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On the Cover: Phosphorus (P) is an essential nutrient in plants critical to the productivity of the world's agricultural systems. The extreme dependence of most crops on P fertilization is highlighted by corn (*Zea mays*) fertilized at increasing levels of inorganic phosphate (left to right). However, P is a nonrenewable resource mined predominantly from rock P reserves in the sparingly soluble forms such as hydroxyapatite, pictured in the heap of white powder at the top left, which is then combined with sulfuric acid to produce the soluble form of phosphate in most fertilizers known as superphosphate. It is predicted that we will reach peak P production (cover image adapted from the predictions of Cordell et al., 2009) within the next few decades (approximately 2030 [blue line]), which will impact the cost of fertilizers and food. Thereafter, access to relatively inexpensive P may decline. Eventually, humanity may face a decline in global food production as reserves are depleted and cost becomes increasingly high. As a consequence, we must work towards strategies that utilize P reserves efficiently and recycle P. In this special issue of *Plant Physiology*, updates of existing knowledge on P stress and nutrition in plants from diverse perspectives will guide research towards a more P-efficient future for global plant production systems. Cover design and photographs by M.W. Shane, Yamin, and S.J. Pearse.

FOCUS ISSUE ON PHOSPHORUS PLANT PHYSIOLOGY

EDITORIALS

Phosphorus Focus Editorial. *Carroll P. Vance and Tzyy-Jen Chiou* 987

UPDATES

Soil Microorganisms Mediating Phosphorus Availability. *Alan E. Richardson and Richard J. Simpson* 989

Phosphorus Dynamics: From Soil to Plant. *Jianbo Shen, Lixing Yuan, Junling Zhang, Haigang Li, Zhaohai Bai, Xinping Chen, Weifeng Zhang, and Fusuo Zhang* 997

Metabolic Adaptations of Phosphate-Starved Plants. *William C. Plaxton and Hue T. Tran* 1006

The Role of MicroRNAs in Phosphorus Deficiency Signaling. *Hui-Fen Kuo and Tzyy-Jen Chiou* 1016

Update on White Lupin Cluster Root Acclimation to Phosphorus Deficiency. *Lingyun Cheng, Bruna Bucciarelli, Jianbo Shen, Deborah Allan, and Carroll P. Vance* 1025

Sugar Signaling in Root Responses to Low Phosphorus Availability. *John P. Hammond and Philip J. White* 1033

Root Phenes for Enhanced Soil Exploration and Phosphorus Acquisition: Tools for Future Crops. *Jonathan P. Lynch* 1041

Roles of Arbuscular Mycorrhizas in Plant Phosphorus Nutrition: Interactions between Pathways of Phosphorus Uptake in Arbuscular Mycorrhizal Roots Have Important Implications for Understanding and Manipulating Plant Phosphorus Acquisition. *Sally E. Smith, Iver Jakobsen, Mette Grønlund, and F. Andrew Smith* 1050

Phosphorus Nutrition of Proteaceae in Severely Phosphorus-Impoverished Soils: Are There Lessons To Be Learned for Future Crops?. *Hans Lambers, Patrick M. Finnegan, Etienne Laliberté, Stuart J. Pearse, Megan H. Ryan, Michael W. Shane, and Erik J. Veneklaas* 1058

Phosphate Deprivation in Maize: Genetics and Genomics. *Carlos Calderón-Vázquez, Ruairidh J.H. Sawers, and Luis Herrera-Estrella* 1067

P for Two, Sharing a Scarce Resource: Soil Phosphorus Acquisition in the Rhizosphere of Intercropped Species. *Philippe Hinsinger, Elodie Betencourt, Laetitia Bernard, Alain Brauman, Claude Plassard, Jianbo Shen, Xiaoyan Tang, and Fusuo Zhang* 1078

Continued on next page

RESEARCH ARTICLES

- [W][OA] Cloning and Characterization of Purple Acid Phosphatase Phytases from Wheat, Barley, Maize, and Rice. *Giuseppe Dionisio, Claus K. Maadsen, Preben B. Holm, Karen G. Welinder, Malene Jørgensen, Eva Stoger, Elsa Arcalis, and Henrik Brinch-Pedersen* 1087
- [W][OA] LEAF TIP NECROSIS1 Plays a Pivotal Role in the Regulation of Multiple Phosphate Starvation Responses in Rice. *Bin Hu, Chenguang Zhu, Feng Li, Jiuyou Tang, Yiqin Wang, Aihong Lin, Linchuan Liu, Ronghui Che, and Chengcai Chu* 1101
- [W][OA] Genetic and Genomic Evidence That Sucrose Is a Global Regulator of Plant Responses to Phosphate Starvation in Arabidopsis. *Mingguang Lei, Yidan Liu, Baocai Zhang, Yingtao Zhao, Xiujie Wang, Yihua Zhou, Kashchandra G. Raghothama, and Dong Liu* 1116
- [W][OA] White Lupin Cluster Root Acclimation to Phosphorus Deficiency and Root Hair Development Involve Unique Glycerophosphodiester Phosphodiesterases. *Lingyun Cheng, Bruna Bucciarelli, Junqi Liu, Kelly Zinn, Susan Miller, Jana Patton-Vogt, Deborah Allan, Jianbo Shen, and Carroll P. Vance* 1131
- [W][OA] Arabidopsis Pht1;5 Mobilizes Phosphate between Source and Sink Organs and Influences the Interaction between Phosphate Homeostasis and Ethylene Signaling. *Vinay K. Nagarajan, Ajay Jain, Michael D. Poling, Anthony J. Lewis, Kashchandra G. Raghothama, and Aaron P. Smith* 1149
- [W][OA] The Phosphate Transporter Gene *OsPht1;8* Is Involved in Phosphate Homeostasis in Rice. *Hongfang Jia, Hongyan Ren, Mian Gu, Jianning Zhao, Shubin Sun, Xiao Zhang, Jieyu Chen, Ping Wu, and Guohua Xu* 1164
- [W][OA] Vacuolar Ca²⁺/H⁺ Transport Activity Is Required for Systemic Phosphate Homeostasis Involving Shoot-to-Root Signaling in Arabidopsis. *Tzu-Yin Liu, Kyaw Aung, Ching-Ying Tseng, Tzu-Yun Chang, Ying-Shin Chen, and Tzyy-Jen Chiou* 1176
- [W][OA] Root Cortical Aerenchyma Enhances the Growth of Maize on Soils with Suboptimal Availability of Nitrogen, Phosphorus, and Potassium. *Johannes Auke Postma and Jonathan Paul Lynch* 1190
- [W][OA] Developing Rice with High Yield under Phosphorus Deficiency: *Pup1* Sequence to Application. *Joong Hyoun Chin, Rico Gamuyao, Cheryl Dalid, Masdiar Bustamam, Joko Prasetyono, Sugiono Moeljopawiro, Matthias Wissuwa, and Sigrid Heuer* 1202
- [W] Phosphate Utilization Efficiency Correlates with Expression of Low-Affinity Phosphate Transporters and Noncoding RNA, *IPS1*, in Barley. *Chun Y. Huang, Neil Shirley, Yusuf Genc, Bujun Shi, and Peter Langridge* 1217
- [W][OA] Regulatory Hotspots Are Associated with Plant Gene Expression under Varying Soil Phosphorus Supply in *Brassica rapa*. *John P. Hammond, Sean Mayes, Helen C. Bowen, Neil S. Graham, Rory M. Hayden, Christopher G. Love, William P. Spracklen, Jun Wang, Sue J. Welham, Philip J. White, Graham J. King, and Martin R. Broadley* 1230

REGULAR ISSUE

ON THE INSIDE

- Peter V. Minorsky* 1242

GENOME ANALYSIS

- [C][W][OA] Gene Coexpression Network Alignment and Conservation of Gene Modules between Two Grass Species: Maize and Rice. *Stephen P. Ficklin and F. Alex Feltus* 1244

BREAKTHROUGH TECHNOLOGIES

- [C][W][OA] Discovery of Rare Mutations in Populations: TILLING by Sequencing. *Helen Tsai, Tyson Howell, Rebecca Nitcher, Victor Missirian, Brian Watson, Kathie J. Ngo, Meric Lieberman, Joseph Fass, Cristobal Uauy, Robert K. Tran, Asif Ali Khan, Vladimir Filkov, Thomas H. Tai, Jorge Dubcovsky, and Luca Comai* 1257
- [W][OA] Application of Gene Targeting to Designed Mutation Breeding of High-Tryptophan Rice. *Hiroaki Saika, Akira Oikawa, Fumio Matsuda, Haruko Onodera, Kazuki Saito, and Seiichi Toki* 1269

Continued on next page

[C][W] Coupling Virus-Induced Gene Silencing to Exogenous *Green Fluorescence Protein* Expression Provides a Highly Efficient System for Functional Genomics in Arabidopsis and across All Stages of Tomato Fruit Development. *Leandro Quadrona, Maria Cecilia Rodriguez, Mariana López, Luisa Bermúdez, Adriano Nunes-Nesi, Alisdair R. Fernie, Adriana Descalzo, Ramón Asis, Magdalena Rossi, Sebastian Asurmendi, and Fernando Carrari* 1278

[C][W][OA] A Versatile Set of Ligation-Independent Cloning Vectors for Functional Studies in Plants. *Bert De Rybel, Willy van den Berg, Annemarie Lokerse, Che-Yang Liao, Hilda van Mourik, Barbara Möller, Cristina Llavata Peris, and Dolf Weijers* 1292

BIOINFORMATICS

[C][W][OA] DNA Free Energy-Based Promoter Prediction and Comparative Analysis of Arabidopsis and Rice Genomes. *Czuee Morey, Sushmita Mookherjee, Ganesan Rajasekaran, and Manju Bansal* 1300

[W] Comparative Network Analysis Reveals That Tissue Specificity and Gene Function Are Important Factors Influencing the Mode of Expression Evolution in Arabidopsis and Rice. *Sara Movahedi, Yves Van de Peer, and Klaas Vandepoele* 1316

SCIENTIFIC CORRESPONDENCE

[C][W] The Role of Brassinosteroids in Shoot Gravitropism. *Filip Vandenbussche, Dmitry Suslov, Liesbeth De Grauwe, Olivier Leroux, Kris Vissenberg, and Dominique Van Der Straeten* 1331

BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES

[W][OA] Nonphosphorylating Glyceraldehyde-3-Phosphate Dehydrogenase Is Phosphorylated in Wheat Endosperm at Serine-404 by an SNF1-Related Protein Kinase Allosterically Inhibited by Ribose-5-Phosphate. *Claudia Vanesa Piattoni, Diego Martín Bustos, Sergio Adrián Guerrero, and Alberto Álvaro Iglesias* 1337

[C][W][OA] Development of Cellulosic Secondary Walls in Flax Fibers Requires β -Galactosidase. *Melissa J. Roach, Natalia Y. Mokshina, Ajay Badhan, Anastasiya V. Snegireva, Neil Hobson, Michael K. Deyholos, and Tatyana A. Gorshkova* 1351

BIOENERGETICS AND PHOTOSYNTHESIS

[C][W][OA] Functional Incorporation of Sorghum Small Subunit Increases the Catalytic Turnover Rate of Rubisco in Transgenic Rice. *Chie Ishikawa, Tomoko Hatanaka, Shuji Misoo, Chikahiro Miyake, and Hiroshi Fukayama* 1603

CELL BIOLOGY AND SIGNAL TRANSDUCTION

[C][W][OA] Cell Wall Damage-Induced Lignin Biosynthesis Is Regulated by a Reactive Oxygen Species- and Jasmonic Acid-Dependent Process in Arabidopsis. *Lucinda Denness, Joseph Francis McKenna, Cecile Segonzac, Alexandra Wormit, Priya Madhou, Mark Bennett, John Mansfield, Cyril Zipfel, and Thorsten Hamann* 1364

Receptor-Like Activity Evoked by Extracellular ADP in Arabidopsis Root Epidermal Plasma Membrane. *Vadim Demidchik, Zhonglin Shang, Ryoung Shin, Renato Colaço, Anuphon Laohavisit, Sergey Shabala, and Julia M. Davies* 1375

OsREC8 Is Essential for Chromatid Cohesion and Metaphase I Monopolar Orientation in Rice Meiosis. *Tian Shao, Ding Tang, Kejian Wang, Mo Wang, Lixiao Che, Baoxiang Qin, Hengxiu Yu, Ming Li, Minghong Gu, and Zhukuan Cheng* 1386

DEVELOPMENT AND HORMONE ACTION

[W][OA] Rice ABI5-Like1 Regulates Abscisic Acid and Auxin Responses by Affecting the Expression of ABRE-Containing Genes. *Xi Yang, Ya-Nan Yang, Liang-Jiao Xue, Mei-Juan Zou, Jian-Ying Liu, Fan Chen, and Hong-Wei Xue* 1397

[W] Nitric Oxide Regulates DELLA Content and PIF Expression to Promote Photomorphogenesis in Arabidopsis. *Jorge Lozano-Juste and José León* 1410

[C][W][OA] Tomato Root Penetration in Soil Requires a Coaction between Ethylene and Auxin Signaling. *Parankusam Santisree, Sapana Nongmaithem, Himabindu Vasuki, Yellamaraju Sreelakshmi, Maria G. Ivanchenko, and Rameshwar Sharma* 1424

[C][W][OA] AtMYB2 Regulates Whole Plant Senescence by Inhibiting Cytokinin-Mediated Branching at Late Stages of Development in Arabidopsis. *Yongfeng Guo and Susheng Gan* 1612

Continued on next page

ENVIRONMENTAL STRESS AND ADAPTATION TO STRESS

- ^{[C][W][OA]}Early Transcriptional Defense Responses in Arabidopsis Cell Suspension Culture under High-Light Conditions. Sergio González-Pérez, Jorge Gutiérrez, Francisco García-García, Daniel Osuna, Joaquín Dopazo, Óscar Lorenzo, José L. Revuelta, and Juan B. Arellano 1439
- Suppression of a NAC-Like Transcription Factor Gene Improves Boron-Toxicity Tolerance in Rice. Kumiko Ochiai, Akifumi Shimizu, Yutaka Okumoto, Toru Fujiwara, and Toru Matoh 1457
- ^{[W][OA]}Regulatory Subunit B' γ of Protein Phosphatase 2A Prevents Unnecessary Defense Reactions under Low Light in Arabidopsis. Andrea Trotta, Michael Wrzaczek, Judith Scharte, Mikko Tikkanen, Grzegorz Konert, Moona Rahikainen, Maija Holmström, Hanna-Maija Hiltunen, Stephan Rips, Nina Sipari, Paula Mulo, Engelbert Weis, Antje von Schaeuwen, Eva-Mari Aro, and Saijaliisa Kangasjärvi 1464
- ^[W]The Cytosolic/Nuclear HSC70 and HSP90 Molecular Chaperones Are Important for Stomatal Closure and Modulate Abscisic Acid-Dependent Physiological Responses in Arabidopsis. Mathilde Clément, Nathalie Leonhardt, Marie-Jo Droillard, Ilja Reiter, Jean-Luc Montillet, Bernard Genty, Christiane Laurière, Laurent Nussaume, and Laurent D. Noël 1481
- ^{[C][W][OA]}K⁺ Transport by the OsHKT2;4 Transporter from Rice with Atypical Na⁺ Transport Properties and Competition in Permeation of K⁺ over Mg²⁺ and Ca²⁺ Ions. Tomoaki Horie, Dennis E. Brodsky, Alex Costa, Toshiyuki Kaneko, Fiorella Lo Schiavo, Maki Katsuhara, and Julian I. Schroeder 1493
- ^{[C][W]}EXORDIUM-LIKE1 Promotes Growth during Low Carbon Availability in Arabidopsis. Florian Schröder, Janina Lisso, and Carsten Müssig 1620
- Biotransformation and Volatilization of Arsenic by Three Photosynthetic Cyanobacteria. Xi-Xiang Yin, Jian Chen, Jie Qin, Guo-Xin Sun, Barry P. Rosen, and Yong-Guan Zhu 1631

PLANTS INTERACTING WITH OTHER ORGANISMS

- ^{[C][W][OA]}Multiple Roles of WIN3 in Regulating Disease Resistance, Cell Death, and Flowering Time in Arabidopsis. Guan-Feng Wang, Savanna Seabolt, Safae Hamdoun, Gina Ng, Jin Park, and Hua Lu 1508
- ^{[C][W][OA]}Lipase Activity in Insect Oral Secretions Mediates Defense Responses in Arabidopsis. Martin Schäfer, Christine Fischer, Stefan Meldau, Eileen Seebald, Ralf Oelmüller, and Ian T. Baldwin 1520
- ^{[W][OA]}Peroxiredoxins and NADPH-Dependent Thioredoxin Systems in the Model Legume *Lotus japonicus*. Alejandro Tovar-Méndez, Manuel A. Matamoros, Pilar Bustos-Sanmamed, Karl-Josef Dietz, Francisco Javier Cejudo, Nicolas Rouhier, Shusei Sato, Satoshi Tabata, and Manuel Becana 1535
- ^{[C][W][OA]}Identification of an ARGONAUTE for Antiviral RNA Silencing in *Nicotiana benthamiana*. Herman B. Scholthof, Veria Y. Alvarado, Julio C. Vega-Arreguin, Jessica Ciomperlik, Denis Odokonyero, Chantal Brosseau, Marianne Jaubert, Alejandro Zamora, and Peter Moffett 1548
- ^{[W][OA]}ARGONAUTE2 Mediates RNA-Silencing Antiviral Defenses against *Potato virus X* in Arabidopsis. Marianne Jaubert, Saikat Bhattacharjee, Alexandre F.S. Mello, Keith L. Perry, and Peter Moffett 1556
- ^[OA]Functional Characterization of a Eukaryotic Melibiose Transporter. Ulrike Lingner, Steffen Münch, Björn Sode, Holger B. Deising, and Norbert Sauer 1565

SYSTEMS BIOLOGY, MOLECULAR BIOLOGY, AND GENE REGULATION

- ^{[W][OA]}Enhanced Seed Oil Production in Canola by Conditional Expression of *Brassica napus* LEAFY COTYLEDON1 and LEC1-LIKE in Developing Seeds. Helin Tan, Xiaohui Yang, Fengxia Zhang, Xiu Zheng, Cunmin Qu, Jinye Mu, Fuyou Fu, Jiana Li, Rongzhan Guan, Hongsheng Zhang, Guodong Wang, and Jianru Zuo 1577
- ^[W]Leaf Rolling Controlled by the Homeodomain Leucine Zipper Class IV Gene *Roc5* in Rice. Liang-ping Zou, Xue-hui Sun, Zhi-guo Zhang, Peng Liu, Jin-xia Wu, Cai-juan Tian, Jin-long Qiu, and Tie-gang Lu 1589
- ^{[W][OA]}Ethylene and 1-Methylcyclopropene Differentially Regulate Gene Expression during Onion Sprout Suppression. Katherine Cools, Gemma A. Chope, John P. Hammond, Andrew J. Thompson, and Leon A. Terry 1639

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