

## A fern walk for guides

A walk for guides to demonstrate how to identify ferns, and share some fern stories.  
This is not intended to be a walk for the public, but guides may use elements of this walk in their own walks

**Note: These notes are extracts from – and need as reference material - several documents on ferns available elsewhere on the guides web ie**

- **Ferns at the ANBG and their identification. Introduction and Part A (Pictures and notes on ferns found commonly at the ANBG)**
- **Ferns at the ANBG and their identification. Part B (Pinnae and sori of fern species at the ANBG)**
- **All about ferns for Guides V3 (everything you want to know about ferns including biology and stories in detail)**

Start	What makes a fern unique and evolution	<p>400+ Australian maybe 10,000-15,000 worldwide cf 1000 Eucalypts. Approx 40% of Australian ferns endemic. First appear in the fossil record about 360 million years ago, but many of the current families and species did not appear until roughly 145 million years ago after flowering plants came to dominate many environments.</p> <p>Arrived after algae and mosses but have vascular systems to transport water and nutrients. No flowers or seed Ferns are generally not of major economic importance, mainly ornamental plants.</p> <p>Some fern species, such as <a href="#">bracken</a> (<i>Pteridium aquilinum</i>) and water fern (<i>Azolla filiculoides</i>) are significant weeds worldwide. Some fern genera, such as <i>Azolla</i>, can <a href="#">fix nitrogen</a> and make a significant input to the nitrogen nutrition of rice paddies.</p>
1	Sword fern	How to identify a fern
2	Hares foot and silver elkhorn	How to identify a fern - sori Epiphytic
3	Dicksonia	<p>Before 280 Mya no gymnosperms of angiosperms. Ferns were dominant species, one family which shares an ancestor with today's ferns, the Lepidodendrils had trunks of frond bases to 55 m tall and 2 m wide. From 342-299 MYA Lepidodendrils dominated the swamps and then came extinct 225MYA due to loss of swamps and land warmed due to converging continents. The compressed carbonised remains of lepidodendrils constitute one of the chief constituents of coal. The energy source in coal is solar energy from millions of years ago which has been stored as carbon bonds.</p>
4	Azolla	<p>Seen terrestrial and epiphytic – now water fern Climate change story 52 MYA <b>3500 ppm</b> CO2 and palm trees at poles . Azolla grew in isolated arctic sea where top layer was fresh water fed by rivers . Sank and captured carbon.</p>

		Took 800,000 to reduce to <b>650</b> ppm and triggered ice age . Today 410 and would take 30,877 years to return to preindustrial levels of 300 and 77% of all lakes
5	Prickly rasp fern	Feel / see sori
6	Mother shield fern	Buds
7	Birds nest fern	Life cycle. Spores-> gametophyte- on which grows Archegonium ( -> 1 egg) and Antheridium ( sperm ) -> fertilisation produces sporophyte ( our fern) grows through gametophyte. Look for sori on underside (contain sporangium contain spores)
8	Elkhorn	Find sori
9	Fishbone water fern	Observe fertile frond just starting in the middle ( Feb 2 )
10	False bracken	Observe features and sori
11	Nardoo	<p>In August 1860, Burke and William John Wills aimed to be the first people to cross the continent from south to north.</p> <p>On their return they ran out of food at Coopers Creek in April 1861, They were offered nardoo by the local Aborigines and gladly accepted it. They prepared their own nardoo, grinding it up and mixing it with water to make a thin paste, as they had seen the local people do. However they grew weaker and thinner and developed symptoms such as shaking legs and a gradually slowing pulse</p> <p>Nardoo contains an enzyme called thiaminase that breaks down thiamine (Vitamin B1), making it unavailable to the body. Thiamine, although needed in only tiny amounts, is essential for energy metabolism, nerve and brain function.</p> <p>Typical symptoms of thiamine deficiency — a disease known as Beri-Beri — are tremors of the hands, feet and legs, an enlarged heart and weakness.</p> <p>The tragedy of this story is that nardoo could have saved Burke and Wills. They failed to add the extra step in the preparation of nardoo that indigenous people followed. Aboriginal people would roast the spore cases (sporocarps), before grinding them. This simple step of adding heat to the process completely breaks down the thiaminase, making it harmless.</p>
12	Maidenhair	Invisibility story/ fairies etc
13	Black stemmed maidenhead	<p>Fern craze of 1850's. In 1840, the cultivation of ferns became a fashionable pursuit.</p> <p>The crucial phrase is 'everyone possessing good taste', a concept of the utmost importance to Victorian middle-class society. The unique selling point of ferns, was the claim that only people possessed of discernment and good taste could appreciate their flowerless charms</p>
14	King fern	Fern habitat and cultivation
15	Cyathea cooperi	Scars where fronds break off
16	Rough maidenhair fern	<p>One of five ferns in this area – all vaguely similar and labelled Red gene story.</p> <p>Around 95 MYA when dinosaurs ruled the Earth, flowering plants were the predominant flora and created shady thick forest canopies . However ferns did OK due to a light-sensing protein called neochrome that allow</p>

		<p>a plant to orient their leaves towards <b>red light</b>. Most plants detect only blue light.</p> <p>That gives ferns an advantage over fellow shade-dwellers because the leaf pigments in the canopy absorb most of the blue light so that predominantly red light reaches the forest floor. This means ferns can orient their photosynthetic equipment towards this red light and absorb enough energy to thrive.</p> <p>What is surprising is how ferns got hold of the gene that produces neochrome. The acquisition appears to be the result of horizontal gene transfer that it was a direct transfer from a hornwort, a bryophyte moss-like plant," roughly 180 MYA around the time that ferns began to diversify and thrive under the canopy</p>
17	Sickle fern	Dark leaves brown stem
18	Kangaroo fern	Simple leaves
19	Fragrant fern	Terrestrial and epiphytic