ASSESSMENT OF PLANT DISEASE LOSSES

PREFACE

A panel discussion on the vital topic of plant disease losses was held at the thirty-fifth annual meeting of the Associate Committee on Plant Diseases of the National Research Council of Canada, at Saskatoon, Saskatchewan, on February 22, 1967. The panel was organized and chaired by W. E. Sackston at the request of the chairman of the Associate Committee on Plant Diseases, M. W. Cormack.

Minutes of the respective Associate Committees are not usually published. However the proceedings of this panel discussion were believed to be of general interest and importance. The contributors agreed to permit the publication of their contributions as originally submitted, or as transcribed from the tape recording of the discussion by the Secretary of the Associate Committee, R. D. Tinline, or after revision by the authors. The panel chairman expresses his sincere appreciation to all the participants for their contributions, and to the Secretary for his invaluable assistance.

In the interval of more than a year that has elapsed between the panel discussion and its preparation for publication, two significant events referred to by Mr. Creelman have taken place. One was the appearance of the excellent book prepared by Mr. I. L. Conners, An annotated Index of Plant Diseases in Canada, Canada Department of Agriculture Publication 1251, 1967. The other was the symposium on crop losses held in Rome in October, 1967, and the publication of the proceedings under the title "Papers presented at the FAO symposium on crop losses, Rome, 2-6 October, 1967", Food and Agriculture Organization of the United Nations, Rome, 1967. This is a major addition to the literature in this field, bringing together new data and previously published, but often inaccessible, information on a subject of great importance.

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INTRODUCTION

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The problem of assessing plant disease losses has been recognized for years in many parts of the world. Relatively little has been done about it, for various reasons. In spite of the relative gaps in our knowledge in this field, there has been extremely valuable information put forward, and there have been various symposia and review articles on the subject (2, 3, 7, 9, 10, 12).

In one such recent symposium, held in 1963 and published in Phytopathology in 1964 (1, 8, 9, 11), there were a number of very quotable statements.

Vallega and Chiarappa (11) pointed out that the problem of appraisal of plant disease losses and their effect on agricultural production is of primary importance throughout the world, for it is only through such an appraisal that rational control measures can be developed and applied. The problem of plant disease losses has received most attention in the most developed countries of the world. It is much more difficult, or even impossible, to evaluate losses in the less developed countries. These authors translate wheat loss from stem rust in Australia in one year into a loss of food to sustain 3 million people for a year: the destruction of sorghum and millets by smuts in Africa per year, as the loss of food for $5\frac{1}{2}$ million people for a year. Less dramatic, debilitating rather than destructive, diseases may cause losses equal to or greater than the obvious and dramatic diseases. With half of the world population of 3 billion humans undernourished, and with that population expected to double by 2000 A. D., we "need to make three blades of grass grow where only one now stands."

LeClerg (8) gave a number of reasons why it was important to have information on crop losses that is as accurate as possible:

> To assure the most efficient use of research effort and funds:
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> To establish the need (financial, etc.) for field activities to control certain diseases;
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> To direct extension efforts to the most important plant diseases;
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> To aid in predicting crop production;
>
> To aid industry in making decisions regarding initiation of research and development of new chemical plant protectants.

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Most of our information on disease losses is derived from estimates rather than from exact measurements. To be of value, "estimates should be based on adequate field sampling by experimental evidence as to the effect of the disease on the reduction in production." The intensity of the disease must be determined, and the relationship between intensity and loss of production must be established. Classic work along these lines has been reported by Large (4, 7) for late blight of potatoes in Britain, and by Chester (2) for leaf rust of winter wheat in the United States. Pianeering studies were made in Canada by Greaney and Goulden (5, 6) and important work is continuing at laboratories throughout the country.

It is appropriate then that we discuss the assessment of plant disease losses at these meetings. It is no accident that the first paper, by D.W. Creelman, will deal with plant disease surveys to assess disease losses. The supporting experimental evidence on the effect of disease on the reduction in crop production will be provided by a galaxy of investigators from across the Prairie Provinces, who will follow this wise man from the East.

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