Mona Hoppenrath; Malte Elbrächter; Gerhard Drebes:

**Marine Phytoplankton**

Selected microphytoplankton species from the North Sea around Helgoland and Sylt

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Marine phytoplankton forms the basis of the food web in the oceans. Phytoplankton, although small enough to be invisible to the naked eye, can under favourable conditions actually be seen from a space satellite, because it occurs in such huge quantities. According to NASA, phytoplankton produces between 50% and 90% of the oxygen in the air that we breathe, depending on the season. Conversely, phytoplankton consumes most of the atmospheric CO$_2$, and so contributes greatly to maintaining a balanced ecosystem which is essential for all life and a healthy planet. More than 99% of all creatures inhabiting the oceans depend, either directly or indirectly, on phytoplankton for their survival.

This book provides a key to determine almost 300 phytoplankton species from the North Sea around Helgoland and Sylt, documenting them with close to 1100 images and 70 line drawings on 85 plates. This book is an important contribution to our understanding of marine phytoplankton of North Sea ecosystems.

Review: Natura 2009/nummer 6, S. 185

Een jaar lang konden Naturalezers kennismaken met de fytoplanktonkalender van het Marsdiep. De fytoplankton biodiversiteit is echter nog veel groter. Drebes schreef in 1974 een uitstekend boekje over honderdzeventig fytoplanktonsoorten uit de Noordzee. Dat boekje heeft mijzelf enorm geholpen om thuis te raken in de grote vormenrijkdom. Drebes legde de nadruk op bestudering van het levende plankton, geïllustreerd met foto’s van levend materiaal, zoals je het ook zag onder je microscoop; geen tekeningen van ‘ideaalbeelden’.

De nu sterk hernieuwde en uitgebreide versie behandelt ‘een selectie’ van maar liefst 288 soorten, vooral kiezelwieren en dinoflagellaten. De hoofdstukken over levenswijze en levenscycli zijn uitgebreid. Er zijn drie keer zoveel afbeeldingen (nu 1100), waarbij de nadruk weer ligt op foto’s van levend materiaal. Dit is hét boek om het fytoplankton van Noordzee en Waddenzee te leren kennen.

Hebt u een microscoop? Maak dan een planktonnetje en schaf dit uitstekende én goedkope boek aan.

Gerhard C. Cadée

Review by Koike Kazuhiko, Hiroshima

When students start the undergraduate projects in my lab, I take them out to get plankton net samples to a beach. I let them look at microalgae under the light microscope as it really is, without adding any fixative. Knowing they are going to be tired of keeping on observing the unknown phytoplanktons for long time, I suggest them to check the genus names of the several abundant species. However, I always experience the difficulty to show a good “identification manual (illustrated guide)” for beginners. It is not necessary for them to find precise systematics of protists or detailed thecal plate arrangement. The most important thing for this kind of book is including a large number of light micrographs showing various angles of cells and being fully organized to make students enhance their curiosity.

“Marine Phytoplankton” introducing here is such a illustrated guide I have wanted for a long time and contains 288 species in 129 genera of diatom, dinoflagellates and other related groups with 1100 micrographs and 70 drawings based on the phytoplankton sample collected from Helgoland island and Sylt island located on southeast North Sea. The morphological descriptions are shown with various angles of the light micrographs for all species and minimal numbers of SEMs are inserted to explain the criteria of the species differences. Since most of the light micrographs are probably taken of the unfixed organisms (or fixed for a short period of time), the original color of the cell and chloroplasts clearly demonstrated. It is also important to remember that this “Marine Phytoplankton” contains a large number of phytoplanktons playing important roles for marine ecology such as images showing the each stage of life cycle in diatoms and the feeding behaviors of heterotrophic dinoflagellates (especially series of images of parasitic dinoflagellates). All of those micrographs attract you to interesting protists every time flipping the pages. As mentioned by authors, this book is organized to help non-experts find the taxonomy rather than detail description of systematics for experts, so protistoligists might feel unsatisfied (especially about the section of diatom) but the most recent information about the taxonomic confusion of diatoms is introduced in this book and this will be very much worth to look at dinoflagellate researchers. See more detail about this “Marine Phytoplankton” on the publisher’s web page: http://www.schweizerbart.de/pubs/books/sng/kleinesenc-
For many of us working with marine phytoplankton in the decades following 1974 when it was published, Marines Phyttoplankton by Gerhard Drebes was a little gem. A compact volume in the series of pocketbooks published by Thieme, it was a mystery why it was never reprinted and translated from the German, particularly as it was always difficult to keep one’s eyes on the copy because of its size and usefulness. Now, at long last, we have its child, which in the way of things, is larger and in English.

For this reviewer the key to success of the book will be the fact that it will be excellent for students examining live samples of marine phytoplankton in marine labs around the world even though it concentrates on taxa that occur in samples from a comparatively small area – the German Bight. It concentrates on the diatoms and dinoflagellates; too small to be seen with the naked eye but large enough to be distinguished in the light microscope. The great bulk of the literature on the subject including texts available to students in those laboratories, have largely lacked good illustrations of the living cells. Now, with this book, there will be opportunity for lab and class organizers to appeal to the general interest of young people in organisms that move and do things, and this for two reasons. The form of cell and colony, division cycles and sexual stages and even infestations are covered for many species and at the end of the book there is a long list of the beautiful films of Drebes and his co-workers available now in DVD form at: www.iwf.de.

Comparison of the introductory sections of the two books shows how new concerns have arisen in the past 35 years, viz. harmful and toxic taxa and the changing face of the assemblages themselves due to invasions of taxa tolerant of a changed environment or brought in by ballast water from ships. The introduction of the present book and the beautiful satellite image in the frontispiece tells us that the book is devoted to the phytoplankton from a corner of the North Sea and sampled in the neritic and oceanic from the islands of Helgoland and Sylt. The book owes its strength to the interest of all three authors in live phytoplankton cells, and to the many years of recording the composition of the assemblages at Helgoland and Sylt. However its purpose is to present the major elements of the phytoplankton of the area in such a way that the reader will be left with a good sense of the morphology, biology and, in many cases, distribution of the taxa (geographical and seasonal data is inevitably incomplete). The two major chapters take up 206 of the 223 pages of text, the diatoms with 92 and the dinoflagellates with 94. Other groups are more briefly covered, e.g. the Prymnesiophyta, Raphidophyceae, Dictyochophyceae, and a number of selected protists and parasites. The picoplankton is excluded as too small for the size range encompassed here, 20–200 µm.

Both major chapters are in the form of an introduction that incorporates some elegantly simple drawings and well-chosen images from light and electron microscopy, which is then followed by a taxonomic treatment. The taxonomy appears up-to-date but I did find Corethron pennatum given as a synonym of C. criophilum rather than the reverse. However, the authors shy away from presenting a complete classification (whichever one they would choose would anyway be a matter of making a valued judgment, arguably not necessary here). They use descriptive terms such as: “centric-looking” and “leaf-like looking” (sheet-like?) for the diatoms. I feel this is not very helpful and especially so “Not centric-looking diatoms” (“Diatoms with valve views not circular” ?). A significant grouping might be “diatoms whose girdle/cingulum comprises the major element of the frustule” e.g. Dactyliosolen and Rhizosolenia. Use of labels can land us in trouble and in many cases I believe it is better to let the reader appreciate any “grouping” intuitively as they examine the images. For the dinoflagellates “armoured (thecate)” and “unarmoured (athecate)” are used but there is no indication in the dinoflagellate introduction to remind the reader that these terms do not indicate a major split in the systematics of the group and are simply descriptive terms.

In addition to describing the major features of the cell the reader is told how to distinguish between related taxa and is given any known information on the sexual stages and their cycle and seasonal occurrence of the cells in the North Sea. The plates comprise as many as 26 figures and naturally they are generally much too small and too little magnified to appreciate the fine details of the valves and other features. I realize that if this is a criticism then it reflects my special interest and I have to remind myself to think of this book being used by a student sitting in the laboratory and examining live samples. Nevertheless, for many readers it will be difficult to imagine the structure of the cells wall of these organisms, especially the diatoms and why taxa in the genera Skeletonema, Detonula, Lauderia, Porosira, Thalassiosira and Minidiscus are so grouped. It would have been a good idea to have illustrated the rimoportula and the fultoportula, so important are they to the systematics. Similarly, it is not easy to see why Roperia is considered to be a separate genus. For the dinoflagellates an image of the transverse flagellum, a distinctive and beautiful thing in action, and visible to the student in some cases, would have been a benefit. These criticisms notwithstanding, all students and even experienced researchers in the field of diatom or dinoflagellate taxonomy will benefit greatly by seeing how the live organisms appear. Too often I have encountered researchers using diatoms for experiments when they have little idea of the biology of their organisms, sometimes even unable to distinguish healthy organisms from sick ones!

References are also liberally given so that the reader can learn much more and the book will be especially useful to people such as myself who have been away from one or other of these two groups for some time. It is interesting to see how the last 35 years have changed the systematics of the diatoms and the dinoflagellates, at least in terms of the composition of the genera. In both cases molecular studies have shown up many differences and resulted in more genera. Some general comments: The book is happily free of typographic errors and the English is excellent; there are scarcely any oddities of translation from the native German of the authors. The plates are nicely composed but, apart from the magnification issue alluded to above, occasionally rather lacking in contrast. For example the threads between cells on Plate 20, figures h–m are barely visible as are the nuclei in Fig. 54, g, k. The sexual cycle passages naturally focus on the centric diatoms but there are sufficient araphid pennate diatoms in these pages to suggest that the work of Sato might be referenced in a revision. New works on the other groups could also be included but generally the volume is up-to-date.

In the description of Thalassiosira oceanica, p.59, “pervalvar axis shorter than diameter” is not peculiar to this species or indeed to this genus. Similarly, T. pacifica claims cells rectangular in girdle view. Do the authors mean that they are square? Some genera, e.g. Cyclotella, are fundamentally freshwater but the reader may not know this.

On page 120, what does “see also Introduction to Gymnodinales” mean? On page 211, the phrasing implies that all red tides are toxic which is not strictly true. Other points are too trivial to mention here but will be sent to the authors in the certainty that this volume, at €18.80 a wonderful bargain, will be reprinted.
It is heartening to know that the interest in these live organisms is itself alive and well, stretching, for example, back to Adolf von Stosch in Marburg. Congratulations to the authors and to the Senckenberg Museum for this excellent and valuable addition to the literature.

Richard M. Crawford
Genus: Asteroplanus 105
Genus: Rhaphoneis 105
Genus: Delphineis 105
Genus: Thalassionema 106
Genus: Achnanthes 106
Genus: Meuniera 106
Genus: Bacillaria 108
Genus: Ceratoneis 108
Genus: Pseudo-nitzschia 110
Genus: Nitzschia 112

Dinoflagellates / Dinophyceae Elbrächter & Hoppenrath 114

Unarmoured (athecate) species 120
Genus: Gymnodinium 120
Genus: Syltodinium 123
Genus: Akashiwo 125
Genus: Karenia 125
Genus: Karlodinium 126
Genus: Gyrodinium 127
Genus: Sclerodinium 130
Genus: Spatulodinium 131
Genus: Actiniscus 131
Genus: Togula 133
Genus: Amphisidinium 133
Genus: Katodinium 134
Genus: Torodinium 135
Genus: Cochlodinium 135

Unarmoured Dinophytes with a conspicuous ocelloid 136
Genus: Warnowia 136
Genus: Nematodinium 138
Genus: Proterythropsis 138
Species forming pseudocolonies 138
Genus: Polykrikos 138
Species with a tentacle, see also mature cells of Spatulodinium 140
Genus: Noctiluca 140
Aberrant dinoflagellates 142
Genus: Pronoctiluca 142
Genus: Oxyrrhis 142

Armoured (thecate) Dinophytes 143
Order Peridiniales 143
Genus: Protoperidinium 143
Group: Scrippsiella 162
Genus: Scrippsiella 163
Genus: Pentapharsodinium 164
Genus: Ensiculifera 164
Genus: Heterocapsa 164
Group: Diplopsalis 166
Genus: Diplopsalis 167
Genus: Preperidinium 167
Genus: Diploptela 169
Genus: Diplopsalopsis 169
Genus: Oblea 172
Order Gonyaulacales 172
Genus: Ceratium 172
Genus: Gonyaulax 179
Genus: Protoceratium 182
Genus: Amylax 183
Genus: Alexandrium 184
Genus: Fragilidium 188
Genus: Pyrophacus 188
Genus: Thecadinium 190
Order Dinophysiales 191
Genus: Dinophysis 191
Order Prorocentrales 194
Genus: Prorocentrum 195
Genus: Mesoporus 198
Parasitic dinoflagellates 199
Genus: Dissodinium 199
Genus: Paulsenella 202
Genus: Oodinium 204
Marine phytoplankton is a microalgae supplement derived from certain oceanic phytoplankton species proven to be a valuable food source for humans as well as aquatic sea life. As a highly nutritious micronutrient-rich substance, it is an excellent way to provide an immediate influx of omega-3 fatty acids, vitamins, minerals, amino acids, superoxide dismutase and many carotenoid antioxidants in an easily absorbed and assimilated liquid. Do you know what marine phytoplankton is? According to NASA and other scientists, marine phytoplankton could be the most important plant in the world as it provides the earth with over 90% of its oxygen. That's more than all the forests in the world put together. Marine phytoplankton is not only an important source of oxygen it is a critical food source for ocean life and apparently, for us too. Marine Phytoplankton is a superfood. One of the main superfoods getting attention today is marine phytoplankton.