

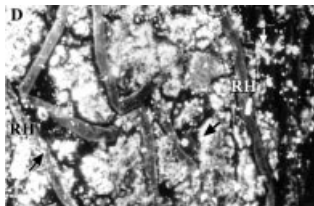
## Genetic regulation of nodule infection and development

Nodule formation is a multistep process requiring coordinated gene expression of the host-plant and *Rhizobium*. **Tsyganov et al. (pp. 357–366)** undertake a genetic dissection of the initiation of nodule formation. They propose the existence of two groups of plant genes controlling the infection process and nodule tissue development, and of possible cross-talk between them.



## Mineral deposition in conifer needles

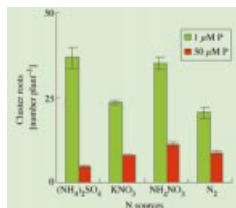
Using x-ray microanalysis, **Hodson and Sangster (pp. 367–374)** show that mineralization in the needles of white pine (*Pinus strobus* L.) differs in some significant respects from that in other conifer species investigated previously. In particular, differences in concentrations of aluminium and silicon in the transfusion tissue in the extreme tip of the needles were observed.



## Immobilization of phosphorus through metal plaque formation

Iron and manganese plaque deposits are known to form on the outer surface of roots of wetland plants. **Batty et al. (pp. 443–449)** reveal that deposits may also be formed from aluminium. Such plaques

may interfere with mineral nutrient uptake. The authors show that iron and/or aluminium plaques immobilize the essential nutrient phosphorus at the root surface.



## Mineral nutrition affects cluster root formation and proton extrusion

In *Lupinus albus*, cluster roots are important for mineral extraction from nutrient-poor soils. **Sas et al. (pp. 435–442)** show that NH<sub>4</sub>-N nutrition stimulates cluster root formation and, under conditions of phosphorus shortage, NH<sub>4</sub>-N promotes H<sup>+</sup> extrusion by the roots.



## In vitro bulb development in shallots

Bulb formation is shown by **Le Guen-Le Saos et al. (pp. 419–425)** to depend on both photoperiod and the presence of incandescent light. Application of anti-gibberellins to the growth medium is also effective, in association with a promotion of root growth.



## Allometric relationships for estimating grapevine seasonal biomass

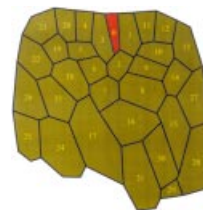
Modelling plant growth requires extensive data sets of biomass collected from the field. However, weighing uprooted

grapevines is impractical in viticulture studies. To overcome the problem, **Castelan-Estrada et al. (pp. 401–408)** propose an alternative approach based on allometric relationships. This estimates accurately, and cost-effectively, the above-ground vegetative and reproductive biomass of a grapevine throughout the growing season.



## Variation in nuclear DNA content among coffee trees is an artefact

**Noirot et al. (pp. 385–389)** show that variation in nuclear DNA content within *Coffea liberica* var. *dewevrei* is an artefact due to cytoplasmic compounds limiting dye accessibility to DNA. This interference modifies the relationship between the fluorescence peak locations of the standard and the target. Interference differs among dyes, and stoichiometric errors may be minimized with propidium iodide, but not with DAPI.



## Maintaining apical dominance in the fern gametophyte

Plasmodesmata allow intercellular transport in multicellular plants, and are necessary for apical dominance in fern gametophytes (one apical-type cell suppressing development of the apical type in all other cells). **Holloway and Lantin (pp. 409–417)** develop a model, based on observed plasmodesmatal networks, that reproduces the apical dominance phenomenon and the responses to experimental disruption of plasmodesmatal connections.



### Actinidia vine architecture

A method for quantifying *Actinidia* vine architecture is presented by **Seleznova et al.** (pp. 471–482). Three shoot types corresponding to different node number distributions are defined. Hidden semi-Markov stochastic models are then used to represent branching patterns. A relationship between axillary shoot growth and the transition from the preformed to newly-formed parts of the parent shoot is discussed.



### Seed dispersal in *Cistus*

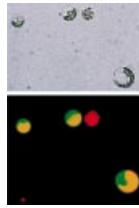
In this fire-following genus, stand recruitment after disturbance is fully dependent upon the soil seed bank. This, in turn, is directly influenced by the seed crop and its dispersal features. **Bastida and Talavera** (pp. 427–434) examine this in two species, and show that barochorous seed dispersal occurs in addition to a much extended seed release period.



### Genome components in southern hemisphere conifers

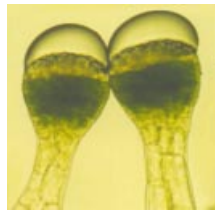
Most gymnosperms have large genomes. **Murray et al.** (pp. 483–489) study various repetitive DNA sequences in the genus *Podocarpus*. Compared with pines and spruces, there are similarities in retro-elements and in telomeric sequences. However, *Podocarpus* has only one pair of nucleolar-organizing regions rather than the usual seven. These observations

help to understand the evolution of genome diversity in these ecologically important gymnosperms.



### GFP lights up somatic hybridization

To be successful, somatic hybridization depends on efficient selection and regeneration of somatic hybrids. **Olivares-Fuster et al.** (491–497) propose green fluorescent protein as a non-destructive *in vivo* marker for monitoring cell growth and for selecting somatic hybrids. It is seen as a promising tool for establishing or improving methods for protoplast fusion and somatic hybrid regeneration.



### Glandular hairs adapted for epizoid propagation

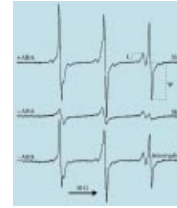
Glandular hairs of *Sigesbeckia jorullensis*, important for epizoid fruit propagation, were studied by **Heinrich et al.** (pp. 459–458). Apical layers of glandular heads are characterized by leucoplasts, sub-apical layers by chloroplasts. The hairs produce a sticky essential oil that is characterized by a high content of oxygenated terpenes and is probably synthesized in leucoplasts.



### Ethylene action keeps the bees away

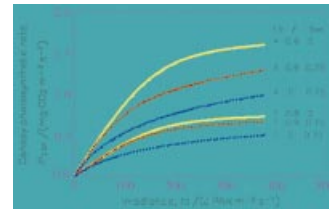
Pollination often results in rapid fading of flowers in association with cessation of nectar and pollen production. This colour change deters many insect pollinators

thus directing them to younger, more rewarding flowers. By surveying 50 families and 200 species, **Wouter van Doorn** (pp. 375–383) finds that species that change flower colour on pollination also respond in this way to applied ethylene.



### Abscisic acid improves desiccation tolerance in somatic embryos

Using Fourier transform infrared micro-spectroscopy and the epr spin probe technique, **Sreedhar et al.** (pp. 391–400) show that loss of viability in somatic embryos of alfalfa is linked to loss of membrane integrity and  $\alpha$ -helical protein secondary structure. However, treatments with 20  $\mu\text{M}$  ABA together with slow drying preserve these features in association with improved capacity for successful long-term storage.



### Modelling of canopy photosynthesis

Carbon fixation by the leaf canopy is the primary driver for crop growth and plant ecosystem models. However, spatial integration from leaves to canopy can present difficulties. **Thornley** (pp. 451–458) derives analytical expressions for sun and shade leaves based on exponential light decay down the canopy and an acclimated non-rectangular hyperbola for leaf photosynthesis. These provide a biologically transparent and computationally efficient algorithm for modellers.