Plant Physiology®

March 2010 • Vol. 152 • No. 3

The electronic form of this issue, available as of March 11, 2010, at www.plantphysiol.org, is considered the journal of record.

On the Cover: Floods dramatically affect natural ecosystems and crop production. In this issue, Jung et al. (pp. 1674–1692) unravel dynamic adjustments of the transcriptomes of near-isogenic rice genotypes that differ in tolerance to prolonged submergence due to the presence or absence of the tolerance-conferring *Sub1A-1* ethylene-responsive transcription factor (ERF). They show that *Sub1A* influences gene networks that modulate hormone accumulation and response, central metabolism, elongation growth, and senescence. Also within this issue, Rocha et al. (pp. 1501–1513) utilize the waterlogging-tolerant species *Lotus japonicus* to investigate adjustments in central carbon and nitrogen metabolism that augment substrate level ATP production. The importance of production of the fermentation end products ethanol and lactate is long recognized. This new study associates the reaction of pyruvate with Glu to form Ala and oxoglutarate with a bifurcation of the tricarboxylic pathway that augments energy production in waterlogged roots. To further our understanding of acclimation to low-oxygen stress, including submergence and waterlogging, Mustroph et al. (pp. 1484–1500) performed a meta-analysis of the transcriptomic responses of four plant and 17 nonplant species (animals, fungi, and bacteria). Through recognition of gene orthologs, the study identifies conserved core adjustments in metabolism, heat shock protein induction, and reactive oxygen species metabolism. Despite commonalities in cellular response, the stress-regulated transcription factors and signaling protein mRNAs are poorly conserved across kingdoms. On pp. 1471–1483 of this issue, Banti et al. report that Arabidopsis (*Arabidopsis thaliana*) heat shock factor A2 (*HsfA2*) is responsible for an overlap in the mechanisms of tolerance to heat shock and anoxia, with *HsfA2* overexpressors displaying markedly enhanced tolerance to low-oxygen stress. Cover image designed by Mathijs Vanwoerkum of Dorado Communications based on a concept from Pierdomenico Perata, Scuola Superiore Sant'Anna, Pisa, Italy.

ON THE INSIDE

GENOME ANALYSIS

BREAKTHROUGH TECHNOLOGIES

BIOINFORMATICS

SCIENTIFIC CORRESPONDENCE

Continued on next page

Continued from preceding page

RESEARCH ARTICLES

BIOCHEMICAL PROCESSES AND MACROMOLECULAR STRUCTURES

BIOENERGETICS AND PHOTOSYNTHESIS

CELL BIOLOGY AND SIGNAL TRANSDUCTION

Continued on next page

Continued from preceding page

DEVELOPMENT AND HORMONE ACTION

ENVIRONMENTAL STRESS AND ADAPTATION TO STRESS

Continued on next page

Continued from preceding page

[C] Some figures in this article are displayed in color online but in black and white in the print edition.
[W] Indicates Web-only data.
[OA] Open Access articles can be viewed online without a subscription.