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Orijinal araştırma (Original article)

Additions to Eriophyoid mites (Acari: Prostigmata: Eriophyoidea) in Van Lake Basin–Turkey[1]

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Summary

This paper provides information about Eriophyoid mites of Van Lake basin during 2008–2010 years (Van, Hizan, Erciş, Tatvan, Muradiye). As a result 7 species were identified; *Rhyncaphytoptus massalongoianus* (Nalepa, 1893), *R. megarostris* (Keifer, 1938), *Abacoptes ulmivagrans* (Keifer, 1939)*, Aceria tuberculata* (Nalepa, 1891), *Aceria angustifoliae* (Denizhan et al., 2008), *Calepitrimerus vitis* (Nalepa, 1905), *Anthocoptes salicis* (Nalepa, 1894). *Rhyncaphytoptus massalongoianus* (Nalepa, 1893), *R. megarostris* (Keifer, 1938), *Abacoptes ulmivagrans* (Keifer, 1939), *Aceria tuberculata* (Nalepa, 1891) are new records for the fauna of Turkey.

Key words: Acari, Eriophyoidea, mite, new record, Van lake basin

Anahtar sözcükler: Acari, Eriophyoidea, akar, yeni kayıt, Van gölü havzası

Introduction

Eriophyoids are very important for cultivated and herbaceous plants. These mites are important not only as direct pests of the plants but they also act as vectors of some important plant diseases. Their identification by morphological examination is quite difficult because of their small size and unclear taxonomic characters. Eriophyoid mites are of small size, the body length of adults averaging about 200µm, and ranging from 80 to nearly 500µm. Known species are still scarce in respect to the expected worldwide number of species; and the geographical areas studied reflect the affiliations of the researchers involved in their study.

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There are about 4000 known species of eriophyoid mites worldwide and about 1000 in Europe (De Lillo & Amrine, 1998). It is estimated that the total number of species may amount to more than 50,000 (Amrine, 1996). Except for Antarctica, eriophyoid mites can be found anywhere plants thrive. The Eriophyoidea is one of the largest group of plant-feeding arthropods. The identification of mites species is evident and necessary for implementing adequate management strategies (Lindquist et al., 1996).

The Turkish eriophyoid fauna is scarcely known while the geographical position and the botanical history make the Turkish territory particularly relevant for a potential large range of species. Some of these could have a scientific and economical interest on crops and weed control. There has been few study of the Eriophyoidea in the Van Lake Basin, in the eastern part of Anatolia. Therefore, a large survey on the eriophyoid mites of Turkey with particular regard to the species on the ornamental plants and on the culture plants is needed.

Materials and Methods

In order to identify eriophyid species on natural and cultivated plants of Van Lake Basin (Hizan, Erciş, Tatvan) surveys were conducted from 2008-2010 with particular regard to species from ornamental and weed plants. Infested leaves were collected from May to October. Specimens collected from plant materials were prepared and slide mounted according to Keifer's methods (Keifer 1975a, b). Lindquist et al. (1996), terminology and setal notation was used in the morphological descriptions. The classification system followed is that of Amrine et al. (2003). The taxonomical verification was made according to Amrine & Stasny (1994), De Lillo & Amrine (1998) and Amrine et al. (2003). All measurements were made according to Amrine & Manson (1996) and are given in micrometers. Host plants were identified by Dr. Fevzi Ozgökçe (Department of Biology, Yüzüncü Yıl Üniversity). Specimens were examined with a Leica DM 1000. All new records correspond to specimens collected by E. Denizhan.

Result

There are few eriophyoid mites identified on *Quercus* spp., *Ulmus* spp. and *Tanacetum* spp. 9 eriophyoid mites are known on *Quercus* spp. from Hungary (Ripka, 2007, 2008, 2009). *Bariella farnei* Lillo, 1988 was described from *Quercus trojana* in Italy (De Lillo, 1988) and four species are known the genus *Glyptacus* Keifer, 1953 (Amrine et al., 2003) in the world (Ripka & Csoka, 2010) in additation to three species are known on *Quercus robur*. These are *Brevulacus reticulatus* (Manson, 1984), *Glyptacus erevanicus* (Shevtchenko & Pogosova, 1983), *Aceria ilicis* (Canestrini, 1890) (Denizhan & Çobanoğlu, 2008). There are many eriophyoid mites on *Ulmus* spp. (Nalepa, 1891; Baker et al., 1996) in the world. *Aceria filiformis* (Nalepa, 1891), *A. campestricola* (Frauenfeld,

1865), *Tetra concava* (Keifer, 1939), *Shevtchenkella ulmi* (Farkas, 1960) identified on *Ulmus campestris* L. (Denizhan & Çobanoğlu, 2010a, b) in Turkey. Therefore, a large survey on the eriophyid mites of Turkey with particular regard to the species on the ornamental plants and on the weeds is needed.

During a survey of the eriophyoid mites of Turkey, mainly in the area around Van Lake basin mites were collected from Fagaceae, Ulmaceae Asteraceae, Vitaceae, Elaeagnaceae and Salicaceae including *Rhyncaphytoptus massalongoianus* (Nalepa, 1893), *R. megarostris* (Keifer, 1938), *Abacoptes ulmivagrans* (Keifer, 1939), *Aceria tuberculata* (Nalepa, 1891), *A. angustifoliae* (Denizhan et al., 2008), *Calepitrimerus vitis* (Nalepa, 1905), *Anthocoptes salicis* (Nalepa, 1894). Four mites were identified as new record for Turkey and are here given their morphological features. These species are scientific and economical interest on crops (*Vitis vinifera* L.), ornamantal plants (*Ulmus* spp., *Salix* sp.) and weed (*Tanacetum uniflorum* L.). Of course, the role played by the eriophyoid species found on the collected weeds and the economical importance of the other species have to be searched and evaluated. The Turkish eriophyoid fauna is basically characterized by a scarce knowledge in its composition. The geographical position and the botanical history make the Turkish territory particularly relevant for a potential large range of host species composing its flora which have been largely spread around the world becoming weeds in some countries. Consequently, these hosts can hide many interesting eriophyoid species and, therefore, a large scale study of the species associated mainly with the weeds, crops and ornamantal plants.

Diptilomiopidae

Rhyncaphytoptinae Roivainen, 1953

Rhyncaphytoptus Keifer, 1939

So far, 78 species of *Rhyncaphytoptus* genus have been found in the world and 6 of them have been found in Turkey (*Rhyncaphytoptus negundivagrans* (Farkas, 1960) on *Acer negundo* L. in Samsun (Özman et al., 1996), *Rhyncaphytoptus ficifoliae* (Keifer, 1939) on *Ficus carica* L. in Ankara). These mites are lower surface leaf vagrant so it is not causing damage (Denizhan, 2007).

Rhyncaphytoptus massalongoianus (Nalepa, 1893)

Body elongate, prodorsal shield with lobe narrow, microtubercles small, round. Accessory setae present. Coverflap smooth. Coxae with one lines.

Tibia 14 (13-15)µm, tarsus 7 (6-8)µm on leg I, the tibia is 11 (10-12)µm, the tarsus is 7 (6-8)µm long on leg II. The length of ω on leg I is 9.5 (9-10)µm, on leg II is 11 (10-12)µm. The empodium 7-rayed, the female genitalia 38 (37-39)µm wide. The seta c_2 is 28 (27-29)µm, seta *d* is 35 (34-36)µm, seta *e* is 20

(19-21)µm, seta *f* is 35 (34-36)µm, seta h_1 is 3.5 (3-4)µm, seta h_2 is 50 (49-51)µm long. The female 140 (139-141)µm long, with 50 dorsal annuli (Figure 1).

Aceria massalongoi (Canestrini, 1890) is different from *Rhyncaphytoptus massalongoianus* (Nalepa, 1893). *A*. *massalongoi* (Canestrini, 1890) is wormlike, prodorsal shield with granular lines forming cellular pattern; microtubercles on pointed or beadlike, produced dorsally, on rear annular margins or ventrally not touching rear annular margins. Coxa with granules; sternal line short, simple and empodia 4 rayed this species was found by Düzgüneş, 1963 (Ankara) on *Syringa vulgaris* L. but *Rhyncaphytoptus massalongoianus* (Nalepa, 1893) is elongate, prodorsal shield with lobe narrow; microtubercles small, round. Coxae smooth and empodia 7 rayed.

Host plant: *Quercus robur* L. (Fagaceae)

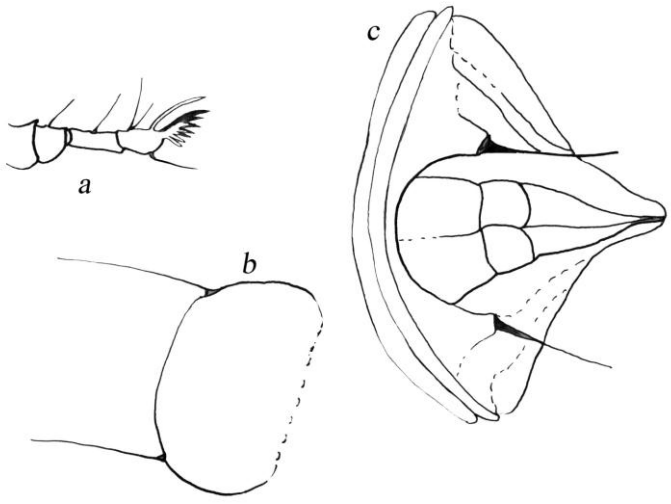
Other host: *Quercus cerris* L., *Q. sessiliflora* L. (De Lillo & Amrine, 1998).

Relation to the host: Irregular, pale spots on leaves.

World distribution: Bulgaria, Denmark, Finland, Germany, Hungary, Italy, Latvia, Poland, Yugoslavia (De Lillo & Amrine 1998).

Regions: Palearctic

Distribution in Van lake basin: Hizan, 28.VII.2008, N: 38° 09' 49, E: 042° 24' 40 1261m. 9♀♀ (New record for the fauna of Turkey).



140µm

Figure 1. *Rhyncaphytoptus massalongoianus* (Nalepa, 1893): a. Empodium, b. Female genitalia, c. Prodorsal shield.

Rhyncaphytoptus megarostris (Keifer, 1938)

Body elongate, prodorsal shield short, declivitous; design of longitudinal lines in disc, netlike laterally; dorsal tubercles slightly ahead of rear margin; microtubercles small, round, touching rear annular margins. Accessory setae present. Coverflap smooth. Coxae smooth.

The prodorsal shield is with median and admedian lines. Tibia 11 (10-12)µm, tarsus 7 (8-6)µm on leg I, the tibia is 11 (10-12)µm, the tarsus is 6 (5-7)µm long on leg II. The length of ω on leg I is 5 (4-6)µm, on leg II is 5.5 (5-6)µm. The empodium 7-rayed, the female genitalia 34 (33-35) µm wide. The seta c_2 is 20 (19-21)µm, seta *d* is 32 (31-33)µm, seta *e* is 10 (9-11)µm, seta *f* is 40 (39-41)µm, seta h_2 is 48 (47-49)µm long. The female 170 (169-171)µm long, with 80 annuli (Figure 2).

Host plant: *Quercus robur* L. (Fagaceae)

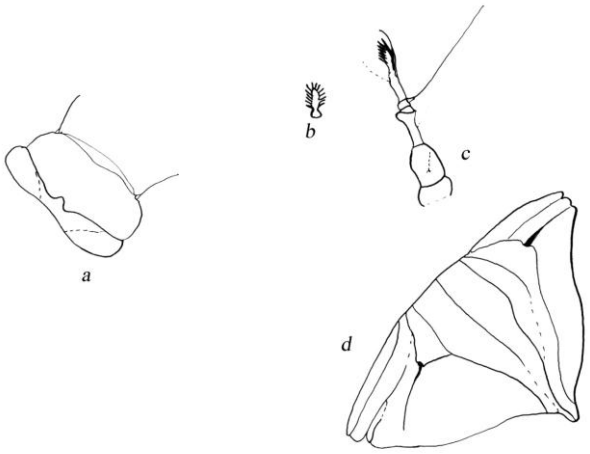
Other host: *Quercus durata* L. (De Lillo & Amrine, 1998).

Relation to the host: This mite is lower surface leaf so it is not causing damage.

World distribution: USA (De Lillo & Amrine 1998)

Regions: Nearctic

Distribution in Van lake basin: Hizan, 28.VII.2008, , N: 38° 09' 49, E: 042° 24' 40 1261m. 5♀♀ (New record for the fauna of Turkey).



220µm

Figure 2. *Rhyncaphytoptus megarostris* (Keifer, 1938): a.Female genitalia, b. Empodium, c. Leg, d. Prodorsal shield.

Abacoptes Keifer, 1939

So far, 78 species of *Abacoptes* genus have been found in the world and 1 of them have been found in Turkey. (*Abacoptes ulmivagrans* (Keifer, 1939) on *Ulmus campestris* L. in Erciş. This mite is lower surface leaf so it is not causing damage).

Abacoptes ulmivagrans (Keifer, 1939)

Body elongate, prodorsal shield humped posteriorly, projecting slightly over shield base; submedian line with two segments. Dorsal tubercles ahead of rear margin projecting setae ahead; microtubercles absent except on posterior ventral annuli. Accessory seta present. Coverflap smooth and sternal line short, simple with a few lines.

Tibia 8 (7-9)µm, tarsus 6 (5-7)µm on leg I, the tibia is 7 (6-8)µm, the tarsus is 6 (5-7)µm long on leg II. The length of ω on leg I is 8 (7-9)µm, on leg II is 9 (8-10)µm. The empodium 5-rayed, the female genitalia 33 (32-34)µm wide. The seta c_2 is 28 (27-29)µm, seta *d* is 46 (45-47)µm, seta *e* is 28 (27-29)µm, seta *f* is 34 (33-35)µm, h_2 is 63 (62-64)µm long. The female 200 (199-201)µm long, with 85 annuli (Figure 3).

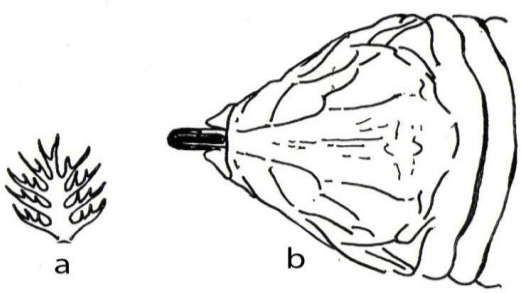
Host plant: *Ulmus campestris* L. (Ulmaceae)

Relation to the host: This mite is lower surface leaf so it is not causing damage.

World distribution: Bulgaria, China, Denmark, Finland, Greece, Hungary, Japan, New Zealand, Poland, Portugal, Spain, Sweden, (Colorado, California, Georgia, Washington) USA (De Lillo & Amrine 1998).

Regions: Nearctic, Palearctic, Australian, Oriental

Distribution in Van lake basin: Erciş, 11.VI.2010, N: 39° 01' 71, E: 043° 22' 55 1660m 7♀♀ (New record for the fauna of Turkey).



110µm

Figure 3. *Rhyncaphytoptus ulmivagrans* (Keifer, 1939): a. Empodium, b. Prodorsal shield.

Eriophyidae Nalepa, 1898

Eriophyinae Nalepa, 1898

Aceriini Amrine & Stasny, 1994

Aceria Keifer, 1944

So far, 903 species of *Aceria* genus have been found in the world and 33 of them have been found in Turkey (*Aceria ankarensis* Denizhan et al., 2006 on *Dianthus chinensis* L., *Aceria egmirae* Denizhan, et al., 2006 on *Althaea rosae* L. in Ankara). These mites are lower surface leaf so it is not causing damage (Denizhan et al., 2006).

Aceria tuberculata (Nalepa, 1891)

Body wormlike, prodorsal shield wide design of admedian lines and two diagonal lateral lines, coxae smooth, microtubercles oval, accessory setae present.

Tibia 6 (5-7)µm, tarsus 4 (3-5)µm on leg I, the tibia is 6 (5-7)µm, the tarsus is 4 (3-5)µm long on leg II. The length of ω on leg I is 6 (5-7)µm, on leg II is 7 (6-8)µm. The empodium 5-rayed, the female genitalia 22 (21-23)µm wide. The seta c_2 is 24 (23-25)µm, seta *d* is 58 (57-59)µm, seta *e* is 21 (20-22)µm, seta *f* is 26 (25-27)µm, seta h_1 is 3 (2-4)µm, seta h_2 is 74 (73-75)µm long. The female 230 (229-231)µm long (Figure 4).

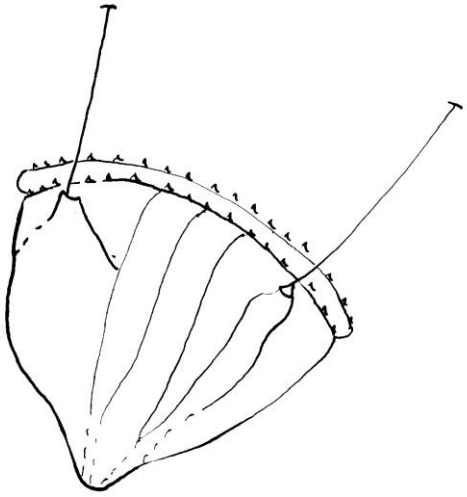
Host plant: *Tanacetum uniflorum* L. (Asteraceae)

Relation to the host: Rolls margins of leaflets; single leaf lobes are rolled threadlike, thereby made crooked, wormlike leaflets. For the most part, only the upper leaves are infected .

World distribution: Austria, Finland, France, Germany, Hungary, Italy, Poland (De Lillo & Amrine 1998)

Regions: Palearctic

Distribution in Van lake basin: Tatvan, 24.VI.2009, N: 38° 31' 36, E: 042° 15' 48 1820m 8♀♀ (New record for the fauna of Turkey).



230 µm

Figure 4. *Aceria tuberculata* (Nalepa, 1891) Prodorsal shield.

Aceria angustifoliae (Denizhan et al., 2008)

Host plant: *Elaeagnus angustifolia* L. (Elaeagnaceae)

Relation to the host: The leaf lamina appeared to be distorted along the mid-rib, with deep or superficial evagination and invagination, folding both laminar side, and with a rough surface (Denizhan et al., 2008).

World distribution: Turkey (De Lillo & Amrine 1998).

Regions: Palearctic

Distribution in Turkey: It was recorded in Ankara and on *Elaeagnus angustifolia* L. (Denizhan et al., 2006).

Distribution in Van lake basin: Erciş, Hizan 24.VI.2008, N: 39° 01' 71, E: 043° 22' 55 1660m.; N: 38° 09' 49, E: 042° 24' 40 1261m. 5♀♀

Vasates Shimer, 1869

So far, 33 species of *Vasates* genus have been found in the world and 2 of them have been found in Turkey (*Calepitrimerus baileyi* Keifer, 1938 on *Malus communis* this mite is lower surface leaf vagrant so it is not causing damage, *Calepitrimerus vitis* (Nalepa, 1905) on *Vitis vinifera* L. in Erzurum, The mite inhabit lower leaf surfaces, causing some rusting, chlorosis. (Alaoğlu, 1984).

Calepitrimerus vitis (Nalepa, 1905)

Host plant: *Vitis vinifera* L. (Vitaceae)

Other host: *Vitis riparia* Michx (De Lillo & Amrine, 1998).

Relation to the host: The mites inhabit lower leaf surfaces, causing some rusting, chlorosis, shortened internods.

World distribution: Australia, Austria, Brazil Bulgaria, Canada, Czech Republic France, Germany, Greece, Hungary, India, Italy, Japan, Spain, Turkey, USA (De Lillo & Amrine 1998).

Regions: Palearctic, Australian, Neotropical, Nearctic

Distribution in Turkey: This species was found in Çukurova region (Düzgüneş, 1977) on *Vitis vinifera* L. and on *Vitis vinifera* L. in Erzurum (Alaoğlu, 1984)

Distribution in Van lake basin: Erciş, 11.VI.2009, N: 39° 01' 71, E: 043° 22' 55 1660m, 7♀♀

Anthocoptes Nalepa, 1892

So far, 52 species of *Anthocoptes* genus have been found in the World and 6 of them have been found in Turkey (*Anthocoptes aspidophorus* (Nalepa, 1893), *Anthocoptes salicis* (Nalepa, 1895) on *Salix alba* L. in Ankara These mites are lower surface leaf vagrant so it is not causing damage) (Denizhan, 2007).

Anthocoptes salicis (Nalepa, 1894)

Host plant: *Salix babylonica* L. (Salicaceae)

Other host: *Salix alba*, *S. caprea*, *S. daphnoides* L., *S. purpurea* L., *S. viminalis* (De Lillo & Amrine, 1998).

Relation to the host: This mite is lower surface leaf vagrant so it is not causing damage.

World distribution: France, Germany, Hungary, Iran, Italy, Spain, Turkey (De Lillo & Amrine 1998).

Regions: Palearctic

Distribution in Turkey: It was recorded in Erzurum, Erzincan (Alaoğlu, 1996) and on *Salix* sp. in Konya (Elma & Alaoğlu, 2008).

Distribution in Van lake basin: Muradiye, 30.VI.2009, N: 39° 01' 71, E: 043° 22' 55 1660m,6♀♀.

Özet

Van Gölü havzası Eriophyoid akar faunasına katkılar

Bu çalışma Van Gölü havzasında 2008–2010 yıllarında Eriophyoid akarları tespit etmek amacıyla gerçekleştirilmiştir. Çalışma sonucunda; *Rhyncaphytoptus massalongoianus* (Nalepa, 1893), *R. megarostris* (Keifer, 1938), *Abacoptes ulmivagrans* (Keifer, 1939), *Aceria tuberculata* (Nalepa, 1891), *Aceria angustifoliae* (Denizhan *et al*., 2008), *Calepitrimerus vitis* (Nalepa, 1905), *Anthocoptes salicis* (Nalepa, 1894) olmak üzere 7 tür tespit edilmiştir. *Rhyncaphytoptus massalongoianus* (Nalepa, 1893), *R. megarostris* (Keifer, 1938), *Abacoptes ulmivagrans* (Keifer, 1939), *Aceria tuberculata* (Nalepa, 1891) türleri ise Türkiye Eriophyoid faunası için yeni kayıt niteliğindedir.

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