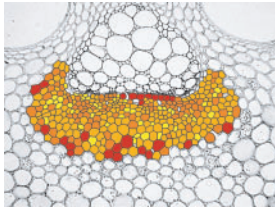


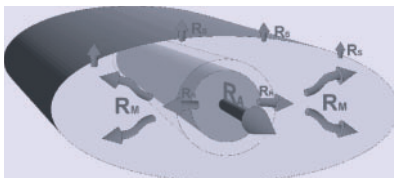
Effects of stress on genome structure (Invited Review)

Stress exerts strong evolutionary pressure on all organisms. In this article, **Madlung and Comai (pp. 481–495)** discuss the effect of stress on chromosomal integrity, transposon activity and the initiation of RNAi as means of mounting a powerful response against different stressful situations.



Phloem fibre development in bamboo

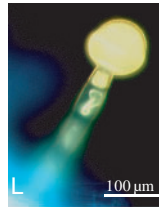
Fibre and parenchyma cells of bamboo have multilayered walls which arise from changes in the orientation of cellulose microfibrils. **Gritsch et al. (pp. 497–505)** describe the development of multilayered cell walls in the phloem fibres of *Dendrocalamus asper* and map their distribution according to the number of wall layers.



Modelling hydraulic constraints on leaf morphology

Because of the sensitivity of cell expansion to water shortage, aspects of leaf morphology may be moulded by hydraulic properties within a leaf. **Zwieniecki et al. (pp. 507–513)** use an iterative mathematical model to examine constraints imposed on leaf size and shape by hydraulic limitations such as vein axial and radial resistances,

mesophyll resistance, stomatal and cuticular resistances. Evolutionary implications are considered.



Glandular trichomes and their secretions in Styrian oil pumpkin

The differences between glandular and non-glandular trichomes and their secretory processes can readily be distinguished on leaves of *Cucurbita pepo* subsp. *pepo* 'styriaca'. **Kolb and Müller (pp. 515–526)** present a morphological and histochemical study of different trichome types during development.



Genetic relationships among *Hylocereus* and *Selenicereus* vine cacti

Tropical and sub-tropical *Hylocereus* and *Selenicereus* (Cactaceae) are potential new fruit crops. Using cytology and interspecific and interploid crosses that give rise to fertile hybrids, including triploids, pentaploids, hexaploids and aneuploids, **Tel-Zur et al. (pp. 527–534)** reveal close genetic relationships between these taxa.



Quantification of photoperiodic effects on timothy grass

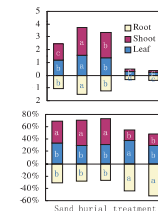
Quantitative and qualitative responses of long- and short-day plants are modelled

by **Wu et al. (pp. 535–543)** using an equation with few and common parameters. In this way, the influence of a wide range of daylengths on various growth traits of timothy grass seedlings (*Phleum pratense*) are described with high precision.



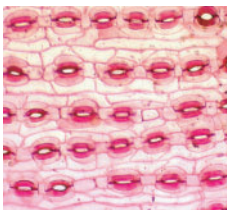
Diversity and genetic structure of *Tillandsia achyrostachys*

Tillandsia achyrostachys, an epiphytic bromeliad of tropical dry forest in Central Mexico, is characterized by clonal growth and a preference for *Bursera copallifera* host trees. Habitat fragmentation has reduced genetic diversity of *T. achyrostachys* and increased genetic differentiation between populations. **Gonzalez-Astorga et al. (pp. 545–551)** propose that host trees of *B. copallifera* should be a conservation priority since they represent the limiting factor to bromeliad population growth and connectivity.



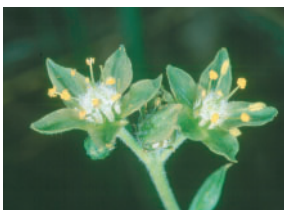
Biomass and allocation patterns under burial treatments

The effects of partial and complete sand burial on growth, gas exchange and biomass allocation in *Ulmus pumila* seedlings are assessed by **Shi et al. (pp. 553–560)**. Complete burial for >2–4 weeks is fatal but morphological and ecophysiological adaptations to shorter burial, or to partial burial, are revealed.



Stomatal frequency of western hemlock during leaf development

Stomatal frequency can be used to estimate atmospheric CO₂ levels of the past. However, effects of developmental stage on stomatal density can confound these analyses. **Kowenburg *et al.*** (pp. 561–569) show this problem is minimal in *Tsuga heterophylla* needles because leaf elongation following budburst has only a marginal influence on stomatal density.



New plant species from Iberia

Navarro *et al.* (pp. 571–582) report new species of the genus *Haplophyllum* (*H. bastetanum*) from south-eastern Iberia. Identity is based on the phylogenies established from ITS sequences and from morphological and cytogenetic analyses. An evolutionary scheme for *Haplophyllum* in the Iberian Peninsula is proposed.



Pollen histochemistry and pollen:ovule ratios in Zingiberaceae

The Zingiberaceae is a large family of forest-dwelling tropical monocotyledons characterized by highly specialized and contrasting pollinating and/or breeding

mechanisms. **Wang *et al.*** (pp. 583–591) examine 37 species from 11 genera and show that pollen:ovule ratios are highly correlated with mating system, while pollen nutrition type is not related in this way.



Sun and shade adaptation in bryophytes

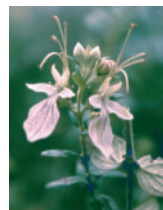
From a survey of light responses and major pigment ratios of 55 bryophyte species, **Marschall and Proctor** (pp. 593–603) conclude that bryophytes include but are not inherently shade plants. In most bryophytes, photosynthesis is probably limited by the CO₂ diffusion rate into unistratose leaves. Exceptions are species of *Polytrichum* that possess ventilated photosynthetic tissues.



Drought effects on leaf growth components

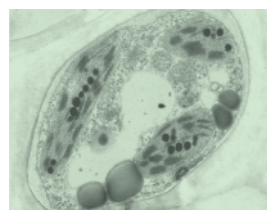
Leaf growth is negatively affected by short-term drought both during the stress and after re-watering.

Alves and Setter (pp. 605–613) evaluate the extent to which components of growth are affected in cassava, an important tropical crop that is valued for its performance in stress environments. Most of the lost growth is attributed to events in the youngest, meristematic leaves rather than in rapidly expanding leaves.



Nutritional analysis of *Teucrium*

Teucrium species can grow in poor soils with limited water resources and yield edible nutlets. The nutritional quality of these nutlets (protein amino acid profile) has been evaluated by **Juan *et al.*** (pp. 615–621). In addition, a similarity analysis of an additional 21 *Teucrium* taxa is described.



Ozone effects on ultrastructure of peatland plants

Using transmission electron microscopy, **Rinnan and Holopainen** (pp. 623–634) assess effects of ozone stress on chloroplast ultrastructure. Under simulated summer and autumn conditions they compared responses in rarely studied peatland species, including dwarf shrubs, *Sphagnum* mosses and a graminoid species.



Comparative ecology of *Picea* seedlings

Miyazawa and Lechowicz (pp. 635–644) examine the relationship between seedling traits in North American spruce species and environmental conditions within their geographic ranges. The results support the existence of reasonably distinct environmental niches for the North American spruce species at the continental scale.