Epiphytes and fire? – My exciting find of *Dendrobium dicuphum* in a hot, dry and burnt landscape.

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The last thing I expected to see growing on the bark a small eucalyptus tree, was a dendrobium in full bloom. Despite its few leafless pseudobulbs, it had two spikes each of more than a dozen blooms. Here I was, standing in the middle of a one hectare plot that was part of a long-term fire experiment, in the remote northern Australian savanna.

What made this discovery so unexpected, was that this particular plot had been burnt early in the dry season, every single year for the past 16 years. How had this epiphyte survived those fires? It seemed miraculous enough that this species could survive the blazing dry season sun, and the annual five to six months of almost no rain at all. But there it was. Not only surviving annual grass fires, but thriving even with scorch marks on the older pseudobulbs.

My gaze quickly turned to the surrounding trees, which I scanned for more of these hardy orchids. A wealth of them quickly rewarded my efforts.

My fascination with orchids began in my early teens in the mid-1970s. With parents who loved gardening, and an eldest sister who was enamoured with growing native plants, my path was set. Way back then, more than half a century ago, my sister started her now extensive collection of plant identification and gardening books. She would often buy two copies, and give one to me.

During my formative teen years, I spent my hours absorbing Keith Williams' *Native Plants of Queensland* and Kathleen McArthur's *Queensland Wildflowers*, amongst other plant books of the era. From those books, I learnt to recognise many of the native genera and species of epiphytic and terrestrial orchids, and to understand something of their ecology. It stood me in good stead. Even now, I can find myself out bush somewhere, and be able to name a plant that I had previously only seen as a photo or a drawing in a book during my early teenage years.

Back then, native orchids were removed from rainforest trees that were being logged. These were bagged, labelled, and could be bought for a small sum from Kmart. This is how I started my collection.

Many of my orchids then were mounted. I was growing such tiny flowering delights as *Bulbophyllum exiguum*, *Dendrobium rigidum* and *D. cucumerinum* on pruned branches of our trees. In pots, I had *Liparis reflexa*, *D. aemulum* and various cultivars of the Cooktown orchid *D. bigibbum*. My *D. speciosum* survived half a century in a hollow eucalypt stump under Dad's lemon tree. It now grows happily on my sandstone retaining wall.

During those years, my orchid obsession was very much a private thing. Our neighbour grew orchids and would sometimes show me the large showy blooms of his cattleyas or huge sprays of oncidiums. They were spectacular, but I preferred some of my tiny miniature native treasures.

Sadly, my orchids were neglected during my later teen years, as my life grew busier. I had many years being nomadic, in a succession of share houses. My orchids were left at the family home. Some of my orchids had very particular requirements. They eventually died during this time,

when my father became ill and couldn't look after them. My orchid obsession would have to wait.

As a young adult, I took up bushwalking and mountain climbing. Orchids were always around. I have a memory of a beautifully flowering and fragrant *Sarchochilus falcatus* at the top of Boar's Head, on the main range west of Brisbane. Other memorable finds include a *Pterostylis* species in flower in New Zealand's Milford Sound; and *D. kingianum* along a gorge near Nowra, NSW.

I developed quite an eye for spotting orchids, but I learnt to tone down the urge to see every orchid I could, after near disaster. I tripped over a tree root high on a ridge in Lamington National Park, while searching the branches overhead.

In the late 1980s, I took up a job with CSIRO in Darwin as an ecologist. The Top End of the Northern Territory isn't a great place for native orchids. The climate is tropical wet and dry, and the vegetation is mostly tropical savannas. Similar environments in Far North Queensland have a much greater diversity and abundance of epiphytic orchids. The prevailing south easterly winds of the long dry season of the Darwin region bring very dry air off the deserts of central Australia, and make it tough for epiphytes. In contrast, the dry season winds of Queensland's Cape York Peninsula bring more humid air off the Coral Sea, making life a bit easier for orchids.

In far northern Australia, the dry season also brings bushfires. About a quarter to a third of all Australia's tropical savannas burn every year. Again, not a great environment for epiphytes. The drier the air, the greater the fire risk. There I was stationed in one of the most fire prone parts of the planet.

When I arrived in Darwin, John Brock had just published his *Top End Native Plants*, which I took to, and started to memorise the vast diversity on offer. I soon learnt that the only epiphytic orchids I was likely to see were the ubiquitous *Cymbidium canaliculatum*, one of only three native cymbidiums; and two dendrobiums: *D. canaliculatum* usually on paperbarks beside wetlands, and *D. dicuphum* (sometimes called *D. affine*), on a variety of host trees. I wasn't holding my breath.

One of my early projects was to visit the Munmarlary fire experiment on Bininj country in the lowlands of Kakadu National Park. My destination was reached by a four-wheel drive trek of many hours, along poorly marked tracks and creek crossings, all with the aid of a hand drawn map. We started off in Munmarlary's eucalyptus woodland plots, not far from the edge of vast floodplain of the South Alligator River. This experiment was laid out as a block of 12 one-hectare plots of natural bush. Three plots remained unburnt. The other nine were burnt either annually or every second year, and had been since 1973. By the time I came along in early August 1989, half the area had been burnt every year for 16 years.

The first orchid I spotted was a *C. canaliculatum* growing luxuriously out of a tree hollow. The native trees in the Top End are famous for their hollows. Their trunks are often like thin-walled pipes, thanks to voracious termites. While foresters and home-owners curse the termites and their appetites, the trees survive their presence for many decades. The hollows host a vast array of wildlife, such as parrots, possums, goannas and geckos. In this case, the hollow provided a cosy home to the Top End's only *Cymbidium* species. The fleshy roots of the cymbidium, travels deep down the hollow trunk, finding rich nutrients in the workings of the tree-hollowing, termite colony.

Hang on! This orchid was growing in the hollow of a tree that had suffered but survived 16 fires in 16 years. How amazing is that? However, it was nestled down somewhat in its hollow, and fairly high in the tree, with thick juicy pseudobulbs to protect it from the heat of the fires. I suppose I could understand it. I looked around to see if there were any others.

Then I saw it. Growing on the hard fissured bark of a Darwin Box, *Eucalyptus tectifica*, this was my first ever sighting of *D. dicuphum*. It was in full bloom. This plant was magnificent. Long pseudobulbs with sprays of nearly two dozen white blooms with purple splash in the middle on the labellum. *D. dicuphum* is often seen as a poor cousin to the Cooktown Orchid, *D. bigibbum* of far North Queensland. To me, there was nothing poor about this plant. Despite its harsh dried out state, clinging to a tree that stood in a harsh landscape, which had burnt every year for more than a decade, *D. dicuphum* was putting on a great show. How could it do this? How could it survive? Was this a fluke, or could they really survive the hammering they received from the fires?

There was nothing for it. Armed with a notebook, pencil and a forester's tree-measuring tape, off we went. We spent the next day or so, counting and assessing every orchid and host tree.

The terrestrial orchids of southern Australia have been researched for many years, focussing on their pollinators, habitats, and responses to fires. Often fires promote them, by reducing competition from other plants, and removing the suppressing leaf litter. I knew of no research looking at fires and epiphytic orchids. Here was a chance to find out something new.

We only found ten cymbidium plants in the 12 hectares of woodland. Almost all were growing in hollows of *Corymbia confertiflor*a, the broad-leaved carbeen. Six of the plants were in the unburnt plots. The rest were in plots burnt annually, early in the dry season. It still amazed me.

For the dendrobiums, we counted 440 individual plants. They were almost all on the Darwin box trees, particularly the larger ones. We found that the burnt plots had a smaller proportion of available trees colonised, and fewer plants per tree than the unburnt areas. Flowering epiphytic orchids were still there, surviving despite the fires.

My days of counting orchids in a remote spot of northern Australia, led to my first ever published scientific paper. This was a short paper in *Australian Journal of Ecology*. It was never going to win me a Nobel Prize, but as a bit of science, backed up by a lot of enthusiasm. It grew out of an interest in orchids and the natural environment, which was seeded and nurtured by my family as a youngster. This interest still keeps me busy now that I have retired.