IN BRIEF

Evolution of Domesticated Bread Wheat 993
Nancy A. Eckardt

MicroRNA Evolution in the Genus Arabidopsis 994
Nancy R. Hofmann

A Shot in the Dark: How Parasitic Plants Find Host Roots 995
Jennifer Mach

Blast Effector Proteins May Pave the Way for Hyphal Invasion 996
Kathleen L. Farquharson

PERSPECTIVE: SPECIAL SERIES ON LARGE-SCALE BIOLOGY

Mapping Plant Interactomes Using Literature Curated and Predicted Protein–Protein Interaction Data Sets 997
KiYoung Lee, David Thorneycroft, Premanand Achuthan, Henning Hermjakob, and Trey Ideker

REVIEWS

How a Plant Builds Leaves 1006
Siobhan A. Braybrook and Cris Kuhlemeier

Morphogenesis of Simple and Compound Leaves: A Critical Review 1019
Idan Efroni, Yuval Eshed, and Eliezer Lifschitz

RESEARCH ARTICLES

Convergent Evolution of Syringyl Lignin Biosynthesis via Distinct Pathways in the Lycophyte Selaginella and Flowering Plants 1033
Jing-Ke Weng, Takuya Akiyama, Nicholas D. Bonawitz, Xu Li, John Ralph, and Clint Chapple

A Genetic Framework for Grain Size and Shape Variation in Wheat 1046
Vasilis C. Gegas, Aida Nazari, Simon Griffiths, James Simmonds, Lesley Fish, Simon Orford, Liz Sayers, John H. Doonan, and John W. Snape

Cell Number Regulator1 Affects Plant and Organ Size in Maize: Implications for Crop Yield Enhancement and Heterosis 1057
Mei Guo, Mary A. Rupe, Jo Ann Dieter, Jijun Zou, Daniel Spielbauer, Keith E. Duncan, Richard J. Howard, Zhenglin Hou, and Carl R. Simmons

MicroRNA Gene Evolution in Arabidopsis lyrata and Arabidopsis thaliana 1074
Noah Fahlgren, Sanjuro Jogdeo, Kristin D. Kasschau, Christopher M. Sullivan, Elisabeth J. Chapman, Sascha Laubinger, Lisa M. Smith, Mark Dasenko, Scott A. Givan, Detlef Weigel, and James C. Carrington

ON THE COVER

Grain morphology has been an important agronomic trait even in very early farming societies. Gegas et al. (pages 1046–1056) identified the genetic components that underlie the variation in grain size and shape in modern elite wheat. A comprehensive survey of the variation in grain morphology in modern and ancestral wheat indicates the occurrence of significant, and surprisingly recent, bottlenecks in the evolution of modern hexaploid wheat. This work provides an important advance in understanding the genetic and historical basis of natural diversity of grain traits in domesticated wheat. The cover image shows the diversity in grain morphology in the genus Triticeae with an illustration of a modern hexaploid wheat spike in the background.
Arabidopsis thaliana Small RNAs: Transient MIRNA and Small Interfering RNA Loci within the Arabidopsis Genus
Zhaorong Ma, Ceyda Coruh, and Michael J. Axtell

miR390, Arabidopsis TAS3 tasiRNAs, and Their AUXIN RESPONSE FACTOR Targets Define an Autoregulatory Network Quantitatively Regulating Lateral Root Growth
Elena Marin, Virginie Jouannet, Aurélie Herz, Annemarie S. Lokerse, Dolf Weijers, Herve Vaucheret, Laurent Nussaume, Martin D. Crespi, and Alexis Maizel

DAY NEUTRAL FLOWERING Represses CONSTANS to Prevent Arabidopsis Flowering Early in Short Days
Karl Morris, Sarah Thornber, Lesley Codrai, Christine Richardson, Adam Craig, Ari Sadanandom, Brian Thomas, and Stephen Jackson

Phosphorylation of Conserved PIN Motifs Directs Arabidopsis PIN1 Polarity and Auxin Transport
Fang Huang, Marcelo Kemel Zago, Lindy Abas, Arnoud van Marion, Carlos Samuel Galván-Ampudia, and Remko Offringa

Jasmonate and Phytochrome A Signaling in Arabidopsis Wound and Shade Responses Are Integrated through JAZ Stability
Frances Robson, Haruko Okamoto, Elaine Patrick, Sue-Ré Harris, Claus Wasternack, Charles Brearley, and John G. Turner

TCP1 Modulates brassinosteroid biosynthesis by regulating the expression of the key biosynthetic gene DWF4 in Arabidopsis thaliana
Zhongxin Guo, Shozo Fujioka, Elison B. Blancaflor, Sen Miao, Xiaoping Gou, and Jia Li

Identification of Specific DNA Binding Residues in the TCP Family of Transcription Factors in Arabidopsis
Pooja Aggarwal, Mainak DasGupta, Agnel Praveen Joseph, Nirmalya Chatterjee, N. Srinivasan, and Utpal Nath

Integrative Transcript and Metabolite Analysis of Nutritionally Enhanced DE-ETIOLATED1 Downregulated Tomato Fruit
Eugenia M.A. Enfissi, Fredy Barneche, Ikhlak Ahmed, Christiane Lichtlé, Christopher Gerrish, Ryan P. McQuinn, James J. Giovannoni, Enrique Lopez-Juez, Chris Bowler, Peter M. Bramley, and Paul D. Fraser

Sulfite Reductase Defines a Newly Discovered Bottleneck for Assimilatory Sulfate Reduction and is Essential for Growth and Development in Arabidopsis thaliana
Muhammad Sayyar Khan, Florian Heinrich Haas, Arman Allboje Samami, Armin Moghaddas Gholami, Andrea Bauer, Kurt Fellenberg, Michael Reichelt, Robert Hänsch, Ralf R. Mendel, Andreas J. Meyer, Markus Wirtz, and Rüdiger Hell

Arabidopsis Histidine Kinase CKI1 Acts Upstream of HISTIDINE PHOSPHOTRANSFER PROTEINS to Regulate Female Gametophyte Development and Vegetative Growth
Yan Deng, Haili Dong, Jinye Mu, Bo Ren, Binglian Zheng, Zhendong Ji, Wei-Cai Yang, Yan Liang, and Jianru Zuo

VND-INTERACTING2, a NAC Domain Transcription Factor, Negatively Regulates Xylem Vessel Formation in Arabidopsis
Masatoshi Yamaguchi, Misato Ohtani, Nobutaka Mitsuda, Minoru Kubo, Masaru Ohme-Takagi, Hiroo Fukuda, and Taku Demura

Functional Modules in the Arabidopsis Core Cell Cycle Binary Protein–Protein Interaction Network
Joanna Boruc, Hilde Van den Daele, Jens Hollunder, Stephane Rombauts, Evelien Mylle, Pierre Hilson, Dirk Inzé, Lieven De Veylder, and Eugenia Russinova

The Activity of a Wall-Bound Cellulase Is Required for and Coupled to Cell Cycle Progression in the Dinoflagellate Cryptothecodinium cohnii
Alvin C.M. Kwok and Joseph T.Y. Wong

Arrangement of Photosystem II and ATP Synthase in Chloroplast Membranes of Spinach and Pea
Bertram Daum, Daniela Nicastro, Jotham Austin II, J. Richard McIntosh, and Werner Kühlbrandt
The Arabidopsis Chaperone J3 Regulates the Plasma Membrane H+-ATPase through Interaction with the PKSS Kinase

Yongqing Yang, Yunxia Qin, Changgen Xie, Feiji Zhao, Jinfeng Zhao, Dafa Liu, Shouyi Chen, Anja T. Fuglsang, Michael G. Palmgren, Karen S. Schumaker, Xing Wang Deng, and Yan Guo

Five Arabidopsis Reticulon Isoforms Share Endoplasmic Reticulum Location, Topology, and Membrane-Shaping Properties

Imogen Sparkes, Nicholas Tolley, Isabel Aller, Julia Svozil, Anne Osterrieder, Stanley Botchway, Christopher Mueller, Lorenzo Frigerio, and Chris Hawes

Endocytic and Secretory Traffic in Arabidopsis Merge in the Trans-Golgi Network/Early Endosome, an Independent and Highly Dynamic Organelle

Corrado Viotti, Julia Bubeck, York-Dieter Stierhof, Melanie Krebs, Markus Langhans, Willy van den Berg, Walter van Dongen, Sandra Richter, Niko Geldner, Junpei Takano, Gerd Jürgens, Sacco C. de Vries, David G. Robinson, and Karin Schumacher

RNA-Dependent RNA Polymerase 1 from Nicotiana tabacum Suppresses RNA Silencing and Enhances Viral Infection in Nicotiana benthamiana

Xiao-Bao Ying, Li Dong, Hui Zhu, Cheng-Guo Duan, Quan-Sheng Du, Dian-Qiu Lv, Yuan-Yuan Fang, Juan Antonio Garcia, Rong-Xiang Fang, and Hui-Shan Guo

Cucumber Mosaic Virus Movement Protein Severs Actin Filaments to Increase the Plasmodesmal Size Exclusion Limit in Tobacco

Shengzhong Su, Zhaohui Liu, Cheng Chen, Yan Zhang, Xu Wang, Lei Zhu, Long Miao, Xue-Chen Wang, and Ming Yuan

Translocation of Magnaporthe oryzae Effectors into Rice Cells and Their Subsequent Cell-to-Cell Movement

Chang Hyun Khang, Romain Berruyer, Martha C. Giraldo, Prasanna Kankanala, Sook-Young Park, Kirk Czymmek, Seogchan Kang, and Barbara Valen

A Single-Electron Reducing Quinone Oxidoreductase Is Necessary to Induce Haustorium Development in the Root Parasitic Plant Triphysaria

Pradeepa C.G. Bandaranayake, Tatiana Filappova, Alexey Tomilov, Natalya B. Tomilova, Denneal Jamison-McClung, Quy Ngo, Kentaro Inoue, and John I. Yoder

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.