The cover photo, taken by Dr. Brendan Choat, shows the detailed structure of the Metasequoia glyptostroboides pit membrane magnified 46,000 times using scanning electron microscopy. In conifers, water transport occurs through single-celled tracheids that are interconnected by wall perforations, known as intertracheid pits. The pit membrane contained within these structures is composed of a centrally thickened region known as the torus surrounded by a porous margo. Because pit membranes serve to transport water as well as prevent the spread of air by cavitation, natural selection has acted on the torus-margo pit membrane to optimize either drought resistance or pit hydraulic efficiency, depending on the water availability of species’ habitats. In this issue, Pittermann et al. (pp. 1919–1931) explore the relationship between the structure and function of torus-margo pit membranes and the evolutionary trajectory of drought resistance in the Cupressaceae family of conifers.

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Peter V. Minorsky

UPDATES

[C] Monitoring the Outside: Cell Wall-Sensing Mechanisms. Christoph Ringli

BREAKTHROUGH TECHNOLOGIES


BIOINFORMATICS

[W][OA] Creation of a Genome-Wide Metabolic Pathway Database for Populus trichocarpa Using a New Approach for Reconstruction and Curation of Metabolic Pathways for Plants. Peifen Zhang, Kate Dreher, A. Karthikeyan, Anjo Chi, Amuradha Pujar, Ron Caspi, Peter Karp, Vanessa Kirkup, Mario Latendresse, Cynthia Lee, Lukas A. Mueller, Robert Muller, and Seung Yon Rhee

[W] Deciphering the Arabidopsis Floral Transition Process by Integrating a Protein-Protein Interaction Network and Gene Expression Data. Fei He, Yuan Zhou, and Ziding Zhang


SCIENTIFIC CORRESPONDENCE

[C][W][OA] DNA-Binding Protein Phosphatase AtDBP1 Mediates Susceptibility to Two Potyviruses in Arabidopsis. María José Castelló, José Luis Carrasco, and Pablo Vera

RESEARCH ARTICLES

BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES

[W][OA] Functional Analysis of the Arabidopsis PAL Gene Family in Plant Growth, Development, and Response to Environmental Stress. Junli Huang, Min Gu, Zhibing Lai, Baofang Fan, Kai Shi, Yan-Hong Zhou, Jing-Quan Yu, and Zhixiang Chen
Three Arabidopsis Fatty Acyl-Coenzyme A Reductases, FAR1, FAR4, and FAR5, Generate Primary Fatty Alcohols Associated with Suberin Deposition. Frédéric Domergue, Sollapura J. Vishwanath, Jérôme Joubès, Jasmine Ono, Jennifer A. Lee, Matthieu Bourdon, Reem Alhattab, Christine Lowe, Stéphanie Pascal, René Lessire, and Owen Rowland

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Biochemical and Immunocytological Characterizations of Arabidopsis Pollen Tube Cell Wall. Flavien Dardelle, Arnaud Lehner, Yasmina Ramdani, Muriel Bardor, Patrice Lefouge, Azeddine Driouch, and Jean-Claude Mollet

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DEVELOPMENT AND HORMONE ACTION
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The Compact Root Architecture Gene Regulates Lignification, Flavonoid Production, and Polar Auxin Transport in Medicago truncatula. Carole Laffont, Sandrine Blanchet, Catherine Lapierre, Lysiane Brocard, Pascal Ratet, Martin Crespi, Ulrike Mathiesis, and Florian Frugier

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The Relationships between Xylem Safety and Hydraulic Efficiency in the Cupressaceae: The Evolution of Pit Membrane Form and Function. Jarmila Pittermann, Brendan Chodel, Steven Jansen, Stephanie A. Stuart, Lucy Lynn, and Todd E. Dawson

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