

The electronic form of this issue, available as of August 13, 2012, at www.plantphysiol.org, is considered the journal of record.

On the Cover: Functional genomics tools for maize (*Zea mays*) have increased significantly over the last decade with the availability of the maize genome sequence. In addition to reverse genetics and other resources, over 100 stable transgenic reporter lines using fluorescent markers have now been produced and disseminated in the public sector (<http://maize.jcvi.org/cellgenomics>). Transient expression methods are still needed in maize to optimize use of these reporter lines, to develop rapid experimental tools for live cell imaging, and to study protein localization during growth and development. Capitalizing on the developmental gradient of the maize leaf, Kirienko et al. (pp. 1309–1318) report here on a reliable method of transient expression in growing regions of maize leaves. The method replaces heterologous expression assays with a more direct, native, and informative system in which marker proteins can be expressed and studied *in vivo*. The method relies on minimal dissection procedures to access expanding zones of the leaf. The cover picture shows a single cell in the maize blade epidermis successfully transformed using this method. The leaf tissue was bombarded with a marker construct for a protein localized in the Golgi and tagged with a red fluorescent protein (polyubiquitin::ZmXylT-mRFP). The crenulated maize epidermal cell shows predicted punctate red fluorescence as expected for this reporter. The blue color is due to cell wall autofluorescence, which serves as a useful counterpoint to outline the cell containing the red fluorescence. The magenta color combines the blue cell wall with red autofluorescence of chloroplasts in the guard cells. Photo credit: Daniel R. Kirienko and Carolyn Rasmussen.

ON THE INSIDE

Peter V. Minorsky

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GENOME ANALYSIS

^{[W][OA]}Structural Variants in the Soybean Genome Localize to Clusters of Biotic Stress-Response Genes.

Leah K. McHale, William J. Haun, Wayne W. Xu, Pudota B. Bhaskar, Justin E. Anderson, David L. Hyten, Daniel J. Gerhardt, Jeffrey A. Jeddelloh, and Robert M. Stupar

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BREAKTHROUGH TECHNOLOGIES

^{[W][OA]}Reliable Transient Transformation of Intact Maize Leaf Cells for Functional Genomics and Experimental Study. *Daniel R. Kirienko, Anding Luo, and Anne W. Sylvestre*

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^{[W][OA]}Control of Pollen-Mediated Gene Flow in Transgenic Trees. *Chunsheng Zhang, Kim H. Norris-Caneda, William H. Rottmann, Jon E. Gullledge, Shujun Chang, Brian Yow-Hui Kwan, Anita M. Thomas, Lydia C. Mandel, Ronald T. Kothera, Aditi D. Victor, Leslie Pearson, and Maud A.W. Hinchee*

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^{[C][W]}Characterization of a Glucosyltransferase Enzyme Involved in the Formation of Kaempferol and Quercetin Sophorosides in *Crocus sativus*. *Almudena Trapero, Oussama Ahrazem, Angela Rubio-Moraga, Maria Luisa Jimeno, Maria Dolores Gómez, and Lourdes Gómez-Gómez*

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^{[W][OA]}Xyloglucan Xylosyltransferases XXT1, XXT2, and XXT5 and the Glucan Synthase CSLC4 Form Golgi-Localized Multiprotein Complexes. *Yi-Hsiang Chou, Gennady Pogorelko, and Olga A. Zabolina*

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- ^{[W][OA]}Mutations in Multiple XXT Genes of Arabidopsis Reveal the Complexity of Xyloglucan Biosynthesis. Olga A. Zobotina, Utku Avci, David Cavalier, Sivakumar Pattathil, Yi-Hsiang Chou, Stefan Eberhard, Linda Danhof, Kenneth Keegstra, and Michael G. Hahn 1367
- ^{[W][OA]}RDR1 and SGS3, Components of RNA-Mediated Gene Silencing, Are Required for the Regulation of Cuticular Wax Biosynthesis in Developing Inflorescence Stems of Arabidopsis. Patricia Lam, Lifang Zhao, Heather E. McFarlane, Mytyl Aiga, Vivian Lam, Tanya S. Hooker, and Ljerka Kunst 1385
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- ^{[W][OA]}Three Members of the Arabidopsis Glycosyltransferase Family 8 Are Xylan Glucuronosyltransferases. Emilie A. Rennie, Sara Fasmer Hansen, Edward E.K. Baidoo, Masood Z. Hadi, Jay D. Keasling, and Henrik Vibe Scheller 1408

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- ^{[W][OA]}Cooperative D1 Degradation in the Photosystem II Repair Mediated by Chloroplastic Proteases in Arabidopsis. Yusuke Kato, Xuwu Sun, Lixin Zhang, and Wataru Sakamoto 1428
- ^{[C][W]}The Arabidopsis *szl1* Mutant Reveals a Critical Role of β -Carotene in Photosystem I Photoprotection. Stefano Cazzaniga, Zhirong Li, Krishna K. Niyogi, Roberto Bassi, and Luca Dall'Osto 1745

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- ^{[C][W][OA]}Brittle Culm15 Encodes a Membrane-Associated Chitinase-Like Protein Required for Cellulose Biosynthesis in Rice. Bin Wu, Baocai Zhang, Yan Dai, Lei Zhang, Keke Shang-Guan, Yonggang Peng, Yihua Zhou, and Zhen Zhu 1440

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- ^{[W][OA]}Early Senescence and Cell Death in Arabidopsis *saul1* Mutants Involves the PAD4-Dependent Salicylic Acid Pathway. Katja Vogelmann, Gabriele Drechsel, Johannes Bergler, Christa Subert, Katrin Philippar, Jürgen Soll, Julia C. Engelmann, Timo Engelsdorf, Lars M. Voll, and Stefan Hoth 1477
- ^{[W][OA]}SEMI-ROLLED LEAF1 Encodes a Putative Glycosylphosphatidylinositol-Anchored Protein and Modulates Rice Leaf Rolling by Regulating the Formation of Bulliform Cells. Jing-Jing Xiang, Guang-Heng Zhang, Qian Qian, and Hong-Wei Xue 1488
- ^{[W][OA]}PIN1-Independent Leaf Initiation in Arabidopsis. Bernadette Guenot, Emmanuelle Bayer, Daniel Kierzkowski, Richard S. Smith, Therese Mandel, Petra Žádníková, Eva Benková, and Cris Kuhlemeier 1501
- ^{[C][W]}Arabidopsis Class I and Class II TCP Transcription Factors Regulate Jasmonic Acid Metabolism and Leaf Development Antagonistically. Selahattin Danisman, Froukje van der Wal, Stijn Dhondt, Richard Waites, Stefan de Folter, Andrea Bimbo, Aalt-Jan van Dijk, Jose M. Muino, Lucas Cutri, Marcelo C. Dornelas, Gerco C. Angenent, and Richard G.H. Immink 1511
- ^[W]Structure-Activity Relationship Studies of Strigolactone-Related Molecules for Branching Inhibition in Garden Pea: Molecule Design for Shoot Branching. François-Didier Boyer, Alexandre de Saint Germain, Jean-Paul Pillot, Jean-Bernard Pouvreau, Victor Xiao Chen, Suzanne Ramos, Arnaud Stévenin, Philippe Simier, Philippe Delavault, Jean-Marie Beau, and Catherine Rameau 1524
- ^{[C][W]}Inducible Repression of Multiple Expansin Genes Leads to Growth Suppression during Leaf Development. Hoe-Han Goh, Jennifer Sloan, Carmen Dorca-Fornell, and Andrew Fleming 1759

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- [C][W][OA] Environmental Stresses of Field Growth Allow Cinnamyl Alcohol Dehydrogenase-Deficient *Nicotiana attenuata* Plants to Compensate for their Structural Deficiencies. Harleen Kaur, Kamel Shaker, Nicolas Heinzl, John Ralph, Ivan Gális, and Ian T. Baldwin 1545
- [W][OA] A Constitutive Expressed Phosphate Transporter, OsPht1;1, Modulates Phosphate Uptake and Translocation in Phosphate-Replete Rice. Shubin Sun, Mian Gu, Yue Cao, Xinpeng Huang, Xiao Zhang, Penghui Ai, Jianning Zhao, Xiaorong Fan, and Guohua Xu 1571
- [W] Arabidopsis NRT1.5 Is Another Essential Component in the Regulation of Nitrate Reallocation and Stress Tolerance. Chun-Zhu Chen, Xin-Fang Lv, Jian-Yong Li, Hong-Ying Yi, and Ji-Ming Gong 1582
- [W] Silencing *Nicotiana attenuata* Calcium-Dependent Protein Kinases, CDPK4 and CDPK5, Strongly Up-Regulates Wound- and Herbivory-Induced Jasmonic Acid Accumulations. Da-Hai Yang, Christian Hettenhausen, Ian T. Baldwin, and Jianqiang Wu 1591
- [OA] Heat Reduces Nitric Oxide Production Required for Auxin-Mediated Gene Expression and Fate Determination in Tree Tobacco Guard Cell Protoplasts. Robert A. Beard, David J. Anderson, Jennifer L. Bufford, and Gary Tallman 1608
- [W][OA] Up-Regulation of a Magnesium Transporter Gene *OsMGT1* Is Required for Conferring Aluminum Tolerance in Rice. Zhi Chang Chen, Naoki Yamaji, Ritsuko Motoyama, Yoshiaki Nagamura, and Jian Feng Ma 1624
- [W][OA] The High-Affinity Phosphate Transporter *GmPT5* Regulates Phosphate Transport to Nodules and Nodulation in Soybean. Lu Qin, Jing Zhao, Jiang Tian, Liyu Chen, Zhaoan Sun, Yongxiang Guo, Xing Lu, Mian Gu, Guohua Xu, and Hong Liao 1634
- [C][W][OA] *Paxillus involutus* Strains MAJ and NAU Mediate K⁺/Na⁺ Homeostasis in Ectomycorrhizal *Populus × canescens* under Sodium Chloride Stress. Jing Li, Siqin Bao, Yuhong Zhang, Xujun Ma, Manika Mishra-Knyrim, Jian Sun, Gang Sa, Xin Shen, Andrea Polle, and Shaoliang Chen 1771
- [W][OA] Proteomic Study of Low-Temperature Responses in Strawberry Cultivars (*Fragaria × ananassa*) That Differ in Cold Tolerance. Gage Koehler, Robert C. Wilson, John V. Goodpaster, Anita Sønsteby, Xianyin Lai, Frank A. Witzmann, Jin-Sam You, Jens Rohloff, Stephen K. Randall, and Muath Alsheikh 1787
- [C][W][OA] The CopRS Two-Component System Is Responsible for Resistance to Copper in the Cyanobacterium *Synechocystis* sp. PCC 6803. Joaquín Giner-Lamia, Luis López-Maury, José C. Reyes, and Francisco J. Florencio 1806

GENETICS, GENOMICS, AND MOLECULAR EVOLUTION

- [W][OA] High-Resolution Mapping of a Fruit Firmness-Related Quantitative Trait Locus in Tomato Reveals Epistatic Interactions Associated with a Complex Combinatorial Locus. Natalie H. Chapman, Julien Bonnet, Laurent Grivet, James Lynn, Neil Graham, Rebecca Smith, Guiping Sun, Peter G. Walley, Mervin Poole, Mathilde Causse, Graham J. King, Charles Baxter, and Graham B. Seymour 1644

PLANTS INTERACTING WITH OTHER ORGANISMS

- [C][W] Effect of Arabinogalactan Proteins from the Root Caps of Pea and *Brassica napus* on *Aphanomyces euteiches* Zoospore Chemotaxis and Germination. Marc Antoine Cannesan, Caroline Durand, Carole Burel, Christophe Gangneux, Patrice Lerouge, Tadashi Ishii, Karine Laval, Marie-Laure Follet-Gueye, Azeddine Driouich, and Maité Vicré-Gibouin 1658
- [W] Transcriptional Responses toward Diffusible Signals from Symbiotic Microbes Reveal *MtNFP*- and *MtDMI3*-Dependent Reprogramming of Host Gene Expression by Arbuscular Mycorrhizal Fungal Lipochitooligosaccharides. Lisa F. Czaja, Claudia Hoge Kamp, Patrick Lamm, Fabienne Maillet, Eduardo Andres Martinez, Eric Samain, Jean Dénarié, Helge Küster, and Natalija Hohnjec 1671
- [W][OA] A *Medicago truncatula* Tobacco Retrotransposon Insertion Mutant Collection with Defects in Nodule Development and Symbiotic Nitrogen Fixation. Catalina I. Pislariu, Jeremy D. Murray, Jiangqi Wen, Viviane Cosson, Raja Sekhara Reddy Duvvuru Muni, Mingyi Wang, Vagner A. Benedito, Andry Andriankaja, Xiaofei Cheng, Ivone Torres Jerez, Samuel Mondy, Shulan Zhang, Mark E. Taylor, Million Tadege, Pascal Ratet, Kirankumar S. Mysore, Rujin Chen, and Michael K. Udvardi 1686
- [C][W] Endoplasmic Reticulum-Quality Control Chaperones Facilitate the Biogenesis of Cf Receptor-Like Proteins Involved in Pathogen Resistance of Tomato. Thomas W.H. Liebrand, Patrick Smit, Ahmed Abd-El-Haliem, Ronnie de Jonge, Jan H.G. Cordeveener, Antoine H.P. America, Jan Sklenar, Alexandra M.E. Jones, Silke Robatzek, Bart P.H.J. Thomma, Wladimir I.L. Tameling, and Matthieu H.A.J. Joosten 1819

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- ^{[W][OA]}Selenium Distribution and Speciation in the Hyperaccumulator *Astragalus bisulcatus* and Associated Ecological Partners. José R. Valdez Barillas, Colin F. Quinn, John L. Freeman, Stormy D. Lindblom, Sirine C. Fakra, Matthew A. Marcus, Todd M. Gilligan, Élan R. Alford, Ami L. Wangeline, and Elizabeth A.H. Pilon-Smits 1834
- ^{[W][OA]}ASPARTATE OXIDASE Plays an Important Role in Arabidopsis Stomatal Immunity. Alberto P. Macho, Freddy Boutrot, John P. Rathjen, and Cyril Zipfel 1845
- ^{[C][OA]}The Ankyrin-Repeat Transmembrane Protein BDA1 Functions Downstream of the Receptor-Like Protein SNC2 to Regulate Plant Immunity. Yuanai Yang, Yaxi Zhang, Pingtao Ding, Kaeli Johnson, Xin Li, and Yuelin Zhang 1857

WHOLE PLANT AND ECOPHYSIOLOGY

- Infestation and Hydraulic Consequences of Induced Carbon Starvation. William R.L. Anderegg and Elizabeth S. Callaway 1866

SYSTEMS BIOLOGY, MOLECULAR BIOLOGY, AND GENE REGULATION

- ^{[C][W]}Differential Expression of the *Chlamydomonas* [FeFe]-Hydrogenase-Encoding *HYDA1* Gene Is Regulated by the COPPER RESPONSE REGULATOR1. Miriam Pape, Camilla Lambertz, Thomas Happe, and Anja Hemschemeier 1700
- ^{[W][OA]}Integrative Comparative Analyses of Transcript and Metabolite Profiles from Pepper and Tomato Ripening and Development Stages Uncovers Species-Specific Patterns of Network Regulatory Behavior. Sonia Osorio, Rob Alba, Zoran Nikoloski, Andrej Kochevenko, Alisdair R. Fernie, and James J. Giovannoni 1713
- ^{[W][OA]}Transcriptional and Metabolic Analysis of Senescence Induced by Preventing Pollination in Maize. Rajandeep S. Sekhon, Kevin L. Childs, Nicholas Santoro, Cliff E. Foster, C. Robin Buell, Natalia de Leon, and Shawn M. Kaeppler 1730

CORRECTIONS

- Plant Physiology* regrets that Klaas Vandepoele's name was misspelled in the reference made to the Heyndrickx and Vandepoele article (pp. 894–901) in the July On the Inside feature. 1875

^[C] Some figures in this article are displayed in color online but in black and white in the print edition.

^[W] Indicates Web-only data.

^[OA] Open Access articles can be viewed online without a subscription.