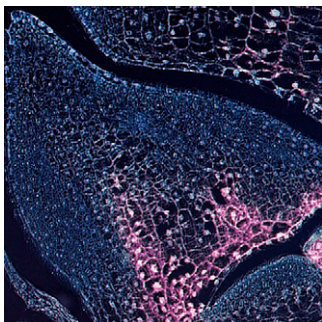


T H E  
**PLANT**  
C E L L

Volume 22 Number 7 July 2010

The electronic form of this issue, available at [www.plantcell.org](http://www.plantcell.org), is the journal of record.

**ON THE COVER**



Several monocot species develop unifacial leaves, in which leaf blades have only abaxial identity. Bifacial leaves require adaxial-abaxial polarity for leaf blade flattening, whereas many unifacial leaves become flattened despite their leaf blades being abaxialized. Yamaguchi et al. (pages 2141–2155) identify a *DROOPING LEAF* (*DL*) gene ortholog as a candidate responsible for leaf blade flattening in unifacial leaves of *Juncus prismatocarpus*. They suggest that *DL* promotes leaf cell proliferation along the median plane in monocots and that such *DL* function leads to leaf blade flattening in unifacial leaves, whereas it leads to leaf midrib formation in bifacial leaves. The cover image shows in situ localization of the *DL* transcripts (the pink color) in a longitudinal section of *J. prismatocarpus* shoot apex.

**IN BRIEF**

- YABBY* Genes and the Development and Origin of Seed Plant Leaves** 2103  
Nancy A. Eckardt
- The Podostemad Puzzle: The Evolution of Unusual Morphology in the Podostemaceae** 2104  
Nancy A. Eckardt and David Baum

**PERSPECTIVE**

- Heterosis** 2105  
James A. Birchler, Hong Yao, Sivanandan Chudalayandi, Daniel Vaiman, and Reiner A. Veitia

**RESEARCH ARTICLES**

- Differentiating *Arabidopsis* Shoots from Leaves by Combined *YABBY* Activities** [W](#)[O](#)[A](#) 2113  
Rajani Sarojam, Pia G. Sappl, Alexander Goldshmidt, Idan Efroni, Sandra K. Floyd, Yuval Eshed, and John L. Bowman
- Expression of *SHOOT MERISTEMLESS*, *WUSCHEL*, and *ASYMMETRIC LEAVES1* Homologs in the Shoots of Podostemaceae: Implications for the Evolution of Novel Shoot Organogenesis** [W](#) 2131  
Natsu Katayama, Satoshi Koi, and Masahiro Kato
- Genetic Framework for Flattened Leaf Blade Formation in Unifacial Leaves of *Juncus prismatocarpus*** [C](#)[W](#)[O](#)[A](#) 2141  
Takahiro Yamaguchi, Satoshi Yano, and Hirokazu Tsukaya
- Orchestration of the Floral Transition and Floral Development in *Arabidopsis* by the Bifunctional Transcription Factor *APETALA2*** [W](#)[O](#)[A](#) 2156  
Levi Yant, Johannes Mathieu, Thanh Theresa Dinh, Felix Ott, Christa Lanz, Heike Wollmann, Xuemei Chen, and Markus Schmid
- Environmental Regulation of Lateral Root Emergence in *Medicago truncatula* Requires the HD-Zip I Transcription Factor *HB1*** [W](#) 2171  
Federico Ariel, Anouck Diet, Marion Verdenaud, Véronique Gruber, Florian Frugier, Raquel Chan, and Martin Crespi
- Natural Variation of Transcriptional Auxin Response Networks in *Arabidopsis thaliana*** [C](#)[W](#)[O](#)[A](#) 2184  
Carolin Delker, Yvonne Pöschl, Anja Raschke, Kristian Ullrich, Stefan Ettingshausen, Valeska Hauptmann, Ivo Grosse, and Marcel Quint

## EDITORIAL BOARD

### Editor in Chief

Cathie Martin

### Coeditors

Sarah M. Assmann

Jody Banks

Alice Barkan

Kathy Barton

David Baum

Sebastian Bednarek

James Birchler

Ulla Bonas

Christopher Bowler

Judy Callis

XiaoFeng Cao

Nigel Crawford

Vincenzo De Luca

Xing Wang Deng

Xinnian Dong

Allan Downie

Alisdair Fernie

Pascal Genschik

Jean T. Greenberg

Thomas Guilfoyle

David Jackson

Martin Kater

Patricia Leon

Clive Lloyd

William Lucas

Blake Meyers

Ortrun Mittelsten-Scheid

Joseph Noel

Michael Palmgren

Markus Pauly

Scott C. Peck

Barry Pogson

David Smyth

Chris J. Staiger

Keiko Sugimoto

### Managing Editor

John Long

### Senior Features Editor

Nancy A. Eckardt

### Features Editor

Mary Williams

### Science Editors

Greg Bertoni

Kathleen L. Farquharson

Nancy R. Hofmann

Jennifer M. Mach

### Production Manager

Susan L. Entwistle

### Manuscript Manager

Annette Kessler

### Publications Director

Nancy A. Winchester

### Publisher

American Society of

Plant Biologists

Executive Director,

Crispin Taylor

### Editorial Office

15501 Monona Drive

Rockville, Maryland 20855-2768

Telephone: 301/296-0908

Fax: 301/279-2996

<http://www.aspb.org>

Online at [www.plantcell.org](http://www.plantcell.org)

- Evidence for Light Wavelength-Specific Photoelectrophysiological Signaling and Memory of Excess Light Episodes in *Arabidopsis*** <sup>W</sup><sup>OA</sup> 2201  
Magdalena Szechyńska-Hebda, Jerzy Kruk, Magdalena Górecka, Barbara Karpińska, and Stanisław Karpiński
- The bHLH Transcription Factor POPEYE Regulates Response to Iron Deficiency in *Arabidopsis* Roots** <sup>W</sup><sup>OA</sup> 2219  
Terri A. Long, Hironaka Tsukagoshi, Wolfgang Busch, Brett Lahner, David E. Salt, and Philip N. Benfey
- Arabidopsis* PCR2 Is a Zinc Exporter Involved in Both Zinc Extrusion and Long-Distance Zinc Transport** <sup>W</sup> 2237  
Won-Yong Song, Kwan Sam Choi, Do Young Kim, Markus Geisler, Jiyoung Park, Vincent Vincenzetti, Maja Schellenberg, Sun Ha Kim, Yong Pyo Lim, Eun Woon Noh, Youngsook Lee, and Enrico Martinoia
- Crossovers Get a Boost in *Brassica* Allotriploid and Allotetraploid Hybrids** <sup>W</sup> 2253  
Martine Leflon, Laurie Grandont, Frédérique Eber, Virginie Huteau, Olivier Coriton, Liudmila Chelysheva, Eric Jenczewski, and Anne-Marie Chèvre
- Repeated Polyploidy Drove Different Levels of Crossover Suppression between Homoeologous Chromosomes in *Brassica napus* Allohaploids** <sup>C</sup><sup>W</sup> 2265  
Marta Cifuentes, Frédérique Eber, Marie-Odile Lucas, Maryse Lode, Anne-Marie Chèvre, and Eric Jenczewski
- Fast Diploidization in Close Mesopolyploid Relatives of *Arabidopsis*** <sup>W</sup><sup>OA</sup> 2277  
Terezie Mandáková, Simon Joly, Martin Krzywinski, Klaus Mummenhoff, and Martin A. Lysak
- The CURLY LEAF Interacting Protein BLISTER Controls Expression of Polycomb-Group Target Genes and Cellular Differentiation of *Arabidopsis thaliana*** <sup>C</sup><sup>W</sup> 2291  
Nicole Schatlowksi, Yvonne Stahl, Mareike L. Hohenstatt, Justin Goodrich, and Daniel Schubert
- Regulation of Cell Proliferation in the Stomatal Lineage by the *Arabidopsis* MYB FOUR LIPS via Direct Targeting of Core Cell Cycle Genes** <sup>W</sup> 2306  
Zidian Xie, EunKyoung Lee, Jessica R. Lucas, Kengo Morohashi, Dongmei Li, James A.H. Murray, Fred D. Sack, and Erich Grotewold
- Temporal Control of Trichome Distribution by MicroRNA156-Targeted SPL Genes in *Arabidopsis thaliana*** <sup>W</sup><sup>OA</sup> 2322  
Nan Yu, Wen-Juan Cai, Shucai Wang, Chun-Min Shan, Ling-Jian Wang, and Xiao-Ya Chen
- DNA Replication Factor C1 Mediates Genomic Stability and Transcriptional Gene Silencing in *Arabidopsis*** <sup>W</sup><sup>OA</sup> 2336  
Qian Liu, Junguo Wang, Daisuke Miki, Ran Xia, Wenxiang Yu, Junna He, Zhimin Zheng, Jian-Kang Zhu, and Zhizhong Gong
- Arabidopsis* Cockayne Syndrome A-Like Proteins 1A and 1B Form a Complex with CULLIN4 and Damage DNA Binding Protein 1A and Regulate the Response to UV Irradiation** <sup>W</sup> 2353  
Caiguo Zhang, Huiping Guo, Jun Zhang, Guangqin Guo, Karen S. Schumaker, and Yan Guo
- Arabidopsis* PHYTOCHROME INTERACTING FACTOR Proteins Promote Phytochrome B Polyubiquitination by COP1 E3 Ligase in the Nucleus** <sup>C</sup><sup>W</sup> 2370  
In-Cheol Jang, Rossana Henriques, Hak Soo Seo, Akira Nagatani, and Nam-Hai Chua
- Ethylene-Induced Stabilization of ETHYLENE INSENSITIVE3 and EIN3-LIKE1 Is Mediated by Proteasomal Degradation of EIN3 Binding F-Box 1 and 2 That Requires EIN2 in *Arabidopsis*** <sup>C</sup><sup>W</sup> 2384  
Fengying An, Qiong Zhao, Yusi Ji, Wenyang Li, Zhiqiang Jiang, Xiangchun Yu, Chen Zhang, Ying Han, Wenrong He, Yidong Liu, Shuqun Zhang, Joseph R. Ecker, and Hongwei Guo

- The Levels of Male Gametic Mitochondrial DNA Are Highly Regulated in Angiosperms with Regard to Mitochondrial Inheritance** 2402  
 Dan-Yang Wang, Quan Zhang, Yang Liu, Zhi-Fu Lin, Shao-Xiang Zhang, Meng-Xiang Sun, and Sodmergen
- Spatial Uncoupling of Mitosis and Cytokinesis during Appressorium-Mediated Plant Infection by the Rice Blast Fungus *Magnaporthe oryzae*** 2417  
 Diane G.O. Saunders, Yasin F. Dagdas, and Nicholas J. Talbot
- Entry Mode-Dependent Function of an Indole Glucosinolate Pathway in *Arabidopsis* for Nonhost Resistance against Anthracnose Pathogens** 2429  
 Kei Hiruma, Mariko Onozawa-Komori, Fumika Takahashi, Makoto Asakura, Pawel Bednarek, Tetsuro Okuno, Paul Schulze-Lefert, and Yoshitaka Takano
- Activation of an *Arabidopsis* Resistance Protein Is Specified by the in Planta Association of Its Leucine-Rich Repeat Domain with the Cognate Oomycete Effector** 2444  
 Ksenia V. Krasileva, Douglas Dahlbeck, and Brian J. Staskawicz
- A Nitrogen Response Pathway Regulates Virulence Functions in *Fusarium oxysporum* via the Protein Kinase TOR and the bZIP Protein MeaB** 2459  
 Manuel S. López-Berges, Nicolas Rispail, Rafael C. Prados-Rosales, and Antonio Di Pietro
- The Myosin Motor Domain of Fungal Chitin Synthase V Is Dispensable for Vesicle Motility but Required for Virulence of the Maize Pathogen *Ustilago maydis*** 2476  
 Steffi Treitschke, Gunther Doehlemann, Martin Schuster, and Gero Steinberg
- The Tig1 Histone Deacetylase Complex Regulates Infectious Growth in the Rice Blast Fungus *Magnaporthe oryzae*** 2495  
 Sheng-Li Ding, Wende Liu, Anton Iliuk, Cecile Ribot, Julie Vallet, Andy Tao, Yang Wang, Marc-Henri Lebrun, and Jin-Rong Xu
- NENA*, a *Lotus japonicus* Homolog of *Sec13*, Is Required for Rhizodermal Infection by Arbuscular Mycorrhiza Fungi and Rhizobia but Dispensable for Cortical Endosymbiotic Development** 2509  
 Martin Groth, Naoya Takeda, Jillian Perry, Hisaki Uchida, Stephan Dräxl, Andreas Brachmann, Shusei Sato, Satoshi Tabata, Masayoshi Kawaguchi, Trevor L. Wang, and Martin Parniske

☐ Some figures in this article are displayed in color online but in black and white in the print edition.

🌐 Online version contains Web-only data.

📄 Open Access articles can be viewed online without a subscription.



© 2010 American Society of Plant Biologists. All rights reserved. Printed on acid-free paper effective with Volume 1, Number 1, January 1989.

Printed in the United States of America.

**The Plant Cell** (ISSN 1040-4651, online ISSN 1531-298X) is published monthly (one volume per year) by the American Society of Plant Biologists, 15501 Monona Drive, Rockville, MD 20855-2768, 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](mailto:institution@aspb.org). A subscription includes both *The Plant Cell* and *Plant Physiology*; single copies may be purchased for \$95 each, plus \$10 shipping (U.S.) or \$12 (outside U.S.). Members of the American Society of Plant Biologists may subscribe to *The Plant Cell* for \$185. Nonmember individuals may subscribe for \$375. For matters regarding subscriptions, contact Suzanne Cholwek, ASPB, 15501 Monona Drive, Rockville, MD 20855-2768; telephone 301/296-0926; fax 301/251-6740; e-mail [scholwek@aspb.org](mailto:scholwek@aspb.org). Notify ASPB in writing 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](mailto:adnet@faseb.org). Periodicals postage paid at Rockville, MD 20850, and at additional mailing offices.

**Postmaster:** Send address changes to *The Plant Cell*, American Society of Plant Biologists, 15501 Monona Drive, Rockville, MD 20855-2768. The online version of *The Plant Cell* is available at [www.plantcell.org](http://www.plantcell.org).

**Permission to Reprint:** Permission to make digital or hard copies of part or all of a work published in *The Plant Cell* 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.

This information is current as of November 19, 2018

<b>Permissions</b>	<a href="https://www.copyright.com/ccc/openurl.do?sid=pd_hw1532298X&amp;issn=1532298X&amp;WT.mc_id=pd_hw1532298X">https://www.copyright.com/ccc/openurl.do?sid=pd_hw1532298X&amp;issn=1532298X&amp;WT.mc_id=pd_hw1532298X</a>
<b>eTOCs</b>	Sign up for eTOCs at: <a href="http://www.plantcell.org/cgi/alerts/ctmain">http://www.plantcell.org/cgi/alerts/ctmain</a>
<b>CiteTrack Alerts</b>	Sign up for CiteTrack Alerts at: <a href="http://www.plantcell.org/cgi/alerts/ctmain">http://www.plantcell.org/cgi/alerts/ctmain</a>
<b>Subscription Information</b>	Subscription Information for <i>The Plant Cell</i> and <i>Plant Physiology</i> is available at: <a href="http://www.aspb.org/publications/subscriptions.cfm">http://www.aspb.org/publications/subscriptions.cfm</a>