

Notes on the type specimen of *Lepidium pseudopapillosum* (Brassicaceae) and its presence and conservation status in New South Wales, Australia

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Abstract

The holotype of *Lepidium pseudopapillosum* Thell. was previously thought to have been collected in New South Wales, Australia, and has been the only specimen lending credence to its occurrence in the state. A review of the type specimen has shown that this is not the case and that the location ascribed to the type in the protologue is in error. It is here posed that *L. pseudopapillosum* is restricted to South Australia and Victoria, and that in New South Wales this name has been misapplied to *L. ginninderrense* N.H.Scarlett. The conservation status on State and Commonwealth legislation should be amended to reflect this correction by removing *L. pseudopapillosum* from New South Wales conservation legislation but listing the species as endangered nationally.

Introduction

When Thellung (1917) first named and described *Lepidium pseudopapillosum* Thell., the type collection was cited as "Australien: Neu-Süd-Wales: Formbe, rocky lands, leg. E. Smith, VIII. 1902, sub nom. *L. papillosum* (Nat. Herb. of New South Wales; typus in herb. Univ. Zurich)". This resulted in the species being considered native to New South Wales (NPWS 2001; CHAH 2024) despite the locality of 'Formbe' never being properly identified and remaining unknown. This has raised the question as to whether the type of *L. pseudopapillosum* was actually collected in New South Wales (Hewson 1981; Scarlett 2001; DEWHA 2008; Scarlett and Hewson 2019).

Specimens subsequently collected from the Canberra area in the Australian Capital Territory (ACT) were tentatively described as *L. pseudopapillosum* (Retter and Harden 2000). However, these specimens were considered atypical for the species (Hewson 1981; Retter and Harden 2000), and were later described as a new species, *L. ginninderrense* N.H.Scarlett, considered endemic to the ACT (Scarlett 2001). With the exception of the ambiguously geolocated type specimen, no other specimen-backed record has been made for *L. pseudopapillosum* in New South Wales (OEH 2023; AVH 2024). The only confirmed specimens of *L. pseudopapillosum* are from the northern plains of Victoria and the Flinders Ranges in South Australia (Scarlett 2001; Scarlett and Hewson 2019).

Since the type of *L. pseudopapillosum* was considered to have been collected in New South Wales, and no other collections have been made since, the species was listed as Endangered in the New South Wales *Threatened Species Act 1995* and *Biodiversity Conservation Act 2016*. Uncertainty surrounding the exact locality of the type collection

Phillips GP (2024) Notes on the type specimen of *Lepidium pseudopapillosum* (Brassicaceae) and its presence and conservation status in New South Wales, Australia. *Telopea* 27: 135–139. [doi:10.7751/telopea18798](https://doi.org/10.7751/telopea18798)

Received: 13 June 2024
Accepted: 17 July 2024
Published: 30 July 2024

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and a lack of any other record in New South Wales suggests that it is either extinct in New South Wales or that it was never present in the state (NPWS 2001). In a 2023 review of the species' threatened status in New South Wales, an ensuing hypothesis was established that, based on a likely typographical error, *L. pseudopapillosum* is not a native species in the state. The rationale in support of this, recommended removal of *L. pseudopapillosum* from the Schedules of the *Biodiversity Conservation Act 2016*, and the reconsideration of its Vulnerable status on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* are presented below.

Re-appraisal of notes attached to the type specimen

Notes attached to the holotype of *L. pseudopapillosum* were accessed by downloading a high-resolution image of the specimen from the catalogue of Z+ZT (University of Zurich 2024). The original notes on the holotype (Fig. 1), as cited by Thellung (1917), are in the hand of Joseph Maiden, director of the National Herbarium of New South Wales (NSW) from 1896–1924. A comparison of the script on the *L. pseudopapillosum* type label with other correspondence made by Maiden in that period (Fig. 2) shows that the locality information on the type should be interpreted as 'Formby' rather than 'Formbe'. The former spelling was previously suggested by Scarlett and Hewson (2019), who indicated that the type might be from Formby Bay in South Australia, rather than anywhere in New South Wales. However, there may be a problem with this assumption, in that the collection dates to 1902, but the name 'Formby Bay' was not applied until 1908 (though it was possibly referred to by this name informally prior to being gazetted). There was a town named Formby in Tasmania at this time, which later merged with its sister town Torquay to become the current town of Devonport. The official merger occurred in 1890, but it appears the use of Formby as a location persisted for several decades. NSW does hold three lichen collections from Formby, Tasmania, collected by Francis Robert Muter Wilson in 1892, but no collections approach the details recorded on the *Lepidium* collection now at Z. No other locality known as 'Formby' is known to have been gazetted in Australia (ICSM 2024). However, several large properties were owned by the prominent South Australian Formby family in the Adelaide Hills area, including one known as 'Formby Park' (Dallwitz *et al.* 1985; Tucker and Crawford 2018), and this region is much more likely the source of the type specimen.

An incorrect association between the locality of Formby and New South Wales appears to have arisen from the pre-printed text 'N.S.W.' on the specimen label. Regular protocol with pre-printed labels was for the botanist lodging any specimen collected outside of the state to strike out the printed text 'N.S.W.' and then insert the correct state by hand. However, some contemporaneous specimens held at NSW (e.g. NSW4258) demonstrate that this sometimes did not happen, and that this manner of mis-labelling might have also occurred on the holotype of *L. pseudopapillosum*.

The above evidence supports that the holotype of *L. pseudopapillosum* was more likely collected from the Adelaide Hills in South Australia, partly supporting assertions of Scarlett and Hewson (2019) and DEWHA (2008). This finding means that *L. pseudopapillosum* is not known to be native to New South Wales.

Type citation

Lepidium pseudopapillosum Thell., *Vierteljahrsschr. Naturf. Ges. Zürich* 61: 462 (1916).

Type citation: "Australien: Neu-Süd-Wales: Formbe, rocky lands, leg. E. Smith, VIII. 1902, sub nom. *L. papillosum* (Nat. Herb. of New South Wales; typus in herb. Univ. Zurich)"

Type: [probably South Australia]: Formby [possibly 'Formby Park' OR Formby Road, Clarendon OR Kenton Valley], rocky lands, Aug. 1902, *E. Smith s.n.* (holo: Z 000005083).

Notes: While the collector is recorded as 'E. Smith', it is difficult to determine who this may have been. In the collections at Z, the collector's name is interpreted as Lindsay Stuart Smith (i.e. in this case the label information would indicate 'Esquire Smith'), though it is unclear how this conclusion was reached. Searching other collections by 'Smith' from 1902 reveals a collection of *Kennedia prostrata* by 'R. Smith' from the vicinity of Formby Bay on Yorke Peninsula (AD 97731402) and a collection of *Templetonia retusa* from the southern Yorke Peninsula (AD 97731401).

The common name of 'Formbe Peppercross' should be corrected to 'Formby Peppercross'.

Consequence for the threatened status of *Lepidium pseudopapillosum*

The threatened status for *L. pseudopapillosum* requires revision of both New South Wales and Commonwealth legislation based on the present finding that the species is not native to New South Wales. Section 4.3(1)(b) of the New South Wales *Biodiversity Conservation Act 2016* provides for flora to be listed as a threatened species only if they are "a species of plant that is native to New South Wales". Furthermore, its vulnerable status should also be reviewed on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. No specimens of *L. pseudopapillosum* have been collected from South Australia since the 1902 Formby type collection, and only one other collection is known, from the Mt Lyndhurst region, northern Flinders Ranges in 1899 (MEL 1620694; see DEWHA 2008; Scarlett and Hewson 2019). It should be noted that this was originally a mixed collection and it remains possible that the locality is in error for this element, though the collector did live in the Mt Lyndhurst region at the time. Max Koch noted on several *Lepidium* collections from this area that they were favoured by sheep, and this may be the reason for the decline of *L. pseudopapillosum*.

The four extant populations occur in Victoria and are each highly restricted in abundance, which provides support to increase the species' conservation value and warrants assessment at a higher threat level. An endangered status under the IUCN Red List Criteria B2ab(iii, v) (IUCN 2024) is suggested since the maximum area of occurrence for the four threat-defined populations is approximately 46 km², and that there is a very high likelihood of continuing decline in the population due to habitat fragmentation. This listing level should also be adopted on the *Environment Protection and Biodiversity Conservation Act 1999*.



Figure 1. Holotype of *Lepidium pseudopapillosum* Thell. (Z-000005083 by United Herbaria Z+ZT / CC BY 4.0).

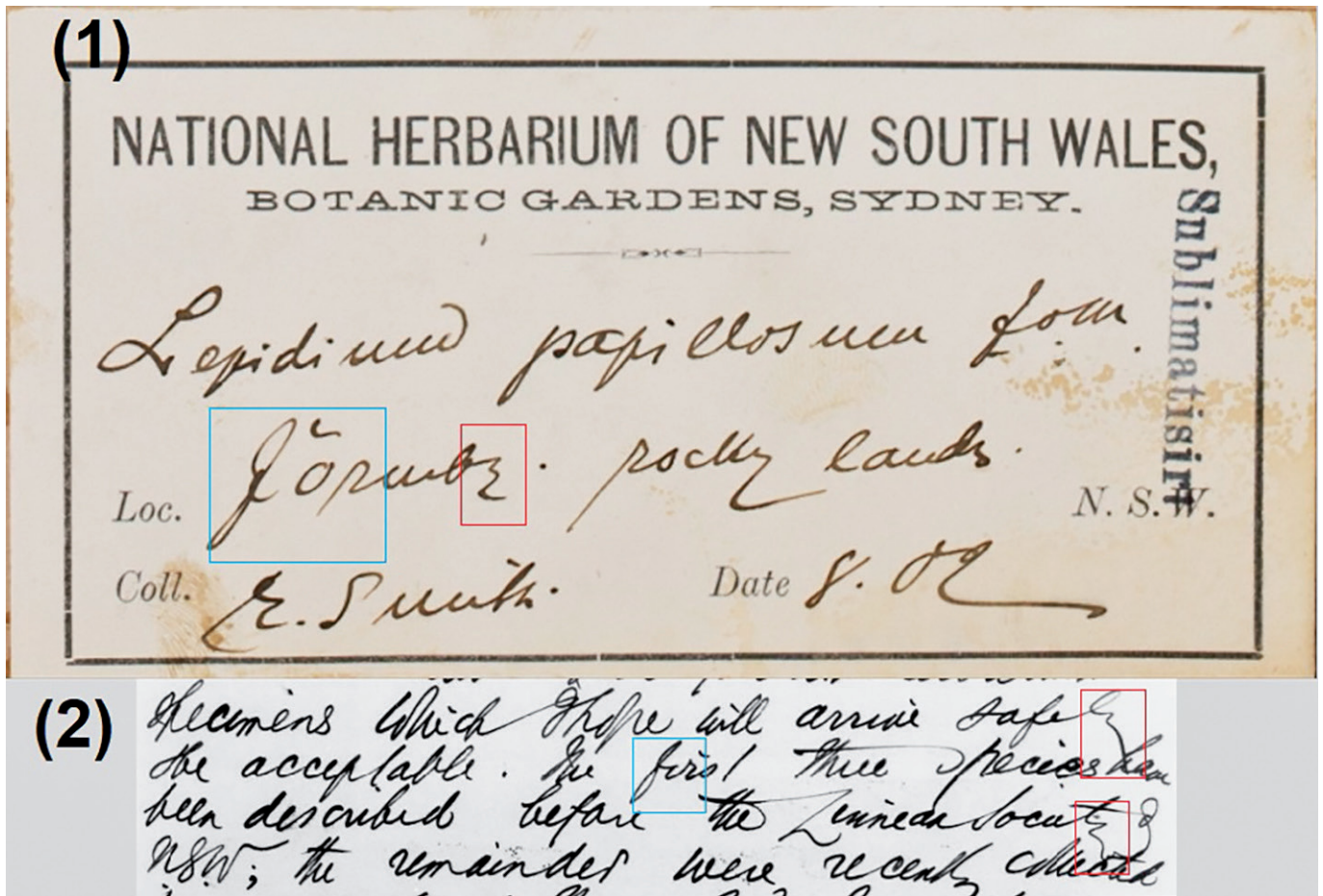


Figure 2. Comparison of (1) the holotype label of *Lepidium pseudopapillosum* (Z-000005083 by United Herbaria Z+ZT / CC BY 4.0); and (2) correspondence written by Joseph Maiden in 1898 (Royal Botanic Gardens, Kew & Australian Joint Copying Project & National Library of Australia & State Library of New South Wales 1950). Note the comparison of Maiden's handwriting of 'f' and 'r' (blue boxes), and 'y' (red boxes).

Acknowledgements

Kerry Gibbons is thanked for discussions on Maiden's handwriting and for reviewing an early draft of the manuscript. Brendan Lepschi is thanked for a helpful review and comments on the manuscript. Russell Barrett is thanked for comments to clarify potential locations of the type collection.

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