# THE AMERICAN PHYTOPATHOLOGICAL SOCIETY

Founded 1908

**Incorporated 1915** 

### The APS Council

President, GEORGE W. BRUEHL, Washington State University, Pullman President-Elect, DURWARD F. BATEMAN, Cornell University, Ithaca, New York Immediate Past President, ROBERT AYCOCK, North Carolina State University, Raleigh Vice-President, JOHN F. SCHAFER, Washington State University, Pullman Secretary, WILEY N. GARRETT, University of Georgia, Athens Treasurer, EDGAR L. KENDRICK, Agricultural Research Service-USDA, New Orleans, Louisiana Editor-in-Chief, ROY L. MILLAR, Cornell University, Ithaca, New York

#### Councilors:

DAVID W. ROSBERG, Texas A&M University, College Station (At Large) FRANCIS A. WOOD, University of Minnesota, St. Paul (At Large) J. ARTIE BROWNING, Iowa State University, Ames (At Large) W. L. KLARMAN, University of Maryland, College Park (Potomac) BENJAMIN H. WAITE, AID/University of Florida, San Salvador (Caribbean) ARTHUR L. HOOKER, University of Illinois, Urbana (North Central) L. V. EDGINGTON, University of Guelph, Ont., Canada (Northeastern) R. JAMES COOK, Washington State University, Pullman (Pacific) CLINTON H. GRAVES, JR., Mississippi State University, State College (Southern)

### Staff:

R. J. TARLETON, Executive Vice-President; The American Phytopathological Society, 3340 Pilot Knob Road, St. Paul, Minnesota 55121.

### **DIVISIONS OF THE SOCIETY**

Caribbean: Pres. RAUL MUNOZ, Compania de Desarrollo Bananero de Guatemala, Ltd., Bandegua, Bananera, Izabel, Guatemala, C.A.; Vice-Pres. ROBERT T. MC MILLAN, JR., University of Florida, Homestead; Sec'y.-Treas. GUILLERMO E. GALVEZ-E., CIAT, Apartado Aéreo 6713, Cali, Colombia, S.A.

Northeastern: Pres. R. L. MILLAR, Cornell University, Ithaca, N.Y.; Vice-Pres. J. S. BOYLE, The Pennsylvania State University,

University Park; Sec'y.-Treas. E. BRENNAN, Rutgers University, New Brunswick, New Jersey.

North Central: Pres. JOSEPH E. HUGUELET, North Dakota State University, Fargo; Vice-Pres. A. H. ELLINGBOE, Michigan State University, E. Lansing; Sec'y.-Treas. CLARE B. KENAGA, Purdue University, Lafayette, Indiana.

Pacific: Pres. D. E. MATHRE, Montana State University, Boseman; Vice-Pres. J. A. HOFFMANN, Utah State University, Logan;

Sec'y.-Treas. M. F. STONER, Calif. State Polytechnic University, Pomona Potomac: Pres. T. H. BARKSDALE, Agricultural Research Center, Beltsville, Maryland; Vice-Pres. FRANCES M. LATTERELL, U.S. Department of Agriculture, Frederick, Maryland; Sec'y.-Treas. J. R. STAVELY, Agricultural Research Center, Beltsville. Maryland.

Southern: Pres. CARTER P. SEYMOUR, Florida Department of Agriculture and Consumer Services, Gainesville; Vice-Pres. ROBERT H. LITTRELL, University of Georgia, Tifton; Sec'y.-Treas. ROBERT W. TOLER, Texas A&M University, College Station.

### EDITORIAL AND BUSINESS STAFF

TECHNICAL EDITOR, Robert J. Minteer; BUSINESS MANAGER, R. J. Tarleton; The American Phytopathological Society, 3340 Pilot Knob Road, St. Paul, Minn. 55121.

Subscriptions: Communications should be addressed to The American Phytopathological Society, 3340 Pilot Knob Road, St. Paul, Minn. 55121. Nonmember subscription price: \$60 per year domestic, foreign postage \$4.00/yr. extra (including Canada and Mexico). Single current numbers (within 60 days of publication): \$6.00. (Price of back volumes and separate numbers on request.) Airmail rates for delivery outside of North America quoted on request. Ten-Year Index (Vol. 31-40, 1941-1950): paper cover, \$5.00. Ten-Year Index (Vol. 41-50, 1951-1960): paper cover \$5.00. Claims for copies lost in domestic mails must be received within 90 days from the date of issue, otherwise the replacement charge will be \$6.00. Deliveries overseas are not guaranteed; foreign mailings are made at the subscriber's risk. No endorsement of any statement of claims made in advertisements is assumed by this Journal or by The American Phytopathological Society. Membership in The American Phytopathological Society: Information concerning membership in The American Phytopathological Society and special publication rates for members will be supplied by the Secretary or the Business Manager.

> Published monthly at The American Phytopathological Society 3340 Pilot Knob Road, St. Paul, Minn. 55121

Second class postage paid at St. Paul, Minn. and additional mailing offices. Subscription, \$60.00 per year

# Phytopathology

### **EDITORIAL BOARD**

### Editor-in-Chief:

R. L. MILLAR, Department of Plant Pathology, Cornell University. Ithaca, NY 14853

### Senior Editors:

R. J. COOK, USDA, Washington State University, Pullman 99163

R. G. GROGAN, University of California, Davis 95616

R. M. LISTER, Purdue University, West Lafayette, IN 47907

L. SEQUEIRA, University of Wisconsin, Madison 53706

## ASSOCIATE EDITORS

R. BAKER, Colorado State University, Fort Collins

R. D. BERGER, Florida Agricultural Research and Education Center, Belle Glade

G. B. BERGESON, Purdue University, West Lafayette, Indiana

J. F. BROWN, University of New England, Armidale, N.S.W., Australia

W. R. BUSHNELL, USDA, University of Minnesota, St. Paul

D. D. DAVIS, Pennsylvania State University, University Park

G. DE ZOETEN, University of Wisconsin, Madison

J. E. DUFFUS, USDA, Salinas, California

A. H. ELLINGBOE, Michigan State University, East Lansing

D. M. GRIFFIN, Australian National University, Canberra

R. I. HAMILTON, Canada Agriculture, Vancouver

H. E. HEGGESTAD, USDA, Beltsville, Maryland

A. L. HOOKER, University of Illinois, Urbana

M. L. LACY, Michigan State University, East Lansing

F. M. LATTERELL, USDA, Frederick, Maryland

C. LEBEN, Ohio Agriculture R & D Center, Wooster L. LITTLEFIELD, North Dakota State University,

Fargo

A. H. MC CAIN, University of California, Berkeley

C. J. MIROCHA, University of Minnesota, St. Paul

S. PATIL, University of Hawaii, Honolulu

J. ROGERS, Washington State University, Pullman D. J. SAMBORSKI, Canada Agriculture, Winnipeg

H. W. SCHROEDER, USDA, College Station, Texas

R. J. SHEPHERD, University of California, Davis

J. S. SEMANCIK, University of California, Riverside

A. F. SHERF, Cornell University, Ithaca, New York A. L. SHIGO, USDA, Durham, New Hampshire

M. R. SIEGEL, University of Kentucky, Lexington

W. A. SINCLAIR, Cornell University, Ithaca, New York

D. H. SMITH, Texas A & M University, Yoakum

D. H. SPALDING, USDA, Miami, Florida

R. STACE-SMITH, Canada Agriculture, Vancouver M. STANGHELLINI, University of Arizona, Tucson

B. G. TWEEDY, Ciba-Geigy, Jamestown, North

Carolina

H. VAN ETTEN, Cornell University, Ithaca, New York J. L. VAN ETTEN, University of Nebraska, Lincoln

A. K. VIDAVER, University of Nebraska, Lincoln

B. M. ZUCKERMAN, University of Massachusetts, East Wareham

## GENERAL PUBLICATION POLICIES

At least one author must be a member of The American Phytopathological Society, except that any subscribing institution outside the United States or Canada may have published, by a staff member, one paper (in English) per volume. A letter of transmittal, signed by an official of the foreign institution, should accompany such manuscripts.

Submission of manuscripts: Submit all new manuscripts to The American Phytopathological Society, Editorial Office, 3340 Pilot Knob Road, St. Paul, Minnesota 55121. Do not submit new manuscripts to the Editor-in-Chief. Submission implies nonsubmission elsewhere and (if accepted) no publication elsewhere in the same form without consent.

Content: Contributions should fall into the following categories: 1) Original research on some aspect of plant pathology or brief accounts of techniques or phytopathological history of general importance. Subject matter is not a criterion for judging the merit of an article for publication in Phytopathology. It is, however, the author's duty to establish relevancy to the science of plant pathology. 2) Review papers developing a new concept, hypothesis, theory, or other integration of plant pathology. 3) Letters to the Editor: These may explain, amplify, or otherwise comment upon research published in the journal or elsewhere. Letters to the editor are reviewed in the same manner as regular contributions, and the Editorial Board reserves the right to reject, or to publish, letters of rebuttal when appropriate.

Page charge: A charge of \$25 per published page will apply to all manuscripts submitted by authors, except obituaries and those submitted in response to invitation by the Society.

Separates: No free copies supplied. Reprints will be available at a nominal cost; quotation will be sent with proof.. For style details, follow: Author's Guide for Manuscript Preparation, Phytopathology 66:8-10, 1976, and CBE Style Manual (third edition, 1972), available from Amer. Inst. Biol. Sci., Washington, D.C. Authors are urged to have one or more colleagues read the manuscript critically prior to submission.

Use of material from this journal: Phytopathology is copyrighted, and those who wish to borrow illustrations or data appearing in Phytopathology for use in other publications should obtain the permission of the author of the paper and of the Editor-in-Chief, and provide a line crediting Phytopathology as the source of the material.