

Functional Plant Biology

Continuing *Australian Journal of Plant Physiology*

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Volume 31 Number 6 2004

Review: Location, location, location: surveying the intracellular real estate through proteomics in plants

A. Harvey Millar 563–572

Knowledge of subcellular compartmentation is critical for understanding many aspects of plant cell function. This paper reviews current efforts in subcellular proteomics and considers the benefits and difficulties associated with determining the subcellular location of proteins of unknown function. The author emphasises the integration of subcellular datasets into a whole-cell proteome.

Distinct *cis*-elements in the *Asparagus officinalis* asparagine synthetase promoter respond to carbohydrate and senescence signals

Somrutai Winichayakul, Richard L. Moyle, Dacey J. Ryan, Kevin J. F. Farnden, Kevin M. Davies and Simon A. Coupe 573–582

This paper follows an earlier paper by Winichayakul *et al.* (FPB 31, 63–72) that reported the analysis of the promoter of the asparagus asparagine synthetase gene. This paper details the identification of putative sugar and senescence response *cis*-elements in the same promoter region, which will be a valuable tool for the identification of regulatory factors controlling sugar and senescence signalling.

The effect of different height reducing genes on the early growth of wheat

Marc H. Ellis, Greg J. Rebetzke, Peter Chandler, David Bonnett, Wolfgang Spielmeier and Richard A. Richards 583–589

Dwarfing genes have been traditionally classified as GA-insensitive or -responsive. Using a more careful assay, the authors found a third group of dwarfing genes that did not affect leaf growth. This class of genes offers breeders the opportunity to reduce final plant height without compromising early growth, and implies that the mode of action of these may only become apparent later in development.

Multiple isoforms of starch branching enzyme-I in wheat: lack of the major SBE-I isoform does not alter starch phenotype

Ahmed Regina, Behjat Kosar-Hashemi, Zhongyi Li, Lynette Rampling, Mark Cmiel, Maria C. Gianibelli, Christine Konik-Rose, Oscar Larroque, Sadequr Rahman and Matthew K. Morell 591–601

This paper describes the generation of wheat mutant lines which lack three isoforms of starch branching enzyme I from the A, D and B genomes. Starch from the mutant lines does not demonstrate any alterations in structure or function compared with starch produced by wild type lines.

Ethylene biosynthesis and endogenous polyamines in relation to development of *in vitro* cultured kiwifruit explants

Luis Arigita, Ricardo Sánchez Tamés and Aida González 603–609

These authors studied the relationship between ethylene and polyamines when kiwifruit explants were cultured *in vitro* with AVG or ACC. AVG increased shoot number, inhibited ACC synthase and increased polyamines mainly in their conjugated form. ACC did not change the putrescine content, there was less spermidine, and spermine was not detected.

Cover illustration: Histochemical analysis of transgenic *Arabidopsis* plants containing a –1958 bp fragment of the *Asparagus* asparagine synthetase promoter linked to the GUSreporter gene. Whole seedling grown on Suc-containing medium (top left); whole seedling grown on Suc-lackingmedium (top right); leaf from a 25-d-old plant excised and analysed immediately (bottom left). Leaf from a 25-d-old plant excised and stored for 48 h in the dark before analysis (bottom right). See Winichayakul *et al.* pp. 573–582.

Effects of soil drying and subsequent re-watering on the activity of nitrate reductase in roots and leaves of *Helianthus annuus*

João Azedo-Silva, Júlio Osório, Filomena Fonseca and Maria João Correia 611–621

Nitrate reductase (NR) activity was studied in sunflower plants subjected to soil drying and rewatering. Drought did not reduce the activation state of NR, but resulted in linearly correlated decreases in the activity of the unphosphorylated active form and the total NR activity in roots and leaves. Recovery of NR activity was higher in roots than in leaves. The delay in the recovery of foliar NR activity did not result from a reduced flux of nitrate through the xylem.

2-Phenylethylisothiocyanate concentration and bacterial community composition in the rhizosphere of field-grown canola

Angelika Rumberger and Petra Marschner 623–631

Changes in the concentration of 2-phenylethylisothiocyanate, the major mustard oil released by canola roots, were assessed in the rhizosphere of four cultivars during development of spring and winter canola. The associated changes in the canola rhizosphere bacterial community were also assessed and indicated that 2-phenylethylisothiocyanate can become a selective factor in the canola rhizosphere under field conditions.

Solute flows from *Hordeum vulgare* to the hemiparasite *Rhinanthus minor* and the influence of infection on host and parasite nutrient relations

Fan Jiang, W. Dieter Jeschke and Wolfram Hartung 633–643

Flows and partitioning of mineral nutrients in the root hemiparasite, *Rhinanthus minor*, its host *Hordeum vulgare*, and between host and parasite have been studied in the 30–43 d after attachment of the parasite to the host. Estimation of the flows of nutrients showed that *Rhinanthus* withdrew about 20% of N, P and K from the host xylem sap.

A validation, comparison and error analysis of two heat-pulse methods for measuring sap flow in *Eucalyptus marginata* saplings

Timothy M. Bleby, Stephen S. O. Burgess and Mark A. Adams 645–658

Useful information regarding the accuracy, appropriate application and potential sources of error of the traditional compensation heat-pulse method and the newly developed heat-ratio method of sap-flow measurement is provided in this paper. These methods are increasingly important for acquiring quantitative measurements of water use and new insights into physiological and hydraulic processes in plants.

Gradients in stomatal conductance, xylem sap ABA and bulk leaf ABA along canes of *Vitis vinifera* cv. Shiraz: molecular and physiological studies investigating their source

Christopher J. Soar, Jim Speirs, Suzanne M. Maffei and Brian R. Loveys 659–669

This paper is the first to describe gradients in xylem sap and leaf ABA that relate to inverse gradients in stomatal conductance. The authors have used a blend of plant physiology and molecular biology in an attempt to understand the sources of ABA creating the gradients. This combination of molecular biology and plant physiology is relatively novel.