Protist, Vol. 157, 251—253, July 2006
http://www.elsevier.de/protis
Published online date 12 July 2006

Protist

PROTIST NEWS

Re-Discovered Beauty — New Images for Old Descriptions — Tropical Tintinnids of the Genus Xystonellopsis (Ciliophora, Tintinnia)

Examining material from a new locale, often we return to our old taxonomic monographs. Perusing these works one cannot help but think, 'What a wonderful variety of forms — but do they all really exist?' This question is almost reasonable when looking through monographs devoted to planktonic forms. Consider, for example the radiolarians of Haeckel (1887). The illustrations are stunning and the variety of morphologies is truly bewildering. However, in the old monographs, many descriptions are of organisms from areas which were, and remain today, rarely sampled and therefore poorly known. Furthermore, some descriptions were based on very few individuals- or only the hard parts, the skeletons and shells. This is the case with regard to tintinnid ciliates. Some descriptions are based on a single or few shells (loricae) from a single sample. One might then justifiably question the existence of some of the more fabulous forms found in the older literature.

Recently, I had the opportunity to examine material for tintinnid ciliates collected during the Biosope cruise which explored a series of stations in the South Pacific between Tahiti and the coast of Chile in 2002. As a reminder, tintinnids are planktonic, mostly marine ciliates, characterized by the possession of a lorica into which the ciliate cell can contract. Taxonomy of tintinnid ciliates is based on the characteristics of the lorica, the shape, material and architecture. They range in size from 40 to 400 μm and feed upon algae.

Here I would like to share images of some 'exotic' species of tintinnids found in these samples, ones which appear to match old drawings. The images are all species of the genus *Xystonellopsis*. The genus was erected by Jörgensen (1924) to separate forms without a distinct inner and outer rim at the mouth of the lorica border, forms previously in the genus *Xystonella*.

Many species were originally described by Brandt (1907) or Laackmann (1909) from material collected during German expeditions to the southern seas. All seem to be restricted to warm waters. Some appear to be very wide-spread. For example, *Xystonellopsis paradoxa* (Fig. 1 A), the type species of the genus has been found in the Atlantic, Pacific, the Mediterranean and Black Seas. For others, such as *X. conicaudata* (Fig. 1 F), no reports appear to exist since their description, which in this case was 1929 (Kofoid and Campbell 1929).

In the samples from the Biosope cruise, I found 11 *Xystonellopsis* species. Here only 9 of the 34 species recognized by Kofoid and Campbell (1939) are illustrated. Each species is shown with a reproduction of the drawing given in Kofoid and Campbell's conspectus (1929). The drawings found in Kofoid and Campbell were in most cases faithful reproductions of the drawings accompanying original species descriptions.

The first figure (Fig. 1) shows images and drawings of the large chalice-shaped species: *Xystonellopsis paradoxa* (the type species of the genus), *X. dicymatica, X. pulchra*, *X. clevei*, and *X. conicaudata*. These were found throughout the tropical Pacific, with the exception of *X. pulchra* found only in the coastal waters of central Chile — a zone of upwelling. The second figure (Fig. 2) shows species of a more tubular form. These include *X. brandti* which appears to be as wide-spread and common as *X. paradoxa*. In contrast is the species *X. armata*; the image is of the only individual encountered in examining material from all of the 23 stations.

Many images of protists exist in the collections and computers of researchers world-wide. Imagine if the 'centralizing' image banks which now exist (e.g., Micro*scope, Plankton*Net) were supplied with images every time an organism is described (or illustrated in a publication). Gene sequences are deposited; type specimens are deposited. Why not images? With the existence of

doi:10.1016/j.protis.2006.05.004

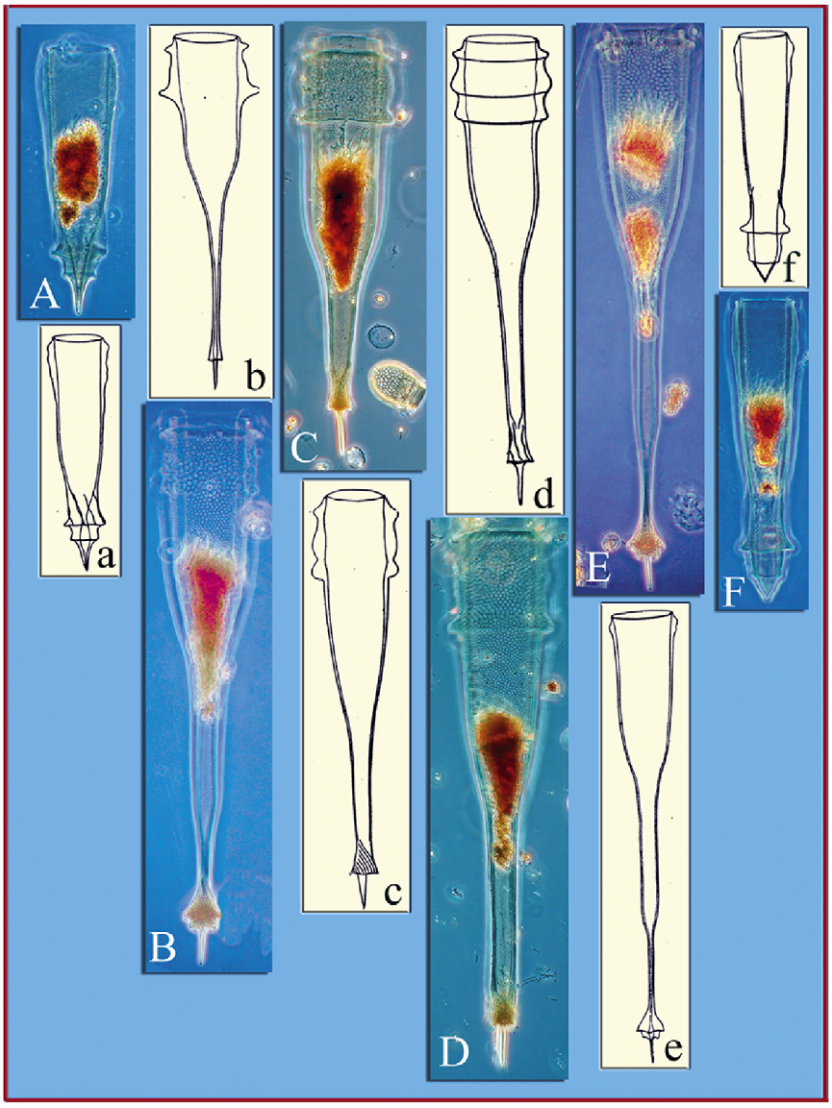

Figure 1. Photomicrographs of examples of chalice-shaped species of *Xystonellopsis* and corresponding copies of line drawings from Kofoid and Campbell (1929). *Xystonellopsis* paradoxa (A, a), *X. dicymatica* (B, b), *X. pulchra* (C, c) the small empty lorica at the lower right is *Codenellopsis pusilla*, *X. clevei* (D, d), and *X. conicaudata* (E, e).

an image bank, parallel to GenBank to match the sequences, the true wealth of the world of protists could be appreciated by all.

Slightly different versions of each image (for copyright reasons) have been deposited, for free and open access, with the Micro*scope site (http://starcentral.mbl.edu/miccroscope/portal/php) as well as the Image library of the American Society of Limnology and Oceanography (http://.aslo.org/photopost/).

Technical notes. The Biosope cruise sampled 23 stations between Tahiti and Conception, Chile, in September 2002 (for detailed information see: http://www.obs-vlfr.fr/proof/vt/op/ec/biosope/bio.htm). At each station, water samples of 5—10 l were obtained from each of 4—6 discrete depths between the surface and 200 m depth. Each water samples was gently concentrated to 20 ml using a 20 μm plankton concentrator. Concentrated samples were fixed with Lugol's Iodine solution. Sample aliquots were settled in sedimentation chambers and examined using a Zeiss Axiovert 25 inverted microscope equipped with 20 × and 40 × Neofluar phase objectives and a Canon G6 digital camera.

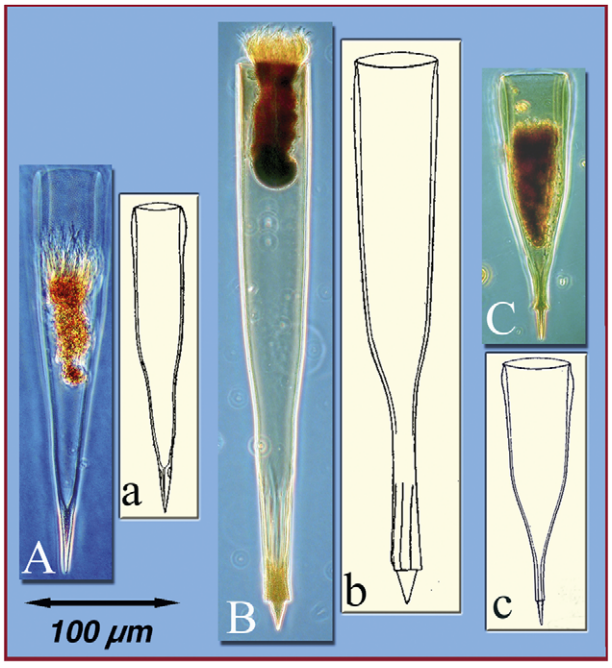

Figure 2. Photomicrographs of examples of tube-shaped species of *Xystonellopsis* and corresponding copies of line drawings from Kofoid and Campbell (1929). *Xystonellopsis brandti* (A, a), *X. armata* (B, b) the image is of the only specimen encountered in all the material examined from the 23 stations, and *X. favata* (C, c).

Some images were compiled from a focal series with the aid of Helicon software. Digital images were edited using Adobe Photoshop.

Acknowledgements

The opportunity to obtain samples from the South Pacific was due to Hervé Claustre, the organizer of the Biosope cruise, and Daniel Vaulot and co-workers, who did the actual sampling for me. This work was carried out within the framework of the Marplan project, part of the MARBEF Network of Excellence (Contract No. GOCE-CT-2003-505446). This is contribution MPS-06020 of MARBEF.

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