
Preface

Symmetry is always appealing, whether it is in art, craft, and architecture or in sciences like biology and chemistry. One of the very important and obvious manifestations of pattern in living organisms or their parts is their symmetric construction. Symmetry is noticed in both their external form and internal organization. But yet asymmetry or symmetry breaking is also as common as or even more common than symmetry in nature. A very critical study of asymmetry reveals that its presence in living organisms should not be considered as an erroneous deviation from the norm but as an evolutionary and functional adaptation to the environmental conditions operating in any situation at any time. In several instances it is selected through Natural selection, provided it has selection and fitness values. In fact, without some asymmetric features the organism may not even survive. Therefore, from an evolutionary and functional perspective, asymmetry is as appealing and "beautiful" as symmetry.

All through academic history, symmetry/asymmetry has attracted the attention of animal scientists to a far greater extent than the plant scientists, although this phenomenon in plants is almost as common as in animals. Several interesting books, review articles, and research papers have been published on animal asymmetry till this date. Although the Darwin's have indicated its importance in plants as early as in the latter part of the nineteenth century and D'Arcy Thomson in 1917 had made a beautiful treatment (from a mathematical perspective) on it in his famous book "On Growth and Form", not much has been done in understanding asymmetry in plants. Kihara's 37-page review in 1992 on "Right- and left-handedness in plants: A review" and a chapter on symmetry by Sinnott in 1960 in his famous book on "Plant Morphogenesis" were perhaps the first detailed accounts on symmetry/asymmetry in plants. These accounts created some renewed interest on this subject among plant scientists in different parts of the world but this interest was not sufficiently sustained. The only book, as far as the present authors are aware of, which used the word "Symmetry" in its title was "Symmetry in Plants" by R. V. Jean and D. Barabe published in 1998. This book almost exclusively covered phyllotaxy, with a greater emphasis on mathematical aspects. Thus, there was an urgent need to reemphasize the need for renewing the interest on symmetry/asymmetry in plants.

Hence, this edited volume was conceived. This book has two major goals: one is to consolidate as much as the scattered information on the various aspects of symmetry/asymmetry in plants in one place. The second is to highlight the gaps that are still wide open in our understanding of this phenomenon in plants so that future researchers may undertake fruitful studies. With these two goals in mind, we have identified topics that needed greater and focus coverage and left out topics like phyllotaxy, where we have fairly sufficient knowledge. We have also identified competent people to write on the topics chosen, from across the world. The book is organized into 24 chapters, including one on concluding remarks. We hope that this volume would be of great interest to students, teachers, and researchers in general biology, botany, genetics, evolution, mathematics, and computation biology. We would like

to apologize for any mistakes, omissions, and failures that might have crept into the book; suggestions for improvement are welcome.

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Bir Bahadur

K. V. Krishnamurthy

Monoranjan Ghose

S. John Adams