

T H E
PLANT
C E L L

Volume 29 Number 4 April 2017

The electronic form of this issue, available at www.plantcell.org, is the journal of record.

ON THE COVER



The cover illustrates some of the variability in seed coat colors and patterns found in soybean (*Glycine max*). Because they are easy to differentiate from the yellow (nonpigmented) parent lines, a number of spontaneous mutant seed in which the seed coats are partially black and yellow (known as the saddle phenotype) have been found and maintained in the USDA soybean germplasm collections for over 70 years. Using these resources, Cho et al. (pages 708–725) investigated the molecular basis of an unusual epistatic interaction between dominant alleles of the *I* (inhibitor) locus that generates small RNAs to chalcone synthase and the unknown *k1* mutation that interacts with it to result in a saddle phenotype. Using RNA, whole-genome, and amplicon sequencing, they determined that the *K1* locus encodes *AGO5*, a specific member of the Argonaute family of proteins that are involved in the small RNA pathway.

IN BRIEF

The Plant Cell Reviews Plant Immunity: Receptor-Like Kinases, ROS-RLK Crosstalk, Quantitative Resistance, and the Growth/Defense Trade-Off [OPEN](#) 601
Nancy A. Eckardt

Meristem Doming and the Transition to Reproductive Development in Tomato [OPEN](#) 603
Jennifer Mach

Saddle Up, Soybean Seed Pigments: Argonaute5 in Spatially Regulated Silencing of Chalcone Synthase Genes [OPEN](#) 604
Jennifer Mach

Threonine Phosphorylation Regulates Polar Localization of the Boric Acid Transporter NIP5;1 in Root Cells [OPEN](#) 605
Gregory Bertoni

A Kinase- and Proteasome-Mediated Link between Lipid Biosynthesis and Energy Homeostasis [OPEN](#) 606
Nancy R. Hofmann

Family Chores: TRAF Family Proteins Help Recycle Cellular Rubbish by Regulating Autophagy Dynamics [OPEN](#) 607
Jennifer Lockhart

COMMENTARY

Widespread Contamination of Arabidopsis Embryo and Endosperm Transcriptome Data Sets [OPEN](#) 608
Michael A. Schon and Michael D. Nodine

REVIEWS

Receptor Kinases in Plant-Pathogen Interactions: More Than Pattern Recognition [OPEN](#) 618
Dingzhong Tang, Guoxun Wang, and Jian-Min Zhou

Bound by Fate: The Role of Reactive Oxygen Species in Receptor-Like Kinase Signaling [OPEN](#) 638
Sachie Kimura, Cezary Waszczak, Kerri Hunter, and Michael Wrzaczek

EDITORIAL BOARD**Editor in Chief**

Sabeeha Merchant

Senior Editors

Sebastian Bednarek
James Birchler
Ralph Bock
George Coupland
Pascal Genschik
Jean Greenberg
Joseph Kieber
Daniel J. Kliebenstein
Blake Meyers

Reviewing Editors

Michael Axtell
Magdalena Bezanilla
Siobhan Brady
Robin Buell
Kent Chapman
Clint Chapple
Sean Cutler
Dean Della Penna
Elizabeth Haswell
Herman R. Hofte
Inwhan Hwang
Regine Kahmann
Ute Kraemer
Barbara Kunkel
J. Clark Lagarias
Jim Leebens-Mack
Zach Lippman
Tsfaye Mengiste
Harvey Millar
Ortrun Mittelsten Scheid
Giles E. Oldroyd
Naomi Ori
Markus Pauly
Eugenia (Jenny) Russinova
Dale Sanders
Karin Schumacher
Keiko Sugimoto
Marja Timmermans
Michael Udvardi
Andreas Weber

Guest Editors

Alice Barkan
Andrea Barta
Judy Callis
XiaoFeng Cao
Katherine Denby
Ram Dixit
Xinnian Dong
Angela Falciatore
Brian Gregory
Rodrigo Gutierrez
Liwen Jiang
Thomas Juenger
Jinsheng Lai
Andrew Leakey
Yonghua Li-Beisson
Damon Lisch
Hongtao Liu
Peter Moffett
Peter Nagy
Erik Nielsen
Michael Palmgren
Barry Pogson
Marcela Rojas-Pierce
Hitoshi Sakakibara
Tai-ping Sun

Quantitative Resistance: More Than Just Perception of a Pathogen 655

Jason A. Corwin and Daniel J. Kliebenstein

Mechanisms to Mitigate the Trade-Off between Growth and Defense 666

Talia L. Karasov, Eunyong Chae, Jacob J. Herman, and Joy Bergelson

RESEARCH ARTICLES

Coordination of Meristem Dying and the Floral Transition by Late Termination, a Kelch Repeat Protein 681

Lior Tal, Gilgi Friedlander, Netta Segal Gilboa, Tamar Unger, Shlomit Gilad, and Yuval Eshed

Tissue-Specific Ubiquitination by IPA1 INTERACTING PROTEIN1 Modulates IPA1 Protein Levels to Regulate Plant Architecture in Rice [OPEN](#) 697

Jing Wang, Hong Yu, Guosheng Xiong, Zefu Lu, Yongqing Jiao, Xiangbing Meng, Guifu Liu, Xuwei Chen, Yonghong Wang, and Jiayang Li

Mutations in *Argonaute5* Illuminate Epistatic Interactions of the *K1* and *I* Loci Leading to Saddle Seed Color Patterns in *Glycine max* 708

Young B. Cho, Sarah I. Jones, and Lila O. Vodkin

Changes in PUB22 Ubiquitination Modes Triggered by MITOGEN-ACTIVATED PROTEIN KINASE3 Dampen the Immune Response [CC-BY](#) 726

Giulia Furlan, Hirofumi Nakagami, Lennart Eschen-Lippold, Xiyuan Jiang, Petra Majovsky, Kathrin Kowarschik, Wolfgang Hoehenwarter, Justin Lee, and Marco Trujillo

CALCIUM-DEPENDENT PROTEIN KINASE5 Associates with the Truncated NLR Protein TIR-NBS2 to Contribute to *exo70B1*-Mediated Immunity 746

Na Liu, Katharina Hake, Wei Wang, Ting Zhao, Tina Romeis, and Dingzhong Tang

Different Cold-Signaling Pathways Function in the Responses to Rapid and Gradual Decreases in Temperature 760

Satoshi Kidokoro, Koshi Yoneda, Hironori Takasaki, Fuminori Takahashi, Kazuo Shinozaki, and Kazuko Yamaguchi-Shinozaki

An NADPH Oxidase RBOH Functions in Rice Roots during Lysigenous Aerenchyma Formation under Oxygen-Deficient Conditions 775

Takaki Yamauchi, Miki Yoshioka, Aya Fukazawa, Hitoshi Mori, Naoko K. Nishizawa, Nobuhiro Tsutsumi, Hirofumi Yoshioka, and Mikio Nakazono

Dual Role of the Histone Variant H2A.Z in Transcriptional Regulation of Stress-Response Genes [OPEN](#) 791

Weronika Sura, Michał Kabza, Wojciech M. Karlowski, Tomasz Bieluszewski, Marta Kus-Slowinska, Łukasz Pawełoszek, Jan Sadowski, and Piotr A. Ziolkowski

Bile Acid Sodium Symporter BASS6 Can Transport Glycolate and Is Involved in Photorespiratory Metabolism in *Arabidopsis thaliana* [OPEN](#) 808

Paul F. South, Berkley J. Walker, Amanda P. Cavanagh, Vivien Rolland, Murray Badger, and Donald R. Ort

Polar Localization of the NIP5;1 Boric Acid Channel Is Maintained by Endocytosis and Facilitates Boron Transport in *Arabidopsis* Roots 824

Sheliang Wang, Akira Yoshinari, Tomoo Shimada, Ikuko Hara-Nishimura, Namiki Mitani-Ueno, Jian Feng Ma, Satoshi Naito, and Junpei Takano

Intron DNA Sequences Can Be More Important Than the Proximal Promoter in Determining the Site of Transcript Initiation 843

Jenna E. Gallegos and Alan B. Rose

Klaas van Wijk
Jeanmarie Verchot
Dan Voytas
Sam Zeeman
Xiaoyu Zhang

Consulting Editors

Volker Brendel
Erin Connolly
Oliver Jensen
Nathan Nelson
Scott Peck
Uwe Rascher
David Smyth
Pam Soltis
Frances-Andre Wollman

Senior Features Editor

Nancy A. Eckardt

Features Editor

Mary Williams

Science Editors

Greg Bertoni
Kathleen L. Farquharson
Nancy R. Hofmann
Jennifer Lockhart
Jennifer M. Mach

Managing Editor

Patti Lockhart

Issue Manager

Felicia Dadak

Production Manager

Susan L. Entwistle

Manuscript Manager

Annette Kessler

Publications Director

Nancy A. Winchester

Publisher

American Society of
Plant Biologists
Executive Director,
Crispin Taylor

Editorial Office

15501 Monona Drive
Rockville, Maryland 20855-2768
Telephone: 301/296-0908
Online at www.plantcell.org



© 2017 American Society of Plant Biologists. All rights reserved.

The Composition of the Arabidopsis RNA Polymerase II Transcript Elongation Complex Reveals the Interplay between Elongation and mRNA Processing Factors [OPEN](#) 854

Wojciech Antosz, Alexander Pfab, Hans F. Ehrnsberger, Philipp Holzinger, Karin Köllen, Simon A. Mortensen, Astrid Bruckmann, Thomas Schubert, Gernot Längst, Joachim Griesenbeck, Veit Schubert, Marion Grasser, and Klaus D. Grasser

Phosphorylation of WRINKLED1 by KIN10 Results in Its Proteasomal Degradation, Providing a Link between Energy Homeostasis and Lipid Biosynthesis [OPEN](#) 871

Zhiyang Zhai, Hui Liu, and John Shanklin

TRAF Family Proteins Regulate Autophagy Dynamics by Modulating AUTOPHAGY PROTEIN6 Stability in Arabidopsis [OPEN](#) 890

Hua Qi, Fan-Nv Xia, Li-Juan Xie, Lu-Jun Yu, Qin-Fang Chen, Xiao-Hong Zhuang, Qian Wang, Faqiang Li, Liwen Jiang, Qi Xie, and Shi Xiao

CORRECTIONS

Campalans, A., Kondorosi, A., and Crespi, M. (2004). *Enod40*, a short open reading frame-containing mRNA, induces cytoplasmic localization of a nuclear RNA binding protein in *Medicago truncatula*. *Plant Cell* 16: 1047–1059. [OPEN](#) 912

Da Silva, C., Zamperin, G., Ferrarini, A., Minio, A., Dal Molin, A., Venturini, L., Buson, G., Tononi, P., Avanzato, C., Zago, E., Boido, E., Dellacassa, E., Gaggero, C., Pezzotti, M., Carrau, F., and Delledonne, M. (2013). The high polyphenol content of grapevine cultivar Tannat berries is conferred primarily by genes that are not shared with the reference genome. *Plant Cell* 25: 4777–4788. [OPEN](#) 913

[CC-BY](#) Article free via Creative Commons CC-BY 4.0 license.

[OPEN](#) Articles can be viewed without a subscription.

The Plant Cell (eISSN 1532-298X) is published monthly (one volume per year) by the American Society of Plant Biologists, 15501 Monona Drive, Rockville, MD 20855-2768, and is produced by The Sheridan Group, Waterbury, VT. For matters regarding library subscriptions, contact Suzanne Cholwek, ASPB, 15501 Monona Drive, Rockville, MD 20855-2768; telephone 301/296-0926; fax 301/251-6740; e-mail scholwek@aspb.org. Send all inquiries regarding advertising to FASEB AdNet, 9650 Rockville Pike, Bethesda, MD 20814-3998; telephone 301/634-7791; fax 301/634-7153; e-mail adnet@faseb.org. The online version of *The Plant Cell* is available at www.plantcell.org.

Permission to Reprint: Permission to make digital or hard copies of part or all of a work published in *The Plant Cell* is granted without fee for personal or classroom use provided that copies are not made or distributed for profit or commercial advantage and that copies bear the full citation and the following notice on the first page: "Copyright American Society of Plant Biologists." For all other kinds of copying, request permission in writing from Nancy A. Winchester, Publications Director, ASPB headquarters.

This information is current as of February 15, 2019

Permissions	https://www.copyright.com/ccc/openurl.do?sid=pd_hw1532298X&issn=1532298X&WT.mc_id=pd_hw1532298X
eTOCs	Sign up for eTOCs at: http://www.plantcell.org/cgi/alerts/ctmain
CiteTrack Alerts	Sign up for CiteTrack Alerts at: http://www.plantcell.org/cgi/alerts/ctmain
Subscription Information	Subscription Information for <i>The Plant Cell</i> and <i>Plant Physiology</i> is available at: http://www.aspb.org/publications/subscriptions.cfm