FLORA

MORE ON TREES WITH SUNSTROKE

In April 2007 (WW 11/2) Avril Baxter and Peter White highlighted the problems that high temperatures can cause to trees, inducing total defoliation that looks like sudden death. It is not only the high temperatures that can affect plants, increased amounts of incoming solar radiation (insolation) can also be harmful. This is especially important for paddock trees, which get no shade, as the potentially damaging insolation can impact on the whole tree for the whole day.

Light provides the energy source for photosynthesis, but damage can occur whenever the light energy absorbed surpasses the amount that can be used. This could potentially occur on many of our brilliant, clear summer days, and especially if the plant is under water stress at the time – water being another ingredient for photosynthesis, of course.

We are all aware that insolation can damage human skin, causing sunburn or skin cancers, and that humans have various mechanisms such as skin pigments to counteract the problems. If plants have a similar problem, how do they manage?

Plants have multiple photoprotection mechanisms that operate together. One strategy operates at cellular level and is based on a chemical process of dissipating energy by metabolising antioxidants. The second strategy involves changes to the structure and morphology of the leaf.

One obvious adaptation is to have leaves that hang vertically, thus the flat leaf blade will only get the full sun in the morning or the afternoon, when the insolation is less intense. Many eucalypts show this feature. Another possibility is to make the leaves more reflective and so

Typical hanging leaf, marri.

dissipate light in that way. Salmon gums show both features, and their crowns shimmer and ripple with reflected light on a sunny day.

But what makes the leaf reflective? It may involve a layer of wax covering the cuticle of the leaf. Raquel Esteban of the University of Basque Country, Spain, has been investigating the photoprotective role of waxes in juniper trees. These normally evergreen trees can defoliate under conditions of extreme environmental stress (like our wandoos and salmon gums) and this is their main photoprotective response, but it has a very drastic effect on the overall health of the tree. Raquel wanted to know if reflecting more light was a useful and less damaging protective feature.

Some Junipers have glaucous (greyer) leaves, caused by a higher than usual wax layer, which she found do reflect more light than the greener ones. So, does this extra reflectance help the tree cope? Maybe, but, the glaucous-leaved types showed worse defoliation under extreme stress than the greener-leaved ones – woops! Perhaps the extra wax helps under mild stress conditions, but is a hindrance – perhaps a drain on resources – during severe ones?

Next time you are in a wheatbelt woodland, look at the two species, salmon gum and inland wandoo, which often grow side by side. Both have similar-shaped hanging leaves, but the salmon gums' are light green and shiny, while the inland wandoos' are dull grey-green. Same stresses – two different approaches to the problem. Which will be more successful in a changing climate? Perhaps a PhD student in WA would like to look into these adaptations?

Penny Hussey

FUNGAL DIVERSITY IN KARRI FOREST

A recent survey* examines fungal diversity in burnt and unburnt karri regrowth near Pemberton. A total of 322 species of macrofungi were recognised, only 127 of which could be identified to species. This is an amazing diversity, given that the total area of all 36 replicate plots sampled was only 900 square metres. There was slightly more diversity on the burnt sites. It has been claimed that there are more species of fungi in WA bushland than there are of understorey plants – this certainly seems to support that point of view!

* Robinson R.M. and V.L. Tunsell. 2007. A list of macrofungi recorded in burnt and unburnt *Eucalyptus diversicolor* regrowth forest in the southwest of Western Australia: 1998-2002. Conservation Science W. Aust. **6:** 75-96.