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A hydrothermal vent mite (Halacaridae, Acari) with a new *Corynophrya* species (Suctoria, Ciliophora), description of the suctorian and its distribution on the halacarid mite

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Abstract

Copidognathus nautilei Bartsch, 1997, from a hydrothermal vent field of the Mid-Atlantic Ridge at about 13°N, 45°W and 4090 m depth, was infested with the suctorian *Corynophrya abyssalis* n. sp., with up to 58 epizoans per mite. The new suctorian has a sacciform body with seven longitudinal ribs, a compact macronucleus and up to 40 non-retractile tentacles. The budding is exogenous. The systematic position of the new species and the genus *Corynophrya* is discussed, as well as infestation rates and sites of suctorians on their halacarid hosts.

Keywords: Abyssal; Ashadze; halacarid mite; Mid-atlantic ridge; new species; Suctoria

Introduction

Suctorians are spread in marine and fresh water, they inhabit both anorganic and organic material, plants and animals. Inhabitants of animals may be commensals, ecto- or endoparasites. Amongst others suctorians colonize halacarid mites.

The first halacarid mite described, *Thalassarachna basteri* (Johnston, 1836), also was the first mentioned halacarid host of a suctorian. Gosse (1855) found two epizoans on this mite (which erroneously was identified as *Halacarus ctenopus* Gosse, 1855 – cf. Bartsch 2001), a *Vorticella* sp. (Peritrichia, Ciliophora) and several *Acineta* sp. (Suctoria) attached to the idiosoma and legs, respectively. The suctorians, described and illustrated by Gosse, 1855: 306, Plate 8, Fig. 6), had a length of 1/390th of an inch (about 65 µm), a short stalk and a slightly longer distinctly annulated and apically truncate body with two tentacle fascicles. These suctorians most likely were representatives of a species nowadays known under the name *Acineta sulcata* Dons, 1927.

Since those days several more records of suctorians on halacarid mites have been published (Dovgal et al. 2008), but still the number of species is limited. Most records are from shallow waters. A deep-sea record of an epibiont on Halacaridae is from the Mid-Atlantic Ridge, Snake Pit, 3500 m (Bartsch 1994). The suctorian species described in this paper is from a more southern site.

Material and methods

The halacarid mites with suctorians are from the Mid-Atlantic Ridge, from the recently discovered station

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Ashadze, collected during the French-Russian cruise Serpentine and taken with the submersible Victor 6000 which was operated from the RV Pourquoi pas? The cruise was organized by IFREMER (Institut Français de Recherche pour l'Exploitation de la Mer), chief scientist was Yves Fouquet. More information on the cruise gives the web page http://www.ifremer.fr/biocean. The biological samples were sorted at the IFREMER. For microscopical studies of the suctorians, the mites, stored in ethanol, were transferred into glycerine. Terminology and systematics in the descriptive part follow Dovgal (2002).

Host of the suctorians is the halacarid *Copidognathus nautilei* Bartsch, 1997, a species first described from the Mid-Atlantic Ridge, site Irina 2 (15°N, 45°W, 3050 m) (Bartsch 1997). It was the only mite species in the samples from station Ashadze. The idiosomal length of the adult mites is within a range of 395-450 µm.

Results

Corynophrya abyssalis n. sp.

Diagnosis: Body sacciform, rounded in cross-section but with seven longitudinal ribs. Body length 37-54 µm. Apical surface with up to 40 non-retractile tentacles. Macronucleus compact, situated centrally, rounded to slightly ovate. Stalk length 18-25 µm, slightly widened towards cell body. Budding exogenous.

Type locality: Mid-Atlantic Ridge, station Ashadze, 12°58.3521N, 44°51.7768W, 4087 m depth, 13 March 2007, Cruise Serpentine, Dive 312–3, slurp gun bottle No 4.

Type host: *Copidognathus nautilei* Bartsch, 1997 (Halacaridae).

Type material: Holo- and several paratypes on a slide, still attached to the female halacarid mite and mounted in glycerine. Holotype on second segment of first right leg (cf. Figs. 1, 2). Muséum National d'Histoire Naturelle, Paris, Section Protistes (registration number MNHN ZS 82).

Additional material (stored in ethanol)*:* Suctorians attached to a female and male of *Copidognathus nautilei*, Mid-Atlantic Ridge, station Ashadze, 12°58.3455N, 44°51.7879W, 4088 m, 13 March 2007, Cruise Serpentine, Dive 312–3, little collection box 3. Muséum National d'Histoire Naturelle, Paris, Section Protistes (registration number MNHN ZS 83). Suctorians attached to a male of *Copidognathus nautilei*, collecting data as above, Zoological Museum, University Hamburg. Suctorians attached to a male of *Copidognathus nautilei*, Mid-Atlantic Ridge, station Ashadze, 12°58.3342N, 44°51.7913W, 4088 m, 15 March 2007, Cruise Serpentine, Dive 313–4, blade corer 7. Muséum National d'Histoire Naturelle, Paris, Section Protistes (registration number MNHN ZS 84).

Etymology: The name is derived from *abyssos* (Greek), bottomless and *abyssal*, the bottomless zone, in which the species live.

Description: Body more or less inverted sacciform, from distinctly to slightly narrowed towards base (Figs. 1, 2, 3A), almost rounded in cross-section but with seven very marked longitudinal ribs (Fig. 3A, B). Length of body 37-54 µm, width 25-30 µm. Body surface with very faint annulated striation. About 40 non-retractile tentacles arranged in single apical group, several arising from near-basis of calotte-shaped protruding. Tentacles about 14-19 µm in length and 1 µm in diameter, each ending with small blunt knob. Macronucleus compact, centrally located, rounded to slightly ovate in outline, dimensions 9×10 µm to 15×8 µm. Number of tentacles reduced to about 30 in individuals with tomit, these tentacles short, 10 µm in length.

Stalk 18-25 µm in length, slightly more half the body length. Calyciform widened toward body and forming an epicone, 7-8 µm in diameter (Fig. 3A, ec). Stalk equal in diameter (4 µm) for most of its length; not markedly narrowed towards its base.

In a few specimens body contracted, almost spherical, length and diameter 28-32 µm. Ribs present. Number and size of tentacles reduced, tentacles concentrated on small apical area. These specimens assumedly moribund.

Reproduction: Asexual reproduction by exogenous budding (Fig. 5). Apical cone of tomit smooth (Fig. 5A), surface of remainder with distinct, annulated striation (Figs. 4, 5C); no cilia recognizable. Tomit studied with eight maternal tentacles, these wider but shorter than in trophont, 8-10 µm in length and almost 2 µm in diameter, and situated within anterior striated part of body. Swarmer vermiform, spindle-shaped (Fig. 3C), dimension 62×17 µm. Surface annulated, uneven, without cilia. Macronucleus rounded, 7 µm in diameter.

Differential diagnosis: The new suctorian species has no lorica, is rounded in cross-section, all tentacles are similar-sized and restricted to an apical calotte, and the macronucleus is compact and rounded, accordingly it was attributed to the mainly marine genus *Corynophrya*, which was erected by Kahl (1934).

Corynophrya symbiotica Jankowski, 1981 (Fig. 6), an epizoan on arctic polychaetes of the family Aphroditidae, and *C. abyssalis* both have a sacciform, slightly irregularly shaped body with marked longitudinal ribs and their tentacles are situated on an apical calotte. The two species can be discriminated on the basis of (1) length of the body and stalk, 37-54 µm and 18-25 µm, respectively, in *C. abyssalis* but 80-105 µm and 90 µm in *C. symbiotica*, (2) the epicone, present in *C. abyssalis* but absent in *C. symbiotica*, (3) the tentacles, non-retractile and about one-third of the