On the Cover: Many plants use self-incompatibility (SI) to reject genetically identical (“self”) pollen to prevent inbreeding. In *Papaver rhoeas* (the field poppy), SI triggers a Ca\(^{2+}\)-dependent signaling network in incompatible pollen, involving several targets, including actin depolymerization and phosphorylation of soluble inorganic pyrophosphatases. Pollen tube inhibition and programmed cell death (PCD) result. A mitogen-activated protein kinase (MAPK), p56, activated by SI, had been previously identified, but its role was not known. In this issue, Li et al. (pp. 236–245) establish a link between the SI-activated MAPK and initiation of PCD in incompatible *Papaver* pollen. Their data implicate MAPK involvement in regulating SI-induced caspase-3-like/DEVDase activation and progression of PCD in incompatible pollen. Although MAPK signaling in PCD is well established, it has not previously been shown to be involved in SI. The cover photograph shows a flower of *P. rhoeas* (var. Shirley) being pollinated by a bee. The image was created by Noni Franklin-Tong.

**BIOCHEMICAL ARTICLES**

**BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES**

**[W][OA]** Enzymatic Properties and Subcellular Localization of Arabidopsis β-N-Acetylhexosaminidases.  
*Richard Strasser, Jayakumar Singh Bondili, Jennifer Schoberer, Barbara Soebera, Eva Liebterm, Josef Glössl, Friedrich Altman, Herta Steinkellner, and Lukas Mach*

**[W][OA]** Glucan, Water Dikinase Activity Stimulates Breakdown of Starch Granules by Plastidial β-Amylases.  
*Christoph Edner, Jing Li, Tanja Albrecht, Sebastian Mahlow, Mahdi Hejazi, Hasnain Hussain, Fatma Kaplan, Charles Guy, Steven M. Smith, Martin Steup, and Gerhard Ritte*

**BIOENERGETICS AND PHOTOSYNTHESIS**

**[W][OA]** A Chlorophyll-Deficient Rice Mutant with Impaired Chlorophyllide Esterification in Chlorophyll Biosynthesis.  
*Ziming Wu, Xin Zhang, Bing He, Liping Diao, Shenglan Sheng, Jiulin Wang, Xiuping Guo, Ning Su, Lifeng Wang, Ling Jiang, Chunming Wang, Huqu Zhai, and Jianmin Wan*

**[W][OA]** Mitochondrial Protein Lipoylation Does Not Exclusively Depend on the mtKAS Pathway of de Novo Fatty Acid Synthesis in Arabidopsis.  
*Ralph Ewald, Üner Kolukisaoglu, Ursula Bauwe, Stefan Mikkat, and Hermann Bauwe*
Changes in Respiratory Mitochondrial Machinery and Cytochrome and Alternative Pathway Activities in Response to Energy Demand Underlie the Acclimation of Respiration to Elevated CO₂ in the Invasive Opuntia ficus-indica. Nuria Gomez-Casanovas, Elena Blanc-Betes, Miquel A. Gonzalez-Meler, and Joaquin Azcon-Bieto

CELL BIOLOGY AND SIGNAL TRANSDUCTION

Characterization of AgMaT2, a Plasma Membrane Mannitol Transporter from Celery, Expressed in Phloem Cells, Including Phloem Parenchyma Cells. Marjorie Juchaux-Cachau, Lucie Landouar-Arsivaud, Jean-Philippe Pichaut, Claire Campion, Benoît Porcheron, Julien Jeaffre, Nathalie Noiraud-Romy, Philippe Simonneau, Laurence Maurouset, and Rémi Lemoine

RTE1 Is a Golgi-Associated and ETR1-Dependent Negative Regulator of Ethylene Responses. Xin Zhou, Qian Liu, Fang Xie, and Chi-Kuang Wen

A Putative CCAAT-Binding Transcription Factor Is a Regulator of Flowering Timing in Arabidopsis. Xiaoning Cai, Jenny Ballif, Saori Endo, Elizabeth Davis, Mingxiang Liang, Dong Chen, Daryll DeWald, Joel Kreps, Tong Zhu, and Yajun Wu

DEVELOPMENT AND HORMONE ACTION

A Putative Hydroxysteroid Dehydrogenase Involved in Regulating Plant Growth and Development. Fengling Li, Tadao Asami, Xianzhong Wu, Edward W.T. Tsang, and Adrian J. Cutler

A Putative CCAAT-Binding Transcription Factor Is a Regulator of Flowering Timing in Arabidopsis. Xiaoning Cai, Jenny Ballif, Saori Endo, Elizabeth Davis, Mingxiang Liang, Dong Chen, Daryll DeWald, Joel Kreps, Tong Zhu, and Yajun Wu

ENVIRONMENTAL STRESS AND ADAPTATION TO STRESS

A Study of Gibberellin Homeostasis and Cryptochrome-Mediated Blue Light Inhibition of Hypocotyl Elongation. Xiaoying Zhao, Xuhong Yu, Eloise Foo, Gregory M. Symons, Javier Lopez, Krishnaprasad T. Bendelakkal, Jing Xiang, James L. Weller, Xuanming Liu, James B. Reid, and Chentao Lin

Genetic Analysis of SUMOylation in Arabidopsis: Conjugation of SUMO1 and SUMO2 to Nuclear Proteins Is Essential. Scott A. Saracco, Marcus J. Miller, Jasmina Kurepa, and Richard D. Vierstra

The Arabidopsis BAPI and BAP2 Genes Are General Inhibitors of Programmed Cell Death. Huijun Yang, Shuhua Yang, Yongqing Li, and Jian Hua

Continued on next page

A Bacterial Transgene for Catalase Protects Translation of D1 Protein during Exposure of Salt-Stressed Tobacco Leaves to Strong Light. Khaled Al-Taweel, Toshio Iwaki, Yukinori Yabuta, Shigeru Shigeoka, Norio Murata, and Akira Wadano 258

Effect of Secondary Metabolites Associated with Anaerobic Soil Conditions on Ion Fluxes and Electrophysiology in Barley Roots. Jiayin Pang, Tracey Cuin, Lana Shabala, Meixue Zhou, Neville Mendham, and Sergey Shabala 266

GENETICS, GENOMICS, AND MOLECULAR EVOLUTION
Differential Expression of Genes Important for Adaptation in Capsella bursa-pastoris (Brassicaceae). Tanja Slotte, Karl Holm, Lauren M. McIntyre, Ulf Lagercrantz, and Martin Lascoux 160

PLANTS INTERACTING WITH OTHER ORGANISMS

Medicago LYK3, an Entry Receptor in Rhizobial Nodulation Factor Signaling. Patrick Smit, Erik Limpens, Rene Geurts, Elena Fedorova, Elena Dolgikh, Clare Gough, and Ton Bisseling 183

The Medicago truncatula DMI1 Protein Modulates Cytosolic Calcium Signaling. Edgar Peiter, Jongho Sun, Anne B. Heckmann, Muthusubramanian Venkateshvaran, Brendan K. Riely, Marisa S. Otegui, Anne Edwards, Glenn Freshour, Michael G. Hahn, Douglas R. Cook, Dale Sanders, Giles E.D. Oldroyd, J. Allan Downie, and Jean-Michel Ané 192

AtNUDT7, a Negative Regulator of Basal Immunity in Arabidopsis, Modulates Two Distinct Defense Response Pathways and Is Involved in Maintaining Redox Homeostasis. Xiaochun Ge, Guo-Jing Li, Sheng-Bing Wang, Huifen Zhu, Tong Zhu, Xun Wang, and Yiji Xia 204

SYSTEMS BIOLOGY, MOLECULAR BIOLOGY, AND GENE REGULATION

A Sepal-Expressed ADP-Glucose Pyrophosphorylase Gene (NtAGP) Is Required for Petal Expansion Growth in 'Xanthi' Tobacco. Man Sup Kwak, Sung Ran Min, Si-Myung Lee, Kyung-Nam Kim, Jang Ryol Liu, Kyung-Hee Paek, Jeong Sheep Shin, and Jung Myung Bae 277

Continued on next page
CORRECTIONS

AtATM3 Is Involved in Heavy Metal Resistance in Arabidopsis.  D.-Y. Kim, L. Bovet, S. Kushnir, E. W. Noh, E. Martinoia, and Y. Lee

Expression of Genomic AtCYCD2;1 in Arabidopsis Induces Cell Division at Smaller Cell Sizes: Implications for the Control of Plant Growth.  R. Qi and P. C. L. John


[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.