
Preface

J. Alfred Prufrock measured out his life in coffee spoons,¹ and so the life of the biosphere may be measured out in the organs of plants. They mark the seasons as they are iteratively produced, and as they are shed or die. Their decay drives the earth's geochemical cycles. Their evolution and increasing complexity marks time in the great geological intervals, and the nature of available plant organs has determined how the terrestrial biosphere has changed over time. It is plant organs that provide the diversity of plant life. Plant diversity is in the organized riot of green organs turned to the sun to form the thin photochemical envelope investing the earth, transducing the energy that drives the biosphere. Plant diversity is also in the tangle and soar of plant structures that provide the food and living space for millions of species, microbiological, invertebrate and vertebrate. The survival of these species depends on a successful outcome, day-to-day, of their interaction with particular plant organs. This is true for the eagle building a nest, the leaf-cutter ant on the forest floor or the rhizobial bacterium inducing root nodules far belowground. The study of the plant organ involves bringing together evolutionary history, plant form, developmental processes and genomic information. This book is not a textbook of plant morphology—there are many fine ones already written. Neither can it offer more than a snapshot of molecular-developmental genetics. Such a fast moving field is constantly changing. This book is, rather, an eclectic and personal tour through both subjects, with the intention of indicating how these

two subjects may be brought together, and also pointing to what we do not know, but need to know in order to achieve that unity. Despite the title, much of plant organography is still without a molecular basis and thus large parts of the book lack accounts of genetic mechanisms. These parts are included to give some idea of the large amount we do not know, and I hope they will be a stimulus for research. If molecular mechanisms are not given, the unwritten subtext "we need to know the molecular basis for this" should be assumed. Another subtext that should be assumed is that covering exceptions. In a group as diverse as the land plants there are likely to be some exceptions to even the most general statement. "Flowering plants have leaves" (as a generalism) is true. "All flowering plants have leaves" (as a definition) is not true (certain angiosperms such as *Cuscuta* are essentially leafless). Statements of this kind should be assumed to be generalisms rather than definitions unless stated otherwise. The subject of this book is a large one and I have had to be selective. I apologize to all those whose work I have not included. I would be grateful for information about other work that should have been included. Even in a selective and short book such as this it is probably inevitable that there will be some errors, or at least points of contention. I would be grateful to have those drawn to my attention by email at: quentin.cronk@ubc.ca. I would like to thank all those, too numerous to mention, who, through conversation or their research work, have changed the way I think about plants. For stimulating discussion of the contents of this book, and/or helpful comments on parts of the manuscript, or other assistance I would like to thank especially Paula Rudall,

¹ Eliot, T. S. (1917). The love song of J. Alfred Prufrock. In *Prufrock, and Other Observations*. The Egoist Ltd., London.

Peter Endress, Philip Benfey, David Baum, Wilf Schofield, Guenter Theissen, Paul Kenrick, Julia Nowak, Barry Tomlinson, Richard Bateman, Stefan Gleissberg, Mike Whitlock, Pat Gensel and an anonymous reviewer. I thank Lindsay McGhee for preparing the figures and copyright holders and publishers for permission to redraw some originals, particularly the Company of Biologists (figs. 2.11, 2.13, 4.17, 4.30, 5.17, 5.23). The work was written in part during the tenure of a sabbatarian fellowship at the National Evolutionary Synthesis Centre (NESCENT) at

Duke University and I would like to thank the National Science Foundation and NESCENT. I thank the National Tropical Botanic Garden (Kampong) for facilitating the photographs in the plates. Research in my laboratory is funded by the Natural Sciences and Engineering Research Council (Canada). I would also like to acknowledge gratefully the editorial promptings of Ian Sherman, Helen Eaton and Carol Bestley of Oxford University Press. Finally, I affectionately dedicate this book to Laura, Sophie, and William Cronk and to the memory of my parents.