

THE SMUT FUNGI

*A Guide to the Literature,
with Bibliography*

By
GEORGE WILLIAM FISCHER
Professor of Plant Pathology and
Chairman of the Department
State College of Washington

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PREFACE

This book is a guide and quick introduction to the literature on the biology and control of some 330 species of smut fungi and the diseases they cause. It represents the essential information on the subject matter contained in more than 3,000 scientific papers, bulletins, and books. The author's expectation is that his compilation will be valuable to those engaged in teaching, research, and extension work in plant pathology, mycology, agronomy, and botany.

The purpose in preparing the book is to make quickly available what is known concerning any particular smut fungus. In embarking on a research problem, the necessity of thoroughly reviewing the literature concerning what has already been published on the subject—and on related subjects—is often discouraging. Our accumulated knowledge in the field of mycology and plant pathology is scattered through literally hundreds of series of journals, periodicals, proceedings, archives, reports, bulletins, books, etc., representing many thousands of volumes and in some cases dating back more than a hundred years. The problem is how to get in touch with the literature without spending a disproportionate amount of time at the task even with the aid of such abstracting journals as the *Review of Applied Mycology*. The answer appears to lie in extensive and exhaustive bibliographic reviews. The present work is not offered as a model or example, but the author does hope that it will give subject-matter specialists in other phases of mycology and plant pathology some encouragement or inspiration to prepare similar reviews of their own fields.

The subject-matter guide subdivides, under each smut species, the published information pertinent to that species. The intent of this arrangement is to enable one to determine at a glance, at least in a general way, what has been published regarding the control, and the several phases of the biology of each species. Using the term "biology" in a broad sense, the several phases are: Culture on Artificial Media; Cytology; Heterothallism and Sex; Hybridization and Genetics; Life History, Parasitism and Factors Affecting; Longevity of Spores; Miscellaneous Records; Physiologic Specialization; Spore Germination and Factors Affecting; and Varietal Resistance and Susceptibility. It will be noticed that the references are arranged chronologically under each heading. This is done to indicate quickly the year of the first contribution as well as the author, for historical interest at least.

Naturally, the material bears witness to the fact that the smuts of our economic crops, particularly the cereals, have been the most thoroughly investigated. Most of the other species, by comparison, have been sadly neglected and indicate a fertile field for those interested in research in the biology of the smut fungi.

It is only theoretically possible for a review of this kind to be absolutely complete. The aim has been to achieve the greatest possible degree of practical completeness, except for such species as *Tilletia caries* and *Tilletia foetida*, where there have been many hundreds of publications of a popular nature which often duplicate for purely local use information published elsewhere. Also, many hundreds of references purposely have been omitted which are merely small lists, or "contributions to the flora," etc. Such publications do contribute to our knowledge of geographic distribution of the smut fungi, but since the sum of their contributions is contained in Zundel's *The Ustilaginales of the World*, a purely taxonomic treatise in which the geographic distribution of each species is given, there would be little justification for duplicating such information here.

It cannot be claimed, either, that each reference in the bibliography is fairly and completely classified in the subject-matter guide. In some instances where the author has not been able to inspect the original article and therefore has had to rely on someone else's review of it, the available information may have been incomplete, resulting in incomplete classification of the subject-matter content. Perhaps it should go without saying that a complete review of the literature on the biology and control of any one smut species should include all the references indicated for that species, irrespective of subject-matter classification. Some hundreds of species are not represented in this book. Concerning them there is either no published information about their biology and control or such information was not discovered during the author's preparation of this work. He would be grateful for having his attention called to any instance where he has not done justice to the subject-matter breakdown, relative to any reference; to reference material which has somehow been overlooked; and to textual misrepresentations and errors, of which more than a few have probably escaped detection. Such contributions and corrections will be acknowledged, accumulated, and later incorporated in a revised edition, perhaps ten years hence.

The author is indebted to many individuals and organizations for various kinds of aid given in the preparation of this book. George L. Zundel kindly gave permission to use a copy of his manuscript, *The Ustilaginales of the World*, as a guide to nomenclature, thus obviating the necessity of waiting for his contribution to appear in print. In general, the nomenclature and synonymy in the present work are

taken or adapted from Zundel's monograph. In order to make the present work as useful as possible, the author has also followed Dr. Zundel's disposition of species, even though Dr. Zundel's treatment of many species is not in agreement with the species concept held by the author. He is grateful to C. S. Holton, H. A. Rodenhiser, R. Sprague, C. G. Shaw and other colleagues for suggestions regarding organization and treatment, and to the staff of the United States Department of Agriculture Library, Washington, D. C., for their courteous and helpful attention during a period of intensive review of literature which was not elsewhere available. Likewise, the helpful suggestions of John A. Stevenson, who made available the facilities of his personal library and that of the Division of Mycology and Disease Survey, United States Bureau of Plant Industry, Beltsville, Maryland, have left me in his debt. The sympathetic attitude of the Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, United States Department of Agriculture, during the time the author was in their employ, is specifically acknowledged. He gratefully acknowledges, also, that this work was supported in part by the State College of Washington Research Fund. Finally, the author wishes to pay tribute to the invaluable assistance of several typists during the years this work has been in preparation, especially to the conscientious and highly competent efforts of the trio who suffered through the endless maze of foreign citations and technical terminology during the final preparation of the manuscript: Mrs. Roberta M. Law, Mrs. Donna I. Neumayer, and Mrs. Ava Butler.

GEORGE W. FISCHER

Pullman, Washington
December, 1950

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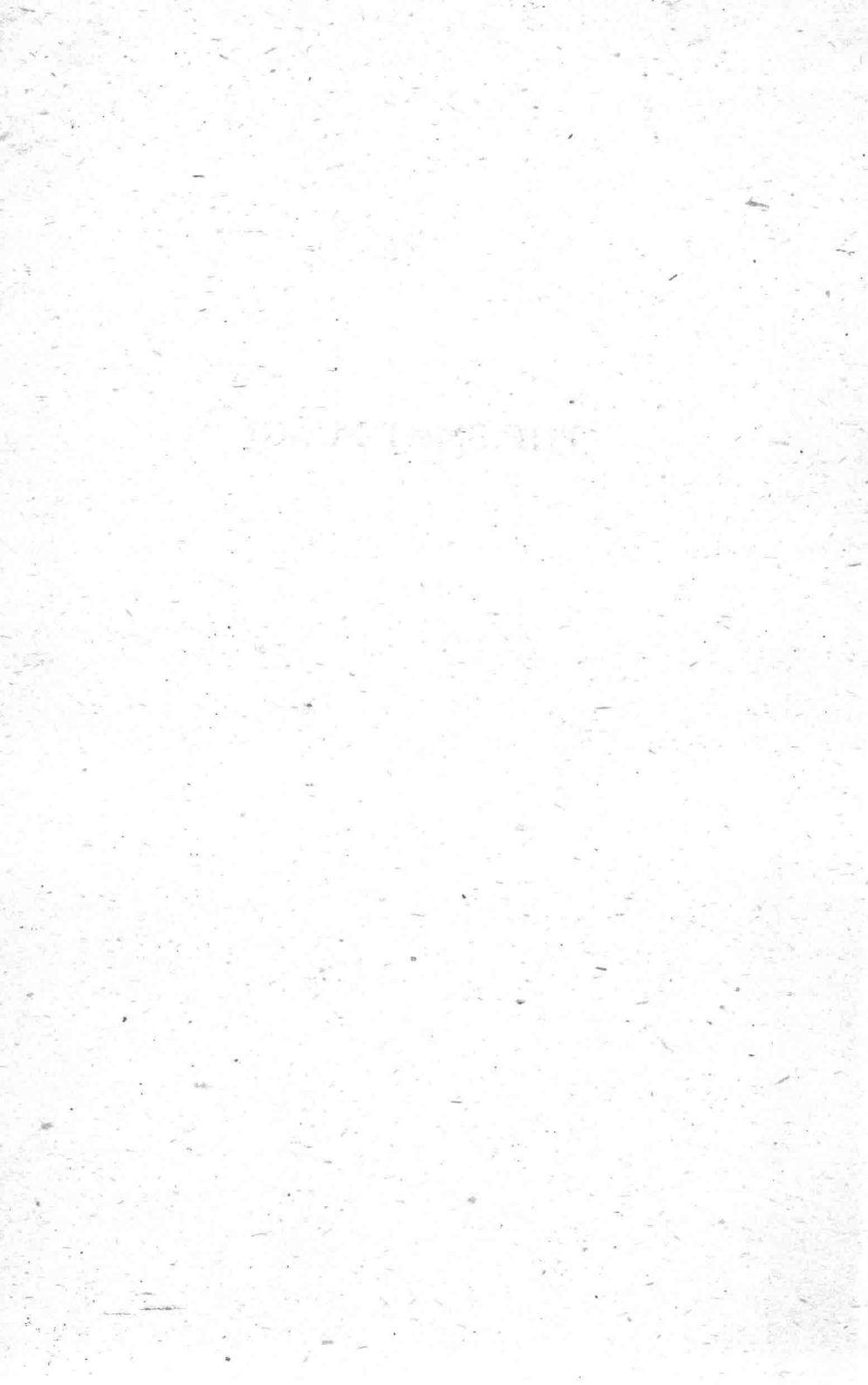
Where applicable, literature references on the biology and control of 320 species of the following genera are cited alphabetically and chronologically under the headings, Control; Culture on Artificial Media; Cytology; Heterothallism and Sex; Hybridization and Genetics; Life History, Parasitism, and Factors Affecting; Longevity of Spores; Miscellaneous Records; Physiologic Specialization; Spore Germination and Factors Affecting; and Varietal Resistance and Susceptibility.

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2971 Thirumalachar 1947

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2971 Thirumalachar 1947

BURRILLIA LIMOSELLAE (Kunze) Liro Lundska Ystava 24: 73. 1929.

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MISCELLANEOUS

Morphology 315 Brefeld 1895

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315 Brefeld 1895

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Doassansiopsis pustulata Kietel, Eng. and Prantl. 1: 22. 1897.

MISCELLANEOUS

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MISCELLANEOUS

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LIFE HISTORY, PARASITISM AND FACTORS AFFECTING

1724 Liro 1938

MISCELLANEOUS

Host range and morphology 1724 Liro 1938

Considered to be a synonym of *C. microspora* Sydow 1213 Hirschhorn 1947

* The number preceding the author's name is the citation number in the bibliography; the number following is the year of publication.

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LIFE HISTORY, PARASITISM AND FACTORS AFFECTING
3037 Trelease 1885

MISCELLANEOUS

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Longevity of spores 779 Fischer 1936

Host range 1724 Liro 1938

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1724 Liro 1938

MISCELLANEOUS

Host range 1724 Liro 1938

Considered to be synonym of *C. arenaria* Sydow 1213 Hirschhorn 1947

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Host range 1724 Liro 1938

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2416 Rawitscher 1922

HETEROTHALLISM AND SEX

2416 Rawitscher 1922 (copulation between promycelial cells)

MISCELLANEOUS

Morphology and symptoms 2655 Schellenberg 1911

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MISCELLANEOUS

Incidence on mat-sedge in Bangalore 3108 Venkatarayan 1949

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Morphology and symptoms 2655 Schellenberg 1911

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315 Brefeld 1895

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2730 Setchell 1892

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