decreased antisocial activity, a more skilled workforce, decrease in drug use and teenage pregnancy, etc., all views which smack of a withdrawal into a conservative agenda that continues to uphold the image and desire of the established US society and nation. Perhaps, this is the only major flaw in the book which is otherwise an in-depth and comprehensive overview of the problems of making higher education the foundation for a more equitable United States of America.

I feel compelled to conclude this review by raising comparative questions for educational institutions, especially for the ones considered as 'elite' in India. Are such matters, of generating access and opportunity for disadvantaged students, concerns that our faculty and administrators have? Or have caste-based reservations become only the burden imposed by the compulsions of the Constitution and the legal apparatus? What stands out as a glaring defect in our educational institutions is not only the overarching negativity and dismissal in which such issues are handled but also the conspiracy of silence that meets any such debate. An example is the fact that most of our elite higher education institutions fail to generate and sustain data, and details about how students from disadvantaged backgrounds and those who have entered as 'reserved candidates' fare over the years. In fact, not only are data not maintained but attempts by scholars to conduct studies have been blocked. Even as we consider many of these elite US institutions to be models and for which many seek access to for their own children, should not Indian educationists also pause to think about issues such as equity, access, institutional obligations and the need to scaffold the abilities of students from disadvantaged backgrounds?

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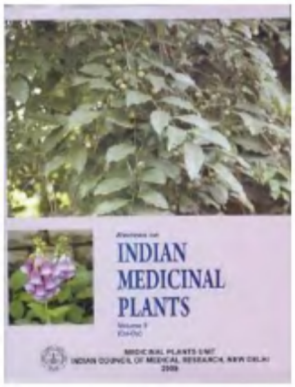

Reviews on Indian Medicinal Plants. Neeraj Tandon and Madhu Sharma (eds). Indian Council of Medical Research, V. Ramalingaswami Bhawan, Ansari Nagar, Post Box 4911, New Delhi 110 029. 2009. Vol. 9 (Da-Dy). xxiii+829 pp. Price: Rs 1000/US$ 70.00.

This is the latest volume in the series of *Reviews on Indian Medicinal Plants*. With genera of medicinal plants arranged alphabetically, the earlier eight volumes were published in 2004 (vols 1, 2, 3: A; vol. 4: B), 2007 (vol. 5: C), 2008 (vols 6, 7: C) and 2009 (vol. 8: C). This suggests there is a long way to go before we see the last volume. Though such long time gaps are undesirable, they are often inevitable in a work of this kind, more particularly when a public sector institution is involved.

This volume contains profiles (ambitiously described as monographs) of 431 species of 91 genera, supported by 5333 references. It is structured to contain a foreword, preface, acknowledgments, monographs of 91 genera, appendices (list of plants reported for only ethnobotanical/traditional uses, list of plants not included in the volume due to change in botanical nomenclature, and list of some important books, treatises and encyclopedias referred), indices (index of botanical names, index of bioactive phytoconstituents, and index of regional and other names) and plant genera in earlier volumes 1–8.

The information on the genera is organized under general information, pharmacognostic studies, chemical studies, pharmacological and biological studies, clinical studies, toxicological studies, references and additional references.

In countries like India, even with the resources of a body like the ICMR, it is always possible that some information was missed or left out inadvertently or due to inappropriate decisions. Hence, these volumes should only be seen as the beginning of profiling medicinal plants, on which the user would build his/her chosen generic/specific profiles, adding material that becomes available from time to time. To be fair to the compilers, these volumes should be judged on what they contain.

When every plant species is a potential medicinal plant, the choice of taxa for profiling is daunting. In this volume, there is vast information on some genera, as for example, *Desmodium* (52 pages, 12 pages of literature), *Derris* (54 pages, 23 pages of literature), *Dolichos* (62 pages, 45 pages of literature) and *Datura* (68 pages, 32 pages of literature), which appears to be comprehensive and these may be called 'Monographs'. On the other hand, there is hardly anything worthwhile on some genera such as *Dactylandra*, *Dioon*, *Disporum*, *Dopatrium*, *Dubyaea* and *Dunbaria*, which makes one wonder why these taxa were included at all when 33 other species (pp. 788, 789) were excluded, though the seven genera to which these species belong are included. At least for such species the descriptive term 'Monographs' is inappropriate.

So long as a species is commonly available in India and has appreciable medicinal uses, the question whether it is native, naturalized (for example *Ageratum conyzoides*, vol. 1) or cultivated exotic (*Daucus*, vol. 9) should not be an issue. However, if a species is a largely unknown cultivated ornamental (*Dioon edule*, p. 454 or *Datura suaveolens*, p. 91) with hardly any therapeutic information included, it only adds to the number of profiles of genera/species.

When a cultivated species has several cultivars, all of them do not have the same therapeutic potential. For example, only some cultivars of rice contain a lectin which makes them useful in controlling diarrhoea. There should be some concern to this issue, for such taxa as carrot (*Daucus carota* subspecies *sativa*, p. 153) or horse gram (*Macrotyloma uniflorum*, under *Dolichos uniflora*, p. 598), a point to be taken care of in the future volumes.

It is refreshing to find the ferns *Dicranopteris*, *Drynaria* and *Dryopteris* in this volume. The ICMR should now pay some attention to the medicinal uses of the non-vascular plant groups – the

algae, fungi and bryophytes. There is an unfortunate mental block in this country, 'plants' mean only angiosperms, to the neglect of the other groups.

Ethnobotany is the interdisciplinary study of the relationship between people and diverse uses of plants, which by both intent and implication involves the indigenous cultural context. It is illogical to see in the Indian ethonobotanical or ethnomedical context, species of the European *Digitalis* in cultivation, the Mexican *Datura suaveolens* found only in a few gardens in the hill stations, the Madagascarian *Delonix regia* (Gul-Mohr) however common it may be, or the Eurasian *Daucus carota* subspecies *sativa* (carrot), a common vegetable though. True, there is a large number of publications on the so-called ethnobotany of exotic species, naturalized or in cultivation in India, which reflects an ignorance or a deliberate misuse of the concept of ethnobotany. The editors/authors of the present volume should have exercised their discretion to avoid the misapplication of the concept of ethnobotany, which has been uncritically over-rated.

Appendix I (p. 755) is a list of species reported only for ethonobotanical/traditional uses. The names of the species and the relevant references to ethnobotanical work, mostly by Indian workers, were given. These species and even some genera (*Dactylotenium*, *Delima*) were not treated in the body of the volume. For some (*Delphinium cashmerianum*, *Duchesnea indica*) a large number of references were cited in appendix I, which reflects the importance of these species. These taxa could have been included in the body of the volume adding general information and indicating that there is only ethnobotanical work, to draw attention of researchers using contemporary methods.

Datura metel Linn.

Correct binomials, relevant synonyms and appropriate author citation are crucial in publications like the one under review. Faulty nomenclatural information seriously impacts international communication, and may even have repercussions on issues of Intellectual Property Rights. Correct nomenclature is a conscious consensus decision of taxonomists and it is not a situation of one opinion against another. I was uncomfortable with the nomenclature, synonyms or author citations in several instances in volume 9, but when professional plant taxonomists themselves often have a hard time with nomenclatural issues, it is unfair to expect others to be entirely accurate. ICMR would do well to adopt the practice of consulting family or genus specialists in the Botanical Survey of India, for advice on appropriate nomenclatural information for each species.

Generic names were abbreviated throughout the present volume, which of course is a common practice. Abbreviated generic names cause serious difficulties in electronic search on the internet or digitized publications or even for the compilers while generating different kinds of lists and appendices for the print editions from their digital files. A nice example as a source of confusion arising from abbreviated generic names in volume 9 is *Derris andamanica*, *Dillenia andamanica*, *Dinochloa andamanica*, *Diospyros andamanica* and *Drypetes andamanica,* if one goes to search by *D. andamanica.* In fact, *Current Science* also should discourage authors from abbreviating generic names, as can be found in the 10th March 2010 issue of the journal.

Vernacular names are an important means of getting to botanical names of species in traditional use and for communication to non-botanists. With so many languages in India and the same species having several names in the same language, and the problem of connecting *Samskrith* names in the Ayurvedic source texts with vernacular and/or botanical names, confusion rules. Even after decades of debate, we still have several problems of botanical identity. For example, for most people *Saraca asoca* (Caesalpiniaceae) is the *ashoka* tree, while some still hold that it is *Polyalthia longifolia* (Annonaceae). Similarly, *Clitoria ternatea* (Fabaceae) is *shankhupushpi* for most, while for some it is *Evolvulus alsinoides* (Convolvulaceae). We have to make very serious attempts to standardize vernaculars and their botanical equivalents. I find several instances in this volume, where I am not very happy with the vernacular names indicated or at the absence of some, but this only reflects the general situation and does not necessarily mean the fault of the compilers. More problems come when one is trying to get botanical equivalents of *Samskrith* names in Ayurvedic source texts. I had several difficulties in doing this from the Government of India's *Ayurvedic Formulary of India* (1978). For example, in the Formulary, *Datura innoxia*, *Datura metel* and *Datura stramonium* are not distinguished and the three species go under nine *Samskrith* names. I did not find in volume 9, which provided Ayurvedic information only under *Datura metel* L., six names (*dhusturaka*, *dhustara*, *harapriya*, *hata*, *hema* and *swarnabija*) mentioned in the formulary and so I fail to connect these names to species in volume 9. The formulary lists *Delphinium zalil* (*sprakka* in *Samskrith*) that is not mentioned in volume 9, even as a synonym. There may be explanations to these issues but the general reader could not be bothered about them, he is only interested in clear and authentic information.

It is necessary to indicate the families of the genera in the index, so that the reader need not search through the text for this information.

Index I (for botanical names), that gives page references to the species treated in volume 9, is very much necessary. On page 787 (to 789), after the last treated species (*Dysoxylum procerum*), the index continues, for three and a half pages starting with *Abrus precatorius* (without even a line space from the previous entry), causing considerable confusion. One would finally understand that these are species mentioned in different contexts in the text, which is certainly useful. Confusion could have been avoided, if these species were separated from main listing. Even when this done, another problem persists. On pp. 788 and 789 there are 33 species of seven genera of alphabet D, which were not treated in the text, for whatever the reason, though the genera were. It is better if these species are moved from here and shuffled alpha-

betically in main part of index I or given as a separate list with a clear heading.

Photographs convey much more than words and so are a valuable component in works such as the present one. When several species of a genus are treated, photographs help in distinguishing one species from the other. Nineteen species of *Dalbergia* are treated in volume 9, but photographs of only two were included, leaving out even the easily obtainable photographs of such species as *Dalbergia sissoo*. One would expect that the Medicinal Plants Unit of the ICMR has built up a file of photographs of medicinal plants, but this does not seem to have happened. From the acknowledgements (p. iii) it looks that almost all photographs were borrowed from others. Unfortunately, there was no critical judgement on their quality. About half the photographs in this volume are bad, the worst being that of *Dolichos uniflorus* on p. 599 (not the correct name). Most photographs borrowed from Minoo Parabia are very poor in quality. For the future volumes at least, ICMR would do well to approach the Botanical Survey of India which has an excellent collection of colour photographs, colour paintings and other types of illustrations of most plant species in India. It is better not to include any photographs at all (as is the case with most species in this volume) than including bad photographs which do not serve even the purpose of decorating the text.

The test for therapeutic and economic potential of a medicinal plant species is the frequency of its use in preparations sold across the counter. Not even a hundred Indian species would pass this test. While it is for the manufacturers to utilize plants taking cue from the information provided in profiles such as those in this volume, it would be useful to indicate species used in various commercialized herbal preparations containing the respective species, either in the indigenous systems or contemporary concoctions.

Overall, volume 9 would be immensely useful to varied interests in medicinal plants.

In its own interest and to serve the cause of medicinal plants better, the ICMR should seriously consider the following while publishing the remaining reviews on medicinal plants:

(a) Once a book is printed, it reaches its dead end. Many a time we are wiser after the fact, but no additions, deletions or corrections are possible in a print edition and all deficiencies and errors stay till the end of the book's useful life. It took over five years to complete medicinal plant species in four alphabets and 22 alphabets remain with some like the very formidable 'S'. Now we do not have profiles of *Melia*, *Rauwolfia*, *Saraca*, *Taxus*, *Zingiber* and several others, which are of wide interest. The editors/authors might already be feeling the need to revise and update profiles in the earlier volumes. Knowing fully well that the correct name of horse gram is *Macrotyloma unifolrum*, this was included in volume 9, under its now incorrect generic name *Dolichos*, probably because the editors/authors did not want to leave one good profile to the uncertainty of the volume of 'M'. Twenty five species were excluded from this volume because of change in botanical nomenclature (p. 762), but why *Macrotyloma* is an exception? Out of the 91 genera in this volume an average reader may be interested in less than a dozen of them, yet has to pay for the whole volume. All these disadvantages could be overcome if these reviews are published as digital databases. They can be frequently updated responding to new literature, comments and suggestions, and post the profiles as they get ready without waiting for all the profiles under a particular alphabet. Printouts or digital files of chosen genus/species profiles could be made available to the users without the burden of unwanted material and paying for it. More importantly, information can be retrieved in any combination the user wishes to have. There are excellent models of such open-ended databases, as for example ILDIS for the legumes or NAPRALERT for natural products. The ICMR would serve the users and itself better if it opts for the digital database mode rather than the laborious and cumbersome print editions. ICMR, being a public sector institution, should digitize all the 9 volumes published so far and make the material freely available in the public domain on their website.

(b) An enormous amount of research work is involved in bringing out these compilations, though often a critical view on the appropriateness of inclusion or exclusion of a taxon in the volume or the credibility of information was not apparent. There is a Technical Review Committee (p. iii) mostly consisting of high profile scientific bureaucrats and the names of two senior ICMR scientists appear as editors. Only four names were mentioned in the acknowledgements casually, for their 'meticulous assistance' (p. viii). These four people must have done much more than just assisting and there must be several others who have slogged in the compilation of this volume but neither their names nor indications of their actual contributions appear anywhere, which is grossly unfair. The question, 'the credit goes to Shahjehan for Tajmahal, but who carried the stones?' is not a mere revolutionary cliché, but a ground reality that reflects the common Indian culture that denies others rightly deserving personal credits for their hard work. That the personnel received salaries or other monetary compensation is beside the point, because even the members of Technical Committee and the editors too did receive similarly. If appropriate and separate personal credits are given for each taxon, the young scientists get the advantage of citing it as their scientific output and will be encouraged to work more enthusiastically. Ascribing authorship will also fix responsibility, which is not possible now. The ICMR should, at least in the forthcoming publications, give appropriate authorship credits where they are due and be a model by acknowledging the efforts of the junior scientists.

(c) Presently, medicinal plant researchers outside the ICMR seem to be helping in drawing attention to new publications (p. xv), but non-ICMR experts may be invited to contribute profiles also, to take advantage of the diverse expertise.

When I enthusiastically agreed to review this volume, I did not realize that it is one of a series and much is yet to come. When I saw the volume, I could not help recollecting a 45-year-old *Readers' Digest* story of a gentleman who bought, in a hurry in a railway station book shop, a book titled *How to Hug*, thinking that it is about the technique, but realized in his compartment that it is one of a series of volumes, dealing with synonyms and antonyms of words, from the word 'How' to the word 'Hug'.

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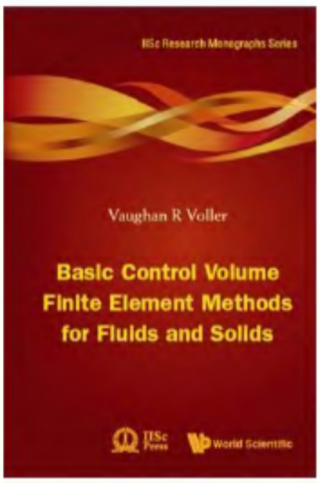

Basic Control Volume Finite Element Methods for Fluids and Solids. Vaughan R. Voller. IISc Research Monographs Series-1, IISc Press and World Scientific Publishing Co. Pvt Ltd, 2009. 184 pp. Price: US$ 48/£26.

The emergence of the digital computer has provided impetus for the rapid development of computational methods for solving field problems. In the early days, the two popular methods were Finite Difference Method (FDM) and Finite Element Method. An important development of FDM led to the Control Volume Finite Difference Method in which a set of discrete equations is arrived at by appropriate balancing of the control volume boundary fluxes. This has a direct connection to physics of the system. Control volumes can also be constructed around the nodal points on an unstructured finite element mesh that conforms to an arbitrarily shaped domain. The fluxes around control volume faces can be approximated by using finite element interpolation. Balancing of these fluxes leads to a physically based representation of the governing equations as a discrete set of equations in terms of mesh nodal values. The original application was in the solution of electromagnetic field problems. It was then extended to heat transfer and fluid flow problems and finally to solid mechanics problems.

The author has consolidated his lectures on Control Volume Finite Element Method (CVFEM) delivered at the Indian Institute of Science during the Centenary celebrations. He gives a brief introduction to the historical development of the method and also the control volume method itself. Then, he proceeds to derive the governing equations for solid and fluid mechanics problems, both in point and integral forms, to provide a background for solving multi-physics problems. Then, the essential ingredients of a numerical solution in general and a CVFEM solution in particular are presented. A data structure that codifies the critical geometric relationships in an unstructured mesh is developed. Then, a brief outline is provided to show how this data structure can be used to make an automated link between the physics underlying the governing equation and the discrete CVFEM equations. The key information required for fully constructing working solutions of basic fluid flow and solid mechanics problems are clearly explained for two-dimensional problems using linear elements and upwinding. The example problems considered are based on (i) advection–diffusion equations for scalar transport; (ii) plane stress and plane strain problem for linear elasticity and (iii) the stream-function – vorticity form of two-dimensional Navier–Stokes equations for incompressible Newtonian fluid.

The results from CVFEM are compared with available analytical solutions. The comparison is good. The methods of extending the work to nonlinear problems as well as 3D problems are also given.

In order to help the reader to start the work in CVFEM, a mesh generator and a CVFEM code are provided based on MATLAB in the appendices A and B. The objective of the monograph to introduce a single common framework for CVFEM solution of both fluid and solid mechanics problems has been achieved in this book. The book deserves a place in libraries of many engineering institutions where numerical solutions are sought for engineering problems.

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