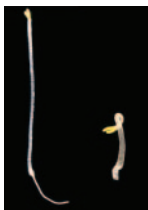


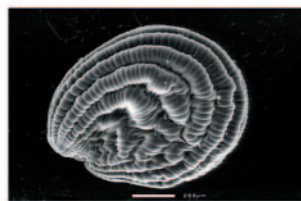
## Dynamics of leaf and root growth (Botanical Briefing)

An advanced time-lapse imaging method recently developed by **Walter and Schurr (pp. 891–900)** gives new insights into the dynamic interaction between environmental factors and endogenous mechanisms controlling spatial and temporal growth patterns.



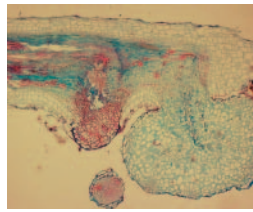
## Ethylene signal transduction (Invited Review)

Ethylene is a key regulator of plant growth and development. **Chen et al. (pp. 901–915)** discuss recent advances in our knowledge of ethylene signal transduction, focusing on recently proposed components of the pathway, on interactions between pathway components, and on the roles of transcriptional and post-transcriptional regulation in ethylene signalling.



## Fruits and seeds of the Salicornioideae (Chenopodiaceae)

Diagnostic characters are limited for the highly modified salt-tolerant Salicornioideae. To improve the situation, **Shepherd et al. (pp. 917–933)** document variation in seed coat morphology and anatomy, seed orientation, embryo shape and the form of storage proteins and carbohydrates in 68 taxa. These characters may prove phylogenetically informative for this taxonomically challenging group.



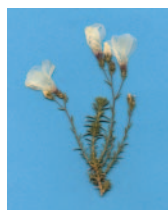
## Interaction between *Orobanche crenata* and its host legumes

*Orobanche* spp. impose major constraints on many crops. **Pérez-de-Luque et al. (pp. 935–942)** examine histological aspects of resistance of legumes to *O. crenata*. They show that unsuccessful penetration of *O. crenata* seedlings into legume roots is not attributable to a hypersensitive response and that accumulation of secretions at infection sites can occlude xylem elements.



## Grapevine flowers under controlled conditions

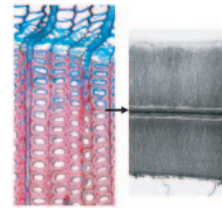
Successful flowering of grapevine (*Vitis vinifera*) under controlled conditions would facilitate developmental and physiological studies considerably. **Lebon et al. (pp. 943–948)** provide a simple protocol enabling flowering and fruiting from forced cuttings that reproduces all the traits found in field-grown plants, including varietal differences.



## Bud morphology and shoot growth in Mediterranean sub-shrubs

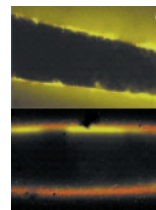
*Linum suffruticosum* and *Lepidium subulatum* co-exist in gypsum outcrops. **Palacio and Montserrat-Martí (pp. 949–958)** show that both species have similar bud morphology and shoot growth dynamics as a result of the strong environmental seasonality. In both

species, spring shoot growth coincides with maximum values of water content at full hydration ( $WC_h$ ), indicating a relationship between  $WC_h$  and shoot expansion.



## Differentiation of terminal latewood tracheids in silver fir during autumn

Using light microscopy, UV-microspectrophotometry and transmission electron microscopy, **Gričar et al. (pp. 959–965)** find that, in October, trees of *Abies alba* with notably wide xylem annual rings possess dormant cambium but only partially differentiated tracheids. The authors show that these tracheids complete their development by early winter.



## Linking wall deposition and cell enlargement

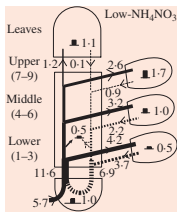
When young cells grow, new wall is deposited while the existing wall is being stretched irreversibly by turgor pressure. **Proseus and Boyer (pp. 967–979)** find that pressure deforms polysaccharides delivered to the inner wall face, allowing them to enter and move through the wall. At lower pressures, they fail to penetrate the wall.



## Separation of drought tolerance traits in a Mediterranean grass

Inheritable traits linked to tolerance of summer drought are assessed by

**Voltaire *et al.* (pp. 981–990)** in *Dactylis glomerata*. Survival of summer drought in dormancy-prone ‘Kasbah’ is associated with low soluble carbohydrates, while in non-dormant ‘Oasis’ it is linked to better levels of tissue hydration. Dehydrin accumulation is not closely associated with tolerance in this species.



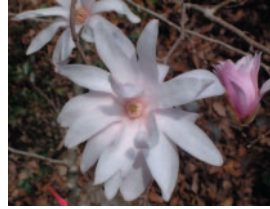
### Nitrogen form and dose influence K<sup>+</sup> flow and partitioning in tobacco

**Lu *et al.* (pp. 991–998)** show that, in spite of different uptake under two N levels, the amount of K<sup>+</sup> transported in the xylem of *Nicotiana tabacum* supplied with NH<sub>4</sub><sup>+</sup>-N or NO<sub>3</sub><sup>-</sup>-N is almost the same even though leaf stomatal conductance and transpiration are decreased in NH<sub>4</sub><sup>+</sup>-N plants.



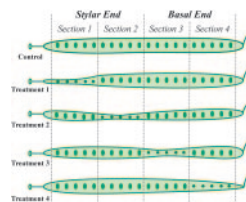
### Allozyme variation in *Dioon angustifolium*

This cycad from the Sierra Madre Oriental of north-eastern Mexico grows in three populations that are small compared to those of *D. edule* to the south. **González-Astorga *et al.* (pp. 999–1007)** assess genetic variation of *D. angustifolium* and the consequences of habitat fragmentation and isolation. They propose that it split from *D. edule* due to founder effects accompanying postglacial ice retreat. IUCN Red List category is recommended and conservation strategies suggested.



### Pollen shortage and fecundity in magnolia

For animal-pollinated tree species with large floral displays, the extent of pollen-limited seed set is determined by a balance between the extent of pollen shortage and the amount of self-pollination. **Hirayama *et al.* (pp. 1009–1015)** separate contributions of pollen shortage and self-pollination for seed production of the endangered tree species *Magnolia stellata*, based on pollination experiments and microsatellite analyses.



### Patterns of seed abortion affect the performance of progeny in a tropical legume

By selectively destroying ovules in different sections within the ovary of developing fruits of *Bauhinia unguolata*, **Mena-Alí and Rocha (pp. 1017–1023)** determine the relative decrease in fitness of offspring under different conditions of seed abortion and relaxed seed competition.



### Biomass allocation and leaf chemical defence in defoliated oak

**Hikosaka *et al.* (pp. 1025–1032)** question whether defoliation alters biomass allocation and chemical defence in similar ways to nutrient deficiency, i.e. by mediation through carbon–nutrient balance. The authors show biomass allocation in *Quercus serrata* to be

regulated by whole-plant-level C–N balance, while leaf chemical defence is regulated by leaf-level C–N.



### Pantothenate synthesis in leaf tissue

**Rathinasabapathi and Raman (pp. 1033–1037)** examined pantothenate (vitamin B<sub>5</sub>) levels in leaves after supplying precursors of this vitamin to excised leaves. Supply of pantooyl lactone and *d*-pantoate significantly increases pantothenate levels but a supply of β-alanine does not, suggesting that pantoate is rate-limiting for pantothenate in leaves.



### Impact of canopy position on seedling survival of epiphytic bromeliads

Seeds of epiphytic bromeliads sometimes mass-germinate close to their mother plant and mortality levels are high. **Winkler *et al.* (pp. 1039–1047)** show that survival is greater where canopy openness is high. Seedling mortality in *Tillandsia deppeana* is also shown to increase with age while in *Catopsis sessiliflora* seedling loss is more seasonally sensitive.



### Phenotypic plasticity allows plants to reproduce under a wide range of conditions

**Marshall *et al.* (pp. 1049–1058)** test whether the pattern of plastic response in

two *Sesbania* species depends on the time of stress. For *S. vesicaria*, timing of defoliation affects the amount but not the pattern of plasticity. However, for *S. macrocarpa*, responses change dramatically between early and late-initiated defoliation.



### **Growth CO<sub>2</sub> and soybean leaf respiration**

Growth at elevated [CO<sub>2</sub>] is expected to increase dark respiration rates of leaves

by increasing photosynthesis. **Bunce (pp. 1059–1066)** reports that respiration of soybean leaves is not increased by elevated [CO<sub>2</sub>] under field conditions, nor does it respond to day-to-day variation in photosynthesis due to cloudiness.