

Book reviews

Loewe, H.: Pferdezücht. 6th edn., revised by W. Hartwig and E. Bruns. Stuttgart: Ulmer 1988. 387 pp., 157 black-and-white figs., 62 tabs. Hard bound DM 78.–.

Horse breeding is being subjected to increasing economic pressure, and in Europe the smaller stables do most of the work in this area. This book is intended as a handbook for both the professional horse breeder as well as for the increasing numbers of amateurs who are becoming interested in horse breeding. It does not, as did the previous editions, cover maintenance and diseases, but concentrates on breeding in more detail, although the origin and phylogenesis of the horse and other equines are included. In addition, a detailed list of horse races with excellent figures is given, as are tips on how to critically examine a horse. The main part of the book concentrates on breeding on a population genetic basis, with details on selection, insemination, inherited defects, performance tests, creation of a line, selection of a tap-root mare and a foundation sire, and fertility and potency. The organization of the breeding industry is described. A most useful addition is the glossary of German, English, and French technical terms that includes those used in breeding, types, exterior of the horse, grassland, forage, and riding. This is a fine book to both read and consult – even for amateur equestrians.

H. F. Linskens, Nijmegen

Oka, H.I.: Origin of Cultivated Rice, Developments in Crop Science, vol. 14. 1st edn. Oxford, New York, Tokyo: Japan Scientific Societies Press and Elsevier 1988. 254 pp., 72 figs., 75 tabs. Hard bound US \$ 98.00.

Rice, the world's most important food crop, is the principal food of more than 40% of the world population. The origin and domestication of rice, *Oryza sativa*, has attracted the attention of many biologists, anthropologists, and archeologists. However, no one has devoted more time and effort to this subject than the author of the volume under review. Dr. Oka has travelled throughout Asia, Africa, Australia, and Latin America to study the wild, weedy, and cultivated forms of *Oryza* and to observe the dynamics of their evolution. He has collected numerous seed samples and assembled one of the world's finest collections of wild and weedy species of *Oryza* at the National Institute of Genetics, Misima, Japan. There, during the last three decades, he and his students have carried out systematic investigations on species relationships, crossability barriers, F_1 sterility, population dynamics, and the ecological and genetic aspects of *Oryza*.

In addition to his own studies, Dr. Oka has made liberal use of the information published by others. Detailed discussion is presented about the Asian common wild rice, considered to be the progenitor of cultivated rice. The dynamics of domestication are considered with regard to hybridization, selection, formation of weedy types, and the accumulation of genetic diversity. Recent archeological findings are cited in relation to the beginning of rice culture. The cultivars of rice are divided into three groups – indica, japonica and javanica. The author has discussed their dynamics of differentiation in light of various hypothesis. Recent information from isozyme studies shows clearly that temperate japonicas, javanicas, and many upland tropical cultivars belong to the same group. The practical aspects of crop evolutionary studies concerned with breeding philosophy

and germplasm conservation are briefly discussed, and attention is drawn to environmental conservation and the need to diversify crop germplasm.

The contents are arranged into ten chapters: (1) The genus *Oryza*, (2) The ancestors of cultivated rice, (3) Ecology and population biology of the common wild rice, (4) Genetic variations and evolutionary dynamics, (5) The dynamics of domestication, (6) The homeland of *Oryza sativa*, (7) Indica-japonica differentiation of rice cultivars, (8) Functions and genetic bases of reproductive barriers, (9) Variations in adaptability to environment, and (10) Germplasm conservation.

This book is an invaluable reference for scientists interested in rice genetics and breeding in general and crop evolution and systematics in particular.

G. S. Khush, Manila

Sakai, A.; Larcher, W.: Frost Survival of Plants. Responses and Adaptation to Freezing Stress. Ecological Studies, Vol. 62. Berlin Heidelberg New York: Springer 1987. 321 pp., 200 figs., 78 tabs. Hard bound DM 198.–.

In this book the authors provide an integral approach to plant responses to low temperature. The entire subject of the ecophysiology of freezing stress and plant adaptation from the biochemical to the ecological level is presented. The book covers our current knowledge and is based to a large extent on the research and significant contributions of these two authors to this area.

In the first chapter, the readers are introduced to the various types and occurrence of low temperatures as an environmental factor and their geographical distribution. In the next two chapters, the freezing process and injury are described followed by several chapters on the mechanism of frost survival and cold acclimation. The mechanisms of injury and resistance are discussed on the physiological and cellular levels with an emphasis on biochemical changes, especially in the plasma membrane. The phenomenon that frost resistance is a genetic trait, the expression of which is induced by environmental conditions, is approached very elegantly by describing the variation in frost resistance between plant taxa and within a population. This chapter is followed by a discussion of regional distribution of plants according to their adaptive response to low temperature and an evolutionary adaptation to low temperature. The integral approach is ended by showing the complexity of winter survival in regard to both stress factors and the plant response.

The book is a valuable source of information to researchers who are interested in understanding the basic mechanisms of plant responses and adaptation to low temperature. Also, it is an important book for researchers in the field of crop improvement towards freezing resistance either by classical breeding or by manipulation of DNA using recombination technology. In an era when emphasis is put on molecular approaches to understand basic mechanisms in biology, it is important to see the overall response as it is described in this book, in particular when applied aspects are involved. The book will also serve graduate students who are interested in stress physiology in general and in low temperature stress in particular. For this group of readers, the appendix which details common techniques and a glossary of terms used in this field may be very helpful.

Arnon Rikin, Stillwater