

Book reviews

Integrierter Landbau. Edited by R. Diercks and R. Heitefuss. Systeme umweltbewusster Pflanzenproduktion; Grundlagen, Praxiserfahrungen, Entwicklungen; Ackerbau, Gemüse, Obst, Hopfen, Grünland. Second revised and enlarged edition. 1994. 440 pp. München, BLV Verlagsgesellschaft. Hardcover price DM 78.00 (approx. US\$ 60.00)

Integrated agriculture. Systems of environmentally conscious plant production; principles, practical experiences, developments; arable crops, vegetables, fruits, hops, pastures.

Rolf Diercks and Rudolf Heitefuss, seasoned plant protectionists, edited, revised and extended a multi-authored book on integrated agriculture, composed by an international team of 28 highly competent authors (mainly German, one Swiss, two Dutch), writing in German, the language of at least 80 million people in Europe. They brought together experiences from research, extension and practice, gained mainly in Central Europe, an ecologically highly diversified area.

Integrated Agriculture comprises plant production systems adjusted to site and environment, in which all suitable methods of crop husbandry, plant nutrition and crop protection are used in optimal mutual adjustment, with due consideration of ecological and economical requirements, utilizing biological and technical improvements as well as natural control mechanisms, in order to guarantee constant yields and good financial results.

Emphasis is placed on the following points. (i) Due consideration of the natural limitations of each site. (ii) Choice of adapted varieties and need-based fertilizer application. (iii) Environmentally friendly application of new biological, chemical and mechanical crop protection technology, including biological control. (iv) Use of economic damage thresholds. (v) Models of integrated and cost-effective interfarm cooperation.

The book addresses enlightened farmers as well as vegetable, fruit and hop growers, extensionists,

teachers at agricultural colleges and university students. It offers an effective support to utilize ecological-economical progress and intends to provide stimuli for future interdisciplinary research.

The future of modern land use is called *integrierter Landbau* or 'integrated agriculture'. This approach integrates all agricultural activities taking into consideration their side effects, back coupling, and interaction in the networks of agroecosystems. The individual grower is requested to be conscious of existing problems and to take his own responsibility.

A mythic-magic undertone characteristic for much German thinking can be found in the introductory lines, emphasizing system oriented thinking and acting for the optimal exploitation of and care for the natural regulatory forces of agroecosystems. The text-book itself is, however, typically hands-on.

With so many authors, differing in views and writing styles, each contributing bits and pieces, and with relatively light editing only, the book retains a coarse freshness. This text book is comprehensive but far from complete, since it tries to address the total problem of integrated agriculture but acknowledges at the same time that the available knowledge is fragmentary.

The book contains 8, usually multi-authored, chapters of very different sizes. 1. 'Introduction' (4 pp). 2. 'Concepts and definitions' (4 pp), in which the concept *Naturhaushalt* which roughly equates to non-agricultural ecosystems. 3. Agroecosystems in conventional and integrated agriculture (13 pp). 4. 'Economic objectives and constraints of conventional and integrated agriculture' (19 pp), which states that the change to integrated agriculture may lead to extra costs in the short and extra benefits in the long run. 5. 'Principles of integration including criteria for planning and decision making for individual growers' (180 pp). This chapter forms the body of the book with much detail and practical suggestions. 6. 'Extension tasks in Integrated Agriculture' (16 pp). 7. 'Examples of subsystems on Integrated Agriculture ready for application' (159 pp), covering the famous German

experimental farm 'Lautenbach Hof', the Swiss project 'The Third Way', and Dutch prototypes of Integrated Agriculture. Examples are given of Integrated Agriculture for vegetables, apples, hops and pastures. 8. 'Perspectives' (7 pp) with suggestions for growers, extensionists and researchers. Interdisciplinary research is recommended.

The book is well documented. It contains a treasury of over 500 references, mainly German and thus unknown to the international reader using English as the vehicle of communication. Unfortunately, these references are arranged by chapter. The index of (German) terms contains some 2000 entries, a precious hoard for the linguistically sensitive reader. The book contains 135 tables and 146 illustrations (block and flow diagrams, graphs, and black-and-white photographs) and 1 box.

The book, which is more a reference book full of ideas than a handbook, addresses growers, extensionists, researchers and students of universities and vocational schools.

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Environmental Biotic Factors in Integrated Plant Disease Control. Edited by M. Mańka. 1995. 661 pp. Poznań. Price: US\$ 50.00. ISBN 83-902901-0-3

The book is a review of the proceedings from the third conference of the European Foundation for Plant Pathology. The conference was held in Poznań (Poland) in September 1994. The volume is divided into lectures by invited speakers containing 15 articles and 96 other papers. The latter include a wide range of unrelated papers on subjects which involve among others different ways of biocontrol, pesticides, induction of resistance, cultivation practices. This collection of papers describes in some articles the very latest progress in their fields in question, in other parts they are mere rehashes of earlier findings.

In the first chapter of the lectures by the invited speakers covers under the headline 'Ecology of non-pathogenic biotic factors in the plant environment', the historical background and some special examples of disease control by non pathogenic microorganisms.

It is not the most excellent chapter of the volume and realizes hardly higher expectations. I was surprised that a historical review on such a topic can be given without reference to the progress due to the term 'rhizosphere' and to the discovery of the widespread soil fungistasis. How shall I rate a chapter of non pathogenic biotic factors in the plant environment in which mycorrhizal fungi are not even mentioned?

The second chapter 'Environmental conditions affecting biological control of diseases' consists of 3 papers covering take-all decline, fusarium-wilts and biocontrol of foliar diseases. They provide a critical up to date survey of the subjects. In the next chapter 'Bioproducts for plant disease control, their production and use' are five articles covering the risks of biological control agents, facts and fantasies of commercial biofungicides, the mode of action and practical use of *Bacillus subtilis*, biocontrol of postharvest diseases, and the development and production of bioproducts. It seems to me that not all of the authors have written their paper with the necessary critical distance to their subject. In my opinion it is beyond the true reality to think beneficial bacteria could create a great chance for biocontrol of fruits. The fourth chapter 'Biotic factors inducing resistance in plants' starts with a stimulating survey of the nature and the chances of induced resistance. The two following articles are upon the role of chitinolytic enzymes and biotechnology strategies for virus resistance respectively. They contain useful informations and reflect the current state of knowledge.

The book is well presented and will be of interest to researchers working in the field of integrated disease control. A subject index would have had improved its usefulness.

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Wheat Rusts, An Atlas of Resistance Genes. By R.A. McIntosh, C.R. Wellings and R.F. Park. 1995. Kluwer Acad. Publ., Dordrecht, The Netherlands. Co-publication with CSIRO, Australia.

Stripe rust, leaf rust and stem rust have threatened wheat cultivation for centuries. Early reports on the occurrence of these pathogens in Greek and Roman literature are certainly indications of their importance in ancient agricultural practice. In addition to that, biblical notes of plant pathogens most probably

referred to rust epidemics. At the beginning of the 20th century it was recognized that rust on wheat was caused by three different rust species, and *formae speciales* of each rust were recognized. Early plant pathology predominantly dealt with the biology of these pathogens, and the rediscovery of Mendel's laws of heredity initiated enormous breeding efforts to control the rusts of wheat. Despite approximately a century of continuous research inputs, the struggle to control these pathogens continues.

The state-of-the-art is summarized in this book. It is essentially an illustrated version of the chapters on stripe, leaf and stem rust in the Catalogue of Gene Symbols for Wheat, which is edited by the first author. The book is a successful complementation of other publications referred to in the preface. In an introductory chapter the biology of pathogen and host, host-pathogen genetics, methodologies in wheat rust diseases and a co-ordinated strategy for rust control are described. The existing sets of differential cultivars for the three pathosystems used in different laboratories are depicted in clear tables. The major infection type classes for the three rusts have been standardized to the 0–4 scale. For those who are used to the 0–9 scale for stripe rust this is a disadvantage, though standardization certainly contributes to enhanced exchange of information. The value of the introductory chapter is its broad approach of the main aspects of research dealing with the three rusts. The authors' plea for maintenance of wheat research and breeding in order to ensure durable long-term crop protection requires support, since it is the only way to meet the global demand. The next three chapters are devoted to leaf, stem and stripe rust, respectively. All known resistance

genes are catalogued, and the (in)compatible responses of the majority of the genes are illustrated. The format is according to the aforementioned Catalogue of Gene Symbols for Wheat, which enables easy cross referencing. For each resistance gene its synonym, chromosome location, low infection types (which are sometimes broader than indicated), environmental variability and origin are mentioned. In addition, the pathogenic variability of rust populations is briefly described. Furthermore diverse reference stocks, such as isogenic lines, hexaploid, tetraploid and alien sources are referred to. The provided source stocks, *i.e.* cultivars which were described to carry the gene sometimes in combination with other resistance genes, for different regions enable pathologists to assemble relevant local differential sets. Each description of a resistance gene is finalized by its use in agriculture.

An overview of the high quality photographs gives one an impression of the immense genetic variation for resistance in host cultivars, for virulence in pathogen isolates, and also of the environmentally variability of these expressions. The majority of the photographs were of interactions that developed under well-controlled environmental conditions and may not reflect responses under less stable environments. Two appendices and an index of resistance genes complete the book.

The book is a good reference manual for wheat rust pathologists, breeders and students.

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