

## BOOK REVIEWS

evolutionary work covered here, for example, is not typically dwelt upon in courses in ecology, although many would argue it should. The converse (ecological work not often taught in courses on evolution) is also true, especially for some of the field studies described in the book, as well as some of the theory. Thus, there is much here to benefit students of both ecology and evolution. There is also good coverage of 'breakthroughs' in coevolutionary thinking: coevolution is one of the topics that often slips through the cracks and is not properly covered in courses in either ecology or evolution. In addition, there is a helpful 18-page appendix with references that covers some basic issues like developing theory in life-history evolution, modelling genetic change in evolution, pros and cons of laboratory versus field experiments, and some genetic techniques widely used in evolutionary ecology studies. This appendix provides a good entry into the literature in the field that is not already cited when discussing the 65 'breakthroughs'.

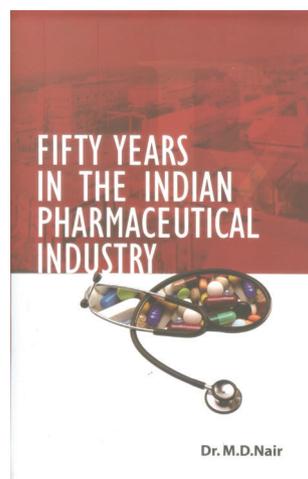
On a more personal note, it was gratifying to find that the sole study from any country in the global south to make it to this selection was a 2003 publication from our laboratory in JNCASR, Bengaluru. This was a paper co-authored with N. G. Prasad (now at IISER Mohali), Sutirth Dey (now at IISER Pune), and Mallikarjun Shakarad (now at the Zoology Dept of Delhi University), and constituted the first experimental validation of the prediction that population stability could evolve, via life-history tradeoffs, as a by-product of regular evolutionary change due to selection on components of the life-history such as developmental rate.

Overall, the book is certainly of considerable value to students and also researchers in the fields of ecology and evolution, especially life-history evolution, density-dependent selection, and population and community ecology. However, due to the constraints of the series' format, the treatment of each piece of work cited is relatively brief and sketchy. I would have enjoyed a much thicker book, with at least twice or thrice as many pages devoted to each of the 'breakthroughs'. Thus, the utility of the book is more as an adjunct to a basic textbook for students, or as a quick reference to major historical developments in the field for researchers. Another major

shortcoming of the book is the extremely shoddy copy-editing done by the publishers. There are numerous typographical errors, including in headings, that detract from an otherwise pleasant reading experience. This is particularly deplorable, because publishers like Elsevier increasingly cite the expenses borne in the value-addition they make by providing top-rate editorial, copy-writing and typesetting services in attempts to justify their exorbitant pricing of scientific literature. Clearly those services have not been of high quality in this case.

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**Fifty Years in the Indian Pharmaceutical Industry.** M. D. Nair. Published in 2019. Reprinted in 2020. 309 pages. Price: Rs 499.

To appreciate the real progress India has made it would suffice to note that in 1950 our average life expectancy was only 31 years and presently it is 69.27 years. This itself attests to the tremendous progress India has made in addressing health and nutritional issues through green revolution, white revolution and pharma transformation. The transformation of the Indian pharma sector from its

infancy to its present exalted position in Global Pharma Business needs to be seen through the eyes of those who have been in this sector life long as this success has been made possible due to vision, hard work, and sustained efforts of so many famous persons scattered across academia, industry, business and government sectors. The Indian pharma success is a fruition of the collective efforts of several persons driven solely by pure passion and commitment to larger national interest.

The personal memoirs of M. D. Nair who has been one such member of passionate pharma enthusiasts, beginning almost mid of previous century, attempts to provide a glimpse into those happening years and in the process remembers great personalities, and events which many a current players possibly may not be aware of.

Nair's professional journey started at CIBA Research Centre, progressed to SPIC, and then to consultancy. This has given him a deep insight into pharma sector where in his more than 50 years contribution in pharma sector he has come in contact with several great personalities and this book is primarily a memoir having 16 chapters in the book, some short and some long. The first chapter 'Story of the growth of Indian pharmaceutical industry' highlights numerous (27) factors which affected pharma growth. The second chapter, 'Some of the stalwarts who influenced healthcare services in India', is the longest chapter of the book and highlights great science influencers like A. P. J. Kalam, M. S. Swaminathan, K. M. Cherian, Devi Shetty, Ranjit Roy Chowdhary, Ramalingaswamy, Mashelkar and others. Though these giants were not directly connected with pharma sector, their vision and actions gave impetus to its growth. The next chapter 'A few of the many who shaped the destiny of the Indian pharmaceutical industry in my era' briefly introduces us to the likes of Parvinder Singh (Ranbaxy), Anji Reddy (DRL), Yosuf Hamied (CIPLA), Kiran Mazumdar (BIOCON), Nitya Anand (CDRI), A. V. Rama Rao (NCL, IICT), T. R. Govindachari (CIBA-Geigy), Mohammed Mazed (SAMI Labs), Chandru Sahni (Klenzoids), Ajit Singh (ACG) and S. Ramachandranan (DBT). Lifetime passion and contributions of each and every person mentioned in this chapter are phenomenal. These three

chapters make an interesting informative reading to many a present pharma enthusiast.

The fourth chapter covers Nair's career path and also depicts the enthusiasm, churn and political angles. The fifth chapter will be of interest to many as it unfolds the events leading to its establishment and the impact of Indian Patent Act-1970 to its inevitable closure. One must remember that CIBA Research Centre was the first major Pharma Research Centre to be established by a major global pharma industry in 1963, and was inaugurated by the then Prime Minister Pt. Jawaharlal Nehru in the presence of the chemistry troika of Lord Todd, Robert Woodward and Vladimir Prelog.

The next two chapters mark Nair's transition from an academic research environment to industry and lucidly detail his efforts in establishing a successful pharma venture at SPIC.

The subsequent chapters not only record his astute observations and opinions but also have an interesting and informative narration to understand the ever changing scenario of Indian pharma.

Nair's encounters and discussions with some of the most renowned researchers like Roger Adams, E. J. Corey, Salvador Luria, Alexander Todd, V. Prelog, R. B. Woodward, Marc Van Montagu and James Watson are covered in the 13th chapter.

The book gives glimpses of the events, influences and the personalities who shaped the journey of Indian pharma from almost non-existence to global recognition. It also introduces us in a personalized way to several science leaders of that era and makes one eager to know more about those towering personalities. In my opinion, all those having interest in the pharma sector will find it interesting, informative and a pleasure to read.

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**Perennial Grasses for Bioenergy and Bioproducts: Production Uses, Sustainability and Markets for Giant Reed, Miscanthus, Switchgrass, Reed Canary Grass and Bamboo.** Efthymia Alexopoulou (ed.). Academic Press, an imprint of Elsevier, 125 London Wall, London EC2Y5AS, UK. 2018. 306 pages. Price: US\$ 150.00.

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In the current epoch of Anthropocene, scientists, academicians, students, policy makers and industry people are desperately brainstorming for providing sufficient, sustainable and affordable energy solutions to every individual around the globe. In such times, a piece of study, idea or publication on different domains or perspectives of bioenergy, bio-products and bioeconomy, is highly welcome and appreciated.

Use of perennial grasses for production of bioenergy and bio-products feedstock has been strongly recommended as a best option among other available alternatives such as edible and non-edible crops. This is also evident from the surging number of publications, including research papers, reviews, concepts, news and views, and books on perennial grasses, etc. People, like me, working on perennial grasses for bioenergy production are always searching for new information related to the subject. The book under review is one such source of information.

The book includes eight chapters covering 277 pages, excluding the introduction and index. Five chapters are on perennial grasses, such as *Miscanthus* (chapter 2), switchgrass (chapter 3), giant reed (chapter 4), reed canary grass (chapter 5) and bamboo (chapter 6). Chapters 1, 7 and 8 address the importance of perennial grasses in bioeconomy, suitability of perennial grasses for various products and sustainability of perennial crops for bio-products respectively. Chapter 1 is an attempt to convince the readers that perennial grasses are important feedstock for bioenergy and bio-products. For this, the authors have described in eight pages, the historical path of increase in interest in perennial grasses as a biomass source. Five of these eight pages are devoted to a comprehensive table on mega conferences like World Climate Conference, IPCC, UNFCCC, European Commission, etc. to support the progressive trends of in-

creased interest in alternative energy options. This section provides no new information and could have been more concise. Similarly, giving a table on climatic characteristics of the European environmental zone is not of any importance in a book written for readers from various parts of the world. Chapters 2–6 on individual grasses are of great value. All these chapters provide a review and synthesis of different aspects, such as taxonomy, breeding, physiology, global production scenario, uses, agronomy and ecological importance of perennial grasses. Inclusion of chapters 7 and 8 is just a repetition of information and could have been avoided. For example, the process of conversion of biomass to various forms of energy is same for any perennial grasses or agro-forestry waste (1.3 and 7.2 are the same). Similarly, life-cycle assessment, ecological restoration potential, and economic analysis of perennial grasses are discussed independently in the chapters on individual grasses and repeated in chapter 8. There are two good reviews in this book; one on detailed descriptions of perennial grasses and second on bioeconomy potential of perennial grasses.

Although the book has some drawbacks like unnecessarily providing comprehensive tables of conferences, data to local climatic conditions, repetition of figures and graphs, overall it is an original publication. To the best of my knowledge, this is the first book on perennial grasses other than two books (*Miscanthus: For Energy and Fibre*, 2000 and *Miscanthus for Bioenergy Production*, 2019) on *Miscanthus* by Michael B. Jones (Trinity College, Dublin, Ireland). This book has been published when perennial grasses are at early stages of development as dedicated crops for biomass production, and little information is available on hundreds of undomesticated and underutilized perennial grasses. In conclusion, this book will be of interest to scientists, students and other stakeholders, and provide comprehensive information on important European and American perennial grasses in a single forum.

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