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# Halacaridae (Acari) from Punta Allen (Quintana Roo, Mexico): description of one new and one known species of the genus *Copidognathus*

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**Abstract**

Two Halacaridae species belonging to the genus *Copidognathus* were collected among *Thalassia testudinum* leaves from Punta Allen on the Caribbean south coast of the Yucatán Peninsula (Quintana Roo State, Mexico) and are described in the present paper. *Copidognathus yucatanensis* sp.n. is characterised by a median transverse rectangular areola on AD made up of rosette pores, posterodorsal plate with two costae, costae in anterior and posterior region wide (3–4 pores) with prominent rosette pores; in the middle portion costae faint, 2–3 pores wide with feebly developed rosette pores, small ostium and also with pycnotic pores, epimeral process I present, ovipositor away from reaching level of perigenital setae I, tarsi III and IV with 4:3 dorsal setae. This species belongs to the '*oculatus*' group. Dissimilarity with closely related species is also reported. A second species of the genus *Copidognathus*, *C. uniscutatus* Bartsch (1984) was also recovered from the samples from Punta Allen. This is a first record of the species in the Atlantic Ocean and away from its type locality (The Philippines). Only small variation can be observed and from this we can conclude that some characteristics such as, e.g., reticulation of AD and PD area cannot be considered as distinctive. In addition to these descriptions, we report an overview of the Halacaridae species recorded so far from the Gulf of Mexico and the Caribbean Sea.

*Abbreviations:* AD – anterior dorsal plate; AE – anterior epimeral plate; ds – dorsal setae of idiosoma; ds1–ds6 – dostal setae 1 to 6; EP – epimeral process; GA – genito-anal plate; GO – genital opening; OC – ocular plate; PAS – parambulacral setae; PD – posterodorsal plate; PGS – perigenital setae; PE – posterior epimeral plate; P1–P4 – first to fourth palpal segment; SGS – subgenital setae

## Introduction

The first systematic work on Caribbean Halacaridae was done by Viets (1936a) on material from Bonaire, Curaçao and Aruba. Newell (1947) focussed on the coast of Florida (Biscayne Bay, Soldier's Key, Gulf of Mexico). Krantz (1971) described a new species of the genus *Actacarus* from Quintana Roo, Mexico. Bartsch (1983, 1984a–e, 1996a) published a series of papers on Caribbean halacarids. In the present paper, one new species *Copidognathus yucatanensis* and a new record of *C. uniscutatus* Bartsch are described from seagrass beds in Punta Allen, along the Caribbean south coast of Mexico.

## Materials and methods

During July 1997, an intensive meiofauna sampling campaign was carried out in Punta Allen (19° 47′ 06″N and 87° 28′ 08″ W) on the Caribbean south coast of the Yucatán Peninsula (Quintana Roo State, Mexico). This site is located in the northern part

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of the UNESCO biosphere reserve of Sian Ka'an, situated 170 km north of the Mexican border with Belize. Meiofauna samples were taken from seagrass plants in the subtidal zone. The halacarid specimens at hand were recovered from leaf samples of *Thalassia testudinum* Banks *ex.* König 1805. These epiphytic samples were taken by enclosing the leaves of one plant in a plastic bag. All samples were taken while snorkelling as the maximum depth was about 2 m. After narcotization with an 8% $MgCl_2$-solution, samples were washed in the field with freshwater over a 1 mm sieve and retained on a 38 $\mu$m sieve. Meiofauna samples were preserved with a warm (60 °C) formaldehyde solution to a final concentration of 4%. In the laboratory, samples were rinsed with a jet of freshwater over a 1 mm sieve, then decanted ten times over a 38 $\mu$m sieve, centrifuged three times with Ludox HS40 (specific density 1.18) and finally stained with Bengal Rose. Meiofauna was sorted and counted at the higher taxon level using a Wild M5 binocular. Halacarid mites were stored in 75% ethanol and later cleared in lactic acid and mounted in glycerine jelly slides for taxonomical purpose.

Drawings were prepared using a camera lucida (type Sipcon SP-14, microscope type Olympus GB). Type specimens are deposited in the Acari collection of the Royal Belgian Institute of Natural Science (KBIN-IRSNB, Brussels, Belgium) under number 29 019.

## Results and discussion

**Subfamily Copidognathinae** Bartsch (1983)

***Copidognathus yucatanensis* sp.n. (Fig. 1A–H)**

*Type material*

One female holotype and one female paratype.

*Etymology*

The specific name *yucatanensis* refers to the Yucatán Peninsula, the type-region of the species.

*Type locality*

Punta Allen, Quintana Roo (Yucatán Peninsula, Mexico), among *Thalassia testudinum* seagrass plants.

*Description*

Female: Idiosoma 240 (holotype) and 278 $\mu$m (paratype) long. All dorsal plates separate (Fig. 1A). AD of holotype 70 $\mu$m long. A median transverse rectangular areolar area on AD, 50 $\mu$m wide and 24 $\mu$m long. Areola containing rosette pores. Anterior to the areolar area of AD foveated; posterior to the areolar area also foveae present but near the posterior margin of AD foveae absent. At the anterior end of AD few rosette pores present. Posterior margin of AD truncate. Dorsal seta 1 (ds1) only present on anterior side of the posteromedian areola of AD. A pair of gland pores at the lateral margin of AD. OC with long caudiform tail-like posterior portion going beyond the insertion of leg III. Two corneae present on OC. In between two corneae an areolar area present containing 4–5 rosette pores. Second dorsal seta of idiosoma on the anteromedial margin of OC. Anterior portion of PD truncate. PD of holotype 168 $\mu$m long, 2.15 times longer than AD and about 1.2 times longer than wide. Anterior end of PD extends far beyond the level of insertion of leg III. PD with two costae. Costae anteriorly and posteriorly three rosette pores wide, sometimes four pores wide. Rosette pores prominent and large in anterior and posterior portion with moderately developed ostium. Under low magnification, the costae faint in the middle portion (between level of insertion of leg III and IV area) but under high magnification (using immersion oil) costae in the middle 2–3 pores wide. In the middle of the costae rosette pores feebly developed, ostium very small, in some cases absent; almost reduced canaliculi, on some places only three to four canaliculi present in a group, pycnotic pores present, posteriorly costae little convergent. Costae extending up to anterior end of PD. Besides costae, other portion of PD ornamented with foveae. Paracostae absent. Third dorsal setae (ds3), ds4 and ds5 are on PD anterior, median and posterior portion respectively.

All ventral plates separate (Fig. 1B). EP1 present, coxal in origin, anterior portion pointed. AE 106 $\mu$m long, with three pairs of setae. The large AE extends beyond the level of leg III. Round stoma of epimeral pores narrowed in the middle. AE punctuate with pycnotic pores. PE with one dorsal and three ventral setae. Marginal areolae present on PE ornamented with rosette pores. GA 122 $\mu$m long and 90 $\mu$m wide, with almost truncated anteriorly margin. GO 45 $\mu$m long. Distance from anterior margin of GA to that of GO about 1.35 times the length of the latter (about 1.3 times in paratype). Ovipositor extending anteriorly beyond GO and away from reaching PGS I. Three pairs of PGS. Position of PGS I in 0.22 from anterior margin of GA (considering total length of GA as 1.0). Paragenital areolae large, exceeding the level of the ovipositor's distal end, made up of rosette pores and

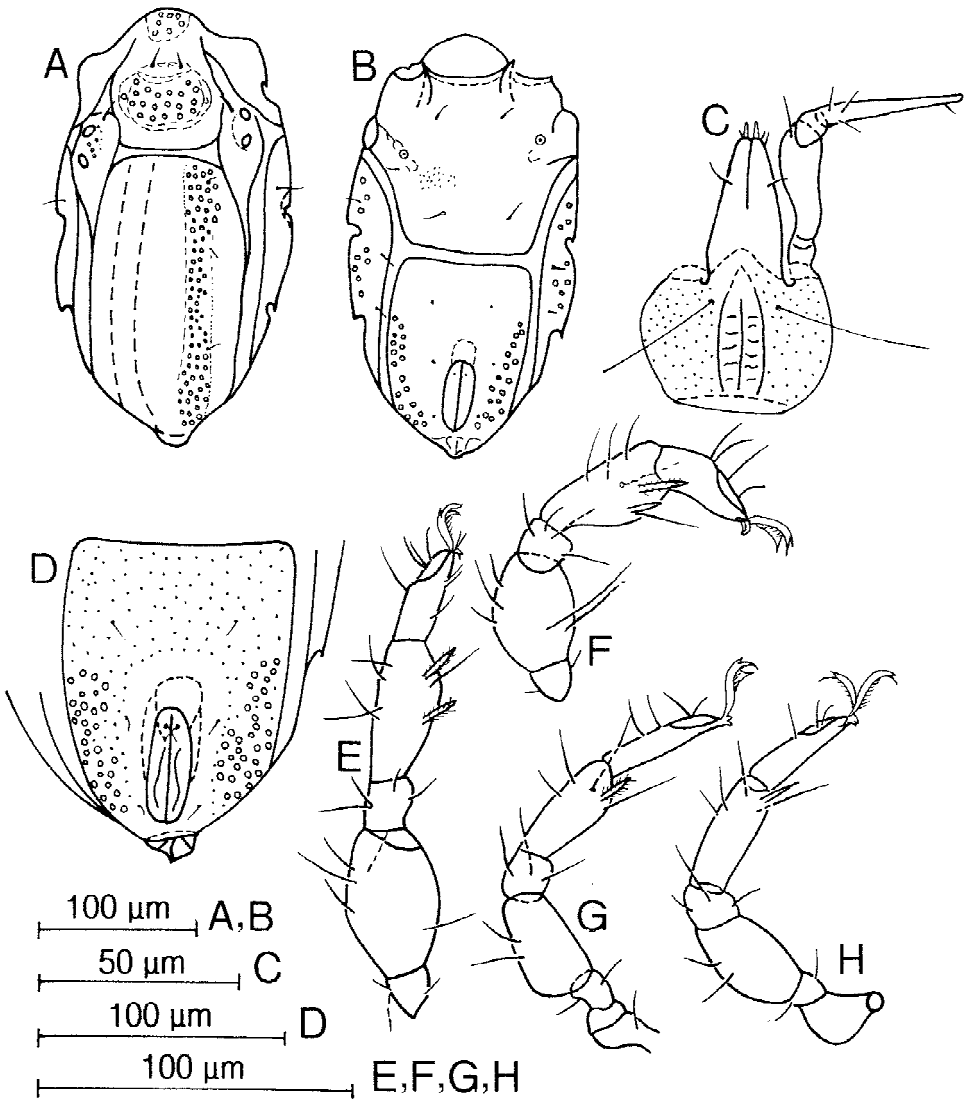


*Figure 1. Copidognathus yucatanensis* sp.n. ♀ (A) idiosoma (dorsal); (B) idiosoma (ventral); (C) gnathosoma; (D) detail of GA; (E) leg I; (F) leg II; (G) leg III; (H) leg IV.

pycnotic pores (Fig. 1D). Rest of the portion of GA punctuate. GO guarded by a pair of sclerites, single pair of subgenital setae near the anterior end.

Gnathosoma: 66 $\mu$m long and 50 $\mu$m wide; 1.32 times longer than wide. Rostrum 38 $\mu$m long. Rostrum tip going almost beyond the level of dorsal seta of P2; not exactly reaching the tip of P2. A pair of proto-, deuto-, trito- and basirostral setae present. Tritorostral (rostral pair of maxillary setae) placed 12 $\mu$m away from the tip of the rostrum. The distance between trito- and basirostral setae 30 $\mu$m. Basirostral maxillary setae long. The rostral sulcus extends posterior to the tritorostral setae. Tectum triangular (Fig. 1C). Palp consists of four segments. Palpal trochanter (P1) and patella (P3) without any seta. Palpal femur with one dorsal seta. Palpal tibio-tarsus with three basal and one minute seta distally. Ventrolateral surface of gnathosoma porose.

Leg chaetotaxy: Trochanter 1-1-1-0, Basifemur 2-2-2-2, Telofemur 5-5-2-2, Patella 4-4-3-3, Tibia 7-7-5-5.

Leg I larger than leg II. Telofemora I and II 1.4 times longer than high. Tibia I as long as telofemur I. Tibia II slightly longer than telofemur II. Tibia I

with three ventral setae (two thick ones and one filiform) and four dorsal setae (Fig. 1E); ventromedial thick setae very delicately serrated. Tibia II with three ventral (two thick and one filiform) and four setae on dorsal margin; ventromedial distal thick seta long, very delicately serrated; basal thick one small delicately serrated, little posteriorly to the level of smooth long ventral seta (Fig. 1F). Tibia III with two ventral setae; ventro-medial seta small, blunt serrated almost half of the length of long filiform seta (Fig. 1G). Tibia IV with two ventral seta (ventromedial thick one very finely serrated, not as long as ventral filiform seta) (Fig. 1H). Telofemora III and IV devoid of any ventral seta. Tibiae III and IV longer than telofemora. Solenidion on tarsi I and II setiform and in dorsolateral position. Tarsus I with three dorsal long setae, three ventral setae (one filiform basely and two eupathidia distally), four PAS, one solenidion and one profamulas. Tarsus II with three dorsal long setae, one solenidion and two PAS. Tarsus III with four dorsal setae. Distance between two basal setae on tarsus III, shorter than the height of the tarsus itself. Tarsus IV with three dorsal setae and two PAS.

All legs with two lateral claws and a bidentate median claw. Lateral claws of all legs with an accessory processus distally and ventrally with pecten.

*Differential diagnosis*

The present species is a member of the '*oculatus*' group (Bartsch 1977a, 1999). Detailed diagnostic characteristics of this '*oculatus*' group were reported by Bartsch (1999). *Copidognathus yucatanensis* sp.n. showed some similarity with *C. oculatus* (*sensu* Lohmann, 1889), *C. culoatus* Bartsch (1999) and *C. modestus* Bartsch (1984). Here, in the middle of the costae rosette pores bear very small ostium, sometimes absent; reduced canaliculi, pycnotic pores present, but different from *C. oculatus*, in the middle of the costae. In the present species, in the middle, costae narrower than the anterior and the posterior end, but in *C. oculatus* they are almost uniform. Anterior and posterior end of costae here wider than in *C. oculatus*.

From the very beginning, there was doubt about the identification of *C. oculatus*. Brady (1875) thought Hodge's (1863) description of *C. oculatus* was based on an immature *C. rhodostigma* (Gosse, 1855). After examining the holotype Fountain (1953) described it as *C. rhodostigma* (Gosse, 1855). Bartsch (1977a, 1999) considered *C. oculatus* as the form described by Lohmann (1889). Newell (1984) concluded that 'all existing records in the southern hemisphere, are probably erroneous'. In the present case, we are comparing *C. yucatanensis* with *C. oculatus sensu* Lohmann as described by Bartsch (1977a, 1999).

In *C. oculatus*, the distance from anterior margin of GA to that of GO is about 1.6 times the latter's length (Bartsch, 1977a; Fig. 2), but in our specimens at hand it is about 1.35 times. In *C. oculatus* the ovipositor is almost reaching the level of PGS I while this is not the case in *C. yucatanensis* sp.n. The position of PGS I is in *C. oculatus* on about 0.38 (considering total GA length as 1.0) from the anterior margin of GA (Bartsch, 1977a; Fig. 2) whereas in the present case it is on 0.22. The nature of rosette pores on costae differs also between both species. The rostrum of *C. yucatanensis* sp.n. is comparatively longer than in *C. oculatus*. Distance between tip of tectum and tritorostral seta is shorter in *C. oculatus* than in the present species.

*C. yucatanensis* is also very similar to *C. culoatus* Bartsch (1999) described from Australia. It differs from the latter one in the following points: areolar area on AD larger; costae wider, about 2–4 pores wide but in *C. culoatus* it is only 1–2 pores wide. Nature of costae and rosette pores (on PD) differs also: in the specimens at hand, the costae are wider (3–4 pores wide) in anterior and posterior portion, with prominent rosette pores; but in the middle costae slightly narrower (2–3 pores wide), faint, rosette pores feebly developed, small ostium. Paracostae absent in present case but present in *C. culoatus*; median two costae up to the end in present case but in *C. culoatus* they are not reaching the end of PD; in present case paragenital and marginal areolae of PE consist of rosette and pycnotic pores but in *C. culoatus* they are foveated. Ventromedial thick seta of tibia IV in *C. culoatus* tapering, long and almost as long as filiform ventral seta, but in present case ventromedian thick serrated seta is not like *C. culoatus* and also not as long as filiform seta.

*C. yucatanensis* shows also close affinity with *C. modestus* Bartsch (1984a) described from the Caribbean area. But the new species has larger areola on AD, the costae on PD are wider, about 2–4 pores wide, while the costae in *C. modestus* are one pore wide in middle to posterior portion. Nature of costae and rosette pores on PD differs also among both species. Ovipositor is longer in *C. modestus* almost extending the proximal pair of PGS in *C. modestus* while it is not reaching PGS I in the present species. In addition, costae little convergent posteriorly in *C. yucatanensis*. Rostrum comparatively longer in present form than in *C. modestus*. Telofemora I and II in *C. modestus* 1.5–

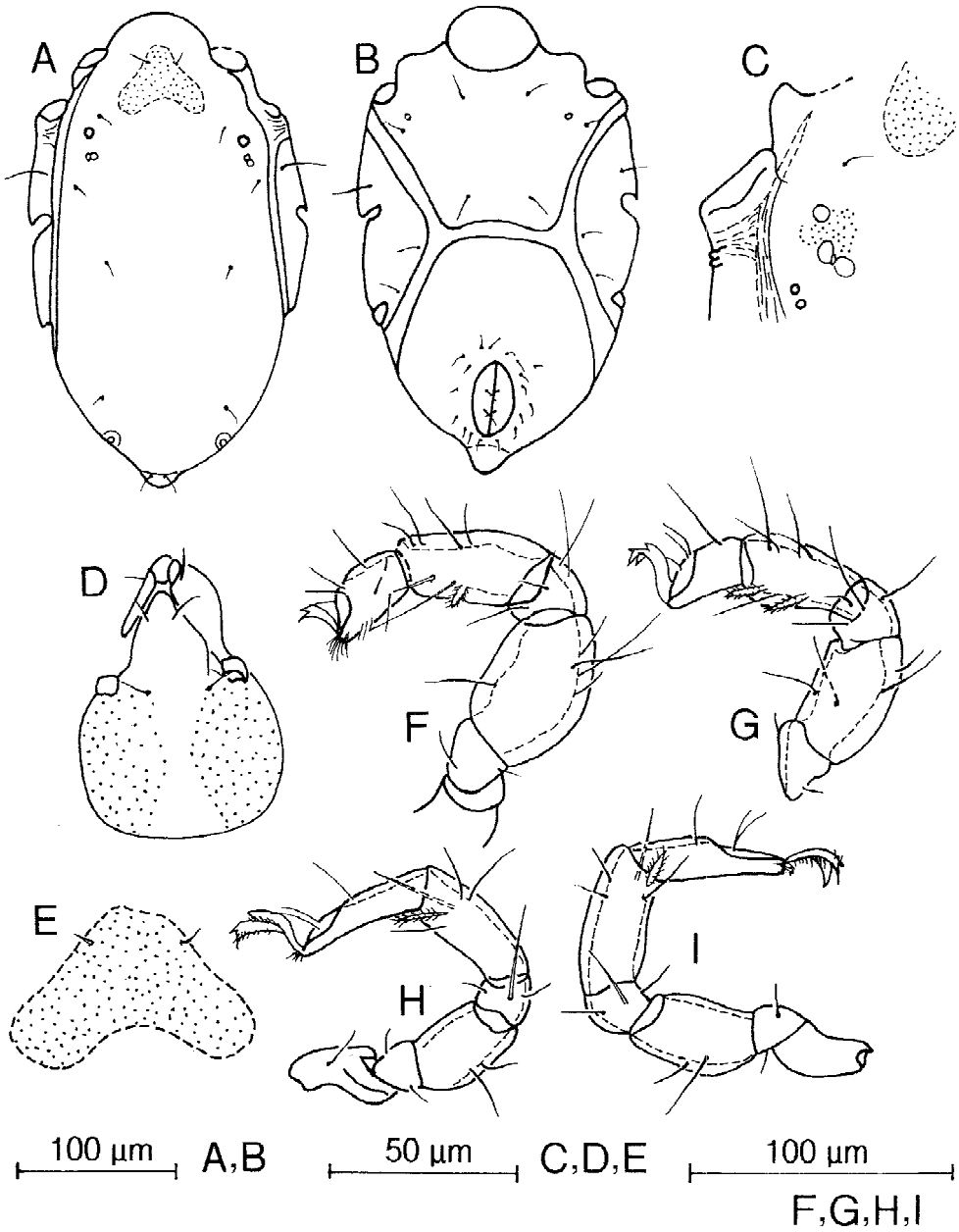


*Figure 2. Copidognathus mexicanus* sp.n. ♂ (A) idiosoma (dorsal); (B) idiosoma (ventral); (C) detail of OC area with ds2; (D) gnathosoma; (E) areola of AD; (F) leg I; (G) leg II; (H) leg III; (I) leg IV.

1.6 times longer than high, but in the present species it is about 1.4 times.

***Copidognathus uniscutatus* Bartsch (1984) (Fig. 2A–I)**

*Material*

One male.

*Locality*

Punta Allen, Quintana Roo (Yucatán Peninsula, Mexico), among the seagrass *Thalassia testudinum*.

*Description*

Male: idiosoma 288 $\mu$m long. All dorsal plates

fused together (Fig. 2A). An elevated transverse-subtriangular porose areola on the AD area. Posterior portion of areola concave (arched). Areola 60 $\mu$m wide (at the base) and 30 $\mu$m long (in the middle portion) (Fig. 2E). First dorsal seta (ds1), at the anterior half of AD area, on the side of the areola. Distance between anterior margin of idiosoma and anterior margin of areola 22 $\mu$m. Two corneae present in the OC area. Posterior cornea subdivided. Porose areola present between anterior and posterior corneae, areola contains brownish pigment (Fig. 2C). Here is the porosity due to pigment granules and restricted to the upper epidermal layer only. Second dorsal seta (ds2) present anterior to cornea. Distance between anterior cornea and ds2 11 $\mu$m. Two small glandular pores present lateral to posterior cornea just above the level of dorsal seta of PE. Third dorsal seta (ds3) present below the glandular pores of OC area and very close to the lateral border of fused dorsal plate. Distance between ds3 and lateral border of fused dorsal plate 8 $\mu$m. Distance between left and right ds3 108 $\mu$m. Fourth dorsal seta (ds4) located halfway the PD area. Distance between ds3 and ds4 58 $\mu$m, ds4 placed 26 $\mu$m away from the lateral border of fused dorsal plate. Distance between right and left ds4 90 $\mu$m. Fifth dorsal seta (ds5) placed on posterior portion of posterodorsal plate area. Distance between ds4 and ds5 73 $\mu$m. Sixth dorsal seta (ds6) on dorsal side of the anal papillae. All dorsal setae (ds1-ds6) short.

All ventral plates separate (Fig. 2B). Epimeral process absent. AE 106 $\mu$m long. AE with three pairs of setae. AE punctuate with pycnotic pores; posterior portion of AE arched. AE extends just below the level of leg III. Epimeral pore present near the coxal area of leg II. PE with three ventral setae and one long dorsal seta. Marginal portion of PE on both dorsal and ventral side with pycnotic pores. GA 146 $\mu$m long, with truncated anterior margin. GO 44 $\mu$m long. Distance from anterior margin of GA to that of GO about 1.7 times the latter length. Spermatopositor large, 38 $\mu$m away from anterior margin of GA. Paragenital areolae absent; 20 PGS present around the GO. GO guarded by sclerites. Three pairs of SGS present. Position of anterior SGS 0.4 of GO length. All SGS long, hair-like. GA punctuate by pycnotic pore. Gnathosoma short (Fig. 2D). Rostrum short. Palp consists of four segments, palpal trochanter and patella without any seta, palpal femur with one dorsal seta; palpal tibiotarsus with three basal and one minute seta distally. Ventrolateral side of the gnathosoma porose.

Leg chaetotaxy: Trochanter 1-1-1-0, Basifemur 2-2-2-2, Telofemur 5-4-2-2, Patella 4-4-3-3, Tibia 7-7-5-5. Legs stout (Fig. 2F–I). Leg I larger than leg II. Telofemora I and II about 1.6 times longer than high. Tibia I almost as long as telofemur I. Telofemur II slightly porose near the dorsolateral margin. Tibia I with three ventral setae (one small thick, weakly denticulate spine and two long slender setae) and four dorsal setae (Fig. 2F). Tibia II with three ventral (two thick pectinate spine-like, one filiform) and four dorsal setae (Fig. 2G). Basal almost pectinate seta of tibia II posterior than the level of smooth, long, slender ventral seta. Tibiae III and IV longer than telofemora III and IV. Telofemora III and IV about 1.8 times longer than wide. Tibiae III and IV about 2.5–2.6 times longer than wide. Telofemora III and IV without any ventral seta (Fig. 2H, I). Tibiae III and IV with one pectinate spine-like and one long filiform seta, besides three dorsal setae. Tarsus I with three long dorsal setae, one hair-like solenidion, one profamulus, four PAS and three ventral setae (one filiform basally and two eupathidia distally). Tarsus II with three dorsal setae, one setiform solenidion and two PAS. Tarsi III and IV with three dorsal setae and two PAS. All legs with two lateral claws and one bidentate median claw. Lateral claws bearing a dorsal accessory tooth. Lateral claws of legs II-IV ventrally faintly pectinate.

*Remarks*

*Copidognathus uniscutatus* Bartsch was before collected from its intertidal (to 15 m) type locality Mactan Island, off Cebu (The Philippines) (Bartsch, 1984). Present report is the first record of this species not only from Mexico but also from the Atlantic Ocean and away from its type locality.

The inverted 'Y' shaped porose area on AD portion present in *C. uniscutatus* has been mentioned by Bartsch (1984) in the original description (specimen collected from The Philippines) but not drawn properly in the figure. The specimen described in the present paper is characterised by a distinct porose area (Fig. 2A, E). Specimens collected by the second author in The Philippines (both male and female specimens; descriptions will be published elsewhere) show also a similar type of porose area and after critical observation we can conclude that both Mexican and Philippine specimens belong to the same species.

Reticulation on AD and PD area is described in the original description of *C. uniscutatus* but is absent here both in the Mexican specimens as well as in the specimens collected by us in the Philippines.

*Table 1.* Marine Halacaridae recorded from the Caribbean Sea and the Gulf of Mexico

| Species name | Sampling site | Habitat | Major reference |
|---|---|---|---|
| **Subfamily Halacarinae Viets 1927** | | | |
| 1. *Halacarus actenos* Trouessart | Florida, Biscayne Bay, Soldier's Key | on calcareous green algae *Halimeda* | Newell (1947) |
| 2. *H. ctenopus* Gosse | Florida, Biscayne Bay, Soldier's Key | on calcareous green algae *Halimeda* | Newell (1947) |
| 3. *Halacarellus tropicalis* Bartsch | Venezuela 11° 51′ 22″ N, 66° 56′ 02″ W | coarse sand and coral | Bartsch (1984e) |
| 4. *Agauopsis nonornata* Bartsch | Panama 9° 33′–9° 13′N, 78° 59′–82° 02′ W | 0–4 m | Bartsch (1996b) |
| 5. *Arhodeoporus bonairensis* Viets | Bonaire, Florida | with algae | Viets (1936a); Newell (1947) |
| 6. *A. mirabilis* Bartsch | Gulf of Honduras | At 15 m depth | Bartsch (1983) |
| 7. *A. perlucidus* Bartsch | Caribbean Sea of Panama | At 1–2 m depth | Bartsch 1983 |
| **Subfamily Copidognathinae Bartsch 1983** | | | |
| 8. *Copidognathus angustus* Viets | Curaçao, Boca Gŏndi | with coral | Viets (1936a); Bartsch (1984b) |
| 9. *C. bairdi* Newell | Florida, Biscayne Bay, Soldier's Key, Caribbean and Gulf region 9° 34.6′ N, 78° 43.2′ W | among algae, intertidal | Newell (1947); Bartsch (1984c) |
| 10. *C. bairdiensis* Bartsch | Caribbean Sea 16° 4.5′ N, 87° 59.2′ W 8° 54.7′ N, 77° 41.0′ W | 0–5 m depth | Bartsch (1984c) |
| 11. *C. biscayneus* Newell | Florida, Biscayne Bay, Soldier's Key | among algae *Halimeda* | Newell (1947) |
| 12. *C. caudatus* Newell | Florida, Biscayne Bay, Soldier's Key | among algae *Halimeda* | Newell (1947) |
| 13. *C. cristatus* Viets | Curaçao | with coral | Viets (1936a) |
| 14. *C. curassaviensis* Viets | Curaçao, Florida, Biscayne Bay, Soldier's Key | with coral, also with *Halimeda* | Viets (1936a); Newell (1947) |
| 15. *C. floridensis* Newell | Florida, Biscayne Bay, Soldier's Key | among algae *Halimeda* | Newell (1947) |
| 16. *Copidognathus gibberipes* Viets | Bonaire | among algae | Viets (1936a) |
| 17. *C. glandulosus* Bartsch | Caribbean area 16° 04.5′ N, 87° 59.2′W | intertidal | Bartsch (1984c) |
| 18. *C. gracilis* Viets | Curaçao, Florida, Biscayne Bay, Soldier's Key | among algae | Viets (1936a); Newell (1947) |
| 19. *C. grandiosus* Bartsch | Puerto Rico 18° 15′ N, 67° 13′W | with sponges, at 18–36 m depth | Bartsch (1984e) |
| 20. *C. hummelincki* Viets | Bonaire, Aruba; Florida, Biscayne Bay, Soldier's Key | among algae | Viets (1936a); Newell (1947) |
| 21. *C. lepidoides* Bartsch | Gulf of Honduras | 3–9 m depth | Bartsch (1984a) |
| 22. *C. manubriatus* Viets | Curaçao, Boca Grandi, Gulf of Honduras 16° 48.2′ N, 88° 04.6′ W | intertidal to 9 m depth, also among algae and corals | Viets (1936a); Bartsch (1984a) |
| 23. *C. uniscutatus* Bartsch | Punta Allen (Quintana Roo, Mexico) 19° 47′ 06″ N, 87° 28′ 08″ W | among seagrass *Thalassia testudinum* | present study |

*Continued on p. 242*

*Table 1.* Continued

| Species name | Sampling site | Habitat | Major reference |
|---|---|---|---|
| 24. *C. milliporus* Bartsch | Gulf of Honduras 16° 43.8′ N, 87° 52.0′ W | 4 m depth | Bartsch (1984d) |
| 25. *C. modestus* Bartsch | Panama; Gulf of Honduras 9° 12.8′ N, 82° 02.7′ W 16° 04.5′ N, 97° 59.2′ W | 0–4 m depth | Bartsch (1984a) |
| 26. *C. nememus* Bartsch | Nicaragua 14° 34.2′ N, 82° 58.0′ W | 0 m | Bartsch (1984a) |
| 27. *C. obesus* Bartsch | Caribbean Sea 17° 13.2′ N, 88° 16.5′ W | 25 m depth | Bartsch (1984c) |
| 28. *C. pachypus* Newell | Florida, Biscayne Bay, Soldier's Key | among *Halimeda* | Newell (1947) |
| 29. *C. pulcher* (Lohmann) | Florida; Gulf of Honduras | among *Halimeda* | Newell (1947); Bartsch (1984d) |
| 30. *Copidognathus triops* Viets | Trinidad and Grenada | among *Sargassum* | Viets (1936a) |
| 31. *C. yucatanensis* n.sp. | Punta Allen (Quintana Roo, Mexico) 19° 47′ 06″ N, 87° 28′ 08″ W | among seagrass *Thalassia testudinum* | present study |
| **Subfamily Actacarinae Viets 1939** | | | |
| 32. *Actacarus giganteus* Krantz | Quintana Roo, Mexico | intertidal beaches with coarse particles of coral and shell fragments | Krantz (1971) |
| 33. *A. minor* Bartsch | Santa Marta area, Colombia; Caribbean Sea, Punta de Betin | intertidal beaches with sand and gravel | Bartsch (1996) |
| 34. *A. mollis* Bartsch | Caribbean Sea Playa Ospina | intertidal | Bartsch (1996) |
| 35. *A. uniscutatus* Bartsch | Caribbean Sea | intertidal with course gravelly sandy deposites | Bartsch (1996) |
| **Subfamily Halixodinae Viets 1927** | | | |
| 36. *Agaue arubaensis* Bartsch | Aruba 12° 32′ 28″ N, 69° 56′ 54″ W | – | Bartsch (1984e) |
| 37. *A. nationalis* (Lohmann) | Florida, Biscayne Bay, Soldier's Key | among *Halimeda* | Newell (1947) |
| **Subfamily Lohmannellinae Viets 1927** | | | |
| 38. *Scaptognathus ornatus* Bartsch | Venezuela, Caribbean Sea 11° 21′ 44″ N, 63° 07′ 52″ W 18° 05′ 51″ N, 65° 28′ 30″ W | intertidal sand | Bartsch (1984e) |
| **Subfamily Rhombognathinae Viets 1927** | | | |
| 39. *Rhombognathus pectinatus* Viets | Bonaire, Curaçao | among algae, coral | Viets (1936a) |
| **Subfamily Simognathinae Viets 1927** | | | |
| 40. *Simognathus fuscus* Viets | Bonaire | among algae | Viets (1936a) |

After discussion with Dr. Ilse Bartsch (Germany) we concluded that reticulation on AD and PD area may not be considered as a distinguishing characteristic between the type specimen collected by Bartsch (1984) from The Philippines and our specimens from both Mexico (this paper) and The Philippines (unpublished material). We completely agree with Bartsch that reticulation may be absent in recently hatched specimens or unclear specimens or after long storage in medium like lactic acid.

So, presence or absence of reticulation only may not be a criterion to distinguish between two specimens.

Mexican specimens and specimens collected in the Philippines do not contain any line on the posterior half of PD–area; which is presented in the figure of *C. uniscutatus* by Bartsch (1984). This variation may also be due to preservation or to the examination of recently hatched specimens.

Important variation was observed between the Mexican specimens and the ones from the Philippines (collected by the second author) as well as in the original description of *C. uniscutatus* by Bartsch (1984). The Mexican specimen is characterised by a porose area with brownish pigment between two corneae. After critical observation we concluded that this porose nature is due to pigmentation and is restricted to the epidermal layer only. So this difference may not be considered as a criteria for separation of species.

### *Halacaridae fauna of the Caribbean Sea and the Gulf of Mexico*

According to the published records (including present report), 40 species of Halacaridae belonging to ten genera and seven subfamilies have been identified from the Gulf of Mexico and the Caribbean Sea (Table 1). Some of these species were also reported in other localities outside this area: *Halacarus actenos* Trouessart (1889) was found in the French Atlantic, the English Channel, Cape Verde and the Kerguelen Islands (Trouessart, 1889b; Halbert, 1915; André, 1946; Green & MacQuitty, 1987; Somerfield, 1988); *H. ctenopus* Gosse (1855) is known from the North Sea, English Channel, Ireland (Viets, 1927, 1936b; André, 1946; Green & MacQuitty, 1987; Somerfield, 1988) and Bermuda (Lohmann, 1893; Schuster & Bartsch, 1986); but the majority of the older identification of *C. ctenopus* from French Atlantic and the English Channel records may be wrong and may thus be of another species (cfr. Bartsch, 1991). *Copidognathus floridensis* Newell (1947), *C. pulcher* (Lohmann, 1893) and *Simognathus fuscus* Viets (1936) were reported from Bermuda (Bartsch & Iliffe, 1985); *C. bairdi* Newell (1947), *Actacarus mollis* Bartsch (1977) and *A. uniscutatus* Bartsch (1977) from the Galapagos Islands (Bartsch, 1977b); *Agaue nationalis* (Lohmann, 1893) from Bermuda (Bartsch & Iliffe, 1985) and Northern Brazil (Viets, 1936a); *Arhodeoporus bonairensis* (Viets, 1936) was also recorded from the Galapagos Islands (Bartsch, 1977b) and the Andaman Islands (Indian Ocean, Sarma & Chatterjee, 1993); *Agauopsis nonornata* Bartsch (1999) from the Galapagos Islands (Bartsch, 1999b).

*Copidognathus uniscutatus* is also known from The Philippines (Bartsch, 1984).

*Rhombognathus magnirostris* (Trouessart, 1889) which was recorded by Newell (1947) from Florida is not conspecific with *magnirostris* which was recorded by Newell (1947) should not to be regarded as the same species of Trouessart (1889a) until further information on morphological variation is obtained. Like this way *Agauopsis brevipalpus* (Trouessart, 1889) that was recorded by Newell (1947) from Florida is not conspecific with *brevipalpus* (cfr. Bartsch, 1996). Bartsch (1996) stated that 'a slide of Newell's halacarid collection (housed in the United States National Museum of Natural History) from Soldier's Key, Florida, proved to contain not *A. brevipalpus* but a species more similar to *A. littoralis* Bartsch & Iliffe. Bartsch (1996) also stated that in her collection some *Agauopsis* are present from the Caribbean area which are closely related but not conspecific with *A. brevipalpus*. So these two species of the genera *Rhombognathus* and *Agauopsis* were not included in our list and are waiting for further specific identification.

As in other tropical areas, the halacarid fauna of the Gulf of Mexico and the Caribbean Sea is dominated by the genus *Copidognathus*. Out of 40 species recorded in the region, 24 species (60%) belong to this genus. Seven species viz. *Halacarellus tropicalis*, *Arhodeoporus mirabilis*, *A. perlucidus*, *Actacarus giganteus*, *A. minor*, *A. mollis* and *A. uniscutatus* are thought to be arenicolous.

The number of halacarid species from the study area is less compared to the halacarid fauna from the Mediterranean, North Sea, the Baltic Sea, the North Atlantic Ocean and adjacent areas. This is mainly due to the lack of intensive sampling effort in the Gulf of Mexico and the Caribbean Sea although this region is very interesting for biogeographical interpretation in view of its genesis (e.g. Rosen, 1975).

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