

Functional Plant Biology

Continuing *Australian Journal of Plant Physiology*

Contents

Volume 30 Number 12 2003

UV screening by phenolics in berries of grapevine
(*Vitis vinifera*)

**Christiane A. Kolb, Jiri Kopecký, Markus Riederer and
Erhard E. Pfündel** 1177–1186

UV radiation has a high potential to damage lipids, nucleic acids and proteins during photosynthesis. One strategy against such damage is to screen out UV radiation: these authors investigated the role of phenolics in UV screening in grape berries. While increased flavonol levels resulted in efficient UV-A shielding, UV-B shielding was incomplete due to decreased levels of hydroxycinnamic acids.

Copper-induced inhibition of photosynthesis: limiting steps of *in vivo* copper chlorophyll formation in
Scenedesmus quadricauda

**Hendrik Küpper, Ivan Šetlik, Eva Šetliková,
Naila Ferimazova, Martin Spiller and
Frithjof C. Küpper** 1187–1196

Using the green alga *Scenedesmus quadricauda*, these authors analysed changes of copper chlorophyll formation in relation to the photosynthetic parameters in the course of the cell cycle, and observed different states of acclimation towards inhibitory copper concentrations. They utilise many techniques, including chlorophyll fluorescence, thermoluminescence glow curves, fluorescence microscopy, and polarographic oxygen measurements.

The relative limitation of photosynthesis by mesophyll conductance in co-occurring species in a temperate rainforest dominated by the conifer *Dacrydium cupressinum*

**Evan H. De Lucia, David Whitehead and
Michael J. Clearwater** 1197–1204

This original research describes comparative mesophyll conductances of some native southern hemisphere conifers. DeLucia *et al.* investigated why *Dacrydium cupressinum*, a coniferous species native to New Zealand, has a very low photosynthetic rate compared to the co-dominant native species in the temperate rain forest. They concluded that a low mesophyll conductance is responsible.

Strategies of light energy utilisation, dissipation and attenuation in six co-occurring alpine heath species in Tasmania

**Erica L. Williams, Mark J. Hovenden and
Dugald C. Close** 1205–1218

Alpine environments are characterised by low temperatures and high light intensities. By studying six co-occurring evergreen heath species growing in southern Tasmania, these authors found significant differences among the species for most variables, and present a highly significant relationship between pre-dawn photochemical efficiency and nocturnal retention of de-epoxidised xanthophyll pigments. They propose that these six co-occurring species possess three separate strategies for tolerating high light at low temperature.

Cover illustration: Infection thread in a siratro root hair visualized via the presence of green fluorescent protein-labeled *Sinorhizobium fredii* strain 042B(s) that is able to nodulate soybean, siratro and alfalfa (see Noreen *et al.*, pp. 1219–1232).

Alfalfa nodulation by *Sinorhizobium fredii* does not require sulfated Nod-factors

**Sadaf Noreen, Helmi R.M. Schlaman,
Ramón A. Bellogín, Ana M. Buendía-Clavería,
María Rosario Espuny, Marga Harteveld,
Carlos Medina, F. Javier Ollero,
Maurien M.A. Olsthoorn, M. Eugenia Soria-Díaz,
Herman P. Spaink, Francisco Temprano,
Jane Thomas-Oates, José M. Vinardell, Su Sheng Yang,
Haiyu Zhang and José E. Ruiz-Sainz** 1219–1232

Rhizobium strain 042B(s) is able to form nodules on both soybean and alfalfa. Genetic and structural analyses indicate that this strain belongs to the species *Sinorhizobium fredii*, which typically nodulates soybean. Genetically engineered 042B(s) derivatives producing unfucosylated and/or unfucosylated sulfated Nod-factor have been tested for symbiotic capacity with Asiatic and Western cultivars of alfalfa and soybean.

Trans-stimulation of $^{13}\text{NH}_4^+$ efflux provides evidence for the cytosolic origin of tracer in the compartmental analysis of barley roots

Dev T. Britto and Herbert J. Kronzucker 1233–1238

This paper tackles an important and fundamental biological problem, the identification of the source of a tracer signal in a multicompartmented system, the radiolabeled root cells of intact barley plants. This provides substantial validation for a method used in a number of recent and classic studies in plant ion transport.

Does water status of *Eucalyptus largiflorens* (Myrtaceae) affect infection by the mistletoe *Amyema miquelii* (Loranthaceae)?

**Anthony C. Miller, Jennifer R. Watling, Ian C. Overton
and Russell Sinclair** 1239–1247

Mistletoes extract water and nutrients from their hosts, forming a close association. The impact of soil salinity and host water status on the host/parasite association between *Eucalyptus largiflorens* and *Amyema miquelii* was investigated in a semi-arid floodplain environment in southern Australia. The data suggest that increasing water and/or salinity stress make *E. largiflorens* a less suitable host for *A. miquelii*.

Involvement of phytochrome in regulation of transpiration: red-/far red-induced responses in the chlorophyll-deficient mutant of pea

**Svetlana V. Sokolskaya, Natalia V. Sveshnikova,
Galina V. Kochetova, Alexei E. Solovchenko,
Sergei A. Gostimski and Ouliana B. Bashtanova** 1249–1259

Stomatal movement in plants follows circadian rhythm, and phytochrome is the likely photoreceptor that tunes it to a local photoperiod. These authors examine effects of blue, red and far-red light on transpiration in a chlorophyll mutant of pea, and report the rhythm alterations in this mutant and in a phytochrome mutant of tomato. They discuss the possible role of phytochrome in the regulation of transpiration intensity and rhythmicity.