

ACTINOLOPHUS MINUTUS A NEW HELIOZOAN, WITH A REVIEW OF THE SPECIES ENUMERATED IN THE GENUS.*

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While examining late in October some sediment in a jar containing *Hydra fusca* collected September 17, 1904, in the Kokosing River, attention was attracted by a small stalked form of heliozoan like appearance. This (Fig. 1), a single example of which was observed, on more careful study proved referable to the genus *Actinolophus* (Heliozoa) the representatives of which are not met with frequently, none to the knowledge of the present writer having thus far been noted in America.

Although there is considerable uncertainty as to the exact relation of the species constituting the group to the other Protozoa, the characteristics of the form in question appear to merit record, differing as it does from *A. capitatus* Penard through the absence of knobbed pseudopodia as well as in its much smaller size, and from *A. pedatus* (Zach.) by the spherical form of the body which is ovoid in the latter and much larger than the body of *A. minutus*.

Schulze, 1874, formed the genus *Actinolophus* for the reception of *A. pedunculatus* a marine form from the Baltic Sea described by him. Penard 1890, described *A. capitatus* from a single individual suggesting its close relationship with the tentaculiferous infusoria (Suctoria). Zacharias, 1893, in a brief description, called attention to a new Heliozoan, *Actinosphaeridium pedatus* which Schaudinn, 1896, in his monograph of the Heliozoa, placed provisionally in the genus *Actinolophus*, recognizing for

that genus three species, two of which were of doubtful value. Penard, 1904, in his valuable monograph of the fresh water Heliozoa, mentions both *A. capitatus* and *A. pedatus* among forms whose position is doubtful, suggesting possible affinities with *Tokophrya* and *Nuclearia*, noting at the same time the desirability for further

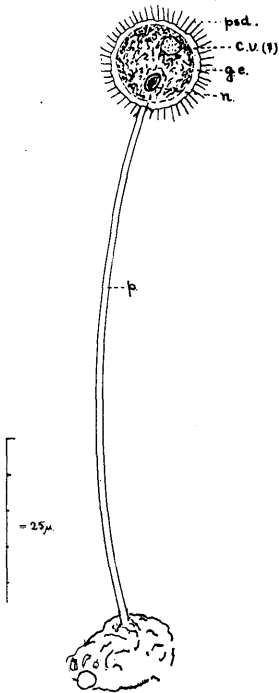


Fig. 1. *Actinolophus minutus* n. sp. (x 1000), psd.—pseudopodia, c. v.—contractile vesicle (?), p.—pedicle, g. e.—gelatinous envelope, n.—nucleus.

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study. Until a better knowledge is obtained of their affinities however, it seems advisable to consider them under the genus *Actinolophus*.

The following summarizes our present knowledge of the group and indicates the position of *A. minutus* in respect to the other species.

Genus *Actinolophus*, Schulze.

1874 *Actinolophus*, F. E. Schulze, Arch. mikr. Anat. v. 10, p. 392.
 ?1893 *Actinosphæridium*, O. Zacharias, Forschungber. Plon., v. 1, p. 15.
 1896 *Actinolophus*, Schaudinn, Das Tierreich, Heliozoa, Berlin.

Body spherical or oval, provided with a pedicle the length of which is usually much greater than the diameter of the body. Body generally (always?) provided with a gelatinous envelope through which the fine pseudopodia are extended. Nucleus excentric. contractile vacuole (?).

The following table will serve to separate the forms:

- A¹ Pseudopodia not knobbed at the extremity.
 B¹ Pedicle 3–4 μ in diameter, marine forms, *A. pedunculatus*
 B² Pedicle not more than 2 μ in diameter, fresh water forms,
 C¹ Body ovoid, diameter 18 μ , length 23 μ , *A. pedatus*
 C² Body spherical, diameter 12 μ *A. minutus*
 A² Pseudopodia knobbed at extremity. diameter 30 μ , fresh water forms, *A. capitatus*

1. *A. pedunculatus*, Schulze, 1874 A. p. F. E. Schulze, Arch. mikr. Anat., v. 10 p. 392 f. 1–9. 1896 Schaudinn, Das Tierreich, Heliozoa, Berlin, p. 11.

Length of body, up to 30 μ , length of pedicle up to 100 μ , diameter of pedicle 3–4 μ .

Marine, Baltic Sea.

2. *A. pedatus*, (Zach.) 1893 *Actinosphæridium pedatum*, Zacharias, Forschungber. Biol. Stat. Plon., v. 1 p. 15, f. 9a, 9b. 1896 ? *Actinolophus pedatus*, Schaudinn, Das Tierreich, Heliozoa, Berlin, p. 11. 1904 ? *Actinosphæridium pedatum*, (? *Nuclearia caulescens*), (? *Tokophrya*), Penard, Les Heliozoaires d'eau douce, p. 318.

Length of body 23 μ , diameter 18 μ , length of pedicle 11–30 μ , diameter 1.7 μ . Body provided with a thick gelatinous envelope from which extends extremely fine and rather short pseudopodia. Nucleus oval, situated in the inferior part of the body. Contractile vesicle not known. Color pale yellow, individuals occasionally agglomerated by their bodies into colonies.

Fresh water, Germany.

Zacharias placed *A. pedatus* in a new genus *Actinosphæridium* on the basis that it differed from *Actinolophus* by possessing, in the encysted condition, plates covering the body. Schaudinn enumerates it among the doubtful species of *Actinolophus*, while Penard refers it back to *Actinosphæridium*, at the same time calling attention to its remarkable similarity to *Nuclearia* and to *Tokophrya*.

3. *A. minutus*, n. sp.

Body spherical, diameter 12μ including gelatinous envelope approximately 1μ thick. Length of pedicle 70μ , diameter 1μ . Extremely fine short pseudopodia of about 2μ in length extend beyond the envelope on all sides. Nucleus suboval situated in the inferior part of the body. Contractile vesicle (?). Base of pedicle (in the form studied) imbedded in a gelatinous mass $10-12\mu$ in extent containing small algæ, etc.

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A single specimen observed Oct. 29, 1904, in sediment from an aquarium jar containing *Hydra fusca*, the entire contents of the jar having been collected Sept. 13, 1904, in the Kokosing River at Gambier and subsequently covered with a glass plate for the purpose of preventing too rapid evaporation. The form was under observation at intervals during a period of four hours.

4. *A. capitatus*, Penard. 1890 A. c. Penard, Jahrb. Nassau. Ver. v. 43 p. 16 t. 1 f. 11. 1896 A. c. Schaudinn, Das Tierreich, Heliozoa, Berlin, p. 12. 1901 A. p. Sand. Etude monographique sur le groupe des Infusoires tentaculiferes, Ann. Soc. Belge de Microscopie. 1904 A. c. Penard, Les Heliozoaires d'eau douce, Geneva, p. 316.

Diameter 30μ , length of pedicle 90μ . Nucleus (?), Contractile vesicle, Pseudopodia few in number, knobbed.

In fresh water, Germany.

Penard described this species in 1890 from a single individual referring it to the genus *Actinolophus* although noting its close relationship with the tentaculiferous infusoria. Sand, 1901, in his study of that group came to the conclusion that *A. capitatus* was nearer related to the Heliozoa than to the Suctorina for the following reasons, (a) the pedicle resembles that of *Clathrulina elegans*, (b) the pedicle does not penetrate into the gelatinous envelope as in *Tokophrya limbata* one of the Suctorina, (c) the nucleus is excentric, (d) the species closely resembles *A. pedunculatus*. Penard, 1904, in his paper on the fresh water Heliozoa, after having examined several more specimens which he remarks are exceedingly rare, insisted on the suctorian nature of the form, maintaining that the points raised by Sand have little value. Penard at the same time suggests the desirability for a further study of the form. Consequently it seems advisable at present to allow it to remain in the genus *Actinolophus*.

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