Paper daisies (*Xerochrysum wilsonii*)

Taxonomic knowledge is essential for meaningful studies in biological diversity, ecology and biogeography. Whilst biological diversity is severely threatened by many hazards including anthropogenic habitat loss, pollution, invasive species and pathogens, overexploitation of natural resources, inappropriate recreation or tourism activity and global climate change, there is an urgent imperative to describe species before they become extinct. To quote the Taxonomy Decadal Plan Working Group: "Trying to manage the Earth sustainably without an adequate taxonomy is like trying to manage the world's largest, most complex corporation without an adequate inventory of stock, and with no real idea of what most of the products look like or do."

The daisy family Asteraceae (a.k.a Compositae) is the largest family of plants in the world. The family is subdivided into subfamilies and tribes, one of which, tribe Gnaphalieae, contains the paper daisies. Australia is endowed with an abundance of paper daisies. The genus *Xerochrysum* is concentrated in the eastern states of Australia with only three species recorded in WA out of 13, prior to my research.

In 2017 I started a PhD project examining paper daisies in the genera *Xerochrysum*, *Coronidium* and the closely related species *Helichrysum leucopsideum* based at the University of New England with co-supervision at CSIRO Centre for Australian National Biodiversity Research. The genus *Xerochrysum* has been 'taxonomically difficult' for over 100 years. Like many groups of Australian native plants, it's relatively easy to recognise a specimen belongs in the genus, but it becomes much harder to confidently identify the species.

I was intrigued by occurrence records in biodiversity hotspots of the Pilbara and the Stirling Range. My fieldwork enabled me to visit the Pilbara to collect disjunct populations of *X. interiore* Paul G.Wilson and to the south-west to collect *X. macranthum* (Bent.) Paul G.Wilson and look at herbarium specimens of *X. boreale* Paul G.Wilson from the Kimberley.

That name, Paul G.Wilson, appears regularly throughout the botanical literature as Paul, a former botanist at the WA Herbarium, has named six species of *Xerochrysum*, as well as the genus *Coronidium* and worked extensively on other Australian Gnaphalieae and the families Chenopodiaceae and Rutaceae.

My project used DNA sequence data to show the genetic similarities and differences between populations from around Australia. With these insights we were able to examine herbarium specimens and glasshouse-grown plants for correlating morphological characteristics. Populations of *Xerochrysum* that were genetically and morphologically distinct were described as new species. Overall we described 12 new species.

Along the way we discovered that the colourful cultivars long thought to be crosses between east coast *X. bracteatum* and African species of *Helichrysum* are hybrids from crosses with Western Australia's *X. macranthum*.

The Pilbara populations were confirmed as *X. interiore* and those herbarium specimens from the Kimberley were identified as *X. boreale*. The widespread annual or short-lived perennial *X. macranthum* was confirmed as mostly having white and pink papery bracts though there are some populations east and north of Perth where the papery bracts are entirely golden-yellow.

The intriguing plants from the summits of the Stirling, Porongurup and Mount Manypeaks ranges were found to be perennials, genetically and morphologically distinct from the mostly annual *X. macranthum*. Surprisingly, populations on southern coastal headlands and tall forests also clustered with the mountaintop plants. Finding a suitable name for these rare and beautiful plants was a simple decision, and so *Xerochrysum wilsonii* T.L.Collins is a newly discovered component of the Western Australian flora.

Above *Xerochrysum wilsonii* growing in Porongurup National Park

Inset The white and pink paper bracts or phylaries of *Xerochrysum wilsonii*
Photos – Dr Tim Collins