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## First record of *Copidognathus tectiporus* (Viets, 1935) (Acari: Halacaridae) from the Lake Eğirdir, Isparta, Turkey

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**Abstract:** In this study, morphological characters of all life stages of *Copidognathus tectiporus* (Viets, 1935) described and illustrated with habitat information and worldwide distribution. The family Halacaridae is recorded for the first time from the Lake Eğirdir, Isparta, Turkey.

**Keywords:** Halacaridae, *Copidognathus*, Lake Eğirdir, Isparta, Turkey.

### Introduction

Halacarid mites are relatively small benthic organisms, the adult body length is less than 1 mm and unable to swim. Although the majority are marine, some are found in freshwater streams, lakes and ponds (Bartsch, 2006). While the first marine halacarid mite recorded in 1758 by Baster, the first freshwater halacarid mite was described in 1879 by Kramer. Up to now, the family Halacaridae includes more than 1000 marine and approximately 60 freshwater species (Bartsch, 2009). On an expedition to Lake Eğirdir, a total of 32 *Copidognathus tectiporus* specimens were found among green macroalgae *Cladophora* sp. In this study, morphological characters of larva, protonymph, female and male, habitat information and worldwide distribution of *C. tectiporus* are given with original illustrations. This is the first study about halacarids on the Lake Eğirdir.

### Materials and Methods

A total of 32 specimens (19 females, 9 males, 3 protonymphs and 1 larva) were collected from green macroalgae *Cladophora* sp. by hand at 0.5 m depth on Lake Eğirdir (37°52'57.30"N, 30°51'57.42"E) (Isparta, Turkey) F. Durucan coll. on September 2016 (Fig. 1). The specimens were extracted by washing the substrates and they were cleared in lactic acid and mounted in glycerine jelly. Figures were drawn with the aid of a camera lucida (Nikon Eclipse E400). Examined specimens are kept in the author's personal collection in Antalya, Turkey (FD-

HALF/27-29).

**The abbreviations:** AD (anterior dorsal plate), OC (ocular plate), PD (posterior dorsal plate), AE (anterior epimeral plate), PE (posterior epimeral plate), GA (genitoanal plate), glp (gland pores), GO (genitoanal opening), pgs (perigenital setae), sgs (subgenital setae).

All measurements are given as  $\mu\text{m}$ .

### Results

A total of 32 *C. tectiporus* specimens were found in shallow water of the Lake Eğirdir, Isparta, Turkey. All body measurements of the illustrated specimens and comparison of some diagnostic characters of collected *C. tectiporus* specimens with related specimens are given in Tables 1 and 2.

### Family Halacaridae Murray, 1877

#### Genus *Copidognathus*, Trouessart, 1888

#### *Copidognathus tectiporus* (Viets, 1935)

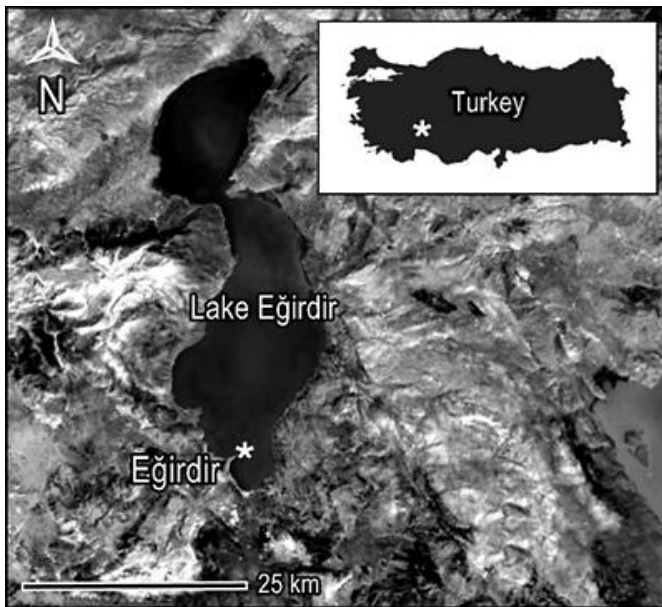
**Short description:** Length of females 265-325, males 270-290, protonymphs 230-250 and a larva 150. Female, dorsal and ventral plates are large, ornamented and foveated. AD bears 4 rounded porose areola with rosetta pores and anterior margin of the plate with blunt frontal process, posterior margin truncate (Fig. 2A-B). OC with 2 corneae, extending backward beyond level of insertion of leg III (Fig. 2C). PD with two pairs of porose costae; width of the medial costae three rosetta pores (Fig. 2D). AE bears 2 enlarged epimeral pores. Epimeral pore 20  $\mu\text{m}$  in

**Table 1.** Body measurements of the illustrated specimens of *Copidognathus tectiporus*.

| L/W        | <i>Copidognathus tectiporus</i> |         |            |         |
|------------|---------------------------------|---------|------------|---------|
|            | ♀                               | ♂       | Protonymph | Larva   |
| Idiosoma   | 325/200                         | 290/185 | 250/160    | 150/100 |
| Gnathosoma | 100/63                          | 95/60   | 80/55      | 63/50   |
| AD         | 100/92                          | 95/87   | 63/50      | 50/37   |
| OC         | 92/37                           | 88/32   | 63/37      | 47/36   |
| PD         | 210/137                         | 185/115 | 150/87     | 100/63  |
| AE         | 100/175                         | 100/160 | 100/125    | 76/85   |
| GA         | 150/125                         | 162/125 | 63/75      | 38/42   |
| GO         | 63/50                           | 50/37   | -          | -       |

**Table 2.** Comparison of some diagnostic characters and localities of *Copidognathus tectiporus* (modified from Bartsch, 1999). \*Only females and males.

| Characters                          | Black Sea<br>(n=5) | Lake Ohrid<br>(n=15) | Lake Eğirdir<br>(n=28*) |
|-------------------------------------|--------------------|----------------------|-------------------------|
| Length of idiosoma (µm)             | 320-345            | 278-360              | 265-325                 |
| Diatemer of epimeral pore (µm)      | 20                 | 21-25                | 20                      |
| Number of surrounding teeth         | 6-8                | 9-12                 | 9-10                    |
| Number of pgs in male               | 19-20              | -                    | 20-22                   |
| Length: height ratio of telofemur I | 1.8                | 1.7-1.8              | 1.8                     |



**Figure 1.** Map of the study area showing the sampling station

diatemer, surrounded by 9-10 teeth. Each PE with 1 dorsal and 3 ventral setae. Female GA with 3 pairs of pgs and 2 pair of sgs. Ovipositor extending beyond GO and anterior pgs (Fig. 2E). Everted ovipositor observed only for 6 females (Fig. 2F). Male GA with approximately 20-22 pgs (Fig. 2G). Gnathosoma short, with rosette pores ventrolaterally. Palps 4 segmented. Total palp length is 88 µm. Basal pair of maxillary setae long. Tip of rostrum with 2 pairs of rostral setae (Fig. 2H). Legs short. Chaetotaxy of leg I, 1, 2, 5, 4, 7, 6. Tibia I bears two short mid-

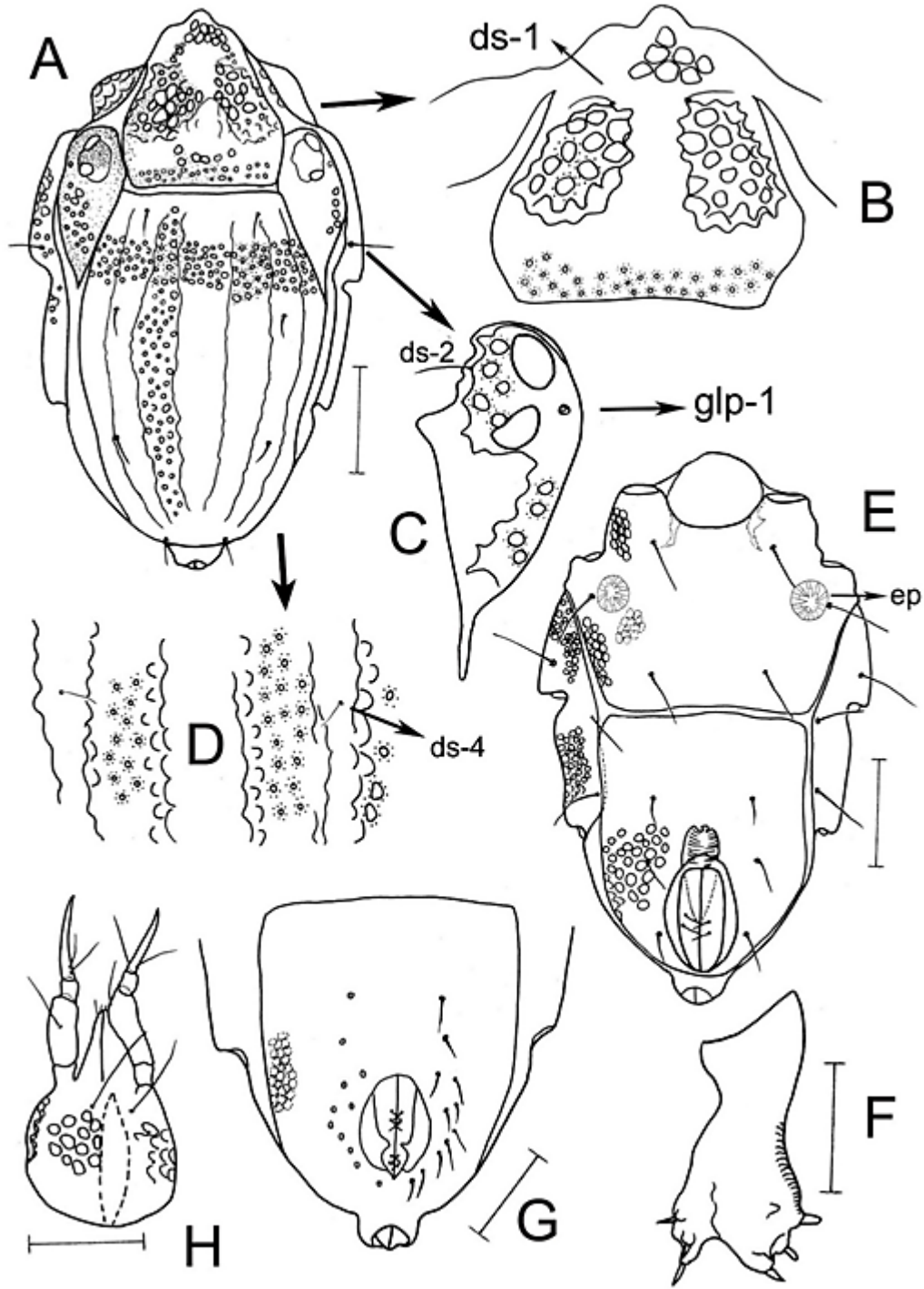
segmental spines near its middle length. Telofemora I 1.7 times longer than high (Fig. 2I-J).

Protonymphs, dorsal plates shorter than adults, PD with a pair of costae, anterior portion of the plate ovate. GA large and ovate, separated from anal plate (Fig. 2 K-L).

Larva, AD lacks porose areola but anterior part of the plate has distinct frontal process. OC without corneae. PD without costae, but there is only slightly lines posteriorly with some small pits on the plate. (Fig. 2M-N). Body measurements of the illustrated specimens of *C. tectiporus* as summarized in Table 1.

**Distribution:** *Copidognathus tectiporus* was described first time from Bulgaria (Burgas and Varna) by Viets 1935 from swamp area with macrophytes (*Najas* and *Phragmites*) and afterwards recorded from Macedonia (Lake Ohrid and Sveti Naum), Ukraine (Danube Delta and Sevastopol) and Turkey (Sinop) (Bartsch, 1999). In Turkey, the species was listed first time from Sinop, Black Sea) by Bartsch (2004) but not illustrated. The present finding constitutes the second record of this species from Turkey and stands as the first report of *C. tectiporus* from Lake Eğirdir, Isparta.

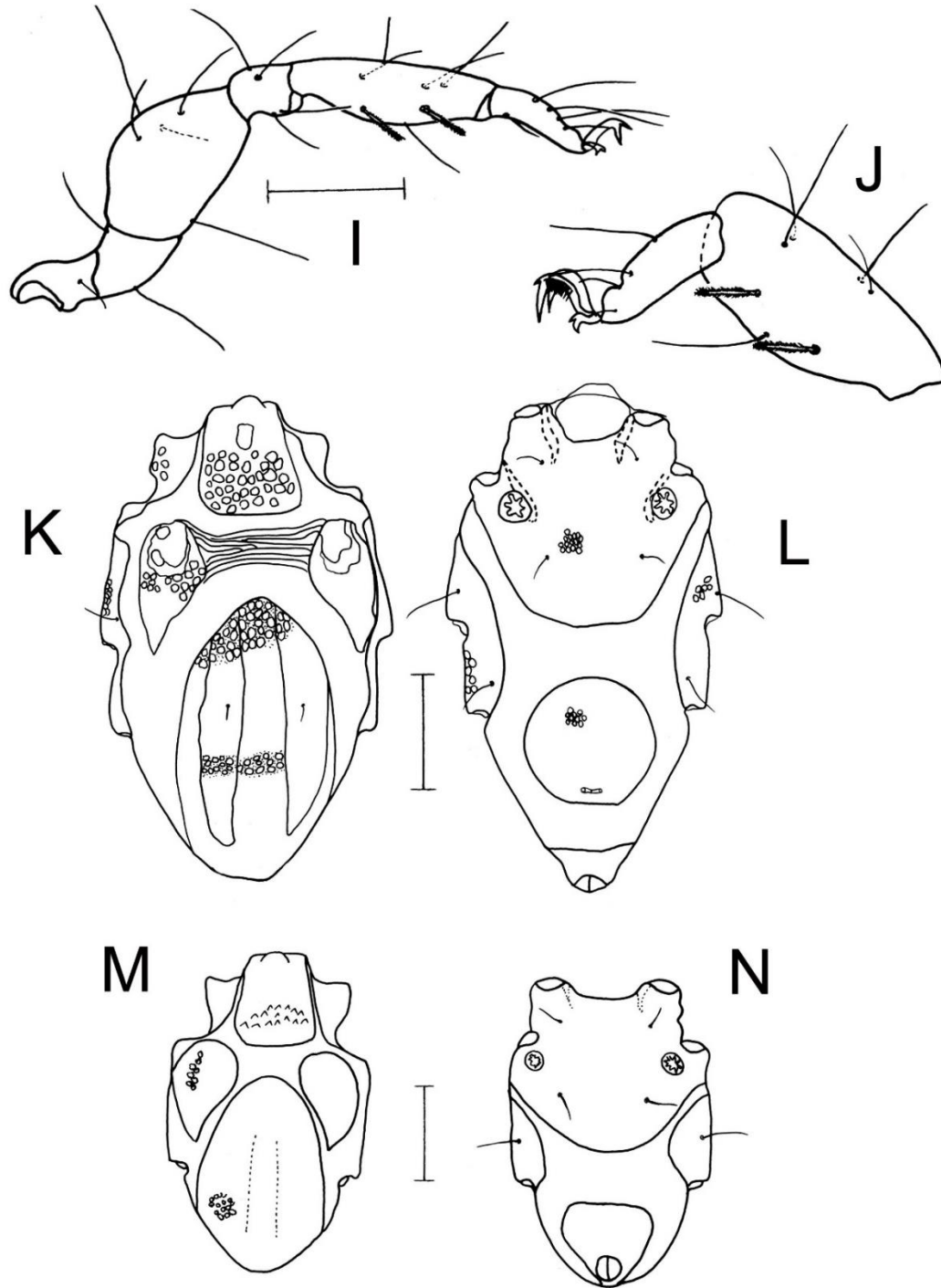
**Remarks:** The morphological characteristics of the specimens from Lake Eğirdir, Turkey accord with the re-description of the species given by Bartsch (1999) (Table 2). *Copidognathus tectiporus* is the most closely related to *C. dactyloporus*. But they are easily distinguished from



**Figure 2.** *Copidognathus tectiporus* Viets, 1935: (A) idiosoma, dorsal, female (B) anterior dorsal plate, enlarged (C) ocular plate, enlarged (D) posterior dorsal plate, enlarged (E) idiosoma, ventral, female (F) everted ovipositor, lateral aspect (G) genitoanal plate, male (H) gnathosoma, ventral, female. Scale bars: 50  $\mu$ m (ep, epimeral pore; glp, gland pore; ds-idiosomatic dorsal seta).

each other by (1) their idiosoma sizes (idiosoma of *C. dactyloporus* 373-407 and idiosoma of *C. tectiporus* 265-325), (2) number of surrounding teeth (between 9-15 in *C. dactyloporus* and between 9-10 in *C. tectiporus*), (3)

number of pgs in male (16-25 in *C. dactyloporus* vs. 20-22 in *C. tectiporus*) and (4) length/height ratio of telofemur I (2.2 in *C. tectiporus* vs. 1.8 in *C. tectiporus*) (Bartsch, 1999).



**Figure 2.** Continued. I-N. (I) Leg I, lateral, female; (J) tarsus-I and tibia-I, lateral, enlarged (K) idiosoma, dorsal, protonymph (L) idiosoma, ventral, protonymph (M) idiosoma, dorsal, larva (N) idiosoma, ventral, larva. Scale bars: 50  $\mu$ m.

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