

# Cunninghamia

A journal of plant ecology for eastern Australia



Date of Publication:  
November 2017

ISSN 0727-9620 (print) • ISSN 2200-405X (Online)

## The first record of the endangered fern *Hypolepis distans* Hook. (Dennstaedtiaceae) on the Australian mainland

*Kevin Mills*

Jamberoo, NSW AUSTRALIA. Email [kevinmillskma@gmail.com](mailto:kevinmillskma@gmail.com)

**Abstract:** The terrestrial fern *Hypolepis distans* (Dennstaedtiaceae) is recorded as indigenous to New Zealand and Tasmania. The fern was not known from New South Wales or the Australian mainland until recently. This paper reports on the recent discovery of the species at Macquarie Pass in the Illawarra area on the south-eastern edge of the Central Tablelands Botanical Subdivision of New South Wales. Its ecology and conservation needs are discussed.

***Cunninghamia*(2017) 17: 35-38**

doi:10.7751/cunninghamia.2017.17.004

## Introduction

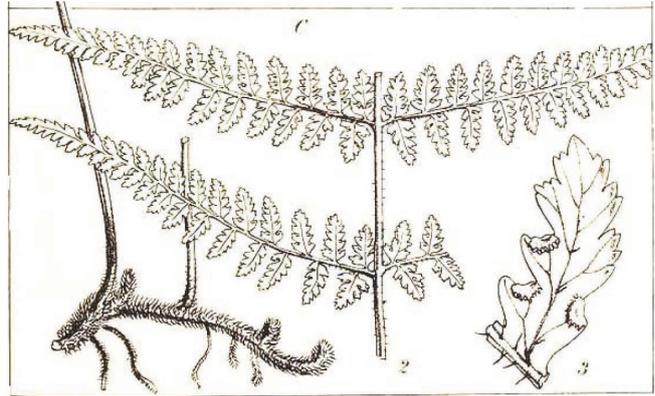
The terrestrial fern *Hypolepis distans* (family Dennstaedtiaceae), commonly known as Scrambling Ground Fern, is recorded as indigenous to New Zealand and Tasmania. During a survey as part of a regional study of the fern flora on the NSW south coast, a colony of *Hypolepis distans* was located in the vicinity of Macquarie Pass, about 29 kilometres southwest of the City of Wollongong, on the extreme south-eastern edge of the New South Wales Central Tablelands Botanical Subdivision. The recent collection of the fern from the Central Tablelands is the first for that state and the first for the Australian mainland. This paper documents the discovery and discusses the habitat and conservation implications.

## The Species *Hypolepis distans*

The species was named by Joseph Hooker in his treatise on ferns *Species Filicum* (Hooker 1858). The fern is known from the northwest corner of Tasmania and on King Island (Garrett 1996), 110 kilometres to the north. In New Zealand it is widespread, including the Chatham Islands (Brownsey & Smith-Dodsworth 2000). The first record of *Hypolepis distans* in Australia was from King Island in 1973 (Chinnock 1976); the species was subsequently discovered in northwest Tasmania. The total population in Tasmania and King Island is very small, nine confirmed populations containing a total of 500-1000 plants (Threatened Species Section Tasmania 2012).

The only other place that *Hypolepis distans* is known to occur is Norfolk Island, the result of an unintentional introduction, where it grows in a limited area, and is removed as an unwanted introduction (de Lange & Christian 2000). It is clear in this case that the species was introduced in peat moss from New Zealand used in the Forestry Nursery, where the plants were found (de Lange & Christian 2000). The possibility of the Australian plants in Tasmania also being introduced in peat moss is discussed by these authors, although they do not take a stand on the matter either way.

The scrambling habit of *Hypolepis distans* makes it distinct from other species in *Hypolepis*; this has been noted by Brownsey (1983). Brownsey and Chinnock (1987) noted that "*Hypolepis distans* can be distinguished immediately from all other species [of *Hypolepis*] by its relatively long, narrow frond, the pinnae arising in opposite or subopposite pairs at right angles to the rachis, the veins ending in emarginations..., the thin, highly polished, rather brittle stipe and the dark brown spores with virtually no perispore projections..."



**Figure 1:** Hooker's plate of *Hypolepis distans* from *Species Filicum* (Hooker 1858).



**Figure 2:** Frond of *Hypolepis distans* from the Macquarie Pass site. Note well spaced, opposite pinnae arising at right angles to rachis.

## Conservation Status

*Hypolepis distans* is listed under Commonwealth legislation as Endangered (*Environment Protection and Biodiversity Conservation Act 1999*), as it is only known from a handful of Australian sites in Tasmania and on King Island (Garrett 1996). The species is not threatened in New Zealand, where it is quite widespread (Brownsey & Smith-Dodsworth 2000). In Tasmania the species is currently listed as Endangered under the Tasmanian Government *Threatened Species Protection Act 1995* (Tasmania 1995) due to its narrow occurrence and relatively low number of plants. Given its rarity in New South Wales, this fern is a candidate for listing as a critically endangered species under the NSW *Biodiversity Conservation Act 2016* (NSW 2016).

## The new record for New South Wales

In June 2017 a colony of *Hypolepis distans* was found in the Macquarie Pass area, west of Kiama in the Central Tablelands Botanical Subdivision of New South Wales. The occurrence is over 800 km northeast of the nearest other Australian occurrence, on King Island in Bass Strait, to the northwest of Tasmania, and about 2000 kilometres west of the closest occurrence in New Zealand. Although some vegetation studies have previously been undertaken in the area (e.g. Fallding & Benson 1985), little detailed survey has been done on the plants of the Macquarie Pass area, although the recent study by Mills (2017) carried out extensive surveys of the fern flora, one outcome being this discovery of *Hypolepis distans*. The species has not been found in the nearby upper Minnamurra River catchment, despite a history of fern interest and identification by Minnamurra Falls Reserve ranger Howard Judd in the 1950s-70s, and more recently by Mills (2016). It is very likely that this fern has been present for quite some time, and being in a rather inaccessible location to the public and botanists alike, had not been found.

The colony of *Hypolepis distans* was found in two sites near Macquarie Pass National Park, on a high plateau at an altitude of about 620 m. The exact locations of the two sites are purposefully withheld. The sites are within semi-cleared tall eucalypt forest growing on the Hawkesbury Sandstone just below the boundary with the overlying Wianamatta Group shale. The sites are on gentle south-facing slopes about 400 m apart; both are associated with a significant outcrop of sandstone. The extent of each site is small; 40 m by 20 m and 5 m by 2 m. The number of plants present is unable to be determined as their intertwined rhizomes and tangle of fronds make identification of individual plants impossible. A second visit to the location in September 2017 found that most of the fronds on the taller plants were dead, likely the result of winter frosts; smaller plants seemed to be unaffected.

The soil is a deep loam with much sand, and high in organic matter; the sites are rather poorly drained due to underlying sandstone, but not the swampy habitat mentioned in the literature for Tasmania and New Zealand.

The surrounding forest is dominated by very tall *Eucalyptus smithii* trees with occasional *Eucalyptus fastigata*; the understorey is mostly cleared. The non-fern understorey species include scattered small trees of *Acacia melanoxydon*, *Tristaniopsis collina* and *Doryphora sassafras*, and the creeper *Hibbertia scandens*. Ferns are very prominent on the sites, including *Blechnum watsii*, *Dicksonia antarctica*, *Histiopteris incisa*, *Hypolepis glandulifera*, *Pteridium esculentum*, *Sticherus flabellatus*, *Todea barbara*, and, epiphytic on the sandstone, *Hymenophyllum cupressiforme*, *Notogrammitis billardierei* and *Pyrrosia rupestris*. The first six of these ferns are also associated with the Tasmanian population (Threatened Species Section Tasmania 2012, p.44).

Specimens have been lodged with the National Herbarium of NSW, Sydney (NSW), where the identity of the species was confirmed. Fertile fronds were present in June 2017.



**Figure 3:** Part of the colony of *Hypolepis distans* at the Macquarie Pass site, photographed June 2017.



**Figure 4:** Habitat of *Hypolepis distans* at Macquarie Pass; note plants above and below the sandstone outcrop. Larger fern lower right is *Histiopteris incisa*.

## Discussion

To find New Zealand species in Australia is not very common. Because the weather systems move from west to east, there is much greater opportunity for Australian species to move in the opposite direction. Distance is not necessarily a barrier to fern dispersal; ferns have fine spores that can travel great distances on the wind and explains the wide distribution of many species.

The question of the origin of the species at Macquarie Pass requires consideration. The possibility of an introduction through imported peat moss (as at Norfolk Island) to two widely separated Australian locations (Tasmania and NSW), neither of which is near habitation, seems rather remote. The Tasmanian occurrence is considered to be indigenous, and the author takes the view that the species is also indigenous to

New South Wales, and an unusual natural introduction from New Zealand, probably well before European colonisation.

The species is a potential candidate for listing as Critically Endangered under the New South Wales threatened species legislation; a proposal has been submitted to the NSW Scientific Committee by the author. The Macquarie Pass occurrence requires conservation action as the site is semi-cleared forest in a grazing paddock. Only a few plants occur in the nearby Macquarie Pass National Park and liaison between the landowners and the NSW National Parks and Wildlife Service is essential to ensure the conservation of this population.

### Acknowledgements

The author would like to thank several reviewers who made constructive comments on a draft of this paper.

### References

- Brownsey, P. J. (1983). Polyploidy and Aneuploidy in *Hypolepis*, and the evolution of the Dennstaedtiales. *American Fern Journal*: 73 (3): 97-108.
- Brownsey, P. J. & Smith-Dodsworth, J. C. (2000). *New Zealand Ferns and Allied Plants*. David Bateman Ltd, Auckland.
- Brownsey, P. J. & Chinnock, R.J. (1987). A Taxonomic revision of the New Zealand species of *Hypolepis*. *New Zealand Journal of Botany* 22: 43-80.
- Chinnock, R. J. (1976). Notes on *Hypolepis distans* Hook. and *Doodia aspera* R. Br. *New Zealand Journal of Botany*, 14 (1): 113.
- Commonwealth of Australia (1999). *Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth Government, Canberra.
- Fallding, H. B. & Benson, J. S. (1985). Natural vegetation and settlement at Macquarie Pass, Illawarra Region, New South Wales. *Cunninghamia*: 1(3): 285-311.
- Garrett, M. (1996). *The Ferns of Tasmania. Their Ecology and Distribution*. Tasmanian Forest Research Council Inc.
- Hooker, W. J. (1858). *Species Filicum*: Volume 2(6): 70, t. 95c.
- de Lange, P. J. & Christian, M. (2000). *Hypolepis distans* (Dennstaedtiaceae) a casual introduction to Norfolk Island. *New Zealand Botanical Society Newsletter*, no. 61 (Sept.), pp. 17-18.
- Mills, K. (2016). The Fern Flora of the Upper Minnamurra River Valley, Budderoo National Park, South Coast, NSW. *Illawarra Vegetation Studies* (54), Coachwood Publishing, Jamberoo, NSW, November.
- Mills, K. (2017). The Fern Flora of Macquarie Pass National Park, South Coast, NSW. *Illawarra Vegetation Studies* (55), Coachwood Publishing, Jamberoo, NSW, June (updated from December 2016).
- New South Wales (2016). *Biodiversity Conservation Act 2016* (NSW). NSW Government, Sydney.
- Tasmania (1995). *Threatened Species Protection Act 1995*. Tasmanian Government, Hobart.
- Threatened Species Section Tasmania (2012). Listing Statement for *Hypolepis distans* (scrambling groundfern). Department of Primary Industries, Parks, Water & Environment, Tasmania.

Manuscript accepted 19 October 2017