

Book review

Chemical fungal taxonomy. Edited by J.C. Frisvad, P.D. Bridge & D.K. Arora. June 1998. 424 pp., illustrated. Marcel Dekker Inc., New York, Basel. \$175.00 ISBN 0-8247-0069-4.

Taxonomy is the basic discipline that delimits taxa and elucidates their mutual relationships; as such taxonomy is indispensable to understand the behaviour of living organisms in their environment. Historically, taxonomy has developed primarily on morphological grounds. In recent years, chemotaxonomy and, particularly, molecular methods have led to dramatic developments in fungal taxonomy. 'But until now, the various aspects of chemical fungal taxonomy had never been covered in one book It is therefore timely and important to present a broad range of information on these techniques, and their applicabilities in systematic mycology, in a single volume'. As a result the emphasis of the book is on methods rather than on the results. Reference to DNA is limited. PCR-based methods are only treated in Chapter 3 by V. Edel, where they are largely confined to RFLP and various fingerprinting methods (no AFLP). This chapter includes reference to the generation of trees, but the value of DNA sequences as a primary source of phylogenetic reconstruction is mentioned only cursorily. The other chapters cover all other aspects of chemotaxonomy, each discussing the methods and their application, and the future possibilities are reviewed in a paragraph of 'Conclusions'.

The editors briefly survey the field in Chapter 1, giving mainly a list of major references; statistical analyses and automation are major entries, but the term 'polyphasic approach', so important in modern taxonomy, is hardly considered in this or other chapters. In Chapter 2, which describes numerical analysis of data, P.D. Bridge and G.S. Saddler present the mathematical backgrounds in an understandable way; the correspondence analysis is, however, only described in Chapter 1, neural networks are mentioned, but expert systems are not. Electrophoresis of whole-cell proteins (Chapter 4) is critically evaluated by G.L. Hennebert and M. Vancanneyt in relation to

morphology throughout the fungal system; an approach that would have been advantageous to several other chapters. S. Rosendahl and S. Banke (Chapter 5) briefly review isozymes in relation to practical work, including data analysis and phylogenetic applications. Immunotaxonomy (Chapter 6, S.H.W. Notermans et al.) has become important in various plant-pathogenic fungi, notably *Penicillium* and *Aspergillus*; applications in medical mycology, plant pathology and food microbiology have become particularly important. Problems of specificity of polyclonal and monoclonal antibodies are discussed with many details on the characterization of antigens. Alkali-extractable polysaccharides of cell walls (Chapter 7, J.A. Leal and M. Bernabé) coupled with NMR analyses facilitate the recognition of taxonomically-relevant marker compounds, while G.E. Pfyffer (Chapter 9) summarizes older work on polyols. Unsaponifiable lipids (Chapter 8, R.R.M. Paterson) including isoprenoids and ubiquinones, which are described in voluminous tables, and steroids and carotenoids, have gained much impact in fungal taxonomy. Concerning fatty acids, J.L.F. Kock and A. Botha (Chapter 10) mainly summarize South African work, though much more literature exists; the possibility of applying fatty acid patterns for a broad-scale classification is discussed, although the standardized methods applied to bacteria and yeasts are not sufficiently reviewed. Volatile metabolites (Chapter 11, T.O. Larsen) play an important role in food and feed research, and surprisingly, their spectrum correlates very well with that of other secondary metabolites in *Penicillium*, which are authoritatively reviewed by J.C. Frisvad et al. in Chapter 12; although single metabolites can have a wide distribution, the spectra of secondary metabolites have contributed enormously to species delimitation in *Penicillium* and *Aspergillus*. Conditions for the production of secondary metabolites are then viewed critically by Frank (Chapter 13). For Lichens, more than for any other group of fungi, metabolites have become an essential component in taxonomy for more than a century. Some compounds are relevant at Order or Family level and no general

statement on the taxonomic significance of metabolite data can be made (H.T. Lumbsch, Chapter 14).

Fascinated by the methods discussed, most authors lose sight of the final goal: a stable phylogeny-based taxonomy that correlates with many other relevant features, particularly morphology. The volume is a valuable and rather up-to-date summary of the state of the art. Only the high price is likely to deter the numerous

mycologists who could greatly profit from this source book.

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