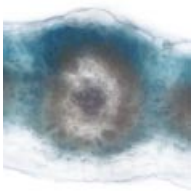


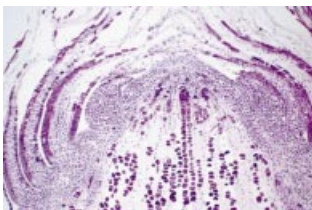
New possibilities for old protuberances (Botanical Briefing)

This review of plant trichomes by **Wagner *et al.*** (pp. 3–11) reveals new opportunities for their manipulation. These offer the potential to enhance pest and disease resistance, to exploit trichomes as factories for molecular farming, as systems for understanding cellular differentiation and cell shape determination, and for expanding understanding of the many suspected functions of trichomes and related surface protuberances.



Molecular evolution of C4 photosynthesis (Invited Review)

C4 plants evolved several times independently from C3 ancestral species. **Westhoff and Gowik** (pp. 13–23) report how phosphoenolpyruvate carboxylase, the entry enzyme of the C4 cycle, acquired its C4 specific enzymatic properties and expression pattern. The Asteracean genus *Flaveria* serves as model system.



Seasonal variation of organogenetic activity and allocation of reserves in shoot apex of *Pinus pinaster*

A detailed structural comparison of meristem size, organogenetic activity, lipids, starch grains and tannins in shoot apices of juvenile and male and female

adult *Pinus pinaster* was made five times during the annual growth cycle (**Jordy pp. 25–37**). Strong correlations amongst traits, and differences in the pattern for juvenile and adult shoots are discussed.



Pollinarium morphology, floral rewards and generic boundaries in brazilian orchids

Sixty species from seven genera of the orchid subtribe Maxillariinae are examined by **Singer and Koehler** (pp. 39–51) with a view to distinguishing major clades. They employ morphological characteristics of pollinaria and biomechanics of pollination. These reveal a larger than expected diversity that is expected to help redefine and diagnose clades of the Maxillariinae.



Graft union in tomato

Graft union formation in tomato plants is considered by **Fernandez-Garcia *et al.*** (pp. 53–60). They describe the structural development of graft union and its relationship with peroxidase and catalase. The localization and activity of these enzymes suggest a functional role in graft formation.



Reproductive challenges of early blooming for gynodioecious *Daphne laureola*

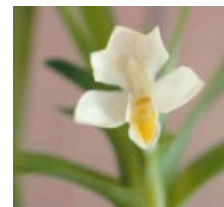
Early blooming in seasonal environments requires an extended flowering time,

unspecialized pollination, or both, for successful reproduction. **Conchita Alonso** (pp. 61–66) shows that extended flowering contributes significantly to maintenance of gynodioecy in *Daphne laureola*. However, the only effective pollinator is a beetle that prefers sunny locations. This emphasizes the relevance of abiotic conditions for reproductive success of this early blooming shrub.



Gene flow from rice to its wild relatives

Transgene escape through gene flow from GM rice to its wild relatives is of universal concern owing to its potentially serious ecological consequences. **Chen *et al.*** (pp. 67–73) measured noticeable frequencies of gene flow from cultivated rice varieties to their weedy and wild relatives under field conditions, suggesting that effective biosafety measures will need to be taken when GM rice varieties are released.



Morphology of floral papillae in *Maxillaria* orchids

The floral papillae of *Maxillaria* spp. vary greatly in form, and provide visual, olfactory and tactile cues that attract and guide potential pollinators along the labellum. Many papillae contain or secrete food substances and are involved in the rewarding of pollinators while others may protect the flower from desiccation and herbivory. **Davies and Turner** (pp. 75–86) reveal the occurrence of identical papillae in species exhibiting diverse vegetative morphology. This indicates that floral papillae, unlike hairs, are of limited use as taxonomic characters in this genus.



Nectary structure and nectar secretion in *Maxillaria coccinea*

Only recently have flowers of the genus *Maxillaria* been shown to produce nectar. **Stpicyńska et al. (pp. 87–95)** now give the first detailed account of nectary structure and nectar secretion in this genus. This account may also be the first detailed study of the nectary of a presumed hummingbird-pollinated orchid. The nectary is characterized by a small protuberance on the ventral surface of the column and nectar collects in a 'sink' formed by the partial fusion of the bases of the column and the labellum. The

ultrastructural basis of nectar secretion in this species is discussed.



Fluoride uptake by tea plants is affected by Ca and pH

Tea plants commonly accumulate large quantities of fluoride (F) from soils containing normal amounts of F. **Ruan et al. (pp. 97–104)** examine how F uptake is affected by pH and Ca in nutrient solution and soil. They show that supplying Ca depresses F uptake possibly by changing root cell wall properties and/or membrane permeability, and by affecting F speciation and concentration in the soil solution.



Mating system in island populations of *Vincetoxicum hirundinaria*

The mating system of *V. hirundinaria* is examined by **Leimu (pp. 105–111)** in island populations located on the northern border of the species' range. The frequencies of self-fertile individuals are shown to be relatively high in all populations. The results point to a mixed-mating system. Evidence is given for a late-acting self-incompatibility system.