

PREFACE

When we received the invitation to write a book on *Physcomitrella patens*, while it was yet another call on our time, the decision was in fact easily made. All of us have been committed to showing the value of *P. patens* as a model organism for most of our scientific careers and for the three of us this covers over 70 years (one of us contributes 38 years to the total).

This is a timely publication. The selection of *P. patens* as the first non-angiosperm land plant to have its genome sequenced and the reporting of the sequence in *Science* in 2008 as part of an international collaboration are amongst the best of recent significant advances in biological research.

We are fortunate to know the moss research community and the selection of chapters and authors was relatively easy. Some of them come from a long history of moss research, others attracted to the system have learned of its utility by laboratories willingly sharing their expertise or by attending practical workshops such as those held in Leeds in the late 1990s. It was in 1999 that the decision was made to meet annually and conferences have since seen a steady increase in new interest and international collaborations.

The chapters included in this book cover a broad range, from those using *P. patens* as a marker against other species for evolutionary or ecological studies (Chapters 1, 2 and 3), to those investigating the unique features of *P. patens*, for example gene targeting (Chapter 4), to those using moss, either as a comparator for other organisms or because of the ease of study in moss, to investigate standard biological processes (Chapters 5–12).

The chapters speak for themselves; however, in bringing them together, there are some general comments to make. The first is one of nomenclature. As described in the first sentence of Chapter 1, *Physcomitrella patens* is sometimes known as *Aphanorrhegma patens*. The difference, according to Brent Mishler, is a matter of opinion as to whether *Physcomitrella* is considered a different genus to *Aphanorrhegma*, in which case *Physcomitrella* is the correct name, but if the two are considered as the same genus, then *Aphanorrhegma* is the correct name. Most taxonomists believe that they are different genera. Of course, much of the research referred to in this book may eventually be able to provide a definitive answer, but in the meantime, we will only refer to this moss as *Physcomitrella patens*.

The second general point is one of terminology and particularly whether mosses have leaves. The single-cell layer of cells with a primitive mid-rib is commonly called a leaf but is clearly not equivalent to an angiosperm leaf. Phyllode is sometimes used as an alternative for leaves but does not meet the exact needs of the bryophytes. The proper word to describe the leaves

of bryophytes would be phyllid, but it is very rarely used in the botanical community. Hence, for the present book, we decided to use leaf or leaves for the sake of clarity, but as more researchers use moss for functional genomic and phenotypic analysis, we should at least debate whether a more specific term is needed. We have also included a glossary which includes terms used within the book which are bryophyte specific. Given the broad nature of disciplines that have contributed to this book, the glossary also includes some general terms which we hope will be useful to a wide audience.

To tackle global issues such as world food security and the impact of climate change, plant science research will increasingly focus on understanding how plants deal with environmental stress. As a bryophyte, *P. patens* represents a group of organisms that survive the stress of living on land with few structural adaptations to drought. However, bryophytes share physiological similarities with angiosperms. Because of its high frequency of gene targeting and the haploidy of its somatic tissues, analysis of gene function in *P. patens* can be more direct and informative than that in angiosperms. These attributes of *P. patens* complement other plant models and we hope this book will inform and inspire more to consider whether *P. patens* can help answer their questions.

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