

An international journal devoted to basic research into how plants function, ranging from the molecular to the cellular to the whole plant levels, and including the interactions of plants with their biotic and abiotic environments.

### Editor-in-Chief

**Donald R. Ort**

USDA/ARS Urbana, IL, USA

### Associate Editors

**Bonnie Bartel** Houston, TX, USA

**Alan M. Jones** Chapel Hill, NC, USA

**Richard M. Amasino** Madison, WI, USA

**Julia Bailey-Serres** Riverside, CA, USA

**C. Robin Buell** East Lansing, MI, USA

**Sheila McCormick** Berkeley, CA, USA

**Andreas P.M. Weber** Düsseldorf, Germany

**Susanne von Caemmerer** Canberra City, ACT, Australia

**Corné M.J. Pieterse** Utrecht, The Netherlands

**Jiming Jiang** Madison, WI, USA

### Research Area and Sections

Signal Transduction and Hormone Action

Cell Biology

Development and Hormone Action

Environmental Stress and Adaptation to Stress

Bioinformatics, Breakthrough Technologies, and Genome Analysis

Systems Biology, Molecular Biology, and Gene Regulation

Genetics, Genomics, and Molecular Evolution

Biochemical Processes and Macromolecular Structures

Plants Interacting with Other Organisms

Bioenergetics and Photosynthesis

Whole Plant and Ecophysiology

### International Board of Monitoring Editors

**Lisa Ainsworth**

Urbana-Champaign, IL, USA

**Antony Bacic**

Parkville, VIC, Australia

**Neil R. Baker**

Essex, UK

**Malcolm J. Bennett**

Nottingham, UK

**Daniel R. Bush**

Fort Collins, CO, USA

**Joe Chappell**

Lexington, KY, USA

**Alice Y. Cheung**

Amherst, MA, USA

**Tzzy-Jen Chiou**

Taipei, Taiwan

**Vitaly Citovsky**

Stony Brook, NY, USA

**Hervé Cochard**

Clermont-Ferrand, France

**Allison DeLong**

Providence, RI, USA

**Karl-Josef Dietz**

Bielefeld, Germany

**Jeffrey J. Doyle**

Ithaca, NY, USA

**Robert Edwards**

Durham, UK

**John R. Evans**

Canberra, ACT, Australia

**Jennifer Fletcher**

Albany, CA, USA

**Peter Geigenberger**

Munich, Germany

**Thomas Girke**

Riverside, CA, USA

**Zhizhong Gong**

Beijing, China

**Stacey Harmer**

Davis, CA, USA

**Martha C. Hawes**

Tucson, AZ, USA

**Luis R. Herrera-Estrella**

Irapuato, Mexico

**Gregg A. Howe**

East Lansing, MI, USA

**Georg Jander**

Ithaca, NY, USA

**Elizabeth Kellogg**

St. Louis, MO, USA

**Anthony Kinney**

Wilmington, DE, USA

**Leon Kochian**

Ithaca, NY, USA

**Joachim Kopka**

Golm, Germany

**Amane Makino**

Sendai, Japan

**Susan Martino-Catt**

St. Louis, MO, USA

**Maureen McCann**

West Lafayette, IN, USA

**Scott D. Michaels**

Bloomington, IN, USA

**Ron Mittler**

Denton, TX, USA

**Ferenc Nagy**

Szeged, Hungary

**Graham Noctor**

Paris, France

**Ralph Panstruga**

Cologne, Germany

**Marinus Pilon**

Fort Collins, CO, USA

**Anireddy S.N. Reddy**

Fort Collins, CO, USA

**Silke Robatzek**

Norwich, UK

**Jocelyn K.C. Rose**

Ithaca, NY, USA

**Wataru Sakamoto**

Kurashiki, Japan

**David E. Salt**

West Lafayette, IN, USA

**Ron R. Sederoff**

Raleigh, NC, USA

**Motoaki Seki**

Yokohama, Japan

**Leslie E. Sieburth**

Salt Lake City, UT, USA

**Neelima Sinha**

Davis, CA, USA

**Nathan M. Springer**

St. Paul, MN, USA

**Dina A. St. Clair**

Davis, CA, USA

**Julie M. Stone**

Lincoln, NE, USA

**Lloyd W. Sumner**

Ardmore, OK, USA

**Dan Szymanski**

West Lafayette, IN, USA

**Keiko U. Torii**

Seattle, WA, USA

**Yi-Fang Tsay**

Taipei, Taiwan

**Carroll P. Vance**

St. Paul, MN, USA

**Guo-Liang Wang**

Columbus, OH, USA

**Astrid Wingler**

London, UK

**Eleanore T. Wurtzel**

Bronx, NY, USA

**Hong-Wei Xue**

Shanghai, China

**Shaul Yalovsky**

Tel Aviv, Israel

**Jürgen Zeier**

Düsseldorf, Germany

### Publisher

American Society of Plant Biologists,

Crispin Taylor, Executive Director; ctaylor@aspb.org

### Publications Director

Nancy A. Winchester; nancyw@aspb.org

### Managing Editor

John Long; jlong@aspb.org

### Science Writer

Peter V. Minorsky; peminorsky@aspb.org

### Production Manager

Jon Munn; jmunn@aspb.org

### Manuscript Manager

Leslie Ash Csikos; lcsikos@aspb.org



*Plant Physiology*® (ISSN 0032-0889, online 1532-2548) is published monthly, in three volumes per year, by the American Society of Plant Biologists, 15501 Monona Drive, Rockville, MD 20855-2768, USA, and is produced by Dartmouth Journal Services, Waterbury, VT. The institutional price for the print and online versions is based on type of institution; contact institution@aspb.org. A subscription includes both *The Plant Cell* and *Plant Physiology*®; single copies may be purchased for \$95 each plus shipping. Members of the American Society of Plant Biologists receive free online access to the journal and may subscribe to the print version of *Plant Physiology*® for \$210. Nonmember individuals may subscribe for \$400. For matters regarding subscriptions, contact Suzanne Cholwek, 15501 Monona Drive, Rockville, MD 20855-2768; telephone 301-296-0926; fax 301-251-6740; e-mail scholwek@aspb.org. Notify ASPB within 3 months (domestic) or 6 months (foreign) of issue date, and defective copies or copies lost in the mail will be replaced. Send all inquiries regarding display advertising to: FASEB AdNet, 9650 Rockville Pike, Bethesda, MD 20814-3998; telephone 301-634-7791; fax 301-634-7153; e-mail adnet@faseb.org. Periodicals postage paid at Rockville, MD 20850, and at additional mailing offices. **Postmaster:** Send address changes to *Plant Physiology*®, American Society of Plant Biologists, 15501 Monona Drive, Rockville, MD 20855-2768. The online version of *Plant Physiology*® is available at www.plantphysiol.org. **Permission to Reprint:** Permission to make digital or hard copies of part or all of a work published in *Plant Physiology*® is granted without fee for personal or classroom use provided that copies are not made or distributed for profit or commercial advantage and that copies bear the full citation and the following notice on the first page: "Copyright American Society of Plant Biologists." For all other kinds of copying, request permission in writing from Nancy A. Winchester, Publications Director, ASPB headquarters.

© 2011 American Society of Plant Biologists. All rights reserved. Printed on acid-free paper. Printed in the USA.