

Preface

During the last one hundred years, cytogenetics has made a significant contribution to the progress and development of concepts in different areas of genetics, breeding and evolution of higher plants. This became possible due to the publication of voluminous original work and a large number of reviews on different aspects of plant cytogenetics in many journals and reference books. More recently, however, new research areas such as molecular genetics or biotechnology, including tissue culture, gene transfer, etc., are becoming more popular among plant research workers. With the development of newer techniques of molecular biology, we are now in a position to explore in more detail the genetic architecture of chromosomes and their function at a level not hitherto possible. However, these studies require a knowledge of existing information on different aspects of cytogenetics. For example, only limited information is available on the plant material generated through the use of molecular approaches for gene transfer. It has also been well documented that traits expressed due to alien genetic material transferred to well established cultivars may be associated with a variety of unexpected cytogenetic and physiological abnormalities due to disturbed genetic balance. These and many other aspects need to be examined cytogenetically when newer techniques of molecular biology are applied in a variety of plant materials for basic genetic studies as well as for practical plant breeding.

Keeping in view the above and also the recent rapid progress being made in the field of plant molecular genetics, it would be welcome if the accumulated information on plant cytogenetics became available in the form of a collection of review articles encompassing the whole range of plant cytogenetics. Such a reference work would be helpful to newcomers in plant research areas particularly to those who are not familiar with the previous achievements made in this fascinating research area. The present book in two parts (Part A and Part B) was undertaken to meet this need for the benefit of plant scientists working either at the classical level or at the molecular level.

The decision to publish the present set of two volumes on chromosome research in plants was taken by the editors at an informal meeting at Fort Collins, Colorado in November, 1983. It was recognized by the editors that an earlier book *Cytogenetics of Crop Plants* co-edited by one of the present editors and published by MacMillan India Limited, on the occasion of XV International Congress of Genetics held in New Delhi, had a narrow scope, since many plant systems that made a significant contribution to the cytogenetics of plants could not be included. Further, since this earlier book was subsidized by National Book Trust of India it could not be marketed outside India. The readers, hopefully, will find that the purpose for which these volumes were planned has largely been achieved. The editors also hope that these two volumes will not only provide useful information to molecular biologists and biotechnologists, but will also serve as an eye opener to the young as well as established cytogeneticists, who should develop new ideas and may like to initiate research in newer areas of plant cytogenetics. It will be noticed that while some chapters deal mainly with previous achievements, others present new ideas and describe the on-going and upcoming experiments in newer areas.

The editors would like to thank all the authors who cooperated throughout the process of production of these two volumes. Thanks are also due to Professor F. M. Catarino, the Editor, *Portugaliae Acta Biologica* for permission to reprint as Chapter 2 of Part A, an article by A. Levan and A. Muntzing from Vol. 7 (1963) of this journal, and to Professor David Wilson, the Director of the Welsh Plant Breeding Station, Institute for Grassland and Animal Production, UK, for permission to reprint as Chapter 20 of Part B, an article by M. Borrill from the 1977 Annual Report of the Institute. Finally, we would like to express our sincere appreciation to the members of Editorial Services, Elsevier Science Publishers, who have patiently cooperated with us, without which this work would not have been published in its present form.

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