

The electronic form of this issue, available as of February 11, 2011, at www.plantphysiol.org, is considered the journal of record.

On the Cover: Developing barley (*Hordeum vulgare*) spike carrying recessive mutations at the *ROBIGINOSUM1*, *SIX-ROWED SPIKE1*, and *ALBINO LEMMA* loci. Original mutants along with more than 800 others representing most of the developmental variation in barley were chosen to generate a collection of backcross-derived lines with cv Bowman as a recurrent parent. In this issue, Druka et al. (pp. 617–627) describe genotyping of this collection with up to 3,000 gene-based markers detecting relatively small introgressions for one-half of the lines. This enabled prediction of the gene content through the conservation of synteny with model cereal genomes, providing a route to rapid gene identification. Photograph: Arnis Druka.

ON THE INSIDE

Peter V. Minorsky 615

GENOME ANALYSIS

^{[W][OA]}Genetic Dissection of Barley Morphology and Development. Arnis Druka, Jerome Franckowiak, Udda Lundqvist, Nicola Bonar, Jill Alexander, Kelly Houston, Slobodanka Radovic, Fahimeh Shahinnia, Vera Vendramin, Michele Morgante, Nils Stein, and Robbie Waugh 617

^{[W][OA]}A Domain-Centric Analysis of Oomycete Plant Pathogen Genomes Reveals Unique Protein Organization. Michael F. Seidl, Guido Van den Ackerveken, Francine Govers, and Berend Snel 628

^{[W][OA]}The Composition and Origins of Genomic Variation among Individuals of the Soybean Reference Cultivar Williams 82. William J. Haun, David L. Hyten, Wayne W. Xu, Daniel J. Gerhardt, Thomas J. Albert, Todd Richmond, Jeffrey A. Jeddelloh, Gaofeng Jia, Nathan M. Springer, Carroll P. Vance, and Robert M. Stupar 645

BREAKTHROUGH TECHNOLOGIES

^{[C][W][OA]}VirtualLeaf: An Open-Source Framework for Cell-Based Modeling of Plant Tissue Growth and Development. Roeland M.H. Merks, Michael Guravage, Dirk Inzé, and Gerrit T.S. Beemster 656

RESEARCH ARTICLES

BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES

Lignin Composition and Structure in Young versus Adult *Eucalyptus globulus* Plants. Jorge Rencoret, Ana Gutiérrez, Lidia Nieto, J. Jiménez-Barbero, Craig B. Faulds, Hoon Kim, John Ralph, Ángel T. Martínez, and José C. del Río 667

^{[W][OA]}Castor Phospholipid:Diacylglycerol Acyltransferase Facilitates Efficient Metabolism of Hydroxy Fatty Acids in Transgenic Arabidopsis. Harrie van Erp, Philip D. Bates, Julie Burgal, Jay Shockey, and John Browse 683

^{[W][OA]}The Role of α -Glucosidase in Germinating Barley Grains. Duncan Stanley, Martin Rejzek, Henrik Naested, Mark Smedley, Sofía Otero, Brendan Fahy, Frazer Thorpe, Robert J. Nash, Wendy Harwood, Birte Svensson, Kay Denyer, Robert A. Field, and Alison M. Smith 932

^[W]The Dual-Targeted Plant Sulfiredoxin Retroreduces the Sulfinic Form of Atypical Mitochondrial Peroxiredoxin. Iván Iglesias-Baena, Sergio Barranco-Medina, Francisca Sevilla, and Juan-José Lázaro 944

BIOENERGETICS AND PHOTOSYNTHESIS

^[W]The Hydroxypyruvate-Reducing System in Arabidopsis: Multiple Enzymes for the Same End. Stefan Timm, Alexandra Florian, Kathrin Jahnke, Adriano Nunes-Nesi, Alisdair R. Fernie, and Hermann Bauwe 694

^{[W][OA]}The Roles of ATP Synthase and the Cytochrome *b₆/f* Complexes in Limiting Chloroplast Electron Transport and Determining Photosynthetic Capacity. Wataru Yamori, Shunichi Takahashi, Amane Makino, G. Dean Price, Murray R. Badger, and Susanne von Caemmerer 956

Continued on next page

CELL BIOLOGY AND SIGNAL TRANSDUCTION

- [W][OA] Differential Effects of Prenylation and S-Acylation on Type I and II ROPS Membrane Interaction and Function. *Nadav Sorek, Orit Gutman, Einat Bar, Mohamad Abu-Abied, Xuehui Feng, Mark P. Running, Efraim Lewinsohn, Naomi Ori, Einat Sadot, Yoav I. Henis, and Shaul Yalovsky* 906
- [W] Self-Incompatibility in *Papaver rhoeas* Activates Nonspecific Cation Conductance Permeable to Ca²⁺ and K⁺. *Juyou Wu, Su Wang, Yuchun Gu, Shaoling Zhang, Stephen J. Publicover, and Veronica E. Franklin-Tong* 963

DEVELOPMENT AND HORMONE ACTION

- [C][W][OA] Physiological Effects of the Synthetic Strigolactone Analog GR24 on Root System Architecture in Arabidopsis: Another Belowground Role for Strigolactones? *Carolien Ruyter-Spira, Wouter Kohlen, Tatsiana Charnikhova, Arjan van Zeijl, Laura van Bezouwen, Norbert de Ruijter, Catarina Cardoso, Juan Antonio Lopez-Raez, Radoslava Matusova, Ralph Bours, Francel Verstappen, and Harro Bouwmeester* 721
- [C][W][OA] Arabidopsis Homologs of the *Petunia* HAIRY MERISTEM Gene Are Required for Maintenance of Shoot and Root Indeterminacy. *Eric M. Engstrom, Carl M. Andersen, Juliann Gumulak-Smith, John Hu, Evguenia Orlova, Rosangela Sozzani, and John L. Bowman* 735
- [W] The Role of Arabidopsis Rubisco Activase in Jasmonate-Induced Leaf Senescence. *Xiaoyi Shan, Junxia Wang, Lingling Chua, Dean Jiang, Wen Peng, and Daoxin Xie* 751
- [C][W][OA] The Role of Two F-Box Proteins, SLEEPY1 and SNEEZY, in Arabidopsis Gibberellin Signaling. *Tohru Ariizumi, Paulraj K. Lawrence, and Camille M. Steber* 765
- [C][W][OA] Reactivation of Meristem Activity and Sprout Growth in Potato Tubers Require Both Cytokinin and Gibberellin. *Anja Hartmann, Melanie Senning, Peter Hedden, Uwe Sonnewald, and Sophia Sonnewald* 776
- [C][W][OA] Loss-of-Function and Gain-of-Function Mutations in *FAB1A/B* Impair Endomembrane Homeostasis, Conferring Pleiotropic Developmental Abnormalities in Arabidopsis. *Tomoko Hirano, Tomohiko Matsuzawa, Kaoru Takegawa, and Masa H. Sato* 797
- [C][W][OA] Strigolactones Are Transported through the Xylem and Play a Key Role in Shoot Architectural Response to Phosphate Deficiency in Nonarbuscular Mycorrhizal Host Arabidopsis. *Wouter Kohlen, Tatsiana Charnikhova, Qing Liu, Ralph Bours, Malgorzata A. Domagalska, Sebastien Beguerie, Francel Verstappen, Ottoline Leyser, Harro Bouwmeester, and Carolien Ruyter-Spira* 974
- [W][OA] XAP5 CIRCADIAN TIMEKEEPER Regulates Ethylene Responses in Aerial Tissues of Arabidopsis. *Cory T. Ellison, Filip Vandebussche, Dominique Van Der Straeten, and Stacey L. Harmer* 988

ENVIRONMENTAL STRESS AND ADAPTATION TO STRESS

- Plasma Membrane Surface Potential: Dual Effects upon Ion Uptake and Toxicity. *Peng Wang, Thomas B. Kinraide, Dongmei Zhou, Peter M. Kopittke, and Willie J.G.M. Peijnenburg* 808
- [C][W] iTRAQ Protein Profile Analysis of Arabidopsis Roots Reveals New Aspects Critical for Iron Homeostasis. *Ping Lan, Wenfeng Li, Tuan-Nan Wen, Jeng-Yuan Shiau, Yu-Ching Wu, Wendar Lin, and Wolfgang Schmidt* 821
- [C][W][OA] *SIZ1* Regulation of Phosphate Starvation-Induced Root Architecture Remodeling Involves the Control of Auxin Accumulation. *Kenji Miura, Jiyoung Lee, Qingqiu Gong, Shisong Ma, Jing Bo Jin, Chan Yul Yoo, Tomoko Miura, Aiko Sato, Hans J. Bohnert, and Paul M. Hasegawa* 1000

GENETICS, GENOMICS, AND MOLECULAR EVOLUTION

- [W][OA] Molecular Evolution and Selection Patterns of Plant F-Box Proteins with C-Terminal Kelch Repeats. *Nadine Schumann, Aura Navarro-Quezada, Kristian Ullrich, Carsten Kuhl, and Marcel Quint* 835
- [C][W][OA] Three Homologous Genes Encoding *sn*-Glycerol-3-Phosphate Acyltransferase 4 Exhibit Different Expression Patterns and Functional Divergence in *Brassica napus*. *Xue Chen, Martin Truksa, Crystal L. Snyder, Aliaa El-Mezawy, Saleh Shah, and Randall J. Weselake* 851

- [W] Allelic Variation in the Perennial Ryegrass *FLOWERING LOCUS T* Gene Is Associated with Changes in Flowering Time across a Range of Populations. *Leif Skot, Ruth Sanderson, Ann Thomas, Kirsten Skot, Danny Thorogood, Galina Latypova, Torben Asp, and Ian Armstead* 1013

PLANTS INTERACTING WITH OTHER ORGANISMS

- [W][OA] The Novel Cyst Nematode Effector Protein 19C07 Interacts with the Arabidopsis Auxin Influx Transporter LAX3 to Control Feeding Site Development. *Chris Lee, Demosthenis Chronis, Charlotte Kenning, Benjamin Peret, Tarek Hewezi, Eric L. Davis, Thomas J. Baum, Richard Hussey, Malcolm Bennett, and Melissa G. Mitchum* 866
- [W][OA] Both Plant and Bacterial Nitrate Reductases Contribute to Nitric Oxide Production in *Medicago truncatula* Nitrogen-Fixing Nodules. *Faouzi Horchani, Marianne Prévot, Alexandre Boscari, Edouard Evangelisti, Eliane Meilhoc, Claude Bruand, Philippe Raymond, Eric Boncompagni, Samira Aschi-Smiti, Alain Puppo, and Renaud Brouquisse* 1023

WHOLE PLANT AND ECOPHYSIOLOGY

- [OA] Effect of Temperature on Postillumination Isoprene Emission in Oak and Poplar. *Ziru Li, Ellen A. Ratliff, and Thomas D. Sharkey* 1037

SYSTEMS BIOLOGY, MOLECULAR BIOLOGY, AND GENE REGULATION

- [W][OA] Distinct Gene Expression Profiles in Egg and Synergid Cells of Rice as Revealed by Cell Type-Specific Microarrays. *Takayuki Ohnishi, Hideki Takanashi, Mirai Mogi, Hirokazu Takahashi, Shunsuke Kikuchi, Kentaro Yano, Takashi Okamoto, Masahiro Fujita, Nori Kurata, and Nobuhiro Tsutsumi* 881
- [C][W] Hemin and Magnesium-Protoporphyrin IX Induce Global Changes in Gene Expression in *Chlamydomonas reinhardtii*. *Björn Voß, Linda Meinecke, Thorsten Kurz, Salim Al-Babili, Christoph F. Beck, and Wolfgang R. Hess* 892
- [W][OA] The Jumonji C Domain-Containing Protein JM30 Regulates Period Length in the Arabidopsis Circadian Clock. *Sheen X. Lu, Stephen M. Knowles, Candace J. Webb, R. Brandon Celaya, Chuah Cha, Jonathan P. Siu, and Elaine M. Tobin* 906
- [C][W][OA] Coordinated Activation of Cellulose and Repression of Lignin Biosynthesis Pathways in Rice. *Madana M.R. Ambavaram, Arjun Krishnan, Kurniawan R. Trijatmiko, and Andy Pereira* 916

CORRECTIONS

- Ethylene Suppression of Sugar-Induced Anthocyanin Pigmentation in Arabidopsis. *S.-W. Jeong, P.K. Das, S.C. Jeoung, J.-Y. Song, H.K. Lee, Y.-K. Kim, W.J. Kim, Y.I. Park, S.-D. Yoo, S.-B. Choi, G. Choi, and Y.-I. Park* 1047

[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.