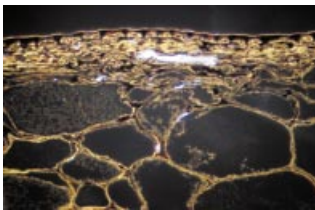


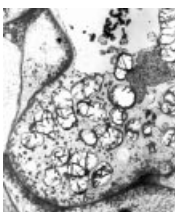
Hot-spotting the ups and downs and calcium waves

The apparent ubiquity of Ca^{2+} as a signalling molecule in plants makes it important to understand how specificity is encoded in changes in cytosolic-free Ca^{2+} . **Ng and McAinsh (pp. 477–485)** discuss how spatio-temporal changes in cytosolic-free calcium can encode stimulus-specific signalling information and the mechanisms by which 'Ca²⁺ signatures' can be generated.



Calcium in plants

All plants need calcium. It is involved in the maintenance of cell walls and membranes, in ion balance and in intracellular signalling. **White and Broadley (pp. 487–511)** reveal the contrasting requirements of different plant species for calcium, and review the physiological roles of this element, with particular reference to the use of Ca^{2+} in intracellular signalling.



Placental morphology helps to analyse pteridophyte ancestry

Highly distinctive gametophyte/sporophyte junctions in leptosporangiate ferns are characterized by sporophytic haustoria, wall ingrowths in both generations, mitochondrial aggregations in the gametophyte and large amyloplasts in the sporophyte. **Duckett and Ligrone**

(pp. 513–521) investigate how major differences between the placentas of ferns and lycophytes reinforce the notion of two major pteridophyte lineages based on morphological and molecular data.



'Berry-cup' system to study phloem unloading

This simple but effective system consists of an *in vivo* peeled grape berry immersed in buffer in a 10 ml polypropylene cup. **Wang et al. (pp. 523–528)** use this system to study phloem unloading of grape sugar under different conditions. Water stress and treatment with biochemical inhibitors are shown to reduce phloem sugar unloading in grapes.



Leaf-to-leaf water movement

Succulents re-distribute water from old to young leaves during drought stress. **Rabas and Martin (pp. 529–536)** examine the effects of water movement by detaching old leaves and studying the resultant physiology of remaining young leaves. An absence of old leaves is shown to reduce competition for water with young leaves, resulting in higher water content and greater photosynthetic rates in the remaining young leaves.



Relative importance of roots and cotyledons as storage organs in seedling establishment under stress

Kabeya and Sakai (pp. 537–545) assess the importance of the storage functions of cotyledons and roots of *Quercus crispula* during seedling development. Although large quantities of carbohydrate reserves are present in both cotyledons and roots at the time of leaf expansion, only reserves in the cotyledon are available to support re-growth following shoot destruction.



Impact of bracken herbicide on mosses

Asulox is a herbicide used to control bracken. Its effects are shown by **Rowntree et al. (pp. 547–556)** to be inhibitory to 18 moss species, although the strength of the effect varies with the taxa. An ability to produce secondary branches is linked to greater tolerance.



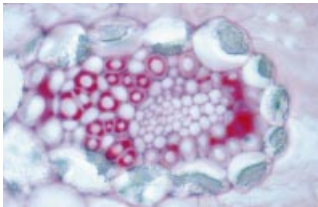
Root and nodule growth in peas

Root and nodule growth are known to be affected by nitrate. **Voisin et al. (pp. 557–563)** examined the rules that drive C allocation to root and nodule growth in relation to the sources of N and photosynthetic C for different stages of growth. They provide quantitative relationships between root and nodule growth and net C-photosynthesis.



Foliar application of boron to sunflower

Boron (B) deficiency limits sunflower production in many parts of the world. **Asad et al. (pp. 565–570)** show that foliar sprays partially overcome this problem as a consequence of foliar B uptake. However, a conclusive demonstration that, subsequently, B is translocated from old to young plant parts remains elusive.



Systematic significance of cell inclusions in Haemodoraceae and allied families

In some groups, the presence or absence of characteristic cell inclusions, such as silica bodies, calcium oxalate crystals, starch grains and tannins, are potentially significant taxonomic characters. **Prychid et al. (pp. 571–580)** present the first record of silica deposits in tissues of Haemodoraceae and add new records of tapetal raphides in this family.



Organ content in over-wintering apple buds

The number of pre-formed organs is investigated by **Costes (pp. 581–588)** in winter buds of ‘Granny Smith’ apple tree with respect to bud position. Total number of organs is shown to depend on meristem position and age. In axillary buds, the mean number of total organs increases with the number of flowers. In terminal buds, a trade-off is observed between leaf and flower primordia.



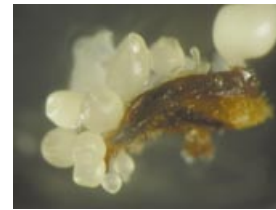
Variations in the branching patterns of trees

Woody plants are highly dependent upon their branching pattern to intercept photosynthetic radiation. Most studies on branching patterns have highlighted variations caused by different environmental conditions. **Puntieri et al. (pp. 589–599)** apply architectural concepts and emphasize the relevance of species-specific gradients in the study of the branching pattern of two *Nothofagus* species.



Day and night temperature responses in arabidopsis

Plants given the same average daily temperature can show differences in growth due to different day and night temperatures. **Thingnaes et al. (pp. 601–612)** examine the effect of different day- and night temperature combinations on cell size, gibberellin and auxin content, morphology and flowering time in *Arabidopsis thaliana*.



Polyphenolics during cocoa somatic embryogenesis

Theobroma cacao L. is naturally polyphenolics rich. The involvement of such compounds in imposing recalcitrance for embryogenesis in tissue culture is examined by **Alemanno et al. (pp. 613–623)**. They determine the composition and localization of polyphenols in the flower and changes occurring during somatic embryogenesis. Greater induction of new hydroxycinnamic acid amides synthesis is associated with non-embryogenic conditions.