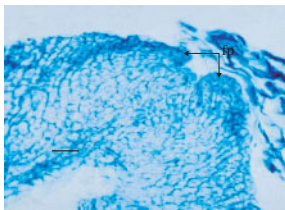


Sulfate assimilation in tall and small plants (Invited Review)

Sulfate assimilation is an essential pathway of primary metabolism. It reduces inorganic sulfate to sulfide and incorporates it into cysteine. **Kopriva** (pp. 479–495) describes the regulation of the pathway and its interconnection with carbon and nitrogen metabolism. Variation between plant species in the regulation of the pathway is emphasized.



Phases of dormancy in yam tubers

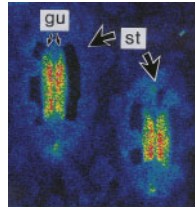
Tuber dormancy in yam is poorly understood. **Ile et al.** (pp. 497–504) propose three distinct dormancy phases between tuber initiation and the appearance of shoot buds. The first and longest phase is seen as endo-dormant while the later phases appear to be endo- or eco-dormant.



Generations of mosses differ in thermotolerance

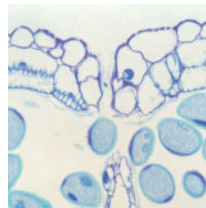
After thermal stress, superior regeneration by maternal gametophytes compared to their attached embryonic sporophytes prompts **McLetchie and Stark** (pp. 505–511) to hypothesize (i) an inherent stress tolerance differing between generations or (ii) that maternal plants jettison

offspring in times of stress as a survival strategy.



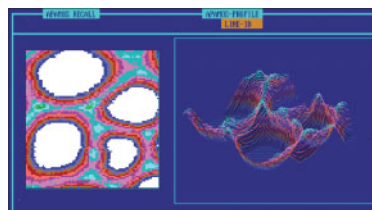
Silica deposition prior to leaf opening in bamboo

Motomura et al. (pp. 513–519) demonstrate conspicuous silica deposition in prickly hairs, silica cells and guard cells before leaf opening, a time when very little silica is present elsewhere in the leaf. Cell types are classified into three groups according to the timing of silica deposition.



Anther opening in *Allium triquetrum*

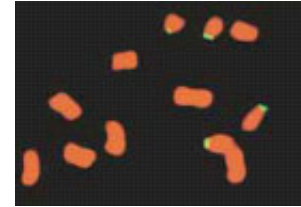
Anther opening involves tissue desiccation and environmental humidity influences its timing. **Carrizo García et al.** (pp. 521–527) describe humidity regulation by means of anther opening at the stomium and by outward bending of the anther walls. These processes appear to be regulated differently.



Lignification and cell wall thickness affect mechanical strength in bamboo

Cell wall thickening and lignification in nodes of bamboo culms are investigated by **Lybeer et al.** (pp. 529–539). They propose that a combination of increased hydroxycinnamic acid content and thin

walls of diaphragm cells with larger diameters strongly affect the function of the node in supporting the culm against bending forces.



Ribosomal RNA families and phylogenetic relationships

Characterization of 5S and 45S rRNA and FISH mapping allow **Dhar et al.** (pp. 541–548) to identify species interrelationships in *Plantago*.



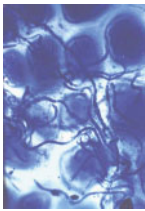
Temperature and CO₂ effects in paddy rice

Borjigidai et al. (pp. 549–557) reveal that the impact of seasonal climate and plant nitrogen status on photosynthesis is changed by a 200 $\mu\text{mol mol}^{-1}$ increase in CO₂ under paddy field conditions.



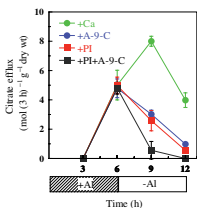
Sapling crown architecture and plasticity

Takahashi and Rustandi (pp. 559–569) examine the relationship between crown development and trunk height during opportunistic exploitation of canopy openings in submontane stands of trees. They also compare patterns of crown development in response to canopy openings between tropical submontane trees and cool temperate trees.



Endophyte affects seed germination in annual ryegrass

Using a hydrotime model, **Gundel et al.** (pp. 571–577) show that seeds of *Lolium multiflorum* infected with *Neotyphodium* endophyte survive a wide range of water potentials better than endophyte-free seeds but are slower to germinate and more seeds fail. It is suggested that endophyte infection influences fitness under different ecological conditions.



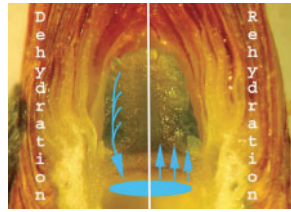
Aluminium and citrate efflux

Aluminium-regulated citrate efflux in rice bean roots is examined by **Yang et al.** (pp. 579–584) using inhibitors of citrate carriers and anion channels. The efflux of citrate is shown to involve citrate transport across the mitochondrial membrane and the plasma membrane.



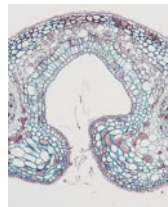
Pollination biology and genetic diversity in Brazil

Extensive genetic diversity in *Vellozia epidendroides* is linked by **Franceschinelli et al.** (pp. 585–592) to large and widely dispersed populations while limited genetic diversity in *V. leptopetala* is explained by poor gene flow between small isolated populations, hummingbird foraging and ineffective seed dispersal.



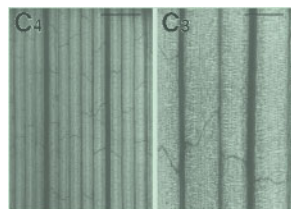
Freezing tolerance in buds of Norway spruce

The lethal freezing point of Norway spruce buds is influenced less by boron status than by dehydration and rehydration arising from external freezing and thawing (**Räisänen et al.**, pp. 593–599). Rapid dehardening of buds after thawing is also shown to influence frost hardiness in winter.



Anatomy and development of domatia

Leaf domatia are small enclosures on abaxial leaf surfaces that can harbour beneficial mites. **Nishida et al.** (pp. 601–610) present the first comparative study of the developmental anatomy of domatia on camphor leaves. It shows that domatia of different shapes are specific to different types of mite.



Leaf vascular systems in C₃ and C₄ grasses

Ueno et al. (pp. 611–621) investigate leaf vein densities in C₃ and C₄ grasses two-dimensionally. C₄ grasses are shown to have a structurally superior photosynthate translocation and water distribution system based on denser networks of small longitudinal and transverse veins. The density of

large longitudinal veins is unchanged.



Natural variation of germination and establishment in Arabidopsis

Schmuths et al. (pp. 623–634) show that the pre-conditioning temperature of mother plants and germination temperature have significant effects on germination and establishment. The marked plasticity of germination found amongst a wide range of lines is to be expected in expanding species such as *Arabidopsis thaliana*.



Allopolyploidy and micro-spatial genetic structure in a rare steppe species

Steppe plants of pre-quaternary origin show adaptive success to continental climates. Using allozymes and AFLP, **Pérez-Collazos and Catalán** (pp. 635–647) demonstrate that ancestral allopolyploidy and allogamy in *Vella pseudocytisus* contributed to the high genetic variability of this restricted Iberian endemic. It may also have been enhanced by human intervention.



Cessation of tillering in spring wheat

Tiller appearance in wheat is affected by light properties within the canopy.

Evers *et al.* (pp. 649–658) show that cessation of tillering occurs at specific threshold values of intercepted photosynthetically active radiation and red : far-red ratio. The effect is independent of plant population density and tiller rank number.



Opposite environmental effects on flowering and summer dormancy in a geophytic grass

Ofir and Kigel (pp. 659–666) reveal that ecotype-variable flowering results from opposite effects of daylength and temperature on flowering and dormancy in *Poa bulbosa*. Long days and high

temperatures are shown to accelerate dormancy and to prevent flowering while short days and low temperatures promote flowering.



Predicting seed desiccation responses in 142 woody species

Using woody species from one vegetation type, **Daws *et al.* (pp. 667–674)** develop a probabilistic model of seed desiccation tolerance based on two readily measurable seed traits (seed mass and seed coat ratio). Validation of the model using species from additional habitats reveals potential for wide applicability.