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Gustavioid Oribatid Mites (Acari) of Çat Forest (Sivas)

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ABSTRACT

In this study, on the basis of the samples collected from Çat forest (Sivas) between February 2014 and October 2014, the morphological features of four oribatid taxa, namely *Xenillus* (*Xenillus*) *tegeocranus* (Hermann, 1804), *Liacarus* (*Liacarus*) *brevilamellatus brevilamellatus* Mihelčič, 1955, *Parapyroppia cornuta* (Berlese, 1910) and *Ceratoppia quadridentata* (Haller, 1882) are given. Their ecology and geographical distribution are also presented.

Anahtar Kelimeler:
Oribatida,
Gustavioidea,
Çat Ormanları,
Sivas,
Türkiye

ÖZ

Bu çalışmada, 2014 Şubat ve Kasım ayları arasında Çat ormanlarından toplanan örneklere dayanarak, dört oribatid akar taksonu, *Xenillus* (*Xenillus*) *tegeocranus* (Hermann, 1804), *Liacarus* (*Liacarus*) *brevilamellatus brevilamellatus* Mihelčič, 1955, *Parapyroppia cornuta* (Berlese, 1910) ve *Ceratoppia quadridentata* (Haller, 1882)'nın morfolojik özellikleri verilmiştir. Ayrıca, bu türlerin ekolojisi ve dağılımı da sunulmuştur.

1. Introduction

Gustavioid mites comprise 377 species and 10 subspecies, 47 genera and 6 subgenera in 8 families with nearly cosmopolitan distribution except for the Antarctic Region [1]. So far, 11 species of this superfamily; *Adoristes* (*Adoristes*) *ovatus* (Koch, 1839) *Adoristes* (*Gordeeviella*) *krivolutskyi* Shtanchaeva, Subías and Arillo, 2010, *Ceratoppia bipilis bipilis* (Hermann 1804), *Ceratoppia quadridentata* (Haller, 1882), *Gustavia fusifer* (Koch, 1841), *Liacarus (Liacarus) brevilamellatus brevilamellatus* Mihelcic, 1955, *Liacarus* (*Dorycranosus*) *splendens* (Coggi, 1898), *Liacarus (Liacarus) coracinus coracinus* (Koch, 1841), *Liacarus* (*Liacarus) incisus* (Grobler, Ozman and Cobanoğlu, 2003), *Xenillus (Xenillus) clypeator* Robineau- Desvoidy, 1939, *Xenillus* (*Xenillus*) *setosus* Grobler, Ozman and Çobanoğlu, 2003, *Xenillus (Xenillus) tegeocranus* (Hermann, 1804) have been recorded from Turkey [2]. The superfamily Gustavioidea can be characterized by the thin cerotegument, usually shiny and smooth bodies; chelate-dentate chelicerae, prodorsum with lamellae, minute notogaster setae except the posterior setae, 5-6 pairs of genital setae [3,4].

Aim of the study, the oribatid mites inhabiting in the Çat Forest are evaluated from the taxonomic point of view with the aim of contributing to the oribatid fauna of Turkey.

2. Material and Methods

The soil, litter, moss, and lichen samples were randomly taken from different habitats of Sivas Çat Forest (SÇF) in between February 2014 and October 2014 (Table 1). Mites were extracted with the help of a Berlese-Tullgren funnel extractor. Extracted mites were killed, fixed and stored in 70% ethanol. The light and scanning electron microscopes (SEM) were used to examine mites. The compound microscopic examinations of specimens were made in lactic acid, mounted in temporary cavity slides. Mite specimens were examined by using a light microscope; the measurements of their various body parts were made. Examined materials are deposited in the Acarological Collection of Erciyes University, Turkey.

Table 1. A list of sample collection sites in the Sivas Çat Forest

Site code	Habitat	Elevation (m)	Date
SÇF-1 to 46	Litter under *Pinus sylvestris*	1534-1550	04.II.2014
SÇF-47 to 92	Soil and litter under *P. sylvestris*	1557-1664	01.III.2014
SÇF-93 to 138	Soil, tree bark, moss, lichen and litter under *P. sylvestris*	1415-1638	05.V.2014
SÇF-139 to 184	Soil, tree bark, moss, lichen and litter under *P. sylvestris*	1602-1639	04.VI.2014
SÇF-185 to 230	Soil, tree bark, moss, lichen and litter under *P. sylvestris*	1602-1639	04.VI.2014
SÇF-231 to 276	Soil, tree bark, moss, lichen and litter under *P. sylvestris*	1640-1686	05.VIII.2014
SÇF-277 to 322	Soil, tree bark, lichen and litter under *P. sylvestris*	1614-1685	09.IX.2014
SÇF-323 to 368	Soil, tree bark, moss, lichen and litter under *P. sylvestris*	1604-1627	06.X.2014

3. Results and Discussion

As a result of the assessment, four taxa belonging to the families Xenillidae, Liacaridae and Ceratoppiidae from the superfamily Gustavioidea Oudemans, 1900 were determined. These were *Xenillus (Xenillus) tegeocranus* (Hermann, 1804), *Liacarus (Liacarus) brevilamellatus brevilamellatus* Mihelčič, 1955, *Parapyroppia cornuta* (Berlese, 1910) and *Ceratoppia quadridentata* (Haller, 1882). These species were previously determined from Turkey.

Xenillidae Woolley and Higgins, 1966
***Xenillus (Xenillus)* Robineau-Desvoidy, 1839**
***Xenillus (Xenillus) tegeocranus* (Hermann, 1804)**

Measurements: Body length: 776–960 μm, body width: 432–560 μm (n = 10)

Morphological features (Fig. 1A-D): Lamellar cusp with sharp median tooth; interlamellar seta long; fusiform sensillus with short stalk and barbed; dorsosejugal suture straight; cuticular structure of notogaster and ventral plate alveolate; humeral setae c1 and c2 short, distally slightly broadened and barbed eleven pairs of notogastral setae; ano-genital setation 5-1-2-3.

Material examined: SÇF-58, 53 exs., SÇF-91, 2exs.

Distribution: Palaearctic (frequent) and Southeast China [1, 5].

Remarks: This species were previously determined from Erzurum, Samsun, Giresun and Kayseri provinces [2,7,9].The body length of this species was given as 720 x 1100 µm by Weigmann (2006), 946 x 594 µm by Sellnick (1928), 690 x 990 µm by Willmann (1931), 765-1075 x 450-745 µm by Pérez-Iñigo (1972) [5]. The Turkish specimens (776–960 x 432–560 µm) examined were in the range of the known dimensions of the species. *Xenillus (X.) tegeocranus* is a silvicolous and xerophilous species [6]. This species lives in the leaf litter, forest soil, moss and the superficial layers of the ground. It has a tendency to climb bushes and herbaceous plants and tolerant in terms of humidity [3-5]. We found this species in soil and litter under *P. sylvestris*.

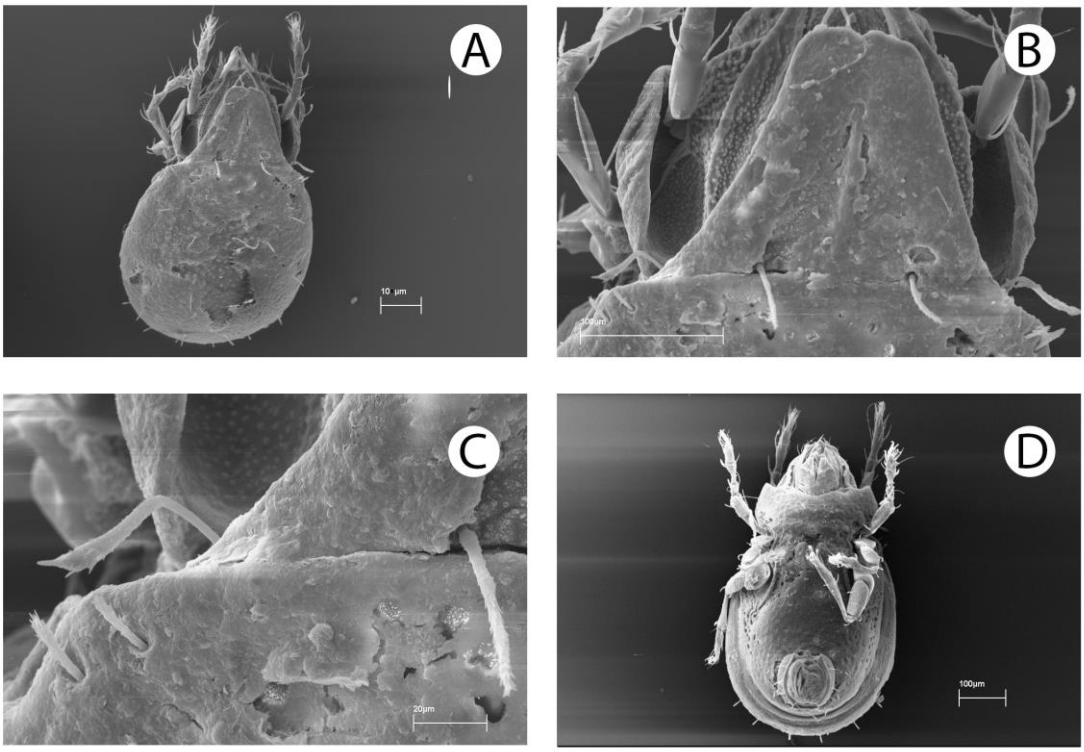

Figure 1. *Xenillus (Xenillus) tegeocranus* (Hermann, 1804): A) Dorsal view, B) Prodorsum, C) Sensillus D) Ventral view

***Liacaridae* Sellnick, 1928**
***Liacarus* (*Liacarus*) Michael, 1898**
***Liacarus* (*Liacarus*) *brevilamellatus brevilamellatus* Mihelčič, 1955**

Measurements: Body length: 720–920 µm, body width: 472–592 µm (n = 10)

Morphological features (Fig. 2A-D): Rostrum truncate; lamellar cusps well developed; inner cusps long and narrow, outer ones short; translamella present; rostral, lamellar and interlamaellar setae setiform; sensillus spindle-shaped; dorsosejugal suture medially weakly concave; eleven pairs of notogastral setae present; epimeral setal formula 3–1– 3–3; ano-genital setation 5-1-2-3.

Material examined: SÇF-2, 1 ex.; SÇF-4, 1 ex.; SÇF-5, 3 exs.; SÇF-8, 16 exs.; SÇF-10, 8 exs.;SÇF-13, 1ex., SÇF-14, 2 exs.; SÇF-16, 2 exs.; SÇF-19, 7 exs.; SÇF-20, 3 exs.; SÇF-22, 3 exs.; SÇF-28,1 ex.; SÇF-32, 1 ex; SÇF-37, 15exs.; SÇF-39, 7 exs.; SÇF-54, 25 exs.; SÇF-55,22 exs.;SÇF-56,2 exs.;SÇF-57, 9 exs.; SÇF-58,18 exs.;SÇF-60, 2 exs.; SÇF-62,2 exs.; SÇF-66 ,1 ex.; SÇF-68, 12 exs.; SÇF-69, 3 exs.; SÇF-70,2 exs.; SÇF-74, 1 ex.; SÇF-75, 1 ex.; SÇF-76, 2 exs.; SÇF-77, 1 ex.; SÇF-79, 1 ex.;

SÇF-80, 6 exs.; SÇF-81,3exs.; SÇF-82, 1 ex.; SÇF-84, 1ex.; SÇF-86, 2 ex.; SÇF-91,7 exs.; SÇF-95, 2 ex.; SÇF-133,3 exs.; SÇF-143,2exs.; SÇF-147, 2 exs.; SÇF-159,2 exs.; SÇF-160,1 ex.; SÇF-161, 1 ex.; SÇF-166, 1 ex.; SÇF-170, 1 ex.; SÇF-175,3 exs., SÇF-181, 2 exs.; SÇF-185, 2 exs.; SÇF-186, 2 exs.; SÇF-190,2 exs.; SÇF-193, 2 exs.; SÇF-197, 2 ex.; SÇF-218, 2 exs.; SÇF-223,12exs.; SÇF-225, 3 exs.; SÇF-228, 17 exs.; SÇF-232, 1 ex.; SÇF-240, 3 exs.; SÇF-243, 1 ex.; SÇF-247, 2 exs.; SÇF-248, 1 ex.; SÇF-250, 2 exs.; SÇF-251,1 ex.; SÇF-253, 2 exs.; SÇF-258, 6 exs.; SÇF-261, 1 ex.; SÇF-263, 3 exs.; SÇF-265,1 ex.; SÇF-271, 1ex.; SÇF-274, 2 exs.; SÇF-275, 2 exs.; SÇF-277, 1 ex.; SÇF- 285, 1 ex.; SÇF-286, 1 ex.; SÇF-287, 1 ex.; SÇF-288, 2 exs.; SÇF-290, 3 exs.; SÇF-292, 4 exs.; SÇF-304, 2 exs.; SÇF-305, 2 exs.; SÇF-311, 2 exs.; SÇF-333, 2exs.; SÇF-336, 2 exs.

Distribution: Palaearctic [1]

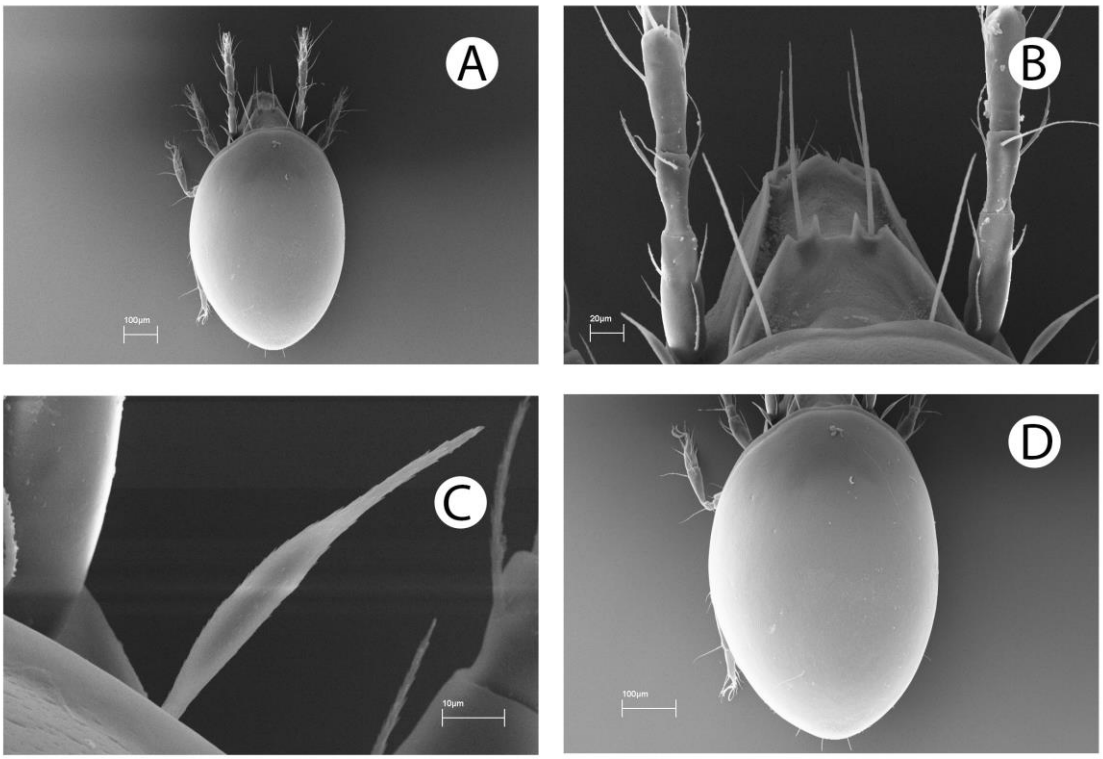

Figure 2. *Liacarus* (*Liacarus*) *brevilamellatus brevilamellatus* Mihelčič, 1955: A) Dorsal view, B) Prodorsum, C) Sensillus, D) Notogaster

Remarks: This species were previously determined from Erzurum [8]. The body length of *L. (L.) brevilamellatus brevilamellatus* was given as 700- 1115 µm by Mihelčič (1955), 690–1040 x 420–630 µm by Pérez-Ĭñigo (1972)(Pérez-Iñigo,1997). The body sizes of the specimens found in this study (720–920 x 472–592 µm) were in the range of the known dimensions of the species. This species lives in the litter, forest soil and moss [5]. We found this species in soil, tree bark, moss, lichen and litter under *Pinus sylvestris.*

Ceratoppiidae Kunst, 1971
***Ceratoppia* Berlese, 1908**
***Ceratoppia quadridentata* (Haller, 1882)**

Measurements: Body length: 584–686 µm, body width: 368–416 µm (n = 10)

Morphological features: Rostrum with strong medial tooth and lateral denticles; lamellar cusps long and extending beyond tip of rostrum and lateral tooth well developed; interlamellae setae as long or longer than lamellae; sensillus long, setiform; mentum with 1 pair of setae; 2 pairs of posterior notogastral setae; ano-genital setation 6-1-2-3.

Material examined: SÇF-5, 2 ex.; SÇF-18, 3 exs.; SÇF-32, 23 exs.; SÇF-37, 18 exs.; SÇF-80, 1 ex.; SÇF -81, 8 exs.; SÇF-95, 5 exs.; SÇF-115, 1 ex.; SÇF-139, 2 exs.; SÇF-150, 1 ex.; SÇF-155- 1 ex.; SÇF- 157 ,1 ex.; SÇF- 167, 8 exs.; SÇF-163, 14 exs.; SÇF-180, 1 ex.; SÇF-190, 2 exs.; SÇF-197, 1 ex.; SÇF-199, 7 exs.; SÇF-205, 9 exs.;SÇF-231, 4 exs.; SÇF-232, 1 ex.; SÇF-234, 1 ex.; SÇF-263, 1 ex.; SÇF-271, 2 exs.; SÇF-287, 1 ex.; SÇF-289, 1 ex.

Distribution: Holartica (Palaearctic frequent and northern Nearctic) and Southeast China ([1]).

Remarks: This species were previously determined from Erzurum [8]. The body length of this species was given as 500 – 600 µm by Weigmann (2006). The Turkish specimens (584-680 x 204-416 µm) examined were in the range of the known dimensions of the species. This species lives in forest soils, wet meadows and heaths [4, 5]. According to Schatz, 2016 this is a euryoecious and silvicolous species. We found this species in soil, tree bark, moss, lichen and litter under *Pinus sylvestris*.

***Parapyroppia* Pérez-Íñigo and Subías, 1979**
***Parapyroppia cornuta* (Berlese, 1910)**

Measurements: Body length: 504–616 µm, body width: 320–380 µm (n = 3)

Morphological features (Fig. 3A-D): Rostrum rounded; lamella large, slightly convergent longitudinally and with short and narrow cuspids; sensillus fusiform with distal hair; interlamellar setae long; notogaster tapered posteriorly ; one pair of posterior notogastral setae (p1); epimeral setal formula 4–1–3–2; ano-genital setation 6-1-2-3. Legs monodactyl.

Material examined: SÇF-81, 3 exs.

Distribution: Mediterránea [1].

Remarks: This species was previously determined from Kayseri province [9]. The body length was given as 330 – 570 µm by Berlese (1910), 420—495 µm by Pérez-Ĭñigo and Subías (1978) [3]. According to our data, body dimensions of this species are 505-616 x 320-380 µm. In this respect, the dimensions of our specimens are within previously known specimens examined were in the range of the known dimensions of the species. This species lives in the soil and the all litter types of vegetation, especially *Cretaegus monogyna*, between 800 and 1500m altitude [3]. Turkish specimens were collected in soil and litter under *Pinus sylvestris*.

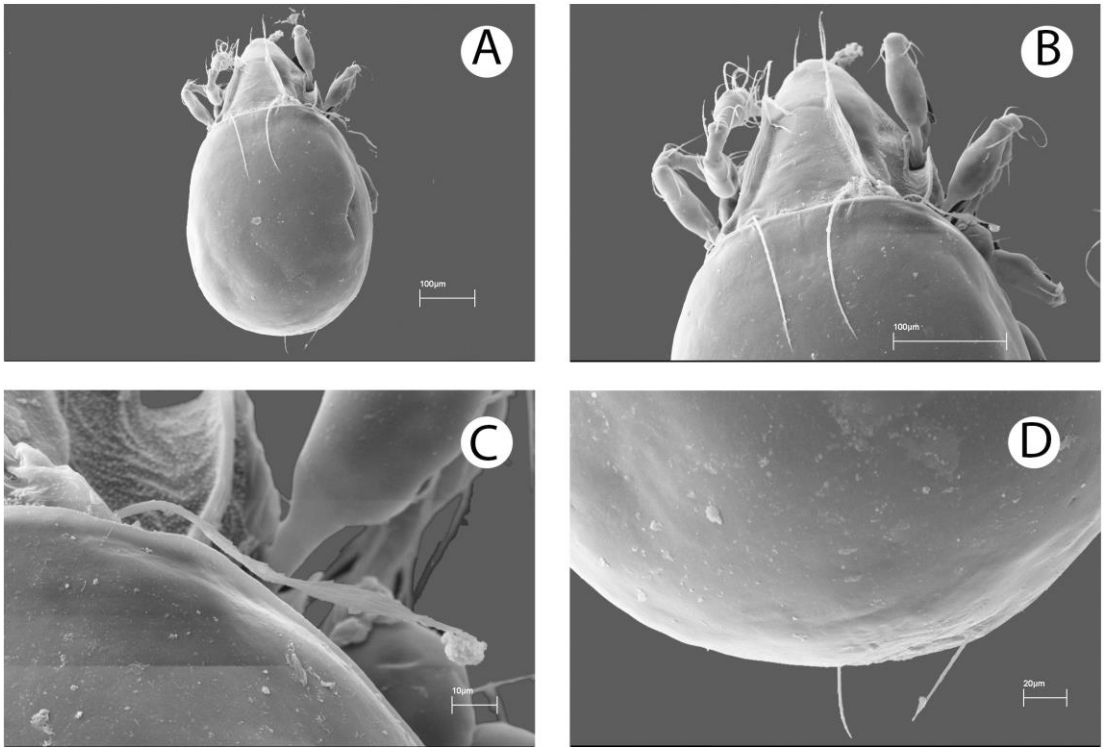

Figure 3. *Parapyroppia cornuta* (Berlese, 1910): A) Dorsal view, B) Prodorsum, C) Sensillus, D) The posterior part of notogster

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