

On the Cover: Cyst nematodes infect plant roots and induce the formation of a feeding site (syncytium) from which the nematodes feed. The cover image shows female cyst nematodes (dark ovals) that have induced a large syncytium (swollen areas) in Arabidopsis roots. Normal roots are visible in the background. The update by **Gheysen and Mitchum** provides an overview on how plant-parasitic nematodes modulate phytohormone and peptide hormone pathways for the establishment of feeding sites. Image credit: Anju Verma.

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Focus Issue Editorial: Biotic Stress. *Hailing Jin, Melissa Mitchum, Ralph Panstruga, and Julie Stone* 1193

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The Immune Redoxome: Effector-Triggered Immunity Switches Cysteine Oxidation Profiles. *Amna Mhamdi* 1196

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[OPEN] Exchanges at the Plant-Oomycete Interface That Influence Disease. *Howard S. Judelson and Audrey M. V. Ah-Fong*

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[OPEN] Phytoparasitic Nematode Control of Plant Hormone Pathways. *Godelieve Gheysen and Melissa G. Mitchum*

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[OPEN] Functions of Extracellular Vesicles in Immunity and Virulence. *Katarzyna Rybak and Silke Robatzek*

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[OPEN] Proteome-Wide Analysis of Cysteine Reactivity during Effector-Triggered Immunity. *Evan W. McConnell, Philip Berg, Timothy J. Westlake, Katherine M. Wilson, George V. Popescu, Leslie M. Hicks, and Sorina C. Popescu*

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[OPEN] A Simple Method for Measuring Apoplast Hydration and Collecting Apoplast Contents. *Irene Gentzel, Laura Giese, Wanying Zhao, Ana Paula Alonso, and David Mackey*

A simple method allows calculation of apoplast hydration and efficient extraction of apoplast contents from maize seedling leaves. 1265

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Leaf Endoplasmic Reticulum Bodies Identified in Arabidopsis Rosette Leaves Are Involved in Defense against Herbivory. Akiko Nakazaki, Kenji Yamada, Tadashi Kunieda, Ryosuke Sugiyama, Masami Yokota Hirai, Kentaro Tamura, Ikuko Hara-Nishimura, and Tomoo Shimada

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[OPEN]Low Water Potential and At14a-Like1 (AFL1) Effects on Endocytosis and Actin Filament Organization. M. Nagaraj Kumar, Yu-Chiuan Bau, Toshisangba Longkumer, and Paul E. Verslues

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[OPEN]Natural Variation in 9-Cis-Epoxycartenoid Dioxygenase 3 and ABA Accumulation. Rajesh Kalladan, Jesse R. Lasky, Sandeep Sharma, M. Nagaraj Kumar, Thomas E. Juenger, David L. Des Marais, and Paul E. Verslues

Natural variation of 9-cis-epoxycarotenoid dioxygenase 3 (NCED3) is associated with altered stress-induced abscisic acid accumulation and NCED3 post-translational processing in *Arabidopsis*. 1620

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[OPEN]Spatiotemporal Coupling of Vessel Cavitation and Discharge of Stored Xylem Water in a Tree Sapling. Thorsten Knipfer, Clarissa Reyes, J. Mason Earles, Z. Carter Berry, Daniel M. Johnson, Craig R. Brodersen, and Andrew J. McElrone

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Nuclear Prohibitin3 Maintains Genome Integrity and Cell Proliferation in the Root Meristem through Minichromosome Maintenance 2. *Ruihua Huang, Si Shu, Mengling Liu, Chao Wang, Bei Jiang, Jieming Jiang, Chengwei Yang, and Shengchun Zhang*

The nuclear localized PROHIBITIN3 acts as a transcriptional co-regulator that sustains genome integrity and cell proliferation by directly suppressing the expression of MINICHROMOSOME MAINTENANCE 2.

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[OPEN]Development of Decreased-Gluten Wheat Enabled by Determination of the Genetic Basis of *lys3a* Barley. *Charles P. Moehs, William J. Austill, Aaron Holm, Tao A.G. Large, Dayna Loeffler, Jessica Mullenberg, Patrick S. Schnable, Wayne Skinner, Jos van Boxtel, Liying Wu, and Cate McGuire*

Inactivation of a transcription factor lowers gluten in wheat and may provide a wheat alternative for some individuals with gluten sensitivities.

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[OPEN]NIN Acts as a Network Hub Controlling a Growth Module Required for Rhizobial Infection. *Cheng-Wu Liu, Andrew Breakspear, Dian Guan, Marion R. Cerri, Kirsty Jackson, Suyu Jiang, Fran Robson, Guru V. Radhakrishnan, Sonali Roy, Caitlin Bone, Nicola Stacey, Christian Rogers, Martin Trick, Andreas Niebel, Giles E.D. Oldroyd, Fernanda de Carvalho-Niebel, and Jeremy D. Murray*

The RWP-RK transcription factor Nodule Inception regulates genes required for rhizobial infection, including Rhizobium Polar Growth (RPG) and genes for nutrient (N, P, and S) uptake and assimilation.

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[OPEN]Phosphate Starvation Alters Abiotic-Stress-Induced Cytosolic Free Calcium Increases in Roots. *Elsa Matthus, Katie A. Wilkins, Stéphanie M. Swarbreck, Nicholas H. Doddrell, Fabrizio G. Doccula, Alex Costa, and Julia M. Davies*

Phosphate starvation, but not nitrogen starvation, changes the cytosolic free calcium signatures of Arabidopsis thaliana roots in response to mechanical, salt, osmotic, and oxidative stress as well as to extracellular nucleotides.

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[OPEN]Direct Comparison of Leaf Plasmodesma Structure and Function in Relation to Phloem-Loading Type. *Johannes Liesche, Chen Gao, Piotr Binczycki, Signe R. Andersen, Hanna Rademaker, Alexander Schulz, and Helle Juel Martens*

Live-cell and electron microscopy reveal differences between species in how the structure of cell connections relates to the inter-cellular transport capacity for small molecules.

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Fucoxanthin-Chlorophyll Protein Complexes of the Centric Diatom *Cyclotella Meneghiniana* Differ in Lhcx1 and Lhcx6_1 Content. *Kathi Gundermann, Volker Wagner, Maria Mittag, and Claudia Büchel*

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[OPEN]The Structural Integrity of Lignin Is Crucial for Resistance against *Striga hermonthica* Parasitism in Rice. *J. Musembi Mutuku, Songkui Cui, Chiaki Hori, Yuri Takeda, Yuki Tobimatsu, Ryo Nakabayashi, Tetsuya Mori, Kazuki Saito, Taku Demura, Toshiaki Umezawa, Satoko Yoshida, and Ken Shirasu*

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[OPEN] ROS1-Dependent DNA Demethylation Is Required for ABA-Inducible NIC3 Expression. *June-Sik Kim, Joo Young Lim, Hosub Shin, Beom-Gi Kim, Sang-Dong Yoo, Woo Taek Kim, and Jin Hoe Huh*

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[OPEN] Loliolide, a Carotenoid Metabolite, Is a Potential Endogenous Inducer of Herbivore Resistance. *Mika Murata, Yusuke Nakai, Kei Kawazu, Masumi Ishizaka, Hideyuki Kajiwara, Hiroshi Abe, Kasumi Takeuchi, Yuki Ichinose, Ichiro Mitsuhashi, Atsushi Mochizuki, and Shigemi Seo*

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[OPEN] A Functional Unfolded Protein Response Is Required for Normal Vegetative Development. *Yan Bao, Diane C. Bassham, and Stephen H. Howell*

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[OPEN] GOLDEN2-LIKE Transcription Factors Regulate WRKY40 Expression in Response to Abscisic Acid. *Rafiq Ahmad, Yutong Liu, Tian-Jing Wang, Qingxiang Meng, Hao Yin, Xiao Wang, Yifan Wu, Nan Nan, Bao Liu, and Zheng-Yi Xu*

The GARP (Golden2, ARR-B, Psr1) family transcription factors GOLDEN2-LIKE 1 and -2 (GLK1/2) modulate the ABA response. 1844

[OPEN] Ascorbic Acid Integrates the Antagonistic Modulation of Ethylene and Abscisic Acid in the Accumulation of Reactive Oxygen Species. *Yanwen Yu, Juan Wang, Shenghui Li, Xiamusiya Kakan, Yun Zhou, Yuchen Miao, Fangfang Wang, Hua Qin, and Rongfeng Huang*

Ethylene and abscisic acid antagonistically modulate ascorbic acid biosynthesis and reactive oxygen species accumulation via an EIN3-ABI4-VTC2 transcriptional cascade. 1861

[OPEN] The B-Box-Containing MicroProtein miP1a/BBX31 Regulates Photomorphogenesis and UV-B Protection. *Arpita Yadav, Souvoika Bakshi, Premachandran Yadukrishnan, Maneesh Lingwan, Ulla Dolde, Stephan Wenkel, Shyam Kumar Masakapalli, and Sourav Datta*

BBX31 negatively regulates photomorphogenesis in visible light and positively regulates UV-B signaling to protect plants from UV radiation. 1876

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[OPEN] Proteome-wide, Structure-Based Prediction of Protein-Protein Interactions/New Molecular Interactions Viewer. *Shaowei Dong, Vincent Lau, Richard Song, Matthew Ierullo, Eddi Esteban, Yingzhou Wu, Teeratham Sivieng, Hardeep Nahal, Allison Gaudinier, Asher Pasha, Rose Oughtred, Kara Dolinski, Mike Tyers, Siobhan M. Brady, Ruth Grene, Björn Usadel, and Nicholas J. Provart*

A structure-based interactome for Arabidopsis and new community tools for accessing it and ~2.8 million other interactions provides researchers with new opportunities for hypothesis generation. 1893

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