On the Cover: *Nicotiana attenuata* is a native diploid tobacco that has been developed as a model system for the study of traits important for ecological performance. It grows in the post-fire habitat in the Great Basin Desert of the southwestern United States and is attacked by a variety of herbivores and pathogens as it germinates from long-lived seedbanks after fires. Depicted is a fourth instar larva of *Manduca quinquemaculata* attacking a flowering-stage plant growing in Utah. Attack elicits increases in transcripts of a germin-like protein (GLP). When *NaGLP* is silenced by transformation or virus-induced gene silencing, attack-elicited H$_2$O$_2$, diterpene glycoside, and trypsin proteinase inhibitor defense responses are also silenced and the plant’s susceptibility to herbivore attack increases, without influencing herbivore-elicited jasmonate and salicylate bursts or the release of the volatile organic compounds that function as an indirect defense. These results (described by Lou and Baldwin, pp. 1126–1136) demonstrate that *NaGLP* mediates some of the herbivore-elicited direct defenses in *N. attenuata*. Cover image by Danny Kessler. Cover layout by Ash Csikos.

### ON THE INSIDE

*Peter V. Minorsky*

### GENOME ANALYSIS

**[W]** Abundantly and Rarely Expressed Lhc Protein Genes Exhibit Distinct Regulation Patterns in Plants. *Frank Klimmek,* Andreas Sjo¨din, Christos Noutsos, Dario Leister, and Stefan Jansson

### BIOINFORMATICS


**[W]** OA1 AGRI and AtRegNet. A Platform to Link cis-Regulatory Elements and Transcription Factors into Regulatory Networks. *Saranyan K. Palaniswamy, Stephen James, Hao Sun, Rebecca S. Lamb, Ramana V. Davuluri, and Erich Grotewold*

### RESEARCH ARTICLES

#### BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES

An Arabidopsis Mutant Impaired in Coenzyme A Biosynthesis Is Sugar Dependent for Seedling Establishment. *Silvia Rubio, Tony R. Larson, Miguel Gonzalez-Guzman, Santiago Alejandro, Ian A. Graham, Ramón Serrano, and Pedro L. Rodríguez*

Interaction between Arabidopsis Brca2 and Its Partners Rad51, Dmc1, and Dss1. Eloïse Dray, Nicolas Siaud, Emeline Dubois, and Marie-Pascale Doutriaux

Function and Characterization of Starch Synthase I Using Mutants in Rice. Naoko Fujita, Mayumi Yoshida, Noriko Asakura, Takashi Ohdan, Akio Miyao, Hirohiko Hirochika, and Yasunori Nakamura

G-Protein-Coupled Receptor 1, G-Protein Ga-Subunit 1, and Prephenate Dehydratase 1 Are Required for Blue Light-Induced Production of Phenylalanine in Etiolated Arabidopsis. Katherine Mary Warpeha, Syed Salman Lateef, Yevgeniya Lapik, Marybeth Anderson, Bao-Shiang Lee, and Lon Seth Kaufman

Multiple Heme Oxygenase Family Members Contribute to the Biosynthesis of the Phytochrome Chromophore in Arabidopsis. Thomas J. Emborg, Joseph M. Walker, Bosl Noh, and Richard D. Vierstra

Identification and Characterization of the Arabidopsis Orthologs of Nuclear Transport Factor 2, the Nuclear Import Factor of Ran. Qiao Zhao, Sara Leung, Anita H. Corbett, and Iris Meier

Posttranslational Regulation of Nitrate Reductase Strongly Affects the Levels of Free Amino Acids and Nitrate, whereas Transcriptional Regulation Has Only Minor Influence. Unni S. Lea, Marie-Thérèse Leydecker, Isabelle Quilleré, Christian Meyer, and Cathrine Lillo

Characterization of low phosphorus insensitive Mutants Reveals a Crosstalk between Low Phosphorus-Induced Determinate Root Development and the Activation of Genes Involved in the Adaptation of Arabidopsis to Phosphorus Deficiency. Lenin Sánchez-Calderón, José López-Bucio, Alejandra Chacón-López, Abel Gutiérrez-Ortega, Esmeralda Hernández-Abreu, and Luis Herrera-Estrella

Control of Floral Meristem Determinacy in Petunia by MADS-Box Transcription Factors. Silvia Ferrario, Anna V. Shchennikova, John Franken, Richard G.H. Immink, and Gerco C. Angenent

A Role for Auxin Response Factor 19 in Auxin and Ethylene Signaling in Arabidopsis. Jisheng Li, Xinhua Dai, and Yunde Zhao


Phytochrome B Represses Teosinte Branched1 Expression and Induces Sorghum Axillary Bud Outgrowth in Response to Light Signals. Tesfamichael H. Kebrom, Byron L. Burston, and Scott A. Finlayson

A Role for Mitochondria in the Establishment and Maintenance of the Maize Root Quiescent Center. Keni Jiang, Tracy Ballinger, Daisy Li, Shibo Zhang, and Lewis Feldman
ENVIRONMENTAL STRESS AND ADAPTATION TO STRESS

A Central Role for the Nitrate Transporter NRT2.1 in the Integrated Morphological and Physiological Responses of the Root System to Nitrogen Limitation in Arabidopsis. Tony Remans, Philippe Nacry, Marjorie Percent, Thomas Girin, Pascal Tillard, Marc Lepetit, and Alain Gojon

AtATM3 Is Involved in Heavy Metal Resistance in Arabidopsis. Do-Young Kim, Lucien Bovet, Sergei Kushnir, Eun Woon Noh, Enrico Martinoia, and Youngsook Lee

GENETICS, GENOMICS, AND MOLECULAR EVOLUTION

Forward Genetic Analysis of the Circadian Clock Separates the Multiple Functions of ZEITLUPE. Éva Kevei, Péter Gyula, Anthony Hall, László Kozma-Bognár, Woe-Yeon Kim, Maria E. Eriksson, Réka Tóth, Shigeru Hanano, Bálázs Fehér, Megan M. Southern, Ruth M. Bastow, András Viczán, Victoria Hibberd, Seth J. Davis, David E. Somers, Ferenc Nagy, and Andrew J. Millar


A Segment of the Apospory-Specific Genomic Region Is Highly Microsyntenic Not Only between the Apomicts Pennisetum squamulatum and Buffelgrass, But Also with a Rice Chromosome 11 Centromeric-Proximal Genomic Region. Gustavo Gualtieri, Joann A. Conner, Daryl T. Morishige, L. David Moore, John E. Mullet, and Peggy Ozias-Akins

GOLD HULL AND INTERNODE2 Encodes a Primarily Multifunctional Cinnamyl-Alcohol Dehydrogenase in Rice. Kewei Zhang, Qian Qian, Zejun Huang, Yajin Wang, Ming Li, Lilan Hong, Dali Zeng, Minghong Gu, Chengcai Chu, and Zhukuan Cheng


Point Mutations with Positive Selection Were a Major Force during the Evolution of a Receptor-Kinase Resistance Gene Family of Rice. Xinli Sun, Yinglong Cao, and Shiping Wang

PLANTS INTERACTING WITH OTHER ORGANISMS

Wound-Induced Terpene Synthase Gene Expression in Sitka Spruce That Exhibit Resistance or Susceptibility to Attack by the White Pine Weevil. Ashley Byun-McKay, Kimberley-Ann Godard, Morteza Toudefallah, Diane M. Martin, Rene Alfaro, John King, Joerg Bohlmann, and Aine L. Plant

Effects of Feeding Spodoptera littoralis on Lima Bean Leaves. III. Membrane Depolarization and Involvement of Hydrogen Peroxide. Massimo E. Maffei, Axel Mithöfer, Gen-Ichiro Arimura, Hannes Uchtenhagen, Simone Bossi, Cinzia M. Bertea, Laura Starvaggi Cucuzza, Mara Novero, Veronica Volpe, Stefano Quadro, and Wilhelm Boland

Silencing of a Germin-Like Gene in Nicotiana attenuata Improves Performance of Native Herbivores. Yonggen Lou and Ian T. Baldwin
HIGH-AFFINITY NITRATE TRANSPORT IN ROOTS OF ARABIDOPSIS DEPENDS ON EXPRESSION OF THE NAR2-LIKE GENE AtNRT3.1.

Mamoru Okamoto, Anshuman Kumar, Wenbin Li, Ye Wang, M. Yaesh Siddiqi, Nigel M. Crawford, and Anthony D.M. Glass

[WI] Indicates Web-only data.

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