BOOK REVIEW

HOLM, LE ROY G., PLUCKNETT, D. L., PANCHO, J. V. and HERBERGER, J. P. (1977) —*The World's Worst Weeds: Distribution and Biology*. East-West Center, University Press of Hawaii, Honolulu, pp. xi, 609, $35.

The authors state that "this is an inventory of the principal weeds of the world's major crops, with particular emphasis on their distribution, seriousness and their known biology".

Following the Preface, the book is divided into two parts, Part I THE WEEDS and Part II THE CROPS. Part I includes 76 species of plants considered to be those responsible for the greatest losses to man on a world-wide scale. It attempts to summarize the world distribution, the known biology and the agricultural importance of each weed. For each one there is a description, a line drawing and a list of common names used in the countries where it is troublesome as well as considerable information on biology and agricultural importance. Maps are given showing generalized world-wide distribution of all the plants described and, for many of them, the major crops in which each is considered to be troublesome.

Within Part I the weeds are subdivided into two groups. Group 1 contains 18 species (or groups of closely related species) considered to be the world's most serious weeds, arranged in order of importance. Group 2 contains an additional 58 weeds that are next in importance. These are arranged in alphabetical order of botanical names because the authors could find "no meaningful way to rank them in order of importance".

Part II deals with the 16 crops that provide the greatest part of the foods and plant fibre used by man on a world-wide basis. It has maps showing the world-wide distribution of each crop. In it are discussed the major weeds of those crops in all the main areas where they are grown.

There are also two appendices, one listing useful publications on weed distribution, identification, biology and control, the other listing books and special publications on poisonous plants. The book is rounded off with a glossary, a bibliography, index to common names and a general index.

The authors make no attempt to define a "weed" in general terms. In a thoughtful and challenging preface, they point out that "weed" is a word almost without dimension in common usage. They emphasize, as many others have done, that plants may be weeds in some situations but useful or innocuous in others. They imply, but do not state explicitly, that plants become weeds when they compete with man, particularly in the production and distribution of food, fibre or industrial materials.

They emphasize the magnitude of losses inflicted by weeds in a food-short world and they question the priorities of a world that can put a man on the moon but cannot feed all its people. They suggest that this situation may have arisen because weeds have always been rather casually accepted as an inevitable nuisance whereas the knowledge needed to build and operate enormous buildings, supersonic aircraft and space vehicles has been developed comparatively recently and that we build these things, not because we really need them, but because we have the technology to do so.

Scientists come in for some harsh criticism. The authors state that many millions of dollars have been spent on research into the biology and control of a few species of weeds that are of only secondary importance for world food production. At the same time several of the world's most destructive weeds cannot be controlled in many of the crops where they are found. They ask bluntly "Have weed scientists got their priorities right?"

In dealing with losses due to weeds and in restating the obvious fact that "costs are staggering" the authors have run into the usual problem of quantifying such losses. Hard facts are difficult to find. Many estimates of losses and costs of treatment are expressed in almost meaningless terms of dollars rather than the somewhat more

meaningful percentages of crop production per unit of area and of time. Absolute monetary figures are meaningless except in the context of the value of money in the places and at the times when the estimates or measurements are made. As we all know to our cost, these values differ radically from country to country and can change rapidly with time.

Some people, scientists and laymen alike, might challenge the usefulness of a work painted on such a broad canvas. They might, with some justification, argue that knowing how a plant rates as a weed in different countries under different social conditions may be of little value, or even misleading, in deciding what to do about it in a local situation. Many will query the choice of plants selected by the authors as the "world's worst weeds".

Be that as it may, there is value in pausing to take stock of the weeds of the world and in gathering together as much information as possible about those that seem to be the most serious impediments to man's agricultural activities. If the book is read carefully, including the preface and the introduction to Part I, it can be of value to research workers, planners and co-ordinators in all fields of weed science and to decision makers involved in weed control legislation or activities. I would point out, however, that if used uncritically, without due regard to the social and economic systems involved, many of the statements given in this book could be misleading to decision makers.

In the detailed parts of the book devoted to single species (or groups of closely related species), discussion is very thorough. Many of the statements are well documented by published papers which the reader may judge for himself.

However, some of the statements, particularly on the "seriousness" or "importance" of particular weeds, appear to be highly subjective. Apropos of this, the authors state that the source of the information that came to be the backbone of the study was "centered in the countries themselves". During the course of preparation, they established a data bank containing 200,000 to 250,000 pieces of information about the weeds of the world. There is no general statement about the nature of the "pieces of information" that were included in this data bank or any indication as to whether they were weighted in any way.

To judge by some comments in the detailed treatments of individual species, a great deal of emphasis seems to have been placed on the *number* of "pieces of information" they received and the number of countries and crops from which plants were reported as weeds. A great deal of weight seems to have been given to the "rank of importance" attached to each weed by "someone knowledgeable about weeds in his own country". For those who wish to use this work it would have been more reassuring to know precisely the kinds of data entered into the computer record and the identities of the people "knowledgeable about weeds" in each country as well as the years when the information was supplied.

One cannot escape the impression that a great deal of emphasis was given to opinions of those primarily concerned with the growing of crops such as rice, sugar, cereals, cotton and pulses and very little emphasis (or none at all) to opinions of those whose primary responsibility is to maintain and increase production of foodstuffs from pasture.

This lack of information about the basis upon which decisions were made in ranking the first 18 weeds (Group 1) and in selecting those in Group 2 is most disquieting. There are many cases where local experience is completely at variance with the rankings proposed.

For example, it would be difficult to convince anyone in tropical or subtropical eastern Australia that *Paspalum conjugatum* is worthy to be rated as one of the 18 "world's worst weeds" when *Axonopus affinis* does not rate a mention, even in the discussion of *A. compressus* that is included in Group 2. Any work that rates

Amaranthus hybridus as No. 14 and *A. spinosus* as No. 15 would also be viewed here with some scepticism.

Readers of Tropical Grasslands may be astonished to note the inclusion of valuable pasture grasses such as guinea grass, para grass, paspalum and kikuyu grass amongst the world's worst weeds and the omission of such widespread and deleterious plants as bracken from the same list. So far as Australia is concerned, buffel grass, green panic, rhodes grass, setaria and siratro would almost certainly fall into the same category as the other pasture species mentioned, even they too are major pasture species and only minor weeds.

The preparation of a major work such as this takes a long time and there is often considerable delay between preparation and publication. This makes the task of updating references very difficult. Unfortunately, the preface is not dated and it is impossible for readers to judge the cut-off date for literature references.

It is disconcerting to note the omission from the special lists of publications, Appendixes A and B, of important comprehensive text-books such as W. T. Parsons' "Noxious Weeds of Victoria", published in 1973 and my own "Poisonous Plants of Australia", published in 1974. If there are similar unlisted books in other countries, such omissions are serious faults.

The real danger in this is that the book might be regarded and quoted as a comprehensive treatment of the literature up to at least 1975, whereas the real situation appears to be that the bibliographies may be four or five years out of date. A note on this point would have been most useful.

Summing up, I would say that the authors have produced a work of lasting value. Even if they may not have achieved the "90 per cent accuracy and completeness" that they claim, they have made a good beginning. They have at least gathered into one volume a wealth of information on the plants that are included. They have provided useful guidelines and some thought-provoking philosophy for planning further work on weeds in every part of the world. A good deal of the information should help to prevent the "waste of time" involved in the "repetition over and over again across the world, by both students and senior researchers" brought about by lack of knowledge of what other people have already done.

I am not convinced that the attempt to choose the 76 "world's worst weeds" and to rate the first 18 of them in order of importance is of such value but at least it provides a basis for further discussion.

I admire the courage and tenacity of the authors in preparing this book. They set themselves one of the most difficult and thankless tasks ever undertaken in the field of weed science. Within the terms of reference they set themselves, they have done very well. The book is beautifully printed and produced.

I doubt if anybody will agree with all the opinions expressed but no research worker, research establishment or decision maker in the fields of weeds and weed control can afford to ignore this book. Most of these people will derive some benefit from it, provided they recognize its limitations and do not jump to the conclusion that the inclusion of a species in this inventory of the world's worst weeds automatically makes that species a target for destruction.

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