Trends in Partial Differential Equations of Mathematical Physics. Jose F. Rodrigues *et al.* (eds). Birkhauser Verlag, P.O. Box 133, CH-4010, Basel, Switzerland. 2005. 282 pp. Price: EUR 115.56.

This book is a collection of twenty papers presented at the international conference on 'Trends in Partial Differential Equations of Mathematical Physics', held at Portugal in 2003 on the occasion of the 70th birthday of V. A. Solonnikov. Solonnikov is one of the outstanding mathematicians from St. Petersburg Mathematical School, Russia, with many fundamental contributions to the partial differential equations (PDEs) of mathematical physics. Naturally several papers deal with various aspects of these PDEs, using the results and techniques of Solonnikov.

Pioneering work in this field has been done by many Russian mathematicians like Petrovski, Kolmogorov, Ladyzhenskaya and Sobolev, to name a few. In addition to well-known PDEs like the Navier–Stokes and Euler's equations, various other equations have also been used to model fluid-flow problems and other physical phenomena. Solavbility of these PDEs in suitable function spaces, uniqueness of solutions, regularity, stability, asymptotic behaviour of the solutions as time tends to infinity and control of the PDE by suitable parameters, are some of the major research directions.

In this book, there are papers which focus on building a model for a physical phenomenon and then prove the existence, uniqueness of a solution, or identify limiting models. Consiglieri *et al.* study a mathematical model for a non-isothermal, incompressible non-Newtonian fluid flow in a tube. They prove that when thermal conductivity σ tends to infinity and latent heat δ tends to 0, the limiting model is p-Laplacian flow with nonlocal diffusivity. Denisova studies a free boundary problem for a model of two incompressible heat-conducting fluids and proves the existence of a classical solution in a Holder class, local in time. Andreucci *et al.* present a mathematical model for the phototransduction cascade, taking into account the spatial localization of the different reaction processes, simplified by a process of homogenization and concentration of capacity. Fasano and Primicerio present a model for heat and mass transport in non-isothermal saturated solutions and prove the existence and uniqueness of solutions.

Some papers deal with fluid flows modelled by the Navier–Stokes and Euler's equations. Frolova proves the existence of a solution in Sobolev spaces, local in time for a time-dependent problem for viscous incompressible nonhomogeneous fluid bounded by a free surface on which surface tension forces act. Brandolese proves that the initial value problem for the Navier–Stokes equation in $\mathbb{R}^3$ with initial data in a subspace of a weighted L^2 space, is locally well posed.

Rautmann considers the vorticity transport equation of Helmoholtz for incompressible flow modelled by the Euler's equations and proves the existence of a unique classical solution to Cauchy's problem with partial discretization in $\mathbb{R}^3$ for each bounded time interval. Mahalov *et al.* study the 3D incompressible Euler's equations with initial data characterized by uniformly large vorticity. They prove the existence of regular solutions on long time-intervals and obtain global regularity of 3D limit resonant Euler's equations.

Stability of the rest state for a layer of compressible fluid between two horizontal plates heated from above and below, is analysed in the paper by Guidoboni and Padula. For this Benard problem, the full compressible model has been used. Padula, in her paper on the equations governing general hyperelastic materials, a hyperbolic–parabolic system, introduces 'free work identity' and uses it to derive a series of stability and instability results for equilibrium configurations.

The paper by Antontsev *et al.* analyses how a coupling between velocity and temperature at suitably low temperature ranges can stop the fluid (velocity decays to 0), without a change of phase. Their model is the planar stationary Navier–Stokes equation for the velocity u, perturbed by a sublinear term $f(x, \theta, u)$ and coupled with a stationary advection–diffusion equation for temperature θ. After proving the existence and uniqueness of weak solutions, they show that the velocity u vanishes for large x. Exact boundary controllability for quasi-linear wave equation is studied by Li Tatsien. There are papers on fully nonlinear elliptic equations and also on nonlinear evolution equations governed by sub critical p-Laplacian.

This book gives an interesting collection of topics dealing with equations of mathematical physics, regarding existence, uniqueness, regularity, stability and control. It is a good addition to any library.

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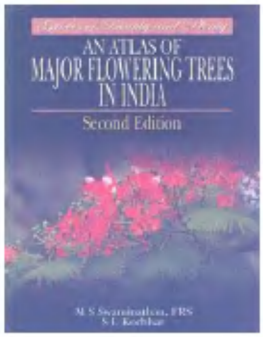

Groves of Beauty and Plenty: An Atlas of Major Flowering Trees in India – Second Edition. M. S. Swaminathan and S. L. Kochhar. Macmillan India Ltd, 2/10 Ansari Road, Daryaganj, New Delhi 110 002. 2007. 324 pp. Price: Rs 950.

The book under review is the second edition of the original publication that appeared in 2003. The very fact that a second edition of the book has appeared within a short span of 3 years indicates its importance and utility. The tree wealth of a country constitutes an important heritage for posterity and has both academic and applicational values. Indian flora is unique in having a rich diversity of 2560 tree species occurring naturally in almost all floristic regions. From the very early times, many Europeans have also introduced several ornamental and other exotic trees in India. Apart from recreation purpose, trees have played a crucial role in the very survival of human beings by providing food, timber, medicines and cleaning of the environment by maintaining carbon balance in the atmosphere. It is therefore essential for everyone to know, understand and study the tree flora in our own surroundings.

The book under review aptly focuses on this aspect. As the authors have pointed out, this atlas of Indian trees in-

cludes 146 most striking and commonly encountered trees in different ecological zones. The book begins with an introduction on the overview of the tree wealth of India. Salient and important floristic diversity (specially tree diversity) in the forests of West Himalaya, East Himalaya, northwest dry zone, Indo-Gangetic Plain, West coast or Malabar, Central Indian region, the Deccan Plateau, northeast India and Andaman and Nicobar Islands is briefly highlighted.

In the enumeration of the trees, the authors have broadly followed the Bentham and Hooker (1862–87) system of plant classification. Treatment of each tree species starts with its widely known English name followed by its correct scientific name with author name, common synonyms if any, and its taxonomic position. Although the nomenclature of tree species adopted is up-to-date and in conformity with the latest Botanical Code of Nomenclature, some discrepancies have crept in. For example, on p. 138, *Adenanthera pavonina* L. is treated as a synonym of *A. microsperma* Teijsm. But *A. pavonina* being a Linnaean name (Sp. pl. 384, 1753), must find priority over *A. microsperma* and hence *A. pavonina* should be the correct name. Again, the author citation for *Albizia lebbeck* (p. 141) should be *A. lebbeck* (L.) Benth. Apart from a clear description of the tree species, the etymology and origin of the scientific name are provided. Chromosome numbers (2*n* number) provided for each species add value to the work. The most striking feature of the work is information on closely allied and cultivated varieties under each species that are grown in gardens and parks. Phenology, mainly the flowering and fruiting periods, and propagation methods are useful for all tree growers and nurserymen. The authors certainly deserve compliments for the excellent colour photographs provided for each species. These photographs greatly help in the identification of tree species by both amateurs and botanists not only in India, but in all adjacent countries too. Vernacular names in different languages for the tree species dealt with are appended at the end of the book. Though I find the vernacular names for each species exhaustive, some vernacular names are still missing. The authors may consult the *Vernacular List of Trees, Shrubs and Woody Climbers in the Madras Presidency* by A. W. Lushington (1915, IIB, Madras) for future editions.

On the whole, the book has been excellently brought out and contains diverse and useful information on the prominent and commonly encountered tree flora of India. The production and get up of the book are excellent. The reviewer has little doubt that this book will not only be a source of useful information about the diverse tree wealth of the country, but will also stimulate us to appreciate more and more the plants that fulfil the diverse needs of humankind and sustain life on earth.

The book is a must for botanists, foresters, landscape architects, planners, environmentalists, conservationists and those seeking information on the tree wealth of India. Although considering the quality of the publication and the amount of valuable information contained in the book, the price is justifiable, low-cost paperback editions can reach more readers. The authors have surely laboured hard in collecting vast scattered information on trees at one place and deserve compliments by the entire botanical community for this high-quality publication.

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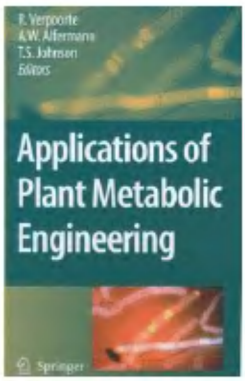

Applications of Plant Metabolic Engineering. R. Verpoorte, A. W. Alfermann and T. S. Johnson (eds). Springer, P.O. Box 17, 3300 AA Dordrecht, The Netherlands. 2007. 332 pp. Price: EUR 123.00.

Ever since the first book of its kind in the field of plant metabolic engineering by Verpoorte and Alfermann in the year 2000, impressive progress has been made in this rapidly growing area of second-generation biotechnology. The present book by the same authors is an updated comprehensive reference on the applications of plant metabolic engineering. The book begins with an excellent introduction to the subject by Verpoorte that briefly covers aspects of secondary metabolism, including pathway elucidation, compartmentation, transport, storage and strategies for metabolic engineering. The remainder of the book is divided into 14 chapters written by leading authorities in their fields.

The first three chapters highlight the use of recombinant microorganisms, plant molecular farming and plastid-assisted plant metabolic engineering for targetted overexpression of aromatic, medicinal and industrial compounds of plant origin. Chapter 1 describes how recombinant microorganisms have been used for the elucidation of plant biosynthetic pathways as well as production of plant natural products. Examples are collated to show production of plant natural products, including medicinal and flavour/fragrance compounds in recombinant microbial systems. The concept and usefulness of microorganisms to produce both natural and designer secondary metabolites is clearly explained, considering both advantages and disadvantages. Chapter 2 on plant molecular farming, covers the background information, techniques involved in gene transfer to plants, host systems, optimization of recombinant protein expression in transgenic plants, commercialized products and products close to market. Cost of production comparisons of recombinant proteins in transgenic plants and animal systems is also highlighted. Chapter 3 reviews plastid-based pathways and chloroplast metabolic engineering for improvement of crop species as well as pharmaceutical and biopolymer production. Topics covered, like chloroplast genome, plastid operons and multigene engineering, pharmaceutical products and prospects for enhancing plant productivity, comparative aspects of nuclear and chloroplast genetic engineering approaches, provide necessary information to further advance this upcoming field. An important addition to the chapter is a table comprising an abbreviated list of nuclear-encoded metabolic enzymes post-translationally imported into the plastid.