



Desiccation tolerance mechanisms in a resurrection plant (Botanical Briefing)

Moore *et al.* (pp. 211–217) review the biology of the remarkable desiccation-tolerant South African resurrection plant *Myrothamnus flabellifolia*. Aspects of this species' ecology, evolution, ethnobotany, medicinal properties, morphology and reproduction provide insights into the physiological, chemical and biochemical mechanisms associated with the tolerance.



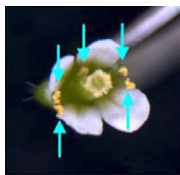
Patchy behaviour offers clues to co-ordinated regulation of stomata (Invited Review)

Plants maximize CO₂ uptake while minimizing water loss through aperture adjustments by countless individual stoma, each responding primarily to local information. But how are their actions co-ordinated? The unpredictable dynamics of patchiness of stomatal apertures suggest to Mott and Peak (pp. 219–226) that co-ordination is an outcome of self-regulating task-performing networks analogous to certain artificial computer-generated systems.



A novel model for studying cadmium tolerance in plants

By screening a collection of chemically induced *Pisum sativum* mutants for decreased Cd sensitivity, Tsyganov *et al.* (pp. 227–237) reveal a new type of Cd-insensitive mutant that copes with elevated internal Cd concentrations and is less damaged than the wild type.



Transcriptional regulation between AtEBP and APETALA2

Arabidopsis thaliana ethylene-responsive element binding protein (AtEBP) helps plants resist abiotic stresses. Ogawa *et al.* (pp. 239–244) reveal mutual regulation of AtEBP and APETALA2 in terms of gene expression, with over-expression of *AtEBP* upregulating *APETALA2* in leaves. They also show that loss of AtEBP function reduces the number of stamens.



Contradictions of form and function in flowers of a Brazilian wild rice

The attractiveness of *Oryza glumaepatula* flowers to insects plus its many associated floral characteristics strongly suggest that it outcrosses. However, genetic analyses of three widely separated populations of this neotropical wild rice (Karasawa *et al.*, pp. 245–253) show that mating ranges narrowly around selfing, indicating a puzzling incongruence between form and function.



Effects of kaolin on photosynthesis: leaf vs. canopy

Kaolin reduces available radiation and photosynthesis of individual leaves but does not reduce, or can even increase, overall canopy photosynthesis (Rosati *et al.*, pp. 255–263). This arises from improved distribution of radiation within the canopy, resulting in reduced available radiation on outer-canopy leaves, but increased radiation on inner-canopy leaves.



Genotypic variation in leaf photosynthesis of rice

Leaf nitrogen content and stomatal conductance are important factors limiting leaf photosynthesis. Ohsumi *et al.* (pp. 265–273) analyse a large set of experimental data for diverse genotypes of rice and derive a model that well explains the interactive effects of the two limiting factors on genotypic variation in photosynthesis.



Atmospheric CO₂ and rhizobial strain affect freezing tolerance in alfalfa

Bertrand *et al.* (pp. 275–284) show that elevated CO₂ stimulates alfalfa growth and reduces freezing tolerance. However, the acquisition of cold and freezing tolerance may be improved by certain rhizobial strains that enhance expression of cold-regulated genes in the host.



Stress and developmental regulation of MIPS gene expression during passion fruit seed development

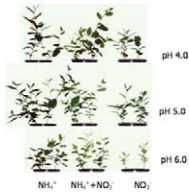
Myo-inositol-1L-phosphate synthase (MIPS) is rate-limiting for production of all inositol-containing compounds. Abreu and Aragão (pp. 285–292) find that expression peaks 9 days after pollination and is strongly influenced by cold and heat stress.



Regulation of summer dormancy by water deficit in a geophytic grass

In Mediterranean climates, *Poa bulbosa* becomes dormant in the spring as days

lengthen, temperatures increase and soil dries. **Ofir and Kigel (pp. 293–299)** show that dormancy can also be induced by drought under non-inductive short days. Abscisic acid may be involved since endogenous concentrations increase in both photo-induced and in drought-stressed plants.



Interaction between nitrogen form and pH affects tea plant growth

Ruan *et al.* (pp. 301–310) show that tea plants (*Camellia sinensis*) have a large capacity for NH_4^+ assimilation but suffer N-deficiency when exposed solely to NO_3^- . Inappropriate external pH values depress N-absorption and decrease plant growth.



Phylogenetic origins of three Himalayan endemics

Using molecular methods, **Wang *et al.* (pp. 311–322)** calibrate possible origin timescales for three Himalayan endemic genera (*Dolomiaea*, *Diplazoptilon* and *Xanthopappus*) and suggest that uplifts of the Qinghai–Tibetan Plateau served as a continuous stimulus for the production of morphologically aberrant endemics.



Distribution of growth to different shoot types in peach

Gordon and DeJong (pp. 323–332) describe the effects of crop load manipulation on shoot growth in peach trees (*Prunus persica*). High crop load is shown to lessen dry weight allocated to epicormic and long shoots, while early epicormic shoot removal has little effect on the distribution of growth.



Plants living on gypsum: beyond the specialist model

Palacio *et al.* (pp. 333–343) compare 13 species of gypsovags, regionally dominant gypsophiles and narrow gypsum endemics of the Iberian Peninsula. Chemical compositions of gypsovags and gypsophiles are shown to differ markedly, while narrow gypsophile endemics resemble gypsovags more closely than regionally dominant gypsophiles. The three groups therefore appear to follow diverse ecological strategies.



Carbon fluxes of a Scots pine ecosystem

Photosynthetic and respiratory CO_2 fluxes were measured by **Zha *et al.* (pp. 345–353)** using the eddy covariance method and the components quantified with an automated chamber system that distinguishes between respiration of soil, branches with

needles, and stems. Soil is revealed as the dominant contributor to this ecosystem's respiratory CO_2 output.



Corolla herbivores affect pollination success in *Linaria lilacina*

Corolla herbivory may deter pollinators and also fruit predators ovipositing in developing ovaries. Experimental manipulations by **Sánchez-Lafuente (pp. 355–364)** of flowers to imitate herbivory in wild populations of *Linaria lilacina* show that modified flowers are less likely to be selected or pollinated by pollinators, while fruit predation is not affected.



Duckweed and N-uptake in phytoremediation (Short Communication)

Species of Lemnaceae are useful for removing N and other mineral nutrients from waste water. **Fang *et al.* (pp. 365–370)** find dotted duckweed *Landoltia punctata* prefers NH_3^+ to NO_3^- as its source of N, and that roots and leaves are each responsible for about half the total uptake, despite roots presenting a larger surface area.