

New Records of the Oppioid Mites (Acari: Oribatida) for the Turkish Fauna from Artvin Province

Ayşe TOLUK, Nusret AYYILDIZ

Department of Biology, Faculty of Arts and Sciences, Erciyes University, 38039, Kayseri - TURKEY

Received: 08.11.2007

Abstract: Four oppioid (Oribatida:Oppioidea) mite species, namely *Berniniella (Berniniella) parasigma* Iturrondobeitia, 1987, *Autogneta (Rhaphigneta) numidiana* (Grandjean, 1960), *Conchogneta dalecarlica* (Forsslund, 1947), and *Lauroppia tenuipectinata* Subías and Rodríguez, 1987, recorded from Artvin province are given with their original figures. Some of their morphological features and distributions in the world are also presented. All of them are new records for the Turkish fauna.

Key Words: Acari, Oribatida, Oppioidea, systematics, new records, Artvin Province, Turkey

Artvin İlinden Türkiye Faunası İçin Yeni Kaydedilen Oppioid Akarlar (Acari: Oribatida)

Özet: Artvin ilinden kaydedilen dört oppioid akar türü *Berniniella (Berniniella) parasigma* Iturrondobeitia, 1987, *Autogneta (Rhaphigneta) numidiana* (Grandjean, 1960), *Conchogneta dalecarlica* (Forsslund, 1947) ve *Lauroppia tenuipectinata* Subías ve Rodríguez, 1987 özgün şekilleri ile birlikte verilmiştir. Ayrıca, bu türlerin bazı morfolojik özellikleri ile dünyadaki dağılışı hakkında da bilgiler sunulmuştur. Kaydedilen türler Türkiye faunası için yeni kayıttır.

Anahtar Sözcükler: Acari, Oribatida, Oppioidea, Sistematik, yeni kayıtlar, Artvin, Türkiye

Introduction

Oppioids are common inhabitants of moss, humus, litter, and pasture sod, both in moist and dry situations. While oppioids are a primarily tropical group, a great number of holarctic forms are known amongst the 12 described families. Most oppioid species are accommodated in the family Oppiidae, which are well represented in temperate realms (Krantz, 1978). The superfamily Oppioidea is one of the largest groups of the oribatid mites, with 159 genera and 12 families (Subías, 2004, 2007). To date, 23 species of the oppioid mites belonging to the families Epimerellidae, Machuelliidae, Quadropiidae, and Oppiidae have been recorded from Turkey. Most of them are represented in the family Oppiidae (Özkan et al., 1988, 1994; Çobanoğlu and Bayram, 1998; Gültekin and Özkan, 1999; Baran and Ayyıldız, 2007a, 2007b; Erman et al., 2007; Toluk et al., 2007).

In the present paper, the morphological features of 4 oppioid mite species that are new to the Turkish fauna are given. The main goal of our research is to contribute to the knowledge of the Turkish Oribatida fauna (Acari).

Materials and Methods

The materials of this study were collected during an investigation of the soil mites of Artvin province between 1992 and 1994. The illustrations have been made using a camera lucida attached to a compound microscope and SEM. Morphological terminology that was used by Subías and Balogh (1989) was applied. The specimens examined were deposited in the Acarological Collection of the Zoological Museum of Erciyes University, Kayseri, Turkey.

* E-mail: atoluk@erciyes.edu.tr

Results

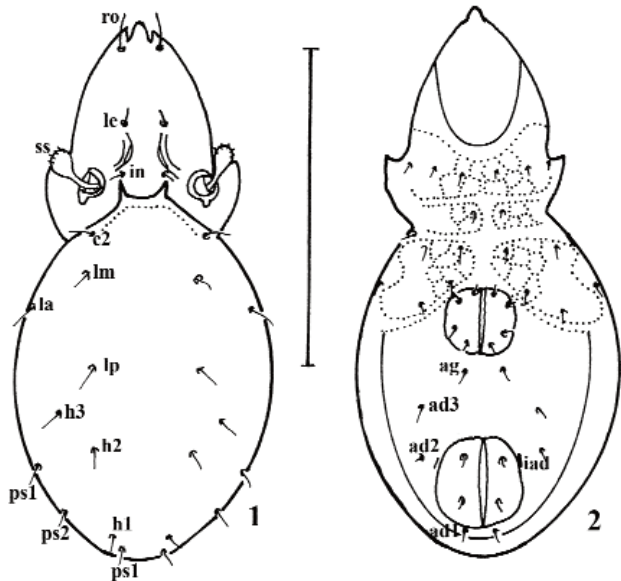
Key to families of Oppioidea known from Turkey

- 1 - Costulae long, reaching into anterior half of prodorsumAutognetidae Grandjean, 1960
 - Costulae not as above if present2
- 2 - Epimera III and IV meet medially3
 - A wide median space present between epimera III and IVEpimerellidae Ayyıldız and Luxton, 1989
- 3 - Epimeral setae long, directed toward the center of epimeral regionMachuellidae Balogh, 1983
 - Epimeral setae normal4

- 4 - Costulae trapeziform, with translamellar line connected anteriorly; notogaster circularQuadroppiidae Balogh, 1983
 - Costulae not as above; notogaster normal, not circularOppiidae Grandjean, 1951

Oppiidae Grandjean, 1951
Oppiellinae Seniczak, 1975
Berniniella Balogh, 1983
Type-species: *Oppia aeoliana* Bernini, 1973
Berniniella (Berniniella) parasigma Iturrondobeitia, 1987

(Figures 1-4)



Figures 1 and 2. *Berniniella (Berniniella) parasigma* Iturrondobeitia, 1987: (1) dorsal view, (2) ventral view. Scale bar = 100 µm.

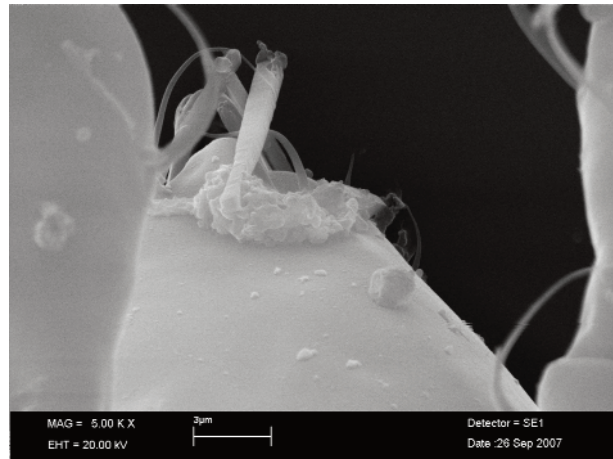


Figure 3. *Berniniella (Berniniella) parasigma* Iturrondobeitia, 1987: Rostral region.

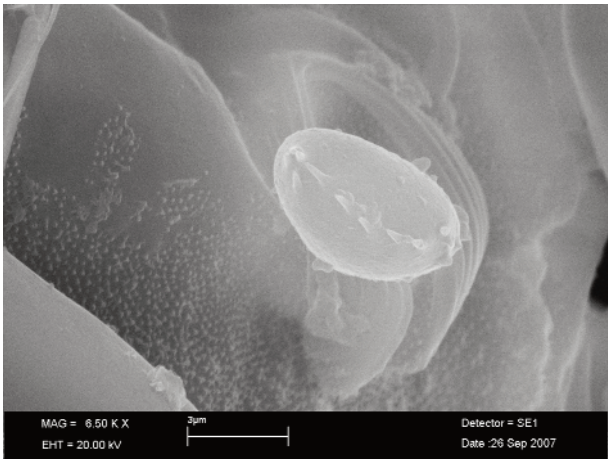


Figure 4. *Berniniella (Berniniella) parasigma* Iturrondobeitia, 1987: Sensillus.

Measurements -Length: 165 (162-170) μm , width: 76 (72-78) μm (n = 3).

Prodorsum – Rostrum divided by 2 deep incisions, the middle part rounded. The rostral setae (*ro*) smooth, curved inwards. Costulae V-shaped, originate in front of the bothridia. Lamellar setae (*le*) weak, short, 2 μm in length. Interlamellar setae (*in*) short and fine. Sensilli (*ss*) radiate, with 6-7 short spicules.

Notogaster – Ovally-elongated. Dorsosejugal suture protruding anteriorly, and its median part straight. One pair of median crista directed outwards. Ten pairs of short notogastral setae present.

Ventral Side – Epimeral setal formula 3-1-3-3. Genital plate 20 \times 20 μm in size; anal plate 26 \times 26 μm in size. Four pairs of genital setae; 1 pair of aggenital; 2 pairs of anal; 3 pairs of adanal. Lyrifissures *iad* in paraanal position. The adanal setae are situated as follows: *ad*₁ - postanally, *ad*₂ – paraanally, *ad*₃ – preanally.

Material examined – Turkey, Artvin, 8 km along Borçka-Muratlı town road, 220 m, 27 October 1993. Samples from litter and soil under elm (*Ulmus* sp.); 3 exs.

Distribution – This is the first record of this species from Turkey. This species is known from Spain (Subías, 2004).

Remarks – The dimensions of this species are given as 200 \times 100 μm for the type specimen by Iturrondobeitia (1987). In this respect, the dimensions of the specimens found in Turkey (160 \times 74 μm) are smaller than the previously given dimensions. These differences in dimensions are considered within the variation limits. This species is well characterized by the median lobe with rounded end of the tripartite rostrum and sensilli. Except for the body size, Turkish specimens closely resemble the type species in all features.

Autognetidae Grandjean, 1960

Autogneta Hull, 1916

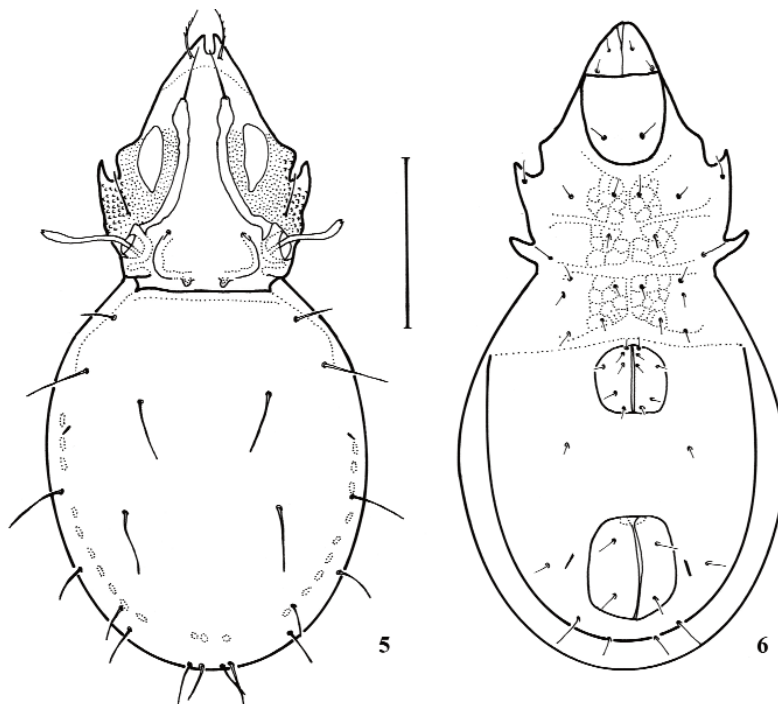
Type-species: *Notaspis longilamellata* Michael, 1888

Autogneta (Rhaphigneta) numidiana (Grandjean, 1960)

(Figures 5-13)

Measurements - Length: 374 (360-388) μm , width: 195 (186-204) μm (n = 8).

Prodorsum - Rostrum divided by a deep incision. Rostral setae 12 μm in length, arched inwards. Costulae long, reaching near the bothridia. Lamellar setae arising at the distal end of the costulae. Interlamellar setae minute.



Figures 5 and 6. *Autogneta (Rhaphigneta) numidiana* (Grandjean, 1960): (5) dorsal view, (6) ventral view. Scale bar = 100 μm .

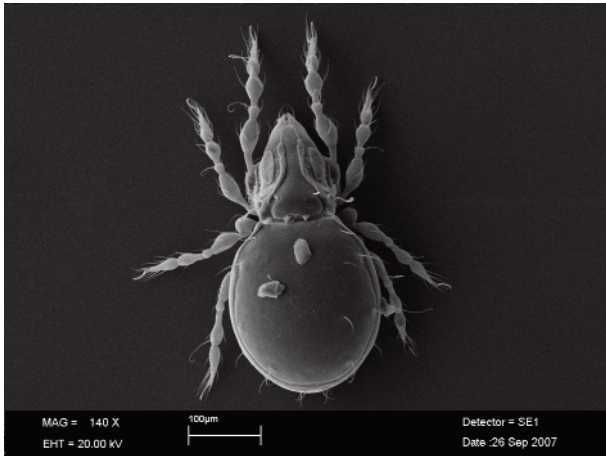


Figure 7. *Autogneta (Rhaphigneta) numidiana* (Grandjean, 1960): Dorsal view.

Prodorsum laterally with granula. Bothridia well developed. Sensilli fusiform with long stalk and 3 short protruding at the apex.

Notogaster - Notogaster oval, straight anteriorly, with a pair of prominent humeral processes. Ten pairs of notogastral setae present.

Ventral side – Genital plate $40 \times 44 \mu\text{m}$ in size; anal plate 58×54 in size. Six pairs of genital setae; 1 pair of aggenital; 2 pairs of anal; 3 pairs of adanal. Lyrifissures *iad* in paraanal position. The adanal setae are situated as follows: ad_1 - postanally, ad_2 - paraanally, ad_3 – preanally.

Material examined – Turkey, Artvin, a mixed forest in the neighborhood of the number 7 bridge on the Borçka-Hopa road, 400 m, 27 July 1993. Samples from litter and soil under *Castanea sativa*; 8 exs.

Distribution - This is the first record of this species from Turkey. This species is known from the Mediterranean region (Subias, 2004).

Remarks - The body length for the type specimens is given as $440\text{--}445 \mu\text{m}$ by Grandjean (1960). In this regard, the Turkish specimens (mean length $374 \mu\text{m}$) are shorter

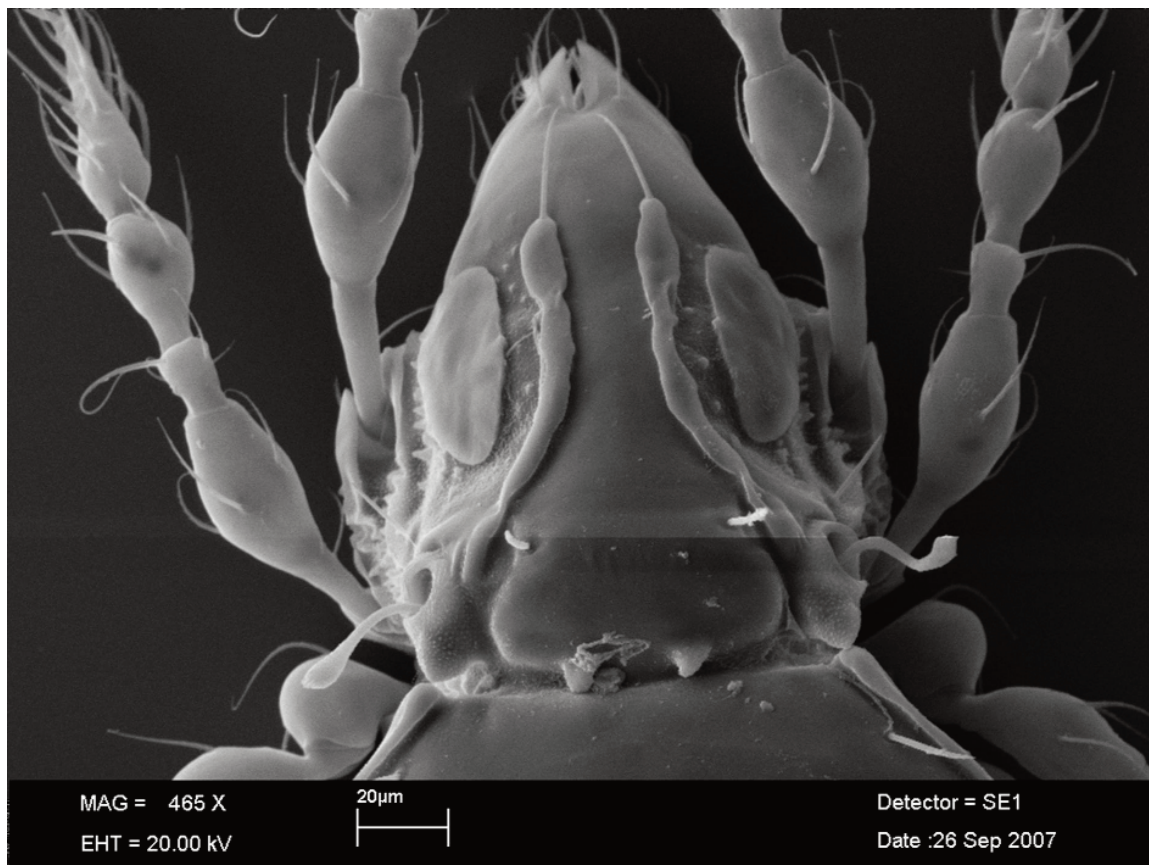


Figure 8. *Autogneta (Rhaphigneta) numidiana* (Grandjean, 1960): Prodorsum.

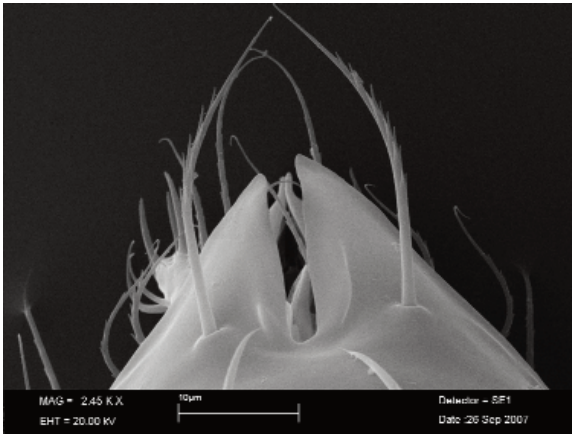


Figure 9. *Autogneta (Rhaphigneta) numidiana* (Grandjean, 1960): Rostrum and rostral setae.

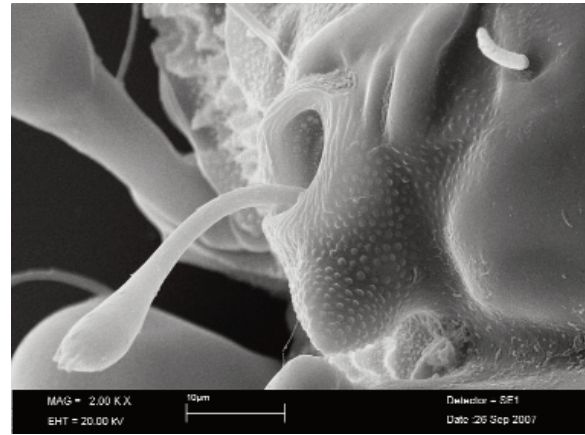


Figure 10. *Autogneta (Rhaphigneta) numidiana* (Grandjean, 1960): Sensillus.

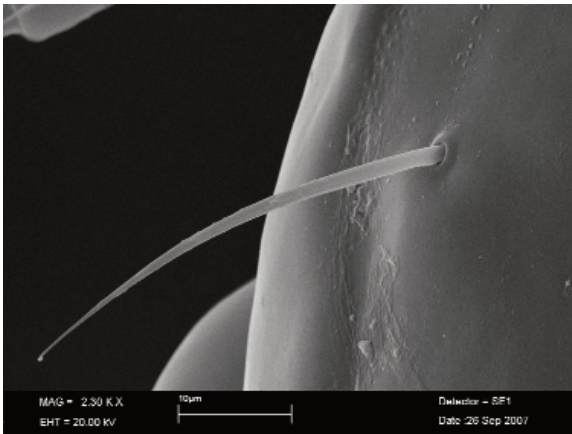


Figure 11. *Autogneta (Rhaphigneta) numidiana* (Grandjean, 1960): Seta.

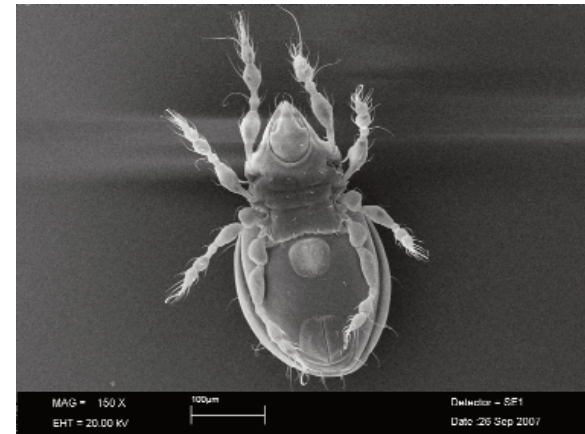


Figure 12. *Autogneta (Rhaphigneta) numidiana* (Grandjean, 1960): Ventral view.

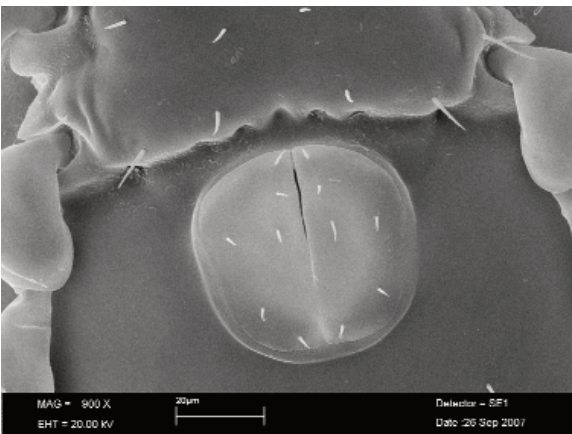


Figure 13. *Autogneta (Rhaphigneta) numidiana* (Grandjean, 1960): Genital plate.

than the type specimens. These differences in dimensions are considered within the variation limits. This species is well characterized by divided rostrum, granula laterally of prodorsum, and the shape of sensilli and costulae. Except for the body size, the Turkish specimens closely resemble the type species in all features.

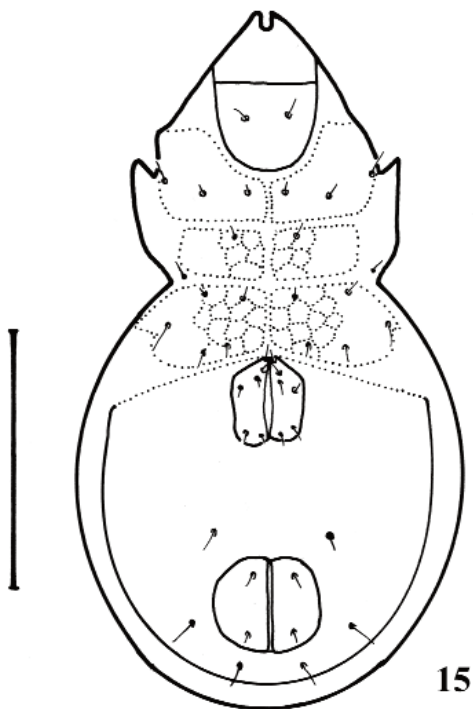
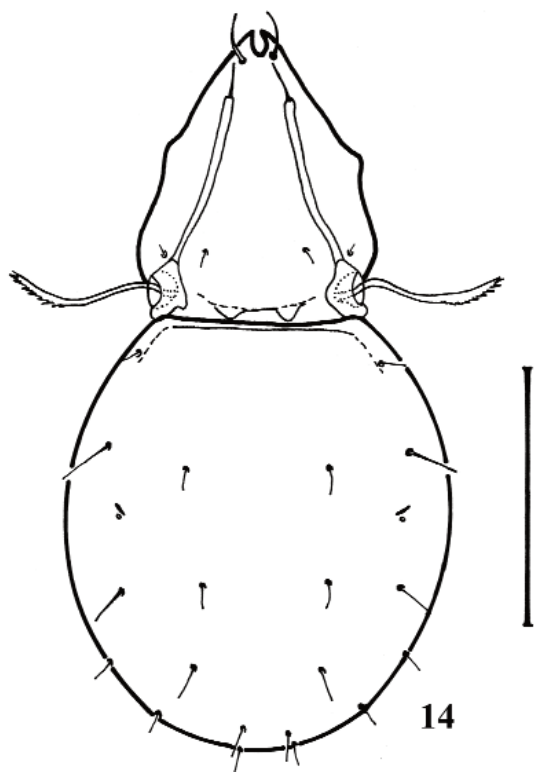
Conchogneta Grandjean, 1963

Type-species: *Autogneta dalecarlica* Forsslund, 1947

Conchogneta dalecarlica (Forsslund, 1947)

(Figures 14-20)

Measurements - Length: 274 (256-308) μm , width: 149 (136-176) μm (n = 35).



Figures. 14 and 15. *Conchogneta dalecarlica* (Forsslund, 1947): (14) dorsal view, (15) ventral view. Scale bar = 100 μ m.

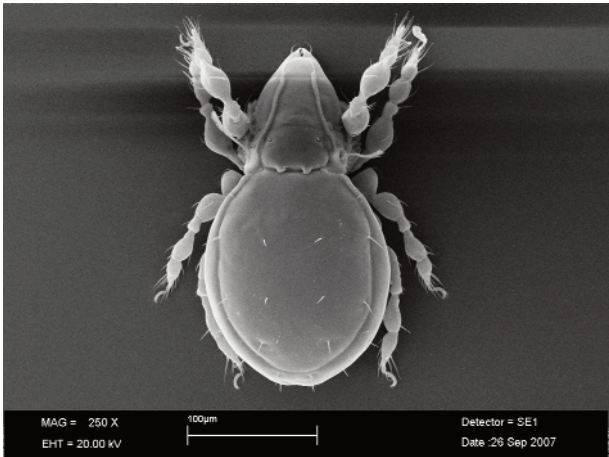


Figure 16. *Conchogneta dalecarlica* (Forsslund, 1947): Dorsal view.

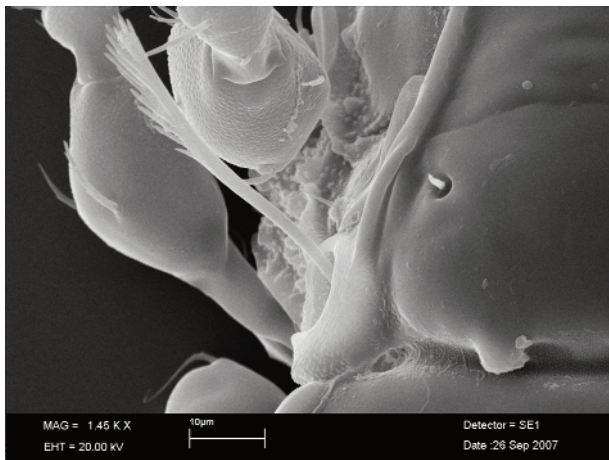


Figure 17. *Conchogneta dalecarlica* (Forsslund, 1947): Bothridium and sensillus.

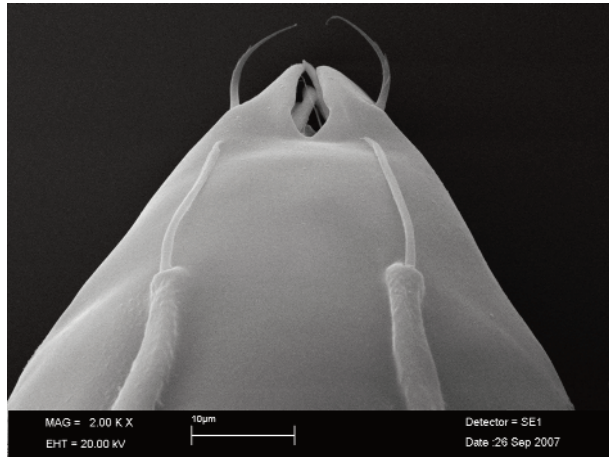
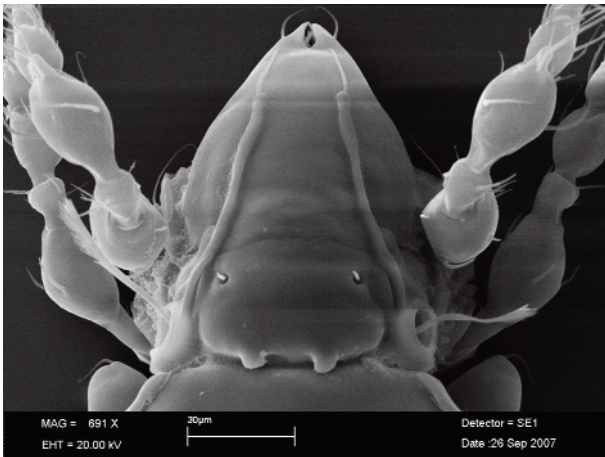
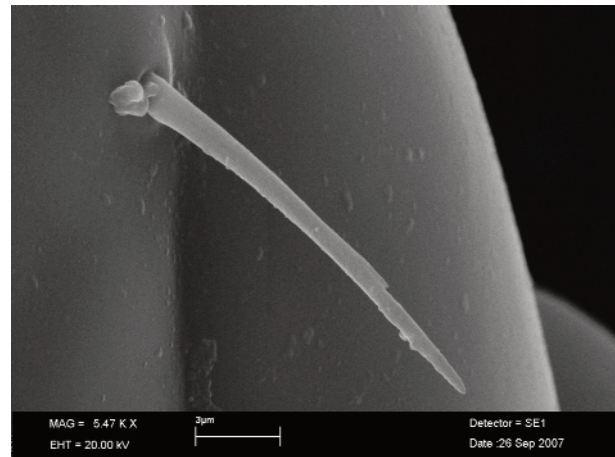


Figure 18. *Conchogneta dalecarlica* (Forsslund, 1947): Rostrum and anterior part of costulae.

Figure 19. *Conchogneta dalecarlica* (Forsslund, 1947): Prodorsum.Figure 20. *Conchogneta dalecarlica* (Forsslund, 1947): Seta Ia.

Prodorsum - Rostrum apex divided by one incision. Rostral setae 12 µm in length, arched inwards. Costulae long, run far from each other, converging anteriorly, and reaching near bothridia. Lamellar setae 14 µm in length, arising at the distal end of the costulae. Interlamellar setae 4 µm in length. Bothridia well developed. Sensilli very long (50 µm in length), its head pectinate.

Notogaster - Notogaster oval, straight anteriorly, with a pair of prominent humeral processes. Ten pairs of notogastral setae present.

Ventral side – Genital plate 30 × 38 µm in size. Six pairs of genital setae; 1 pair of aggenital; 2 pairs of anal; 3 pairs of adanal. Lyrifissures *iad* in paraanal position. The adanal setae are situated as follows: ad_1 - postanally, ad_2 - paraanally, ad_3 - preanally.

Material examined - Turkey, Artvin, Arhavi, Şenköy, 90 m, 28 July 1993. Samples from moss on a hazel tree (*Corylus avellana*); 35 exs.

Distribution - This is the first record of this species from Turkey. This species is known from the Palearctic region (Subías, 2004; Miko, 2006).

Remarks - The dimensions of the type specimens were given as 328 (319-336) / 173 (168-185) µm by Forsslund (1947). In this regard, the dimensions of the Turkish specimens are smaller compared to the type specimens. The lamellar setae reach beyond the rostrum in the type species. However, they reach the insertion of the rostral setae in the Turkish and German specimens (Miko, 2006). This species is well characterized by the shape of costulae

and sensilli. Except for the body size and the length of lamellar setae, the Turkish specimens closely resemble the type species in all features.

Opipiidae Grandjean, 1951

Opipiellinae Seniczak, 1975

Lauropia Subías and Mínguez, 1986

Type-species: *Dameosoma fallax* Paoli, 1908

Lauropia tenuipectinata Subías and Rodríguez, 1987

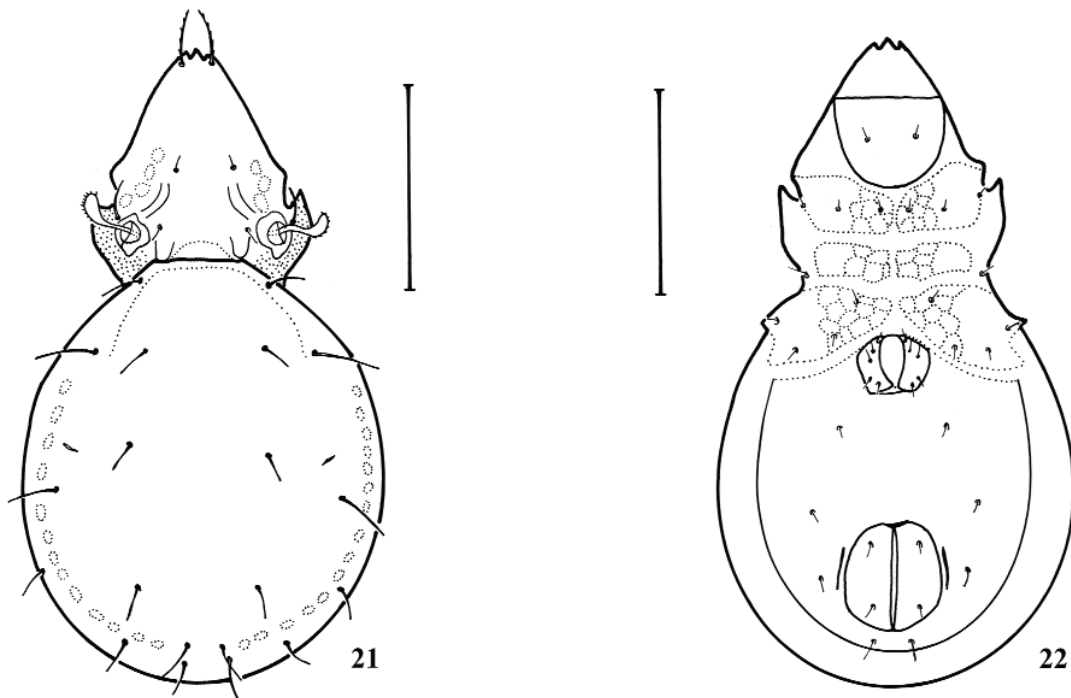
(Figures 21, 22)

Measurements - Length: 295 (284-312) µm, width: 163 (144-188) µm (n = 8).

Prodorsum – Rostrum tridentate. Rostral setae 22 µm in length, unilaterally ciliated, arched inwards. Costulae short, reaching near the bothridia. Lamellar setae arising near the costulae. Interlamellar setae minute. Bothridia well developed. Sensilli fusiform, their distal half being distinctly expanded, short setae unilaterally.

Notogaster - Notogaster oval, straight anteriorly. Ten pairs of notogastral setae present.

Ventral side – Genital plate 30 × 36 µm in size; anal plate 48 × 46 µm in size. Five pairs of genital setae; 1 pair of aggenital; 2 pairs of anal; 3 pairs of adanal. Lyrifissures *iad* in paranal position and long. The adanal setae are situated as follows: ad_1 - postanally, ad_2 - paraanally, ad_3 - preanally.



Figures 21 and 22. *Lauroppia tenuipectinata* Subías and Rodríguez, 1987: (21) dorsal view, (22) ventral view. Scale bar = 100 μ m.

Material examined – Artvin, Şavşat, Çevreli village, 1350 m, 17 August 1993. Sample from litter and soil under alder (*Alnus glutinosa*) in a mixed forest. 8 exs.

Distribution - This is the first record of this species from Turkey. This species is known from the Western Mediterranean (Subías, 2004).

Remarks – The dimensions of the type specimens were given by Subías and Rodríguez (1987) as 273-301 / 152-166 μ m. The Turkish specimens (the mean 295 / 163 μ m) are in the range of the dimensions of the type specimens. The Turkish specimens resemble the type specimen by the

shape of sensilli and rostrum. However, the Turkish specimens differ from the type species in the ciliated rostral setae and the long setae la and h_3 .

Acknowledgments

We would like to thank Drs. Raşit Urhan (Pamukkale University, Denizli) and Kamil Koç (Celal Bayar University, Manisa) for their valuable time and help in sampling the soil mites and Mr. İ. Akşit and Mrs. A. Altuntaş for SEM specimen preparation and the processing of the photographs.

References

- Baran, Ş. and Ayyıldız, N. 2007a. A new species of the family Quadropiidae (Acari, Oribatida) from Turkey. J. Acarol. Soc. Jpn. 16: 1-4.
- Baran, Ş. and Ayyıldız, N. 2007b. Two new species of soil mites (Acari, Oribatida, Oppiidae and Machuellidae) from Turkey. Zootaxa 1445: 57-64.
- Çobanoğlu, S. and Bayram, S. 1998. Mites (Acari) and flies (Insecta: Diptera) from natural edible mushrooms (*Morchella*: Ascomycetes) in Ankara, Turkey. Bull. Anns. Soc. r. Belge. Ent. 134: 187-197.
- Erman, O., Özkan, M., Ayyıldız, N. and Doğan, S. 2007. Checklist of the mites (Arachnida: Acari) of Turkey. Second supplement. Zootaxa 1522: 1-21.
- Forsslund, K.-H. 1947. Über die gattung *Autogneta* Hull (Acari, Oribatei). Zool. Bidr. Upps. 25: 111-117.
- Grandjean, F. 1960. Les Autognetidae n. fam. (Oribates). Acarologia 2: 575-609.
- Gültekin, N. and Özkan, M. 1999. Erzurum il merkezinde depolanan ürünlerde saptanan akarlar üzerine araştırmalar. Türk. Entomol. Derg. 23: 289-303.

- Iturrondobeitia, J.C. 1987. *Berniniella parasigma* n.sp. de opido (Acari Oribatida) del Pais Vasco. Boletín Asoc. esp. Entom. 11: 263-267.
- Krantz, G.W. 1978. A Manual of Acarology, Second Edition, Oregon State University Book Stores, Inc., Corvallis.
- Miko, L. 2006. Oppiidae Grandjean, 1951. In: Hornmilben (Oribatida). Die Tierwelt Deutschlands, Begründet 1925 von Friedrich Dahl, 76. Teil. Goecke & Evers, Keltern, pp. 263-296.
- Özkan, M., Ayyıldız, N. and Erman, O. 1994. Check list of the Acari of Turkey. First supplement. EURAAC News Letter 7: 4-12.
- Özkan, M., Ayyıldız, N. and Soysal, Z. 1988. Türkiye akar faunası. Doğa TU Zooloji D. 12: 75-85.
- Subías, L.S. 2004. Listado sistemático, sinonímico y biogeográfico de los ácaros oribatidos (Acariformes: Oribatida) del Mundo (Excepto fósiles). Graellsia 60: 3-305.
- Subías, L.S. 2007. <http://www.ucm.es/info/zoo/Artropodos/Catalogo.pdf>. Listado sistemático, sinonímico y biogeográfico de los ácaros oribatidos (Acariformes: Oribatida) del Mundo (Excepto fósiles). Graellsia 60: 3-305. (Actualizado en junio de 2006 y en abril de 2007).
- Subías, L.S. and Balogh, P. 1989. Identification keys to the genera of Oppiidae Grandjean, 1951 (Acari: Oribatei). Acta Zool. Hung. 35: 355-412.
- Subías, L.S. and Rodríguez, P. 1987. Los opidos (Acari, Oribatida) de los sabinos albares españoles. VII. Géneros *Hypogeoppia*, *Oppiella* y *Lauroppia*. Misc. Zool. 11: 105-111.
- Toluk, A., Ayyıldız, N. and Subías, L.S. 2007. Two new species of oppioid mites from Turkey (Acari: Oribatida). Zootaxa 1551: 61-68.