July #1, 2019
Plant, Cell & Environment
How Plants Respond to Climate Change. A new Virtual Special Issue of *Plant, Cell & Environment*.
Cornelia Eisenach
First Published: 29 June 2019

Genetic dissection of drought and heat-responsive agronomic traits in wheat
Long Li, Xinguo Mao, Jingyi Wang, Xiaoping Chang, Matthew Reynolds, Ruilian Jing
Version of Record online: 24 June 2019

We uncovered consistent marker alleles for agronomic traits across different environments and eurytopic marker alleles controlling multiple abiotic stress tolerances in wheat. Selective sweep analysis showed that the gradual loss of advantageous variation for abiotic stress tolerances due to preferential selection for yield potential may be a common phenomenon in current wheat breeding. Two promising candidate genes identified in the present study provide potential targets for studying the molecular mechanism of stress tolerance-productivity trade-off. These results are timely in terms of developing efficient molecular markers and dissection of the functions of relevant genes for wheat improvement in times of unexpected climatic fluctuations.

Protein degraders, from clinic to crops

Nature Biotechnology **volume 37**, page701 (2019) | Download Citation

Bayer and Arvinas have joined forces to develop a new class of agents that degrade proteins rather than inhibit them. The overall deal, announced on June 4, includes $110 million in upfront cash to work with Arvina's protein-degrading PROTAC (PROteolysis-TArgeting Chimeras) technology to find new therapeutics for cardiovascular, oncology and gynecology indications. The deal also extends to agricultural uses, with Bayer and Arvinas launching a Crop Science joint venture. The aim is to develop novel protein-degrading molecules to fight weeds, insects and other agricultural pests. Unlike traditional small molecules that aim to inhibit the target protein's active site, Arvina's PROTACs harness the ubiquitin proteasome system to destroy the target molecule. PROTACs are bifunctional small molecules that use one arm to bind a target and the other to bind an E3 ubiquitin ligase. Once a PROTAC brings together the target protein and the E3 ligase, the enzyme ubiquitinates the target protein, tagging it for disposal. In agriculture, PROTAC technology also has the potential to rekindle crop-protection mechanisms that have become ineffective due to resistance, according to Bayer. Other companies focused on targeted degrader chemistries for clinical applications include C4 Therapeutics and Kymera Therapeutics. In April, Arvinas became the first company to take this approach to the clinic, when it began dosing patients in a phase 1 trial for the treatment of metastatic castration-resistant prostate cancer with the drug ARV-110. Results are expected in the second half of 2019. The company also has plans for testing this drug against breast cancer, and a phase 1 clinical trial planned for the third quarter of 2019.

 Review Articles | 17 June 2019
Synthetic evolution
From unbiased mutagenesis to precision modification, in genes or whole genomes, researchers have a panoply of tools to direct evolution. Anna J. Simon , Simon d'Oelsnitz & Andrew D. Ellington

 Review Article | 17 June 2019
Breeding crops to feed 10 billion
Development of next-generation crops will be enabled by combining state-of-the-art technologies with speed breeding. Lee T. Hickey , Amber N. Hafeez […] & Brande B. H. Wulff
The Signal - July 4, 2019
World Not Prepared for Next Plant Health Emergency, Scientists Warn
From Science via The Sainsbury Laboratory
Scientists at The Sainsbury Laboratory, along with partners at CIAT, the John Innes Centre and elsewhere, warn that we are not fully prepared to tackle the rise in new epidemics of plant diseases. In a paper published in *Science*, Professor Sophien Kamoun and colleagues are proposing a Global Surveillance System that will extend and adapt established biosecurity practices and networking facilities
Plant, Cell & Environment, Vol. 42, No. 8, August 2019

The capacity to emit isoprene differentiates the photosynthetic temperature responses of tropical plant species
Tyeen C. Taylor, Marielle N. Smith, Martijn Slot, Kenneth J. Feeley
Pages: 2448-2457 | First Published: 16 April 2019
That isoprene emission enhances the thermal tolerance of photosynthesis is supported by decades of experimental physiology. But whether isoprene differentiates the thermal niches of emitting from non-emitting species remains untested in the real world. We provide evidence that isoprene-emitting tropical woody plant species photosynthesize to higher maximum temperatures, and over a broader thermal range, compared with co-occurring, non-emitting species. Even accounting for the carbon cost of isoprene emissions, we find no substantial trade-offs associated with this high-temperature advantage.

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Evolutionary potential of thermal preference and heat tolerance in *Drosophila subobscura*
Luis E. Castañeda, Valèria Romero-Soriano, Andrés Mesas, Derek A. Roff, Mauro Santos
Pages: 818-824 | First Published: 30 April 2019
Methodology affects the heat tolerance and heritability estimates but not its genetic correlation with thermal preference in *Drosophila subobscura*.

The Plant Journal

Resolving subcellular plant metabolism
Lisa Fürtauer, Lisa Küstner, Wolfram Weckwerth, Arnd G. Heyer, Thomas Nägele
First Published: 30 July 2019

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Bernhard T[1], Koch M[2], Snowdon RJ[3], Friedt W[3], Wittkop B[3].

Journal of Evolutionary Biology
Evolution of Escherichia coli in different carbon environments for 2000 generations
Debika Choudhury, Supreet Saini
First Published: 09 August 2019

Plant Cell & Environment
Carbon assimilation in crops at high temperatures
Rebecca A. Slattery, Donald R. Ort
Version of Record online: 29 July 2019
We review the effects of high temperatures and heat waves, with and without interacting climate variables, on crop photosynthesis. We also discuss the biochemical reactions limiting crop photosynthesis at high temperatures, promising strategies for adaptation, and current progress toward achieving each strategy.

The ubiquitin-proteasome system in plant responses to environments
Fa-Qing Xu, Hong-Wei Xue
First Published: 30 July 2019