

Some new Tarsonemidae (Acarina, Prostigmata) species for Turkish acarofauna

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Summary

Three Tarsonemidae (Acarina, Prostigmata) species namely such as *Tarsonemus waitei* Banks, *Tarsonemus confusus* Ewing and *Polyphagotarsonemus latus* (Banks) were determined from Edirne and Antalya. The first two species were collected on the leaves of *Pyracantha coccinea* while the last one on *Morus* sp. and *Citrus* sp. leaves. Taxonomical characters, distribution, economic importance and host plants of each species are taken into consideration under the light of literature. Two species of Tarsonemidae are accepted as new species for Turkish fauna.

Introduction

The Tarsonemidae (Acarina, Prostigmata) species have long been known economic importance because of the damages on the cultivated plants. Therefore these mites have attracted attention for a long time ago (Ewing, 1939; Beer, 1958; Smiley, 1967; 1969; Jeppson et al., 1975).

This group is poorly known in Turkey even though some are of economic importance. Çobanoğlu (1991-1992) reported *Pseudotarsonemus* sp. and *Polyphagotarsonemus* sp. on hazelnut in Turkey. Since then, neither any additional records nor detailed data has been available.

During 1990-1992 a survey was carried out in cultivated area of Turkey. It was noticed that three species belonging to the family Tarsonemidae, two of them new for Turkish acarofauna.

Samples were preserved in 70 % alcohol and mounted in Hoyer's fluid. Applied terminology based on Ewing (1939), Smiley (1967, 1969) and Lindquist and Smiley

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(1978). All measurements are given in μm . Illustrations and measurements made with the help of phase-contrast microscope. Host range, distribution and damages of the species have given under the light of literature.

Confirmation was done by Professor Dr. E. E. Lindquist (centre for land and Biological Resources Research, Biological Resources Division Central Experimental Farm, KW Neatby Bldg. Ottawa, Ont. Kia OC6, Canada).

The specimens are kept in a part of author's collection of Ankara University, Agricultural Faculty at Plant Protection Department, Ankara.

Tarsonemidae

The family of Tarsonemidae has three subfamilies, Tarsopolipinae, Podapolipinae and Tarsonominae. Some tarsonemid species are parasitic of insects, some of them are necrophagous and others are attack living plants. Subfamily Tarsoneminae mainly belongs to the last feeding habits.

This family is characterised by the members have a segmented idiosoma; have a pair of pseudostigmatic organs situated just behind the gnathosoma. These stigmatal or tracheal openings are distinct in the females and being located dorsolaterally anterior margin of propodosoma.

The diagnosis of this family based on female and male characters. For female the fourth pair of legs are very important in the taxonomy. This legs very slender, four segmented and ending in two long, simple setae, on the tarsus one is apical and the other one is subapical.

In male the last pair of legs thickened, clasperlike, generally four segmented and usually ending in a single claw. Tarsus, usually bears one or two simple setae in addition to tarsal claw. Tarsal claw sometimes clawlike, tubercle like or absent. Tibia and tarsus are fused and forming as a tibiotarsus (Ewing, 1939). In male femur IV has some specifications, in some species this segment has a thin membranelike inner flange or a spurlike projection of the inner margin (Jeppson et al., 1975).

Tarsonemus Canestrini and Fanzago, 1876

Tarsonemus waitei Banks 1912, Peach bud mite, (Figure 1 - 3)

Female

Body elongate, about two thirds as broad as long. Total length: 217.5 μm (including capitulum). Total width: 90 μm .

Gnathosoma: Palpi three segmented and partly fused with capitulum.

Dorsal: Propodosoma bearing two pairs of simple setae. First pair: 27.5 μm , Second pair: 92.5 μm , Pseudostigmatic organs oval, pedicel short. Dorsum of hysterosoma with six distinct transverse segments.

Venter of hysterosoma has inverted "U" shaped. Transverse apodeme as it connects on each side with the anterior median apodeme.

Leg IV: Longer than usual. Femur IV (Segment III) without a hyaline expansion and not swollen on innerside. Femur IV not wider at base than coxa IV; Inner distal femoral setae extending much beyond tip of tibia. Segment III as long as or

slightly longer than other segments taken together. Femoral subapical seta rather inconspicuous and 12.5 μm in length. Tibia IV distinct from tarsus, and two segments taken together (Segment IV) much longer than tibia is broad. Segment IV less than one-half as long as Segment III. Apical seta flagelliform, about as long as the leg itself; subapical seta somewhat spinelike, longer than segment IV. The length of subapical tarsal seta is 22.5 μm . Apical tarsal seta is 67.5 μm . Leg IV femur: 27.5 μm ; tibiotarsus: 17.5 μm .

The length of legs are measured as follows:

Leg I: 62.5 μm , Leg II: 62.5 μm , Leg III: 105 μm , Leg IV: 42.5 μm .

Male: Not found

Type: Five female specimen were collected from Peach trees in West Chester Pa by J. F. Zimmer. The type slides is deposited in the United States National Museum No: 1122.

After Type material, it was found on the same host, Michigan Agricultural College, East Lansing, Michigan (Ewing, 1939).

Distribution: America (Ewing, 1939; Smiley, 1969).

Collection records: It was found on *Pyracantha coccinea* Roem. leaves (under the leaf surface) Edime (6. 12. 1991) (1 female).

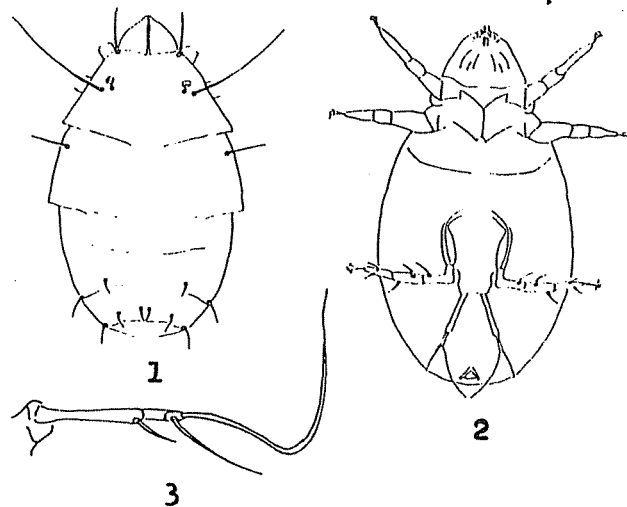


Fig 1- 3. *Tarsonemus waitei* (female) 1. Dorsum; 2. Venter; 3. Leg IV

Tarsonemus confusus Ewing, 1939, Confused tarsonemid mite. (Fig 4 - 6)

Female

Body oval, about twice as long as broad, light brown colour. Total length: 215 μm (212.5 - 217.5) (Including capitulum), Total width: 125.5 (117.5 - 132.5) μm .

Gnathosoma: Cone shaped, slightly longer than broad. Palpi small.

Dorsal: Propodosoma bearing two pairs of simple setae, First pair: 25 μm (22.5 - 27.5), Second pair: 76.25 μm . Pseudostigmatic organs global and it has short pedicel. Dorsum of hysterosoma have six distinct transverse segment.

Venter of propodosoma and hysterosoma faintly punctate. The first pair of ventral apodemes Y - shaped. Transverse apodeme inverted "U" shaped. Venter of hysterosoma has a pair of lateral plates.

Leg IV: Shorter than the other legs.

Third segment (femur), without a hyaline expansion or cups like process on inner side, longer than the other segments taken together. Femoral subapical setae 10 (7.5 - 12.5) μm in length.

Tibia IV anchylosed with or indistinctly seperated tarsus IV, which is short and slightly longer than broad and one fourth to one - third as long as third segment. Apical setae very long, longer than leg IV itself, subapical setae over twice as long as segment IV. The length of subapical tarsal seta is: 26.25 μm (25 - 27.5). Apical tarsal seta is: 58.75 μm (55 - 62.5), Leg IV femur 25 μm ; tibiotarsus: 7.5 μm . The length of legs are measured as follows: Leg I: 62.5 (62.5); Leg II: 60 (50 - 70); Leg III: 87.5 (87.5); Leg IV: 41.5 (40 - 42.5) μm .

Male: Not found

Type: Specimen were collected from *Delphinium belladonna* in Suitland by F. F. Smith. Type slide is deposited in the United States National Museum No. 1124.

Additional collection have been reported from Colombia Maryland, Maine New York, Oregon, Pennsylvania, South Carolina, Virginia (Ewing, 1939).

Host plants: *Cyclamen* sp., *Nicotiana* sp., *Fragaria* sp., *Myosotis* sp., *Gerbera* sp., *Iris* sp., *Rubus* sp., *Acalypha* sp., *Chrysantemum* sp., *Dahlia* sp., *Impatiens* sp., *Camellia* sp. (Ewing, 1939). Smiley (1969) reported that this species was collected on a culture of *Aphelenchus* sp., (Nematoda) and from blueberry buds.

Collection records: It was collected on *Pyracantha coccinae* Roem. (6. 12. 1994); Edirne (2 females). The specimen collected under the leaves.

T. waitei and *T. confusus* have close morphological resemblance. The main differences between these two species are depends on chaetotaxy of leg IV and tibio - tarsus length.

In *T. waitei*, tibia IV distinct from tarsus and the two segments taken together much longer than the tibia is broad. Segment IV less than one half as long as segment III.

In *T. confusus*; Tibia IV anchylosed with tarsus and forming a tibio - tarsus which is slightly longer than broad. Segment IV short one fourth to one third as long as third segment.

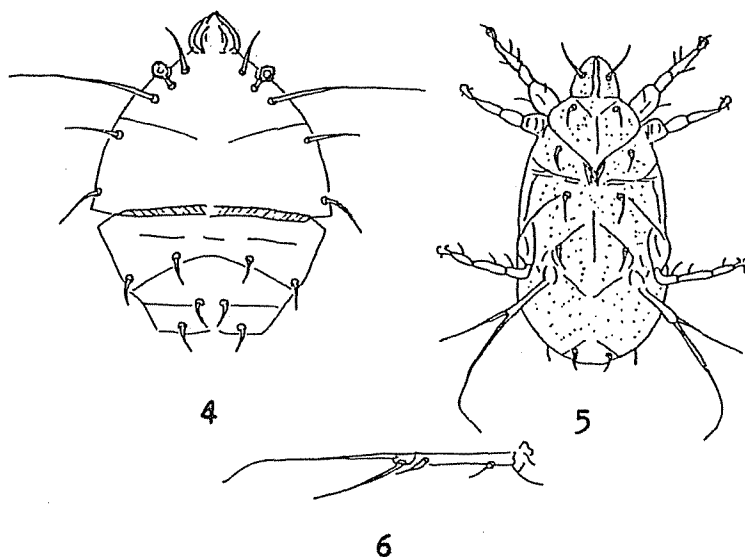


Fig 4 - 6. *Tarsonemus confusus* (female) 4. Dorsum; 5. Venter, 6. Leg IV.

Polyphagotarsonemus latus (Banks, 1904), Broad mite, (Fig 7 - 10)

Synonyms: According to Ewing (1939) and Smiley (1967); *Acarus translucens* Green, 1890; *Hemitarsonemus latus* Ewing, 1939; *Tarsonemus latus* Banks, 1904; *Tarsonemus phaseoli* Bonder, 1928; *Neotarsonemus latus* Smiley, 1967

Female (Fig 7, 8)

Body oval large. Light and translucent yellowish in colour. Total length 231.87 μm ; Total width 146.87 μm .

Gnathosoma: As broad as long.

Idiosoma: Dorsally it has 3 propodosomal setae. The length of the first one is 6 μm and the others are not very identical. Pseudostigmatic organs well developed, circular and it has a little bit longer pedicel.

Venter of idiosoma characterized by free transverse apodeme which is not connected anterior apodeme.

Legs: Tarsus I has a recurved claw. Tarsi II and III are without claws but well developed bell - shaped empodia, Femur IV bears subapical seta. Fourth segment long, it has long flagelliform terminal seta and its length is 43.75 μm . Subterminal seta shorter than the apical setae and it is 24.37 μm in length. The length of female legs are measured as follows:

Leg I: 62.50, Leg II: 79.16, Leg III: 97.50, Leg IV: 97.50, Leg IV: 66.87 μm .

Male (Fig 9, 10)

Dorsal: Body short and broad, tapers at the posterior end. It is colorless or rich amber colour. Total length 198.5 (192.5 - 205) μm and total width 98.75 (95 - 102.5) μm .

Gnathosoma, as broad as long.

The propodosoma has four pairs of propodosomal setae. Which are only the two pairs are conspicuous. The length of anterior propodosomal seta 27.5 μm and posterior one is 15 μm .

Hysterosomal setae are short.

Ventral: Male has arch like structure between the posterior coxal segments and apodeme. It has a suckerlike organ at the apex on the ventral side.

Legs: Tarsi I have claws. Leg II and III are ending with well developed pulvillus with minute claws. Leg IV very long, slightly enlarged. Femur IV very long, base is it at broadest, has a spurlike process on the inner margin. Distal femoral seta is located near the base of spurlike process and about one half leg IV length. The length of femur IV: 28.75 μm . subapical femoral process is 12.5 μm ., Distal femoral seta is 62.5 μm .

Tibiotarsus IV curved of about equal width throughout; clavate seta spinelike at dorsal position. Tactile seta situated on outer margin of tibiotarsus and very long. Tarsus IV terminates with knoblike tubercle. Tibiotarsus: 25 μm . Apical tibia - tarsal seta 62.5 μm . The length of legs in male are as follows; Leg I: 82.5 μm ; Leg II: 107.5 μm ; Leg III: 142.5 μm ; Leg IV: 117.5 μm .

Type: One female, one larva collected from Mango (in green houses) in Washington D.C. The type slide is deposited in Washington D. C.

Additional collection have been recorded: America, Brasil and Europe (Jeppson et al., 1975).

Host plants: *Beta* sp., *Boussingultia* sp., *Castanea* sp, *Citrus* sp., *Cyclamen* sp., *Delphinium* sp., *Fragaria* sp., *Gerberia* sp., *Geum* sp., *Hevea* sp., *Impatiens* sp., *Iresine* sp., *Lycium* sp., *Magnifera* sp., *Pelargonium* sp., *Persa* sp., *Rubus* sp., *Solanum* sp., *Thunbergia* sp., *Torenia* sp., *Vaccinium* sp., *Vitis* sp., *Mangifera* sp., *Spathodea* sp. *Gardenia* sp., *Begonia* sp., *Dahlia* sp., *Hedera* sp., *Cuphea* sp., *Bouvardia* sp. (Ewing, 1939).

Collection Records: On Citrus leaves, under the leaf surface Antalya (26. 3. 1992), (6 females, 3 males); *Morus alba* (11. 4. 1992) (7 females).

Polyphagotarsonemus latus is distributed in the field and in greenhouses on a wide variety (about 50) of agricultural crops, ornamental and wild plants.

The mites feed almost entirely on the lower leaf surface of the plants, the leaf surface becomes bronzed and injured flowers have part or all distorted or discolored. Feeding injury is caused on many hosts a sudden curling and crinkling of leaves followed by blister patches. Growing of the plants stopped and finally died.

This species multiplies rapidly so only 4 to 5 days are required to complete a generation in the summer and 7 to 10 days in winter. The average egg deposition during the summer is 36 eggs per day, but activity and reproduction continues throughout the year, even though productivity decreases during the winter. Mites are most numerous in damp, shady places (Jeppson et al., 1975).

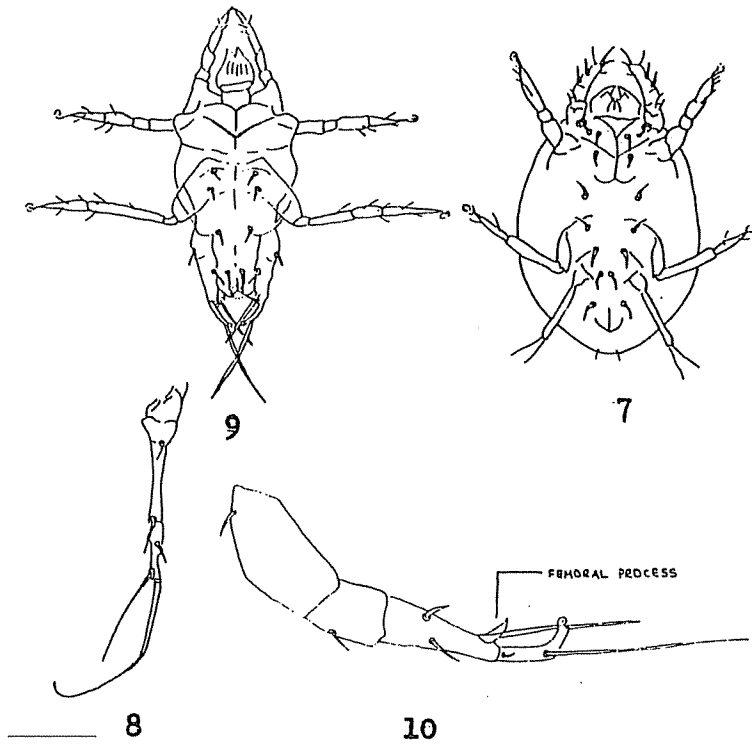


Fig 7 - 10. *Polyphagotarsonemus latus* 7. Venter (female), 8. Leg IV. (female) 9. Venter (male) 10. Leg IV. (male)

Conclusions

Plant pest of Tarsonemidae species are cause severe distortion of the plants. Leaf growth giving a stunted appearance to the infested plants. They are harmful on the greenhouse plants and outdoor plants as well. Most of the species of tarsonemid mites feed on higher plants and show a high degree of host specificity. But some of them have a long list of host plants such as *Steneotarsonemus pallidus* Banks and *P. latus* (Beer, 1958).

It will be very useful, to work on Tarsonemidae in Turkey. Such as their damage, host range, feeding habits, biology and control methods.

Özet

Türkiye'den bazı Tarsonemidae (Acarina, Prostigmata) türleri

Türkiye'de Tarsonemidae familyası akarları ile ilgili veriler yok denecek kadar azdır. Akarlarla ilgili faunistik çalışmalar sırasında mevcut kaynakların ışığı altında Türkiye akar faunası için yeni olduğu kabul edilen *Tarsonemus waitei* Banks ile *Tarsonemus confusus* Ewing ateş dikenini üzerinden ve *Polyphagotarsonemus latus* ise *Citrus* ve dut yapraklarından saptanmıştır. Bu çalışmada elde edilen türlerin tanınmasında yardımcı olacak taksonomik karakterler şekillerle açıklanarak, konukçuları, yayılışları ve son türün zarar şekli literatür verileri ışığı altında ele alınmıştır.

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