among the other mites (Table 3).

3.6. Family acaridae

*Tyrophagus putrescentiae* (Schrank 1781)

Material examined– Atatürk University Campus, 05.VII.2017 (1♀) (*R. canina*)
Comments: *Tyrophagus putrescentiae* prefer mostly stored products and common species throughout Turkey in different habitats and saprohagous mites. It was determined fresh onion fields in Izmir (Kılıç et al 2012), *Sinapis arvensis* L. (Brassicaceae) in Çanakkale (Kasap et al 2013), *Lycopersicon esculentum, Solanum dulcamara* L. and *Solanum nigrum* L. (Solanaceae) in Ankara, Bursa, Yalova (Çobanoğlu & Kumral 2014; Kumral & Çobanoğlu 2015). It represented by only one specimen.

4. Conclusions

Nineteen mite species are identified on woody ornamental plants in Erzurum. *T. urticae, B. rubrioculus, T. kazachstanicus, E. finlandicus, K. aberrans, P. soleiger, P. talbii* (Athias-Henriot), *P. soleiger, P. talbii* (Athias-Henriot), *P. echinus, N. tiliarum, T. (*A.* rhenanus, *N. zwölferi* and *P. okanagensis* were identified previously (Ecevit 1981; Çobanoğlu 1989; Alaoğlu 1996). The rest of identified species in the parks and ornamental plants in Erzurum (*A. andersoni, T. cotoneastri, N. astutus, P. finitimus, T. (*A.* kerkirae, T. (*A.*) recki, Z. mali, T. californicus, B. praetiosa, C. pulcher, B. californicus and *T. putrescentiae*) are new records for this region. Erzurum has rich mite diversity especially concerning of beneficial mites because of rich host plants diversity and protected environment. Phytoseiidae members play important role as potential for biological control of economically important plant parasitic pests. Therefore, it is important to protect them in the environment. It will be useful to do more extensive studies in that area of Turkey.

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