

## BOOK REVIEWS

Feng presents an accessible introduction to these issues in 'Naturalness and the status of supersymmetry'. Interactions that go beyond the standard model may lead to particles such as electrons and muons transmuting into one another: Mihara *et al.* review these issues and experiments searching for such signals in 'Charge lepton flavor-violation experiments'.

In summary, this fascinating collection of articles is entertaining as well as illuminating and an excellent addition to any library.

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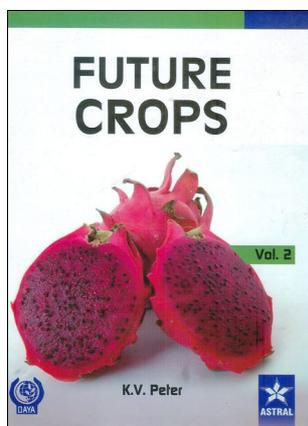
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**Future Crops.** K. V. Peter (ed.). Daya Publishing House, a Division of Astral International Pvt Ltd, 81 Darya Ganj, Delhi Medical Association Road, New Delhi 110 002. 2014. Vol. 2. xix + 361 pp. Price: Rs 2995.

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The first volume of *Future Crops* covered more than a dozen species and the book under review, the second volume, covers a score more. Although each chapter covers one species, both volumes feature a few chapters that are broader in scope, because they cover specific habi-

tats such as the arid zone and the aquatic environment, or Indian states such as Mizoram and Kashmir. The organization of the book is not obvious: even if we assume that each of the two volumes aims at a representative collection (instead of devoting one volume to annuals and the other to perennials, for example, or one to fruits and the other to vegetables and so on), the sequence of chapters within each volume appears random (although it is actually alphabetical, an odd choice since the listing is a mix of common names and botanical names). The information is exhaustive and detailed, but variably so; for instance, there is a figure that shows the results of thin-layer chromatography of the bark of true asoka (*Saraca asoca*) and a photomicrograph of a transverse section of the bark, but the chapter contains no photographs of the tree or of its inflorescence.

I pondered over the title of the book. What exactly are future crops? The adjective normally excludes the present: you do not expect current leaders to feature in a volume titled 'Future leaders', for instance, nor commonly used materials in a volume on future materials. The Land Institute<sup>1</sup> can be said to focus truly on future crops such as perennial forms of rice and maize, whereas Crops for the Future<sup>2</sup> in Malaysia, works mostly on underutilized crops and prefers the term 'neglected and underutilized species'. The contents of the present volume fall in that category, as do those of several other publications on the topic, including, perhaps, the report<sup>3</sup> published nearly 40 years ago that spurred interest in the topic and introduced 36 plants, chosen from 400 nominated by plant scientists the world over. More broadly, future crops do not even have to be new crops; they can be old crops bred for new environments (city farming, vertical farming, and so on) or for new requirements (extra rich in some vitamins or minerals, higher glycaemic index, and so on). A more practical approach is that taken by the African Orphan Crops Consortium, which, for its Plant Breeding Academy, selected the crops 'based on surveys of anthropologists, sociologists and scientists working in Africa, who were asked to identify the crops most important to people's diets'<sup>4</sup>. The consensus is that species should have most or all of the following attributes irrespective of whether they are collectively labelled as promising, orphan, minor or traditional<sup>5</sup>.

- Unrealized potential for contributing to human welfare, particularly through income generation, food security and improved nutrition.
- Strong cultural links.
- Inadequate information and poor documentation despite a long history of mainly local production or collection from the wild.
- Adaptation to specific agro-ecological niches.
- Non-existent or inadequate sources of seed or other plating material.
- Wide intra-specific diversity (landraces).
- Traditional and multiple uses and processing methods that vary locally.
- Little or no external inputs, or collected from the wild.
- Neglected by mainstream research, extension services, farmers, policy-makers, donors, technology providers and bulk consumers.
- Little-known or under-appreciated nutritional, culinary, medicinal or other properties.

Whether all the crops covered in the series share most or all of the above attributes is a moot question. Perhaps readers can judge for themselves from the list appended to this review. This raises another question: Who are the target readers? It is hard to discern a clear category from the contents or from the depth of treatment. The blurb tells us that 'fifty working scientists from research institutes of ICAR and CSIR have contributed to the present volume' and offers a brief resume of the editor, but is silent on the readership. The preliminary pages add little except for a line towards the end of the preface, which expresses the conviction that the publication 'will immensely benefit teachers, students, researchers and all engaged in enriching the fruit basket of India.' However, a curious disclaimer caught my eye: 'No responsibility for loss or damage occasioned to any person acting, or refraining from action, as a result of the material in this publication can be accepted by the editor, the publisher or the author.' This probably eliminates practitioners and also to some extent researchers because they would certainly expect to act on the information provided by the fifty experts and edited by another with decades of experience behind him, both as a scientist and as an editor of many volumes.



Ajowan seed.

However, there is little evidence of any serious editorial intervention. The extent of repetition and overlap in the contents of multiple chapters indicates lack of any substantive editing. Tamarind, for instance, features in three successive chapters; ‘bael’ (*Aegle marmelos*) and a couple of others, in two of those three chapters; and jamun not only features in the two chapters, but also has a chapter to itself. The length, and presumably the depth, also vary considerably: camelina (*Camelina sativa*) has 25 pages, ‘lasoda’ (*Cordia myxa*) has only 2.5, and *Embelia ribes* has two chapters, the second devoted almost exclusively to propagation and cultivation techniques. Even in the chapters devoted to individual species, the treatment is not uniform across chapters: the chapter on castor has a section titled ‘Draft genome sequence and annotation of *Ricinus communis*’; that on cactus pear devotes two pages to structural formulae of some chemicals found in the fruit; that on jujube has a section titled ‘Current scenario and research needs’ and jamun alone seems to have future prospects (going by the heading, that is).

By definition, many of the species described in the book are not widely known, and the inclusion of their photographs, in full colour, is a useful feature. Unfortunately, the total absence of scale makes the photographs far less useful. The close-up of ajowan (*Trachyspermum ammi*) seed (p. 107) and that of *Elaeocarpus floribundus* (p. 94) are good examples: the photographs are clear, but since there is no indication of scale, it is hard to know the true size of either.

If substantive editing is cursory, copy-editing is dismal: the text is marred by poor grammar, which at times obscures the meaning, as in ‘For preparations of wine, the whole fruits are pressed without crushing’ and ‘Accession of fruit

from NEH region indicated the fruiting season is midseason and dates July.’

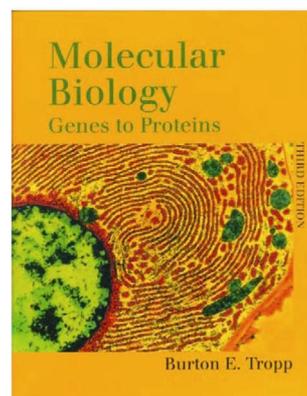
All in all, although this book is useful as a compendium of information and an exhaustive survey of the literature on the chosen crops (the chapters are listed below), I wonder whether it offers value for money.

List of chapters: aquatic vegetables, aquatic weeds as potential future foods, underutilized fruits of Indian arid zone, underexploited and lesser known fruits of Mizoram, underutilized spices, cactus pear, camelina, castor bean, citron, delphiniums, *Embelia ribes*, propagation and cultivation techniques of *Embelia ribes*, jujube, jamun, lasoda, mappia, palmyrah, *Salacia oblonga*, *Saraca asoca*, and water chestnut.

1. <http://landinstitute.org/>
2. <http://www.cropsforthefuture.org/>
3. Underexploited tropical plants with promising economic value, National Academy of Sciences, New York, 1975.
4. [www.theguardian.com/global-development-professionals-network/2014/may/16/food-crops-africa-plant-breeding-academy](http://www.theguardian.com/global-development-professionals-network/2014/may/16/food-crops-africa-plant-breeding-academy)
5. [www.cropsforthefuture.org/about-us/what-are-neglected-and-underutilised-species/](http://www.cropsforthefuture.org/about-us/what-are-neglected-and-underutilised-species/)

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**Molecular Biology: Genes to Proteins.** Burton E. Tropp. Jones and Bartlett Publishers, Sudbury, Massachusetts, USA. 2008. 3rd edn. 1000 pp. Price: US\$ 126.95, £34.99. ISBN 978-0-7637-0916-7.

This undergraduate textbook by Tropp is a comprehensive guide through the basic

molecular processes and genetic phenomena of both prokaryotic and eukaryotic cells. Revised and developed from late David Freifelder’s classic *Molecular Biology* (1st edn, 1983; 2nd edn, 1987) that stressed structure–function relations, this book has incorporated the important advances made since the second edition of Freifelder’s classic. A tribute to the original author reads, ‘David Freifelder taught biochemistry and molecular biology first at Brandeis University and later at the University of California, San Diego. His research interests and expertise were in a broad range of subjects. Therefore, he was qualified to write both general and specialized textbooks ... From his teaching and writing experiences he developed a remarkable understanding of the ways in which students learn.’ The task of maintaining lucidity despite incorporating increasing complexity is a daunting one, but Tropp has done that rather well in this book.

The term ‘molecular biology’ is appropriately shown to have first been used in 1938 by Warren Weaver to describe a research approach in which physics and chemistry would be used to address fundamental biological problems, though two studies in the 1860s by Gregor Mendel and Friedrich Miescher laid the intellectual foundation. Since little molecular biology is taught at the school level, the contents of this book represent the most fundamental/important topics in Tropp’s view. A total of 247 scientists from Julie Ahringer to Joost Zomerdijsk have been discussed in the book.

While the first chapter introduces molecular biology itself, the second and third chapters are on protein structure and function respectively; chapters 4–6 are about nucleic acids and nucleoproteins. These six chapters in 210 pages form the base for the rest of the text. An example of historical development of ideas is given at the start of chapter 6 about chromosome structure: ‘Until the mid-1970s, biologists’ view of chromatin was colored by the belief that all life on Earth belonged to one of two primary lineages, the **eukaryotes** (animals, plants, fungi that have a defined nucleus) and the **prokaryotes** (all remaining microscopic organisms that lack a defined cell nucleus). Based on this classification scheme and what was then known about chromatin structure, it seemed likely that prokaryotes would have one type of chromatin structure and eukaryotes