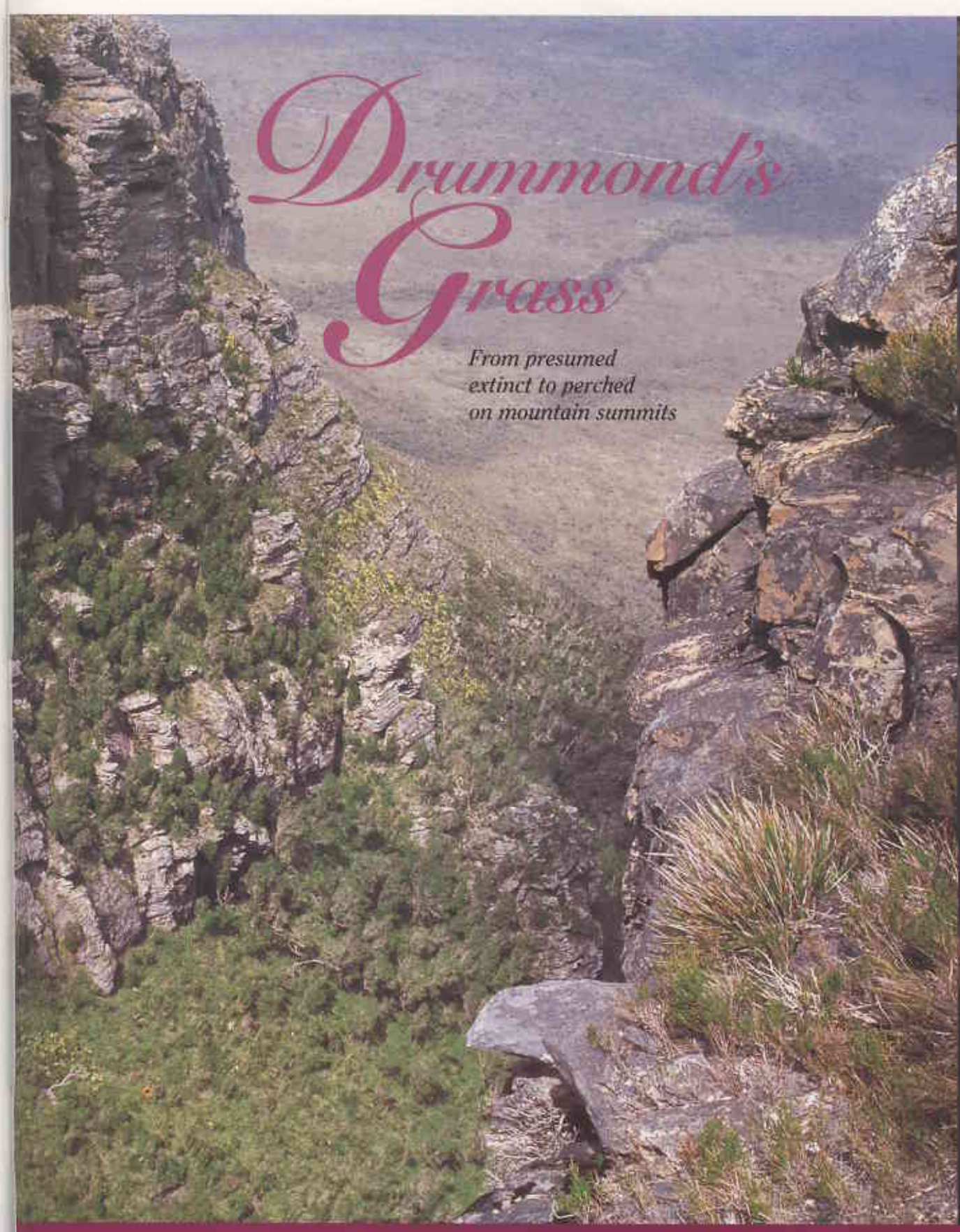
Drummond's Grass

From presumed extinct to perched on mountain summits



Until recently, the rare Drummond's grass had eluded searchers. This small, inconspicuous species was first collected by Colonial Botanist James Drummond 'between the Swan River and Cape Riche' in 1854. As no collections had been made since 1867, it was presumed to be extinct. The elusive grass was finally rediscovered in 1997, perched on the mountain tops of the Stirling Range National Park.

by - Anne Cochrane and Sarah Barrett

Herbarium specimens showed Drummond's grass (*Deyeuxia drummondii*) to be a small, densely tufted perennial up to 25 centimetres high. It had bright green leaves and numerous inflorescences or flower heads. Clusters of these dense, purplish flower heads projected above the leaves on long flowering stems. But where did the species grow?

LOST JEWEL

Drummond's grass was listed as presumed extinct until 1998, as the grass had not been collected since 1867 (see 'Lost Jewels in the Bush', *LANDSCOPE,* Autumn 2000). The type specimen was collected by the botanist and explorer James Drummond in 1854 somewhere between the Swan River and Cape Riche. Department of Conservation and Land Management (CALM) Senior Research Scientist Terry MacFarlane had noticed shiny mineral fragments around the roots of the original specimen, and suggested that it may have been collected on or around a rocky outcrop such as those in the Porongurup Range.

In 1995, during a survey of 13 mountain peaks throughout the south coast, CALM Conservation Officer Sarah Barrett attempted to relocate the missing grass. However, collections of numerous grass species from the Porongurup Range failed to reveal Drummond's lost grass.

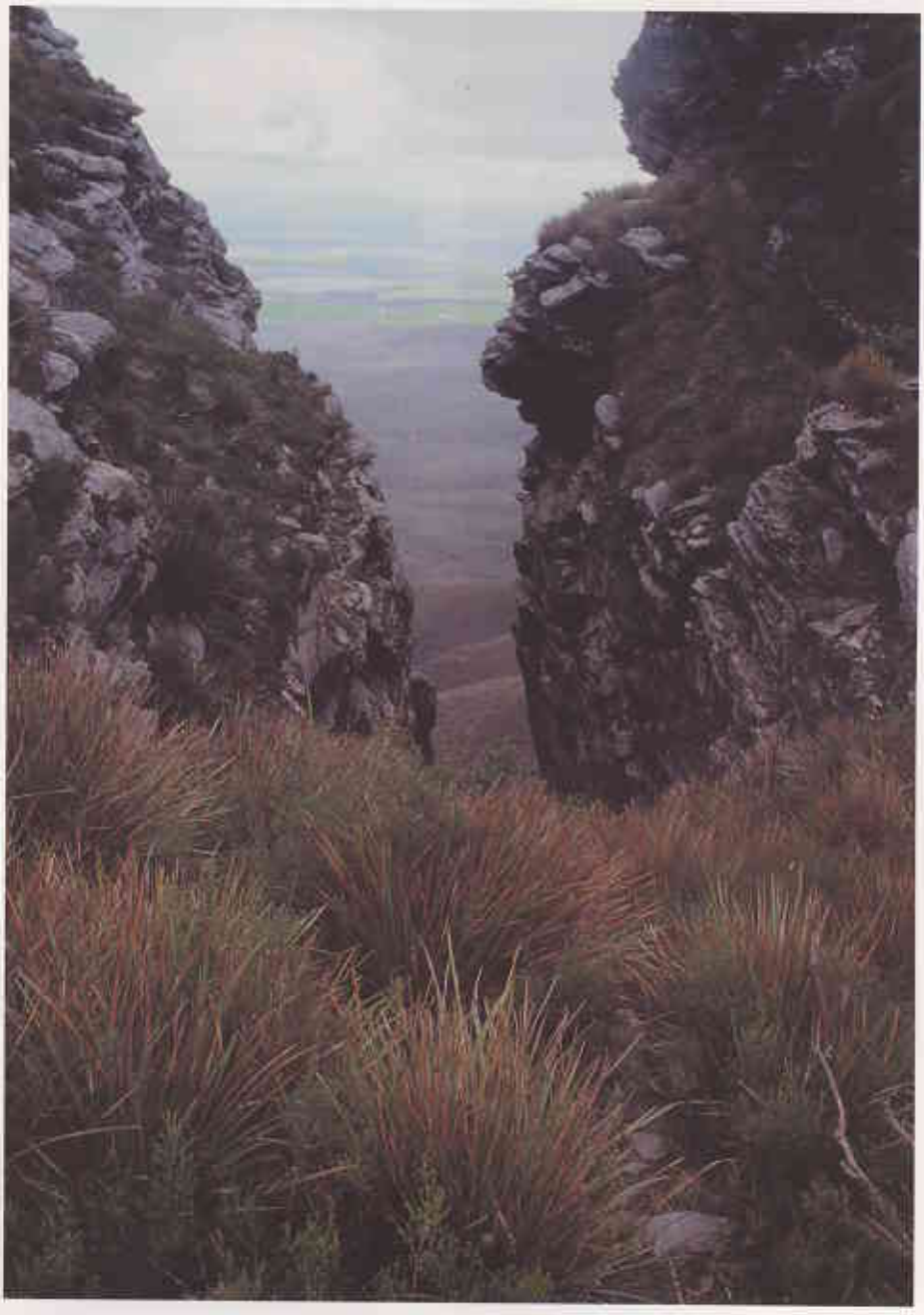
Nevertheless, the benefits of systematic flora survey were proved when a small sterile specimen was collected by Sarah Barrett (not Sara Bennett as previously reported in 'Lost Jewels in the Bush') from Ellen Peak in the Stirling Range in April 1995. As Terry McFarlane carefully worked his way through all the specimens collected in that survey, he finally came across the grass from Ellen Peak and decided that this might be the elusive Drummond's grass. A positive identification could not be made without flowering material, so in November 1997 a return visit was made to the summit of Ellen Peak. The grass was in full flower and 16 plants were found. Terry, armed with fresh material, confirmed that Drummond's grass was no longer extinct. The newly refound species was subsequently ranked Critically Endangered.

Since then, new populations have been gradually and painstakingly discovered and the species' range has been considerably extended. The largest population yet known was located by Sarah Barrett in April 1999 in a rocky chasm on Bluff Knoll. In December 1999, the species' range was extended west of Chester Pass to the summit of Toolbrunup Peak. In the summer of 1999–2000, more populations were found on Coyanarup, Isongerup and Pyungoorup peaks in the eastern Stirling Range. After much climbing and walking, the species is now known to be in a much more secure position,

Previous page:
Main: South side of Bluff Knoll in the Stirling Range National Park.
Photo – Rob Olver
Inset: Drummond's grass.
Photo – Ellen Hickman/CALM

Below: The location of Drummond's grass was a mystery for many years due to the rugged topography of the Stirling Range.
Photo – Bill Belson/Lochman Transparencies

Right: Drummond's grass growing on a rock ledge on Ellen Peak.
Photo – Ellen Hickman/CALM



Below right: The cliff face in a chasm on Bluff Knoll provides numerous ledges for Drummond's grass to grow.
Photo – Sarah Barret/CALM

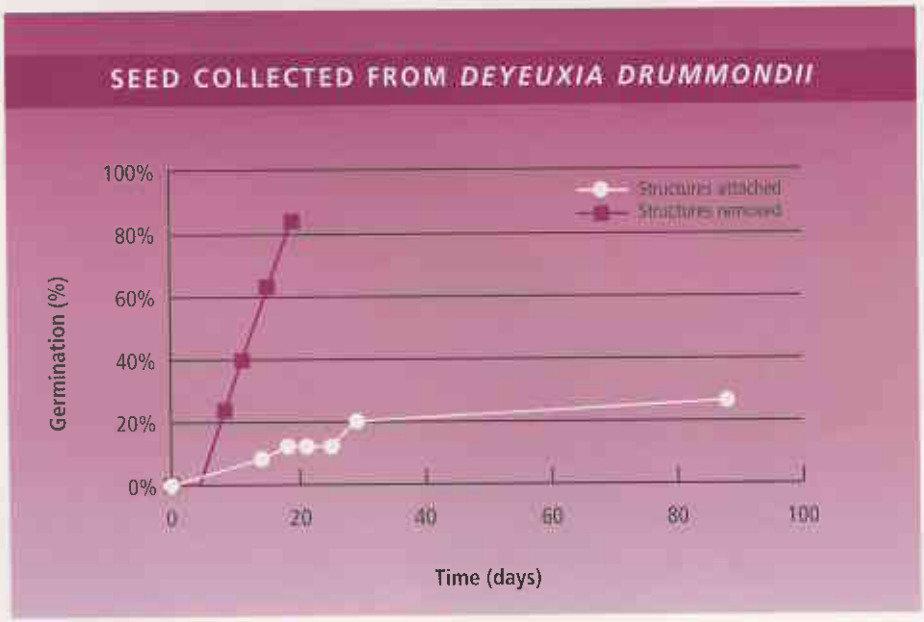
with multiple populations. It is quite possible that the threat status of Drummond's grass can be reduced.

These discoveries revealed that Drummond's grass inhabited the rocky ledges of mountain summits, some 900 metres or more above sea level. It may have been overlooked during previous surveys because of its small stature and its likeness to other grasses, and perhaps also because it lacked the flamboyant looks of other rare species, such as Foote's grevillea (*Grevillea calliantha*) or matchstick banksia (*Banksia cuneata*).

STORING SEED

Although Drummond's grass may not be as threatened as originally thought, it was considered judicious to collect material for propagation, storage and possible recovery. Grasses are not traditionally propagated from cuttings, rather by division or from seed. Propagation by division involves disturbing the mother plant, so in the interests of conservation, the collection of seeds was considered more appropriate.

Unfortunately, collecting seed material for long-term storage at CALM's Threatened Flora Seed Centre has not been without its difficulties. As the species had only recently been rediscovered, no-one was sure of the best time of year for seed collection. Secondly, the plants grew on the edge of rocky crevasses and ledges at more than 1,000 metres altitude in the Stirling Range, so a 'quick visit' to see if plants were fruiting wasn't possible. In fact, the best way to collect seed from a wide range of plants would be to don climbing gear and abseil to the various rocky ledges where Drummond's grass is located. Fortunately, this proved unnecessary and a good range of the genetic diversity of the species could be



collected without hanging by a rope over a precipice.

Through the summer of 1999–2000, we visited Bluff Knoll several times to collect seed. The first visit was made to this peak in November 1999 to assess plants for seed collection. This visit proved too early and plants were still in full flower. During a second visit in early December a small amount of fruiting material was collected. It still appeared to be too early for ripe seed, but the presence of mature seed had to be assessed under a microscope, as the seeds are too small to be identified by the naked eye. Sarah Barrett made further collections from the same site in late January and early March, and then a last collection in early April 2000 from a different site in the Stirling Range. The last three collections were sent to Perth for testing.

In the Threatened Flora Seed Centre laboratory, fruiting spikes from each collection were carefully dissected to determine the presence of ripe seed. Unlike that of many larger grasses (such as wheat and barley), the seed of Drummond's grass does not harden on maturity and remains slightly soft, so much care is needed to preserve the ripe seed from damage. What appeared to be the best seed was obtained from the late January collection. The collection in April contained only old fruiting heads, with all the seeds having dispersed.

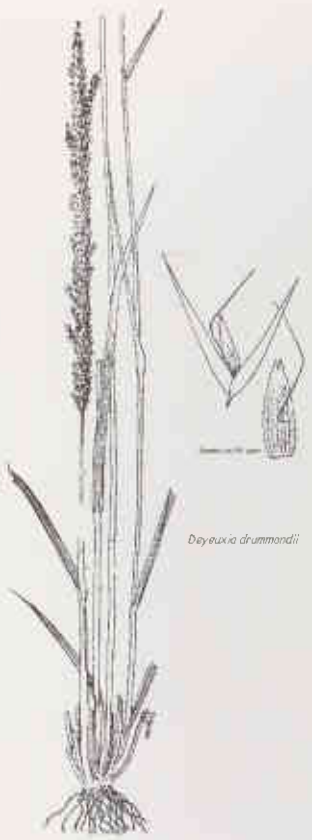
GERMINATION

To stimulate germination in grasses, it appears that seeds may need to undergo a number of different pre-treatments. Previous research, in particular by the mining industry in Australia, has indicated that allowing seeds to mature for many months under dry conditions (equating to

Top left: Terry MacFarlane and Sarah Barrett confirm the identity of Drummond's grass on Ellen Peak in 1997.

Above far left: Fruiting spikes of Drummond's grass.

Above left: Purplish flowering spikes of Drummond's grass.
Photos – Ellen Hickman/CALM



storage at room temperature) will assist with the germination of a range of grasses. Removing some of the intricate papery structures that surround the seed itself may also aid germination.

The structure of the fruiting body of Drummond's grass is made up of a solitary spikelet on a long culm or stalk. The spikelet consists of many flowers and/or fruits, each with a pair of glumes or outer scales. Within the glumes are the lemma and palea (inner scales), and within these is the seed. A small awn or bristle rises from the lemma (see illustration above).

Seeds were prepared for germination using a pre-treatment of the naturally occurring plant growth hormone gibberellic acid, and samples were incubated on a jelly-like agar solution in germination cabinets in the laboratory. Two different trials were established. The first trial consisted of seeds with all the covering structures (palea and lemma) intact. In the second trial the seeds had the lemma and palea removed.

These trials were conducted for each of the collection dates, although germination was best for the collection from late January when seed was most mature (see diagram on page 46). The results showed that seeds of Drummond's grass with the structures removed germinated quicker and achieved higher rates of germination than seed with the structures still attached (84 per cent germination after 20 days, compared to 24 per cent germination after 90 days). These results mean that we can easily germinate seeds for recovery and research work when required. A small quantity of seed has been stored in the gene bank to complement on-site conservation. These seeds will be monitored every five to 10 years to ensure they remain viable.

THE FUTURE

The future for Drummond's grass looks good. We now know where it grows and how to propagate the seed to create living plants. As more and more Drummond's grass plants are found in remote locations, the risk of losing this species in the wild is reduced. With some seed in long-term storage at CALM's Threatened Flora Seed Centre and seedlings at Perth's Botanic Gardens and Parks Authority for display, this inconspicuous member of the grass family is assured a future. Seedlings have been sent to CALM's Plant Diseases laboratories for dieback testing and we hope that Drummond's grass will prove to be 'tolerant' to *Phytophthora cinnamomi* when tested. This is likely, given that members of the grass family (Poaceae) do not appear to be susceptible to the disease, although they may act as hosts.

Left: Drummond's grass. Illustration – C. A. Gardner. Copyright CALM's WA Herbarium

Above: Bluff Knoll is one of only a handful of peaks where Drummond's grass is known to grow. Photo – Rob Olver

The rediscovery of Drummond's grass has highlighted the importance of intensive systematic flora surveys, especially for species that are seemingly small and insignificant in the scheme of things, but are nevertheless important components of Western Australia's biodiversity. Once located, research into the ecology and biology of the species is warranted to help understand their continued existence in what may be considered a very fragile environment.

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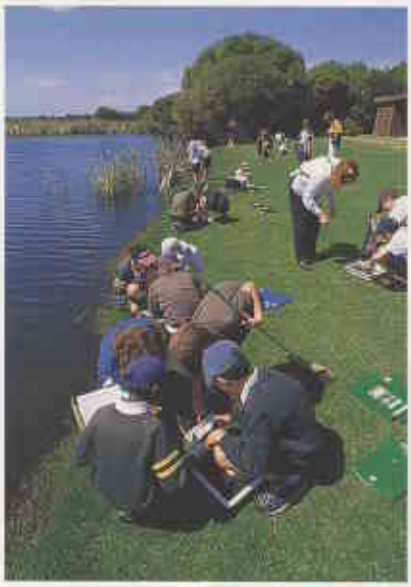
Botanists rediscover a presumed extinct grass perched on the mountain tops of the Stirling Range National Park. See page 43.

How can we preserve the Leeuwin-Naturaliste caves while catering for increasing visitation? See page 16.

Salinity Strategy surveys are revealing that salinity threatens more than 850 Wheatbelt plant species. How can managers intervene? See page 36.



Discover Perth's eight regional parks and their special features and attractions on page 28.

Learn about the spineless wonders of the marine world and their clever disguises on page 42.

FEATURES

REGULARS

COVER

More than 160 different bird species use Cape Arid National Park, which lies on the South Coast about 120 kilometres east of Esperance. The red-eared firetail is one of them. This exotic-looking finch is confined to south-western Australia. It is found in areas of dense heath and undergrowth in thick forest, never too far inland. Cape Arid National Park is the eastern limit of its distribution.

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