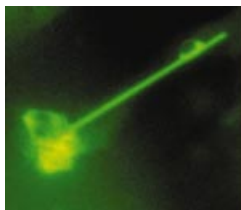


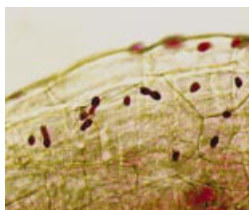
Plant glutamate receptors

The existence, in *Arabidopsis*, of a family of genes predicted to encode proteins similar to glutamate-gated cation channels expressed in mammalian neurones was unexpected. This review by **Davenport (pp. 549–557)** summarizes evidence for the functions of these genes in plants, including possible roles in the transport of Ca^{2+} , NH_4^+ and the toxic ion Na^+ .



Chromoplast structure revealed in tomato

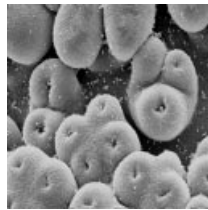
By using green fluorescent protein targeted to plastids, **Pyke and Howells (pp. 559–566)** reveal the complex morphology of chromoplasts in tomato fruit. They show that chromoplasts in tomato fruit pericarp cells are linked together by thin stromules with highly complex architecture including bead-like structures.



Infection of parasitic *Orobanche aegyptiaca* by *Fusarium*

Orobanche spp. are major parasitic weeds of vegetable crops. Two mycoherbicide *Fusarium* species are examined by **Cohen et al. (pp. 567–578)** for their potential in biological control. The aetiology of pathogenesis and the biological responses of *Orobanche* infected by *Fusarium* are examined, and the

kinetics of infection biochemically and histochemically tracked using light, confocal and electron microscopy.



Homeosis in the flower of *Philodendron*

Atypical bisexual flowers with staminodes and fully functional carpels on the same whorl are commonly found in the genus *Philodendron*. **Barabé et al. (pp. 579–592)** examine the range of homeotic transformation in two given species and show that there is a quantitative relationship between the number of staminodes and the number of carpels in atypical bisexual flowers.



Root growth and closed environments

A sealed room allows CO_2 uptake and release by shoots and roots to be monitored daily. **Nobel and Bobich (pp. 593–598)** find that over a 3-month period after planting as bare-rooted specimens, five species of desert succulents diverted all net carbon uptake from the atmosphere and even more stored shoot carbon to newly developing roots.



Sex expression in an invasive tree *Yamashita* and Abe (pp. 599–605)

examine sex changes and size distribution

of a dioecious tree (*Bischofia javanica*) that has invaded a group of subtropical Pacific islands. A male-biased sex ratio was observed and the maintenance of female reproduction was related to the flowering frequency of individuals and to reversals to the male form.



Sugar phosphorylating enzymes in pollen grains

High temperatures cause flower abscission and seed abortion in peppers by reducing pollen grain germination and increasing pollination failure, whereas enrichment with CO_2 has the opposite effect. **Karni and Aloni (pp. 607–612)** suggest that possible explanations lie in the characteristics of hexo- and fructokinase, two enzymes involved in the first steps in hexose metabolism within pepper pollen.



Gender variation in sequential inflorescences

Darwin deduced that the first flowers to open sometimes abort because they are useless in dichogamous plants. **Huang et al. (pp. 613–622)** confirmed this notion by examining gender variation in arrowhead, a protogynous aquatic herb. Generally, femaleness increases in late inflorescences due to an increase in plant size. Early male inflorescences are seen as an adaptive strategy that conserves resources and enhances the probability of pollinating female flowers.

Continued overleaf



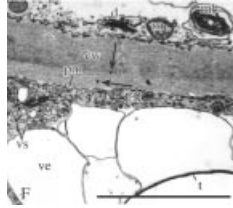
Abscisic acid catabolism in maize kernels

Apical kernels on maize ears are more vulnerable to water stress than are basal kernels. **Wang *et al.* (pp. 623–630)** examine the relative rates of ABA catabolism in tissues of maize kernels and conclude that placenta tissues play a key role in this difference.



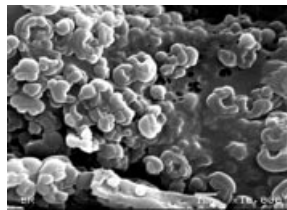
Heat-stress effects on tomato pollen grains

The failure of tomatoes grown under chronic high temperature conditions to set fruit is often associated with reduced pollen viability. **Pressman *et al.* (pp. 631–636)** show that high temperatures interfere with starch accumulation in the developing grains, which results in a lower soluble sugar concentration in mature grains. Low sugar content possibly contributes to the poor pollen performance.



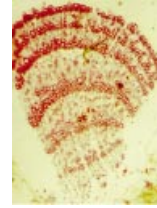
Ultrastructural differences in chilled and frozen leaves

Oilseed rape is chilling-resistant and prior chilling hardens leaves to any subsequent freezing. The ultrastructural changes associated with these responses are described in cold-acclimated leaves by **Stefanowska *et al.* (pp. 637–645)**.



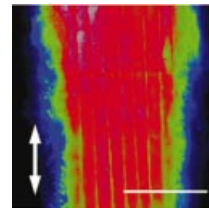
Morphological and ultrastructural diversity of orbicules in relation to evolutionary tendencies in Apocynaceae s.l.

Minute granules of sporopollenin, called orbicules, can be observed on the walls of tapetum cells. **Vinckier and Smets (pp. 647–662)** investigate orbicules in 62 Apocynaceae s.l. species and uncover a correlation between orbicule typology and evolutionary tendencies in Apocynaceae s.l. palynology.



Plant age and variations in growth unveiled by herb-chronology in alpine forbs

Analyses of annual rings in plants provide *a posteriori* insights into plant growth. **Dietz and Fattorini (663–668)** demonstrate the presence of annual rings in the roots of different experimentally grown alpine forbs and suggest that year-specific variations in growth ring width reflect fluctuations in climatic growth conditions.



Cellulose fibril orientation and the direction of cell expansion

Kerstens and Verbelen (pp. 669–676) examine root cells in 57 angiosperm species from 29 families and show that transverse orientation of cellulose fibrils is not always linked to longitudinal cell elongation. In the Poaceae, Juncaceae and Cyperaceae, fibrils are found parallel to the direction of growth. Differences in fibril orientation patterns may be useful in biosystematics.