Book Reviews

Laboratory Guide for Identification of Plant Pathogenic Bacteria, Third Edition. N. W. Schaad, J. B. Jones and W. Chun (eds). 22 × 28 cm, 373 pp. St Paul, USA: American Phytopathological Society Press [http://www.scisoc.org], 2001. US$55. ISBN 089054 263 5 (paperback).

If we compare the mere doubling of the number of pages and contributors in each successive edition of this lab manual (1980: 72 and 13; 1988: 164 and 21; 2000: 373 and 33, respectively) with the exponential progression of knowledge in bacteriological sciences over the last 20 years, it is evident that very severe criteria of selection guided the editors when they chose the information included in the book. Numerous reputed experts in diagnostic and in plant bacteriology from the most qualified laboratories compiled a guide that is now the latest source for identification methods of phytopathogenic bacteria.

Seventeen groups of bacteria are addressed in different chapters illustrating criteria and techniques for their isolation, infraspecific and infrasubspecific differentiation, classic serological and molecular diagnosis, pathogenicity tests and culture preservation. All of these aspects are accompanied with very detailed protocols complete with bibliographic references. In this third edition methods for identification and diagnosis of FLVB, Spiroplasmas and Phytoplasmas are also extensively treated. In the two chapters dealing with these organisms, details are given about their new taxonomy and their main biological and phytopathological features. All of the chapters dedicated to the different bacterial groups are organized in the same way. This allows for rapid and easy consultation, even though this third edition of the book is rather large and heavy. One can find the latest taxonomy and nomenclature as well as a useful checklist with the old names of the phytopathogenic bacteria. A good idea, which already occurred in the previous editions, is the section dedicated to the names of chemicals and their producers. This is very useful and reliable for procuring and handling all of the specific material necessary for studying each group of bacteria. Because of the wealth of conventional and innovative information offered and its handy use for consultation, this guide is an indispensable aid for anyone interested in plant bacterial diseases.

A similar guide could be useful for other fields as well. A few days ago a microbiologist friend of mine saw the volume on my desk and looked at it with great interest and a bit of envy. He exclaimed, 'Why hasn't anyone produced a similar guide for other types of bacteria, such as soil bacteria, food bacteria and so on!?'. Isn't anybody out there who could answer his plea?

Although this laboratory guide is less expensive than most scientific books, the quality is not the highest. It is a spiral-bound book and the printing is not particularly accurate. The errors in the Latin names of some species are regrettable. Fifty-five dollars is a reasonable price for a fundamental working tool of every plant pathology laboratory.

A. Zoina

Ganoderma Diseases of Perennial Crops. J. Flood, P. D. Bridge and M. Holderness (eds). 23 × 15 cm, 275 pp. Wallingford UK: CABI. [http://www.cabi.org.uk], 2000. £49·95. ISBN 085199 388 5 (hardback)

The chapters in this book are based on presentations at two workshops in 1998: one in the UK and the other in Malaysia. They are grouped into five sections dealing with the following areas: nomenclature and systematics; the occurrence and status of diseases; disease control and management; molecular variation; and the development of diagnostic tests. It is perhaps incongruous that the section on disease control and management includes a chapter by Olson and Stenlid which provides an example of functional taxonomic units in root diseases. This does not deal with *Ganoderma*, but with another basidiomycete *Heterobasidion annosum*.

In view of the title of the book, there could be some disappointment for those with an interest in hosts other than oil palm, which gets far more coverage than any other species. This emphasis no doubt reflects the economic importance of oil palm and of the constraints that *Ganoderma* diseases place on its cultivation. Two other crop species (*Acacia mangium* and coconut) each have a single chapter and there are just brief references to others, such as betelnut, tea, rubber and cocoa.

The pathogenic role of *Ganoderma* species in tropical tree species is interesting from the viewpoint of forest pathologists in the cool temperate zones, where most members of the genus are widely regarded as causing decay rather than disease. None of the authors seems to comment on the relative importance of pathogenesis versus decay, perhaps because there has been insufficient contact between workers who encounter *Ganoderma* species in these different situations. Differences between tropical and temperate species or intraspecific forms may underlie their different effects on host plants, but it is also interesting that pathogenesis in stem tissues

is perhaps most pronounced in palms, in which vascular structure may be an important factor.

Although, on balance, it was helpful to divide the book into five sections, there is inevitably some overlap, especially between the papers on systematics in Part I and the molecular taxonomy in Part IV. Indeed the molecular contributions include some which are largely of taxonomic interest (e.g. Miller, Holderness and Bridge on oil palm), while others reveal some insight into possible modes of spread of different species and genotypes within crops (e.g. Abdullah on coconut).

As with many conference proceedings, the layout of the book displays more the style of a journal, rather than the more glossy and exciting formats that can often be found in modern books. It is nevertheless adequate for its purpose, and the same can be said of the index which provides entries for most major topics but is not comprehensive. For example, there are no entries for terms such as 'chemical control' or 'spores'. The contributions are mostly easy to read, despite a number of minor errors.

As a compilation of state-of-the-art conference proceedings, this book cannot be expected to provide a balanced coverage of all topics that might interest everyone who works on *Ganoderma* species as pathogens or decay fungi. In particular, it would be good to see some further research on infection processes, which might shed some light on modes of spread within and between crops. The book does, however, bring together a wealth of information which should be very valuable to those who specialize in the pathology of tropical plantation crops, at least in oil palm.

D. Lonsdale

Stem Rust of Wheat: From Ancient Enemy to Modern Foe. Paul D. Peterson (ed.). 16 × 23·5 cm, 168 pp. St Paul, USA: American Phytopathological Society Press [http://www.scisoc.org], 2001. US$69. ISBN 089054 271 6 (hardback).

This engaging monograph describes studies on *Puccinia graminis tritici* (*Pgt*) and the epidemiology of black stem rust of wheat. Most of the text refers to events during the 20th century and mainly activity in North America. The significance of this paramount disease on the world's premier staple crop is well known and many pathologists will be familiar with various elements featured in this short, well written text. However, events are chronicled in five essays that collectively deal with historical, socio-economic, strategic and scientific aspects with this major threat to food security.

In an Introductory chapter the editor, Paul Peterson, explores concepts and shows the part played by *Pgt* in the general acceptance of the germ theory of disease in the latter half of the 19th century. This advance was mainly through the work of de Bary, but the role of earlier Europeans, e.g. Micheli, Fontana, Targioni-Tozzetti, Lindley is also described. The heteroecious nature of *Pgt* had been proved by de Bary in 1866 and confirmed by other European and also American mycologists in the following decades. Heteroecism remains a neglected area of study.

The early epidemics of wheat stem rust of the 20th century in North America and the war time necessity to produce grain led to the public support for the campaign to eradicate the alternate host *Berberis vulgaris* in the USA and Canada. C. L. Campbell and D. L. Long describe the war against barberry and the various factors that gave impetus to the eradication campaign, e.g. crop losses, the need to provide adequate food supplies for Allied troops engaged in World War I. The chapter charts other initiatives that maintained barberry removal for most of the last century and its effect on reducing the frequency and the severity of stem rust epidemics.

James Kolmer's chapter concentrates on the pioneering research on genetics of the host and parasite in Canada and the USA. Early studies leading to understanding of specialized forms (*formae specialis*), physiological specialization (races) dissected by establishing host differentials and the establishment of annual national surveys (still continued to this day) make interesting reading. These aspects and the continuing threat of epidemics led to the establishment of the 'Rust Lab' (the Dominion Rust Research Laboratory) on the campus of the Manitoba Agricultural College, Winnipeg, with a mandate to study epidemiology of disease, physiological specialization of cereal rusts and to develop rust-resistant cultivars. Among the initial team was J. H. Craigie, who inspired by A. H. R. Buller, a regular transatlantic visitor to the laboratory, was able to demonstrate that *Pgt* pycnia were indeed a functional stage of the life cycle and that the rust was heterothallic. This led to genetical studies on pathogenicity by other personnel, namely Newton and Johnson. Kolmer states that he had pleasure in reading some of the primary literature, I suspect Craigie's note (*Nature* **120**, 765–766) was one such item.

If the massive stem rust epidemic of 1916 and the concern it caused to food security at a time of war prompted the public awareness of crop disease epidemics and support for the eradication of barberry, then it was war of another kind, namely biological warfare that involved *Pgt* later in the century. The Cold War rivalry between the USA and its allies and the Soviet Union led to military-funded research on stem rust epidemiology. R. F. Line and C. S. Griffith describe briefly the Cold War and biological warfare in general, aspects of secrecy, the logistics of spore production and storage, and trials on establishing foci and spread of disease. The location of where some of this work was conducted, e.g. Fort Detrick in Maryland, Puerto Rica and the US Virgin Islands, is highlighted. Technological advance always accelerates in time of war and this particular chapter reveals how much biological information was gained by these militarily classified experiments, especially in understanding epidemiology. Perhaps some of this information is relevant to more

recent initiatives proposed by some authorities to target crop sources of narcotics!

Kurt Leonard's concluding chapter asks if stem rust is a future enemy. Although no area of the North American continent has seen a severe epidemic of stem rust since either 1955 (spring wheat in the Dakotas) or 1974 (soft red winter wheat in south-eastern USA), it seems that susceptible cultivars in trap plots suffer significant damage one year in three. Spring sown wheat suffers most and these cultivars are grown in regions with hot summers; stem rust is a hot weather disease. Leonard points out that various disease control initiatives, e.g. barberry eradication, deployment of resistant cultivars, cannot ensure against recurrence of economically important epidemics. However, he describes how effective barberry eradication has structurally reduced the population of *Pgt* in the Great Plains region to just a few asexual lineages, thereby simplifying the task of breeding for resistance.

Currently the disease is well managed and under control but the author says 'it would be premature to declare rust a nonproblem'. Changes in cultural practices, the lower priority for stem rust resistance in breeding programmes, slackening of barberry eradication programmes (delegated to individual states since 1978), variation in planting regimes and expanding plantings of forage grasses susceptible to stem rust that could provide a green bridge for urediniospore inoculum, all provide opportunities for stem rust to become troublesome again.

Norman Borlaug, in his foreword to the book, asks if 'stem rust is a vanquished enemy of the past or a menacing foe of the future?'. Furthermore, 'is the complacency that currently restricts research on this shifting enemy the result of nearly half a century without an epidemic?' Well, enough examples of this phenomenon exist, e.g. potato late blight in the USA, foot and mouth disease of cattle in the UK, and reading this interesting collection of essays will allow you to form your own opinion.

Richard Shattock