ON THE COVER

Sieve tubes are the functional units for long-distance transport and signaling in the phloem. The tube architecture defines frictional interactions with the fluid, so sieve tube structure has a direct impact on translocation. There has been debate about the in vivo structure of sieve elements and the pressure flow hypothesis for many decades; in particular, the shape and location of P proteins remained unresolved. Froelich et al. (pages 4428–4445) present in vivo observations of transgenic Arabidopsis thaliana plants carrying P proteins from the Sieve-Element-Occlusion-Related (SEOR) family, tagged with yellow fluorescent protein. New protocols for transmission electron microscopy reveal the in vivo ultrastructure of sieve tubes. The authors show that massive protein agglomerations in the flow path are common but do not impede translocation, and implications for understanding phloem translocation are discussed. The cover shows an epifluorescence micrograph of an Arabidopsis flower. Yellow fluorescent protein–tagged SEOR proteins outline the phloem files in the petals (green/blue).

IN BRIEF

Postcards from the Rice Genome: Massive Analysis of Small RNAs in Response to Environmental Stress
Nancy A. Eckardt

Large-Scale RNA Sequencing to Identify maize Genes with Parent-of-Origin Expression Effects
Jennifer Mach

A Case for Spatial Regulation in Tetrapyrrole Biosynthesis
Nancy R. Hofmann

LETTERS TO THE EDITOR

Internal Membranes in maize Aleurone Protein Storage Vacuoles: Beyond Autophagy
John C. Rogers

Reply: Internal Membranes in maize Aleurone Protein Storage Vacuoles: Beyond Autophagy
Francisca C. Reyes, Marisa S. Otegui, and Richard Vierstra

PERSPECTIVE

Plant Oxygen Sensing is Mediated by the N-End Rule Pathway: A Milestone in Plant Anaerobiosis
Rashmi Sasidharan and Angelika Mustroph

LARGE-SCALE BIOLOGY ARTICLES

Massive Analysis of Rice Small RNAs: Mechanistic Implications of Regulated MicroRNAs and Variants for Differential Target RNA Cleavage
Dong-Hoon Jeong, Sunhee Park, Jixian Zhai, Sai Guna Ranjan Gurazada, Emanuele De Paoli, Blake C. Meyers, and Pamela J. Green

Systems Analysis of a maize Leaf Developmental Gradient Redefines the Current C4 Model and Provides Candidates for Regulation
Thea R. Pick, Andrea Bräutigam, Urte Schlüter, Ailsandra K. Denton, Christian Colmsee, Uwe Scholz, Holger Fahrenstich, Roland Pieruschka, Uwe Rascher, Uwe Sonnewald, and Andreas P.M. Weber
RESEARCH ARTICLES

Different Gene Families in Arabidopsis thaliana Transposed in Different Epochs and at Different Frequencies throughout the Rosids

Margaret R. Woodhouse, Haibao Tang, and Michael Freeling

Arabidopsis ATM and ATR Kinases Prevent Propagation of Genome Damage Caused by Telomere Dysfunction

Simon Amiard, Annie Depeiges, Elisabeth Allain, Charles I. White, and Maria Eugenia Gallego

Identification of Plant RAD52 Homologs and Characterization of the Arabidopsis thaliana RAD52-Like Genes

Aviva Samach, Cathy Melamed-Bessudo, Naomi Avivi-Ragolski, Shmuel Pietrokovski, and Avraham A. Levy

Maize Rough Endosperm3 Encodes an RNA Splicing Factor Required for Endosperm Cell Differentiation and Has a Nonautonomous Effect on Embryo Development

Romain Fouquet, Federico Martin, Diego S. Fajardo, Christine M. Gault, Elisa Gómez, Chi-Wah Tseung, Tyler Policht, Gregorio Hueros, and A. Mark Settles

The RPT2 Subunit of the 26S Proteasome Directs Complex Assembly, Histone Dynamics, and Gametophyte and Spermatophyte Development in Arabidopsis


A Data-Driven Integrative Model of Sepal Primordium Polarity in Arabidopsis

Camilo La Rota, Jérôme Chopard, Pradeep Das, Sandrine Paindavoine, Frédérique Rozier, Etienne Faricot, Christophe Godin, Jan Traas, and Françoise Monéger

Increased Leaf Angle1, a Raf-Like MAPKKK That Interacts with a Nuclear Protein Family, Regulates Mechanical Tissue Formation in the Lamina Joint of Rice

Jing Ning, Baocai Zhang, Nili Wang, Yihua Zhou, and Lzhong Xiong

POPCORN Functions in the Auxin Pathway to Regulate Embryonic Body Plan and Meristem Organization in Arabidopsis

Daoquan Xiang, Hui Yang, Prakash Venglat, Yongguo Cao, Rui Wen, Maozhi Ren, Sandra Stone, Edwin Wang, Hong Wang, Wei Xiao, Dolf Weijers, Thomas Berleth, Thomas Laux, Gopalan Selvaraj, and Raju Datla

Positive Autoregulation of a KNOX Gene Is Essential for Shoot Apical Meristem Maintenance in Rice

Katsutoshi Tsuda, Yuukihiro Ito, Yutaka Sato, and Nori Kurata

GIGAS CELL1, a Novel Negative Regulator of the Anaphase-Promoting Complex/Cyclosome, Is Required for Proper Mitotic Progression and Cell Fate Determination in Arabidopsis

Eriko Iwata, Saki Ikeda, Sachihiro Matsunaga, Mariko Kurata, Yasushi Yoshioka, Marie-Claire Criqui, Pascual Genschik, and Masaki Ito

Arabidopsis ULTRAVIOLET-B-INSENSITIVE4 Maintains Cell Division Activity by Temporal Inhibition of the Anaphase-Promoting Complex/Cyclosome

Jefri Heyman, Hilde Van den Daele, Kevin De Wit, Véronique Boudolf, Barbara Berckmans, Aurine Verkest, Claire Lessa Alvim Kamei, Geert De Jaeger, Csaba Koncz, and Lieven De Veylder

MDP25, A Novel Calcium Regulatory Protein, Mediates Hypocotyl Cell Elongation by Destabilizing Cortical Microtubules in Arabidopsis

Jiejie Li, Xianling Wang, Tao Qin, Yan Zhang, Xiaomin Liu, Jingbo Sun, Yuan Zhou, Lei Zhu, Ziding Zhang, Ming Yuan, and Tonglin Mao
Phloem Ultrastructure and Pressure Flow: Sieve-Element-Occlusion-Related Agglomerations Do Not Affect Translocation


The Arabidopsis Tail-Anchored Protein PEROXISOMAL AND MITOCHONDRIAL DIVISION FACTOR1 Is Involved in the Morphogenesis and Proliferation of Peroxisomes and Mitochondria

Kyaw Aung and Jianping Hu

Lumen Thiol Oxidoreductase1, a Disulfide Bond-Forming Catalyst, Is Required for the Assembly of Photosystem II in Arabidopsis

Mohamed Karamoko, Sara Cline, Kevin Redding, Natividad Ruiz, and Patrice P. Hamel

An Arabidopsis GluTR Binding Protein Mediates Spatial Separation of 5-Aminolevulinic Acid Synthesis in Chloroplasts

Olaf Czarnecki, Boris Hedtke, Michael Melzer, Maxi Rothbarth, Andreas Richter, Yvonne Schröter, Thomas Pfannschmidt, and Bernhard Grimm

Syringyl Lignin Is Unaltered by Severe Sinapyl Alcohol Dehydrogenase Suppression in Tobacco

Abdelaab Barakate, Jennifer Stephens, Alison Goldie, William N. Hunter, David Marshall, Robert D. Hancock, Catherine Lapierre, Kris Monreel, Wout Boerjan, and Claire Halpin

GLYCOALKALOID METABOLISM1 Is Required for Steroidal Alkaloid Glycosylation and Prevention of Phytotoxicity in Tomato

Maxim Itkin, Ilana Rogachev, Noam Alkan, Tally Rosenberg, Sergey Malitsky, Laura Masini, Sagit Meir, Yoko Iijima, Koh Aoki, Ric de Vos, Dov Prusky, Saul Burdman, Jules Beekwilder, and Asaph Aharoni

CORRECTIONS


Some figures in this article are displayed in color online but in black and white in the print edition.

Online version contains Web-only data.

Open Access articles can be viewed online without a subscription.