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.

MADHU DIKSHIT

Translational Health Science and Technology Institute (THSTI),
NCR Biotech Science Cluster,
3rd Milestone,
Faridabad–Gurgaon Expressway,
Faridabad 121 001, India
e-mail: madhudikshit@thsti.res.in

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.

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 increased 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.

KRIPAL SINGH

CSIR-National Botanical Research Institute,
Rana Pratap Marg,
Lucknow 226 001, India
e-mail: kripalsingh04@gmail.com