

On the Cover: Germination of pea seeds on ice. Dry pea seeds were placed on ice in a covered polystyrene box that was stored at 1.5°C. Ice was changed weekly and the photograph was taken after 6 weeks. When transferred to soil, the ice-germinated seeds developed into healthy pea plants. Such a performance is likely to be related to the amazing temperature tolerance of seed mitochondria that are able to sustain oxidative phosphorylation at subfreezing temperatures, using exogenous NADH as a substrate (Stupnikova et al., pp. 326–335).

ON THE INSIDE

Peter V. Minorsky

1

BREAKTHROUGH TECHNOLOGIES

Agroinjection of Tomato Fruits. A Tool for Rapid Functional Analysis of Transgenes Directly in Fruit.
Diego Orzaez, Sophie Mirabel, Willemien H. Wieland, and Antonio Granell

3

BIOINFORMATICS

^[OAI]Oryzabase. An Integrated Biological and Genome Information Database for Rice. *Nori Kurata and Yukiko Yamazaki*

12

RESEARCH ARTICLES

BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES

Role of Petal-Specific Orcinol O-Methyltransferases in the Evolution of Rose Scent. *Gabriel Scalliet, Claire Lionnet, Mickaël Le Behec, Laurence Dutron, Jean-Louis Magnard, Sylvie Baudino, Véronique Bergougnoux, Frédéric Jullien, Pierre Chambrier, Philippe Vergne, Christian Dumas, J. Mark Cock, and Philippe Huguency*

18

^[W]^[OAI]A coumaroyl-ester-3-hydroxylase Insertion Mutant Reveals the Existence of Nonredundant *meta*-Hydroxylation Pathways and Essential Roles for Phenolic Precursors in Cell Expansion and Plant Growth.

Nawroz Abdulrazzak, Brigitte Pollet, Jürgen Ehlting, Kim Larsen, Carole Asnaghi, Sebastien Ronseau, Caroline Proux, Mathieu Erhardt, Virginie Seltzer, Jean-Pierre Renou, Pascaline Ullmann, Markus Pauly, Catherine Lapierre, and Danièle Werck-Reichhart

30

^[W]ARABINAN DEFICIENT 1 Is a Putative Arabinosyltransferase Involved in Biosynthesis of Pectic Arabinan in Arabidopsis. *Jesper Harholt, Jacob Krüger Jensen, Susanne Oxenbøll Sørensen, Caroline Orfila, Markus Pauly, and Henrik Vibe Scheller*

49

^[W]An LL-Diaminopimelate Aminotransferase Defines a Novel Variant of the Lysine Biosynthesis Pathway in Plants. *André O. Hudson, Bijay K. Singh, Thomas Leustek, and Charles Gilvarg*

292

Continued on next page

BIOENERGETICS AND PHOTOSYNTHESIS

- ^{[W][OA]}The Photorespiratory Arabidopsis *shm1* Mutant Is Deficient in *SHM1*. Lars M. Voll, Aziz Jamai, Petra Renné, Hildegard Voll, C. Robertson McClung, and Andreas P.M. Weber 59

CELL BIOLOGY AND SIGNAL TRANSDUCTION

- Cell Type-Specific Role of the Retinoblastoma/E2F Pathway during Arabidopsis Leaf Development. Bénédicte Desvoyes, Elena Ramirez-Parra, Qi Xie, Nam-Hai Chua, and Crisanto Gutierrez 67

- Lectin Receptor Kinases Participate in Protein-Protein Interactions to Mediate Plasma Membrane-Cell Wall Adhesions in Arabidopsis. Anne Gouget, Virginie Senchou, Francine Govers, Arnaud Sanson, Annick Barre, Pierre Rougé, Rafael Pont-Lezica, and Hervé Canut 81

- Overexpression of *RAN1* in Rice and Arabidopsis Alters Primordial Meristem, Mitotic Progress, and Sensitivity to Auxin. Xin Wang, Yunyuan Xu, Ye Han, Shilai Bao, Jizhou Du, Ming Yuan, Zhihong Xu, and Kang Chong 91

- ^[W]MICROTUBULE ORGANIZATION 1 Regulates Structure and Function of Microtubule Arrays during Mitosis and Cytokinesis in the Arabidopsis Root. Eiko Kawamura, Regina Himmelspach, Madeleine C. Rashbrooke, Angela T. Whittington, Kevin R. Gale, David A. Collings, and Geoffrey O. Wasteneys 102

- ^[W]*ABA-Hypersensitive Germination3* Encodes a Protein Phosphatase 2C (*AtPP2CA*) That Strongly Regulates Abscisic Acid Signaling during Germination among Arabidopsis Protein Phosphatase 2Cs. Tomo Yoshida, Noriyuki Nishimura, Nobutaka Kitahata, Takashi Kuromori, Takuya Ito, Tadao Asami, Kazuo Shinozaki, and Takashi Hirayama 115

- The Regulator of G-Protein Signaling Proteins Involved in Sugar and Abscisic Acid Signaling in Arabidopsis Seed Germination. Yun Chen, Fangfang Ji, Hong Xie, Jiansheng Liang, and Jianhua Zhang 302

DEVELOPMENT AND HORMONE ACTION

- ^[W]The Protein Phosphatase *AtPP2CA* Negatively Regulates Abscisic Acid Signal Transduction in Arabidopsis, and Effects of *abh1* on *AtPP2CA* mRNA. Josef M. Kuhn, Aurélien Boisson-Dernier, Marie B. Dizon, Mohammad H. Maktabi, and Julian I. Schroeder 127

- ^[W]The Arabidopsis Group 1 LATE EMBRYOGENESIS ABUNDANT Protein ATEM6 Is Required for Normal Seed Development. Alicia J. Manfre, Lea M. Lanni, and William R. Marcotte Jr. 140

- Grapes on Steroids. Brassinosteroids Are Involved in Grape Berry Ripening. Gregory M. Symons, Christopher Davies, Yuri Shavrukov, Ian B. Dry, James B. Reid, and Mark R. Thomas 150

- ^[OA]The Onset of Gravisensitivity in the Embryonic Root of Flax. Zhong Ma and Karl H. Hasenstein 159

- Cell Wall Proteome in the Maize Primary Root Elongation Zone. I. Extraction and Identification of Water-Soluble and Lightly Ionically Bound Proteins. Jinming Zhu, Sixue Chen, Sophie Alvarez, Victor S. Asirvatham, Daniel P. Schachtman, Yajun Wu, and Robert E. Sharp 311

ENVIRONMENTAL STRESS AND ADAPTATION TO STRESS

- Organ-Specific Expression of Glutathione S-Transferases and the Efficacy of Herbicide Safeners in Arabidopsis. *Ben P. DeRidder and Peter B. Goldsbrough* 167
- ^[W]Increased Accumulation of Cuticular Wax and Expression of Lipid Transfer Protein in Response to Periodic Drying Events in Leaves of Tree Tobacco. *Kimberly D. Cameron, Mark A. Teece, and Lawrence B. Smart* 176
- Pea Seed Mitochondria Are Endowed with a Remarkable Tolerance to Extreme Physiological Temperatures. *Irina Stupnikova, Abdelilah Benamar, Dimitri Tolleter, Johann Grelet, Genadii Borovskii, Albert-Jean Dorne, and David Machereel* 326

GENETICS, GENOMICS, AND MOLECULAR EVOLUTION

- ^{[W][OA]}Identification of a Glyphosate-Resistant Mutant of Rice 5-Enolpyruvylshikimate 3-Phosphate Synthase Using a Directed Evolution Strategy. *Min Zhou, Honglin Xu, Xiaoli Wei, Zhiqiang Ye, Liping Wei, Weimin Gong, Yongqin Wang, and Zhen Zhu* 184
- Distinct Roles of the First Introns on the Expression of Arabidopsis Profilin Gene Family Members. *Young-Min Jeong, Jeong-Hwan Mun, Ilha Lee, Je Chang Woo, Choo Bong Hong, and Sang-Gu Kim* 196
- ^[W]Patterns of Sequence Loss and Cytosine Methylation within a Population of Newly Resynthesized *Brassica napus* Allopolyploids. *Lewis N. Lukens, J. Chris Pires, Enrique Leon, Robert Vogelzang, Lynne Oslach, and Thomas Osborn* 336
- ^[W]Proteomic Analysis of Different Mutant Genotypes of Arabidopsis Led to the Identification of 11 Proteins Correlating with Adventitious Root Development. *Céline Sorin, Luc Negroni, Thierry Balliau, Hélène Corti, Marie-Pierre Jacquemot, Marlène Davanture, Göran Sandberg, Michel Zivy, and Catherine Bellini* 349

PLANTS INTERACTING WITH OTHER ORGANISMS

- Heterotrimeric G Proteins Facilitate Arabidopsis Resistance to Necrotrophic Pathogens and Are Involved in Jasmonate Signaling. *Yuri Trusov, James Edward Rookes, David Chakravorty, David Armour, Peer Martin Schenk, and José Ramón Botella* 210
- ^[W]Transcript Analysis of Early Nodulation Events in *Medicago truncatula*. *Dasharath Prasad Lohar, Natalya Sharopova, Gabriella Endre, Silvia Peñuela, Deborah Samac, Christopher Town, Kevin A.T. Silverstein, and Kathryn A. VandenBosch* 221
- ^[W]A Circadian Rhythm-Regulated Tomato Gene Is Induced by Arachidonic Acid and *Phytophthora infestans* Infection. *Philip D. Weyman, Zhiqiang Pan, Qin Feng, David G. Gilchrist, and Richard M. Bostock* 235
- The Outcomes of Concentration-Specific Interactions between Salicylate and Jasmonate Signaling Include Synergy, Antagonism, and Oxidative Stress Leading to Cell Death. *Luis A.J. Mur, Paul Kenton, Rainer Atzorn, Otto Miersch, and Claus Wasternack* 249
- The *DMI1* and *DMI2* Early Symbiotic Genes of *Medicago truncatula* Are Required for a High-Affinity Nodulation Factor-Binding Site Associated to a Particulate Fraction of Roots. *Bridget V. Hogg, Julie V. Cullimore, Raoul Ranjeva, and Jean-Jacques Bono* 365

WHOLE PLANT AND ECOPHYSIOLOGY

- Analysis of Freeze-Thaw Embolism in Conifers. The Interaction between Cavitation Pressure and Tracheid Size. *Jarmila Pittermann and John S. Sperry* 374
- Phloem Loading in Two Scrophulariaceae Species. What Can Drive Symplastic Flow via Plasmodesmata? *Olga V. Voitsekhovskaja, Olga A. Koroleva, Denis R. Batashev, Christian Knop, A. Deri Tomos, Yuri V. Gamalei, Hans-Walter Heldt, and Gertrud Lohaus* 383

Continued from preceding page

SYSTEMS BIOLOGY, MOLECULAR BIOLOGY, AND GENE REGULATION

^[W]Repressing the Expression of the SUCROSE NONFERMENTING-1-RELATED PROTEIN KINASE Gene in Pea Embryo Causes Pleiotropic Defects of Maturation Similar to an Abscisic Acid-Insensitive Phenotype.

Ruslana Radchuk, Volodymyr Radchuk, Winfriede Weschke, Ljudmilla Borisjuk, and Hans Weber

263

Identification of the Flavonoid Hydroxylases from Grapevine and Their Regulation during Fruit Development.

Jochen Bogs, Ali Ebadi, Debra McDavid, and Simon P. Robinson

279

CORRECTION

Ethylene Inhibits Abscisic Acid-Induced Stomatal Closure in Arabidopsis. *Y. Tanaka, T. Sano, M. Tamaoki, N. Nakajima, N. Kondo, and S. Hasezawa*

396

^[W] Indicates Web-only data.

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