

THE AMERICAN PHYTOPATHOLOGICAL SOCIETY

Founded 1908

Incorporated 1915

The APS Council

President, LUIS SEQUEIRA, University of Wisconsin, Madison 53706
President-Elect, ANNE K. VIDAVER, University of Nebraska, Lincoln 68583
Immediate Past President, JOHN L. LOCKWOOD, Michigan State University, East Lansing 48824
Vice-President, ALBERT WEINHOLD, University of California, Berkeley, CA 94720
Secretary, CHARLES J. DELP, E. I. Dupont & Co., Wilmington, DE 19898
Treasurer, H. RONALD CAMERON, Oregon State University, Corvallis 97331
Editor-in-Chief, APS Press, GEORGE N. AGRIOS, University of Massachusetts, Amherst 01003
Editor-in-Chief, PHYTOPATHOLOGY: G. E. SHANER, Purdue University, West Lafayette, IN 47907
Editor-in-Chief, PLANT DISEASE: C. WENDELL HORNE, Texas A&M University, College Station 77843

Councilors:

BARRY J. JACOBSEN, University of Illinois, Urbana 61801 (At Large)
DONALD C. RAMSDELL, Michigan State University, East Lansing 48824 (At Large)
DOUGLAS P. MAXWELL, University of Wisconsin, Madison 53706 (At Large)
RODRIGO RODRIGUEZ-KABANA, Auburn University, AL 36830 (Caribbean)
RANDALL C. ROWE, Ohio State University, Wooster 44691 (North Central)
DAVID R. HOUSTON, USDA Forest Service, Hamden, CT 06514 (Northeastern)
MAURY V. WIESE, University of Idaho, Moscow 83843 (Pacific)
LAURENCE D. MOORE, Virginia Polytechnic Institute & State University, Blacksburg 24060 (Potomac)
O. W. BARNETT, Jr., Clemson University, Clemson, SC 29631 (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: President, CHARLES L. NIBLETT, University of Florida, Gainesville; Vice-President, JOSÉ MANUEL DÍAZ, ICTA, Guatemala, Guatemala; Secretary-Treasurer, GUILLERMO E. GÁLVEZ, CIAT/IICA, San José, Costa Rica
North Central: President, STANLEY JENSEN, University of Nebraska, Lincoln 68503; Vice-President, CHARLES R. CURTIS, Ohio State University, Columbus, OH 43210; Secretary-Treasurer, MEL LACY, Michigan State University, East Lansing 48823
Northeastern: President, DAVID A. ROSENBERGER, New York State Agricultural Experiment Station, Highland 12528; Vice-President, WILLIAM E. MacHARDY, University of New Hampshire, Durham 03824; Secretary-Treasurer, GARY C. BERGSTROM, Cornell University, Ithaca, NY
Pacific: President, MERRITT R. NELSON, University of Arizona, Tucson 85720; Vice-President, ALBERT O. PAULUS, University of California, Riverside 92521; Secretary-Treasurer, GARY A. CHASTAGNER, WWREC/Washington State University, Puyallup 98371
Potomac: President, ROBERT W. GOTH, USDA, Beltsville, MD 20705; Vice-President, TOM VAN DER ZWET, USDA, Kearneysville, WV 25430; Secretary-Treasurer, ROBERT B. CARROLL, University of Delaware, Newark 19717
Southern: President, STATES McCARTER, University of Georgia, Athens 30602; Vice-President, DONALD L. HOPKINS, University of Florida, Leesburg 32748; Secretary-Treasurer, KENNETH E. CONWAY, Oklahoma State University, Stillwater 74074

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 JOHNSON; 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:** \$150.00 per year domestic, \$175.00 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.** 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 subscribers'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:

G. E. SHANER, Purdue University, West Lafayette, IN 47907

Senior Editors:

O. W. BARNETT, Clemson University, Clemson, SC 29631
D. M. BENSON, North Carolina State University, Raleigh 27695
S. M. LIM, University of Illinois, Urbana 61801
N. K. VAN ALFEN, Utah State University, Logan 84322

Associate Editors

W. W. BOCKUS, Kansas State University, Manhattan 66506
C. R. BRONSON, Iowa State University, Ames 50010
L. BURPEE, University of Guelph, Guelph, Ontario, Canada
S. M. COAKLEY, National Center for Atmospheric Research, Boulder, CO 80307
Y. COHEN, Bar-Ilan University, Ramat-Gan, Israel
D. COPLIN, OARDC, Wooster, OH 44691
M. J. DAVIS, University of Florida, Fort Lauderdale 33314
R. J. FERRISS, University of Kentucky, Lexington 40406
B. FORTNUM, Clemson University, Florence, SC 29503
M. O. GARRAWAY, Ohio State University, Columbus 43210
S. A. GHABRIAL, University of Kentucky, Lexington 40546
F. HAMMERSCHLAG, Tissue Culture and Molecular Genetics Laboratory, Beltsville, MD 20705
R. E. HAMMERSCHMIDT, Michigan State University, East Lansing 48824
P. J. HANCHEY, Colorado State University, Fort Collins 80523
E. M. HANSEN, Oregon State University, Corvallis 97331
A. O. JACKSON, Purdue University, West Lafayette, IN 47907
M. J. JEGER, Texas A&M University, College Station 77843

F. F. JEWELL, Sr., Louisiana Tech University, Ruston 71272
J. A. LAURENCE, Boyce Thompson Institute, Ithaca, NY 14853
S. LEATH, North Carolina State University, Raleigh 27695
M. E. MACE, USDA, ARS National Cotton Pathology Laboratory, College Station, TX 77841
M. A. MARCHETTI, Texas A&M University Agricultural Research and Extension Center, Beaumont 77706
G. P. MARTELLI, Istituto di Patologia Vegetale, 70126 Bari, Italy
H. A. SCOTT, University of Arkansas, Fayetteville 72701
R. C. SEEM, New York State Agricultural Experiment Station, Geneva 14456
S. A. SLACK, University of Wisconsin, Madison 53706
T. SUTTON, North Carolina State University, Raleigh 27695
S. V. THOMSON, Utah State University, Logan 84322
E. D. WHITNEY, U.S. Agricultural Research Station, Salinas, CA 93915
R. J. WILLIAMS, Ciba-Geigy Ltd., CH-4002 Basle, Switzerland
C. L. WILSON, Appalachian Fruit Res. Stn., Kearneysville, WV 25430
D. M. WILSON, Georgia Coastal Plain Research Station, Tifton 31794
C. E. WINDELS, University of Minnesota, Crookston 56716
K. S. YODER, VPI, Winchester, VA 22601

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. Authors who submit manuscripts satisfactorily prepared for OCR-electronic processing will receive a decrease of \$20 per printed page. 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 76:4-6, 1986. 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/86 \$3.00 + .00