

FLORA



Orange Borya, Sullivan Rock.



Golden Cord Rush, Ecdeiocollea, near Moora.

AUTUMN COLOURS

Alex S. George

AUTUMN colours in Western Australia? Surely only deciduous trees in gardens turn colour at that season? Apart from the well-known orange or pale yellow pincushions, *Borya* spp., on granite rocks, and the brown or purple hues of tamma, *Casuarina campestris*, in the wheatbelt, our native plants do not turn colour in autumn. After all, they are evergreen - or they were until last year!

The record dry summer of 2000-2001 revealed a different face to the bush. Apart from the north-eastern and eastern agricultural regions, the south-west had its driest summer and autumn on record, generally receiving less than a quarter of the average rainfall. From the end of November until the start of May, for example, Badgingarra had 7.6mm compared with the average of 82mm. Even in Perth, where 20mm fell over the same period, the effect on the bush was startling. Just as we talk of 100-year floods, so was this a 100-year drought. It was a rare opportunity to see how the bush responded.

In autumn 2001, from Eneabba to Perth and inland to Ravensthorpe, many plants showed a change in foliage colour, and some colours were quite spectacular: reds, yellows and browns. Observations after the winter rains began showed that, although a number of plants died, most turned green and recommenced growing and flowering.

The habitats where I saw 'autumn colour' include eucalypt woodland, coastal heath on dunes and limestone, inland heath on sandy, gravelly and granitic soil, winter-

wet clay-loam flats and granite outcrops. In some places there was a general colour change, whereas in others only certain species and plants changed. One prominent area was the Darling Scarp just east of Perth, where many shrubs changed to turn large areas orange-brown. Small areas on the Brand Highway between Cataby and Eneabba also changed markedly.

Some changes were spectacular. A cushion sedge common in the central wheatbelt, *Schoenus calcatus*, normally dark green, turned bright yellow or golden. The coneflower *Petrophile seminuda*, widespread in parts of the south-west, turned deep red and glowed in the late-afternoon sunlight. Along the coast Cockies' Tongues, *Templetonia retusa*, gradually changed to gold. Less colourful but still striking was the Common Hibbertia, *Hibbertia hypericoides*, which turned brown or yellow and gave every appearance of being dead. A number of sedges such as *Caustis dioica* and *Desmocladius flexuosus* turned yellow. The very common, sedge-like *Ecdeiocollea* became deep orange.

Other changes were more subtle. The honeymyrtle *Melaleuca platycalyx* and the bell flower *Darwinia speciosa* usually have some red colouring in their leaves; they just turned a deeper red. Around Perth the hopbush *Dodonaea hackettiana* simply went a dull, pale green.

Generally the leaves that changed colour showed no or little change in orientation and texture. After all, many are quite stiff in their structure which allows no 'give'. Those that did alter include the bipinnate-leaved wattles

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Acacia lasiocarpa and *A. pulchella*, in which the leaflets closed together, *Thomasia macrocarpa*, in which they hung vertically, and the coast banjine *Pimelea ferruginea* in which the leaf edges rolled under.

The rate of regreening was quite variable. Whereas *Borya* regreens within a few days of receiving sufficient moisture, other plants generally seemed to take two to three weeks, but some took longer. A few such as *Spyridium globulosum* regreened within a week or so of the first rain. The coastal beard-heath *Leucopogon insularis* and its inland relative *Astroloma serratifolium* not only regreened but their flower buds, formed the previous spring but dormant during summer, grew to flowering within three weeks. *Templetonia retusa* regreened variably, some plants taking two weeks, others still having yellowish leaves after four weeks or more.

In some species not all plants behaved the same way, probably due to variation in the soil moisture. A plant in autumn colour might be seen next to one that remained green. An extreme case was seen in the fuchsia grevillea, *G. bipinnatifida*, when, among a population that changed variably, one was even seen in flower! After the rain came, not all plants regreened: some had clearly gone beyond the point when they could recover and died. Species that suffered many deaths include the pea *Nemcia spathulata* and prickly moses, *Acacia pulchella*. The extreme drought also led to deaths in species that showed no autumn colouring of the leaves, e.g. *Hakea trifurcata*.

In all some 100 species in 59 genera of 24 families of flowering plants were recorded in which there was a colour change which was followed, after the rain, by the same foliage regreening. Some of them are plants that are killed by fire and regenerate from seed, others are lignotuberous or rhizomatous plants that sprout after fire. Leaf form ranged from broad and flat to narrow, some needle-like, some with revolute margins. In some leafless plants the stems changed colour, e.g. the globe pea *Sphaerolobium*, and sedges of the Restionaceae. The list will certainly be extended as opportunities arise to make observations at other localities and habitats. Not every year will be suitable, of course, since any substantial rain will either reverse or at least delay any colour change.

It seems that at least 10 mm of rain within a 24-hour period is required to begin the regreening process. Lighter rain has no obvious effect on the plants. In 2001 the first widespread effective fall over the south-west (generally around 20 mm) was on 6 May, though some areas did not get a good fall until much later. Conversely, some inland areas (such as around Merredin) received rain during the summer, and there the autumn colours did not develop.

These autumn colours should not be confused with the colourful new leaves of many native plants. Many Proteaceae, in particular, have red, pink or brown new leaves. Nor should they be confused with foliage that appears pale or yellow either through ageing or through

a nutritional deficiency as is commonly seen in cultivated plants, less so in the wild.

Besides colour change of foliage, other fascinating changes occur in the bush during late summer and autumn. A few species avoid the dry season by shedding their leaves, e.g. *Phyllanthus calycinus*, or by allowing leaves to die, then producing new ones after the rain, e.g. *Opercularia*. In some small herbs such as triggerplants, *Stylidium*, the leaves die but form a protective covering over the shoot tip and/or rootstock.

Other shrubs and trees appear to survive by 'allowing' parts to die while the rest of the plant remains alive. In autumn 2001, many balga, *Xanthorrhoea preissii*, at several localities seemed stressed, the lower leaves and/or upper parts of leaves turning yellow. These parts did not regreen after rain. On a plant of *Hovea pungens* at Crystal Brook one half died, the other remained green and flowered.

At Crystal Brook and Forrestfield, most mature trees of Wandoo (*Eucalyptus wandoo*) showed no or little drought effect, but on a number of young plants (up to 4 m tall) the foliage died, possibly because the roots had not yet reached the water table. Yet a very few leaves remained green, and by 7 August new shoots appeared as they do after fire.

Another seasonal change is in the colour of the bark of some smooth-barked species of *Eucalyptus*. In these the colour becomes more intense as the summer progresses, the outer layer then peeling off to reveal pale new bark beneath, e.g. White Mallee (*E. erythronema*). In others the new bark is darker and slowly pales, e.g. Salmon Gum (*E. salmonophloia*), Gimlet (*E. salubris*) and Salmon White Gum (*E. lanepoolei*).

The story related here contrasts with one that I wrote a year ago on summer wildflowers (*WW* 5/1). It is a paradox that, while some plants are shutting down to survive the dry spell, others are flowering or even making new growth. So, don't think that spring is the 'wildflower season' and that there is nothing worth going out for in summer. In fact there is a great deal to see.

If you noticed the autumn colour in the bush last year then you may have seen a one-in-100-year event. This summer there has been more rain, albeit patchy, and the colours may not show up again except for the 'regulars' - orange pincushions, brown tamma and red petrophile. I will be interested to hear of your observations.

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Unfortunately in this newsletter we cannot print colour plates to show the startling colour changes that some of these plants undergo. You can see them in Alex's book on autumn colours, The Long Dry.