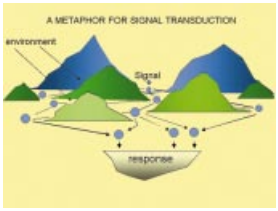
Content*Snapshots*



The intelligence of plants

Intelligence is not a word commonly used to describe plant behaviour. This review article by **Trewavas (pp. 1–20)** raises the issues of intelligence, learning and memory in a plant context, seeks to identify antagonisms to the concepts and raises issues and examples that might lead to a better appraisal of plant behaviour under natural circumstances.

Genome size variation in chilli peppers

Nuclear DNA content is a highly useful feature for charaterizing species and for tracking evolutionary paths. Flow cytometric and Feulgen densitometric measurements by **Moscone *et al.* (pp. 21–29)** show significant genome size variation between *Capsicum* species that contribute to their taxonomic grouping. The findings support the authors' previous working hypothesis on chromosome evolution in peppers.

Plant communities of Pitcairn Island, South Central Pacific Ocean

Quantitative surveys of Polynesian Islands are rarely undertaken because of logistical restrictions. However, they are a fundamental requirement for determining the conservation status of fragile island ecosystems. **Kingston and Waldren (pp. 31–40)** determine the extent to which there are definable plant communities on Pitcairn, and seek underlying environmental gradients influencing these communities. They find that the major gradient affecting the plant composition is altitude, but with large anthropogenic influences also.

Soil and plant water relations determine photosynthetic responses of C_3 and C_4 grasses in a semi-arid ecosystem under elevated CO_2

In a field study, **LeCain *et al.* (pp. 41–52)** show that acclimation in a C_3 grass almost eliminates a direct photosynthetic response to elevated CO_2, but enhances soil and plant water relations and improves seasonal carbon uptake in a C_3 and a C_4 grass.

Carbon and water flux of pine shoots

Wang *et al.* (pp. 53–64) show that, in the long term, elevated CO_2 increases light- and water-use efficiencies of pine shoots despite strong diurnal and seasonal variation, but that warmer temperatures have little effect.

Model of cell division

In young reproductive organs, intensive cell division is followed by decreased proliferative activity. When division finally stops the cells start to grow. **Bertin *et al.* (pp. 65–72)** propose a deterministic model describing the dynamics of cell population in tomato fruit. Parameters of the model are time at which cell proliferation declines, relative decrease after each cell cycle and cycle duration.

Environmental scanning microscopy reveals details of epidermal cell separation

Donald *et al.* (73–77) characterize *in situ* wall rupture and cell separation in hydrated *Allium cepa* tissue using the Environmental Scanning Electron Microscope. Cell rupture and release of contents are shown to take place at cellular junctions ahead of a propagating notch. However, cells that separate rather than rupture maintain their turgor. Strands of material between separating cells are compared with those between the layers of rupturing *Chara corallina* wall.

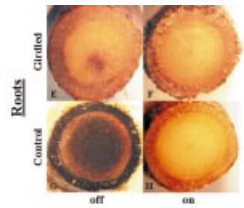
Xylem mechanical/hydraulic compromises in *Metasequoia*

Favouring water transport over mechanical support is thought to be an important adaptative strategy for plants favouring warm and wet polar palaeolatitudes. However, using a novel technique, **Jagels *et al.* (pp. 79–88)** show that in the very low density stem of *Metasequoia*, this strategy can, despite decay-resistant heartwood, sometimes lead to irreversible (plastic) deformation in the xylem of this relict tree.

Continued overleaf

Respiration of woody shoots under elevated CO_2 and temperature

The respiration rates of shoots of Scots pine growing in controlled-environment conditions are shown by **Zha *et al.* (pp. 89–96)** to vary diurnally and seasonally with temperature, to be reduced by elevated CO_2, but to be increased by elevated temperature. The changes by environmental treatments are mainly attributed to the changes in maintenance component of respiration.



Girdling and sugar signalling affect starch synthesis genes in biennially bearing citrus

Li *et al.* (pp. 137–143) show that carbohydrate accumulates in leaves and shoots above a stem girdle in citrus trees during their fruitless, 'off' year but not during their fruiting 'on' year. Girdling is also shown to decrease markedly carbohydrate concentrations in roots. Expression of starch biosynthesis-related genes is high in starch-accumulating organs and low in roots with declining starch concentrations.

Tobacco phylogeny

Species of nicotiana (Solanaceae) have become minor model organisms and the focus of numerous studies of genomic organization and other evolutionary phenomena. **Chase *et al.* (pp. 107–127)** present a phylogenetic study of almost all species of nicotiana based on sequences of the non-coding transcribed spacers of nuclear ribosomal DNA (ITS). The patterns are compared with those obtained previously using plastid DNA.

Epicormic branch formation in *Dicorynia guianensis*

Epicormic branches are maintenance structures for forest trees surviving in the understorey. **Nicolini *et al.* (pp. 97–105)** examine the architecture and the growth of trees forming epicormic branches on their main axis and propose possible patterns of development for *D. guianensis* including the presence or absence of epicormic branch formation.

Ectopic structures on roots of *Helianthus annuus* × *H. tuberosus*

A variant clone of *Helianthus annuus* × *H. tuberosus* that develop 'root buds' and somatic embryos from intact adventitious roots of *in vitro* grown plantlets is described by **Fambrini *et al.* (pp. 145–151)**. These ectopic structures are initiated without exogenous hormonal treatments. Histological analysis demonstrates that they originate from cortical cells in association with the development of lateral root primordia.

Nuclear DNA amounts in Macaronesian angiosperms

Nuclear DNA content is an important character with many uses in various fields of plant science. **Suda *et al.* (pp. 153–164)** concentrate on species from previously under-represented phytogeographic regions, and demonstrate that Macaronesian angiosperms possess very small nuclear DNA C-values and genome sizes.

Plant regeneration from chestnut somatic embryos

Maintenance of embryogenic competence and control of plant recovery is of great importance for somatic embryogenesis systems of woody species. **Corredoira *et al.* (pp. 129–136)** investigate proliferation, maturation and conversion ability of chestnut somatic embryos. They show that carbon source and pre-germination treatments, such as cold storage, have a marked influence on maturation and germination of somatic embryos.