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Antarctic Halacaridae (Acari), new records, these species characteristics and an updated list of species

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Abstract: Four halacarid species: *Agaue agauoides*, *Agaue parva*, *Bradyagaue drygalskii*, and *Halacarus minor* have been extracted from bottom samples taken in Admiralty Bay, King George Island, South Shetland Islands, another four, *Colobocerasides auster*, *Halacarus arnaudi*, *Lohmannella fukushimai*, and *L. gaussi*, from Kapp Norvegia, Atka and Halley Bay, Weddell Sea. Most of these species are widespread around Antarctica and adjacent islands. Diagnostic characters are outlined. An annotated list presents 66 halacarid species reported from south of the Antarctic Polar Front.

Key words: Antarctic, Halacaroidea, King George Island, Weddell Sea

Introduction

The first halacarids from the Antarctic were collected more than a century ago. The Belgica Expedition (1897–1899) with the S/Y *Belgica*, the French Antarctic Expedition 1903–1905 (Expédition Antarctique Française 1903–1905) with the ship *Française* and the Deuxième Expédition Antarctique Française with the ship *Pourquoi Pas?* (1908–1910) concentrated on the area west of the Antarctic Peninsula and the adjacent coastline; eight halacarid species (synonyms excluded) were mentioned by Trouessart (1907b, 1914) and Cooreman (1953). The Swedish Antarctic Expedition 1901–1903, with the ship *Antarctic*, brought back halacarids from Falkland Islands and South Georgia, the material from South Georgia contained six species (Viets 1950, 1952). The German South Polar Expedition 1901–1903 (Deutsche Südpolar-Expedition 1901–1903), also called the Gauss-Expedition (1901–1903), explored the Antarctic sector south of the Indian Ocean, Kaiser-Wilhelm II Land. The ship *Gauss* spent the austral wintertime near the Gaussberg, an extinct volcano at 66°48'S, 89°11'E; samples taken at about 46–385 m depth held 13 halacarid species (Lohmann 1907a, b; Gimbel 1919). The British National Antarctic Expedition, 1901–04, with RSS *Discovery*, generally known as the Discovery Expe-

dition, visited Victoria Land, Ross Sea; two halacarid species were mentioned from the Granite Harbour (Trouessart 1907a, 1914). In the course of the Australasian Expedition, on the ship *Aurora*, samples were taken in the Commonwealth Bay, George V Land; they included eight named halacarid species (Womersley 1937). The results of these expeditions were records of 23 halacarid species collected around Antarctica and the islands south of the Antarctic Polar Front (synonyms and species which are in need of re-identification are excluded).

In the following decades only sparse new material was collected and consequently only a few new records or descriptions of species were published (Sokolov 1962; Newell 1967; Imamura 1968). An enormous increase in knowledge of the Antarctic halacarid fauna was made by Newell (1984); his paper included numerous descriptions of new species and diagnoses on the basis of published data and re-examined material stored in museums. In all, 200 species or subspecies were mentioned, though only one fifth of them had Antarctic records, the others were from Subantarctic and temperate waters. The number of new records and new species quickly increased. The Synopsis of the Antarctic Halacaroidea (Bartsch 1993) included 53 species, all with records south of the Southern Polar Front. A year later, nine species were mentioned from South Georgia, which meant eight new records to the Antarctic fauna (Pugh and Bartsch 1994; Bartsch 1999). In the following two decades, another four new species and one new record were added to a list of Antarctic species (Bartsch 1995, 1998, 2005, 2008, 2010b). At present, the genera, and number of species (in parentheses), known from south of the Antarctic Convergence are: *Agaue* (7), *Agauopsis* (4), *Bathyhalacarus* (1), *Bradyagaue* (3), *Colobocerasides* (1), *Copidognathus* (7), *Halacarellus* (12), *Halacarus* (13), *Isobactrus* (1), *Lohmannella* (8), *Mictognathus* (1), *Rhombognathus* (7), and *Werthella* (1). Excluded are records published but doubtful and in need of verification.

Material, methods and area under consideration

The halacarids outlined below were collected in Admiralty Bay, King George Island, South Shetland Islands, and off the eastern coast of the Weddell Sea. The halacarids from Admiralty Bay were taken in 1985 in a transect (Central Basin, Section I) off the *Henryk Arctowski* Polish Antarctic Station (Shag Point) and the Ezcurra Inlet (Section III). Most of the samples were taken with a Van Veen grab (sample area *ca*. 0.1 m¸). The seafloor in the bay is covered by poorly sorted sediment, medium sand to fine silt but also significant portion of gravel and drop stones (Siciński *et al*. 2011). There is a regular exchange of water between the Admiralty Bay and the Bransfield Strait down to 100 m and the waters in the bay are well oxygenated also in deeper parts (Siciński *et al*. 2011). The mites from the Weddell Sea were collected in 1989 during the cruise *Antarktis* VII/4 with the RV *Polarstern*, EPOS (European *Polarstern* study), leg 3. The meiofauna was taken with a multibox

corer (Dahms *et al.* 1990; Klages and Hain 1990). The waters around King George Island are ice free for several months and the Central Basin of King George Island is not completely freezing every year (Jażdżewski *et al*. 2001; Kejna *et al*. 2013), in contrast, off the north-eastern coast of the Weddell Sea the sea is ice covered for most part of the year (Voss 1988). Both areas have a rich bottom fauna (Jażdżewski *et al.* 1986; Voss 1988; Arnaud *et al*. 1990; Siciński *et al*. 2011).

The terminology in the descriptive part follows Bartsch (1993, 2006). The descriptions are prepared on the basis of both published data and the above mentioned material. Abbreviations used are: AD, anterior dorsal plate; AE, anterior epimeral plate; ds-1 to ds-6, first to sixth pair of dorsal idiosomatic setae, numbered from anterior to posterior; GA, genitoanal plate; glp, (pair of) gland pore(s), numbered glp-1 to glp-5, from anterior to posterior; GO, genital opening; OC, ocular plate(s); P-2 to P-4, second to fourth palpal segment; pas, parambulacral seta(e); pc, pore canaliculus; PD, posterior dorsal plate; PE, posterior epimeral plate(s); pgs, perigenital setae, numbered from anterior to posterior; sgs, subgenital setae. The position of a seta is given in a decimal system, with reference to the length of a given structure from its anterior to posterior or basal to apical margin. The length of a leg segment is that along the dorsal margin. The legs, their segments and claws are numbered I to IV, from anterior to posterior. The leg segments are trochanter, basifemur, telofemur, genu, tibia, and tarsus.

The list of Antarctic halacarids includes species reported south of the Antarctic Polar Front, consequently those from the continent of Antarctica with the Antarctic Peninsula, and the islands South Georgia, South Sandwich, South Orkneys, and South Shetlands but excludes the islands north of that front, namely the Falkland, Prince Edward, Crozet, Kerguelen Islands, St. Paul, and Macquarie Island. The area equals the SCAR-MarBIN/RAMS area of interest (*cf.* De Broyer *et al.* 2011: fig. 2).

Systematics

Agaue agauoides (Lohmann, 1907)
(Fig. 1A–G)

Material examined. — One male. King George Island, Admiralty Bay, Section I, 27 September 1985, 184 m.

Description. — Adults. Known length range of female idiosoma 575–680 μm, length of present male 530 μm. Idiosoma with hyaline cerotegument (Fig. 1A), in striated integument cerotegument in form of raised lamellae arranged on striae; between aperture of legs II and III height of these lamellae about 25 μm. AD with arched cerotegumental area, OC with raised hyaline lamellae around corneae and PD with pair of cerotegumental ribs. Ventral plates almost smooth, only marginal parts anterior to aperture of legs III and IV with honeycomb-like textured cerotegument. AE with three ventral setae. Each of PE with one dorsal seta. Female GA

with four to five pairs of pgs. Ovipositor extending beyond anterior margin of GA. Male GA with almost 100 pgs arranged densely around GO (Fig. 1B). Genital sclerites with five pairs of sgs (Fig. 1C); sgs short, stump-like, ending with a few spicules. Spermatopositor short, extending beyond genital foramen by about the latter's length and far from reaching anterior margin of GA.

Rostrum slender, slightly longer than gnathosomal basis. Both pairs of maxillary setae near basis of rostrum, basal pair of setae only slightly longer than following pair. Female P-2 with short bifurcate and P-3 with spiniform dorsal seta (Fig. 1D). In male seta on P-2 smooth, tapering, that on P-3 less than length of P-3 (Fig. 1E).

Telofemora with prominent cerotegumental cover; dorsal cerotegumental lamellae larger than ventral ones, height of lamellae on telofemora 20–25 µm or almost same as that of leg segment. Tibiae I to IV with five ventral setae each. All tarsi with large membranes of claw fossae. Solenidion of tarsus I on dorsolateral (Fig. 1G), of tarsus II on dorsomedial membrane. Lateral claws with elongate accessory process and a pecten with minute tines extending to basis of claw (Fig. 1F).

Remarks. — Amongst the Antarctic *Agaue* fauna, this is the only species with such large cerotegumental lamellae on idiosoma and legs, the height of the dorsal lamella on telofemur I almost equalling that of the segment.

Distribution. — This species is known from West and East Antarctica and Subantarctic Islands (Lohmann 1907a, b; Womersley 1937; Newell 1984; Bartsch 1990 and present new report from King George Island). A Subantarctic (unverified) record is from St. Paul (André 1933), namely *A. debilis* var. *consobrina* André, 1933. The presently known depth distribution of *Agaue agauoides* is from 30 to 680 m.

Agaue parva (Chilton, 1883)
(Fig. 1H–J)

Material examined. — Thirteen females, 14 males, seven deutonymphs, King George Island, Admiralty Bay, Section I, 97–380 m, March, August, September, October, December 1985. Two males, three deutonymphs, Ezcurra Inlet, 45 m, November 1985.

Description. — Adults. Known length range of female idiosoma 690–1200 µm, that of male 615–1025 µm, length of female in present material 830–1000 µm, of male 780–990 µm. Dorsal and ventral plates with slightly reticulate but hardly raised cerotegumental lamellae. Dorsal plates foveate (Fig. 1J). AD distinctly wider than long, anterolateral corners protruding, marginally reaching to the level of lateral margin of trochanter I; corners with pair of gland pores. OC with corneae but no eye pigment. AE with three ventral setae. Each PE with three dorsal setae. Anterior margin of female GA truncate; ovipositor at rest extending beyond that margin; GA with about 10 pairs of pgs, arranged around GO and near anterior margin of GA. Everted ovipositor elongate, in a 950 µm-long female 385 µm long; ovipositor with a pair of ventral lamellae and six pairs of weakly sclerotized geni-

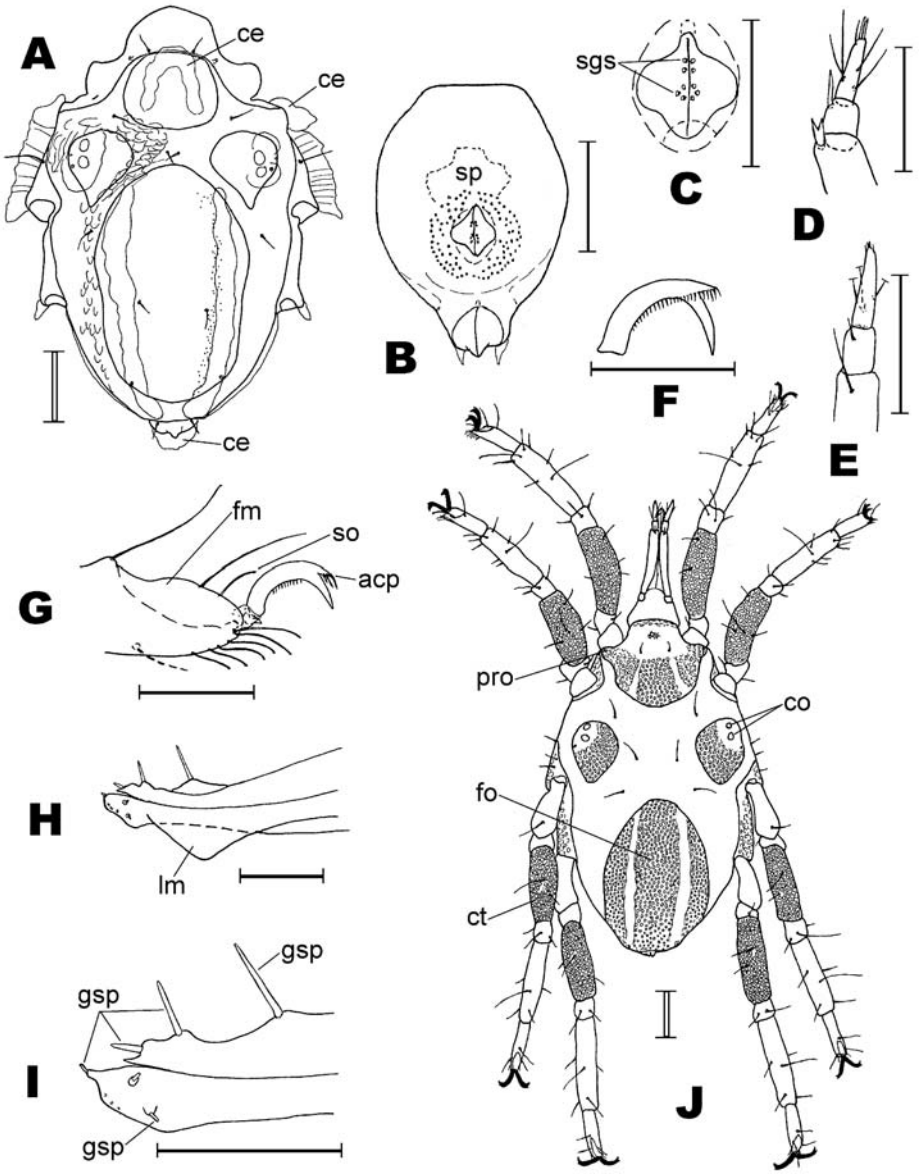

Fig. 1. **A–G**. *Agaue agauoides* (Lohmann, 1907): idiosoma, dorsal, female (**A**); genitoanal plate, male (**B**); genital opening, male (**C**); tip of palp, female (**D**); tip of palp, male (**E**); claw I, male (**F**); tip of tarsus I, lateral (medial setae and claw omitted, ventral seta in broken line), male (**G**). **H–J**. *Agaue parva* (Chilton, 1883): tip of ovipositor, female (**H**); tip of ovipositor, enlarged, female (**I**); dorsal, male (**J**). Abbreviations: acp, accessory process; gsp, genital spine(s); ce, cerotegument; co, corneae; ct, honeycomb-like cerotegumental texture; fm, membrane of claw fossa; fo, foveate ornamentation; lm, lamella; pro, protrusion with gland pore; sgs, subgenital setae; so, solenidion; sp, spermatopositor. Single-lined scale 50 µm; double-lined scale 100 µm. Collecting localities of specimens illustrated: A and D, off Graham Land (65°14'S, 64°15'W); B, C, E–G, King George Island; H and I, King George Island; J, off Anvers Island.

tal spines (Fig. 1H). Basal-most pair of spines 22 µm long, two following pairs 16 and 9 µm long, remaining three pairs short, papilliform, 2–4 µm long (Fig. 1I). Anterior margin of male GA oviform. GO surrounded by more than 100 pgs.

Gnathosoma elongate (Fig. 1J), length of slender rostrum at least twice that of gnathosomal base. In females dorsal seta of P-2 scaliform and with dentate margin, in males that seta bristle-like but short. In both sexes dorsal seta on P-3 short, bristle-like.

Legs slender; telofemora with honeycomb-like though rather thin cerotegumental texture, in general with debris trapped between this texture. Tibiae I to IV with four ventral setae. Paired claws with accessory process and pecten.

Juveniles. Length of deutonymphs 490–1100 µm, in present material 580–1100 µm. Last mentioned length representing that of quiescent stage with adult. AD with gland pores on lateral projections; PD foveate. Dorsal seta on P-2 slender. Telofemora with honeycomb-like ornamentation. Tibiae I to IV with two ventral bristle-like setae.

Remarks. — The honeycomb-like cerotegumental ornamentation on the telofemora is a typical character of *A. parva* and helps to identify this species even at low magnification (50X). Other unique characters of the species are the foveate ornamentation of the dorsal plates and the unusual width of the AD with its pair of lateral protrusions, each bearing a gland pore, both characters are recognizable at 100X magnification.

Distribution. — *Agaue parva* is wide-spread in the southern hemisphere, taken around Antarctica as well as in Subantarctic and temperate zones (Newell 1984; Bartsch 1990). Though already mentioned from off the Antarctic Peninsula (Newell 1984), this is the first record from Admiralty Bay, King George Island.

Bradyagaue drygalskii (Lohmann, 1907)
(Fig. 2A–C)

Material examined. — Three females, one male, three deutonymphs, five protonymphs, one larva, King George Island, Admiralty Bay, Section I, 206–405 m, January, July, October 1985. Six females, four males, three deutonymphs, Ezcurra Inlet, 45 m, November 1985.

Description. — Adults. Known length range of female idiosoma 750–1000 µm, that of male 740–1000 µm, in present material length of female 750–965 µm, of male 770–900 µm. Surface of dorsal plates with faint, almost smooth cerotegumental cover. Opposing margins of AD and PD slightly acuminate. Mid-lateral part of OC protruding; plate with two corneae and eye pigment (Fig. 2A). Length of PD 1.6–1.8 times the width. AE with three ventral setae and PE with five dorsal and three ventral setae, three of dorsal setae anterior to insertion of leg III, two anterior to that of leg IV. Opposing medial margins of PE truncate. Female GA anteriorly narrowed, extending to the level of second pair of ventral setae of PE.

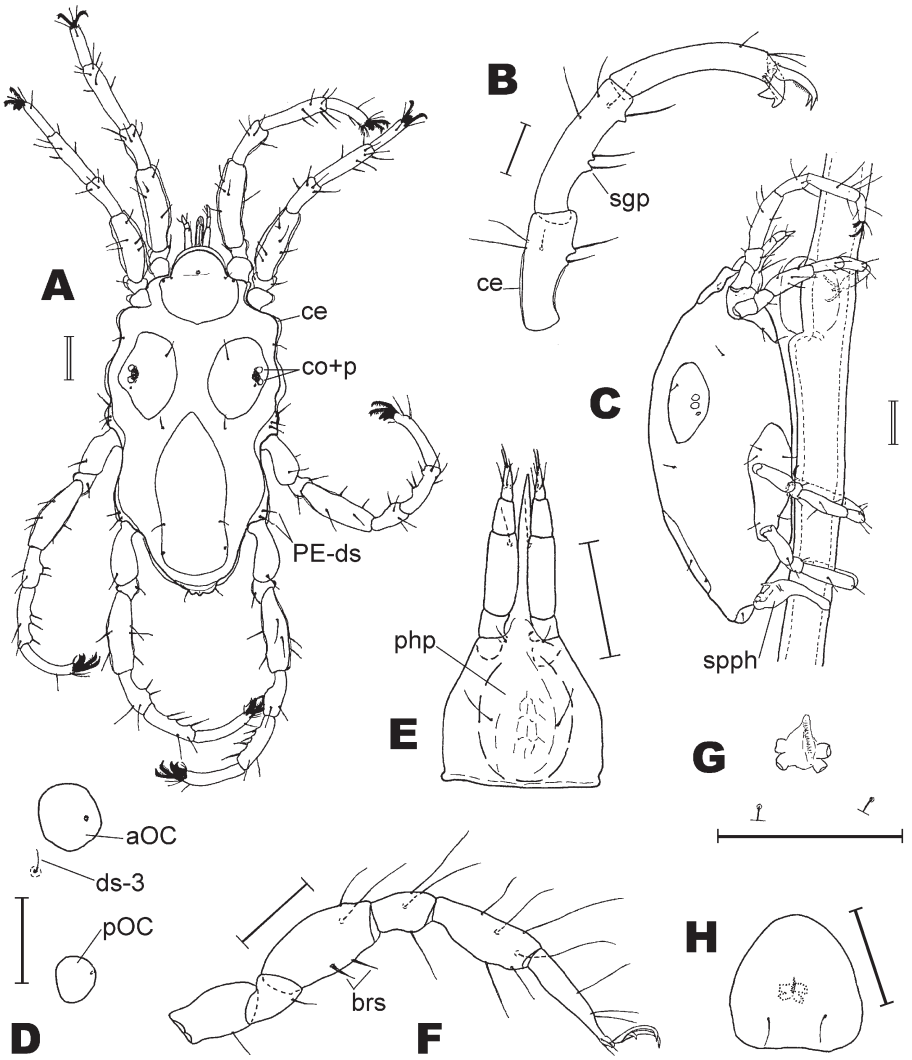

Fig. 2. **A**–**C**. *Bradyagaue drygalskii* (Lohmann, 1907): dorsal, female (**A**); genu to tarsus III, lateral, male (**B**); quiescent stage, lateral, deutonymph (**C**). **D**–**H**. *Colobocerasides auster* Bartsch, 1998, deutonymph: right part of idiosoma with ocular plates (**D**); gnathosoma, ventral (**E**); leg IV, medial (**F**); genital acetabula and perigenital setae (**G**); genital plate (**H**). Abbreviations: aOC, anterior ocular plate; brs, bristle-like setae; ce, cerotegument; co+p, corneae and eye pigment; ds-3, third dorsal seta; PE-ds, setae on PE; php, pharyngeal plate; pOC, posterior ocular plate; sgp, setigerous process; spph, spermatophor. Single-lined scale 50 µm; double-lined scale 100 µm. Collecting localities of specimens illustrated: A and B; off South Sandwich Islands (56°42'S, 27°00'W); C, King George Island; D–H, Weddell Sea, Kapp Norvegia.

GO in anterior half of plate. Interval between anterior margin of GA and that of GO slightly less than length of GO. GA with 6–11 pairs of pgs. Male GA wider than that of female, as in female extending to about the level of second pair of ven-

tral setae of PE. GO small, in anterior half of GA. About 150 pgs densely arranged around GO. Spermatopositor extending beyond GO but not beyond GA.

Gnathosoma short and slender. Rostrum longer than gnathosomal base. The latter with large pharyngeal plate and distinct compartments from muscles. P-2 with long dorsal seta; no seta on P-3.

Legs slender, with thin layer of cerotegument. Tibiae and tarsi I and II cylindrical, tibiae and tarsi III and IV bowed. Tibiae I and II generally with four bristle-like ventral setae. Tibiae III and IV with three, rarely four, bristle-like setae, each of these setae on a small setigerous process (Fig. 2B). Genua III and IV generally with two ventral and three dorsal setae, both ventral setae on setigerous processes. Tarsus I with ventral seta in about middle of segment and apical cluster of eupathidia, tarsi II to IV lack ventral setae. Median claw of tarsi II, III and IV distinctly enlarged, when compared with that on tarsus I, and thicker than lateral claws. Lateral claws on tarsus I shorter than those of following tarsi. All lateral claws with pectines.

Juveniles. Known length of deutonymphs 630–950 µm, protonymphs 450–650 µm and larvae 430–470 µm, in present material deutonymphs 820–920 µm, protonymphs 579–640 µm, larva 475 µm long. General shape similar to that of adults.

Remarks. — Two species are similar to *Bradyagaue drygalskii*, namely *B. aspidionis* Newell, 1984 and *B. grandiphora* Newell, 1984. Of *Bradyagaue aspidionis* a single specimen, a female, is known; extracted from a sample from Victoria Land, from ca 1400 m depth (Newell 1984). According to Newell (1984), its PD is smaller than in *B. drygalskii. Bradyagaue grandiphora* is spread in Subantarctic waters of southern South America. *Bradyagaue drygalskii* can be distinguished from *B. grandiphora* on the basis of the more delicate cerotegumental layer on the legs, the mid-laterally widened OC, the smaller GO in both females and males, compared to length of GA, the shorter spermatopositor which is not extending beyond the GA, but in *B. grandiphora* far beyond the anterior margin of that plate (Newell 1984: fig. 193), and the number of ventral setae on genua and tibiae III and IV, in *B. drygalskii* two and three, respectively, in *B. grandiphora* one and four setae.

Distribution. — *Bradyagaue drygalskii* is a circumantarctic species with a few records from north of the Polar Front (Newell 1984; Bartsch 1990). This is the first report from Admiralty Bay, King George Island. The species has been taken from the lower tidal zone to 1674 m.

Biology. — Fig. 2C shows a quiescent deutonymph fixed to the stolon of a hydrozoan, this deutonymph includes a female almost ready to emerge. At the posterior end of the deutonymph a spermatophor is fixed to the stolon. Little is known about mating behaviour in halacarids and sperm transfer has been described for just a single species (Kirchner 1969). It is tentative to expect that the immediately adjacent deposition of the spermatophor, or the deutonymphal stage, has been chosen deliberately so that the hatching female can take the sperm sack, but actually, it

is not known if this spermatophor belongs to *B. drygalskii*, neither if, after days of immobility, the female which leaves the pupa through a dorsal rupture in the nymphal integument really will recognize and take up the sperm sac.

Colobocerasides auster Bartsch, 1998
(Fig. 2D–H)

Material examined. — One deutonymph (including a female), Weddell Sea, Kapp Norvegia, 71°37'S, 12°11'W, 211 m, 15 February 1989, multibox corer, from tubes of tanaidaceans.

Description. — Female. Length of idiosoma 470 µm. Dorsal plates AD, PD and two pairs of ocular plates faintly reticulated, each polygon foveate. AD distinctly wider than long; ocular plates circular, anterior plate larger than posterior one. PD ovate, its anterior margin arched. AD, anterior ocular plates and PD with gland pores. Surface of ventral plates with faint, irregular reticulation. Posterior margin of AE truncate; plate with three pairs of ventral setae. Each PE with one dorsal and two ventral setae. GA and AE almost equal in length; anterior margin of GA truncate; plate with three pairs of pgs.

Gnathosoma slender, narrow, styletiform rostrum about as long as gnathosomal base. P-2 with dorsal bristle-like seta.

Legs shorter than idiosoma. Telofemora I to IV with 1, 0, 1, 2 ventral setae, setae on telofemur IV slender spines. Tibiae I to IV with 10, 9, 5, 8 setae, 3, 2, 2, 3 of setae in ventral position, 1, 1, 1, 0 of ventral setae bipectinate. Tarsi I to IV with 3, 1, 0, 0 ventral setae. Median sclerite of all tarsi with long claw-like process.

Deutonymph. Length of idiosoma 490 µm. Dorsum with AD, PD and two pairs of circular ocular plates; anterior plate with gland pore, posterior one with pore canaliculus (Fig. 2D). Surface of plates irregularly foveate. AD short, 1.4 times wider than long. PD somewhat longer than wide, anterior margin ovate. Each PE with one dorsal and two ventral setae. Genital plate with single pair of pgs (Fig. 1H) and two pairs of internal acetabula (Fig. 1G).

Gnathosoma elongate, 137 µm long, 67 µm wide. Rostrum longer than gnathosomal base. Pharyngeal plate wide (Fig. 1E).

Number of setae on legs, from trochanter to tarsus (solenidion included, pas excluded): leg I: 1, 2, 3, 5, 7, 7; leg II: 1, 2, 3, 4, 7, 5; leg III: 2, 1, 4, 3, 5, 3; leg IV: 1, 1, 4, 3, 6, 3. Telofemora I to IV with 2, 0, 1, 2 ventral setae; setae on telofemur IV bristle-like (Fig. 2F). Tibiae I to IV with two ventral setae each, on tibia I to III ventromedial seta bipectinate, on tibia IV that seta smooth and slender. Median sclerite on all tarsi with claw-like process, length of this median claw almost half that of slender paired claws.

Remarks. — Two *Colobocerasides* species are known, *C. auster* and *C. koehleri* (Trouessart, 1896). Adults and deutonymphs of the two species can be separated on the basis of the number of setae on telofemur IV, setae are lacking in *C. koehleri* whereas *C. auster* bears two spiniform (female) or bristle-like (nymph) setae.

Distribution. — The first record of *Colobocerasides auster* was from off Elephant Island, extracted from a sample with pieces of Octocorallia inhabited by Polychaeta, this new record from the Weddell Sea is from tubes of tanaidaceans. *Colobocerasides* species are expected to be temporary ectoparasites (Bartsch 1998).

Halacarus arnaudi Newell, 1984
(Fig. 3A)

Material examined. — One male, Weddell Sea, Halley Bay, 74°40'S, 29°40'W, 500 m, 02 February 1989.

Description. — Adults. Known length of female idiosoma 640 µm, of male 550–600 µm, present male 600 µm long. Plates and legs with maze-like structured epicuticula (punctate according to Newell 1984). AD with short frontal spine. Pair of ds-1 somewhat posterior to the level of gland pores. OC with cornea and pc, glp-3 in striated integument posterior to OC. Female PD with narrow anterior part extending to the level of pair of glp-4 (Fig. 3A). Male PD anteriorly wide, including pair of glp-4. AE with three ventral setae, each PE with one dorsal and three ventral setae. In female one pair of pgs in striated integument somewhat anterior to almost truncate margin of female GA. Male GA longer than female GA, extending to the level of aperture of leg IV, outlying pair of pgs within anterior ovate part of male GA. Male GO surrounded by 60–70 pgs. In female interval between anterior margin of GA and that of GO less than length of GO, in male that interval about twice the length of GO.

Rostrum about as long as gnathosomal base. Basal seta on P-2 at 0.6, distal setae at 0.9.

Legs shorter than idiosoma. Tibiae I to IV with four ventral setae each, none of setae distinctly pectinate. Tarsi III and IV with three dorsal but no ventral setae (pas excluded).

Remarks. — *Halacarus arnaudi* is most similar to *H. nanus* Gimbel, 1919. Compared with other Antarctic species these two have a rather long PD, in males the PD extends anteriad beyond the glp-4, these pores are either included or immediately adjacent the PD. *Halacarus arnaudi* may prove to be a junior synonym of *H. nanus*.

Distribution. — Previous records of *Halacarus arnaudi* are from both western and eastern Antarctica (Newell 1984; Bartsch 1993), this is the first record from the Weddell Sea.

Halacarus minor Lohmann, 1907
(Fig. 3B–E)

Material examined. — One female, King George Island, Admiralty Bay, Ezcurra Inlet, 45 m; 11 November 1985.

Description. — Adults. Known length of female idiosoma 450–680 µm, that of male 450–500 µm, length of present female 680 µm. Dorsum with AD, pair of OC and PD. Plates with maze-like structured epicuticula. AD with short, acute

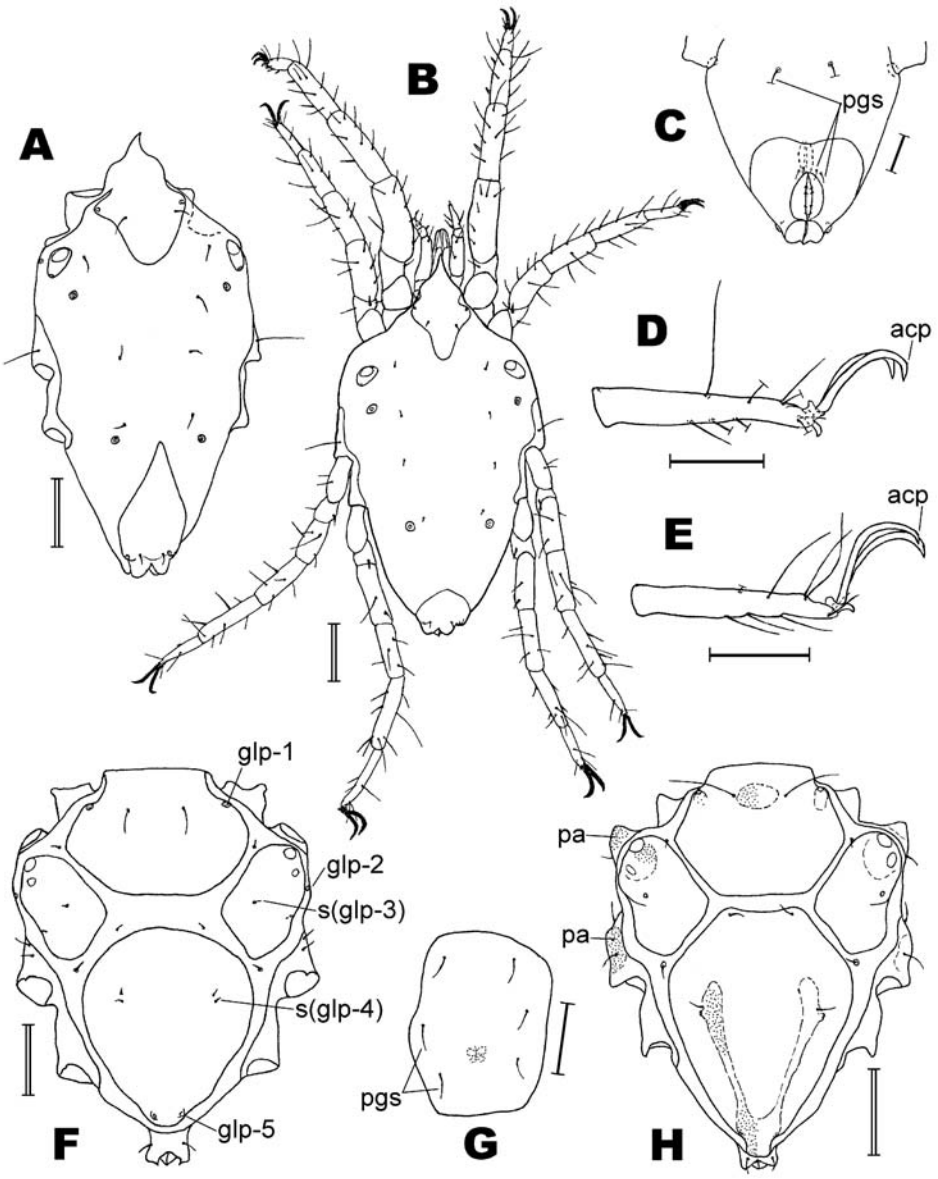

Fig. 3. **A**. *Halacarus arnaudi* Newell, 1984; idiosoma, dorsal, female. **B**–**E**. *Halacarus minor* Lohmann, 1907: dorsal, female (**B**); posterior part of idiosoma, ventral, female (**C**); tarsus III, lateral, female (**D**); tarsus III, lateral, male (**E**). **F**, **G**. *Lohmannella fukushimai* Imamura, 1968: idiosoma, dorsal, female (**F**); genital plate, deutonymph (**G**). **H**. *Lohmannella gaussi* Lohmann, 1907; idiosoma, dorsal, female. Abbreviations: acp, accessory process; glp-1, glp-2, glp-5, gland pores 1, 2 and 5; pa, porose areola; pgs, perigenital seta(e); s(glp-3), seta replacing third gland pore; s(glp-4), seta replacing fourth gland pore. Single-lined scale 50 µm; double-lined scale 100 µm. Collecting localities of specimens illustrated: A, off Elephant Island (62°41'S, 56°09'W); B–D, King George Island; E, *Gauss* Station; F, Ross Sea (72°03'S, 172°16'E); G, Weddell Sea, Kapp Norvegia; H, off Marion Island (Prince Edward Islands).

frontal spine; posterior part of AD tongue-like. Single cornea covering about half of OC. Female PD short, about as long as wide, far from extending to the level of glp-4 (Fig. 3B). Male PD distinctly longer than wide and anteriad extending to or beyond the level of glp-4. Pair of glp-1 on AD level with insertion of leg I, glp-2 in ventral position in striated integument, glp-3 and glp-4 on small platelets, glp-3 posterior to OC, glp-4 level with trochanters IV, glp-5 in posterior part of PD. Dorsal setae small; ds-1 on AD removed from gland pores, ds-2 to ds-5 within striated integument, arranged in line from somewhat medial to OC (ds-2) to anterior to glp-4 (ds-5); ds-6 on PD between gland pores. AE with three ventral setae, each PE with one dorsal and three ventral setae. Anterior margin of female GA almost truncate or slightly excavate; one pair of pgs in striated integument, two pairs near anterior part of GO (Fig. 3C). GA of male longer than that of female; pair of outlying pgs within anterior truncate part of male GA and about 50 pgs scatteredly arranged around GO. GO in about middle of GA.

Gnathosoma about twice as long as wide. Rostrum slightly longer than gnathosomal base. Tectum somewhat arched. Basal and apical seta on P-2 at 0.6 and 0.9, respectively.

Legs shorter than idiosoma. Each of tibiae I to IV with four bristle-like ventral setae, distomedial seta on tibia II bipectinate. All tarsi with ventral setae. In present female tarsi I and II with two bristle-like setae each, a pair of eupathidia and pair of doubled pas, tarsi III (Fig. 3D) and IV with three and two setae, respectively, and pair of pas. Published number of dorsal/ventral setae from tarsus I to IV (solenidia included, famuli, eupathidia and parambulacral setae omitted; rare states in parentheses) 4/2, 4/2, 4/3, 3/(1–)2–3 (Lohmann 1907b; Newell 1984; Bartsch 1993). Paired claws slender, each with small accessory process (Fig. 3E).

Remarks. — Tarsi III and IV of *Halacarus minor* have ventral setae, in contrast to the above mentioned *H. arnaudi* and *H. nanus* which lack these setae. Two of the presently known Antarctic *Halacarus* species have ventral setae on tarsi III and IV, *H. minor* and *H. setifer* Newell, 1984, the latter recorded from the South Sandwich Islands, from 148 m depth (Newell 1984). *Halacarus setifer* has two and three pairs of ventral setae on genu and tibia I, respectively, in contrast to *H. minor* with its single and two pairs.

Ventral setae on the tarsi II to IV are also present in the two South Atlantic species *H. lamellipes* Newell, 1984 and *H. longior* Bartsch, 1981 which have records from 56°S and 61°S, respectively (Newell 1984; Bartsch 2005). Distinguishing characters are: *H. lamellipes* has four and six ventral setae on genu and tibia I, respectively, and wide cerotegumental lamellae on the epimera and legs (Newell 1984: figs 126, 129, 132), in contrast, *H. minor* has two and four ventral setae and lamellae are lacking. In *H. longior* the ds-1 are almost at the level of the glp-1, females have 12–16 pgs, males more than 150 pgs on the GA and one pair in the striated integument immediately anterior to the GA, in *H. minor* the ds-1 are distinctly removed from the glp-1, females have two pairs of pgs on the GA and one pair in

the striated integument, males approximately 50 pgs around the GO and a pair of outlying setae on the GA, near the anterior margin.

Distribution. — *Halacarus minor* was known from the *Gauss* Station and George V Land (Lohmann 1907a, b; Gimbel 1919; Womersley 1937). This is the first record from the West Antarctic, from King George Island, consequently one can expect the species to be circumantarctic in its distribution.

Lohmannella fukushimai Imamura, 1968
(Fig. 3F, G)

Material examined. — Two males, Weddell Sea, Atka Bay, 71°15'S, 12°59'W, 193 m, 25 January 1989. One female, two males, three deutonymphs, Weddell Sea, Kapp Norvegia, 71°37'S, 12°11'W, 211 m, 15 February 1989. Two males, Halley Bay, 74°35'S, 29°40'W, 820 m, 04 February 1989; multibox corer.

Description. — Adults. Known length of female idiosoma 495–560 μm, of male 491–582, in present material female 550 μm, males 520–582 μm long. Surface of dorsal and ventral plates with delicate epicuticular granules, else almost smooth. OC with two corneae. AE with four ventral setae, each PE with two dorsal and three ventral setae. Anal cone elongate and protruding (Fig. 3F). Pair of ds-1 longer than following minute setae. Pairs of glp-3 and glp-4 replaced by minute setae (Fig. 3F). PE with two dorsal and three ventral setae. Female with about 20 scatteredly arranged pgs, males with about 60 pgs situated densely around GO and eight setae outlying.

Gnathosoma slender, about as long as idiosoma, rostrum 1.7–1.8 times length of gnathosomal base.

Legs slender, longer than idiosoma. Genua I ventrally with four bipectinate bristles, tibiae I with seven such bristles. Claws with minute accessory process.

Deutonymph. Length of idiosoma in present material 422–489 μm. As in adults, anal papilla protruding, surface of dorsal and ventral plates almost smooth and glp-3 and glp-4 replaced by minute setae. Genital plate and anal plate separated. Genital plate rectangular, with three pairs of pgs and two pairs of internal acetabula (Fig. 3G).

Remarks. — A preliminary identification is possible at low magnification. The gnathosoma and legs of *Lohmannella fukushimai* are as long or even longer than the idiosoma, the anal cone extends beyond the idiosoma, and two pairs of gland pores (glp-3 and glp-4) are replaced by minute setae. In congeners these gland pores are either distinct, often enlarged (southern hemisphere species) or lacking, not replaced by setae (northern hemisphere species).

The deutonymph bears three pairs of pgs, this number has also been found in *L. gaussi* (Bartsch 1979: fig. 37). The smaller sized northern hemisphere species *L. kervillei* (Trouessart, 1894), and *L. rustica* Bartsch, 1977 have two pairs of pgs (Bartsch 1977).

Distribution. — Circumantarctic (Bartsch 1993).

Lohmannella gaussi Lohmann, 1907
(Fig. 3H)

Material examined. — One female, Weddell Sea, Kapp Norvegia, 71°37'S, 12°11'W, 211 m, 15 February 1989; multibox corer.

Description. — Adults. Known length of female idiosoma 431–568 µm, of male 407–596 µm, present female 568 µm. Areolae with delicate porosity on dorsal and ventral plates, on AD scattered pores posterior to glp-1 and distinct porosity between pair of ds-1, on OC porosity close to anterior cornea, on PD in anterior and posterior end of V-shaped costae, on AE lateral to aperture of leg II, and on PE marginally anterior to aperture of leg III (Fig. 3H) and often ventrally anterior to leg IV. Pairs of ds-5 and glp-4 immediately adjacent. AE with four ventral setae, each PE with two dorsal and three ventral setae. Females with 17–24 scatteredly arranged pgs, males with about 50 pgs close around GO and six to eight outlying setae.

Gnathosoma slightly shorter than idiosoma. Length of rostrum about two thirds of that of gnathosoma.

Legs slender, legs I and II slightly shorter, legs III and IV somewhat longer than idiosoma. Genua I to IV with 4, 3–4, 1, 1–2 and tibiae I to IV with 7, 6, 6, 5 ventral bipectinate bristles; tarsi I to IV with 2, 2, 4, 2–3 ventral setae (eupathidia excluded). Claws with minute accessory process.

Remarks. — *Lohmannella gaussi* is one of the long-legged *Lohmannella* species, *L. fukushimai*, which shared the habitat with *L. gaussi*, has somewhat longer legs, its dorsal plates bear a delicate epicuticular granulation but no porose areolae, and glp-3 and glp-4 are replaced by minute setae. The deep-sea species *L. cygna* Bartsch, 1988, another long-legged species, is characterized by an elongate anal cone with a pair of minute ds-6 and eight ventral bristles (instead of seven) on each tibia I.

Distribution. — Antarctic records are from the *Gauss* Station, Weddell Sea and off South Sandwich Islands (*L. humerosa*), Subantarctic records from islands of the Crozet Plateau (Lohmann 1907a; Newell 1984; Bartsch 1979, 1993).

In the samples from the western Weddell Sea, *L. gaussi* was less abundant and wide-spread than *L. fukushimai* which was taken both in the Atka Bay, off Kapp Norvegia and Halley Bay, in 193 to 820 m depth.

Conclusions

Antarctic halacarid fauna. — Table 1 presents a list of Antarctic records of halacarids. The area in consideration is the continent of Antarctica and the islands south of the Antarctic Polar Front, consequently the Falkland, Prince Edward, Crozet and Kerguelen Islands, St. Paul and Macquarie Island are excluded. The list is a compilation of previously published data and the present findings. Surveys and keys are given in Newell (1984) and Bartsch (1993).

Table 1

The list of Antarctic records of halacarids.

Species	Antarctic records	Other records	Depth [m]	Ecology
Agaue agauoides (Lohmann, 1907). Syn. *Halacarus* (*Polymela*) *agauoides* Lohmann, 1907; *Leptospathis agauoides* – Trouessart 1907a; *Agaue debilis* var. *consobrina* André, 1933; *Agaue consobrina* – Viets 1940	South Sandwich Is, King George I., off Graham Land, Georg V Coast (Commonwealth Bay), Terre Adélie, *Gauss* Station (Lohmann 1907b; Womersley 1937; Newell 1984; Bartsch 1993, present paper)	St. Paul (André 1933)	30–680	epibenthic on various substrata
Agaue obscura Bartsch, 1987	off South Shetland Is, Amundsen Sea, Ross Sea (Bartsch 1987, 2010b)	no data	70–1486	epibenthic
Agaue parva (Chilton, 1883). Syn. *Halacarus parvus* Chilton, 1883; *H.* (*Polymela*) *occultus* Lohmann, 1907; *Leptospathis bouvieri* Trouessart, 1907; *L.* (*Polymela*) *occultus* – Trouessart 1914; *H.* (*Polymela*) *pilosus* Gimbel, 1919; *A. occultus* var. *setifera* Womersley, 1937; *A. parva womersleyi* Viets, 1950; *A. affinis* Sokolov, 1962; *Thalassarachna sokolovi* Newell, 1984	Weddell Sea (Vestkapp, Halley Bay), off South Georgia, South Orkney Is and Elephant I. (54°S, 38°W; 61°S, 43°W; 63°S, 55°W; 63°S, 55°W), South Shetland Is, Wiencke I., King George I., Anvers I., Ross Sea, Georg V Coast (Commonwealth Bay), Terre Adélie, Wilkes Land, *Gauss* Station, Davis Sea (Lohmann 1907b; Trouessart 1907b, 1914; Womersley 1937; Sokolov 1962; Newell 1984; Bartsch 1990, present paper)	New Zealand, South Pacific (55°S, 130°W; 54°S, 140°W) (Chilton 1883; Newell 1984)	tidal to 1061	epibenthic on various substrata
Agaue tenuirostris (Lohmann, 1907). Syn. *Halacarus* (*Polymela*) *tenuirostris* Lohmann, 1907; *Leptospathis tenuirostris* – Trouessart 1907b; *L. scriptor* Trouessart, 1907b; *A. scriptor* – Viets 1931; *L.* (*Polymela*) *tenuirostris* – Trouessart 1914; *A. longissima* Sokolov, 1962	Weddell Sea, South Atlantic (61°S, 41°W), Wiencke I. (Port Lockroy), Victoria Land (McMurdo Sound), *Gauss* Station, Davis Sea (Lohmann 1907b; Trouessart 1907b, 1914; Sokolov 1962; Newell 1984; Bartsch 1995)	South Pacific (55°S, 130°W; 54°S, 140°W) (Newell 1984)	20–622	epibenthic on various substrata
Agaue uncinata Bartsch, 1990	Victoria Land (Cape Hallett) (Bartsch 1990)	no data	350	epibenthic
Agaue verrucosa Bartsch, 1982	South Sandwich Trench, Scotia Sea (off Shag Rock and South Orkney Is) (Bartsch 1990, 2005, 2010b)	Argentine Basin (Bartsch 1982)	201–2893	epibenthic
Agaue villosa (Lohmann, 1907). Syn. *Halacarus* (*Polymela*) *villosus* Lohmann, 1907; *Leptospathis villosus* – Trouessart 1907b	*Gauss* Station, off Anvers Island (Lohmann 1907b; Newell 1984; Bartsch 1990)	Macquarie Rise (Newell 1984)	310–415	epibenthic
Agauopsis antarctica (Lohmann, 1907). Syn. *Agaue antarctica* Lohmann, 1907; *A. polaris* Lohmann, 1907b; *A. veles* Trouessart, 1907b; *Agauopsis veles* –Viets 1927	Ross I., Victoria Land (McMurdo Sound), Georg V Land (Commonwealth Bay), *Gauss* Station (Lohmann 1907b; Trouessart 1907b; Womersley 1937; Newell 1984)	Kerguelen Is (Lohmann 1907a)	15–460	inhabitant of various substrata
Agauopsis glacialis Bartsch, 1993	South Georgia, off Anvers I. (Bartsch 1993, 1999)	no data	tidal and subtidal	expected to be epibenthic on and amongst various substrata
Agauopsis mccaini Newell, 1984	Anvers I. (Newell 1984)	no data	13	expected to live amongst various substrata

Table 1 – *continued*.

Species	Antarctic records	Other records	Depth [m]	Biology
Agauopsis racki Newell, 1984	off South Shetland Is (Bartsch 1993)	off southern Argentina; South Pacific (54°S, 140°W) (Newell 1984)	247–567	expected to live on various substrata
Bathyhalacarus anomalus Bartsch, 2005	off South Shetland Is (Bartsch 2005)	no data	2875	deep-water form; substratum inhabited not known
Bradyagaue aspidionis Newell, 1984	off Victoria Land (Newell 1984)	no data	1442–1444	expected to live on stolonaceous organisms
Bradyagaue crassa Bartsch, 1990	Victoria Land (Cape Hallett) (Bartsch 1990)	no data	350	expected to live on stolonaceous organisms
Bradyagaue drygalskii (Lohmann, 1907). Syn. *Halacarus* (*Polymela*) *drygalskii* Lohmann, 1907; *Leptospathis alberti antarctica* Trouessart, 1907a; *L.* (*Polymela*) *drygalskii* – Trouessart 1914; *Agaue alberti antarctica* – Viets 1931; *H. drygalskii* – Womersley 1937; *B. alberti drygalskii* – Pugh 1993	off South Sandwich Is, off Elephant I., South Shetland Is, King George I., Ross Sea, Victoria Land (Cape Hallett), Georg V Land (Commonwealth Bay), Terre Adélie, *Gauss* Station (Lohmann 1907b; Viets 1952; Newell 1984; Bartsch 2008, present paper)	Kerguelen Is, Macquarie I., Falkland Is (Viets 1952; Newell 1984)	lower shoreline to 1674	found clinging to stolonaceous organisms
Colobocerasides auster Bartsch, 1998	Weddell Sea (Kapp Norvegia), off Elephant I. (Bartsch 1998, present paper)	no data	211–480	expected to live temporarily ectoparasitic
Copidognathus acanthophorus Viets, 1950. Syn. *C.* (*Copidognathopsis*) *acanthophorus* Viets, 1950	South Georgia, Anvers I. (Viets 1950; Newell 1984)	no data	12–22	expected to live on and amongst various substrata
Copidognathus arnaudi Newell, 1984	South Shetland Is, Anvers I., Terre Adélie (Newell 1984; Bartsch 1993)	no data	12–370	expected to live on and amongst various substrata
Copidognathus confusus Newell, 1984	Anvers I., Terre Adélie (Newell 1984)	Punta Arenas (Newell 1984)	13	expected to live on and amongst various substrata
Copidognathus floridus Trouessart, 1914. Syn. *C.* (*Copidognathopsis*) *floridus* – Viets 1927; *Copidognathopsis floridus* – Viets 1931	off Graham Land (Port Lockroy), Terre Adélie (Trouessart 1914; Newell 1984)	no data	tidal and subtidal, 0–31	expected to live on and amongst various substrata
Copidognathus marcandrei Viets, 1950. Syn. *Copidognathus* (*Copidognathopsis*) *marcandréi* Viets, 1950	South Georgia (Viets 1950)	no data	22	expected to live on and amongst various substrata
Copidognathus porosus Newell, 1984	Anvers I. (Newell 1984)	no data	13	expected to live on and amongst various substrata
Copidognathus vanhoeffeni (Lohmann, 1907). Syn. *Halacarus* (*Copidognathus*) *vanhoeffeni* Lohmann, 1907; *C.* (*Copidognathopsis*) *vanhoeffeni* – Viets 1927; *C. liouvillei* Trouessart, 1914; *C.* (*Copidognathopsis*) *liouvillei* – Viets 1927	off Antarctic Peninsula, Terre Adélie, *Gauss* Station (Lohmann 1907b; Gimbel 1919; Trouessart 1914; Bartsch 1993)	no data	46–385	expected to live on and amongst various substrata

Table 1 – *continued*.

Species	Antarctic records	Other records	Depth [m]	Biology
Halacarellus arnaudi (Newell, 1984). Syn. *Thalassarachna arnaudi* Newell, 1984	off Graham Land, Terre Adélie (Newell 1984; Bartsch 1990)	no data	subtidal to 460	expected to live on and amongst various substrata
Halacarellus auster Bartsch, 1990	Anvers I. (Bartsch 1990)	no data	9–52	expected to live on and amongst various substrata
Halacarellus bouvieri (Trouessart, 1914). Syn. *Werthella bouvieri* Trouessart, 1914; *Copidognathus bouvieri* – Newell 1947; *Thalassarachna bouvieri* – Newell 1967	Anvers and Petermann I. (Trouessart 1914; Newell 1984)	no data	shallow water	expected to live on and amongst various substrata
Halacarellus georgiensis (Newell, 1984). Syn. *Halacarus* (*Halacarellus*) *novus* – Viets 1950; *Thalassarachna georgiensis* Newell, 1984	South Georgia (Viets 1950)	no data	22	expected to live on and amongst various substrata
Halacarellus glaber Bartsch, 1990	South Sandwich Is (Bartsch 1990)	no data	93–121	expected to live on and amongst various substrata
Halacarellus harioti (Trouessart, 1889). Syn. *Halacarus harioti* Trouessart, 1889; *H. armatus* Kramer, 1898; *H. harrioti* var. *kerguelensis* Lohmann, 1907; *H.* (*Halacarellus*) *harioti* – Viets 1927; *Thalassarachna harioti* – Newell 1984; *T. kerguelensis* – Newell 1984; *Halacarus* (*Halacarellus*) *uschakovi* Sokolov, 1962; *T. uschakovi* – Newell 1984	South Georgia (Viets 1950)	Southern South America (Tierra del Fuego, Strait of Magellan, Punta Arenas), Macquarie I., Kerguelen (Trouessart 1889; Kramer 1898; Lohmann 1907a; Sokolov 1962; Newell 1984)	tidal	expected to be found on and amongst various substrata
Halacarellus heteroculus (Newell, 1984). Syn. *Thalassarachna heteroculus* Newell, 1984	off King George and Anvers I. (Newell 1984; Bartsch 1990)	no data	6–80	expected to be found on and amongst various substrata
Halacarellus lubricellus Bartsch, 1990	off South Shetland Is (Bartsch 1990)	no data	300	expected to live on and amongst various substrata
Halacarellus novellus Bartsch *et* Pugh, 1994	South Georgia (Bartsch and Pugh 1994)	Tierra del Fuego (Bartsch 2009)	0	expected to be found on and amongst various substrata
Halacarellus obsoletus Bartsch, 1995	Weddell Sea (Kapp Norvegia, Halley Bay) (Bartsch 1995)	no data	185–275	inhabitant of hexactinellid sponges; according to the mite's morphology, it is specialized for a life in sponge tissue
Halacarellus porellus Bartsch *et* Pugh, 1994	South Georgia (Bartsch and Pugh 1994)	no data	tidal	expected to live on and amongst various substrata
Halacarellus thomasi (Newell, 1984). Syn. *Thalassarachna thomasi* Newell, 1984	Weddell Sea, Ross I. (*McMurdo* Station, Scott Base) (Newell 1984; Bartsch 1995; Royuela *et al.* 2000)	no data	100–460	expected to live on and amongst various substrata

Table 1 – *continued*.

Species	Antarctic records	Other records	Depth [m]	Biology
Halacarus arnaudi Newell, 1984	Weddell Sea (Halley Bay), off Elephant I., Terre Adélie (Newell 1984; present paper)	no data	subtidal to 500	epibenthic on various substrata
Halacarus cucullatus Bartsch, 1993	Anvers I. (Bartsch 1993)	no data	9	epibenthic on various substrata
Halacarus excellens Lohmann, 1907	Amundsen Sea, *Gauss* Station (Lohmann 1907b; Bartsch 2010b)	no data	385–509	epibenthic on various substrata
Halacarus laterculatus Viets, 1950	South Georgia, Anvers I. (Viets 1950; Newell 1984)	Falkland Is, off Falkland Is and Burdwood Bank, Chile (Punta Arenas) (Viets 1950; Newell 1984)	low tide mark to 746	epibenthic on various substrata
Halacarus longior Bartsch, 1981	off South Shetland Is (Bartsch 2005)	Argentine, Angola, Northwest Atlantic Basin and Mid-Atlantic Ridge (Bartsch 1981, 2010b)	2195–3356	deep-water form; most likely epibentic
Halacarus minor Lohmann, 1907. Syn. *H. latirostris* Gimbel, 1919	King George I., Georg V Land (Commonwealth Bay), *Gauss* Station (Lohmann 1907b; Gimbel 1919; Womersley 1937; present paper)	no data	45–385	epibenthic
Halacarus nanus Gimbel, 1919	*Gauss* Station (Gimbel 1919)	no data	350–385	epibenthic
Halacarus otiosus Bartsch, 1993	off South Shetland Is (Bartsch 1993)	no data	238–285	epibenthic
Halacarus parmatus Bartsch, 1993	off Elephant I. (Bartsch 1993)	no data	300	epibenthic
Halacarus profundus Newell, 1984	Ross Sea (Newell 1984)	no data	2212–2306	deep-water form; most likely epibenthic
Halacarus propinquus Viets, 1940. Syn. *H. lohmanni* Womersley, 1937; *H. nanus propinquus* Viets, 1940	George V Land (Commonwealth Bay) (Womersley 1937)	no data	46	most likely epibenthic
Halacarus setifer Newell, 1984	off South Sandwich Is (Newell 1984)	no data	148	epibenthic
Halacarus validus Gimbel, 1919	*Gauss* Station, Ross Sea (Gimbel 1919; Bartsch 1993)	no data	350–385	epibenthic
Isobactrus microdens Newell, 1984	South Georgia (Pugh and Bartsch 1994)	Southern Chile, Chiloe I., Puerto Montt (Newell 1984)	tidal	living and feeding on small algae; most likely restricted to upper tidal zone
Lohmannella abyssalis Bartsch, 2005	off Elephant I. (Bartsch 2005)	no data	2893	most likely a deep-water form
Lohmannella antarctica Newell, 1984	Weddell Sea, off Elephant I., Anvers I., Ross I., Terre Adélie (Newell 1984; Bartsch 2008)	no data	6–460	inhabitant of crevices amongst hapteres and colonial organisms
Lohmannella bihamata Viets, 1950	South Georgia (Pugh and Bartsch 1994)	Falkland Is (Viets 1950)	0–16	found amongst various substrata

Table 1 – *continued*.

Species	Antarctic records	Other records	Depth [m]	Biology
Lohmannella consimilis Bartsch, 1993	South Sandwich Is (Bartsch 1993)	no data	93–121	expected to live in a substratum rich in crevices
Lohmannella fukushimai Imamura, 1968	Weddell Sea (Atka Bay, Kapp Norvegia, Halley Bay), Amundsen Sea, Ross Sea (Cape Hallett), Prince Harald Coast (Imamura 1968; Bartsch 1993, 2010b, present paper)	no data	190–1047	epibenthic
Lohmannella gaussi Lohmann, 1907. Syn. *L. humerosa* Newell, 1984	Weddell Sea, South Sandwich Is, *Gauss* Station (Lohmann 1907b; Newell 1984; present paper)	Marion I., Crozet I. (Bartsch 1979)	95–385	epibenthic
Lohmannella grandipora Newell, 1984	South Georgia (Pugh and Bartsch 1994)	Chile, Punta Arenas to Punta Caldera (Newell 1984)	tidal	inhabitant of a system of crevices amongst coarse sediment, shell fragments and hapteres
Lohmannella kerguelensis Lohmann, 1907. Syn. *L. gaussi kerguelensis* Lohmann, 1907	off Graham Land (Bartsch 1993)	Kerguelen Is (Lohmann 1907b)	0–58	inhabitant of crevices between colonial organisms and algal tufts
Mictognathus werthelloides Newell, 1984	South Sandwich Is, Anvers I. (Newell 1984; Bartsch 1992)	no data	6–121	found on various substrata. Remarks: an individual from Georg V Land, by Womersley (1937: 11–12, pl. 8) described as *Copidognathus* sp., is according to Newell (1984) *M. werthelloides*
Rhombognathus adeliensis Newell, 1984	Terre Adélie (Newell 1984)	no data	subtidal (on algae stranded)	inhabitant of subtidal algae
Rhombognathus ambiguus Newell, 1984	Terre Adélie (Newell 1984)	no data	20	inhabitant of subtidal algae
Rhombognathus auster Bartsch, 1989	South Georgia (Pugh and Bartsch 1994)	Kerguelen Is, Prince Edwards Is, southern South America (Bartsch 1989; Abé 1998; Marshall *et al*. 1999)	tidal	all present records are from tidal algae
Rhombognathus gressitti Newell, 1967	South Georgia, South Orkney Is, Elephant I., South Shetland Is, Anvers I. (Newell 1967, 1984)	Prince Edward Is (Pugh and Mercer 2001)	tidal	present records are from tidal algae
Rhombognathus multisetosus Newell, 1984	South Georgia (Pugh and Bartsch 1994)	southern Chile (Punta Arenas) (Newell 1984)	low tide zone	inhabitant of algae
Rhombognathus plumifer Trouessart, 1889. Syn. *R. magnirostris* var. *plumifer* Trouessart, 1889	South Georgia (Pugh and Bartsch 1994)	South America (Cape Horn to Valparaiso) (Trouessart 1889; Newell 1984)	tidal	inhabitant of algae

Table 1 – *continued*.

Species	Antarctic records	Other records	Depth [m]	Biology
Rhombognathus sandwichi Newell, 1984	South Sandwich Is (Newell 1984)	no data	148	inhabitant of algae
Werthella terella Bartsch, 1993	off South Sandwich Is and Elephant I. (Bartsch 1993, 2008)	no data	110–473	the present records are from sandy deposits

Species not listed in the table, though mentioned in literature, are *Agauopsis inflata* Newell, 1984 (*cf.* Pugh 1993; Pugh and Bartsch 1994), *Copidognathus oculatus* (Hodge 1863) (*cf.* Womersley 1937), *C. simonis* (Lohmann, 1907) (*cf.* Trouessart 1914), *Halacarellus novus* (Lohmann, 1907) (*cf.* Trouessart 1914), *Halacarellus eltanini* (Newell, 1984) (*cf.* Newell 1984), *Lohmannella falcata* (Hodge, 1863) (*cf.* Lohmann 1907b; Trouessart 1914). Not known is the identity of a juvenile *Agauopsis* collected during the *Belgica* expedition along the Antarctic Peninsula and by Cooreman (1953) identified as *Agauopsis veles* (Trouessart, 1907).

The record of *Agauopsis inflata* from South Georgia is a lapsus (Bartsch 1999). Halacarid specimens collected by P.J.A. Pugh were forwarded to the present author in order to get them identified or the identification verified. According to a letter from 18 February 1992 sent to P.J.A. Pugh, the *Agauopsis* individual was said to belong to *A. glacialis* Bartsch, 1993.

Reliable records of *Copidognathus oculatus* are restricted to northeastern Atlantic waters (Bartsch 2009). The European *C. oculatus* has given the name to the *C. oculatus* group and six of the presently known seven Antarctic *Copidognathus* species belong to this group (Bartsch 1993).

Copidognathus simonis and *Halacarellus novus* were described by Lohmann (1907b) on the basis of material from South Africa, Kerguelen and St. Paul. Trouessart (1914) mentioned both species from the Antarctic Peninsula. In respect to the Antarctic halacarid fauna, the western coastline off the Antarctic Peninsula is the area best studied, but at present there are no further records of these two species. The Antarctic fauna includes several species which in their general outline come close to these two species, *e.g.* there are six *Copidognathus* species which, like *C. simonis*, belong to the *oculatus* group and two *Halacarellus* species, *H. arnaudi* and *H. georgiensis*, which resemble *H. novus*.

Halacarellus eltanini was, according to Newell (1984), collected at 56°07'S, 66°25'W (*Eltanin* cruise 9, station 740), this is off Cape Horn and not off the South Sandwich Islands (as mentioned in Newell 1984).

The individuals of *Lohmannella falcata* mentioned by both Lohmann (1907a, b) and Trouessart (1914) were collected off the *Gauss* Station (eastern Antarctica), the Antarctic Peninsula (western Antarctica) and the Kerguelen Islands. *Lohmannella falcata* was once described on the basis of specimens from Seaham (North Sea, United Kingdom), it is an abundantly collected species in the North Atlantic and adjacent basins. In the past century, 22 southern hemisphere *Lohmannella* species were described (Bartsch 2009) but none is similar to *L. falcata* or any other

northern hemisphere species, accordingly the Antarctic and Subantarctic records of *L. falcata* are classified as incorrect.

Most scientific expeditions to the Antarctic concentrated on macrofauna and hence the number of halacarids taken in the Antarctic region is small, at present 66 species are mentioned. Twenty of them have records from both western and eastern Antarctic and are classified as circumpolar species, 21 species have records from at least two widely separated localities and finally 25 species were taken in just one area.

The Antarctic halacarid fauna covers the depth range from the intertidal zone to deep-sea trenches. The genus *Isobactrus* is known to be restricted to the more or less regularly exposed area of the shoreline, most of the species live above the mid-tidal zone (Bartsch 2010a) and this will certainly also be true for *I. microdens*. Amongst *Rhombognathus* a few species are restricted to the upper tidal area, the majority of species inhabit a wider range. Table 1 includes four species which are mentioned from the tidal zone, of these the two species *Rhombognathus auster* and *R. gressitti* turned out to be numerous in the middle and lower tidal zone (Gressitt 1967; Pugh and Bartsch 1994).

Bathyhalacarus abyssalis, *Halacarus longior*, *H. profundus*, and *Lohmannella abyssalis* are at present classified as deep-water species. *Halacarus longior* is not restricted to the Antarctic, records are from several Atlantic deep-sea basins and trenches in the South and North Atlantic, as far north as the North American Basin (Bartsch 1981). The number of records of the other species is too small to pass any judgement on their distributional range.

Except for a few tidal collections (Gressitt 1967; Pugh and Bartsch 1994), almost nothing is known about association or preference of a given substratum, reliable biological data are rare. Most samples were taken with a trawl, grab or core, the halacarids were extracted from residues of these samples or washings of macrofauna that had been picked up from catches hauled onboard. Sometimes morphological characters hint at the life style. The species of four genera, *Bradyagaue*, *Colobocerasides*, *Isobactrus*, and *Rhombognathus*, are expected to live in close association with a given substratum. *Isobactrus* and *Rhombognathus*, all with green gut content, mainly feed on algae, hence are bound to the presence of algae. *Isobactrus* with its short gnathosoma and chelicerae is dependent on algae with a thin epidermis (Bartsch 1974), *Rhombognathus* certainly can use a wider spectrum of food items. *Colobocerasides* is said to be temporarily ectoparasitic (Bartsch 1998), but the host is unknown. The above mentioned deutonymph was found amongst tubes of tanaidaceans but contamination of the tubes cannot be excluded. The hind legs of *Bradyagaue* are curved, obviously of advantage while moving on and clasping stolonaceous substrata, and indeed, several individuals were found clinging to stolons of Hydrozoa (Newell 1971; Bartsch 1988: fig. 44.2b).

The majority of the halacarids at present known from the Antarctic are expected to be epibiontic scavengers or predators which live on and amongst a wide range of substrata.

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