

**On the Cover:** Blooming flowers have fascinated people for thousands of years. Research led to the discovery of major molecular mechanisms regulating flowering time, flower organ, and germline development, as well as fertilization, culminating in the generation of seeds containing a new generation. Depending on developmental and environmental cues, male and female gametophytes are produced in the anther and ovules after meiotic and additional mitotic divisions. Pollination from selfing or mediated by wind or insects then starts a long series of male-female dialogues leading to targeted pollen tube growth to the ovules, delivering immotile sperm cells to the female gametophyte for a double fertilization event that gives rise to the embryo and endosperm. This focus issue highlights the tremendous progress that has been made during the past 10 years to understand flowering and reproduction. The image shows an *Amaryllis* flower of the cultivar *Minerva*. Photo taken by Thomas Dresselhaus.

## THANK YOU TO REVIEWERS

An acknowledgment of *Plant Physiology* reviewers.

## FOCUS ON FLOWERING AND REPRODUCTION

### EDITORIAL

Focus on Flowering and Reproduction. *Richard M. Amasino, Alice Y. Cheung, Thomas Dresselhaus, and Cris Kuhlemeier*

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### UPDATES

[OPEN] Circadian Clock and Photoperiodic Flowering in *Arabidopsis*: CONSTANS Is a Hub for Signal Integration. *Jae Sung Shim, Akane Kubota, and Takato Imaizumi*

*The circadian clock and light signaling regulate CONSTANS function through intricate mechanisms that reside in phloem companion cells of leaves for controlling photoperiodic flowering in Arabidopsis.*

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[OPEN] Changing Responses to Changing Seasons: Natural Variation in the Plasticity of Flowering Time. *Benjamin K. Blackman*

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[OPEN] Natural Variation in *Brachypodium* Links Vernalization and Flowering Time Loci as Major Flowering Determinants. *Jan Bettgenhaeuser, Fiona M.K. Corke, Magdalena Opanowicz, Phon Green, Inmaculada Hernández-Pinzón, John H. Doonan, and Matthew J. Moscou*

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[CC-BY] A Conserved cis-Regulatory Module Determines Germline Fate through Activation of the Transcription Factor DUO1 Promoter. Benjamin Peters, Jonathan Casey, Jack Aidley, Stuart Zohrab, Michael Borg, David Twell, and Lynette Brownfield

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[OPEN] The Genetic Control of Reproductive Development under High Ambient Temperature. Mahwish Ejaz and Maria von Korff

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[OPEN] IRREGULAR POLLEN EXINE1 Is a Novel Factor in Anther Cuticle and Pollen Exine Formation.

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[OPEN] Structure-Activity Relation of AMOR Sugar Molecule That Activates Pollen-Tubes for Ovular Guidance. Jiao Jiao, Akane G. Mizukami, Subramanian Sankaranarayanan, Junichiro Yamguchi, Kenichiro Itami, and Tetsuya Higashiyama

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<sup>[OPEN]</sup>Natural Variation of Molecular and Morphological Gibberellin Responses. *Youn-Jeong Nam, Dorota Herman, Jonas Blomme, Eunyoungh Chae, Mikiko Kojima, Frederik Coppens, Veronique Storme, Twiggy Van Daele, Stijn Dhondt, Hitoshi Sakakibara, Detlef Weigel, Dirk Inzé, and Nathalie Gonzalez*

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Mitogen-Activated Protein Kinase Phosphatases Affect UV-B-Induced Stomatal Closure via Controlling NO in Guard Cells. *Feng-Chen Li, Jing Wang, Mi-Mi Wu, Cai-Ming Fan, Xuan Li, and Jun-Min He*

*Mitogen-activated protein kinase phosphatases 1 and 6 promote ultraviolet B-induced stomatal closure by modulating hydrogen peroxide-induced nitric oxide production in Arabidopsis guard cells.*

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<sup>[OPEN]</sup>A Cysteine-Rich Protein Kinase Associates with a Membrane Immune Complex and the Cysteine Residues Are Required for Cell Death. *Koste A. Yadeta, James M. Elmore, Athena Y. Creer, Baomin Feng, Jessica Y. Franco, Jose Sebastian Rufian, Ping He, Brett Phinney, and Gitta Coaker*

*Arabidopsis CRK28 is synthesized upon immune perception, associates with the FLS2 receptor complex, and silencing multiple related CRKs enhances disease susceptibility.*

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Yanhua Ge, Fenglian Yan, Melina Zourelidou, Meiling Wang, Karin Ljung, Astrid Fastner, Ulrich Z. Hammes, Martin Di Donato, Markus Geisler, Claus Schwechheimer, and Yi Tao

*SAV4 modulates auxin transport through its shootward membrane localization and inhibitory effect on ABCB1-mediated auxin efflux in hypocotyls of Arabidopsis.*

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Weimei Ma, Fuqing Wu, Peike Sheng, Xiaole Wang, Zhe Zhang, Kunneng Zhou, Huan Zhang, Jinlong Hu, Qibin Lin, Zhijun Cheng, Jiulin Wang, Shanshan Zhu, Xin Zhang, Xiuping Guo, Haiyang Wang, Chuanyin Wu, Huqu Zhai, and Jianmin Wan

*Rice LBD12-1 functions as a repressor of shoot apical meristem size by down-regulating expression of AGO10 and HD-ZIP III.*

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Two h-Type Thioredoxins Interact with the E2 Ubiquitin Conjugase PHO2 to Fine-Tune Phosphate Homeostasis in Rice. Yinghui Ying, Wenhao Yue, Shoudong Wang, Shuai Li, Min Wang, Yang Zhao, Chuang Wang, Chuanzao Mao, James Whelan, and Huixia Shou

*Oryza sativa PHO2 interacts with two h-type thioredoxins, which links phosphate homeostasis with redox balance in rice.*

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<sup>[OPEN]</sup>Substituted Phthalimide AC94377 Is a Selective Agonist of the Gibberellin Receptor *GID1*.

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*AC94377 preferentially binds the *GID1* receptor to activate the gibberellin signaling in Arabidopsis.*

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<sup>[OPEN]</sup>An Ethylene-Induced Regulatory Module Delays Flower Senescence by Regulating Cytokinin Content.

Lin Wu, Nan Ma, Yangchao Jia, Yi Zhang, Ming Feng, Cai-Zhong Jiang, Chao Ma, and Junping Gao

*A regulatory module by which ethylene and cytokinin interaction affects rose flower senescence.*

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<sup>[OPEN]</sup>A DII Domain-Based Auxin Reporter Uncovers Low Auxin Signaling during Telophase and Early G1.

Ricardo Mir, Leslie Z. Aranda, Tiffany Biaocchi, Anding Luo, Anne W. Sylvester, and Carolyn G. Rasmussen

*A new DII reporter indicates a low level of auxin signaling during telophase and G1 in maize.*

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<sup>[OPEN]</sup>Network-Guided GWAS Improves Identification of Genes Affecting Free Amino Acids.

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*A metabolic network-guided genome-wide association study of seed free amino acids facilitates the identification of a histidine-specific transporter in Arabidopsis.*

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[<sup>OPEN</sup>] Systems Genetics Identifies a Novel Regulatory Domain of Amylose Synthesis. *Vito M. Butardo Jr., Roslen Anacleto, Sabiha Parween, Irene Samson, Krishna de Guzman, Crislina Mae Alhambra, Gopal Misra, and Nese Sreenivasulu*

*Interlinking GWAS of Debranched Starch Structure with Gene Regulatory Networks Uncovers a Regulatory Region for Amylose Synthesis in Rice (Oryza sativa).*

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[<sup>CC-BY</sup>] The Transcription Factor ATHB5 Affects GA-Mediated Plasticity in Hypocotyl Cell Growth during Seed Germination. *Petra Stamm, Alexander T. Topham, Nur Karimah Mukhtar, Matthew D.B. Jackson, Daniel F.A. Tomé, Jim L. Beynon, and George W. Bassel*

*The seed-to-seedling transition in Arabidopsis can occur following multiple spatiotemporal patterns of cell expansion, including hypocotyl-based growth promoted by the transcription factor ATHB5.*

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