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**REPORT OF *ACAROTHRIX PALUSTRIS* BARTSCH  
(ACARI: HALACARIDAE) FROM THE INDIAN OCEAN**

**Abstract**

The present study reports a new distribution record for the halacarid mite *Acarothrix palustris* Bartsch, 1990 on mangrove pneumatophores from Goa, India. Earlier this species was known from Hong Kong and Singapore (West Pacific Ocean). The present report represents the first record of the species from the Indian Ocean.

**Keywords:** Goa, India, new record, mangrove, taxonomy

**Introduction**

Six species of the halacarid genus *Acarothrix* are known from tropical and warm temperate shallow water habitats with low salinity and muddy areas that perio-

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dically are influenced by freshwater. Most of these species are associated with mangrove areas. The genus was discovered and described by Bartsch (1990), with *A. palustris* collected among algal turfs on salt marshes and mangrove flats in southern China, named as type species for the genus. Later, Bartsch (1997) described a second species, *A. longiunguis*, from a mangrove area in northern Australia. Procheş (2002) described *A. umgenica* from Beachwood Mangrove in Durban, KwaZulu-Natal, South Africa, in sediment and algae covering the pneumatophores of the mangrove tree *Avicennia marina*. Two years later, Bartsch (2004) described *Acarothrix ampliata* from the Little Manatee River, which empties into the Gulf of Mexico at Tampa Bay, Florida. Subsequently she described *A. ampliomeris* from *Cladophora* mats on muddy and sandy sediment in mangrove areas of the northern coast of Singapore (Bartsch 2006), where she also found *A. palustris* in similar habitats. Bartsch (2006) also reported *A. palustris* from the river Padam on the southern coast of Singapore, in sediment, green algae and epibiota on *Avicennia* pneumatophores. Recently Chatterjee et al (2012) described *Acarothrix grandocularis* from algal turf on mangrove pneumatophores in Brunei Darussalam and India.

In the present paper *A. palustris* is reported from mangrove pneumatophores from Goa, India. This is the first report of the species from India and from the Indian Ocean.

## Materials and methods

Mites were collected from scrapings of the algal turf growing on *Avicennia* mangrove pneumatophores at Chora Island, North Goa (15°30'45.74"N, 73°52'11.25"E), India. They were sorted under a binocular microscope, cleared in lactic acid and mounted in glycerine jelly. Drawings were prepared with a camera lucida. Specimens for scanning electron microscopy (SEM) were 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 dried in a critical point dryer, and coated with platinum/ palladium mix in a high evaporator, and then examined with a JSM–6335F field emission scanning electron microscope.

The following abbreviations are used in the text and figure legends: AD, anterior dorsal plate; AE, anterior epimeral plate; ds<sub>1,5</sub>, dorsal setae 1–5 on the

idiosoma; GA, genitoanal plate; GO, genital opening; OC, ocular plate(s); PAS, parambulacral seta(e); PD, posterior dorsal plate; PGS, perigenital setae; P<sub>1-4</sub>, first to fourth palpal segment; SGS, subgenital setae.

## Systematics

### Family Halacaridae Murray, 1877

Subfamily Copidognathinae Bartsch, 1983

Genus *Acarothrix* Bartsch, 1990

*Acarothrix palustris* Bartsch, 1990

*Acarothrix palustris* Bartsch, 1990: pp. 205–206, figs. 1–14; Bartsch, 2006: 86–87, figs. 17–20.

## Material examined

Four females from algal turf growing on *Avicennia* mangrove pneumatophores at Chorao Island, North Goa (15°30'45.74"N 73°52'11.25"E), India, 20th May 2011, coll. T. Chatterjee. Two females were used for SEM.

### Brief Description of Indian specimens (Figures 1–5)

Female: Posterior margin of AD rounded. Pair of ds<sub>1</sub> on AD. Setae ds<sub>2</sub> near anteromedial margin on OC. Setae ds<sub>3</sub> present about medially on OC. The OC with 2 corneae; gland pore present close to lateral margin of OC near the posterior cornea; pore canaliculus at lateral margin of OC posterior to posterior cornea. A pair of longitudinal costae with narrow cerotegumental ridges on PD; remainder of PD reticulate. Setae ds<sub>4</sub> and ds<sub>5</sub> on PD near lateral margin on small tubercles (Figs. 4B & 5E). PD with two pairs of gland pores: a pair between ds<sub>4</sub> and ds<sub>5</sub> (Figs. 3F, 4B & F) and a more posterior pair. Gland pores of PD elevated on cone-like structures. Anterior margin of GA ovate. Three pairs of PGS present: anterior pair located close to the anterior margin of GA. One pair of SGS on anterior part of genital sclerites. Distance between anterior margin of GO and that of GA about 0.36 of GO's length. Adanal setae in ventral position, adjacent to anal sclerites. Chaetotaxy of legs: Trochanters I–IV: 1-1-1-1; Basifemora I–IV: 2-3-2-2; Telfemora I–IV: 5-5-3-3; Genua I–IV: 4-4-3-3; Tibiae I–IV: 6-6-5-5; Tarsi I–IV (PAS excluded): 6-4-4-3. Tibiae I–IV with 1-1-1-0 pectinate setae. Pectinate

setae fan shaped anteriorly (Fig. 5A). Lateral claws almost smooth, vestiges of accessory process present.

Some of the examined specimens were infested with epibiont fungi (Figs 4C–E).

### **Distribution**

Southern China (Bartsch 1990); Singapore (Bartsch 2006); West coast of India (present report).

### **Remarks**

*Acarothrix palustris* was earlier recorded by Bartsch (1990, 2006) from Hong Kong and Singapore. The present record of this species is the first from India and the Indian Ocean. Furthermore, the first SEM documentation of this species is presented, including details of setae  $ds_4$  and  $ds_5$ , and the gland pore of PD between them.

*Acarothrix grandocularis* has earlier been reported from the same habitat and locality as *A. palustris* in northern Goa, India (Chatterjee et al. 2012). *Acarothrix palustris* can be differentiated from *A. grandocularis* by the position of setae  $ds_3$  which are located on OC in *A. palustris* (Fig 1A) and on PD in *A. grandocularis*. The panels between the costae on PD consist of subpanels in *A. grandocularis* while there are no such subpanels in *A. palustris*. The shape of OC also varies between the two species. Anterior PGS in females of *A. grandocularis* are not situated very much nearer the anterior margin of GA, as they are in *A. palustris*. Furthermore, basifemur II of *A. grandocularis* has two setae, while three setae are present on that segment in *A. palustris*.

*Acarothrix longiunguis* has been recorded from northern Australia and is morphologically close to *A. palustris* but the latter species has a pair of longitudinal costae with narrow cerotegumental ridges on PD alongwith reticulated panels, these characters are lacking in *A. longiunguis*. In addition, *A. longiunguis* displays very large elevated posterior gland pores cones on PD compared to those of *A. palustris*.

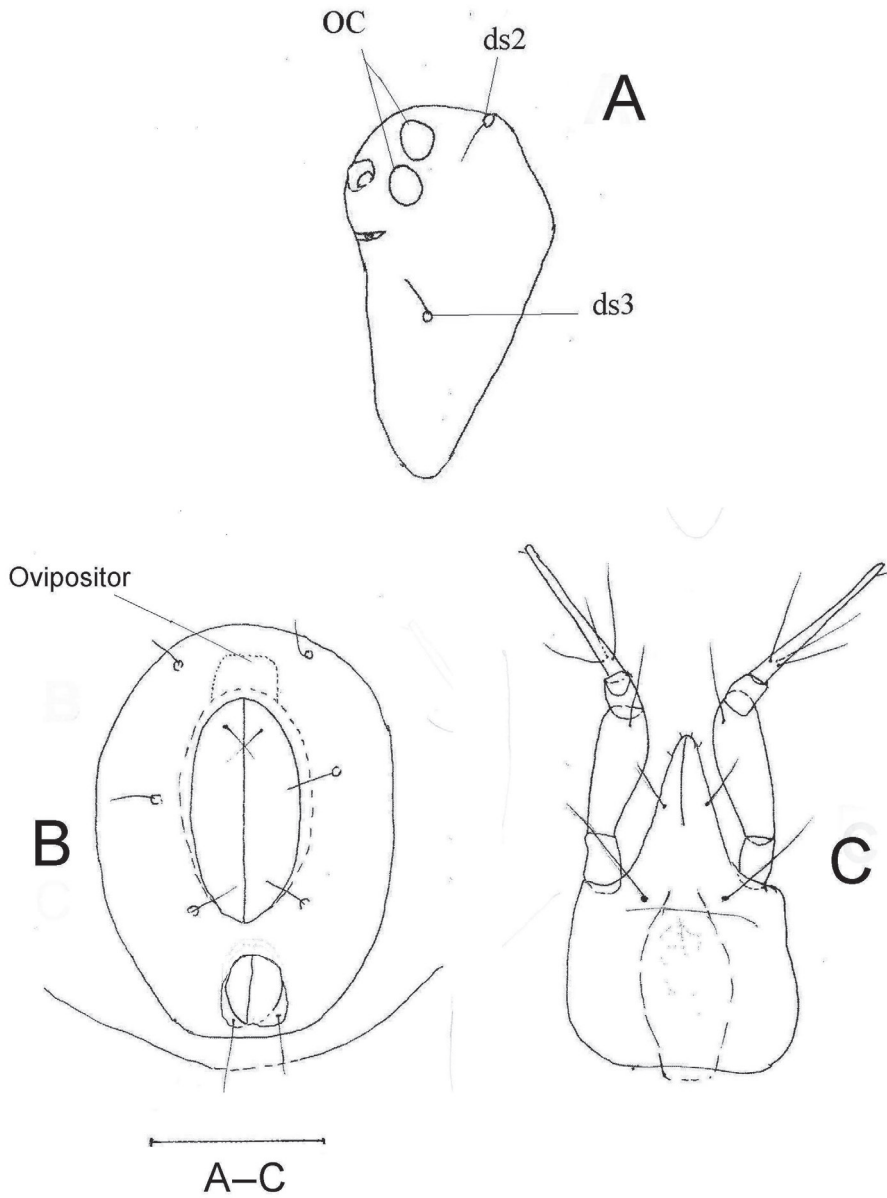


Fig. 1. *Acarothrix palustris* Bartsch, female (compressed specimen): A. OC; B. GA; C. Gnathosoma (Scale bar: 50  $\mu$ m)

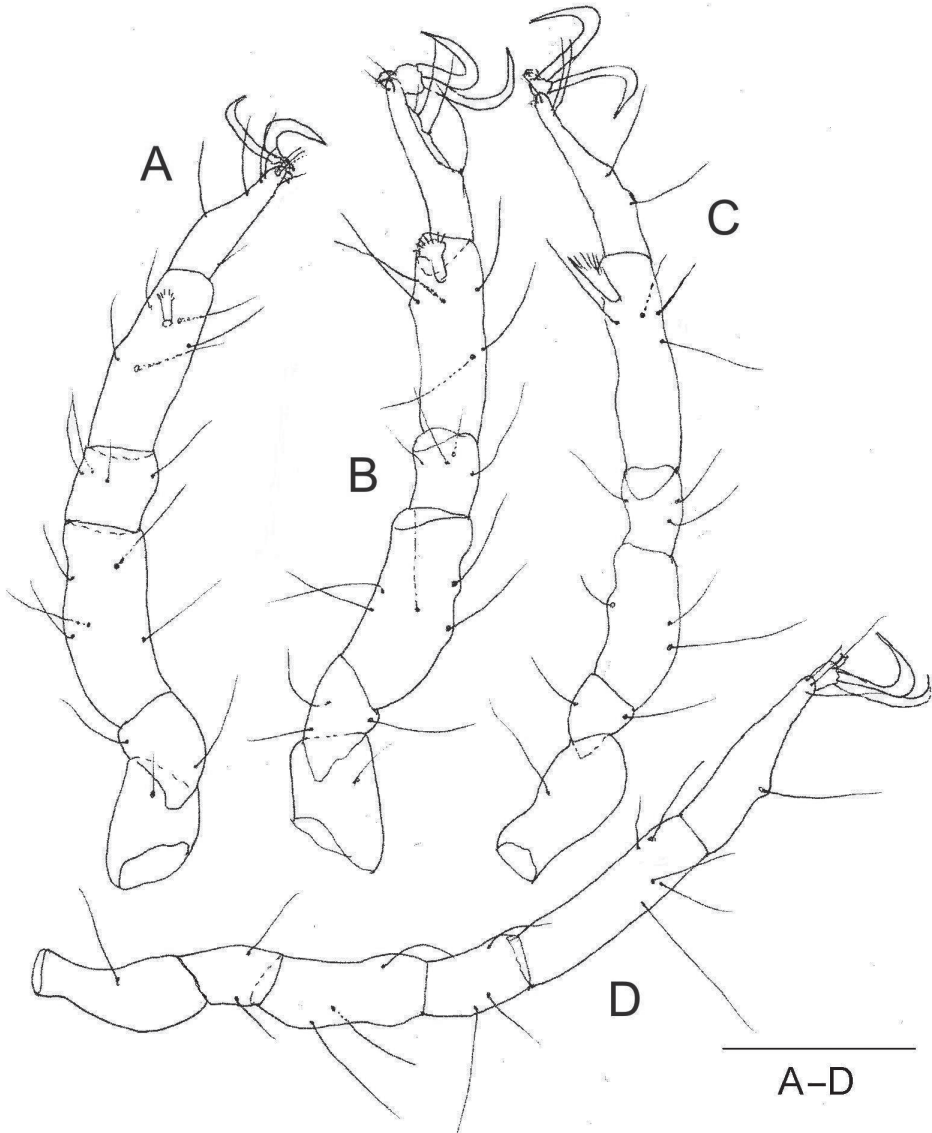


Fig. 2. *Acarothrix palustris* Bartsch, female: A-D. Legs I-IV. (Scale bar: 50  $\mu$ m)

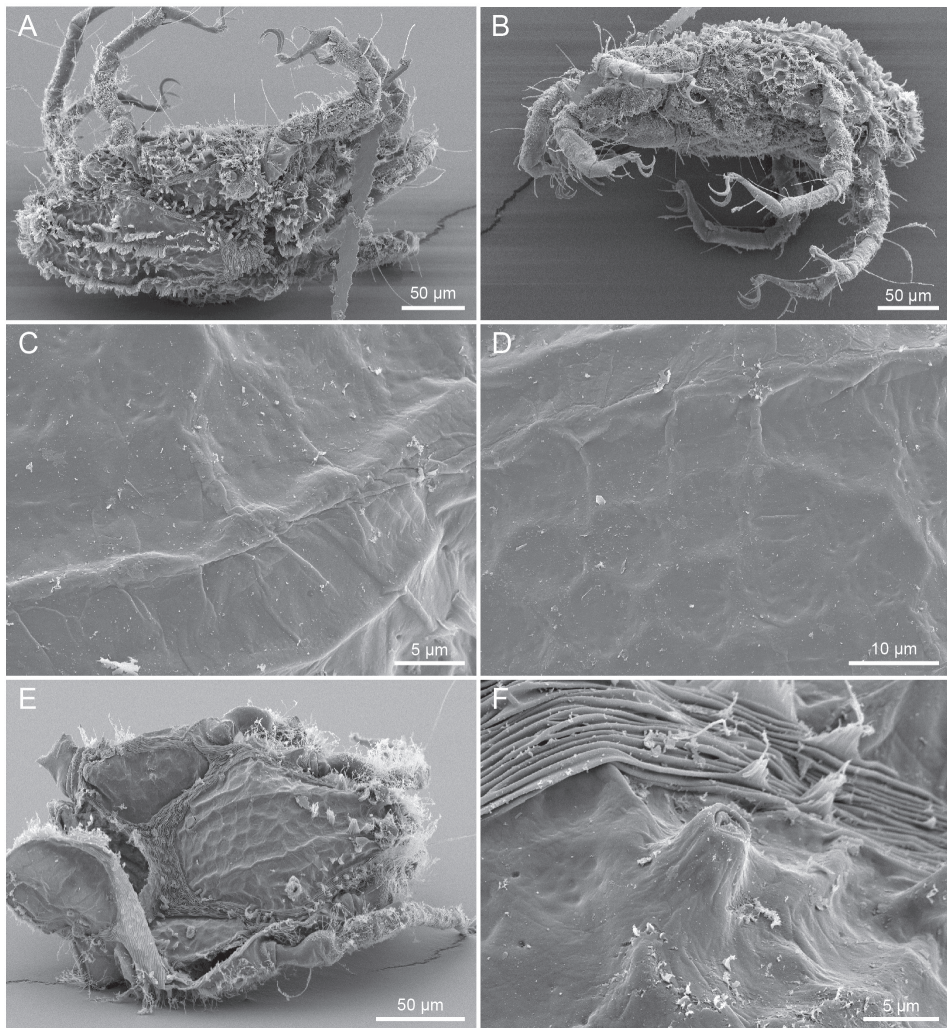


Fig. 3. *Acarothrix palustris* Bartsch, SEM figures: A, B. Idiosoma lateral; C. Part of costa and panels on PD; D. Panels on PD; E. OC and PD; F. Gland pore between  $ds_4$  and  $ds_5$  on PD

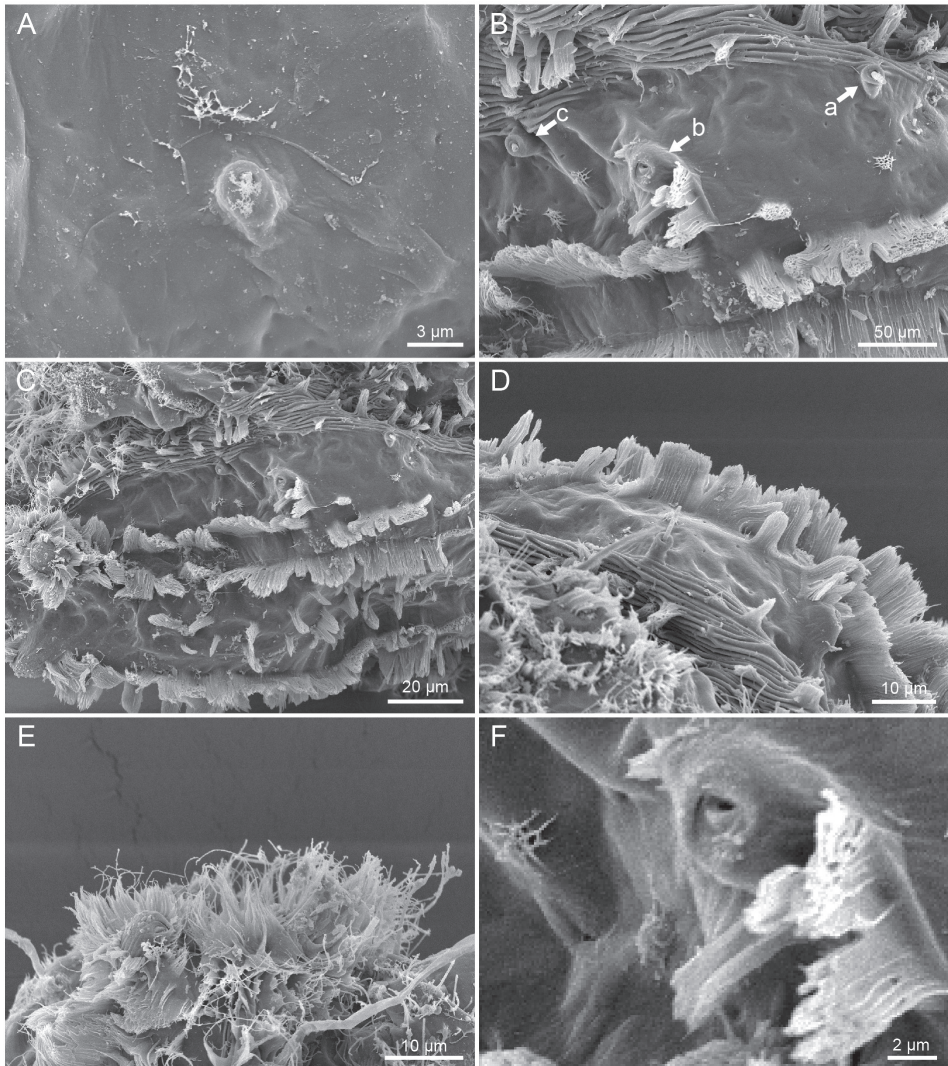


Fig. 4. *Acarothrix palustris* Bartsch, SEM figures: A. Epimeral pore on AE; B. Part of PE with (a)  $ds_4$ , (b) gland pore and (c)  $ds_5$ ; C-E. Fungal epibiont on idiosoma; F. Gland pore between  $ds_4$  and  $ds_5$  on PE



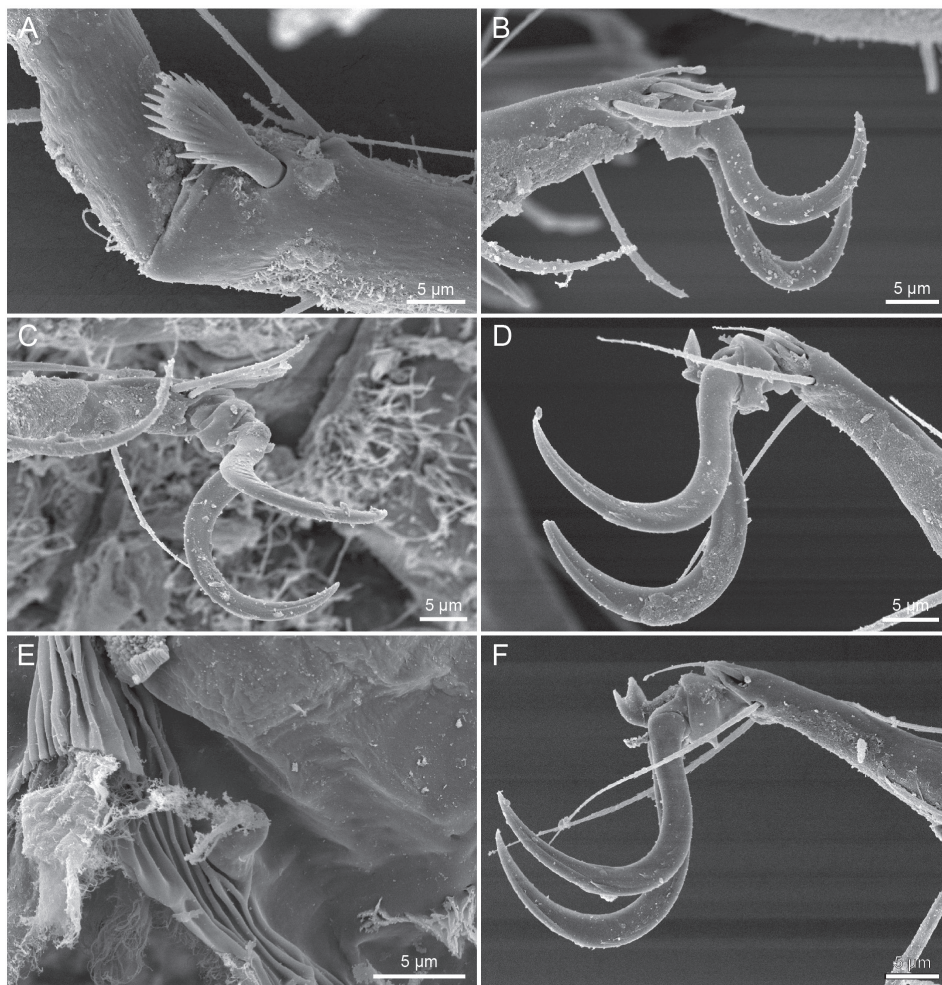


Fig. 5. *Acarothrix palustris* Bartsch, SEM figures: A. Pectinate seta on tibia I; B. Tip of tarsus I; C. Tip of tarsus II; D. Tip of tarsus III; E. Setae  $ds_4$ ; F. Tip of tarsus IV

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## DANE O WYSTĘPOWANIU *ACAROTHRIX PALUSTRIS* BARTSCH (ACARI: HALACARIDAE) W OCEANIE INDYJSKIM

### Streszczenie

Niniejsze badania wskazują nowe miejsca występowania *Acarothrix palustris* Bartsch, 1990 w zaroślach namorzynowych z okolic Goa (Indie). Wcześniej gatunek ten był znany z Hong Kongu i Singapuru (West Pacific Ocean). Niniejsza praca jest pierwszym doniesieniem o występowaniu tego gatunku w Oceanie Indyjskim.

**Słowa kluczowe:** Goa, Indie, Halacarinae, mangrowce, taksonomia

**Cite this article as:** Chatterjee T., Charan Guru B., Sørensen M.V. 2013. Report of *Acarothrix Palustris* Bartsch (Acari: Halacaridae) from the Indian Ocean. *Acta Biologica*, 20: 17–26.