

On the Cover: Scanning Electron Micrograph of the tip of a young maize tassel, showing several axillary meristems developing from an apical inflorescence meristem. Liu et al. show that the transcriptional corepressor REL2 is involved in the initiation and maintenance of these meristems. Image credit: Andrea Gallavotti.

Note: The article affiliated with this image will be appearing in the January 2019 issue of Plant Physiology, Volume 179 Issue 1.

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BREAKTHROUGH TECHNOLOGIES

^[OPEN]MAPINS, a Highly Efficient Detection Method That Identifies Insertional Mutations and Complex DNA Rearrangements. Huawen Lin, Paul F. Cliften, and Susan K. Dutcher

A fast and efficient whole-genome sequencing method identifies insertional mutations and reveals complex DNA rearrangements accompanied insertional mutagenesis in Chlamydomonas reinhardtii. 1436

Micro Imaging Displays the Sucrose Landscape within and along Its Allocation Pathways.

André Guendel, Hardy Rolletschek, Steffen Wagner, Aleksandra Muszynska, and Ljudmilla Borisjuk

A procedure for the quantitative mapping of sucrose in plant tissue with spatial resolution sufficient to measure sucrose in individual phloem bundles and across transport boundaries. 1448

RESEARCH REPORTS

^[OPEN]Local and Systemic Metabolic Responses during Light-Induced Rapid Systemic Signaling.

Feroza K. Choudhury, Amith R. Devireddy, Rajeev K. Azad, Vladimir Shulaev, and Ron Mittler

Rapid systemic signaling is accompanied by coordinated metabolic changes in local, transport, and systemic tissues. 1461

^[OPEN]NRT1.1-Related NH_4^+ Toxicity Is Associated with a Disturbed Balance between NH_4^+ Uptake and Assimilation. Shaofen Jian, Qiong Liao, Haixing Song, Qiang Liu, Joe Eugene Lepo, Chunyun Guan, Jianhua Zhang, Abdelbagi M. Ismail, and Zhenhua Zhang

Nitrate transporter NRT1.1 enhances NH_4^+ accumulation, disturbs NH_4^+ metabolism, and aggravates NH_4^+ toxicity in Arabidopsis grown in a high concentration of NH_4^+ as the sole N source. 1473

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RESEARCH ARTICLES

BIOCHEMISTRY AND METABOLISM

A Musashi Splice Variant and Its Interaction Partners Influence Temperature Acclimation in *Chlamydomonas*. Wenshuang Li, David Carrasco Flores, Juliane Füssel, Jan Euteneuer, Hannes Dathe, Yong Zou, Wolfram Weisheit, Volker Wagner, Jan Petersen, and Maria Mittag

Three RNA metabolism proteins are part of an interaction network that integrates temperature information and confers acclimation to changes in ambient temperature in the green alga Chlamydomonas.

1489

[OPEN] Identification of Genes Encoding Enzymes Catalyzing the Early Steps of Carrot Polyacetylene Biosynthesis. Lucas Busta, Won Cheol Yim, Evan William LaBrant, Peng Wang, Lindsey Grimes, Kiah Malyszka, John C. Cushman, Patricia Santos, Dylan K. Kosma, and Edgar B. Cahoon

Members of a large family of fatty acid desaturase enzymes in carrot control the production of dehydrocrepenynic acid, an intermediate in the falcarin-type polyacetylene biosynthesis pathway.

1507

[OPEN] The Spermine Synthase OsSPMS1 Regulates Seed Germination, Grain Size, and Yield. Yajun Tao, Jun Wang, Jun Miao, Jie Chen, Shujun Wu, Jinyan Zhu, Dongping Zhang, Houwen Gu, Huan Cui, Shuangyue Shi, Mingyue Xu, Youli Yao, Zhiyun Gong, Zefeng Yang, Minghong Gu, Yong Zhou, and Guohua Liang

OsSPMS1, a spermine synthase that participates in polyamine and ethylene homeostasis, plays an important role in seed germination, plant architecture, and yield in rice.

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CELL BIOLOGY

The Mitochondrial Endonuclease M20 Participates in the Down-Regulation of Mitochondrial DNA in Pollen Cells. Fei Ma, Hui Qi, Yu-Fei Hu, Qian-Ru Jiang, Li-Guang Zhang, Peng Xue, Fu-Quan Yang, Rui Wang, Yan Ju, Hidenobu Uchida, Quan Zhang, and Sodmergen

The mitochondrial endonuclease M20 is an H-N-H/N nuclease that degrades linear and circular DNA and participates in mitochondrial DNA regulation during pollen development.

1537

CLASP Facilitates Transitions between Cortical Microtubule Array Patterns. David Thoms, Laura Vineyard, Andrew Elliott, and Sidney L. Shaw

The microtubule associated protein, CLASP, impacts polymer dynamics leading to a slowdown in microtubule array pattern transitions without altering the ability to form specific array patterns.

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ECOPHYSIOLOGY AND SUSTAINABILITY

ARSENATE INDUCED CHLOROSIS 1/ TRANSLOCON AT THE OUTER ENVELOPE MEMBRANE OF CHLOROPLASTS 132 Protects Chloroplasts from Arsenic Toxicity. Peitong Wang, Xi Chen, Xuan Xu, Chenni Lu, Wei Zhang, and Fang-Jie Zhao

The translocon at the outer envelope membrane of chloroplast Toc132 plays an important role in alleviating arsenic toxicity in chloroplasts.

1568

[OPEN] The Causes of Leaf Hydraulic Vulnerability and Its Influence on Gas Exchange in *Arabidopsis thaliana*. Christine Scoffoni, Caetano Albuquerque, Hervé Cochard, Thomas N. Buckley, Leila R. Fletcher, Marissa A. Caringella, Megan Bartlett, Craig R. Brodersen, Steven Jansen, Andrew J. McElrone, and Lauren Sack

Declines in leaf outside-xylem hydraulic conductance prior to turgor loss point contribute strongly to stomatal closure, and improve performance, survival and efficient water use during drought.

1584

Diurnal Variation in Nonstructural Carbohydrate Storage in Trees: Remobilization and Vertical Mixing. *Aude Tixier, Jessica Orozco, Adele Amico Roxas, J. Mason Earles, and Maciej A. Zwieniecki*

NSC storage is highly dynamic at the diurnal timescale, exhibiting vertical mixing and a potential role for the xylem as a secondary pathway for sugar redistribution.

1602

GENES, DEVELOPMENT AND EVOLUTION

[OPEN]RNA Polymerase II Read-Through Promotes Expression of Neighboring Genes in SAL1-PAP-XRN Retrograde Signaling. *Peter A. Crisp, Aaron B. Smith, Diep R. Ganguly, Kevin D. Murray, Steven R. Eichten, Anthony A. Millar, and Barry J. Pogson*

Consequences of transcription out of bounds: a retrograde signal can trigger RNA Polymerase II read-through, upregulating the expression of downstream genes.

1614

[OPEN]Enhancer-Promoter Interaction of *SELF PRUNING 5G* Shapes Photoperiod Adaptation. *Shuaiyin Zhang, Zhicheng Jiao, Lei Liu, Ketao Wang, Deyi Zhong, Shengben Li, Tingting Zhao, Xiangyang Xu, and Xia Cui*

Loss of an enhancer element in the 3' untranslated region of SP5G conferred day-length insensitivity to domesticated tomato cultivars and helped the species spread worldwide.

1631

[OPEN]Efficient Replication of the Plastid Genome Requires an Organellar Thymidine Kinase. *Monique Le Ret, Susan Belcher, Stéphanie Graindorge, Clémentine Wallet, Sandrine Koechler, Mathieu Erhardt, Rosalind Williams-Carrier, Alice Barkan, and José M. Gualberto*

Depletion of organellar thymidine kinase affects plastid genome replication and repair, leading to the accumulation of truncated genomes and the apparent mobilization of new replication origins.

1643

MEMBRANES, TRANSPORT AND BIOENERGETICS

K⁺ Efflux Antiporters 4, 5, and 6 Mediate pH and K⁺ Homeostasis in Endomembrane Compartments. *Xiaojie Zhu, Ting Pan, Xiao Zhang, Ligang Fan, Francisco J. Quintero, Hong Zhao, Xiaomeng Su, Xiaojiao Li, Irene Villalta, Imelda Mendoza, Jinbo Shen, Liwen Jiang, Jose M. Pardo, and Quan-Sheng Qiu*

Arabidopsis thaliana KEA4, KEA5, and KEA6 are endosomal K⁺ transporters that function in maintaining pH and ion homeostasis in the endomembrane network.

1657

[OPEN]SNAREs SYP121 and SYP122 Mediate the Secretion of Distinct Cargo Subsets. *Sakharam Waghmare, Edita Lileikyte, Rucha Karnik, Jennifer K. Goodman, Michael R. Blatt, and Alexandra M.E. Jones*

Two closely related SNAREs mediate secretion of specific cargo proteins in Arabidopsis thaliana.

1679

[OPEN]Going with the Flow: Multiscale Insights into the Composite Nature of Water Transport in Roots. *Valentin Couvreur, Marc Faget, Guillaume Lobet, Mathieu Javaux, François Chaumont, and Xavier Draye*

A bio-physical model of the "root hydraulic anatomy" allows testing hypotheses related to radial water transport down to the cell level and proves complementary to current experimental approaches.

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SIGNALING AND RESPONSE

[OPEN]A Temperature-Sensitive Misfolded *bri1-301* Receptor Requires Its Kinase Activity to Promote Growth. *Xiaowei Zhang, Linyao Zhou, Yukuo Qin, Yongwu Chen, Xiaolei Liu, Muyang Wang, Juan Mao, Jianjun Zhang, Zuhua He, Linchuan Liu, and Jianming Li*

bri1-301 is a temperature-sensitive misfolded brassinosteroid receptor that requires kinase activity to promote growth and is rapidly degraded in the endoplasmic reticulum and on the cell surface.

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[^{OPEN}] Network Analysis Reveals a Role for Salicylic Acid Pathway Components in Shade Avoidance.
*Kazunari Nozue, Upendra Kumar Devisetty, Saradadevi Lekkala, Patricia Mueller-Moulé, Aurélie Bak,
Clare L. Casteel, and Julin N. Maloof*

Shade avoidance involves complex regulation of multiple hormone network modules, and salicylic acid pathway genes are required for petiole shade avoidance.

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[^{OPEN}] Articles can be viewed without a subscription.