This book represents parts of Reynolds' response to his receipt of the Ecology Institute Prize for 1994 in Limnetic Ecology. Prize laureates are offered the opportunity to publish their views and interests relative to their particular fields of expertise within the series 'Excellence in Ecology', published by the Ecology Institute. The book amply fulfils the objectives of the series title.

After brief introduction, biographical sketches of previous prize-winners and a laudation from the chairman of the prize jury, Reynolds sets out his aims for the book in the main preface. The most important of these is no less than to demonstrate that, with due allowance for scaling, the limnetic environment offers many testable insights into the structure and functioning of all ecosystems, with the major advantage that many of the time-scales of limnetic systems are more easily encompassed by human generation times.

The book is separated into nine main chapters, a glossary of symbols used and a bibliography of reference sources. As with most of Reynolds' work, the content of the main chapters reflects a comprehensive interest in, and appreciation of, the diverse biological, chemical and physical aspects (and their interactions) of the pelagic environment.

The first chapter is an overview of the pelagic vegetation, ranging in size from 0.2 µm to 2 mm: colloquially the phytoplankton of lakes, rivers and seas. Brief details are given of the main groupings considered, but without unnecessary taxonomic detail. The main thrust is to begin identifying those 26 or so associations that may be indicative of, or at least associated with, particular environments.

Chapter 2 considers the pelagic environment, the text being broadly separated into consideration of the main physical and chemical environmental characteristics. The chapter begins with the properties of water per se, and passes through turbulence, mixing and entrainment, and the consequences for sedimentation and light exposure, to the main chemical environment for the pelagic vegetation. This chapter is, however, no simple recital of basic physical and chemical properties, but also a much more critical, quantitative appraisal of the process consequences for the phytoplankton.

Thus, questions such as 'How long is a circulating plant cell in the light?' or 'What would it take to mix a phytoplankton population?' so often posed, but not answered, are here quantitatively addressed. The essence of the chapter is that the pelagic environment is fundamentally capable of fulfilling all the requirements of its vegetation, but does so either discontinuously or with occasional inadequacy. It is the diverse means of coping with this environmental variability that forms a main crux of the whole book.

The third chapter considers some of the ways in which the pelagic vegetation has evolved to gather its required resources in the face of a relatively hostile, dark and dilute environment subject to destructive perturbations. Photosynthesis and nutrient transportation are developed from their fundamental process function to, for example, adaptation to high- and low-light environmental conditions, and nutrient limitation and starvation.

Chapter 4 deals with the growth of pelagic plants. Consideration again begins at the sub-cellular level with the limitations imposed by the stage rates of cell division, and progresses through to cell replication rates under ideal and non-ideal environmental conditions. Of particular importance is Reynolds' association of phytoplankton growth capability with their size as characterized by volume and surface area to volume ratio. This chapter also discounts non-limiting resource ratios as a significant factor in species selection.

The development of plant populations, and their ability to exploit the capacities of their environment, is dealt with in Chapter 5. A simple dynamic simulation model is used to explore aspects of resource- and energy-limitation responses by various phytoplankton groupings, in relation to their morphological and physiological differentiation. This leads to support for the evolution of three primary growth strategies within the pelagic vegetation.

Chapter 6 details the main physical and biological processes that reduce potential or actual algal populations, and some indications of responsive adaptation. Consideration includes, for example, basal respiration, sinking, physical wash-out of entrained organisms, and other factors such as zooplankton grazing and pathogen attack. It is suggested that temporal variation in type and intensity of loss rates contributes significantly to selection of algal dominants, and by considering biomasses and relative process rates explains many apparent pelagic paradoxes.

Chapter 7 moves the discussion to the wider, community-based ecology of the phytoplankton. This is primarily viewed by identifiable patterns and changes in the structure of the pelagic vegetation, and its relation to the many planktonic and environmental capacities detailed in previous chapters. This leads to theories of phytoplankton sequences, possible effects of disruptions to sequence formation and their influence on the annual patterns and sizes of phytoplankton populations.

The penultimate chapter deals with the regulation of pelagic ecosystems. It includes discussion of energetic control, 'top-down' and 'bottom-up' regulatory possibility and external forcings. The conclusion is drawn that most planktonic populations are in a continual, primitive state of persistent re-establishment. Ecological concepts such as interspecific competition are suggested as unsuited to the biology of dynamic, pulsing ecosystems.
The final chapter sets out in more detail the proposition that pelagic systems can have significant implications for quantitative interpretation of other ecosystems. The chapter also illustrates some of the applicability of ecosystem theory for the conservation, exploitation and restoration of aquatic ecosystems.

Reynolds presents the book’s information and arguments in his usual vivid and lucid style, with clear and well-designed diagrams. The book will be of value and interest to students, researchers and thinkers in ecology. Students will find the information content and interdisciplinary methodology both instructive and persuasive (and, it is hoped, indicative of the greater rigour of future ecology!). Ecological theoreticians will also value the book for the wider ecological issues and theories it addresses. In my view this book constitutes a major contribution to ecosystem thought. Ecosystem ‘theory’ is so often ecosystem ‘concept’ in that the so-called theory allows no reasonable, quantitative and refutable tests of it to be devised. Here Reynolds supports his theories with wide-ranging (and persuasive) assembled evidence that he avers leads away from alternatives, as well as exposing his theories to potentially modifying, quantitative evidence by virtue of the overall premise on which the book is based.

Not least, all this is provided at cost price by the Ecology Institute. In these days of inflated technical book prices, this amount of information and thought for DM68 in hardback is a bargain for anyone even vaguely involved in ecology.

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This book is a simplified guide to 96 common freshwater genera. It appears to be modelled after the Audubon series or similar guides and contains page after page of well-reproduced colour photographs. The intended audience is amateur naturalists, students and scientists who wish to identify algae to the generic level. This book would also be of interest to marine and freshwater phycologists as a teaching tool, source of good photographs and a key to genera with which we are not immediately familiar. One might also buy this book for children with a keen interest in natural history.

The beginning of the book gives a brief introduction to the algae, habitats, collection methods and preservation. The authors stress the need to use a microscope in examining algae but try to do so in a way that makes it sound less onerous to people who do not regularly use one. In addition, there is a short section on freshwater algal management. The information in these sections skims the surface of each topic and is obviously for the general public.

The key is arranged in 10 groups based primarily on thallus form: non-flagellate unicells, flagellates, unbranched filaments, branched filaments, siphons, filaments more than one cell thick, filaments with whorled branches, colonies, sheets and cyanobacteria (cells without organelles). In the beginning of the key, the genera belonging to each group are named and a line drawing of each is given. Subsequent pages are divided by group with descriptions of each genus. These pages are colour-coded along the right-hand margin so that one could easily flip to a particular group and find the genus in question. For each genus the left-hand page gives information on the habitat, colour, microscopic features, classification, number of species and distribution (in Australia), notes and genera with which it should be compared. Along the bottom of the right-hand page are icons indicating whether the genus can be recognized with the naked eye, or whether a hand lens or microscope is needed. Two other icons identify whether this genus is macro- or microscopic.

The strength of this book lies in its simplicity and ease of use by people other than phycologists. The identifications by forest ecologists in my department confirmed the book’s utility. There are no long dichotomous keys with technical terms and hard-to-pin-down descriptors such as grass green versus blue-green in colour. One might argue that it is too easy for students just to flip through the photographs and not learn anything about systematic relationships. However, I do not think that taxonomy was the intent of the book and if one really wants to know more, the section ‘What are algae?’ has the genera laid out in a taxonomic manner. I was very impressed with the photographs and the care put into showing most genera at a variety of magnifications including macro- and microscopic and/or a number of species with slightly different morphologies. However, one problematic point is that there are unincluded genera scattered throughout the book. For example, among the photographs of *Gomphonema* there is one of *Cymbella* and under *Urosoiena* there is a photograph of *Asterionella*. Although the figure captions (on the opposite page) are well labelled, one could easily mistake those pictures as another view of the genus described. I think the authors would have been well to either include these genera with appropriate descriptions or leave them out.

On the whole I would strongly recommend this book. I think that this type of guide is sorely lacking for freshwater algae. Its ease of use may draw more people into identifying algae – I have had requests already from students to buy the book. Although the title is *Freshwater Algae in Australia*, most of the genera described are common in freshwaters worldwide, so that the scope of this volume is not limited to that continent. I intend to use this book in my classroom for student identification of field material not shown in class and I feel it will be a well-used addition to my library.

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