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Orijinal araştırma (Original article)

Two new records of the genera *Cepheus* C.L. Koch, 1835 and *Caleremaeus* Berlese, 1910 (Acari: Oribatida) from Turkey, with notes on their distribution and ecology[1]

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Summary

On the basis of the samples collected from Artvin province between the years 1992-1994, the morphological features of two oribatid mites new to the Turkish fauna, namely *Cepheus dentatus* (Michael, 1888) and *Caleremaeus monilipes* (Michael, 1882) are given. Their distribution and ecological characteristics are also presented.

Key words: Acari, Oribatida*, Cepheus*, *Caleremaeus,* new records, Turkey

Anahtar sözcükler: Acari, Oribatida*, Cepheus*, *Caleremaeus,* yeni kayıtlar, Türkiye

Introduction

Oribatid mites are one of the richest acarine groups that occur in soil, litter, moss, lichen, and rarely aquatic environments. Over 10 000 species have been described (Subías, 2004), and it is estimated that the total species number may reach to 100 000 (Schatz, 2002). The number of oribatid species recorded in Turkey is about 150 (Ozkan et al., 1988, 1994; Erman et al., 2007). Two oribatid mite species given as new records to the Turkish fauna in the present paper belong to the genera *Cepheus* Koch, 1835 and *Caleremaeus* Berlese, 1910.

Cepheus is a semicosmopolitan genus described by Koch in 1835, with the type species *Cepheus latus* Koch, 1835. Up to now, a total of 28 species have been reported in the world (Subías, 2004). Formerly, none of them were known from Turkey. It can be characterized by broad and marginal lamellae, long interlamellar setae, ten pairs of straight and short notogastral setae, humeral region with obtuse tubercle, six pairs of genital setae and monodactylous legs.

Caleremaeus was described by Berlese in 1910, with the type species *Notaspis monilipes* Michael, 1882. It has a Holarctic distribution and is represented by only three species in the world (Subías, 2004). Formerly, none of them were known from Turkey. *Caleremaeus* can be characterized by prodorsum without costula, genital plates small, far from each other and with 6 pairs of setae, notogaster with a posteriorly attenuating elevation in the middle part.

The aim of this study is to contribute to the knowledge of the Turkish oribatid fauna.

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Material and Methods

The main material of this study was extracted by means of a modified Berlese-Tulgren apparatus from soil, litter and moss samples collected during an investigation of the soil mites of Artvin province, Turkey. The techniques used in the collecting, extraction and preparation of the examined oribatid mites follow that proposed by Walter & Krantz (2009).

The terminology used in this paper follows the system of Norton and Behan-Pelletier (2009), based on that of Grandjean (1954, 1965), and besides we also use the works of Subías (2004). All measurements are given in micrometers (µm). The specimens examined were deposited in the Acarological Collection of the Zoological Museum of Erciyes University, Kayseri, Turkey.

Results and Discussion

Compactozetidae Luxton, 1988

Cepheus C. L. Koch, 1835

(=*Pelonia* Grube, 1859)

(=*Tegeocranus* Nicolet, 1855)

Type-species: *Cepheus latus* C. L. Koch, 1835

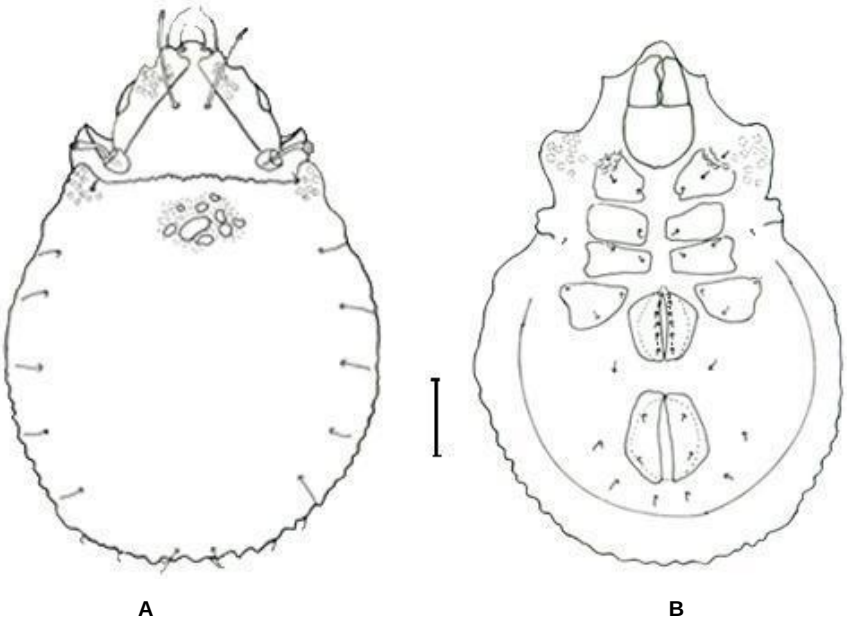
Cepheus dentatus (Michael, 1888)

(=*Cepheus grandis* Sitnikova, 1975)

Measurements: Length: 656-664, width: 472–496 (n= 2).

Prodorsum (Figure 1A): Rostrum rounded. Rostral setae, smooth and 50 in length. Setae *la,* 50 in length arising on the dorsal surface of the proximal of cusps. Interlamellar setae 100 in length and smooth at the basis, ciliated at the apex. Lamellae converging and extending in front of rostral margin; with point in front, behind which are a wide emargination, which end in a second point. Sensilla with thin stem, 20 in length and a swollen spinose head, 40 in length.

Notogaster (Figure 1A): Oval shaped. Dorsosejugal suture straight with humeral projections. Ten pairs of dorsal setae thick and smooth.



A **B**

Figure 1. *Cepheus dentatus* (Michael, 1888): A) Dorsal view, B) Ventral view (Scale bar = 100 µm).

Ventral side (Figure 1B): Epimeral borders distinctly visible and strongly sclerotized. Epimeral setal formula 3-1-3-3. Genital plates 84x84 in size, with nine pairs of setae. Anal plates 108x108 in size, with two pairs of setae, all of them equal in length and smooth. Lyrifissures *iad* situated paraanally. Adanal setae *ad1* and *ad2* in postanal and *ad3* in paraanal positions.

Material examined: Artvin: Borçka-Hopa, litter and soil under chestnut tree, 400 m, 27.VII.1993, 2 exs, leg. N. Ayyıldız and his collaborators (R. Urhan & K. Koç).

Geographical Distribution and Ecology: Until now, *Cepheus dentatus* (Michael, 1888) has been recorded from Austria, Bulgaria, Caucasus, Crimea, Denmark, Finland, France, Germany, Great Britain, Hungary, Italy, Norway, Poland, Romania, Spain, Trans-Carpathian, and Switzerland (Willmann, 1931; Kunst, 1961; Sitnikova, 1975; Karppinen & Krivolutsky, 1982; Luxton, 1996; Olszanowski et al., 1996; Niemi et al., 1997; Pérez-Íñigo, 1997; Subías, 2004; Weigmann, 2006; Siepel et al., 2009). It is a new record for the Turkish fauna. According to this data and the chorotype classification proposed by Vigna Taglianti et al. (1999), it is a member of the Western Palearctic chorotype, and the most eastern border of its range is Anatolia and Caucasus.

This species is believed to be arboricolous (Rajski, 1967; Schatz, 1983). Bernini (1987) stated that this fact alone may explain its general scarcity in soil samples. It has also been found in moss, forest soils, especially in acidic needle litter and on trees and old tree stumps (Willmann, 1931; Weigmann, 2006). In Turkey *C. dentatus* has been found in litter and soil under chestnut tree in mixed forest. Artvin province where this species were collected, is located in Euxine-Colchic broadleaf forests (PA0422) ecoregion (Figure 2). Our data are in accordance with previous data.

Remarks: The range of body size given by the various authors for this species is 640–854x460–682 (Willmann, 1931; Sellnick, 1960, Pérez-Íñigo, 1974; Sitnikova, 1975; Bernini, 1987; Weigmann, 2006). In this regard, the Turkish specimens (656-664x472–496) appear in the minimum limits of the known dimension of the species. Bernini (1987) stated that the most significant variations arising from the analysis of the western European populations are the dimensions and the morphology of the sensillar head, and therefore these characters cannot be considered to have great taxonomic value. This species is well characterized by the shape of lamellae, the long thick interlamellar setae, and nine pairs of genital setae. In this regard, the Turkish specimens closely resemble the species in all features.

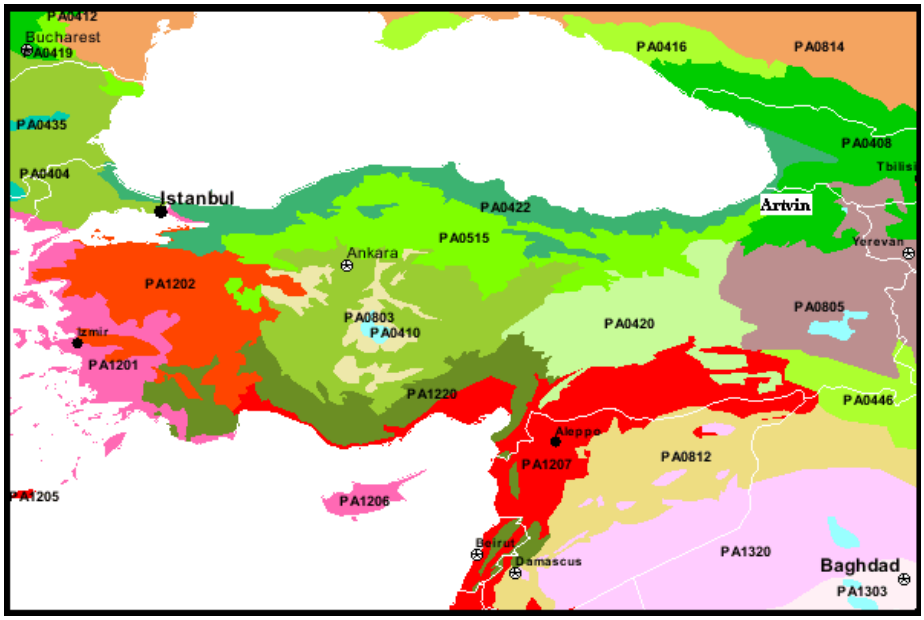


Figure 2. The terrestrial ecoregions of Turkey. Artvin province where the oribatid mite samples were collected, is located in Euxine-Colchic broadleaf forests (PA0422) ecoregion (Anonymous, 2011).

Caleremaeidae Grandjean, 1965

Caleremaeus Berlese, 1910

Type-species: *Notaspis monilipes* Michael, 1882

Caleremaeus monilipes (Michael, 1882)

Measurements: Length: 328–340, width: 156–188 (n = 9).

Prodorsum (Figure 3A): Rostrum rounded. Rostral setae, smooth and 16 in length. Setae *la,* 18 in length arising on the dorsal surface of the proximal of cusps. Interlamellar setae 12 in length and smooth. Lamellae converging and extending in front of rostral margin. Lamellar setae inserted at its end. Sensilla with thin stem (20 *μ*m) and a swollen spinose head (40 *μ*m), claviform. Bothridia well developed.

Notogaster (Figure 3A): Oval shaped. Dorsosejugal suture straight, with a series of tubercles or denticles, setae c_2 are located in the humeral projections. The central of notogaster with alveoli, extends a backwards at the end of which are located a pairs of setae. Ten pairs of dorsal setae thick and smooth.

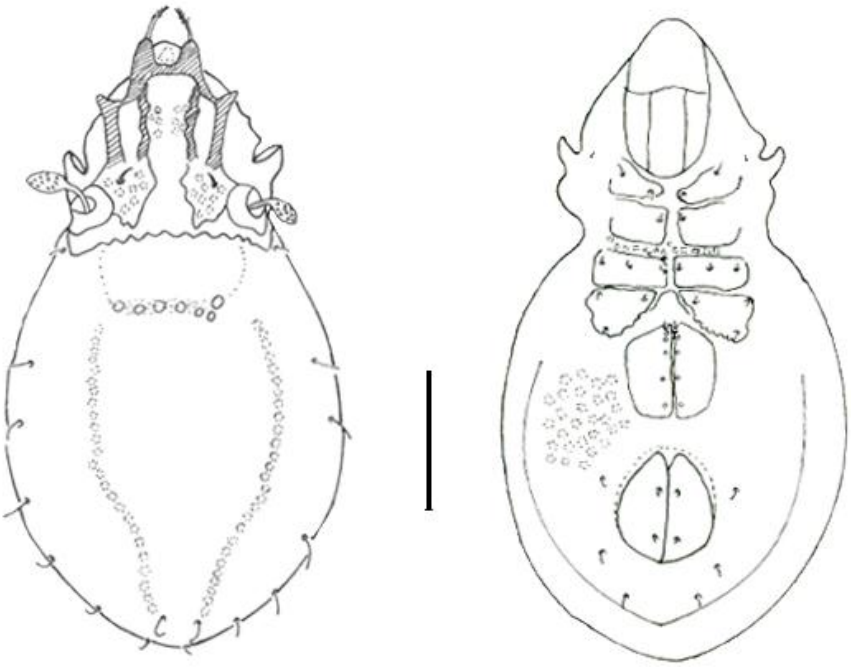


Figure 3. *Caleremaeus monilipes* (Michael, 1882): A) Dorsal view, B) Ventral view (Scale bar= 100 *μ*m).

Ventral side (Figure 3B): Epimeral borders distinctly visible and strongly sclerotized. Epimeral setal formula 3-1-3-3. Genital plates 48 in length, 46 in width, with six pairs of setae. Anal plates 50x50 in size, with two pairs of setae, all of them equal in length and smooth. Adanal setae ad_1 in postanal, ad_2 paraanal and ad_3 in preanal positions.

Material examined: Artvin, Kafkasör plateau, moss over the soil from a mixed forest, 1200 m, 15.IX.1993, 9 exs., leg. N. Ayyıldız and his collaborators (R. Urhan and K. Koç).

Geographical Distribution and Ecology: Until now, *Caleremaeus monilipes* (Michael, 1882) has been recorded from Austria, Bulgaria, Byelorussia, Caucasus, Czech Republic, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Norway, Poland, Romania, Russia, Spain, Sweden, and Switzerland (Willmann, 1931; Kunst, 1961; Bulanova-Zachvatkina, 1975; Karppinen & Krivolutsky, 1982; Bernini et al., 1987; Luxton, 1996; Olszanowski et al., 1996; Niemi et al., 1997; Subías & Arillo, 2001; Subías, 2004;

Weigmann, 2006; Baranovska, 2007; Siepel et al., 2009). It is a new record for the Turkish fauna. According to this data and the chorotype classification proposed by Vigna Taglianti et al. (1999), it is a member of the Western Palearctic chorotype, and the most eastern border of its range is Anatolia and Caucasus.

C. monilipes has been found in moss, forest soils, and on trees and rocks in Germany (Willmann, 1931; Weigmann, 2006). Schatz (1983) considered it as silvicolous and arboricolous. It has also been found as very common in mosses in Spain (Subias & Arillo, 2001). In Turkey *C. monilipes* has been found in moss over the soil from a mixed forest. It is concluded that our finding is in accordance with previous studies.

Remarks: The body length is given as 375 by Willmann (1931), 380 by Bulanova-Zachvatkina (1975) 373–475 by Subias & Arillo (2001), and 330-380 by Weigmann (2006). The Turkish specimens (328–340) are smaller than the known body length of the species. These differences in dimensions are considered within the variation limits. This species is well characterized by the pattern shape of prodorsum and notogaster, and the number and position of notogastral setae. In this regard, the Turkish specimens closely resemble the species in all features.

Özet

Dağılım ve ekolojisi üzerine notlarla birlikte Türkiye'den *Cepheus* C.L. Koch, 1835 ve *Caleremaeus* Berlese, 1910 (Acari: Oribatida) cinslerine ait iki yeni kayıt

1992–1994 yılları arasında Artvin ilinden toplanan örneklere dayanarak, Türkiye faunası için yeni olan iki oribatid akar türü; *Cepheus dentatus* (Michael, 1888) ve *Caleremaeus monilipes* (Michael, 1882)'in morfolojik özellikleri verilmiştir. Ayrıca, bu türlerin dağılımı ve ekolojik özellikleri de sunulmuştur.

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