



**Pillars of Life: Magnificent Trees of the Western Ghats.** Divya Mudappa and T. R. Shankar Raman with Botanical illustrations by Nirupa Rao and sketches by Sartaj Ghuman, Nature Conservation Foundation, Mysuru. 2018. xiv + 101 pages. Price not mentioned.

Trees are vital to uphold a steady and congenial climate as they expressively contribute to atmospheric oxygen, water conservation and in lessening soil erosion and in support of wildlife. Their elegance, grandeur and generosity are documented in numerous articles by passionate tree lovers. The book under review is authored by two field biologists, the first one of them is Divya Mudappa, who specialized in plant-animal interactions and conservation biology while the second author, T. R. Shankar Raman, specialized in birds and also studies involving human interactions with nature. Thus, both the authors had no training or expertise in plant taxonomy which is desirable in endeavouring such a publication. In wild world, animals easily catch the care and curiosity of humans in comparison to trees for reasons that cannot be easily listed out. The interest in trees requires certain state of mind and disposition and the authors developed this affinity and passion during their professional field trips. They appeared to have gained versatility with lofty trees and their names by being field biologists which has given them the confidence in executing the task. In the introduction of the book, the authors were utmost reverential, emotive and poignant towards trees, often citing from the book *The Tree: A Natural History of What Trees Are, How They Live, and Why They Matter* authored by Colin Tudge. More per-

ceptible and appreciable contribution for the book has come from the paintings of Nirupa Rao, a young explorer and winner of numerous fellowships (National Geographic Young explorer, 2017, INK fellowship, 2018 and Plant Humanities fellowship at Dumbarton oaks, 2019). Her illustrations numbering 30 with meticulous details and soothing colours, particularly habit sketches, are unquestionably brilliant. The presented text in the publication is greatly reinforced with these beautiful paintings. We are certain these paintings would be appreciated greatly by botanical art lovers and emerging botanical artists. In our inquisitiveness, these paintings have been compared with the *Icons/illustrations* rendered by renowned botanical artists of Roxburgh of early 19th century (the Father of Indian Botany) and others. We could reach out to at least 15 illustrations of 11 species namely, *Bombax ceiba*, *Elaeocarpus munroii*, *E. serratus*, *E. tuberculatus*, *Mesua ferrea*, *Persea macrantha*, *Sterculia guttata*, all three *syzygium* species (not stated distinctly by the authors) and *Toona ciliata* (there could be more!) which are also dealt in the present publication. Honestly, unnamed local artists employed by Roxburgh and two artists Rungaiyah and Govindoo by Robert Wight brought in good botany in the illustrations, particularly with correct delineations of flowers and fruits that not many could think of. Hence, these icons/drawings remained in good harmony with the text of the floras attempted then. This was made possible with the constant supervision and guidance received from the renowned botanists to the artists of that time. These works in course of time turned out to be real foundations of Indian botany. We have no intention of comparing the work under reference with these classical works but would like to emphasize the strength of good illustrations when accurately complemented with good botanical texts.

The book under review comparatively missed some crucial botanical features of flowers and fruits in certain paintings which are otherwise diagnostic to the species dealt with/concerned. The authors did not believe in methodical/systematic description and followed their own narrative and lyrical style. This might appeal amateurs and other non-botanists but with missing salient diagnostics of species! The other smaller omission, of

course that has no bearing with primary focus of the book, is the usage of plant names without citing the authority. Only generic name was given in case of *Syzygium* but the drawings presented can be safely correlated to three species as for the fruits are concerned; *Syzygium laetum* (Buch.-Ham.) Gandhi (yellow-green pear-shaped fruit, page 40), and *S. hemisphericum* (Wight) Alston (spherical fruit, page 41) and *S. cumini* (L.) Skeels (somewhat elliptic purple fruit, page 41). The importance of the book is claimed based on low level of awareness/knowledge on trees of India and the book is said to be focused on '30 little known trees'. But honestly, all of them are well-known and well established in botanical literature. While stating so, one should simultaneously accept that the species included are so important and characterize/confine/or vividly support wildlife in the land scape they inhabit.

The trees dealt in this book are grouped into six themes. This has resulted in clustering widely different families. Under land mark trees (for being fairly big in size!), six species namely *Cullania exarillata* A. Robyns (a characteristic evergreen endemic tree to southern Western Ghats and an important food source for the Lion-tailed Macaque, Malvaceae), *Mesua ferrea* L. (known for its graceful shape, colourful young leaves and fragrant white flowers, Calophyllaceae), *Palaquium ellipticum* (Dalzell) Baill. (an evergreen tree with flowers white and fragrant, Sapotaceae), *Canarium strictum* Roxb. (known for its commercially valued resin, the black dammar, Burseraceae), *Artocarpus heterophyllus* Lam. (a fast-growing evergreen tree and valued for its fruits,



The beautiful and extravagant flower of the *Bombax* attracts many nectar-loving birds.

Moraceae) and *Nageia wallichiana* (C. Persl) Kuntze (a Gymnosperm, the only wild conifer of South India with male cones in pedunculate clusters and solitary female cone, Podocarpaceae) are included. Under hitchhikers (adopted for dispersal of fruits by a variety of animals), *Bhesa indica* (Bedd.) Ding Hou (evergreen tree with white flowers and prominently 2-lobed capsules, Centrop-lacaceae), *Semecarpus travancorica* Bedd. (endemic to the southern Western Ghats, Anacardiaceae), *Dimocarpus longan* Lour. (a tree species that produces edible fruits, Sapindaceae), *Trichilia connaroides* (Wight & Arn.) Benth. (tree with compound leaves, bisexual flowers and a globose, bright red, capsule with an arillate seed, Meliaceae), *Actinodaphnae malabarica* N. P. Balakr. (smaller tree, branchlets rusty with simple, subverticillate leaves, flowers in fascicles and fruit black, 1-seeded, Lauraceae), *Cinnamomum malabratum* (Burm. f.) J. Persl (tree, tri-nerved leaves young bright pinkish tinged with yellowish-green, and mature ones dark green, distinct thalamus-based fruits green, purple when ripe), *Litsea oleoides* (Meisner) Hook.f. (tree, leaves simple, flowers in racemes, fruit depressed globose, 1-seeded, Lauraceae), *Persea macrantha* (Nees) Kosterm. (known to be medicinal, commercially important tree for its bark, native to Western Ghats and Sri Lanka, Lauraceae) and *Ormosia travancorica* Bedd. (an endemic tree with distinct scarlet seeds, Leguminosae) are included. Under wild Rudraksha (treated separately for having religious significance), three species namely *Elaeocarpus munroii* Mast., *E. serratus* L. and *E. tuberculatus* Roxb. are included. Under stranglers included are *Ficus macrocarpa* L.f. and *F. tsjahela* Burm.f. (inappropriately, the keystone species had gone into stranglers group!). The species namely, *Bombax insignae* Wall., *B. ceiba* L., *Vernonia arborea* Buch.-Ham., *Toona ciliata* M. Roem. and *Heritiera papilio* Bedd., with majority of them having samaroid fruits, have been placed under 'blown in the wind group' (wind as medium of dispersal). The group representing sun trees (plants that appear as pioneers in sun-lit gaps of rain forests) are *Mallotus tetracoccus* (Roxb.) Kurz and *Sterculia guttata* Roxb.

Sartaj Ghuman has drawn five beautiful pen sketches of Anamalai landscapes with buildings and trees of *Ficus*, Man-

go, *Erythrina*, probably *Eucalyptus*? and *Prunus ceylanica* in the book. The front and back covers of the book are decorated by *Canarium strictum* and *Elaeocarpus munroii* respectively. The book is dedicated to the 'Trees – the original landscape historians' and true to the caption, trees are real mute witnesses to all events that happen in their surroundings. The book was published by Trail Blazer India Private Limited, Bangalore, on recycled chlorine free paper. It is a welcome gesture of Nature Conservation Foundation that they intend to distribute this book free to schools and colleges, plantation managers, and forest officers/staff for the cause of awareness and conservation of these prominent trees of Western Ghats. The excellent production standards further add to its merit to be on the reference shelves of every serious botanical artist and artists with experience and skill in drawing and painting of plant habit sketches, flowers and fruits.

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#### Annual Review of Immunology, 2018.

Dan R. Littman and Wayne M. Yokoyama (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, California 94303-0139, USA. Vol. 36. vii + 887 pages. Price: US\$ 112.

As every year, this authoritative collection covers recent advances in immunological science. Increasingly, fresh insights into hitherto undiscovered immunological processes are powered by the emergence of new technologies and approaches. This is an exciting time: The interval between an advance in the basic understanding of immune dysfunction and the emergence of potential therapeutics is shrinking, which augurs well for interventions aimed at bettering the

human condition. Apologies are due to authors whose excellent work we could not review due to space constraints.

As Boehm *et al.* (pp. 19–42) discuss, the study of the nature of immune defence in jawless fish (lampreys and hagfish) is instructive from an evolutionary standpoint, because these organisms are considered representative of early vertebrates. After early experiments demonstrating the generation of immunological responses (in the form of  $\approx 300$  kDa antibody-like 'agglutinins') subsequent to immunization with foreign moieties, injecting lampreys with plant mitogens and antigens has helped enumerate the presence of membrane-bound variable lymphocyte receptors (VLRs). The highly diverse sequences that characterize such VLRs comprise invariant N- and C-terminal regions flanking intervening regions of variability. Three VLR isotypes have been characterized (VLRA, VLRB and VLRC), with each lymphocyte expressing one VLR gene on account of allelic exclusion, indicating a pattern of clonal antigen receptor expression akin to that seen in jawed vertebrates. While VLRBs are secreted from cells after antigen stimulation (as antibodies are from B cells in jawed vertebrates), VLRA and VLRCs remain cell-bound (as do TCRs in jawed vertebrates). Precise mechanisms of negative selection that enable tolerance to self-grafts remain unknown. While two genes (*CDA1* and *CDA2*), putatively encoding activation-induced deaminases, have been described in lamprey, formal proof of their involvement in gene conversion-like events is awaited. The antibody-like agglutinins that are generated upon immunization can fix complement to lyse target cells. Several cytokine and their receptors have been discovered, and downstream effects are being discerned. Parallels between components of adaptive immunity between jawed and jawless vertebrates are suggestive of the existence of a common vertebrate ancestor.

Bangam (pp. 43–71) discusses current knowledge on the biology of human T cell leukemia virus Type 1 (HTLV-1). Interestingly, disease manifests in only an estimated 5–10% of people who are infected. Viral transmission occurs via sexual intercourse, or upon transfusion with infected blood products; vertical transmission through breast milk is also considered a significant mechanism of