Murray, J.D.: **Mathematical Biology. II: Spatial Models and Biomedical Applications.** 3rd Ed. – Springer, New York – Berlin – Heidelberg – Hong Kong – London – Milan – Paris – Tokyo 2003. ISBN 0-387-95228-4. Pp. 811, € 84.95, GBP 59.50, sFr 141,20, € 84.95, GBP 59.50, s Fr 141.00.

This book is the 18th volume of the series "Interdisciplinary Applied Mathematics" which consists of monographs devoted to the application of mathematics in other fields of science. The review of the 1st volume appeared in Photosynthetica 40 (3): 414, 2002.

First, let me list the titles of individual chapters in order to present the content of this voluminous book. 1. Multi-Species Waves and Practical Applications (70 pp.). 2. Spatial Pattern Formation with Reaction Diffusion Systems (70 pp.). 3. Animal Coat Patterns and Other Practical Applications of Reaction Diffusion Mechanisms (39 pp.). 4. Pattern Formation on Growing Domains: Alligators and Snakes (46 pp.). 5. Bacterial Patterns and Chemotaxis (57 pp.). 6. Mechanical Theory for Generating Pattern and Form in Development (84 pp.). 7. Evolution, Morphogenetic Laws, Developmental Constrains and Teratologies (19 pp.). 8. A Mechanical Theory of Vascular Network Formation (24 pp.). 9. Epidermal Wound Healing (49 pp.). 10. Dermal Wound Healing (44 pp.). 11. Growth and Control of Brain Tumours (73 pp.). 12. Neural Models of Pattern Formation (46 pp.). 13. Geographic Spread and Control of Epidemics (60 pp.). 14. Wolf Territoriality, Wolf-Deer Interaction and Survival (34 pp.). Appendix: A. General Results for the Laplacian Operator in Bounded Domains (3 pp.). The subsequent Bibliography contains 761 items. The book ends with a detailed Index.

I would also like emphasize that a very good knowledge of mathematical formalism is needed in order to study this text and to be able to follow both the construction and deduction of the described deterministic models. According to the author of this volume, it "requires more knowledge of partial differential equations and is more suitable for graduate courses and references".

As seen from the chapter titles, the book is of no direct interest for readers of Photosynthetica. Biophysics, biochemistry, physiology or ecology of photosynthesis is completely absent. Nevertheless, if a researcher in photosynthesis is deeply involved in modelling its processes, the text could provide some useful hints.

Let me, once more, take this opportunity and present some of the general statements of J.D. Murray, which characterise some important features of mathematical modelling of biological processes. I quote: "...the art of mathematical modelling relies on (i) a sound understanding and appreciation of the biological problem; (ii) a realistic mathematical representation of the important biological phenomena; (iii) finding useful solutions, preferably quantitative; and what is crucially important; (iv) a biological interpretation of the mathematical results in terms of insights and predictions".

As a biologists, I also very much appreciate the author's statement that "The mathematics is dictated by the biology and not vice versa". May this be the case with all models constructed in plant physiology! However, I find the last quotation in a contradiction with another one, according to which "No previous knowledge of biology is assumed of the reader". I do not want to question the competence of the introductory descriptions of the biological bases of the individual problems dealt with in the chapters. But I am doubtful about whether such a brief introduction could qualify a reader who is a non-biologist, to competently understand the very problem and assess the model outputs. For any application of the described models, I would always prefer a close collaboration with a professional biologist, who acquired sufficient skill in order to communicate with mathematicians. Otherwise, there is a danger, that some important and/or unrealistic biological consequences derived from the model could be overlooked.

Mathematical modelling becomes a very important part of biological research from the subcellular up to the ecological levels. The exponentially increasing amount of experimental data cannot be handled without the use of mathematical models. Hence, let me take the opportunity of this review to emphasize the role of mathematics in biology including photosynthesis by the next quotation: "Mathematical biology is a fast-growing, well-recognised, albeit not clearly defined, subject and is, to my mind, the most exciting modern application of mathematics. The increasing use of mathematics in biology is inevitable as biology becomes more quantitative". And the very last quotation illustrating, that the author of the two volumes of Mathematical Biology is well aware of the danger of superficial application of mathematics to model processes which would hardly find its existence in biology: "However, the use of esoteric mathematics arrogantly applied to biological problems by mathematicians who know little about real biology, together with unsubstantiated claims as to how important such theories are, do little to promote the interdisciplinary involvement which is so essential".

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