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Book review

Neergaard, P.: Seed Pathology. MacMillan, London, Basingstoke, 1977. 2 vol., XXIV + 1187 pp., numerous figures and 5 colour plates, cloth-bound with cardboard casing. Price £ 60.

Paul Neergaard is an outstanding authority in seed pathology and director of the Government Institute of Seed Pathology for Developing Countries in Copenhagen. His exhaustive textbook is the fruit of his many years of teaching activity. He demonstrates that seed pathology is a major discipline in plant pathology of great economic significance and covers much more than just seed testing for the sake of quarantine with ensuing rejection, seed treatment or acceptance of a seed sample. It is particularly useful that glossary (38 pp.), references (142 pp.) and index including hosts, diseases and vectors (167 pp.) are separately bound in Vol. 2. The text (chapters indicated in parenthesis) is divided into five main sections: I. Pathogens – diseases – hosts; II. Mechanisms of seed transmission; III. Principles of control; IV. Seed health testing methods; and V. Assessment of seed-borne inoculum. It covers the anatomy of ovules and maturing seeds susceptible to infection (12) at various stages (10), depending on environmental conditions (11); thus quite different parts of the seed can be colonized (13). A different microflora develops during storage (7). Seed-borne organisms include mainly fungi (5), but also bacteria (4), viruses (3) and nematodes (6). They may affect germination and subsequent development of seedlings as well as consumptive value by deterioration and toxicity. Mycotoxin production is rather fully treated (8). After sowing, the seed-borne organisms compete with soil organisms and are transmitted to the seedling in various proportions, determined by the kind of pathogen, its position in the seed (14), environmental conditions (15, 16) and factors inherent to the pathogen (17) and host (18). The

disease can affect various parts of the plant at various times, thus determining its compensatory growth (32). Consequently a certain seed-borne inoculum (V) can have quite different effects on the subsequent crop. Some seed-borne diseases show an explosive spread from a single focus; others have little effect but infect the plants systemically. An increase of seed infection by a certain proportion does not necessarily reduce yield reduction by that same proportion (32). In control measures (III), proper seed management (19, 20) is of greater importance than curative seed treatment (21–23).

The chapter on quarantine (24, 33 pp.) gives major proposals for improving regulations to overcome the unsatisfactory present situation. Seed testing (IV, 25–31) is dealt with on 90 pp. with the main chapters: examination of ungerminated seed (27), incubation tests (28), factors affecting the results (29), bioassays and biochemical procedures (30), and inspection of plants beyond the seedling stage (31). The possible ways of seed testing are so numerous (helpful tables are provided) that much experience is required to choose the best techniques for a particular combination of seed and pathogen, the outcome being influenced by many factors.

The book contains major surveys of organisms infecting seeds, but much further information on individual species can be found in other parts by consulting the index. I have scrutinized the section on fungi (5.3) and find it remarkably up-to-date (to 1975) with correct nomenclature (authors are cited in the index). Its purpose is not to provide means of identifying all seed-borne fungi (no keys given). Reference to special literature remains indispensable, though some guidance is given. The few photographs and drawings of fungal species do not always show the main features of the species illustrated (illustrations of Sphaeropsidales are particularly unsatisfactory), and a colour plate of *Fusarium* species is too yellow. Morphological characters are briefly mentioned and data on distribution are compiled. There are helpful synoptic plates for *Alternaria* and *Colletotrichum* species. Corrections are needed in *Phyllosticta* which has *Guignardia* perfect states, and *Mycosphaerella*, which is not connected with *Phyllosticta*. The name *Eupenicillium* should be used instead of *Carpenteles*. Although Neergaard is one of the greatest authorities in *Alternaria*, his arguments for retaining the name *A. tenuis* instead of *A. alternata* are not convincing, since, whatever the limitation, this species remains an aggregate, for which *A. alternata* is the only available name according to the Code of Nomenclature. *Phoma glumarum* is now correctly called *Ph. sorghina*. *Discella* is not an imperfect state of *Didymella*. The perfect state of *Botryodiplodia theobromae* is *Botryosphaeria rhodina*, whilst *Physalospora* is a genus of the unitunicate ascomycetes. The Corticiaceae do not belong to the Polyporales, however the latter are defined. *Rhizoctonia* has no clamp connexions, and *Fomes annosus* should be excluded from *Fomes* and is correctly called *Heterobasidion*. The term Hyphomycetes does not apply to sterile mycelia, but to the often richly sporulating Moniliales. In view of the amount of valuable information, these errors are few; the whole work testifies that utmost care was taken, and it is almost free from printing errors.

'Seed Pathology' is intended to serve a double purpose: as a textbook for use in university courses and as a source-book. However it seems more suited to the latter, being too comprehensive and expensive for students. For teaching seed pathology, a suggested selection of chapters depending on the required level (p. XXIII) will be very helpful. It is hoped that the limited distribution to single scientists, to be expected from its price, will be compensated by its presence in phytopathological libraries, where this standard work cannot be missed.

W. Gams