

## Halacaridae (Acari) from Western Antarctica. New data.

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(with 8 figures)

### Abstract

Five halacarid species were present in samples taken in the South Atlantic off the Elephant Island. *Werthella terella* Bartsch, 1993 was the species most abundant, with 7-82 individuals per grab sample. The other four species were *Bradyagaue drygalskii* (Lohmann, 1907), *Lohmannella antarctica* Newell, 1984, *Copidognathus* sp., and *Halacarus* sp.

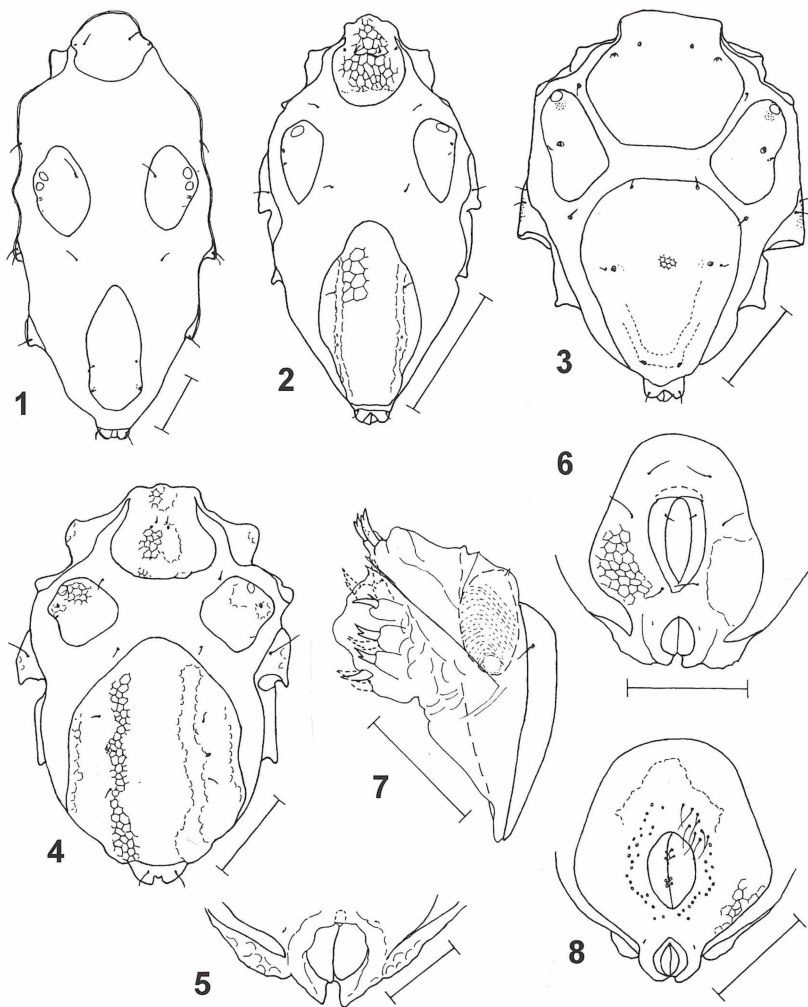
**Key words:** Acari, Halacaroida, Antarctica, Elephant Island, grab samples, bathyal.

### Introduction

According to present knowledge, the Antarctic region, with Antarctica and the islands south of 60 °S (consequently South Georgia and South Sandwich Islands excluded), contains 47 identified species. The genera, and the number of named species (in parentheses), are *Agau* (6), *Agauopsis* (4), *Bathyhalacarus* (1), *Bradyagaue* (3), *Colobocerasides* (1), *Copidognathus* (6), *Halacarellus* (6), *Halacarus* (11), *Lohmannella* (5), *Rhombognathus* (3), and *Werthella* (1) (Lohmann 1907, Trouessart 1907, 1914, Newell 1967, 1984, Bartsch 1993, 1995, 1998, 2005a). Both new records of these species as well as new species are expected to be found in the course of future expeditions.

### Material and Methods

In 1986, during the expedition ANT V, the German R.V. POLARSTERN (PS) spent the austral winter in an area around the Elephant Island, Bransfield Strait and west of the Antarctic Peninsula (Sahrhage 1987). Amongst the meiofauna in samples taken with a Van-Veen grab several halacarid mites were present. The mites were recently forwarded to the author. Part of the material was overcleared and did not permit a reliable identification. The halacarid mites are stored in the Zoological Museum in Hamburg.



**Figs. 1-8.** 1. *Bradyagaue drygalskii* (Lohmann), deutonymph, dorsal aspect. 2. *Copidognathus* sp., protonymph, dorsal aspect (pair of ds-5 obscured); 3. *Lohmannella antarctica* Newell, female, dorsal aspect; Figs 4-8: *Werthella terella* Bartsch; 4. male, dorsal aspect; 5. female, anal cone, ventral aspect; 6. female, genitoanal plate; 7. ovipositor; 8. male, genitoanal plate. (1-4, 6 and 8, scale = 100  $\mu$ m, 5 and 7, scale = 50  $\mu$ m.)

**Abbreviations:** *AD*, anterior dorsal plate; *AE*, anterior epimeral plate; *ds-1* to *ds-5*, first to fifth pair of dorsal setae numbered from anterior to posterior; *GA*, genitoanal plate; *glp-1* to *glp-4* first to fourth pair of gland pores, numbered from anterior to posterior; *GO*, genital opening; *GP*, genital plate; *OC*, ocular plate(s); *PD*, posterior dorsal plate(s); *PE*, posterior epimeral plate(s); *pgs*, perigenital setae; *sgs*, subgenital setae. The legs, their segments and claws are numbered I to IV. The leg segments 1 to 6 are trochanter, basifemur, telofemur, genu, tibia, and tarsus.

## Results

The samples studied are from a depth range of 209 to 473 m. Seven of the grab samples, from five stations, contained halacarid mites. Five species were present. *Werthella terella* Bartsch, 1993 was the species most abundant, present in the seven samples, with 7-82 individuals per grab sample. The other species were rare, *Lohmannella antarctica* Newell, 1984 represented by a female and two juveniles, *Bradyagaue drygalskii* (Lohmann, 1907) by three juveniles, and the genera *Copidognathus* and *Halacarus* by a single individual each.

### *Bradyagaue drygalskii* (Lohmann, 1907) (Fig. 1)

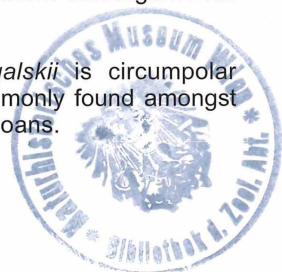
**MATERIAL.** 1 deutonymph, PS ANT V, Station 144, 60°56'S, 55°09'W, 362 m, 10 June 1986; 1 deutonymph, 1 protonymph, PS ANT V, Station 148, 60°52'S, 55°24'W, 311 m, 12 June 1986.

**CHARACTERS** (deutonymph from Station 144). Length 704 µm, width 339 µm. Integument of slightly brown colour. Shape of dorsal plates as outlined (Fig. 1). *PE* with two marginal setae anterior to insertion of leg III and one seta anterior to insertion of leg IV. *GP* small, with two pairs of internal genital acetabula, two pairs of subgenital setae and one pair of *pgs*. Length of gnathosoma 167-200 µm. No cerotegumental cover on genua III and IV.

The second deutonymph, length 770 µm, width 328 µm, and the protonymph, length 620 µm, are expected to belong to *B. drygalskii* but are overcleared and do not permit a reliable determination.

**REMARKS.** According to the shape of the dorsal plates and absence of cerotegumental cover on the genua III and IV, the deutonymph (Station 144) is identified as *B. drygalskii*. *Bradyagaue grandiphora* Newell, 1984 and *B. drygalskii* demonstrate an overall similarity, but in the former species both adults and nymphs have a more prominent cerotegumental cover on genua III and IV.

**DISTRIBUTION AND HABITAT.** *Bradyagaue drygalskii* is circumpolar Antarctic (Bartsch 1993: map 5). The species is commonly found amongst an epibios, e.g., clinging tightly to stolons of hydrozoans.



*Copidognathus* sp.  
(Fig. 2)

MATERIAL. 1 protonymph, PS ANT V, Station 144, 60°56'S, 55°09'W, 362 m, 10 June 1986.

CHARACTERS (protonymph). Length of idiosoma 300 µm, width 165 µm. Length of gnathosoma 156 µm. Dorsal plates reticulate. OC slender, almost as long as AD; posterior cornea very faint. Length of PD twice that of AD. PD with pair of slender costae, one panel wide (Fig. 2). Pair of ds-5 obscured. Length of telofemur I slightly more than twice the height. Tarsus III with four dorsal setae; two basal setae separated by height of that segment. Tarsus IV with three dorsal setae.

REMARKS. The juvenile most likely belongs to the *Copidognathus oculatus* group, it resembles *C. vanhoeffeni* (Lohmann, 1907).

*Halacarus* sp.

MATERIAL: 1 male, PS ANT V, Station 148, 60°52'S, 55°24'W, 311 m, 12 June 1986.

CHARACTERS (male). Length 500 µm, width 300 µm. With frontal spine.

REMARKS. All cuticular structures are extremely cleared and consequently the shape of idiosomal plates and the position and shape of setae is hardly recognizable, the interpretation to vague for any reliable determination. Eleven *Halacarus* species are at present recorded from Antarctica. The male at hand has a length of 500 µm. Three of the eleven Antarctic species are distinctly larger (*H. excellens* Lohmann, 1907, *H. longior* Bartsch, 1981, *H. profundus* Newell, 1984), their females reach a length of 1000 µm and more, their males are slightly smaller, eight species are within a length range of 450-850 µm (*H. arnaudi* Newell, 1984, *H. cucullatus* Bartsch, 1993, *H. laterculatus* Viets, 1950, *H. minor* Lohmann, 1907, *H. nanus* Gimbel, 1919, *H. otiosus* Bartsch, 1993, *H. parmatus* Bartsch, 1993, *H. validus* Gimbel, 1919).

*Lohmannella antarctica* Newell, 1984  
(Fig. 3)

MATERIAL. 1 female, PS ANT V, Station 144, 60°56'S, 55°09'W, 362 m, 10 June 1986; 1 protonymph, PS ANT V, Station 143, 60°56'S, 55°01'W, 351 m, 10 June 1986; 1 deutonymph, PS ANT V, Station 148, 60°52'S, 55°24'W, 311 m, 12 June 1986.

CHARACTERS (female). Length of idiosoma 420 µm, width 304 µm, length of gnathosoma 245 µm. Length relation idiosoma: gnathosoma 1:0.58. Dorsal plates with irregularly reticulate epicuticula. PD with V-shaped porose areola extending to about the level of insertion of leg IV (Fig. 3). Pair of ds-1 anterior to gland pores, ds-3 in anterior truncate margin of PD, ds-5 on PD close to anterior pair of gland pores. Pair of glp-2 slightly closer to pore canaliculus than to medial edge of OC. In female distance

between anterior margin of GA and that of GO slightly more than length of GO. With 9 pairs of *pgs*. Genu, tibia and tarsus I with 4, 6, 2 bipectinate ventral setae, respectively.

Length of deutonymph 329  $\mu\text{m}$ , width 242  $\mu\text{m}$ , length of gnathosoma 175  $\mu\text{m}$ . Length relation idiosoma: gnathosoma 1:0.53.

Length of protonymph 234  $\mu\text{m}$ , width 194  $\mu\text{m}$ , length of gnathosoma 130  $\mu\text{m}$ , width 60  $\mu\text{m}$ , length:width 1:0.46. Length relation idiosoma: gnathosoma 1:0.56.

REMARKS. Three of the Antarctic and Subantarctic *Lohmannella* species have six bipectinate ventral setae on tibia I, *L. antarctica*, *L. consimilis* Bartsch, 1993 and *L. reticulata* Viets, 1950 (Viets 1950, Bartsch 1993, 2005a), the three species differ in the position of the gland pore on the OC (in *L. antarctica* and *L. consimilis* close to lateral margin, in *L. reticulata* close to medial margin), the position of *ds-5* relative to *glp-4* (in *L. antarctica* close to *glp-4*, in *L. reticulata* distinctly posterior to *glp-4*, in *L. consimilis* in an intermediate position), the shape and ornamentation of the PD (in *L. antarctica* and *L. reticulata* lateral margins evenly convergent and PD ornamented with epicuticular reticulation and V-shaped porose areola, in *L. consimilis* PD pyriform, porose areola or epicuticular reticulation lacking). More material from the type localities Anvers Island, Antarctic Peninsula (*L. antarctica*), South Sandwich (*L. consimilis*) and Falkland Islands (*L. reticulata*) may prove the characters to vary and these three to be local variants of a single species.

DISTRIBUTION AND HABITAT. *Lohmannella antarctica* demonstrates a circumpolar distribution, at present with records from the Palmer Archipelago, Ross Sea and Terre Adélie (Newell 1984), Elephant Islands (present material) and Weddell Sea (70°S, 8°W, 330 m, unpublished record). Its depth distribution is from shallow subtidal to 460 m.

*Werthella terella* Bartsch, 1993  
(Figs 4-8)

MATERIAL. 2 females, 3 males, 2 protonymphs, PS ANT V, Station 140, 60°50'S, 55°44'W, 294 m, 9 June 1986; 7 females, 2 males, 1 protonymph, PS ANT V, Station 143, 60°56'S, 55°01'W, 351 m, 10 June 1986; 5 females, 3 males, 1 protonymph, PS ANT V, Station 144, grab 1, 60°56'S, 55°09'W, 362 m, 10 June 1986; 7 females, 1 male, 1 protonymph, PS ANT V, Station 144, grab 2, 60°56'S, 55°09'W, 362 m, 10 June 1986; 12 females, 6 males, 17 protonymphs, 3 larvae, PS ANT V, Station 148, grab 1, 60°52'S, 55°24'W, 311 m, 12 June 1986; 5 females, 6 males, 14 protonymphs, 2 larvae, PS ANT V, Station 149, grab 1, 60°50'S, 55°34'W, 473 m, 12 June 1986; 28 females, 21 males, 30 protonymphs, 3 larvae, PS ANT V, Station 149, grab 2, 60°50'S, 55°34'W, 473 m, 12 June 1986.

DESCRIPTION. Length of female 400-627  $\mu\text{m}$ , of male 395-564  $\mu\text{m}$ . Dorsal plates reticulated; within distinctly raised, porose areolae integument thicker, reticulation accordingly more prominent; each panel with delicate canaliculi. AD with porose areolae, a small anterior one, a large median

one and a pair of small areolae in posterior margin (marginal areolae) (Fig. 4). Median areola either uniform, but with a small anterior and posterior incision, or, in about one third of adults, separated longitudinally. Pair of marginal areolae absent in about 12 % of adults. Anterior pair of gland pores and dorsal setae adjacent in anterior margin of median porose areola. OC with faint cornea and two porose areolae. PD with two pairs of costae, medial costae one to three panels wide and each panel with distinct canaliculi, lateral costae slightly raised, one panel wide, canaliculi faint. Pair of gland pores in lateral margin of costae at the level of insertion of leg IV. Anal valves extending beyond anal sclerites (Fig. 5).

Surface of ventral plates reticulated, marginal areas with canaliculi. In female and male distance between anterior margin of GA and that of GO 0.6 and 1.2 times length of GO, respectively (Figs 6 and 8). Ovipositor short, in rest hardly extending beyond GO (Fig. 6). Ovipositor apically with 11 bi- or trifold genital spines (Fig. 7), their length 8-9  $\mu\text{m}$ ; basally with pair of minute delicate papillae, 3  $\mu\text{m}$  in length. Male GA with about 50 pgs. Spermatopositor large, extending beyond GO (Fig. 8).

Gnathosoma as typical in *Werthella* species, 1.5 times longer than wide. Telfemora reticulate, slender, telfemora I and II 1.9-2.5 times longer than high. Tibiae I and II each with three rather stout ventral setae and four dorsal setae, tibiae III and IV with two ventral and two dorsal setae. Tarsus I with three dorsal fossary setae, setiform solenidion and lamellar, digitiform famulus, ventrally with long seta in basal half and short seta level with solenidion. Tarsus II with three dorsal fossary setae and setiform dorsolateral solenidion. Tarsus III with four dorsal setae (rarely three setae); distance between basal seta and equal-sized dorsal fossary setae equalling about height of tarsus (sometimes more, rarely slightly less). Tarsus IV with three setae. Claws with accessory process.

About two-third of the females are ovigerous, with two to four eggs each. Most of the females without eggs seemed to be moribund.

Length of protonymph 310-505  $\mu\text{m}$ . Dorsal plates smaller than in adults. AD with small anterior areola and pair of median areolae, the latter situated immediately adjacent; marginal areolae lacking. PD with pair of medial costae; lateral costae lacking. GP slightly wider than long. Length of telfemora I and II 1.8-1.9 times the height. Tibiae I and II each with two ventral and three dorsal setae; tibiae III and IV with four setae each. Chaetotaxy of tarsi same as in adults.

Length of larva. 250-309  $\mu\text{m}$ .

REMARKS. *Werthella terella* has slender telfemora; telfemora I and II are 1.9-2.5 times longer than high. In the ten *Werthella* species at present known, *W. atlantica* Bartsch, 1986, *W. plumifera* Newell, 1971 and *W. tera* Bartsch, 1979 have similar slender telfemora (length: height ratio 1.8-2.5). *Werthella atlantica* and *W. plumifera* bear plumose setae on tibiae III and genua and tibiae IV, the setae are smooth in *W. tera* and *W. terella*. The

two latter species differ in the leg chaetotaxy, tibiae III and IV of *W. tera* bear 3/2 dorsal/ventral setae but there are 3/1 setae in *W. terella*, and tarsus I of *W. tera* has a single ventral seta (the apical one), *W. terella* two setae (one basal and one apical seta). *Werthella tera* is represented by a single female (Bartsch 1979) and the variability of the characters hence not known.

The ovipositor bears 11 apical genital spines. The same number of spines was found in *Copidognathus* species, e.g., in *C. caelatus* Bartsch, 1994 and *C. wadjemupis* Bartsch, 1999 (unpublished). Eleven genital spines are also present in many, but not all *Isobactrus* species (Bartsch 1975, 2000, Newell 1984).

**DISTRIBUTION AND HABITAT.** From Eastern Antarctica, off Wilkes Land (66°S, 111°E, 36 m) (unpublished record) and off Western Antarctic and Subantarctic islands, from Elephant Island and South Sandwich Islands, 110-470 m (Bartsch 1993 and present material). According to the halacarid material at hand, *W. terella* is an inhabitant of soft sediment.

### Discussion

The data are sparse, nonetheless it is of interest that in the seven grab samples, from five stations, *Werthella terella* was the halacarid species most abundant, with 7-82 individuals per sample. The species seems to be an inhabitant of rather soft sediment. The biology of the species, and the genus *Werthella* in general, is almost unknown. The genus inhabits a depth range from tidal beaches (Bartsch 1996) to the deep sea (2800 m, Newell 1971) and a variety of habitats. *Werthella ampliata*, e.g., proved to be an inhabitant of coarse sandy deposits in a tidal beach but was also extracted from the epibios on constantly submerged seagrass (Bartsch 1996, 2005b).

### Zusammenfassung

Sedimentproben, gesammelt vor Elephant Island, Westantarktis, enthielten fünf Halacariden Arten. Stets und auch zahlreich vorhanden war *Werthella terella*. *Bradyagaue drygalskii*, *Lohmannella antarctica* und je ein Vertreter der Gattungen *Copidognathus* und *Halacarus* waren mit jeweils nur wenigen Exemplaren vertreten.

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