

Eryngium undulatum, a new name for the New Zealand plant long known as *E. vesiculosum*

Peter W. Michael & Peter G. Wilson National Herbarium of New South Wales, Botanic Gardens of Sydney,
Locked Bag 6002, Mount Annan NSW 2567, AustraliaCorrespondence: peter.wilson@botanicgardens.nsw.gov.au

Abstract

Historically, *Eryngium vesiculosum* Labill. has been considered to be a species indigenous to both south-eastern Australia and New Zealand. However, a comparative analysis of the morphology of plants on each side of the Tasman has led us to conclude that the New Zealand populations are distinct and can readily be distinguished from the Australian ones. Accordingly, the New Zealand plants are here described as a new species, *Eryngium undulatum* P.W.Michael & Peter G.Wilson.

Introduction

Early studies

Eryngium vesiculosum was formally described, and illustrated, by Labillardière (1804: 73, t. 98; see Fig. 1) from specimens he collected in south-eastern Tasmania. He diagnosed the species by its pinnatifid lanceolate leaves with sharp, spinescent segments, stoloniferous habit and fruits with acuminate scales. In the following years, several good descriptions of the species were published. The first of these was published by Delaroche (1808: 47), apparently based on the material collected by Labillardière. This was followed by Poiret (1816: 291), Schultes (1820: 329), and de Candolle (1830: 92). All of these descriptions are of the south-eastern Australian plant originally described by Labillardière as *E. vesiculosum*, and largely derived from previous publications.

However, for the first time, J.D. Hooker (1853: 85–86), in his *Flora Novae-Zelandiae*, applied Labillardière's name to collections from New Zealand. His description begins as follows: "One species alone of this extensive South European and South American genus inhabits New Zealand: it is also found in Tasmania, and forms a small, rigid, spinous herb, with a stout root, radical leaves, and long prostrate stems, thrown off like scions, which bear leaves and flowers here and there, but do not root." From this time onwards, citations of New Zealand examples of what was assumed to be *E. vesiculosum* began to appear in the literature. This is likely to have increased the probability that descriptions of New Zealand plants might include some features of the Australian plants.

In his *Handbook of the New Zealand Flora*, Hooker (1864: 90) provided a revised description of *E. vesiculosum*, including a more detailed description of the habit, leaves, involucral leaves, and calyx tube ornamentation. He stated that its distributional range was "from Auckland to Otago." In Part 2 of the same work, Hooker (1867: 729) added this comment: "Colenso assures me that this is a rare and local plant and has not been found in Auckland, where I supposed Dr. Sinclair had gathered it." We can add here that there is a specimen in the National Herbarium of New South Wales of *E. vesiculosum* collected by Dr Sinclair in the 1860s (NSW2474289), with the collecting locality indicated as Patea, which is a considerable distance south of Auckland, in the South Taranaki District, closer to Whanganui.

Michael PW, Wilson PG (2025)
Eryngium undulatum, a new name
for the New Zealand plant long
known as *E. vesiculosum*.
Telopea 29: 83–89.
[doi:10.7751/telopea20306](https://doi.org/10.7751/telopea20306)

Received: 31 October 2024
Accepted: 10 December 2024
Published: 6 February 2025

© 2025 The Author(s) or their
employer(s). Published by Botanic
Gardens of Sydney.
This is an open access article
distributed under the Creative
Commons Attribution-
NonCommercial 4.0 International
License ([CC BY-NC](https://creativecommons.org/licenses/by-nc/4.0/))
OPEN ACCESS

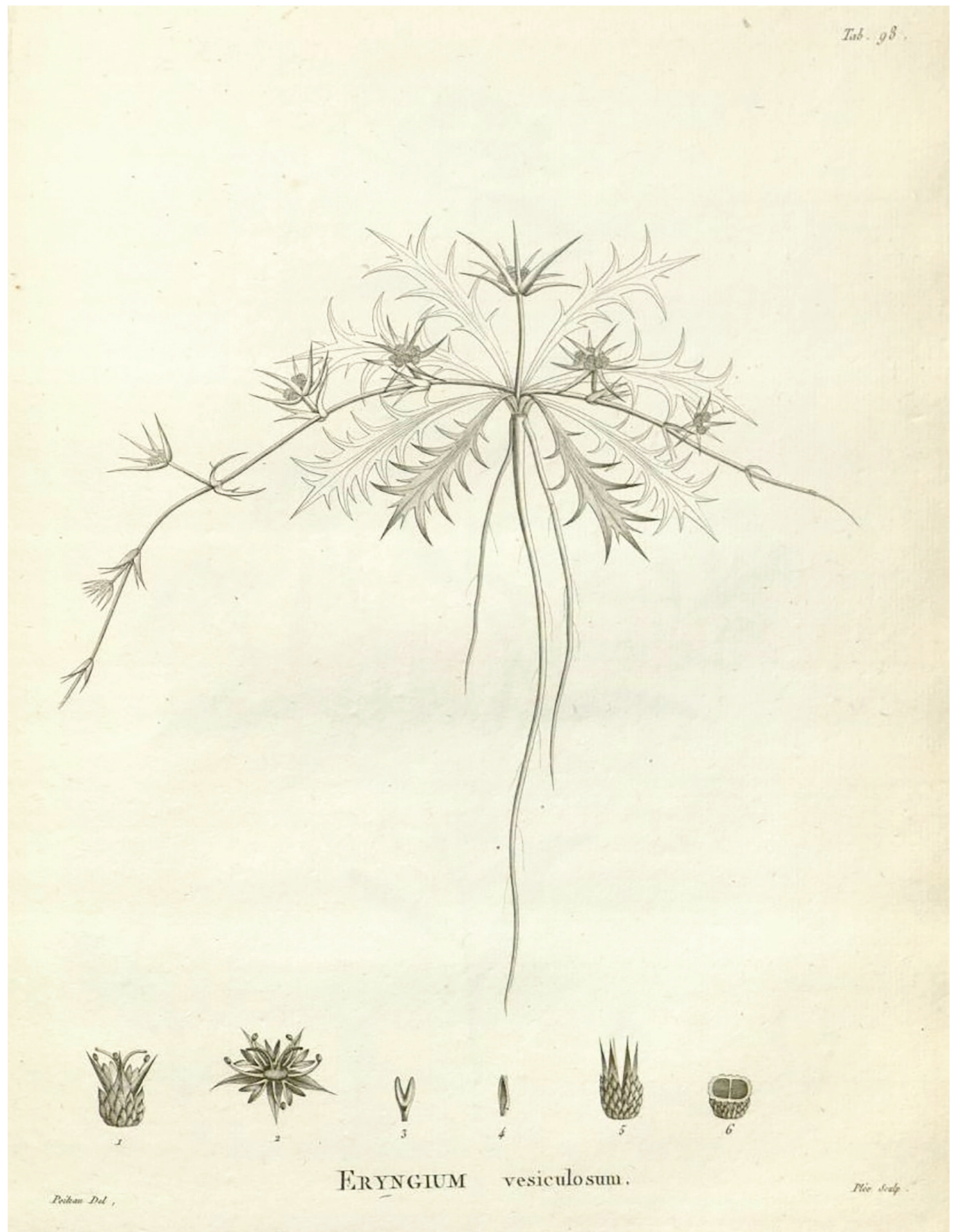


Figure 1. Illustration of *Eryngium vesiculosum* in Labillardière (1804; t. 98).

Hooker's description appears to have been based on New Zealand material alone. However, there is some evidence that later treatments of the genus in works on the New Zealand flora by Kirk (1899) and Cheeseman (1906, 1925) were influenced by Bentham's treatment of the genus in the *Flora australiensis* (Bentham 1866). Wolff (1913), in his treatment of *E. vesiculosum*, listed both Australian and New Zealand plants under the one specific name.

A notable contribution from this era was in a publication by E.A.J. De Wildeman, director of the Brussels Botanic Gardens. His treatment of *E. vesiculosum* (De Wildeman 1902) includes a detailed illustration (t. 107; see Fig. 2) which was undoubtedly based on a specimen in BR collected by Julius von Haast in the Canterbury region in 1868 (Haast 489, [BR0000035231301](#)) since it is a very close match morphologically.

Later 20th Century publications

Simpson (1945: 190) noted that, in cultivation, plants showed growth characteristics that differed from those described in most earlier publications. He cites Kirk (1899) and Cheeseman (1925), who both say that the stems are prostrate and never root at the nodes. As evidence for this, he gives the following description of the growth of cultivated plants: "No flowers are produced directly from the radical tuft, but a short stout erect stem appears as an offset from the root crown, and this divides at the surface of the ground into 3—sometimes 2 only—widely spreading stems. At their conjunction and at their lower nodes—usually at 2 of them—single flower heads are raised. The stems arch stiffly and press firmly downwards, the upper nodes root, their tips submerge and proceed as subterranean stems, rooting at intervals to send up a continuity of new radical tufts. The vegetative spread in this cycle is rapid, and large patches are rapidly formed."

Allan (1961) agrees with Simpson's observation and says "stolons or rhizomes few to many, forming offset plants at nodes, the whole forming patches up to ± 30 cm dm [diameter]" and gives a detailed description of the radical leaves as "rosulate ± 5 –15 cm. long, subfleshy, coriaceous, pale green to glaucous, lanceolate to oblanceolate to spatulate in outline; margins \pm undulate; deeply, coarsely toothed or lobed; teeth c. 5 mm. long, spinous." He gives the distribution of the species as occurring on both the North and South Islands, occurring on "Coastal sands, gravels, rock-clefts throughout. Inland in low-land drainage area of Hurunui River to Waimakariri River."

Webb (1984) makes a significant contribution to our knowledge of this species in New Zealand. He propagated clones of two separate plants and, under controlled conditions, subjected them to immersion and variation in daylength to test for leaf form variation in response to these treatments. From the latter experiment, he showed that the "species is seasonally heterophyllous; summer leaves are laminoid and prickly, winter leaves are linear and fistular" and he illustrates the striking differences in leaf form (Webb 1984: 30, Fig. 1). Furthermore, he notes that the striking leaf dimorphism "was not recorded in the original description of the species (Labillardière 1805), and only summer leaves are described in New Zealand and Australian floras." Webb (in Webb et al. 1988: 127) provides a revised description of *E. vesiculosum* that includes details of these

two leaf forms. This appeared in a volume of the *Flora of New Zealand* that was focused on naturalised taxa, but this species was included so that all native and introduced species could be distinguished from each other.

It should be noted that there had been earlier published observations of similar linear leaves in *Eryngium*. Bentham (1866) recorded leaves that were "entire, grass-like ... and marked with raised transverse lines" in '*E. rostratum*' and Hart (1950) documented "hollow subulate leaves" in *E. vesiculosum*. In both cases, these leaves were said to occur on plants growing in wet places.

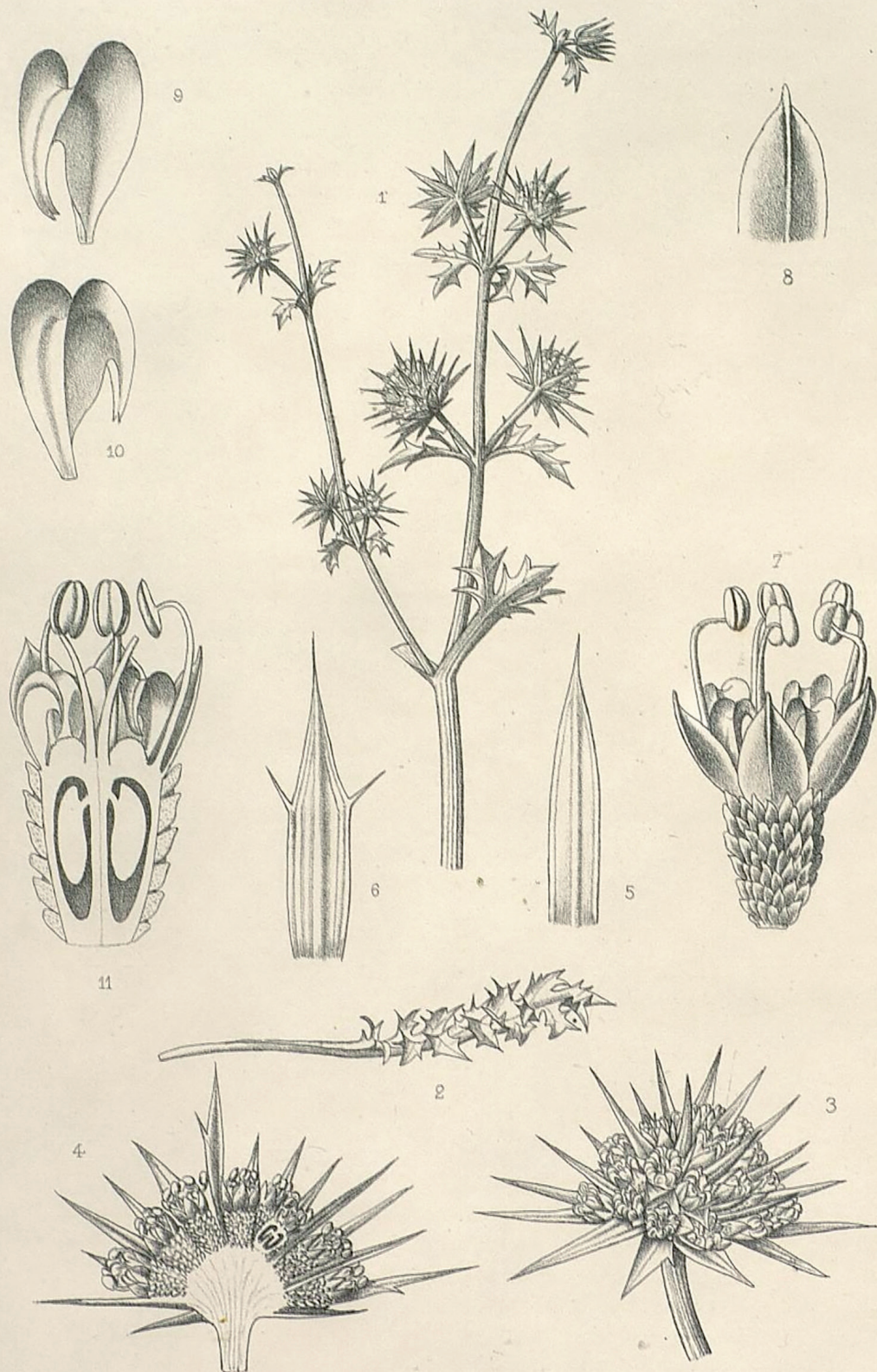
Taxonomic assessment

Webb (in Webb et al. 1988: 127), following his description of *E. vesiculosum* in New Zealand, commented that "critical comparison is needed with Australian plants known by the same name." All evidence from recent descriptions, as well as the studies of morphology and development, of New Zealand material, clearly differentiates it as an entity that is distinct from the Australian taxon with which it has long been classified. Our assessment of the literature and morphological variation also supports recognition of two species. The differences between the taxa are as follows:

- 1) In the New Zealand species, the summer leaves are undulate and have flattened petioles, which can be up to 2.5 cm wide (see Figs 2 & 3). This was recognised by Hooker who initially described the width of the petioles as being 'rarely $\frac{1}{2}$ " broad' in 1853 but later revised this to 'rarely 1" broad' in 1864. Such undulate leaves with flattened petioles are not seen in the Australian species, which have more coarsely toothed, distinctly spinose margins. Note that transition leaf forms can be seen in observations on iNaturalist (e.g. [1074471](#)).
- 2) The many-flowered umbels of the New Zealand species, described by Allan (1961), as " ± 15 –20-fl'd", and illustrated by De Wildeman (1902; see fig. 2) contrasts with the 5–10 flowers cited by Labillardière ("quinque ad decemfloris") in the protologue, although images on the *Flora of Victoria* website (<https://vicflora.rbg.vic.gov.au/>) appear to show c. 10–13 flowers per inflorescence. Flowers of New Zealand populations are white, but in Australian plants the flowers often mature to blue.
- 3) The involucral bracts of the capitula in the New Zealand species are triangular, glaucous or grey-green and mostly 4–8.5 mm long, shorter than those of the Australian species which are bluish and both narrower and longer, mostly 10–16 mm long.
- 4) The mericarps on the New Zealand species are much smaller than those of the Australian species. The image from website of the South Australian Seed Conservation Centre clearly shows that the bodies of the mericarps of the Australian species are approximately 4 mm long with persistent sepals c. 2 mm long and clothed with scales terminating in long weak points (Fig. 4a). By contrast, the bodies of the mericarps of the New Zealand plants are less than 2 mm long with persistent sepals 1–1.5 mm long and clothed with scales that have short blunt tips (Fig. 4b).

ICON. SELECT. HORTI THENEN.

PL. CVII.



A. d'Apréval, ad nat. del. et lith.

Imp. J. Minot, Paris.

ERYNGIUM VESICULOSUM Labill.

Figure 2. Illustration of '*Eryngium vesiculosum*' (= *E. undulatum*) in De Wildeman (1902; t. 107).



Figure 3. *Eryngium undulatum*, Christchurch District, New Zealand, showing typical summer leaves and linear winter leaves. Photograph: Pat Enright, iNaturalist: 21608139 (CC-BY-NC).

These readily observable characteristics enable one to distinguish the New Zealand forms, hitherto known as *E. vesiculosum*, from the Australian forms of *E. vesiculosum* Labill. These differences warrant the New Zealand populations being recognised as a distinct endemic taxon, which we describe here as *Eryngium undulatum*.

Eryngium undulatum P.W.Michael & Peter G.Wilson, *sp. nov.*

Diagnosis: Stoloniferous perennial, heterophyllous; leaves often undulate, not coarsely toothed; inflorescences many-flowered; flowers white; mericarps < 3.5 mm long

Type: NEW ZEALAND: South Island: near southern end of Lake Forsyth, 24 Feb 1977, *Orchard 4911* (holo: AK 141843; iso: AD *n.v.*, CANB 316899, CHR *n.v.*, CTES *n.v.*, L.2576429, MO-3408779], L barcode U.1077158, Z *n.v.*).

Tufted perennial, with stolons or rhizomes, forming patches up to c. 30 cm in diameter. Basal leaves of 2 forms: winter leaves entire, fistular, septate; summer leaves lanceolate to ovate or spatulate, long-petiolate, deeply spinose-serrate and often undulate, c. 5–12 cm long; non-rossette leaves similar but reduced. Capitula solitary on short peduncles lateral to stolons or arising from rosette, 5–10 mm diam.; involucre bracts 6–9, triangular, mostly 5–7 mm long; bracteoles similar to bracts but smaller. Flowers many (± 15 –20), white, 1–3 mm diam.; calyx teeth c. 1 mm long. Fruits comprising the two mericarps, each up to 3 mm long, scaly; scales <0.5 mm long with blunt tips.

Distribution: Endemic to New Zealand. In the North Island, most recent records are from south of 41°10'S, with a few outliers, including the early record from Patea cited above. On the South Island, it is mostly found in coastal areas from North West Nelson south to Okarito in the west and North Otago in the east. Now uncommon over large parts of this range.

Habitat: Occurs on sandy beaches, coastal gravels, lower drainage areas of rivers, and exposed headlands. The type specimen was recorded as growing on “shingle on shore of lake ... with *Cotula dioica* [*Leptinella dioica*], *Selliera radicans* [*Goodenia radicans*] and *Lilaeopsis novae-zelandiae*”.

Phenology: Flowers recorded for December–March.

Selected specimens examined: NEW ZEALAND: NORTH ISLAND: Eastern Wairarapa, near Hapukura Stream, *de Lange 1995 & Crowcroft*, 28 Feb 1993 (AK 231075, CHR 497467); Eastern Wairarapa, Te Kaukau Point, *de Lange 1999 & Crowcroft*, 28 Feb 1993 (AK 232583, CHR 497501); Eastern Wairarapa, Pahaoa River Mouth, Glendhu Rocks, *de Lange 2074*, 6 May 1993 (AK 231365, CHR 497576); Western Lake Reserve, Lake Wairarapa, *A.P. Druce s.n.*, Feb 1974 (CHR 273087); South Wellington Coast, Cape Terawiti [Terawhiti], *T. Kirk s.n.* (NSW2474288); South Wellington, Lake Kohangapiripiri, Pencarrow, *J. Knox s.n.*, 13 Mar 1965 (CHR 625324; SP095237).

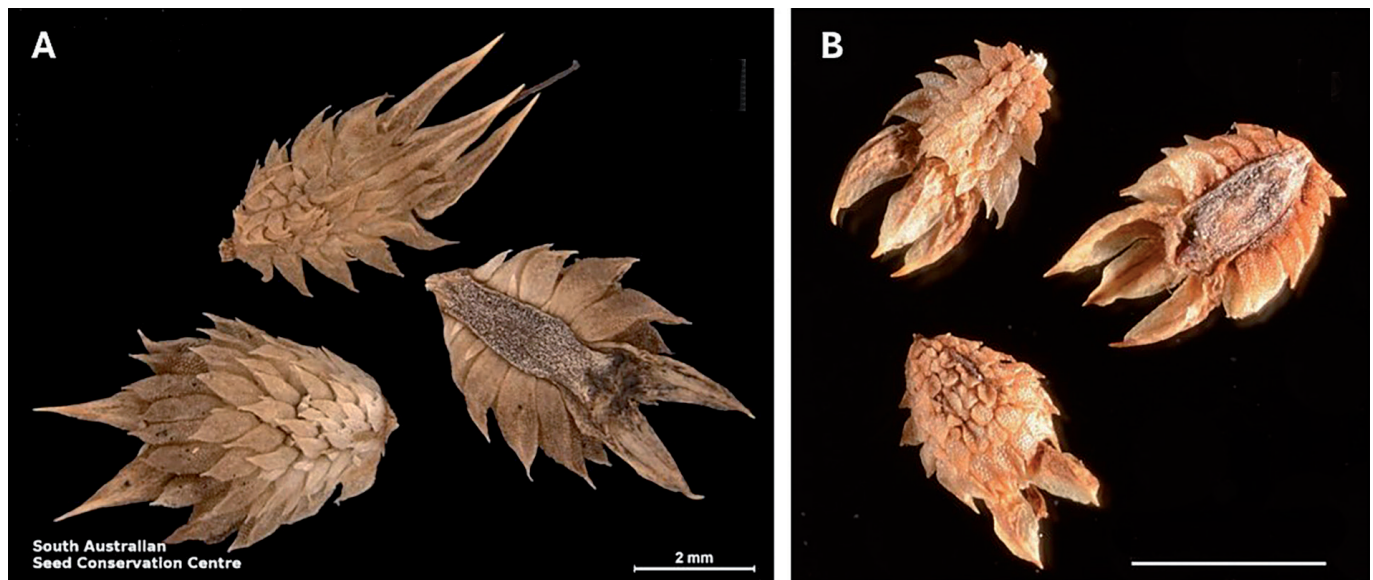


Figure 4. A. Mericarps of *Eryngium vesiculosum* (voucher T.S. Te 931, Lucindale to Kingston Road, South Australia). Photo courtesy of the [SA Seed Conservation Centre](#). B. Mericarps of *Eryngium undulatum* (voucher: R. Mason s.n., Wellington District, New Zealand). Photo by Peter Heenan from SH 3317 (Seed Herbarium at CHR). Scale for both images = 2 mm.

SOUTH ISLAND: Marlborough, Marvell Beach [Marfells Beach], A.P. Druce s.n., May 1974 (CHR 273166); Marlborough, mouth of Awatere River, J.H. MacMahon s.n., n.d. (AK6349, AK 6350, AK 6351); North Otago, Oamaru, D. Petrie s.n., n.d. (AK 6352; WELT SP054941); Canterbury, Canterbury Plains, T. Kirk 236, n.d. (AK 11517); Banks Peninsula, Lake Forsyth (Wairewa), C.J. Webb 81/22, 23 Nov 1981 (CHR 480490); Canterbury, Kaitorete Spit, Birdlings Flat, A.J. Healy & T. Rawson s.n., 28 Nov 1955 (CHR 89548); Westland, North end of Okarito Lagoon, P. Wardle s.n., 26 Feb 1970 (CHR 195149).

Selected iNaturalist observations (<https://www.inaturalist.org/observations/>): [947435](#); [1176546](#); [71818033](#); [92891807](#); [148352134](#); [200078615](#).

Conservation status: The most recent conservation assessment (de Lange et al. 2024: 48) has listed the status of *Eryngium vesiculosum* as “At Risk – Declining,” qualified CI [Climate Change], DPS [Data Poor Population Size], DPT [Data Poor Trend], RR [Range Restricted], SO [Secure Overseas], Sp [Sparse] noting that this was a positive change from the previous assessment where it was evaluated as “Threatened – Nationally Vulnerable” (de Lange et al. 2018: 9). The criterion for the recent assessment is given as A(2), “The total area of occupancy is ≤ 1000 ha (10 km²).” Since we are now distinguishing the New Zealand populations as a distinct, endemic species, the qualifier ‘Secure Overseas’ will no longer apply, but the most recent assessment will likely stand.

Acknowledgements

The first author thanks Diana Davey for assistance and field observations, and Guy Lowe for assistance at the National Herbarium of NSW. The second author is grateful to Daniel Duval and Thai Te, of the SA Seed Conservation Centre, for approval to use the image from the Centre website, and Ines Schönberger and Peter Heenan (CHR) for specimen information and the image they provided. Our sincere thanks to Peter de Lange for his very useful comments that greatly improved an earlier version of this manuscript.

References

- Allan HH (1961) *Flora of New Zealand*, vol. 1. Government Printer: Wellington
- Bentham G (1866) *Eryngium*. In: *Flora australiensis*, vol 3. Pp. 369–371. London: Reeve & Co.
- Candolle AP de (1830) *Eryngium*. In: *Prodromus Systematis Naturalis Regni Vegetabilis*, vol. 4. Pp. 87–97.
- Cheeseman TF (1906) *Eryngium*. In: *Manual of the New Zealand flora*. Pp. 203–204. Wellington: Government Printer.
- Cheeseman TF (1926) *Manual of the New Zealand flora*. 2nd ed. Wellington: Government Printer.
- Delaroche F (1808) *Eryngiorum nec non generis novi Alepideae historia*. Paris: Deterville.
- de Lange PJ, Rolfe JR, Barkla JW, Courtney SP, Champion PD, Perrie LR, Beadel SN, Ford KA, Breitwieser I, Schönberger I, Hindmarsh-Walls R, Heenan PB, Ladley K (2018) Conservation status of New Zealand indigenous vascular plants, 2017. *New Zealand Threat Classification Series* No. 22. [PDF](#) (Accessed 8 October 2024)
- de Lange PJ, Gosden J, Courtney SP, Fergus AJ, Barkla JW, Beadel SM, Champion PD, Hindmarsh-Walls R, Makan T, Michel P (2024). Conservation status of vascular plants in Aotearoa New Zealand, 2023. *New Zealand Threat Classification Series* No. 43. [PDF](#) (Accessed 3 December 2024)
- De Wildeman EAJ (1902) *Eryngium vesiculosum* Labill. In: *Icones Selectae Horti Thenensis* Volume 3, fascicle 6. Pp. 107–109, t. 107. Brussels: Veuve Monnom. [URL](#) (Accessed 8 October 2024)
- Hart TS (1950) Heterophylly in the Pricklefoot (*Eryngium vesiculosum*). *The Victorian Naturalist* 66: 197.

-
- Hooker JD (1853) *Flora Novae-Zelandiae*, Part 1. London: Reeve & Co.
- Hooker JD (1864) *Handbook of the New Zealand flora*, Part 1. London: Reeve & Co.
- Hooker JD (1867) *Handbook of the New Zealand flora*. Part 2. 'Additions, Corrections, &c' London: Reeve & Co.
- Kirk TW (1899) *Students' flora of New Zealand and the outlying islands*. Wellington: Government Printer.
- Labillardière JH de (1804) *Novae Hollandiae Plantarum Specimen*, vol 1. Paris: Huzard.
- Poiret JLM (1816) *Eryngium*. In: *Encyclopédie methodique Botanique*. Supplement, vol. 4. Paris: Agasse.
- Simpson G (1945) Notes on some New Zealand plants and descriptions of new Species (No. 4). *Transactions of the Royal Society of New Zealand* 75(2): 187–202. [URL](#) (Accessed 8 October 2024)
- Sprengel KPJ (1820) *Eryngium*. In: Schultes JA, *Systema vegetabilium*, vol. 6. Pp. 316–337. Stuttgart: JG Cottae.
- Webb CJ (1984) Heterophylly in *Eryngium vesiculosum* (Umbelliferae). *New Zealand Journal of Botany* 2: 29–33. [DOI](#)
- Webb CJ, Sykes WR, Garnock-Jones PJ (1988) *Flora of New Zealand*, vol. 4. Christchurch: Botany Division DSIR.
- Wolff H (1913) Umbelliferae – Saniculoideae. In: Engler A, *Pflanzenreich IV*. 228, Heft 61. Berlin: Engelmann.
-

