

Functional Plant Biology

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Cloning and function analysis of BAG family genes in wheat <i>Shiming Ge, Zhen Kang, Ying Li, Fuzhen Zhang, Yinzhu Shen, Rongchao Ge and Zhanjing Huang</i>	393–402	The plant heat resistance relative <i>TaBAG</i> gene is reported here. <i>TaBAG2</i> can enhance the heat tolerance of <i>Arabidopsis</i> by interacting with Hsp70 and CaM proteins. Results of this work reveal the mechanism of heat tolerance in plants.
Contribution of apoplast to short-term copper uptake by wheat and mung bean roots <i>Nataly Meychik, Yuliya Nikolaeva, Maria Kushunina and Igor Yermakov</i>	403–412	The cell wall is the first structure in the root that comes into contact with external solution, so it plays an essential role in the control of solute transport into the cell. Here we show that accumulation of copper in root cell walls is a principal response of wheat and mung bean plants to excess Cu, limiting symplastic Cu uptake in roots in short-term treatment. This enhances our understanding of the functioning of plant root cells under elevated Cu concentrations.
Expression and functional analysis of <i>PhEOL1</i> and <i>PhEOL2</i> during flower senescence in petunia <i>Juanxu Liu, Ji Zhao, Zhina Xiao, Xinlei Chang, Guoju Chen and Yixun Yu</i>	413–422	Ethylene controls flower senescence in petunia but it is not known whether EOL1 protein, negatively regulating ACS, the key enzyme of ethylene biosynthesis, plays a role during flower senescence. Here, silencing of petunia EOL1 accelerated flower senescence and produced more ethylene than the control. The results are important for molecular breeding of cut flower for preservation.
Component traits of plant water use are modulated by vapour pressure deficit in pearl millet (<i>Pennisetum glaucum</i> (L.) R.Br.) <i>Jana Kholová, Paul Zindy, Srikanth Malayee, Rekha Baddam, Tharanya Murugesan, Sivasakthi Kaliamoorthy, C. Tom Hash, Olga Votrubová, Aleš Soukup, Marie Kočová, Mareme Niang and Vincent Vadez</i>	423–437	Traits related to plant water use were measured in pearl millet plants grown under different vapour pressure deficits (VPDs). High VPD growth conditions decreased leaf growth and affected root anatomy. High VPD led plants to develop in a way that allowed more water transport. These long-term effects affected the transient response of transpiration to increasing VPD in a genotype-dependent manner.
Assessing the xanthophyll cycle in natural beech leaves with hyperspectral reflectance <i>Rei Sonobe and Quan Wang</i>	438–447	The xanthophyll cycle is critical for protecting the photosynthetic apparatus, and a clear view of it is important for understanding abiotic stresses. This study has identified a new hyperspectral index to trace the xanthophyll cycle in typical temperate deciduous species and its robustness has also been confirmed. The proposed index is hence applicable for tracing the xanthophyll cycle in deciduous forests.

Cover illustration: (Top) Subcellular localisation of TaBAGs in *Arabidopsis* root cells (see Ge *et al.* pp. 393–402). The expression vectors pEDAG-TaBAGDW (left), pEDAG-TaBAG2-DW (centre), and the pEDAG empty vector (right) were used to transfect *Arabidopsis* with *Agrobacterium* to obtain transgenic *Arabidopsis*. After culturing at 22°C for 6 days, root tips of seedlings were selected and observed under a laser scanning confocal microscope. (Bottom) Regulation of heat shock expression patterns with BAG and CaM. Images by Rongchao Ge.

Different strategies of acclimation of photosynthesis, electron transport and antioxidative activity in leaves of two cotton species to water deficit

Xiao-Ping Yi, Ya-Li Zhang, He-Sheng Yao, Hong-Hai Luo, Ling Gou, Wah Soon Chow and Wang-Feng Zhang

448–460

The mechanisms of drought-tolerant may be related to photoprotective feature in cotton plants. Upland cotton can rely on enhanced alternative electron transport such as photorespiration and the Mehler reaction while pima cotton can through photorespiration and heat dissipation to dissipate light energy. The two cotton species possess different adaptation mechanisms to water deficit in field conditions.

Potassium enhances frost tolerance in young individuals of three tropical dry forest species from Mexico

Pilar A. Gómez-Ruiz, Roberto Lindig-Cisneros, Erick de la Barrera and Carlos Martorell

461–467

Climate change will shift species distribution ranges, so movement of species outside their current range of distribution could provide a strategy for conservation. We evaluated frost tolerance of three tropical dry forest species; all were susceptible to frost damage, but potassium addition increased resistance. If plants are moved to areas that are colder areas than their current habitat, the use of potassium fertilisation could improve survival.

Temperature response of CO₂ exchange in three tropical tree species

Martijn Slot, Milton N. Garcia and Klaus Winter

468–478

We have a limited understanding of how climate change will affect tropical forests, particularly tree physiology. Our study showed large differences in how temperature affected carbon uptake and release characteristics among early- and late-successional Panamanian tree species, and between seedlings and canopy trees. Such laboratory and field comparisons are essential to improve predictions of the high-temperature performance of tropical forests.