

New record of *Copidognathus andhraensis* (Acari: Halacaridae) from the west coast of India, Arabian Sea

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Keywords *Copidognathus andhraensis*, West coast India, Arabian Sea

Abstract *Copidognathus andhraensis* Chatterjee, Annapurna & Chang, 2004 is reported here from Anjuna beach, Goa, west coast of India (Arabian Sea) among algal sediment. This is the first report of this species from west coast of India and also from the Arabian Sea.

Nowe stwierdzenie *Copidognathus andhraensis* (Acari: Halacaridae) z Zachodniego wybrzeża Indii, Morze Arabskie

Słowa kluczowe *Copidognathus andhraensis*, zachodnie wybrzeż Indii, Morze Arabskie

Streszczenie *Copidognathus andhraensis* został stwierdzony na plaży Anjuna, (Goa, zachodnie wybrzeża Indii, Morze Arabskie) pośród osadów alg. Jest to pierwsze stwierdzenie tego gatunku z zachodniego wybrzeża Indii, a także z Morza Arabskiego.

Introduction

Copidognathus is most species rich genus in the family Halacaridae (see Bartsch, 2009). In India, species of the genus *Copidognathus* were recorded from Chilka lagoon, Odisha, east coast of India (Chatterjee, 1991a; Chatterjee, Sarma, 1993); Visakhapatnam, Andhra Pradesh, east coast of India (Chatterjee, 1991b, Chatterjee, Annapurna, 2002, 2003; Chatterjee et al., 2003, 2004); Kerala, west coast of India (Chatterjee, Sarma, 1993; Chatterjee, 2000); Maharastra, west coast of India (Chatterjee, Chang, 2004); Goa, west coast of India (Chatterjee, Guru, 2011; Chatterjee, 2015) and Andaman & Nicobar Islands (Chatterjee, 1991c, 1992, 1995, 1996, 1997, 1999a,b; Chatterjee, De Troch, 2003; Sarma, Chatterjee, 1991; Chatterjee, Guru, 2013).

Copidognathus andhraensis was first described from Palm beach, Visakhapatnam, Andhra Pradesh, east coast of India among phytal samples (macroalgae) (Chatterjee et al., 2004). This species was also recorded from Singapore among colonies of Bryozoa (Bartsch, 2013).

The specimen of *C. andhraensis* used in the present study was collected from Goa, India, among macro algae, makes it the first recording of the species from west coast of India and also first report from the Arabian Sea.

Material and methods

One male among mixed macro algae growing on rocky coast of Anjuna beach (Lat. 15° 34' 58" N; Long. 73° 44' 28.54" E), Goa, west coast of India, 20th May 2011, coll. T. Chatterjee.

After preliminary observation specimen was processed for SEM study.

Specimen for scanning electron microscopy (SEM) was prefixed overnight at 4°C in 2.5% glutaraldehyde, followed by post fixation in 2% cold osmium tetroxide. After dehydration through a graded series of ethanol (50–100% at 10% interval) for 30 minutes each, the material was critical point dried, and coated with a platinum-palladium mix in a high evaporator, and then examined with a scanning electron microscope.

The following abbreviations are used in the text and figure legends: AD, anterior dorsal plate; AE, anterior epimeral plate; ds, dorsal setae 1–2 on the idiosoma; GA, genitoanal plate; GO, genital opening; OC, ocular plate(s); PAS, parambulacral seta(e); PGS, Perigenital setae.

Results and Discussion

Copidognathus andhraensis Chatterjee, Annapurna & Chang 2004

Copidognathus andhraensis – Chatterjee et al. 2004, 75–78, Figs. 1A–G, 2A–D.

Copidognathus andhraensis – Bartsch 2013, 111–119, Figs. 1–20.

Brief Description: Small median elevated area (areola) on AD; setae ds₁ on posterior side of median areola and pair of gland pores on anterior side of this areola. Distance between two gland pores almost (or more than) twice than that of two setae of ds₁. A pair of middle costae restricted to posterior third of the posterior dorsal plate. Anterior cornea on OC large, posterior cornea subdivided into two small corneae; ds₂ on near anteromedian corner of OC. Pair of oblong punctate areolae present within area representing first pair of epimera on AE (Figure 1B). Magnified view of epimeral pore on AE shown in Figure 1C. In male paragenital areolae enlarged anteriorly and occupying almost entire length of GA, but not touching anterior end of GA. In present male, distance between anterior end of GO and that of GA equaling about 1.2 times of GO length (Figure 1A). In male about 40 PGS present, about 5 pairs close to and about 30 setae in a wide ring around GO (Figures 1A, D). Legs slender (Figure 1A). Pectinate setae on leg I–IV: 0–2–1–0 (Figures 2A, B). Tarsus I with 2 doublets eupathid PAS. Tarsus II with 2 singlet eupathid PAS. Paired claws II to IV with pectines extending along inner flank of claws (Figures 2C–E).

Distribution: Indian Ocean - Andhra Pradesh, east coast of India, Bay of Bengal (Chatterjee et al 2004); Goa, west coast of India, Arabian Sea (Present report); Pacific Ocean – Singapore (Bartsch, 2013).

Remarks: Bartsch (2013) commented about pair of gland pores on the AD and pair of ds₁ shown in Fig 1B of Chatterjee (2004) 'distance between pores about the same as between the pair of setae', but in Fig 1B of Chatterjee (2004) and in present specimen showing that the distance between two gland pores more than twice than that between two setae of ds₁ as found in Singapore specimens. The position of ds₂ in the present study is found near anteromedian corner of OC similar with Bartsch (2013). Claws also found similar with Singapore specimens in present study.

There are many natural species groups in the genus *Copidognathus*. One of these groups is the '*tricornatus*' group. At present, 14 species of this species group have been recorded. *Copidognathus andhraensis* Chatterjee, Annapurna & Chang has been reported among phytal algal samples from Andhra Pradesh, east coast of India (Chatterjee et al., 2004), among algal

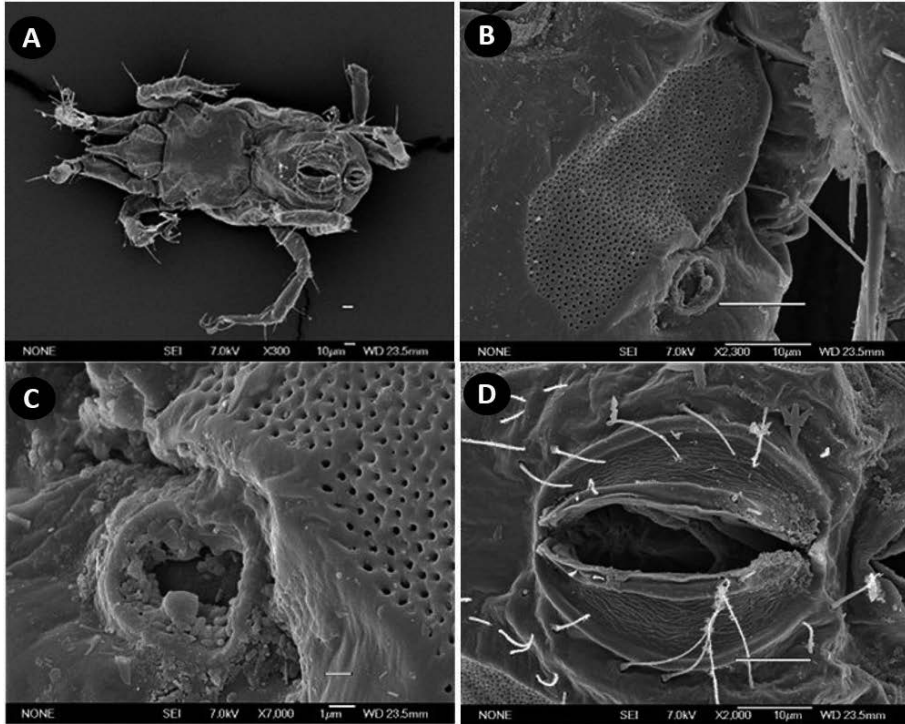


Figure 1. *Copidognathus andhraensis* Chatterjee, Annapurna and Chang, 2004 male. A. Idiosoma, ventral; B. Ventral areola on AE; C. Magnified view of epimeral pore on AE; D. GO. (Scale bars: A, B, D = 10 μ m, C = 1 μ m)

sediments from Anjuna beach Goa, west coast of India (present report) and among bryozoa from Singapore (Bartsch, 2013). *Copidognathus dictyotellus* Bartsch was reported among corals, algae and sponges in Rottnest Island, Western Australia (Bartsch, 1997, 1998). Bartsch (1993) reported *C. dictyotus* Bartsch from Babi Besar Island, Malaysia, South China Sea, among dead coral blocks and calcareous algae, in and below the tidal range. The species *C. hummelincki* (Viets) was reported from Bonaire and Aruba, Caribbean Sea (Viets, 1936) and also among algae *Halemida* from Florida, USA (Newell, 1947). *Copidognathus kagamili* Newell was reported in northeastern Pacific, Aleutian Islands from boulders covered with corals, sponges, and hydrozoans at about 75 m depth (Newell, 1950). Otto (2001) reported *C. leptoporus* Otto from Great Barrier Reef in northeastern Australia among coarse sand, coralline algae, and hydroids at 0.5m to 9m depth. Otto (2001) also reported *C. megaloporus* Otto, 2001 from Great Barrier Reef in northeastern Australia (Otto, 2001). *Copidognathus longipes* Bartsch was recorded from northwestern Atlantic (Josephine Bank), taken from a depth of 210-240 m (Bartsch, 1973). *Copidognathus mucronatus* Viets was reported from Black Sea (Viets, 1928; Bartsch, 1997, 2001) taken from Phyllophora, Rhodophyta (Viets, 1928). *Copidognathus quadricostatus* (Trouessart) and *C. trouessarti* (Voinov) were reported from northeastern Atlantic and Mediterranean (Trouessart, 1894; Voinov, 1896; Bartsch, 1991, 1997). The species *C. quadricostatus* and *C. trouessarti* often found together amongst sublittoral bryozoans and barnacles (Bartsch, 1997). *Copidognathus spophaie* Pepato

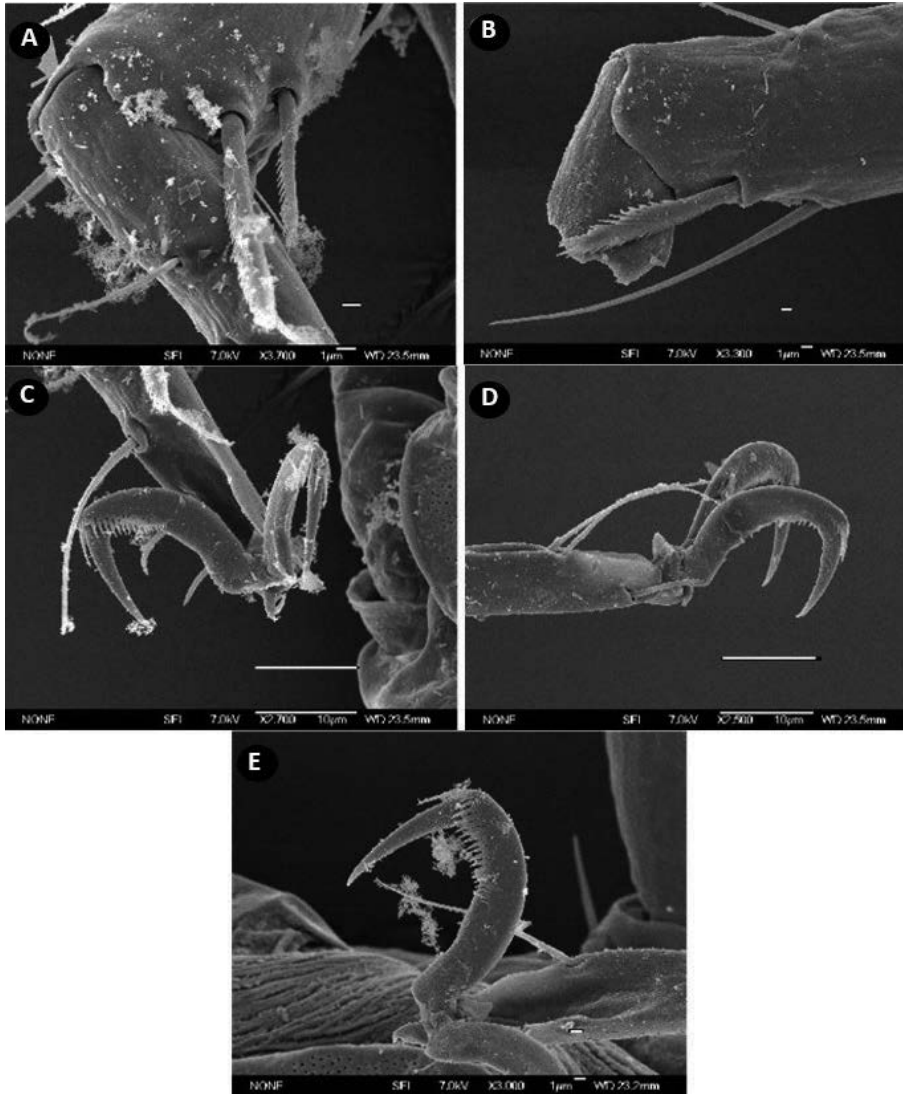


Figure 2. *Copidognathus andhraensis* Chatterjee, Annapurna and Chang, 2004 male. A. Part of tibia II showing pectinate setae; B. Part of tibia III showing pectinate seta; C. Part of tarsus II showing claws; D. part of tarsus III; E. Claw of tarsus IV. (Scale bars: A, B, E = 1 μm ; C, D = 10 μm)

& Tiago was reported among *Sargassum cymosum* from intertidal rocky shore at Lázaro Beach, Brazil (Pepato, Tiago, 2005). *Copidognathus tricorneatus* was reported from eastern Australia, Sydney, from a substratum with corals and sponges (Viets, 1938; Bartsch, 1997). *Copidognathus xaixaiensis* Proches was reported from the middle littoral rocks on the breakwater wall facing the resort in Xai-Xai, Mozambique (Proches, 2002). Three species: *C. andhraensis*, *C. dictyotellus*, and *C. xaixaiensis* are known from Indian Ocean region.

Acknowledgement

Thanks are due to Dr. Martin V. Sorensen, Natural History Museum of Denmark, University of Copenhagen, Denmark for making the SEM photographs of these mites.

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Cite as: Chatterjee, T. (2018). New record of *Copidognathus andhraensis* (Acari: Halacaridae) from the west coast of India, Arabian Sea. *Acta Biologica*, 25, 123–129. DOI: 10.18276/ab.2018.25-10.