On the Cover: The cover shows a scanning electron micrograph of the abaxial leaf surface of a peppermint (Mentha × piperita) leaf. The evident spherical structures are peltate glandular trichomes, the sites of monoterpenoid essential oil biosynthesis and storage. In this issue, Rios-Estepa et al. (pp. 2105–2119) report on the utilization of an iterative approach that involves mathematical modeling and experimental testing to identify the determinants of essential oil composition and yield in highly specialized peltate glandular trichomes. Importantly, simulations of monoterpane profiles are based entirely on experimental measurements and are performed without any curve fitting or other computational optimizations. The good fit between simulations and experimentally determined monoterpenoid profiles indicates that the regulation of essential oil biosynthesis is now well understood at various levels of control, including environmental, developmental, and transgenic effects on transcript abundance, enzyme expression dynamics, glandular trichome size and distribution, and pathway feedback regulation. This opens up new opportunities for guiding metabolic engineering and molecular breeding efforts aimed at modulating monoterpenoid essential oil profiles. The cover image was taken by Dr. Glenn Turner using a FEI Quanta 200 F SEM in environmental mode at the Franceschi Microscopy and Imaging Center of Washington State University.

ON THE INSIDE

Peter V. Minorsky

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[C] Simulating Plant Metabolic Pathways with Enzyme-Kinetic Models. Kai Schallau and Björn H. Junker

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[BIOINFORMATICS]

[C][W][OA] PlantMetabolomics.org: A Web Portal for Plant Metabolomics Experiments. Preeti Bais, Stephanie M. Moon, Kun He, Ricardo Lettuo, Kate Dreher, Tom Walk, Yees Sucaet, Lenore Barkan, Gert Wohlgemuth, Mary R. Roth, Eve Syrkin Wurtele, Philip Dixon, Oliver Fiehn, B. Markus Lange, Vladimir Shulaev, Lloyd W. Summer, Ruth Welti, Basili J. Nikolau, Seung Y. Rhee, and Julie A. Dickerson

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[W] The Role of Phloem Loading Reconsidered. Robert Turgeon

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[1][OA] The Catalytic and Protein-Protein Interaction Domains Are Required for APM1 Function. Fazeeed H. Nosein, Anindita Bandyopadhyay, Wendy Ann Peer, and Angus S. Murphy


BIOENERGETICS AND PHOTOSYNTHESIS


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[1] Inhibition of Target of Rapamycin Signaling and Stress Activate Autophagy in Chlamydomonas reinhardtii. María Esther Pérez-Pérez, Francisco J. Florencio, and José L. Crespo


[OA] Interdependence of Endomembrane Trafficking and Actin Dynamics during Polarized Growth of Arabidopsis Pollen Tubes. Yan Zhang, Junmin He, David Lee, and Sheila McCormick

DEVELOPMENT AND HORMONE ACTION

[1][OA] Phytochrome Regulation of Branching in Arabidopsis. Scott A. Finlayson, Srirama R. Krishnareddy, Tesfamichael H. Kebrom, and Jorge J. Casal


[OA] Phosphate Regulation of Lipid Biosynthesis in Arabidopsis Is Independent of the Mitochondrial Outer Membrane DGS1 Complex. Eric R. Moellingern and Christoph Benning

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[WI][OA] Nitric Oxide Mediates the Hormonal Control of Crassulacean Acid Metabolism Expression in Young Pineapple Plants. Luciano Freschi, Maria Aurineide Rodrigues, Douglas Silva Domingues, Eduardo Purgatto, Marie-Anne Van Sluys, Jose Ronaldo Magalhaes, Werner M. Kaiser, and Helenice Mercier 1971


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PLANTS INTERACTING WITH OTHER ORGANISMS

[CI][WI][OA] S-Glycoprotein-Like Protein Regulates Defense Responses in Nicotiana Plants against Ralstonia solanacearum. Milimo Maimbo, Kouhei Ohnishi, Yasufumi Hikichi, Hirofumi Yoshioka, and Akinori Kiba 2023

[CI][WI][OA] Abscisic Acid-Induced Resistance against the Brown Spot Pathogen Cochliobolus miyabeanus in Rice Involves MAP Kinase-Mediated Repression of Ethylene Signaling. David De Vleesschauwer, Yinong Yang, Casiana Vera Cruz, and Monica Höfte 2036


[WI] Identification of MicroRNAs Involved in Pathogen-Associated Molecular Pattern-Triggered Plant Innate Immunity. Yan Li, QingQing Zhang, Jiaowang Zhang, Liang Wu, Yijun Qi, and Jian-Min Zhou 2222


WHOLE PLANT AND ECOPHYSIOLOGY

[CI][WI][OA] The α-Subunit of the Arabidopsis Heterotrimeric G Protein, GPA1, Is a Regulator of Transpiration Efficiency. Sarah E. Nilson and Sarah M. Assmann 2067

SYSTEMS BIOLOGY, MOLECULAR BIOLOGY, AND GENE REGULATION


Mathematical Modeling-Guided Evaluation of Biochemical, Developmental, Environmental, and Genotypic Determinants of Essential Oil Composition and Yield in Peppermint Leaves.  
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Matthew A. Hannah, Camila Caldana, Dirk Steinhauser, Ilse Balbo, Alisdair R. Fernie, and Lothar Willmitzer

Transcriptional Profiling of the Arabidopsis Iron Deficiency Response Reveals Conserved Transition Metal Homeostasis Networks. 
Thomas J.W. Yang, Wen-Dar Lin, and Wolfgang Schmidt

Probing the Reproducibility of Leaf Growth and Molecular Phenotypes: A Comparison of Three Arabidopsis Accessions Cultivated in Ten Laboratories. 

Multiple Roles and Interaction Factors of an E-Box Element in Chlamydomonas reinhardtii. 
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Modulation of Transcriptome and Metabolome of Tobacco by Arabidopsis Transcription Factor, AtMYB12, Leads to Insect Resistance. 
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CORRECTIONS

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