

THE AMERICAN PHYTOPATHOLOGICAL SOCIETY

Founded 1908

Incorporated 1915

The APS Council

President, R. JAMES COOK, USDA, ARS, Washington State University, Pullman 99164
President-Elect, JOHN L. LOCKWOOD, Michigan State University, East Lansing 48824
Immediate Past President, RICHARD E. FORD, University of Illinois, Urbana 61801
Vice-President, LUIS SEQUEIRA, University of Wisconsin, Madison 53706
Secretary, CHARLES J. DELP, E. I. Dupont & Co., Wilmington, DE 19898
Treasurer, H. RONALD CAMERON, Oregon State University, Corvallis 97331
Editor-in-Chief, K. J. LEONARD, USDA, ARS, North Carolina State University, Raleigh 27650
Publications Coordinator, THOR KOMMEDAHL, University of Minnesota, St. Paul 55108

Councilors:

DONALD E. MATHRE, Montana State University, Bozeman (At Large)
ALBERT R. WEINHOLD, University of California, Berkeley (At Large)
BARRY J. JACOBSEN, University of Illinois, Urbana (At Large)
JULIA MIGNUCCI-HEPPERLY, University of Puerto Rico, Mayaguez (Caribbean)
RICHARD L. KIESLING, North Dakota State University, Fargo (North Central)
RICHARD A. ROHDE, University of Massachusetts, Amherst (Northeastern)
MAURY V. WIESE, University of Idaho, Moscow (Pacific)
LAURENCE D. MOORE, Virginia Polytechnic Institute & State University, Blacksburg, MD (Potomac)
O. W. BARNETT, Jr., Clemson University, Clemson, SC (Southern)

Staff:

R. J. TARLETON, Executive Vice-President; STEVEN C. NELSON, General Manager; The American Phytopathological Society, 3340 Pilot Knob Road, St. Paul, MN 55121

DIVISIONS OF THE SOCIETY

Caribbean: Pres. MANUEL F. JIMENEZ, BASF, San José, Costa Rica; Vice-Pres. M. C. GUILLERMO FDO. LÓPEZ-ACEVES, Universidad Autónoma Chapingo, Chapingo, Mexico; Sec.-Treas. GUILLERMO E. GÁLVEZ, CIAT/IICA, San José, Costa Rica.
Northeastern: Pres. ALAN R. GOTLEIB, University of Vermont, Hills Building, Department of Plant & Soil Science, Burlington; Vice-Pres. CARL H. BECKMAN, University of Rhode Island, Department of Plant Pathology & Ent., Kingston; Sec.-Treas. DAVID ROSENBERGER, NY State Agricultural Experiment Station, P.O. Box 727, Highland.
North Central: Pres. L. E. WILLIAMS, CARD, Department of Plant Pathology, Wooster, OH; Vice-Pres. O. P. SEHGAL, University of Missouri, Department of Plant Pathology, Columbia; Sec.-Treas. JAMES V. GROTH, University of Minnesota, St. Paul.
Pacific: Pres. JOSEPH M. OGAWA, University of California, Department of Plant Pathology, Davis; Vice-Pres. GAYLORD I. MINK, Washington State University IAREC, P.O. Box 30, Prosser; Sec.-Treas. LARRY W. MOORE, Oregon State University, Corvallis.
Potomac: Pres. STANLEY A. OSTAZESKI, USDA, Beltsville, MD; Vice-Pres. R. JAY STIPES, Virginia Polytechnic Institute and State University, Blacksburg, VA; Sec.-Treas. ROBERT W. GOTH, USDA, Beltsville, MD.
Southern: Pres. WILLIAM E. BATSON, Jr., Mississippi State University, Mississippi State; Vice-Pres. STATES McCARTER, University of Georgia, Athens; Sec.-Treas. KENNETH E. CONWAY, Oklahoma State University, Stillwater.

EDITORIAL AND BUSINESS STAFF

Publisher and Business Manager, R. J. TARLETON; Graphic Services Manager, MILES WIMER; Senior Technical Editor, VERA BAKER; Technical Editor, ROBERT J. MINTEER; Editorial Assistant, CHERYL ZOOK; Editorial Records Coordinator, JANICE SAMPSON.

Subscriptions: Communications should be addressed to The American Phytopathological Society, 3340 Pilot Knob Road, St. Paul, MN 55121. **Nonmember subscription price:** \$130.00 per year domestic, \$155.00 per year foreign (including Canada and Mexico). All prices include postage. **Single current numbers** (within 60 days of publication): \$13.00. (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, \$10.00. **Ten-Year Index** (Vol. 41-50, 1951-1960): paper cover, \$10.00. Claims for copies lost in domestic mails must be received within 90 days of the date of issue, otherwise the replacement charge will be \$13.00. Deliveries overseas are not guaranteed; foreign mailings are made at the subscriber's risk. No endorsement or 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 are available from the business office of the Society.

Published monthly at The American Phytopathological Society
3340 Pilot Knob Road, St. Paul, MN 55121
(612) 454-7250

Second class postage paid at St. Paul, MN. PUB 431540

Phytopathology

EDITORIAL BOARD

Editor-in-Chief:

K. J. LEONARD, USDA, ARS, North Carolina State University, Raleigh

Senior Editors:

R. H. LAWSON, USDA, Beltsville Agricultural Research Center, Beltsville, MD
R. G. PRATT, USDA, ARS, Mississippi State University, Mississippi State
G. E. SHANER, Purdue University, West Lafayette, IN
R. T. SHERWOOD, USDA, ARS, Pennsylvania State University, University Park

ASSOCIATE EDITORS

- | | |
|--|--|
| E. BROWN, Florida Dept. of Citrus, Lake Alfred | L. R. KRUSBERG, University of Maryland, College Park, MD |
| L. BURPEE, University of Guelph, Guelph, Ontario, Canada | E. G. KUHLMAN, USDA Forest Service, Research Triangle Park, NC |
| E. L. CIVEROLO, USDA Fruit Lab., Horticultural Science Institute, Beltsville, MD | L. C. LANE, University of Nebraska, Lincoln |
| C. CLARK, Louisiana State University, Baton Rouge | S. M. LIM, University of Illinois, Urbana |
| M. J. DAVIS, University of Florida, Fort Lauderdale | M. E. MACE, USDA, ARS National Cotton Pathology Lab., College Station, TX |
| J. A. DODDS, University of California, Riverside | D. R. MacKENZIE, Pennsylvania State University, University Park |
| R. L. DODMAN, Department of Primary Industries, Queensland, Australia | G. P. MARTELLI, Istituto di Patologia Vegetale, 70126 Bari, Italy |
| L. D. DUNKLE, Purdue University, West Lafayette, IN | G. W. PETERSON, University of Nebraska, Lincoln |
| L. V. EDGINGTON, University of Guelph, Guelph, Ont., Canada | C. P. ROMAINE, Pennsylvania State University, University Park |
| R. J. FERRISS, University of Kentucky, Lexington | N. W. SCHAAD, University of Idaho, Moscow |
| W. C. FULTON, Purdue University, West Lafayette, IN | H. A. SCOTT, University of Arkansas, Fayetteville |
| M. O. GARRAWAY, Ohio State University, Columbus | G. S. SIDHU, University of Nebraska, Lincoln |
| J. M. HALLOIN, USDA National Cotton Pathology Research Lab., College Station, TX | J. TUIITE, Purdue University, West Lafayette, IN |
| J. H. HART, Michigan State University, East Lansing | N. VAN ALFEN, Utah State University, Logan |
| M. C. HEATH, University of Toronto, Toronto, Ont., Canada | C. P. VANCE, University of Minnesota, St. Paul |
| J. P. HELGESON, University of Wisconsin, Madison | T. C. WEIDENSAUL, Ohio Agricultural Research and Development Center, Wooster |
| A. O. JACKSON, Purdue University, West Lafayette, IN | E. D. WHITNEY, U.S. Agricultural Research Station, Salinas, CA |
| N. KEEN, University of California, Riverside | R. J. WILLIAMS, Ciba-Geigy Ltd., CH-4002 Basle, Switzerland |
| A. KERR, Waite Institute, Glen Osmond, South Australia | T. D. WYLLIE, University of Missouri, Columbia |
| | E. L. ZEHR, Clemson University, Clemson, SC |

GENERAL PUBLICATION POLICIES

Manuscripts may be submitted for consideration of publication in PHYTOPATHOLOGY by members of The American Phytopathological Society and by nonmembers. Membership in the society is not a prerequisite for publication in the journal, but page charges are higher for nonmembers than for members.

Submission of manuscripts: Submit all new manuscripts to The American Phytopathological Society, Editorial Office, 3340 Pilot Knob Road, St. Paul, MN 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 other contributions, and the Editorial Board reserves the right to reject or to publish letters of rebuttal when appropriate. If possible, the opportunity will be provided for a letter of rebuttal to appear in the same issue as the letter to which it is directed.

Page charges: Because of the high cost of publishing articles in PHYTOPATHOLOGY, payment of page charges is mandatory. Page charges are subject to change and will not be finalized until an author receives galley proofs. Current charges are \$80 per printed page for members of the Society and \$150 per printed page for nonmembers. An author will be billed after the article is printed in the journal. **A letter confirming that the author or the author's institution, company, or research sponsor will honor the page charges must accompany each manuscript submitted.**

Separates: No free copies supplied. Reprints will be available at a nominal cost; an estimate will be sent with proof. Orders for reprints must be received within the year after publication of an article.

For style details, follow: Author's Guide for Manuscript Preparation, PHYTOPATHOLOGY 74:5-7, 1984. 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 use illustrations or data appearing in PHYTOPATHOLOGY in other publications should obtain the permission from The American Phytopathological Society and the author of the paper and provide a line crediting PHYTOPATHOLOGY as the source of the material.

Authorization to photocopy copyrighted material for internal or personal use, or the internal or personal use of specific clients, is granted by The American Phytopathological Society for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$3.00 per copy of an article is paid directly to CCC, 21 Congress St., Salem, MA 01970. 0031-949X/84 \$3.00 + .00