

Functional Plant Biology

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Review: Transcriptional regulation of secondary metabolism

Kevin M. Davies and Kathy E. Schwinn 913–925

Plants produce secondary metabolites during development and in response to environmental stimuli such as light or pathogen attack. Transcriptional regulation provides the most important control point for the secondary metabolic pathways studied to date. This paper reviews data on the transcription factors that modulate this regulation.

Temperature-dependence of carbon acquisition and demand in relation to shoot and fruit growth of fruiting kiwifruit (*Actinidia deliciosa*) vines grown in controlled environments

Dennis H. Greer, Chiara Cirillo and Cara L. Norling 927–937

Growing temperature affects shoot elongation, leaf appearance rates, growth rates and photosynthesis in kiwifruit. These authors have also studied carbon demand and competition between fruit and shoot to determine optimal growing conditions. They conclude that, at low temperatures, there is insufficient carbon to meet the full demands of both fruit and shoot growth.

Relationship of indoleacetic acid and tryptophan to dormancy and preharvest sprouting of wheat

Shashi Ramaih, Mohammed Guedira and Gary M. Paulsen 939–945

Preharvest sprouting of wheat occurs in numerous regions throughout the world and lowers both the yield of grain and its functional quality for many food products. This study determined the role of indoleacetic acid, tryptophan and related compounds in seed dormancy in relation to preharvest sprouting of wheat caryopses. The study covered cultivars that differed in susceptibility to preharvest sprouting.

Silicon nutrition promotes root growth and tissue mechanical strength in symbiotic cowpea

Felix D. Dakora and Aziwe Nelwamondo 947–953

Silicon has been suggested to provide mechanical strength in plants through its role in cell walls. This paper reports the effect of silicate on plant growth and tissue strength of symbiotic cowpea, with some supporting measurements of plant hormones. Silicon nutrition promotes an increase in mechanical strength of stems and peduncles, and the resulting increased ABA concentration in roots affects lateral root growth.

Hydrogen peroxide-induced chilling tolerance in mung beans mediated through ABA-independent glutathione accumulation

Chih-Wen Yu, Terence M. Murphy and Chin-Ho Lin 955–963

Many plants protect themselves by generating antioxidant compounds such as glutathione. Studies have shown correlation between glutathione and stress tolerance, but have not indicated the extent to which glutathione is required for tolerance. These authors show how glutathione participates in induced chilling tolerance in mung beans, and also conclude that H₂O₂-treatment-induced glutathione accumulation may be mediated through an ABA-independent pathway.

Cover illustration: Transient oxidative shock induced by pretreatment with H₂O₂ (right) effectively increased tolerance of mung bean seedlings chilling (4°C for 36 h) (see Yu *et al.*, pp. 955–963).

Accumulation of soluble carbohydrates, trehalase and sucrose synthase in effective (Fix⁺) and ineffective (Fix⁻) nodules of soybean cultivars that differentially nodulate with *Bradyrhizobium japonicum*

**Zhi-Ping Xie, Christian Staehelin,
William J. Broughton, Andres Wiemken,
Thomas Boller and Joachim Müller**

965–971

This paper describes experiments that show new and interesting interactions about carbohydrate partitioning in nodules formed on different soybean cultivars after inoculation with different *Rhizobium* strains. It contains new information that links the nodulation efficiency of soybean cultivars and soybean nodulating *Rhizobium* strains with the specific accumulation of carbohydrates and carbohydrate modifying enzymes in nodules and roots.

Genetic variation for adventitious rooting in response to low phosphorus availability: potential utility for phosphorus acquisition from stratified soils

**Carter R. Miller, Ivan Ochoa, Kai L. Nielsen,
Douglas Beck and Jonathan P. Lynch**

973–985

Low phosphorus availability is a primary limitation to crop growth, and may stimulate adventitious rooting. This paper suggests that this response is a useful adaptation by enhancing the physiological efficiency of topsoil foraging. Genetic variation for this trait, as reported here, makes it a potential target for plant breeders.

A quantitative study of lateral branching in petunia

Kimberley C. Snowden and Carolyn A. Napoli

987–994

Plant architecture is diverse and ranges from a simple unbranched shoot system to multiple shoot systems arranged as distinct patterns of branched shoot arrays. This paper describes the branching habit of wild type as well as *dad* and *sym* mutants of *Petunia*. This work provides an important baseline for studying branching in this species.

Short communication: Changes in release level of momilactone B into the environment from rice throughout its life cycle

**Hisashi Kato-Noguchi, Takeshi Ino and
Masahiko Ichii**

995–997

This paper describes changes in release level of an allelochemical compound, momilactone B, into the environment from rice during its life cycle. The rate of release increased with rice plant growth until flowering initiation, and it was found to act as an allelochemical to inhibit germination and growth of neighbouring plants.