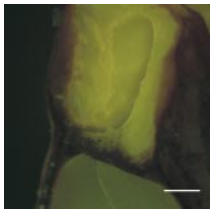


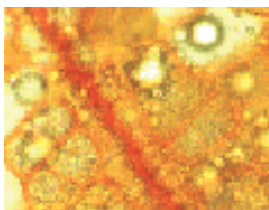
Crop research and the understanding of plant evolution (Invited Review)

Hancock (pp. 953–963) evaluates the impact of studies of crop species on evolutionary theory. The article encompasses effects of quantitative trait loci (QTL) on the pace of species evolution; the understanding of self-incompatibility; gene-to-gene interactions underpinning co-evolution of plants and their pathogens, and crop/wild progenitor interactions. Prospects arising from genome sequencing of the two major geographic races of domesticated rice are assessed.



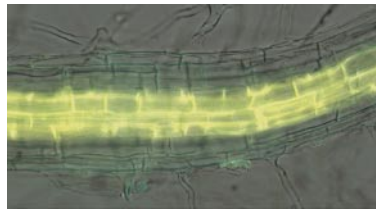
Seed dormancy in *Grevillea* spp. in relation to seed coat characteristics

Grevillea linearifolia, *G. sericea* and *G. buxifolia* are fire-responders with seed coat induced dormancy. Examination of the seed coat by **Briggs *et al.* (pp. 965–980)** shows three potential dormancy mechanisms: (i) barriers to diffusion of large molecular weight compounds at the exo- and endotesta, and hypostase; (ii) possible interference with gas exchange at the exotesta; and (iii) mechanical constraint by the endotesta and tegmen.



Kernal quality in macadamia nuts
Kernels (embryos) are subject to breakage (separation of the cotyledons).

Walton and Wallace (pp. 981–988) examine the effect of cultivar, anatomy of the embryonic axis, and ultrastructure of the adaxial cuticle on the separation. They find a strong genetic effect and suggest that electron-dense objects in adaxial epicuticular wax help bond the cotyledons.



Improved method for clearing and staining free-hand sections and whole-mount samples

Lux *et al.* (pp. 989–996) describe effective methods for clearing and staining of hand sections and whole-mount roots and for the use of lactic acid as a solvent for fluorescent suberin stains. The resulting high-quality images may be used in combination with recent CCD camera systems and make it possible to superimpose images of the same section stained or illuminated in various ways.

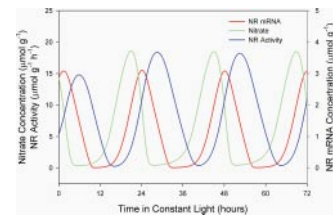


Genotypic differences in leaf development rates in maize

Thermal time is commonly used for modelling development. **Padilla and Otegui (pp. 997–1007)** demonstrate the existence of genotypic variability in leaf initiation and leaf appearance rates in response to temperature. They show that a single coordination model well describes the relationship between both processes from seedling emergence to floral initiation.



Patch dynamics of a biennial Suzuki *et al.* (pp. 1009–1017) test the null hypothesis that only habitat heterogeneity determines the spatial patterns of plants in a patchy habitat. However, they find that spatial structures and dynamics of a local population are also affected by seed dispersal and life-history variation.



A model for circadian oscillations in nitrate reduction

In higher plants, the expression of genes implicated in several metabolic pathways and developmental responses are circadian regulated. A mathematical model is proposed by **Yang and Midmore (pp. 1019–1026)** to explain the origin of circadian oscillations in gene expression and in enzyme activity of nitrate reductase.



Phylogenetic variation in the silicon composition of plants

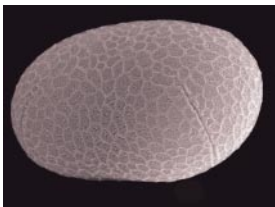
Using data from the primary literature, **Hodson *et al.* (pp. 1027–1046)** make a meta-analysis of silicon concentrations in leaves and non-woody shoot tissues from 735 species, including angiosperms, gymnosperms, ferns, clubmosses, horsetails, liverworts and mosses. The results confirm that many Poales,

including rice, are silicon accumulators, although monocot species are not invariably higher in silicon concentration than dicots.



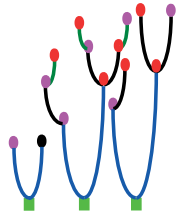
Pollen morphology in Marcgraviaceae

Palynological variation in the neotropical Marcgraviaceae is used to comment on the intergeneric classification. **Lens *et al.* (pp. 1047–1060)** show that taxonomically useful features include the shape, sexine sculpturing, and ultrastructure of the pollen wall. Based on a fragmentary knowledge of the pollination biology of the family, no clear correlations between pollinators and pollen features could be found.



Pollen morphology in Balsaminaceae, Tetrameristaceae and Pellicieraceae

Janssens *et al.* (pp. 1061–1073) investigate pollen morphology and ultrastructure in the Balsaminaceae, Tetrameristaceae and Pellicieraceae, and compare it with palynological data from the Marcgraviaceae. Balsaminaceae pollen is shown to be highly distinct from that of other balsaminoid families. Pollen features suggest a relationship exists between the Tetrameristaceae, Pellicieraceae and Marcgraviaceae.



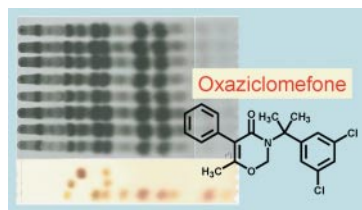
Buds, shoots, and leaf phenology in Cerrado

Contrasting dependence on climate in three Cerrado woody species is revealed by **Damascos *et al.* (pp. 1075–1084)**. They argue that aerial space acquisition should be analysed using linked traits such as bud composition, branching pattern, shoot apical persistence and leaf phenology.



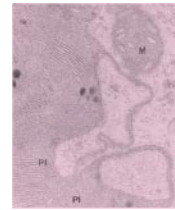
Isozyme comparisons in vetch and *Lathyrus* spp.

Variation of 15 isozymes in 27 vetch species of subgenus *Cracca* is compared with that of three species of *Lathyrus* (**Jaaska, pp. 1085–1096**). Phylogenetic relationships amongst the species are evaluated by parsimony and neighbour-joining methods and compared with the traditional morphology-based taxonomy of the subgenus.



New herbicide inhibits maize cell wall expansion

Oxaziclofene blocks wall expansion without affecting turgor pressure. However, **O’Looney and Fry (pp. 1097–1107)** show that this novel herbicide does not affect any of seven biochemical processes proposed to control cell wall loosening or tightening.



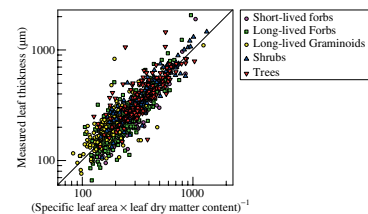
Features of *Deschampsia antarctica* Desv. (Poaceae) leaves from different habitats

Gielwanowska *et al.* (pp. 1109–1119) reveal that stress conditions can disturb the formation of sclerenchymatous fibres in leaves of *D. antarctica* and that chloroplasts of plants growing in the Maritime Antarctic are irregular in shape with distinctive pockets or outgrowths.



Pre-infection development in a parasitic plant

The mechanisms controlling early stages of host infection in the parasitic plant *Orobanchae* are poorly understood. Using a new *in vitro* system in the absence of the host plant, **González-Verdejo *et al.* (pp. 1121–1127)** show that, in *O. ramosa*, an exogenous signal induces seed germination while endogenous signalling promotes attachment organ differentiation.



Estimating thickness in laminar leaves

Leaf thickness plays an important role in leaf and plant functioning. Using 1039 data points in a wide range of growth forms, **Vile *et al.* (pp. 1129–1136)** show that leaf thickness can be estimated by using two easily measurable traits

(specific leaf area and leaf dry matter content) that are often reported in the literature.



Monitoring the development of underground parasitism

Eizenberg *et al.* (pp. 1137–1140)

describe a non-destructive method for following the parasitic development of *Orobanche cumana* on sunflower roots using clear acrylic mini-rhizotrons and cameras. The method enables the entire life cycle of the parasite to be observed.