

Papilionoideae. This table details the occurrence of (+)- and (-)-pterocarpan (a type of isoflavonoid) in Old and New World legumes, and relies on information obtained from a by no means comprehensive review (Isoflavonoids by E. Wong in "The Flavonoids") and a survey of reports which appeared in *Phytochemistry* between 1975 and 1979. (What about relevant papers, and there are several, published in other learned journals?). Of course, the table is designed to illustrate an interesting trend towards (+)-pterocarpan in New World Papilionoideae and I would not have expected it to be one hundred percent complete, but what I do find somewhat irritating is the lack of a precise reference for each given piece of information. As a result there is no easy way of locating the original research papers, and hence of checking the table for accuracy. Lastly, because of the way it is arranged the book tends to give the impression of being a series of edited scientific

papers rather than a unified account, but this is a small point and considering the complexity of the subject a rather 'journal-style' presentation is probably acceptable.

These minor criticisms apart, the book contains a wealth of useful and thought-provoking information, and anyone interested in secondary products and plant systematics should at least make an attempt to read and evaluate it for him or herself. Although I suspect this is probably not a book which large numbers of students or researchers will buy, I do hope that it becomes available for reference in University libraries and those of other Institutes as Professor Gottlieb's novel approach to systematics and evolution undoubtedly deserves to be widely recognized.

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Fungal Metabolites, Volume II: by W. B. TURNER and D. C. ALDRIDGE. Academic Press, London, 1983. 631 pp. £44.

In 1971, W. B. Turner produced a first volume, listing the nearly a thousand secondary metabolites produced by fungi whose structures had been established at that time. Now, with the assistance of Dr. Aldridge, he has provided us with a supplementary volume covering the literature of the intervening 12 years. The number of new structures are double that in the first volume! As in the first volume, compounds are classified according to biosynthetic origin and details of biosynthetic experiments are included whenever such information is available. The second volume thus follows the same plan as the first and cross-reference between the two is readily achieved because the same headings and sectional numberings are used.

A particularly admirable feature of this volume II is that new fungal sources of compounds reported in volume I are carefully listed in appropriate sections. This is particularly useful in the sterol chapter. That ergosterol, a characteristic fungal sterol, has been found in many new sources is hardly surprising; perhaps more interesting is the fact that a number of 'higher plant' sterols such as stigmasterol and sitosterol have now been identified in a respectable number of fungal genera. The most interesting fungal sterols are probably antheridiol and the oogoniols, which act as sex hormones in the aquatic fungus *Achlya*, and new structural assignments are included here.

From the human viewpoint, fungal metabolites continue to command interest because of the possibilities of finding new drugs of comparable value to the penicillin antibiotics. According to these authors, the immunosuppressant agent cyclosporin A, a cyclic peptide from *Trichoderma*, is currently showing the greatest promise of utility. Economically too, the various phytotoxins isolated from fungi are important if only because of their deleterious effects on higher plants in causing many of the symptoms of plant disease. They are also useful exper-

imental tools for studying the flow of ions across the plasmalemma of higher plants. Structures of the many diterpene-based fusicoccins and cotylenins can be found in this volume. It is unfortunate that the corrected structures of the *Helminthosporium sacchari* toxins arrived too late for inclusion here (but see V. Macko *et al.* *Experientia* 1983, 39, 343).

The chemotaxonomic interest of these two volumes is also very considerable. Although not commented on in any detail, the raw data now available can be used by anyone wishing to seek correlations between natural distribution and chemical complexity among the fungi. While many of the compounds reported are unique to the fungi, a substantial number also appear in unrelated plant sources. Many well known higher plant substances are reported here for the first time, e.g. ferulic acid, geraniol, myrcene and limonene, but the most distinctive finding is of the betalain pigment vulgaxanthin II from beetroot in the fly agaric *Amanita muscaria*. Such parallel occurrences do not necessarily imply biosynthetic homology across the phyla. Indeed, as reported here, the only known fungal flavonoid, chloroflavonin of *Aspergillus candidus*, is biosynthesized by a different route from that followed in higher plants.

This volume, as the first one, is an essential reference to any scientist remotely interested in either secondary metabolism or in the fungal kingdom. It is excellently provided with hundreds of literature references, as well as formula, organism, and subject indexes. Although the price has increased five-fold, compared with Volume I, it is still good value. It must have been a considerable labour of love to have produced this elaborate and complex listing of so many chemical formulae and we are deeply indebted to the authors and publisher for what will remain a standard reference in the years ahead.

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