

# Phytopathology

An International Journal of the American Phytopathological Society

---

## EDITOR-IN-CHIEF

---

**Dennis C. Gross**

Washington State University, Plant Pathology Department, Pullman, WA 99164-6430  
Telephone: 509/335-1187 • Fax 509/335-9581 • E-mail: gross@wsunix.wsu.edu

---

## SENIOR EDITORS

---

### Biochemistry and Cell Biology

Margaret E. Daub  
North Carolina State University  
Department of Plant Pathology  
Box 7616  
Raleigh, NC 27695-7616  
Telephone: (919) 515-6986  
Fax: (919) 515-7716  
E-mail: margaret\_daub@ncsu.edu

### Plant Virology

Bryce W. Falk  
Department of Plant Pathology  
University of California  
Davis, CA 95616  
Telephone: (916)752-0302  
Fax: (916)752-5674  
E-mail: bwfalk@ucdavis.edu

### Epidemiology

Kenneth B. Johnson  
Oregon State University  
Cordley Hall 2082  
Department of Botany and Plant Pathology  
Corvallis, OR 97331-2902  
Telephone: (503) 737-5249  
Fax: (503)-737-3573  
E-mail: johnsonk@bcc.orst.edu

### Nematology

Ann E. MacGuidwin  
University of Wisconsin  
Department of Plant Pathology  
1630 Linden Drive  
Madison, WI 53706-1598  
Telephone: (608) 263-6131  
Fax: (608) 263-2626  
E-mail: aem@plantpath.wisc.edu

### Biological Control

Timothy Paulitz  
Department of Plant Science  
Macdonald Campus of McGill University  
21,111 Lakeshore Road  
Ste. Anne de Bellevue, QUE  
CANADA H9X 3V9  
Telephone: (514) 398-7851, ext. 7855  
Fax: (514) 398-7897  
E-mail: paulitz@nrs.mcgill.ca

### Phylobacteriology

Timothy Denny  
University of Georgia  
Plant Sciences Building  
Department of Plant Pathology  
Athens, GA 30602-7274  
Telephone: (706) 542-1282  
Fax: (706) 542-1262  
E-mail: tdenny@uga.cc.uga.edu

### Plant Virology

Said Ghabrial  
University of Kentucky  
Department of Plant Pathology  
Lexington, KY 40546-0091  
Telephone: (606) 257-5969  
Fax: (606) 323-1961  
E-mail: saghab00@ukcc.uky.edu

### Genetics and Resistance

James Kolmer  
Agriculture Canada  
Research Station  
195 Dafoe Road  
Winnipeg, MB  
CANADA R3T 2M9  
Telephone: (204) 983-0771  
Fax: (204) 983-4604  
E-mail: jkolmer@em.agr.ca

### Molecular and Population

**Genetics of Fungi**  
Bruce McDonald  
Texas A&M University  
Department of Plant Pathology &  
Microbiology  
College Station, TX 77843-2132  
Telephone: (409) 845-7311  
Fax: (409) 845-6483  
E-mail: b-mcdonald@tamu.edu

### Soilborne Fungi

L. W. Timmer  
University of Florida  
IFAS CREC  
700 Experiment Station Road  
Lake Alfred, FL 33850  
Telephone: (941) 956-1151  
Fax: (941) 956-4631  
Bitnet: lwt@IFASGNV  
Internet: lwt@gnv.ifas.ufl.edu

---

## ASSOCIATE EDITORS

---

Anne M. Alvarez, *University of Hawaii*  
Anne J. Anderson, *Utah State University*  
Philip H. Berger, *University of Idaho*  
Robert L. Bowden, *Kansas State University*  
Gil Choi, *Human Genome Sciences, Rockville, MD*  
Ralph A. Dean, *Clemson University*  
André Drenth, *CRCTPP, University of Queensland*  
James A. Duthie, *Oklahoma State University*  
James T. English, *University of Missouri*  
Robert L. Gilbertson, *University of California, Davis*  
Frederick E. Gildow, *Pennsylvania State University*  
Stephen B. Goodwin, *Purdue University*  
Bradley I. Hillman, *Rutgers University*  
Scot H. Hulbert, *Kansas State University*  
Linda L. Kinkel, *University of Minnesota*  
H. Corby Kistler, *University of Florida*  
Wolfram D. Köller, *Cornell University*  
Craig M. Liddell, *New Mexico State University*  
Rosemary Loria, *Cornell University*  
Marco A. Marchetti, *USDA/ARS, Beaumont, TX*  
Frank N. Martin, *USDA, ARS, Salinas, CA*  
Ulrich K. Melcher, *Oklahoma State University*  
Rebecca J. Nelson, *Centro Internacional de la Papa, Lima, Peru*  
G. B. Ouellette, *Centr. de Res. For. des Laur.*  
Bonnie H. Ownley, *University of Tennessee*  
Randy C. Poetz, *IFAS, University of Florida, Homestead*  
Jack B. Rasmussen, *North Dakota State University*  
Katherine L. Reynolds, *University of Georgia*  
Jean B. Ristaino, *North Carolina State University*  
Erich Seemüller, *Biologische Bundesanstalt, Dossenheim*  
Barbara B. Shew, *North Carolina State University*  
Krishna V. Subbarao, *University of California, Davis*  
David M. Weller, *USDA/ARS, Washington State University*

---

## EDITORIAL AND BUSINESS STAFF

---

**Publisher and Business Manager:** Steven C. Nelson  
**Director of Publications:** Miles Wimer  
**Production Manager:** Steve Kronmiller  
**Production Coordinator:** Patti Ek  
**Editorial Supervisor:** Jean Rice  
**Technical Editors:** Jordana Anker  
Susan Figueroa  
Paul Hintz  
Diana Roeder  
**Journals Assistant:** Ina Pfefer  
**Circulation Coordinator:** Janice Sampson



## 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 one copy of the manuscript with original figures to the appropriate senior editor (see Editorial Board) and two copies with figures to The American Phytopathological Society Editorial Office, 3340 Pilot Knob Road, St. Paul, MN 55121-2097. (A copy of the cover letter to the Senior Editor should accompany the copies mailed to the Editorial Office.) Submit Letters to the Editor, Obituaries, and Mini-Reviews 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. Subject matter is not a criterion for judging an article for publication in PHYTOPATHOLOGY. It is, however, the author's duty to establish relevancy to the science of plant pathology. 2) Obituaries. 3) Letters to the Editor: These may explain, amplify, or otherwise comment on research published in the journal or elsewhere. Letters to the Editor are reviewed in the same manner as other contributions; the Editorial Board reserves the right to reject or 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. 4) Mini-Reviews: These will focus on current literature and work on a specific area of research.

Authors are encouraged to include with *revised* manuscripts an illustration or illustrations (photographs, drawings, or diagrams) from an article or related to an article that they would like to have considered for the cover. Such figures should be labeled.

The emphasis in PHYTOPATHOLOGY is on research that advances understanding of the nature of plant diseases, their spread, the losses they cause, and measures that can be used to control them. Acceptance depends on the originality of the work, soundness of organization of the manuscript, reliability of the methods in terms of their adequacy to support conclusions, clarity of presentation, validity of the reasoning in deriving the conclusions, and the possibility of alternative interpretations. Authors should display an awareness of previously published information on the same subject and relate their findings to it. Appropriate statistical analyses should be included. In general, an article in which the conclusions are based on unrepeatable experiments is unacceptable.

**Page charges:** Because of the high cost of publishing articles in PHYTOPATHOLOGY, payment of page charges is mandatory. Page charges are subject to change without notice. Current charges are \$80 per printed page for members of The American Phytopathological Society and \$130 per printed page for nonmembers, plus \$15 per halftone or composite illustration. Cost of color: one page of color containing one figure, \$1,300; each additional page of color containing one figure each, \$600; each additional figure on any one page, \$200. Manuscripts not submitted for final processing on computer diskette are subject to a \$50 per article surcharge to cover the costs of copy input. The author is billed after the article is printed in the journal.

**Separates:** No free copies are supplied. Reprints are available to authors at a nominal cost; an order form will be provided and must be returned with the proof.

**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 of 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 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 a base fee of \$3.00 per copy of an article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923; tel.: 508/750-8400. 0031-949X/94 \$3.00 + .00.

## Subscriptions

Communications should be addressed to The American Phytopathological Society, 3340 Pilot Knob Road, St. Paul, MN 55121-2097. **Nonmember subscription price:** \$270 per year domestic, \$320 elsewhere. Canadian subscribers, please add 7% GST to the elsewhere price. (Canadian GST #R 12988129.) Subscription price includes expedited mailing. All payments must be made in U.S. funds, through a member bank of the U.S. Federal Reserve System. **Single current issues** (within 60 days of publication) \$30. (Prices of other single issues on request).

## Journals On-Line

The American Phytopathological Society provides up-to-date information on-line about articles published in its three journals, *Molecular Plant-Microbe Interactions*, *Plant Disease*, and *Phytopathology*. On-line access is via APSnet, an Internet server located on the World Wide Web at URL address <http://www.scisoc.org/>. Current offerings include tables of contents of recent issues, abstracts of articles, and listings of recently accepted but not yet published manuscripts. In 1996, on-line publication of the *Plant Disease* section "Disease Notes" constitutes first publication, with notes subsequently printed in the paper journal. Future plans call for publication of full-text research articles on-line as well.

## Advertisements

No endorsement or any statement of claims made in advertisements is assumed by this journal or The American Phytopathological Society.

## Membership in APS

Information concerning membership in The American Phytopathological Society and special publication rates for members is available from the membership services of the Society.

**Articles on Demand.** Beginning with the January 1996 issues of APS journals, each item will contain a publication number (e.g., P-1996-1201-01R), found in the bottom left corner of the first page, used to identify items that can be purchased for a fee on demand by interested readers. To order call 1-800-328-7560.

**PHYTOPATHOLOGY (ISSN 0331-949X)** is published monthly at The American Phytopathological Society, 3340 Pilot Knob Road, St. Paul, MN 55121-2097 (612/454-7250). Periodicals postage paid at St. Paul, MN, and at additional offices. USPS 431-540. Canadian IPM# 0969184.

**POSTMASTER: Send address changes to Phytopathology, 3340 Pilot Knob Road, St. Paul, MN 55121-2097.**

PHYTAJ: 86 (10):1005-1148

PHYTOPATHOLOGY for September (897-1004) was issued 29 August 1996.