

A new species of *Agauopsis* (Halacaridae, Acari) from Brazil

Almir Rogério PEPATO^{1,2} & Cláudio Gonçalves TIAGO^{2*}

(¹) Departamento de Zoologia – Instituto de Biociências da Universidade de São Paulo

(²) Centro de Biologia Marinha da Universidade de São Paulo

Rodovia Manoel Hipólito do Rego, km 131,5; São Sebastião - SP; CEP 11600-000; Brazil.

(*) Corresponding author: Fax: (55) 12 3862-6646 - E-mail: clgtiago@usp.br

Abstract: Specimens of a new species of *Agauopsis* (Halacaridae, Acari) were obtained from algal samples from Cigarras Beach (São Sebastião, State of São Paulo, Brazil) and Lazaro Beach (Ubatuba, State of São Paulo, Brazil). *Agauopsis bilophus* sp. nov. is described and details of its taxonomy are given.

Résumé : Une nouvelle espèce du genre *Agauopsis* (Halacaridae, Acari) du Brésil. Des spécimens d'une nouvelle espèce appartenant au genre *Agauopsis* ont été récoltés sur des algues échantillonnées sur la plage de Cigarras (São Sebastião, état de São Paulo, Brésil) et sur la plage du Lazaro (Ubatuba, état de São Paulo, Brésil). *Agauopsis bilophus* sp. nov. est décrite et des informations détaillées sont apportées sur sa taxonomie.

Keywords: *Agauopsis*, Halacaridae, Acari, phytal, Brazil, Southwestern Atlantic

Introduction

Halacaridae is a cosmopolitan family, predominantly marine, with approximately 900 species living in intertidal regions to great depths. The Brazilian Halacaridae are mostly unknown. Until now, only seven species have been described, five of which collected near Marajó Island by the Plankton Expedition (Lohmann, 1893) and two in Bahia State, Northeastern Brazil (Trouessart, 1900).

Considering the length of the Brazilian coastline and the variety of substrates suitable for Halacaridae, the diversity of the family should at least be similar to that recorded from the North Western Atlantic (116 species) or Mediterranean (83 species) (Bartsch, 1989).

Material and methods

The specimens were collected from intertidal rocky shore algae of Cigarras Beach (São Sebastião, São Paulo State, Southeastern Brazil), at two sites: 23°43'54.1''S, 45°23'53.4''W and 23°43'40.7''S, 45°23'51.3''W, and at Lazaro Beach, 23°30'04.5''S, 45°08'17.2''W (Ubatuba, São Paulo State, Southeastern Brazil). Intertidal algae were sorted under stereoscopic microscope and the material obtained was fixed in formalin 4%. Mites were cleared in lactic acid and mounted in glycerin jelly (Green & MacQuitty, 1987). The holotype was deposited in the Museu de Zoologia da Universidade de São Paulo (MZUSP). Drawings were made with the aid of a camera lucida.

Abbreviations used in the description: AD, anterior dorsal plate; PD, posterior dorsal plate; AE, anterior epimeral plate; PE, posterior epimeral plate; GA, genitoanal plate; GO, genital opening; OC, ocular plate; Legs

numbered I to IV and the segments, in proximal to distal, named: trochanter, basifemur, telofemur, genu, tibia and tarsus; palpal segments in same order numbered P1 to P4; ds, dorsal setae, from anterior to posterior: ds-1 to ds-5; glp, gland pores, in same order numbered glp-1 to glp-4.

Chaetotaxy formula are referred without solenidia and parambulacral setae, from trochanter to tarsus. The position of certain structures was described according to Newell (1984), using the decimal system.

Taxonomy

Agauopsis bilophus sp. nov.

(Figs 1-2)

Material examined

Holotype: Female (MZUSP 14586), on *Gymnogongrus griffithsiae* (Turner, 1808) C.F.P. Martius, 1828, from intertidal rocky shore at Cigarras Beach, 24 November 2000; Coll. E. Nascimento.

Paratypes: Male (MZUSP 14587), on *Padina gymnospora* (Kützinger, 1859) Sonder, 1871, from intertidal rocky shore at Cigarras Beach, 24 November 2000; Coll. E. Nascimento. Female (MZUSP 14588a, b), on *Padina gymnospora* from intertidal rocky shore at Cigarras Beach, 25 November 2000; Coll. E. Nascimento. Female (author's collection), on *Aglaothamnion felipponei* (Howe, 1931) Aponte et al., 1994, from intertidal rocky shore, locality data as holotype, 24 November 2000; Coll. E. Nascimento; Female (author's collection), on *Sargassum cymosum* C. Agardh, 1820, from intertidal rocky shore at Lazaro Beach, November 1990; Coll. R. Curvêlo; Deutonymph (author's collection), on *Sargassum cymosum* from intertidal rocky shore at Lazaro Beach, January 1991; Coll. R. Curvêlo. Deutonymph (author's collection), on *Acanthophora spicifera* (M. Vahl, 1802) Børgesen, 1910, from intertidal rocky shore at Cigarras Beach, 25 November 2000; Coll. E. Nascimento.

Description

Female:

Idiosoma 415-458 µm long, 275-300 µm wide at level of OC, length of holotype 453 µm. Dorsal and ventral plates separated by membranous cuticle, with outline as shown in Fig. 1A, C. Length of AD 138-165 µm and width 138-150 µm - including the single anterior spine that covers 0.16-0.17 of total length. Behind the frontal spine two little crests raises followed by two gland pores. AD is slightly reticulated, with an M-shaped distinctly elevated and punctuated ridge. Pair of ds-1 is on internal surface of areola ridge of AD, at 0.09 of overall length of the areola from anterior end of the areola, measurement from holotype. Raised areas with great number of canaliculi assembled in groups (rosette pores) of six to thirteen. Beneath each such group no alveolus present. Pair of ds-2 inserted on anterior edge of OC, just behind glp-2. Pair of ds-3 inserted in

integument between AD and PD. OC 103-108 µm long and 77-83 µm wide. This plate bears two cornea, one circular, the other elongate, on a distinctly punctuated and elevated triangular area.

Length of PD 227-260 µm and 169-177 µm width, with ornamentation similar to AD and two raised costae, as wide as three rosette pores, distinctly divergent in the anterior portion. Pair of ds-4 inserted in the anterior margin of PD, at level of leg III. Pair of gland pores on external face of costae, behind ds-4 level, at 0.28-0.32 of PD's length, ds-5 at 0.45-0.51 of PD's length.

Ventral plates are punctuated with small pores. AE with three pairs of setae and a pair of slit-like epimeral pores near insertion of leg II. Genitoanal plate 123-138 µm long and 143-164 µm wide, bearing three pairs of setae, one inserted anterior to GO and two flanking GO posterior to it. Genital opening is 59-67 µm long, 28-33 µm wide. The distance between anterior edge of GA and GO is 58-63 µm. Inserted internally to the genital sclerites are broad endogenital setae with finger-like projections.

Leg chaetotaxy, observed in all individuals: leg I, 1,2,8,5,10,5; leg II, 1,2,5,3,6,3; leg III, 1,2,3,3,5,3; leg IV, 0,2,3,3,5,3. Leg I has stout spines situated as follows: one anterior on tarsus, three anterior and one ventral on tibia, one anterior and one ventral on genu, two anterior and one ventral on telofemur. These spines have few denticles at the apical end. The anterior spine of genu is much larger than the ventral one. Tarsus I (Fig. 2E) with three dorsal setae, parambulacral setae divaricate, bacillum, a pair of ventral setae and the spiniform setae cited above. Tibia and telofemur II-IV bear lamellae, better developed in leg III. Tibia II-IV with two bipectinate spines. The trochanter and basifemur III and IV have spiniform processes.

Gnathosoma (Fig. 1E) 118-130 µm long, 70-77 µm wide, rostrum 0.50-0.51 of overall length of gnathosoma. Four-segmented palp with one dorsal seta on P2, one medial on P3, one ventral and other dorsal on P4. Chelicerae with a broad, scythe shaped movable digit.

Male:

The only specimen collected was very damaged. However it was possible to obtain these measurements: AD, 158 µm long, 153 µm wide; OC, 117 µm long, 87 µm wide; Gnathosoma, 128 µm long, rostrum half the length of gnathosoma. GO surrounded by 34 perigenital setae, in a single ring. There is one pair of outlying setae. The genital area, despite damaged, is illustrated (Fig. 1G).

Deutonymph:

Idiosoma 385-405 µm long. Strips of membranous cuticle between dorsal and ventral plates much broader than those of adults. Setae ds-2 inserted anterior to OC, ds-3 between these plates and ds-4 anterior to PD, all setae in membranous integument. Pair of ds-5 inserted at 0.44-0.46 of PD's length. Genital plate is 58-63 µm long, 69-83 µm

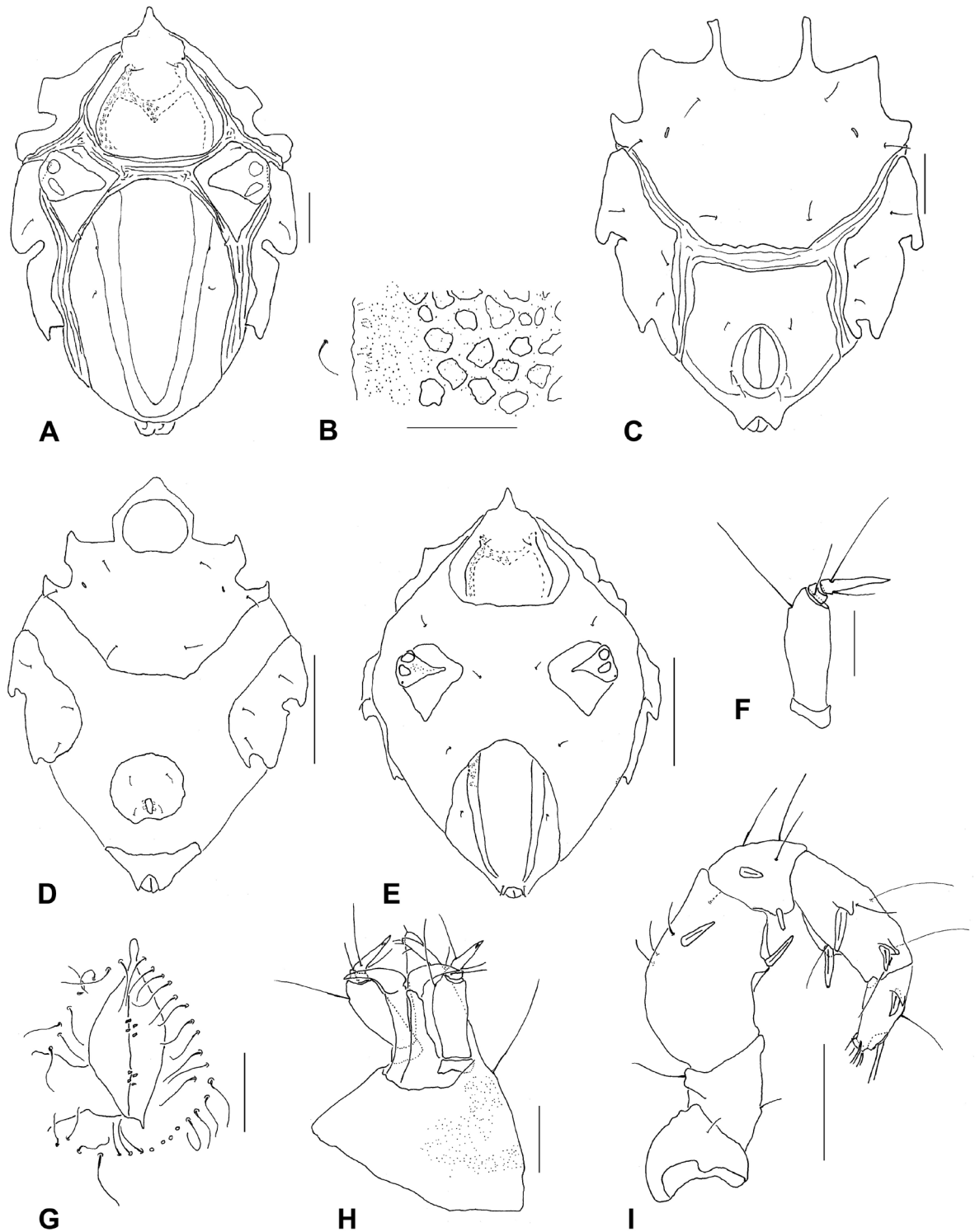


Figure 1. *Agauopsis bilophus* sp. nov. **A.** Idiosoma of female, dorsal view. **B.** Portion of posterior dorsal plate close to ds-5. **C.** Idiosoma of female, ventral view. **D.** Idiosoma of deutonymph, ventral view. **E.** Idiosoma of deutonymph, dorsal view. **F.** Palp, lateral view. **G.** Genital opening of male. **H.** Gnathosoma, medial view. **I.** Leg I, deutonymph. Scale bars: A,C,D,E: 50 μ m, B,F,G,H,I: 25 μ m.

Figure 1. *Agauopsis bilophus* sp. nov. **A.** Vue dorsale de l'idiosome de la femelle. **B.** Détail de la plaque dorsale postérieure proche de la cinquième soie dorsale. **C.** Vue ventrale de l'idiosome de la femelle. **D.** Vue ventrale de l'idiosome de la deutonymphe. **E.** Vue dorsale de l'idiosome de la deutonymphe. **F.** Palpe, vue latérale. **G.** Ouverture génitale du mâle. **H.** Gnathosome, vue médiale. **I.** Patte I, deutonymphe. Échelles : A,C,D,E : 50 μ m, B,F,G,H,I : 25 μ m.

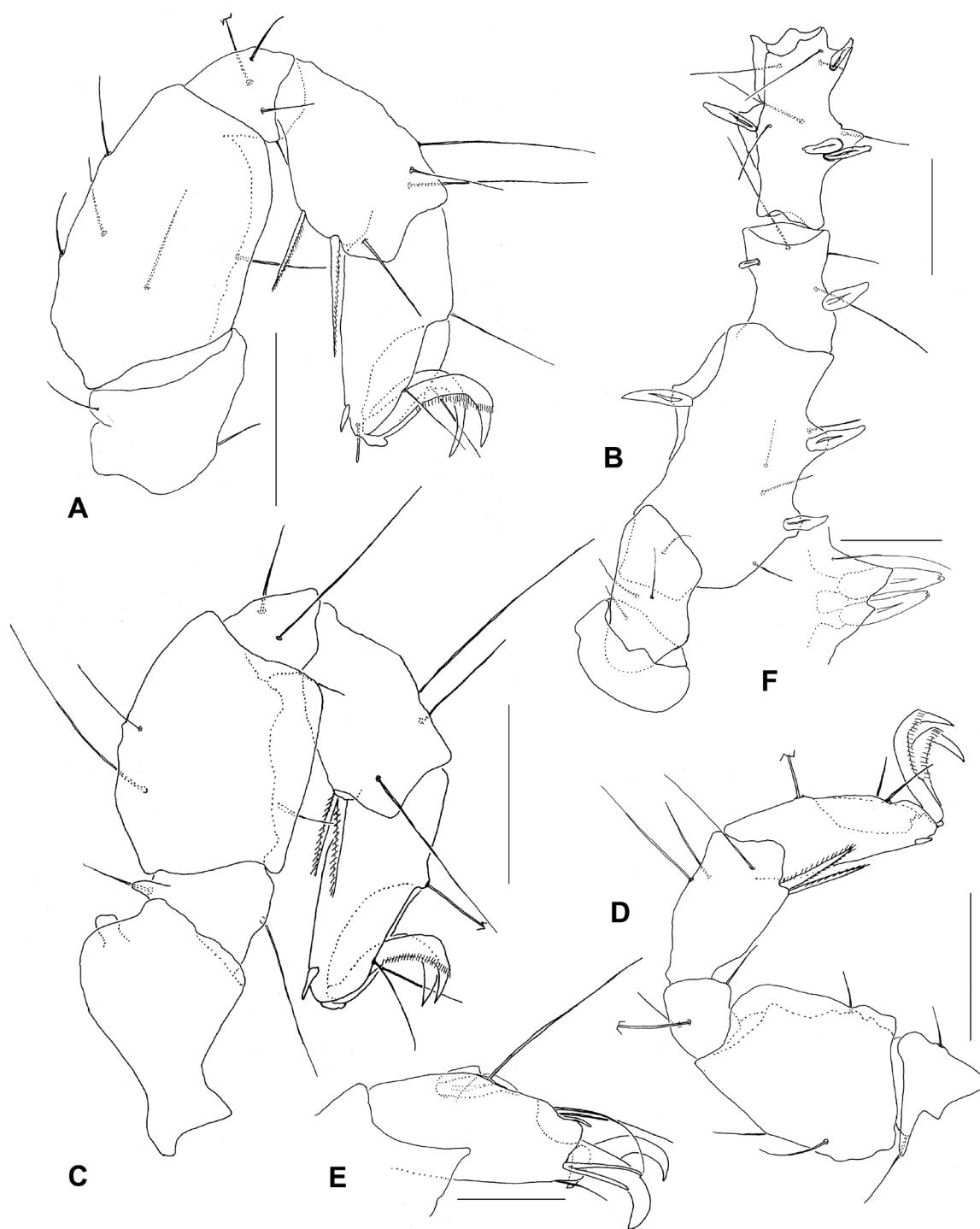


Figure 2. *Agauopsis bilophus* sp. nov., female **A.** Leg II, lateral. **B.** Leg I, ventral. **C.** Leg III, lateral. **D.** Leg IV, lateral. **E.** Tarsus I, lateral. **F.** Portion of leg I. Scale bars: A,B,C,D: 50 μ m, E: 25 μ m.

Figure 2. *Agauopsis bilophus* sp. nov., femelle **A.** Patte II, vue latérale. **B.** Patte I, vue ventrale. **C.** Patte III, vue latérale. **D.** Patte IV, vue latérale. **E.** Tarse I, vue latérale. **F.** Détail de la patte I. Échelles : A,B,C,D : 50 μ m, E, F : 25 μ m.

wide, with two pairs of pgs and two pairs of internal genital acetabula. Leg Chaetotaxy: leg I:1,2,6,5,9,6; leg II:1,2,4,4,6,3; leg III:1,2,3,3,5,3; leg IV:0,2,3,3,5,3; Leg I

armored with spines situated as follows: one anterior on tarsus, two anterior and one ventral on tibia, one anterior and one ventral on genu and telofemur.

Etymology: Bi [Latin] = two; Lophos [Greek] = crest; referring to two little crests in AD.

Remarks

Agauopsis bilophus sp. nov. belongs to the *microhyncha* group (Bartsch, 1986) that includes Newell's key group 7000. This group is characterized by a ventral and two anterior spines on telofemur I, a ventral and three anterior spines on tibia I, two of which are adjacent, and one seta on P3 and two on P4 (Newell, 1984). Nineteen species that belong to this group have been described, most of them from the Southern Hemisphere (Bartsch, 1996; Otto, 1994, 1999). Some individuals collected in Bermuda and identified as *A. microhyncha* (Trouessart, 1889) by Lohmann (1893) represent the single occurrence notified for the *microhyncha* group on the Western Tropical Atlantic.

Agauopsis bilophus sp. nov. can be distinguished from most species of this group for having the AD's areola "M" shaped. It shares this character only with *A. curvata* Krantz, 1973 but it has a rounded anterior spine on AD, three bipectinate spines on tibia II, a characteristic general shape of idiosomatic plates and the absence of a ventral spine on genu in most individuals.

The original description of *A. microhyncha* is very short and re-descriptions made by Lohmann (1893) and Viets (1940) do not agree in some aspects. However, *A. bilophus* differs particularly from these mites by the shape of AD's areola, the spines on genu I and the number of bipectinate setae of tibia II.

Acknowledgements

The authors wish to thank B. Sc. Edisa Nascimento (Depto Ecologia, IB-USP) and MSc. Rita Curvelo (Depto Oceanografia Biológica, IO-USP) that kindly provided the specimens. We are grateful to Dr Carlos Rocha (Depto Zoologia, IB-USP) and his students for the use of optical equipment and for their suggestions about the illustrations. We also thank MSc. Cynthia Santos (Depto Zoologia, IB-USP), Dr Jean-Jacques Geoffroy (Museum National

d'Histoire Naturelle) and B. Sc. Silvia Dias Peres for their suggestions on the manuscript. Special thanks are due to Dr Ilse Bartsch (Forschungsinstitut Senckenberg), who made helpful comments on the manuscript.

References

- Bartsch I. 1986.** Zur Gattung *Agauopsis* (Acari, Halacaridae), Beschreibung zweier neuer Arten und Übersicht über Verwandtschaftsgruppen. *Zoologica Scripta*, **15**: 165-174.
- Bartsch I. 1989.** Marine mites (Halacaroida: Acari): a geographical and ecological survey. *Hydrobiologia*, **178**: 21-42.
- Bartsch I. 1996.** Halacarines (Acari: Halacaridae) from Rottneest Island, Western Australia: the genera *Agauopsis* Viets and *Halacaropsis* gen. nov. *Records of the Western Australian Museum*, **18**: 1-18.
- Green J. & Macquitty M. 1987.** *Halacarid mites*. Linnean Society of London/Estuarine and Brackish-Water Sciences Association & E.J. Brill/W. Backhuys: London. 178 pp.
- Krantz G.W. 1973.** Four new predatory species of Halacaridae (Acari: Prostigmata) from Oregon, with remarks on their distribution in the intertidal mussel habitat (Pelecypoda: Mytilidae). *Annals of the Entomological Society of America*, **66**: 975-986.
- Lohmann H. 1893.** *Die Halacarinen der Plankton-Expedition*. Lipsius & Tischer: Kiel 95 pp. + 13 pl (Ergebnisse der Plankton-Expedition der Humboldt-Stiftung; Bd. 2G.a.b.).
- Newell I.M. 1984.** Antarctic Halacaroida - *Antarctic Research Series*, **40**: 1-284.
- Otto J.C. 1994.** New Species of Halacaridae from Australia (Acarina: Prostigmata). *Acarologia*, **35**: 31-48.
- Otto J.C. 1999.** Halacarid fauna of the Great Barrier Reef and Coral Sea: The genera *Agauopsis* and *Halacaropsis* (Acarina: Halacaridae). *Memoirs of the Queensland Museum*, **43**: 797-817.
- Trouessart E. 1889.** Acariens marins (Halacaridae) des côtes de France: diagnoses d'espèces et genres nouveaux. *Naturaliste*, **11e Année**, 2^e Ser. : 181.
- Trouessart E. 1900.** Description d'espèces nouvelles d'Halacaridae par le Dr Trouessart et description d'un genre nouveau par MM. Brucker et Trouessart. *Bulletin de la Société Zoologique de France*, **25**: 38-43.
- Viets K. 1940.** Meeresmilben aus der Adria. (Halacaridae und Hydrachnellae, Acari). *Archiv für Naturgeschichte*, **9**: 1-135.