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ON THE COVER

Roots must circumnavigate barriers in soil to optimize nutrient and water access as well as to physically support aerial organs. The integration of environmental stimuli controlling root architecture and growth is poorly understood. Chen et al. (pages 1972–1991) report the identification of regulatory components of root thigmomorphogenesis. The phylogenetically related Arabidopsis thaliana genes MLO4 and MLO11 encode heptahelical, plasma membrane–localized proteins predominantly expressed in the root tip. Null mutations in either of these genes resulted in anisotropic, chiral root expansion manifesting as tightly curled root patterns upon contact with solid surfaces. A combination of genetic analysis, chemical genetics, and cell biology showed that cooperative function of MLO4 and MLO11 in controlling root thigmomorphogenesis is auxin dependent. The cover illustration shows a typical touch-induced root coiling pattern (viewed from the top) of a 6-d-old Arabidopsis mlo4 mutant seedling on a hard agar medium.

IN BRIEF

Targeted Overexpression of a Sodium Transporter in the Root Stele Increases Salinity Tolerance
Kathleen L. Farquharson 1875

Flipping the Centromere Switch: Reactivation of a Dormant Centromere in Maize
Jennifer Mach 1876

REVIEW

What Has Natural Variation Taught Us about Plant Development, Physiology, and Adaptation?
Carlos Alonso-Blanco, Mark G.M. Aarts, Leonie Bentsink, Joost J.B. Keurentjes, Matthieu Reymond, Dick Vreugdenhil, and Maarten Koornneef 1877

RESEARCH ARTICLES

Phylogenomic Analysis Demonstrates a Pattern of Rare and Ancient Horizontal Gene Transfer between Plants and Fungi
Thomas A. Richards, Darren M. Soanes, Peter G. Foster, Guy Leonard, Christopher R. Thornton, and Nicholas J. Talbot 1897

Comparative Analysis between Homoeologous Genome Segments of Brassica napus and Its Progenitor Species Reveals Extensive Sequence-Level Divergence
Foo Cheung, Martin Trick, Nizar Drou, Yong Pyo Lim, Jee-Young Park, Soo-Jin Kwon, Jin-A Kim, Rod Scott, J. Chris Pires, Andrew H. Paterson, Chris Town, and Ian Bancroft 1912

Reactivation of an Inactive Centromere Reveals Epigenetic and Structural Components for Centromere Specification in Maize
Fangpu Han, Zhi Gao, and James A. Birchler 1929

Arabidopsis DUO POLLEN3 Is a Key Regulator of Male Germline Development and Embryogenesis
Lynnette Brownfield, Said Hafidh, Anjusha Durbary, Hoda Khatab, Anna Sidorova, Peter Doerner, and David Twell 1940

Partitioning the Apical Domain of the Arabidopsis Embryo Requires the BOBBER1 NudC Domain Protein
Rebecca Joy Jurkuta, Nicholas J. Kaplinsky, Jennifer E. Spindel, and M. Kathryn Barton 1957
Downy Mildew Resistance in *Arabidopsis* by Mutation of *HOMOSERINE KINASE*

Mireille van Damme, Tieme Zeilmaker, Joyce Elberse, Annemiek Andel, Monique de Sain-van der Velden, and Guido van den Ackerveken

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