Detection of the diurnal environment requires a circadian system that is correctly integrated with the light-dark cycle. EARLY FLOWERING4 (ELF4) is required to fulfill this normal circadian function. McWatters et al. (pp. 391–401) have shown that ELF4 has two functions within the clock. ELF4 was found to be a circadian element required both for clock resetting at the evening phase of the day (the light-to-dark phase of entrainment), and it was also found to be required for persistence of clock oscillations. For the latter, ELF4 was found to be a dose-dependent activator of the morning clock genes CCA1 and LHY. ELF4 is thus a core component of the circadian oscillator. The cover cartoon illustrates a plant having trouble sleeping. This caricature is indicative of elf4 mutant defects in detecting dusk. The cartoon was drawn by Prof. Dr. Edward Himelblau at California Polytechnic State University.

ON THE INSIDE

Peter V. Minorsky

HIGH IMPACT

The Role of Trehalose Biosynthesis in Plants. Aleel K. Grennan

GENOME ANALYSIS

Increases in the Number of SNARE Genes Parallels the Rise of Multicellularity among the Green Plants. Anton Sanderfoot

BREAKTHROUGH TECHNOLOGIES

Successful Gene Tagging in Lettuce Using the Tnt1 Retrotransposon from Tobacco. Marianne Mazier, Emmanuel Botton, Fabrice Flamain, Jean-Paul Bouchet, Bénénic Courtial, Marie-Christine Chupeau, Yves Chupeau, Brigitte Maisonneuve, and Hélène Lucas

Sampling the Arabidopsis Transcriptome with Massively Parallel Pyrosequencing. Andreas P.M. Weber, Katrin L. Weber, Kevin Carr, Curtis Wilkerson, and John B. Ohlrogge

BIOINFORMATICS

A Novel Bioinformatics Approach Identifies Candidate Genes for the Synthesis and Feruloylation of Arabinoxylan. Rowan A.C. Mitchell, Paul Dupree, and Peter R. Shewry

SCIENTIFIC CORRESPONDENCE

Solar UV Radiation Drives CO₂ Fixation in Marine Phytoplankton: A Double-Edged Sword. Kunshen Gao, Yaping Wu, Gang Li, Hongyan Wu, Virginia E. Villafañe, and E. Walter Helbling
RESEARCH ARTICLES

BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES

MAM3 Catalyzes the Formation of All Aliphatic Glucosinolate Chain Lengths in Arabidopsis.  
Susanne Textor, Jan-Willem de Kraker, Bettina Hause, Jonathan Gershenzon, and James G. Tokuhisa  
60

Characterization of Lipid Rafts from Medicago truncatula Root Plasma Membranes: A Proteomic Study Reveals the Presence of a Raft-Associated Redox System.  
Benoit Lefebvre, Fabienne Furt, Marie-Andrée Hartmann, Louise V. Michaelson, Jean-Pierre Carde, Françoise Sargueil-Boiron, Michel Rossignol, Johnathan A. Napier, Julie Cullimore, Jean-Jacques Bessoule, and Sébastien Mongrand  
402

A Genomic Approach to Suberin Biosynthesis and Cork Differentiation.  
Marçal Soler, Olga Serra, Marisa Molinas, Gemma Huguet, Silvia Fluch, and Mercè Figueras  
419

Flavonoid Biosynthesis in Barley Primary Leaves Requires the Presence of the Vacuole and Controls the Activity of Vacuolar Flavonoid Transport.  
Krasimira Marinova, Katja Kleinschmidt, Gottfried Weissenböck, and Markus Klein  
432

Synergistic Substrate Inhibition of ent-Copalyl Diphosphate Synthase: A Potential Feed-Forward Inhibition Mechanism Limiting Gibberellin Metabolism.  
Sladjana Prisic and Reuben J. Peters  
445

Cloning and Characterization of Unusual Fatty Acid Desaturases from Anemone leveillei: Identification of an Acyl-Coenzyme A C20 Δ5-Desaturase Responsible for the Synthesis of Sciadonic Acid.  
Olga Sayanova, Richard Haslam, Monica Venegas Caleron, and Johnathan A. Napier  
455

Light and Metabolic Signals Control the Selective Degradation of Sucrose Synthase in Maize Leaves during Deetiolation.  
Quan-Sheng Qiu, Shane C. Hardin, Jacob Mace, Thomas P. Brunnell, and Steven C. Huber  
468

BIOENERGETICS AND PHOTOSYNTHESIS

Coordinate Regulation of Phosphoenolpyruvate Carboxylase and Phosphoenolpyruvate Carboxykinase by Light and CO2 during C4 Photosynthesis.  
Karen J. Bailey, Julie E. Gray, Robert P. Walker, and Richard C. Leegood  
479

Shunichi Takahashi, Hermann Bauwe, and Murray Badger  
487

CELL BIOLOGY AND SIGNAL TRANSDUCTION

Actin Dynamics in Papilla Cells of Brassica rapa during Self- and Cross-Pollination.  
Megumi Iwano, Hiroshi Shiba, Kyoko Matoba, Teruhiko Mina, Miyuki Funato, Tetsuyuki Enlani, Pula Nakayama, Hiroko Shimasato, Akio Takaoka, Akira Isogai, and Seiji Takayama  
72

Participation of Endomembrane Cation/H+ Exchanger AtCHX20 in Osmoregulation of Guard Cells.  
Senthilkumar Padmanabhan, Salil Chanroj, June M. Kwak, Xiyan Li, John M. Ward, and Heven Sze  
82

Nitric Oxide and cGMP Signaling in Calcium-Dependent Development of Cell Polarity in Ceratopteris richardii.  
Mari L. Sabit, Kacey E. Morris, Stanley J. Roux, and D. Marshall Porterfield  
94

E2F Regulates FASCIATA1, a Chromatin Assembly Gene Whose Loss Switches on the Endocycle and Activates Gene Expression by Changing the Epigenetic Status.  
Elena Ramirez-Parra and Crisanto Gutierrez  
105

GIGANTEA Regulates Phytochrome A-Mediated Photomorphogenesis Independently of Its Role in the Circadian Clock.  
Karina Andrea Oliverio, Mariä Crepy, Ellen L. Martin-Tryon, Raechel Milich, Stacey L. Harner, Jo Putterill, Marcelo J. Yanovsky, and Jorge J. Casal  
495

DEVELOPMENT AND HORMONE ACTION

The Rice YABBY1 Gene Is Involved in the Feedback Regulation of Gibberellin Metabolism.  
Mingqiu Dai, Yu Zhao, Qian Ma, Yongfeng Hu, Peter Hedden, Qifa Zhang, and Dao-Xiu Zhou  
121
Genetic Interactions of TGA Transcription Factors in the Regulation of Pathogenesis-Related Genes and Disease Resistance in Arabidopsis. Meenu Kesarkani, Jungmin Yoo, and Xinnian Dong 336

Transcript Profiling of Poplar Leaves upon Infection with Compatible and Incompatible Strains of the Foliar Rust Melampsora larici-populina. Cécile Rinaldi, Annegret Kohler, Pascal Frey, Frédéric Duchaussay, Nathalie Ningre, Arnaud Couloux, Patrick Wincker, Didier Le Thiec, Silvia Fluch, Francis Martin, and Sébastien Duplessis 347

Resistance to Botrytis cinerea Induced in Arabidopsis by Elicitors Is Independent of Salicylic Acid, Ethylene, or Jasmonate Signaling But Requires PHYTOALEXIN DEFICIENT3. Simone Ferrari, Roberta Gallelli, Carine Denoux, Giulia De Lorenzo, Frederick M. Ausubel, and Julia Dewdney 367

Magnaporthe grisea Infection Triggers RNA Variation and Antisense Transcript Expression in Rice. Malali Gowda, R.-C. Venu, Huameng Li, Chatchawan Jantasuriyarat, Songbiao Chen, Maria Bellizzi, Vishal Pampanwar, HyeRan Kim, Ralph A. Dean, Eric Stahlberg, Rod Wing, Cari Soderlund, and Guo-Liang Wang 524

SYSTEMS BIOLOGY, MOLECULAR BIOLOGY, AND GENE REGULATION

A WUSCHEL-LIKE HOMEOBOX Gene Represses a YABBY Gene Expression Required for Rice Leaf Development. Mingqiu Dai, Yongfeng Hu, Yu Zhao, Huifang Liu, and Dao-Xiu Zhou 380


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

Indicates Web-only data.

Open Access articles can be viewed online without a subscription.