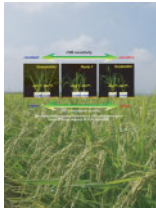


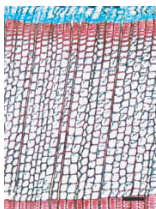
How do root symbiotic fungi find their hosts in the soil? (Botanical Briefing)

Strigolactones act as signalling molecules during interactions between plants and arbuscular mycorrhizal fungi and also root parasitic weeds. **Akiyama and Hayashi (pp. 925–931)** review the discovery of strigolactones and their biological and chemical properties.



UVB sensitivity and mutation in photolyase gene (Invited Review)

Spontaneously occurring mutations in the cyclobutane pyrimidine dimer (CPD) photolyase gene cause different degrees of UVB sensitivity in rice. **Hidema and Kumagai (pp. 933–942)** explore the prospects for improving resistance to UVB radiation by increasing CPD photolyase function through conventional breeding or bioengineering.



Local heating and cooling influences cambial activity

Gričar et al. (pp. 943–951) show that localized warming triggers earlier activation of division in the cambium of mature *Picea abies* while cooling induces earlier cessation. Light microscopy, transmission electron microscopy and UV-microspectrophotometry fail to detect any associated changes in secondary wall formation and lignification.



Dwarf mistletoe endophyte in host apical buds

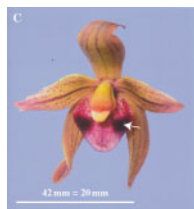
Dwarf mistletoes (*Arceuthobium*) are highly specialized parasitic angiosperms on many gymnosperm hosts in the northern hemisphere. Several are capable of inducing an unusual form of isophasic infection in which the internal (endophytic) system proliferates even into the apical buds of its hosts.

David Lye (pp. 953–963) describes this unusual pattern of growth.



Bird pollination in an angraecoid orchid

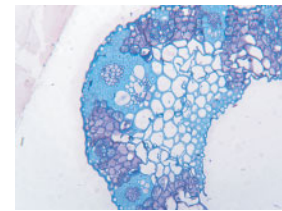
Although long-spurred angraecoid orchids of Madagascar are known for being pollinated by long-tongued hawkmoths, **Micheneau et al. (pp. 965–974)** describe an unexpected case of bird pollination (*Zosterops borbonicus*, white-eye, Zosteropidae) within the genus *Angraecum* on Reunion Island (Mascarene archipelago). Details of floral morphology, nectar properties, pollination and reproductive success in natural conditions are also presented.



Colour, pattern and the attraction of potential orchid pollinators

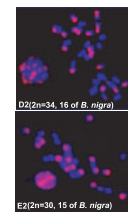
Davies et al. (pp. 975–984) report a rudimentary speculum in certain

species of *Cymbidium*. In contrast to that of *Ophrys* spp., the cymbidium speculum comprises only conical papillae with truncated angular tips. In *C. lowianum*, these papillae may provide nutrition since they contain protein, starch and lipid droplets, and secrete lipoidal material via the labellum.



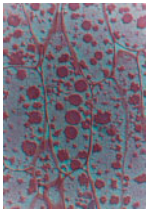
Leaf tensile properties and drought tolerance

Balsamo et al. (pp. 985–991) describe how the tensile properties of monocot leaves correlate with internal architecture and lignification, and reveal that such properties are altered by levels of tissue hydration and by tissue age. These features play an important role in stabilizing tissues mechanically during drought.



New events during parental genome separation in distant hybrids

GISH and AFLP analyses of *Brassica carinata* × *Orychophragmus violaceus* hybrids by **Hua et al. (pp. 993–998)** confirm that complete and partial genome separation occur during mitotic divisions of F₁ hybrid cells. This is followed by chromosome doubling, elimination of cells with *O. violaceus* chromosomes and some introgression of its genetic information.



Contrasting achene structure and lipid accumulation in sunflower cultivars

Variations in the rate and duration of growth of sunflower pericarp and its initial thickness are shown by **Mantese et al. (pp. 999–1010)** to influence mature achene oil concentration, embryo oil concentration and the proportion of embryo in the achene. Different cultivars are found to accumulate oil bodies at different rates and durations.



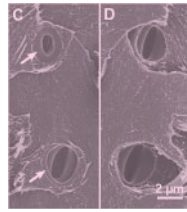
Phyllotaxis hypotheses revisited

Despite a long history, many competing hypothetical mechanisms for the control of phyllotaxy in leaves and flowers remain unresolved. **Korn (pp. 1011–1015)** achieves clarification by examining anodic spiral phyllotaxy, i.e. orientation upwards towards the younger end. The most favourable hypothesis implicates the primary vasculature since an asymmetric component can be included.



A quantitative survey of cyanogenesis in tropical rainforests

This study by **Miller et al. (pp. 1017–1044)** expands the limited knowledge of the frequency of cyanogenesis in natural plant communities. It includes novel reports of cyanogenesis among a range of taxa from north Queensland, Australia, and characterizes patterns in intra-plant and intra-population variation of cyanogenesis.



Family differences in fibres and tracheids

The micromorphology of pit membranes in fibres and tracheids of woody species from various families is examined by **Sano and Jansen (pp. 1045–1053)**. Differences in the structure of interfibre pit membranes between cell types are shown to be closely associated with the particular specialization of the fibre cells.



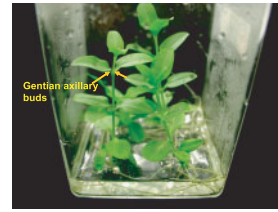
Bulb dynamics of an invader

Oxalis pes-caprae is an invasive South African geophyte relying exclusively on vegetative reproduction. **Vilà et al. (pp. 1055–1062)** analyse temporal and spatial variability of bulb production, size of bulb bank, bulb predation, bulb germination, seedling establishment and survival across a Mediterranean island to understand the critical stages in recruitment likely to control invasion.



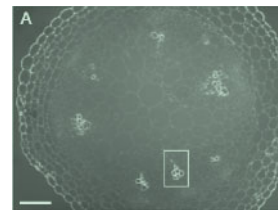
Selection pressures and variability in germination characteristics

Pezzani and Montaña (pp. 1063–1071) find the spatial heterogeneity of two-phase mosaics in the Chihuahuan Desert has resulted in differences in germination behaviour. Differences between genotypes of closed habitats and those from open habitats are particularly clear.



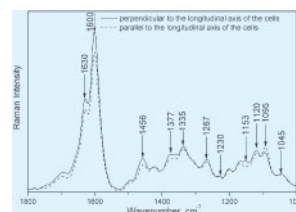
Desiccation and cryopreservation tolerance in vitro

A two-step preculturing of axillary buds of gentian (*Gentiana scabra*) with sucrose confers tolerance to partial desiccation and subsequent cryopreservation (**Suzuki et al., pp. 1073–1081**). The first preculture step involves a transient increase in ABA and increases in sucrose/raffinose and proline levels. The second step involves loading of sucrose. ABA treatment can replace the first step.



Hypergravity, mechanoreceptors and xylem development in Arabidopsis

Number, cross-section and thickness of metaxylem elements are shown by **Nakabayashi et al. (pp. 1083–1090)** to be increased in flower stalks of *Arabidopsis thaliana* exposed to hypergravity (300 g for 1 day). Blocking of mechanoreceptors with gadolinium chloride interferes with this response.



Contrasting orientation of macromolecules affects mechanical properties of cell walls

Using polarized Raman spectra, **Cao et al. (pp. 1091–1094)** reveal that the net orientation of different classes of macromolecules in epidermal cell walls is not the same. This indicates that

cellulose, lignin and xylan form a relatively ordered network that defines the mechanical and structural properties of the cell wall.



Explaining dwarfism in mangroves

Mangrove dwarfing is common in many parts of the world. **Naidoo (pp. 1095–1101)** identify hydroedaphic factors contributing to high soil salinities, low water potentials and ion imbalance within tissues, including P deficiency, as major influences on this phenomenon in *Avicennia marina*.



Neither host-specific nor random: vascular epiphytes on three tree species in a Panamanian lowland forest

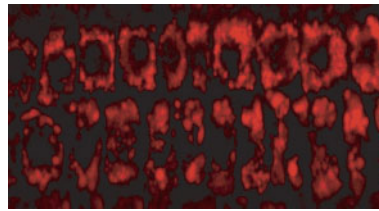
The possibility that the identity of the host tree influences the structuring of epiphyte communities is examined quantitatively by **Laube and Zotz (pp. 1103–1114)** who take advantage of a census of epiphytes in 0.4 ha of tropical rainforest.



Modelling germination response to temperature

Germination response to temperature follows a consistent general pattern but there are many ways to characterize and model cumulative germination rate. **Hardegee (pp. 1115–1125)** tests three

cardinal-temperature models and two linear-regression approaches to evaluate relative accuracy in predicting cumulative germination response. Models with the fewest *a priori* shape assumptions provide the best predictive fit.



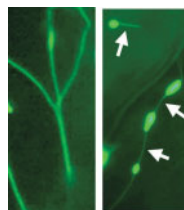
Neutral red is useful in confocal microscopy (Technical Article)

Dubrovsky et al. (pp. 1127–1138) demonstrate that neutral red, a well-established vital stain, also permits direct visualization of tissue anatomy in confocal microscopy. Without further sample preparation, the neutral red probe readily stains cell walls, xylem elements, Casparian bands and the vasculature, thereby combining rapid image acquisition with minimum time and cost.



Isolation of egg cells and zygotes in *Alstroemeria* (Technical Article)

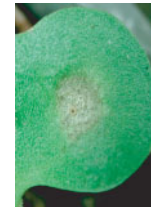
A procedure for isolating living egg cells and zygotes from *Alstroemeria* is developed by **Hoshino et al. (pp. 1139–1144)**. Based on histological examinations, isolation of egg cells and zygotes can be achieved using enzyme treatment, microdissection and a micropump. The procedure holds promise for effecting *in vitro* fertilization in *Alstroemeria*.



Plant cell death and mitochondrial fission (Short Communication)

Morphological changes by mitochondria during mammalian and plant cell death

are described by **Yoshinaga et al. (pp. 1145–1149)**. Using *Arabidopsis thaliana* over-expressing dominant-negative DRP3B, they show that even though DRP3B is needed for mitochondrial fragmentation during cell death it does not itself determine the natural fate of the cell.



Pathogenicity of blackleg disease in oilseed rape (Short Communication)

The pathogenicity of pycnidiospores of *Leptosphaeria maculans* on *Brassica napus*, even at low inoculum levels, is shown by **Li et al. (pp. 1151–1156)** to be enhanced by the presence of ascospores of the pathogen. This has significant implications for the epidemiology and management of blackleg in brassicas.