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BOOK REVIEW

COHEN A.C. 2021: DESIGN, OPERATION AND CONTROL OF INSECT-REARING SYSTEMS. SCIENCE, TECHNOLOGY, AND INFRASTRUCTURE. CRC Press, Boca Raton, xxv + 394 pp., 297 color and 63 b/w illustrations. ISBN 9781138571259. Price GBP 170.00 (hardback), GBP 119.00 (e-book).

Humans have benefited from rearing insects for centuries, with honey bees, silkworms and weaver ants the most notorious examples. However, the modern advances in science, medicine and agriculture resulted in the need for new ways of rearing insects. Already in the first decade of the 20th century, developments in genetics led to the search for fast reproducing, model organisms. *Drosophila* fruit flies were adopted for this purpose and since then, the techniques for rearing them have rapidly evolved. In general, insects are reared for a number of reasons, from conservation to waste treatment. However, it was the growing demand of agricultural and public health authorities that triggered the development of mass rearing of insects, which is in the main theme of this book. Examples like the successful eradication of Screwworm fly (*Cochliomyia hominivorax*) or Pink bollworm (*Pectinophora gossypiella*) in the United States by releasing sterile males underline the importance of such programs.

Based on work-flow algorithms, systematic and scientific approaches, Allen Carson Cohen, one of the leading authorities on the mass rearing of insects, describes in 14 chapters and over 350 illustrations, charts and diagrams, the development of the mass rearing of insects. Each step, from the initial domestication of the target species, the development of an artificial diet and a suitable controlled environment, optimisation of the mass rearing technology, the training of scientific and technical personnel and optimisation of quality control, is described in detail. Special attention is paid to why a scientific approach needs to be used for creating a successful supply chain for the mass rearing of insects. And rationale paragraphs like section 1.3.8 "More discussion of why rearing is not (or should not be art)…" occur throughout the book like the mythical Ariadne's thread.

Already in the first chapter of the book the reader is introduced to the technical problems of insect rearing programs (IRPs) and the benefits of using algorithms in everyday life and scientific tasks is highlighted. The complexity of developing IRPs is demonstrated by two case studies of insects with sucking/piercing mouthparts based on the author's personal experience. Specific rearing programs are also described in chapter 3 (*Drosophila*, *Cochliomyia hominivorax*, *Pectinophora gossypiella*, *Lymantria dispar* and tephritid flies), chapter 4 (*Bombyx mori*) and chapter 5 (*Anthonomus grandis*). Environmental factors affecting the behaviour of target species in IRPs are covered in chapter 6, while chapters 7, 8 and 10 are dedicated to improvements and quality control of IRPs. Chapter 9 contains tutorials for the development of IRPs using statistical software like Design-expert, JMP and SAS. The author also discusses how to publish the results of studies on the rearing of insects in scientific journals (chapter 11). Chapter 12 deals in detail with the process of education and training of scientists and technicians, including examples of student protocols, posters and other means of training. There are three appendices, one on the history of rearing *Drosophila*, the other two are historical accounts of rearing *Bombyx mori* and *Anthonomus grandis*, the information in this section, however, is already incorporated in the main body of the book.

The book is well written and demonstrates the author's dedication to the problem of mass rearing of insects and the technical and scientific approaches needed to develop a functional system. From a graphical point the numerous illustrations help to explain the text, although some of them are redundant (like reprints of student posters), instead more attention should be paid to the technical quality of figures and charts as a number of them are unfortunately reprinted at a very low resolution.

The book provides a deep insight into the history and development of IRPs, however it does not incorporate the current advances in biological sciences like various genetic screening approaches, role of endosymbionts or the possibility of metabarcoding of intestinal biota of species. Also future challenges in mass rearing of insects, like production of insects as food for humans and/or domesticated animals, for waste management and medicinal and conservation purposes are not covered at all. The book thus targets mostly workers involved in plant protection agencies, agricultural research and the development techniques for the mass rearing of insects.

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