

The electronic form of this issue, available as of June 11, 2012, at www.plantphysiol.org, is considered the journal of record.

On the Cover: Strawberry (*Fragaria* × *ananassa*) fruit flavor and aroma are among the most appreciated quality traits by consumers; as such, the improvement of strawberry aroma is receiving increasing importance in breeding programs. However, breeding for better aroma, particularly in polyploid crops, presents many challenges and requires a previous knowledge of the genetic determinants controlling its variation. More than 300 volatile compounds have been detected in strawberry, although the regulatory mechanisms controlling their content remain largely unknown. In this issue, Zorrilla-Fontanesi et al. (pp. 851–870) carried out a metabolomic and genetic analysis of strawberry fruit volatiles and identified genomic regions controlling their variation. Using a candidate gene approach and molecular analyses, their study further shows that the gene *FaOMT* is the locus controlling natural variation on mesifurane content and identifies a polymorphism in its promoter that it is likely responsible for both driving high *FaOMT* expression in ripe strawberry receptacle and mesifurane production. The cover picture depicts a strawberry field in Huelva, Spain, where the mapping population was grown and where more than 95% of Spanish strawberry fruit is produced. Below, the graph shows total ion counts of a gas chromatography-mass spectrometry chromatogram of the volatile fraction from ripe strawberry fruit. Image and design by José L. Rambla and Iraida Amaya.

ON THE INSIDE

Peter V. Minorsky

529

GENOME ANALYSIS

^{[W][OA]}Transcription Factors of Lotus: Regulation of Isoflavonoid Biosynthesis Requires Coordinated Changes in Transcription Factor Activity. *Dale Shelton, Maria Stranne, Lisbeth Mikklesen, Nima Pakseresht, Tracey Welham, Hideki Hiraka, Satoshi Tabata, Shusei Sato, Suzanne Paquette, Trevor L. Wang, Cathie Martin, and Paul Bailey*

531

BREAKTHROUGH TECHNOLOGIES

^{[W][OA]}DNA Millichips as a Low-Cost Platform for Gene Expression Analysis. *Kurt W. Heinrich, Jamison Wolfer, DongGee Hong, Melissa LeBlanc, and Michael R. Sussman*

548

SCIENTIFIC CORRESPONDENCE

^[W]Studies on Subcellular Compartmentalization of Plant Pathogenic Noncoding RNAs Give New Insights into the Intracellular RNA-Traffic Mechanisms. *Gustavo Gómez and Vicente Pallas*

558

RESEARCH ARTICLES

BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES

^[W]A Novel Lactone-Forming Carboxylesterase: Molecular Identification of a Tuliposide A-Converting Enzyme in Tulip. *Taiji Nomura, Shinjiro Ogita, and Yasuo Kato*

565

^[W]The Plastid Genome-Encoded Ycf4 Protein Functions as a Nonessential Assembly Factor for Photosystem I in Higher Plants. *Katharina Krech, Stephanie Ruf, Fifi F. Masduki, Wolfram Thiele, Dominika Bednarczyk, Christin A. Albus, Nadine Tiller, Claudia Hasse, Mark A. Schöttler, and Ralph Bock*

579

^[W]Atypical Thioredoxins in Poplar: The Glutathione-Dependent Thioredoxin-Like 2.1 Supports the Activity of Target Enzymes Possessing a Single Redox Active Cysteine. *Kamel Chibani, Lionel Tarrago, José Manuel Gualberto, Gunnar Wingsle, Pascal Rey, Jean-Pierre Jacquot, and Nicolas Rouhier*

592

Continued on next page

- [C][W][OA]The Acyl-Acyl Carrier Protein Synthetase from *Synechocystis* sp. PCC 6803 Mediates Fatty Acid Import. *Simon von Berlepsch, Hans-Henning Kunz, Susanne Brodesser, Patrick Fink, Kay Marin, Ulf-Ingo Flügge, and Markus Gierth* 606
- [W]Characterization of Three O-Methyltransferases Involved in Noscapine Biosynthesis in Opium Poppy. *Thu-Thuy T. Dang and Peter J. Facchini* 618

CELL BIOLOGY AND SIGNAL TRANSDUCTION

- [W][OA]Auxin Activates the Plasma Membrane H⁺-ATPase by Phosphorylation during Hypocotyl Elongation in Arabidopsis. *Koji Takahashi, Ken-ichiro Hayashi, and Toshinori Kinoshita* 632
- [C][W][OA]ATP-Binding Cassette B4, an Auxin-Efflux Transporter, Stably Associates with the Plasma Membrane and Shows Distinctive Intracellular Trafficking from That of PIN-FORMED Proteins. *Misuk Cho, Zee-Won Lee, and Hyung-Taeg Cho* 642
- Pattern of Deposition of Cell Wall Polysaccharides and Transcript Abundance of Related Cell Wall Synthesis Genes during Differentiation in Barley Endosperm. *Sarah M. Wilson, Rachel A. Burton, Helen M. Collins, Monika S. Doblin, Filomena A. Pettolino, Neil Shirley, Geoffrey B. Fincher, and Antony Bacic* 655
- [W]Purification and Characterization of ZmRIP1, a Novel Reductant-Inhibited Protein Tyrosine Phosphatase from Maize. *Bingbing Li, Yanxia Zhao, Liyan Liang, Huibo Ren, Yu Xing, Lin Chen, Mingzhu Sun, Yuanhua Wang, Yu Han, Haifeng Jia, Conglin Huang, Zhongyi Wu, and Wensuo Jia* 671
- [W][OA]Characterization of the Plasma Membrane H⁺-ATPase in the Liverwort *Marchantia polymorpha*. *Masaki Okumura, Shin-ichiro Inoue, Koji Takahashi, Kimitsune Ishizaki, Takayuki Kohchi, and Toshinori Kinoshita* 826

DEVELOPMENT AND HORMONE ACTION

- [W][OA]Histidine Kinase Activity of the Ethylene Receptor ETR1 Facilitates the Ethylene Response in Arabidopsis. *Brenda P. Hall, Samina N. Shakeel, Madiha Amir, Noor Ul Haq, Xiang Qu, and G. Eric Schaller* 682
- [W][OA]Genetic Evidence for the Reduction of Brassinosteroid Levels by a BAH1 Acyltransferase-Like Protein in Arabidopsis. *Hyungmin Roh, Cheol Woong Jeong, Shozo Fujioka, Youn Kyung Kim, Sookjin Lee, Ji Hoon Ahn, Yang Do Choi, and Jong Seob Lee* 696
- [C][W]The Tobacco *BLADE-ON-PETIOLE2* Gene Mediates Differentiation of the Corolla Abscission Zone by Controlling Longitudinal Cell Expansion. *Xiao-Min Wu, Yi Yu, Li-Bo Han, Chun-Li Li, Hai-Yun Wang, Nai-Qin Zhong, Yuan Yao, and Gui-Xian Xia* 835

ENVIRONMENTAL STRESS AND ADAPTATION TO STRESS

- [W][OA]The Chloroplast Triggers Developmental Reprogramming When MUTS HOMOLOG1 Is Suppressed in Plants. *Ying-Zhi Xu, Roberto de la Rosa Santamaria, Kamaldeep S. Viridi, Maria P. Arrieta-Montiel, Fareha Razvi, Shaoqing Li, Guodong Ren, Bin Yu, Danny Alexander, Lining Guo, Xuehui Feng, Ismail M. Dweikat, Tom E. Clemente, and Sally A. Mackenzie* 710
- [W][OA]Uncovering Small RNA-Mediated Responses to Cold Stress in a Wheat Thermosensitive Genic Male-Sterile Line by Deep Sequencing. *Zhonghui Tang, Liping Zhang, Chenguang Xu, Shaohua Yuan, Fengting Zhang, Changping Zhao, and Yonglian Zheng* 721
- [W][OA]DELLA Signaling Mediates Stress-Induced Cell Differentiation in Arabidopsis Leaves through Modulation of Anaphase-Promoting Complex/Cyclosome Activity. *Hannes Claeys, Aleksandra Skirycz, Katrien Maleux, and Dirk Inzé* 739

GENETICS, GENOMICS, AND MOLECULAR EVOLUTION

- [C][W][OA]The Helicase and RNaseIIIa Domains of Arabidopsis Dicer-Like1 Modulate Catalytic Parameters during MicroRNA Biogenesis. *Chenggang Liu, Michael J. Axtell, and Nina V. Fedoroff* 748

^{[W][OA]}The *b* Gene of Pea Encodes a Defective Flavonoid 3',5'-Hydroxylase, and Confers Pink Flower Color. Carol Moreau, Mike J. Ambrose, Lynda Turner, Lionel Hill, T.H. Noel Ellis, and Julie M.I. Hofer 759

^{[C][W][OA]}Genetic Analysis of Strawberry Fruit Aroma and Identification of *O*-Methyltransferase *FaOMT* as the Locus Controlling Natural Variation in Mesifurane Content. Yasmín Zorrilla-Fontanesi, José-Luis Rambla, Amalia Cabeza, Juan J. Medina, José F. Sánchez-Sevilla, Victoriano Valpuesta, Miguel A. Botella, Antonio Granell, and Iraida Amaya 851

PLANTS INTERACTING WITH OTHER ORGANISMS

^{[C][W][OA]}*NaJAZh* Regulates a Subset of Defense Responses against Herbivores and Spontaneous Leaf Necrosis in *Nicotiana attenuata* Plants. Youngjoo Oh, Ian T. Baldwin, and Ivan Gális 769

^{[W][OA]}Mycorrhizal Networks: Common Goods of Plants Shared under Unequal Terms of Trade. Florian Walder, Helge Niemann, Mathimaran Natarajan, Moritz F. Lehmann, Thomas Boller, and Andres Wienken 789

^{[C][W][OA]}Plasma Membrane Calcium ATPases Are Important Components of Receptor-Mediated Signaling in Plant Immune Responses and Development. Nicolas Frei dit Frey, Malick Mbengue, Mark Kwaaitaal, Lisette Nitsch, Denise Altenbach, Heidrun Häweker, Rosa Lozano-Duran, Maria Fransiska Njo, Tom Beeckman, Bruno Huettel, Jan Willem Borst, Ralph Panstruga, and Silke Robatzek 798

SYSTEMS BIOLOGY, MOLECULAR BIOLOGY, AND GENE REGULATION

^{[W][OA]}Structural and Functional Analysis of VQ Motif-Containing Proteins in Arabidopsis as Interacting Proteins of WRKY Transcription Factors. Yuan Cheng, Yuan Zhou, Yan Yang, Ying-Jun Chi, Jie Zhou, Jian-Ye Chen, Fei Wang, Baofang Fan, Kai Shi, Yan-Hong Zhou, Jing-Quan Yu, and Zhixiang Chen 810

CORRECTIONS

Disruption of Signaling in a Fungal-Grass Symbiosis Leads to Pathogenesis. C.J. Eaton, M.P. Cox, B. Ambrose, M. Becker, U. Hesse, C.L. Schardl, and B. Scott 871

The cover image by Nick Sloff includes an aphid image adapted from a drawing by Thomas Degen (www.thomas-degen.ch) and an image of plant cells adapted from a drawing by Kerry Mauck. 872

^[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.