

## Protein transport in plant cells: in and out of the Golgi

The Golgi apparatus represents the heart of the endomembrane system. It is a mobile biofactory, positioned at the crossroads of the secretory and endocytic pathways where it plays a central role in protein sorting to various cell destinations. **Neumann *et al.* (pp. 167–180)** review recent findings of Golgi dynamics and function in plant cells.



## Improving the prediction of leaf appearance rate in winter wheat

Accurate predictions of leaf appearance rate are important in crop simulation modelling. **Streck *et al.* (pp. 181–190)** present an improved leaf appearance model for winter wheat. The model now takes into account the faster rate of appearance for the first two leaves due to seed reserves and a slower rate for later-appearing leaves due to the increasing distance between the meristem and the whorl.



## Nectar secretion and pollination in orchids

Nectar is the most advantageous reward for orchid pollinators, and its secretion is a dynamic process occurring throughout the life of the flower. **Stpiczyńska (pp. 191–197)** shows that pollination does not limit nectar secretion, but does influence

flower longevity. Flower position within the inflorescence is found to determine the availability of nectar to pollinators.



## Characterization of early floral development in apple

Apple is an important crop and a focus of research worldwide. However, some aspects of floral commitment and morphogenesis remain unclear. **Foster *et al.* (pp. 199–206)** characterize the transition to flowering and early floral development in terms of defined morphological landmarks. This study provides a contextual framework for future molecular and physiological studies in apple.



## Sex allocation in a gynodioecious geranium

Sex allocation patterns of female and hermaphroditic plants in the gynodioecious *Geranium sylvaticum* have been studied by **Ramula and Mutikainen (pp. 207–213)**. They show that fitness gain through female function in hermaphroditic plants is labile and may vary in a limited spatial scale.



## Island deviations in photosynthetic traits

Leaf photosynthesis correlates with nitrogen content and specific leaf area in patterns that are thought to be common to all species. However, **Gulías *et al.* (pp.**

**215–222)** show that in species endemic to the Balearic Islands these patterns deviate significantly from those seen in other Mediterranean species and crops. The results are discussed in the context of evolution under pre-human ecological conditions.



## Conservation strategies for Allegheny chinkapin

Chestnut blight has a devastating effect on American chestnuts and chinkapins (*Castanea pumila*). With the aim of developing appropriate conservation strategies, **Fu and Dane (pp. 223–230)** use allozymes to assess the genetic diversity of Allegheny chinkapin populations. Genetic variation is shown to be greatest within the populations. No differentiation along the Appalachian mountain range was detected.



## Unfolding of leaves and of the female inflorescence in walnut

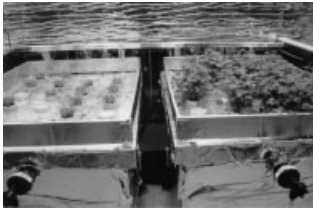
**Sabatier *et al.* (pp. 231–238)** show that pre-formed leaf and female inflorescences in *Juglans regia* are differentiated in the bud during extension of the parental annual shoot. The ability to exhibit several periods of leaf differentiation during one growing season is a feature related to the marked capacity of *J. regia* to respond to environmental fluctuations.

*Continued overleaf*



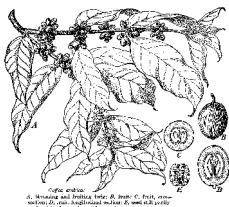
### Effects of drought and mycorrhiza on *Opuntia*.

Data on mycorrhizal function in an ecophysiological context are lacking for CAM species growing in a rocky environment. **Pimienta-Barrios *et al.* (pp. 239–245)** report that inhibition of AM-fungal colonization using benomyl does not affect photosynthesis, water uptake or P uptake. This suggests that development of the CAM species *Opuntia robusta* in a highly stressful environment might be regulated by other physiological strategies and mechanisms.



### Constructing compatible mixtures of ryegrass and white clover

In temperate climates, associations of perennial ryegrass and white clover form the basis of low input, sustainable grassland production. **Collins *et al.* (pp. 247–258)** show how cultivars of these species that demonstrate contrasting morphological/physiological strategies in response to nitrate supply may be of value in constructing ‘compatible mixtures’. Such mixtures are intended to reduce oscillations in pasture clover content by extending the range of conditions that allow a balanced co-existence of the two species.



### Bias in estimates of genome size using flow cytometry

Some species are rich in endogenous substances that may interfere with propi-

dium staining of the nucleus, and thus with estimations of genome size using flow cytometry. By measuring accessibility of petunia DNA to propidium iodide **Noirot *et al.* (pp. 259–264)** demonstrate that the large amounts of caffeine and chlorogenic acid present in *Coffea* spp. have the potential to confound estimates of nuclear DNA.



### Variation in DNA-ploidy levels of *Reynoutria* taxa

Fast evolution of new species by coincidence of hybridization and polyploidization and subsequent spread of newly evolved taxa is described in representatives of the genus *Reynoutria*. **Mandák *et al.* (pp. 265–272)** show the degree of cytological variation within the genus *Reynoutria* in the Czech Republic and discuss possible origins of particular cytotypes.



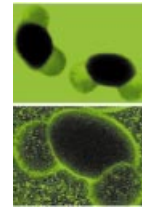
### High-mountain vegetation is highly sensitive to climate warming

**Sanz-Elorza *et al.* (pp. 273–280)** have studied a high-mountainous area of central Spain. They provide evidence that observed changes in altitudinal arrangement of some plant communities can be related to increases in minimum winter temperatures recorded since the 1940s.



### Interactions between nuclear and cytoplasmic genes affect plant phenotype

**Zubko *et al.* (pp. 281–288)** demonstrate that genetic re-composition of tobacco cytoplasm via distant cybridization with henbane induces a wide range of maternally inherited phenotypic alterations in flower and leaf morphology. Combining parasexual hybridization and conventional backcrossing is considered to be a promising approach for generating genetic variability.



### Sporopollenin microcapsules from pine pollen

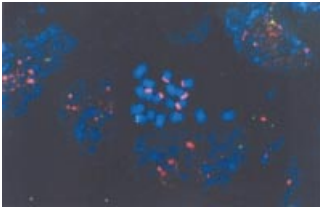
Purified exines prepared from pine pollen represent sporopollenin microcapsules. **Bohne *et al.* (pp. 289–297)** find that the inner layers of the central capsule have a low permeability even for small solutes as required for controlled release applications. In contrast, the highly porous and rigid wall of the sacci allows rapid exchange of large colloids, which is crucial for chromatography.



### Evolution of the placenta in liverworts

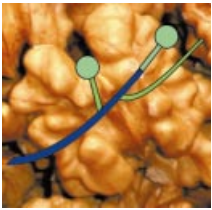
The placenta is a specialized region at the interface between the sporophyte and parental gametophyte in embryophytes. Stemming from a comparative analysis of placental structure in putatively basal liverwort taxa, the work by **Carafa *et al.* (pp. 299–307)** recognizes

a plesiomorphic (primitive) type of placenta in the liverwort lineage and discusses possible inter-relationships of the different types of placenta present in major bryophyte groups.



#### **Variability of the 5S and 45S rDNA sites and phylogenetic relationships in *Passiflora***

Cytologically, species of *Passiflora* are diploids, although some polyploids have been registered. **de Melo and Guerra (pp. 309–316)** show that the number and location of 5S and 45S rDNA are consistent with the hypothesis of  $x = 6$  as the probable ancestral genome for the genus.



#### **Branching and fruiting habit in walnut**

**Solar and Štampar (pp. 317–325)** describe architectural units of trees of *Juglans regia* and define the main branching and fruiting patterns. They show that the generative potential in lateral fruiting genotypes is much higher than in genotypes that typically bear fruit at the ends of shoots. Types with a fruiting pattern that is intermediate between lateral and terminal display a superior balance of vegetative growth and fruiting.