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Ca²⁺ pulsation in BY-2 cells and evidence for control of mechanosensory Ca²⁺-selective channels by the plasmalemmal reticulum

Barbara G. Pickard and Masaaki Fujiki 863–879

These authors show that arabinogalactan protein, which abounds in the cytoskeletal network, communicates with the cell interior by regulating these channels, thereby elevating both cytosolic and nuclear free calcium. Because arabinogalactan protein has already been shown to control cytosolic calcium within the more specialised lily pollen tube, some features of the process may well be part of a general signalling mechanism.

The *Arabidopsis* selenium-binding protein confers tolerance to toxic levels of selenium

Adamantia Agalou, Andreas Roussis and Herman P. Spaink 881–890

These authors investigate the function of a putative Selenium-Binding Protein (SBP) in *Arabidopsis*, using overexpression and RNAi knockdown. They generated plants with altered levels of SBP, and tested their response to selenium. Plants with enhanced expression of *Atsbp1* show improved tolerance to selenium, but no role for this protein in the regulation of developmental processes was detected under standard growth conditions. The results show that SBP is involved in processes controlling selenium tolerance.

Senescence-associated down-regulation of 1-aminocyclopropane-1-carboxylate (ACC) oxidase delays harvest-induced senescence in broccoli

Nigel E. Gapper, Simon A. Coupe, Marian J. McKenzie, Richard W. Scott, Mary C. Christey, Ross E. Lill, Michael T. McManus and Paula E. Jameson 891–901

Although the effects of antisense expression of ethylene biosynthetic genes have been described in several crop species previously, this paper provides new information about changes in expression of sugar metabolism genes. The paper describes the characterisation of transgenic broccoli plants altered for ethylene status following harvest. Broccoli plants transformed with an anti-sense ACO construct showed delayed post-harvest senescence, a reduction in ethylene biosynthesis and expression of a number of senescence-associated genes, normally associated with post-harvest senescence, confirming that ethylene is a key regulator in this process in harvested broccoli.

The balance between RuBP carboxylation and RuBP regeneration: a mechanism underlying the interspecific variation in acclimation of photosynthesis to seasonal change in temperature

Yusuke Onoda, Kouki Hikosaka and Tadaki Hirose 903–910

Photosynthetic rate is limited by either RuBP carboxylation or regeneration. This study investigates interspecific difference in temperature acclimation of photosynthesis with respect to the balance between these two factors. The authors found that interspecific variation was attributable to the differences in the temperature dependence of the capacities between species.

Cover illustration: Selections from a time-lapse study of a calcium reporter in onion cell ER. The reporter was ratiometric cameleon YCX prepared with a leader sequence for entry to the ER and a terminal sequence for retention. Ca²⁺ distribution is dynamic in space and time; such studies indicate that further evaluation of stimulated ratio changes should be carried out with very high spatiotemporal resolution. (See Pickard and Fujiki pp. 863–879.)

Galactosidases in opening, senescing and water-stressed
Sandersonia aurantiaca flowers

**Erin M. O'Donoghue, Jocelyn R. Eason,
Sheryl D. Somerfield and Dacey A. Ryan** 911–922

Many petals wilt at the onset of senescence. These authors investigate the relationship between flower petal textural change and cell wall rheology, by applying dehydration or firming treatments to *Sandersonia* flowers and studying the impacts on aspects of cell wall galactose metabolism. They conclude that galactose mobilisation seems to occur independently of senescence-related wilt, but may be engaged by the same senescence induction signals.

Characterisation of a T-DNA-tagged gene of
Arabidopsis thaliana that regulates GA metabolism
and flowering time

**Maria Svensson, Dan Lundh, Per Bergman
and Abul Mandal** 923–932

The molecular mechanisms of regulation of flowering time in higher plants is of great interest; using a promoter trap T-DNA tagging approach and *in vivo* gene fusion, these authors identified a mutant of *Arabidopsis thaliana* with delayed flowering time, and cloned the tagged gene. Plants containing a T-DNA tag showed decreased levels of bioactive GA₄ and a late-flowering phenotype that could be repressed by application of exogenous GA₃. They also show that the gene encodes a previously uncharacterised protein involved in GA metabolism.

Phenotypic plasticity of an invasive acacia versus two
native Mediterranean species

**Ralf Peperkorn, Christiane Werner and
Wolfram Beyschlag** 933–944

Enhanced phenotypic plasticity may be one of the most important traits of invading species, and has been hypothesised as allowing such species to successfully colonise new habitats. These authors investigated an invasive acacia species and two native Mediterranean species, exploring phenotypic plasticity in response to biotic and abiotic factors. This explains the observed differences in competitiveness between invasive and native species.

Potential yield and water use efficiency benefits in
sorghum from limited maximum transpiration rate

**Thomas R. Sinclair, Graeme L. Hammer and
Erik J. van Oosterom** 945–952

This theoretical paper on plant–environment interactions aims to target new morphophysiological traits when breeding sorghum. The authors explore the consequences on crop growth and yield of imposing a restriction on maximum transpiration rate. A modelling and simulation approach is used to quantify consequences on sorghum production in Australia. A simulation study based on an existing crop models suggests that restricting maximum transpiration rate may be particularly beneficial in many instances.

Hydraulic efficiency of the leaf venation system in sun-
and shade-adapted species

**Andrea Nardini, Emmanuelle Gortan and
Sebastiano Salleo** 953–961

These authors use a novel high-pressure flow system and leaf cutting to quantify the vascular resistance to water flow of leaves of species associated with sunny or shady habitats. The venation system of sun species was hydraulically more efficient than that of shade species. Vein hydraulic resistance was negatively correlated with the diameter of midrib's conduits, where leaf gas exchange was a function of the hydraulic properties of the leaf venation. Their conclusions highlight the role of vein resistance on water transport to leaves and possible relation to stomatal conductance.

Identification of microRNAs from rice

Yu-Zhu Lu, Da-Wei Yan and Ying-Tang Lu 963–971

MicroRNAs (miRNAs) are eukaryotic non-coding RNAs, range in size from 20 to 25 nucleotides, and play important post-transcriptional regulatory roles in plants and animals. As most cloning efforts in plants have focused on *Arabidopsis*, monocot-specific miRNAs are largely unresearched. These authors cloned and identified small RNAs out of rice. Nine sequences were selected using bioinformatics techniques and northern blot.