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RESEARCH ARTICLE

## *Leptospermum tairawhitiense* (*Myrtaceae*), a new species from Aotearoa / New Zealand, segregated from *Leptospermum scoparium* s. l.

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**Abstract.** *Leptospermum tairawhitiense* G.J. Atkins, de Lange & M.A.M. Renner sp. nov. (*Myrtaceae*) is segregated from *L. scoparium* J.R. Forst. & G. Forst. (sensu lato). The new species is endemic to Tairāwhiti / East Cape, Te Ika a Māui / North Island of Aotearoa / New Zealand. The new species is genetically distinct from *L. scoparium* sensu lato, *L. hoipolloi* L.M.H. Schmid & de Lange, and *L. repo* de Lange & L.M.H. Schmid, and chemically it is distinguished by having unusually high levels of triketones. Morphologically, *Leptospermum tairawhitiense* differs from these species in vegetative characters by the shortly and densely branching growth habit; the often suckering growth habit; the patent leaves, arising at 70–90° from the stem; the lamina is narrow-lanceolate, elliptic lanceolate, or rarely narrowly ovate and (3.0–)4.8–6.2(–9.0) mm long by (1.0–)1.3(–2.1) mm wide and coloured dull green to dark green, red-tinged, ± glaucescent (new growth yellow-green, red-tinged, glaucescent); and in reproductive characters, the flowers are cupped and small in comparison to other species, being 8–14 mm in diameter, with 5(–8) white petals, 5.0–7.0 × 4.6–6.4 mm and 20–32 stamens with white or pink filaments. The capsules of *Leptospermum tairawhitiense* are up to 6.8 mm wide and 5.5 mm tall when unopened, with exerted valves that comprise half the capsule height in profile, and when opened the valves exceed the capsule rim. A conservation assessment using the New Zealand Threat Classification System is proposed and a revised key to *Leptospermum* of Aotearoa / New Zealand provided.

**Keywords:** Aotearoa / New Zealand, *Leptospermum*, *Myrtaceae*, new species, taxonomy

### Introduction

This paper is the third in a series revising the Aotearoa / New Zealand mānuka / kahikatoa (*Leptospermum scoparium* J.R. Forst. & G. Forst.) complex.

The last two papers (de Lange, Schmid, 2021; Schmid et al., 2023) provided a formal treatment for three tag named entities within one of five clades recognised for *Leptospermum scoparium* s. l. by Buys et al. (2019) and Koot et al. (2022). Two

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species, *L. repo* de Lange & L.M.H. Schmid and *L. hoipolloi* L.M.H. Schmid & de Lange, were recognised, with three formae established within *L. hoipolloi*, namely f. *hoipolloi*, f. *incanum* (Cockayne) de Lange & L.M.H. Schmid and f. *procumbens* L.M.H. Schmid & de Lange (de Lange, Schmid, 2021; Schmid et al., 2023). Those papers resolved the status of *Leptospermum* aff. *scoparium* (a) (AK284541; “Auckland”), *L.* aff. *scoparium* (b) (AK247250; “coastal silver prostrate”), *Leptospermum* aff. *scoparium* (c) (AK191319; “Waikato peat bog”), *Leptospermum* aff. *scoparium* (f) (AK 319498; North Cape), *Leptospermum* aff. *scoparium* (g) (AK319494; Surville Cliffs), and *Leptospermum* aff. *scoparium* var. *incanum* (h) (AK309827; North Cape), all tag named entities proposed by de Lange et al. (2018), as well as *Leptospermum scoparium* var. *incanum* Cockayne.

In this paper we examine the status of *Leptospermum* aff. *scoparium* (d) (AK286289; East Cape) which is the sole, or at least the predominant, representative of the ‘East Cape North Island’ cluster recognised by Koot et al. (2022) and endemic to Tairāwhiti / East Cape (Fig. 1). That entity has long been recognised on account of its distinctive chemistry (Douglas et al., 2004) and production of high yielding honey rich in dihydroxyacetone and methylglyoxal which has resulted in a thriving mānuka honey industry centred on this *Leptospermum* growing wild and in plantations at Tairāwhiti / East Cape (see <https://eastcapemanuka.co.nz/>). Morphologically *Leptospermum* aff. *scoparium* (d) (AK286289; East Cape) is well defined on account of its densely branched, often root suckering growth habit, resulting at times in clonal patches; its narrow, short, dark green, often red-tinged or glaucescent glabrescent leaves, that typically arise at 70–90° from the branchlet, and small, semi-campanulate flowers. On the sum of the genetic, chemical, morphological differences and because *Leptospermum* aff. *scoparium* (d) (AK286289; East Cape) is broadly sympatric and syntopic with *L. hoipolloi* and *L. scoparium*, we recognise it here as a new species *L. tairawhitiense* G.J. Atkins, de Lange & M.A.M. Renner. For ease of reading, this name will be used from here on, even before the formal description of the species.

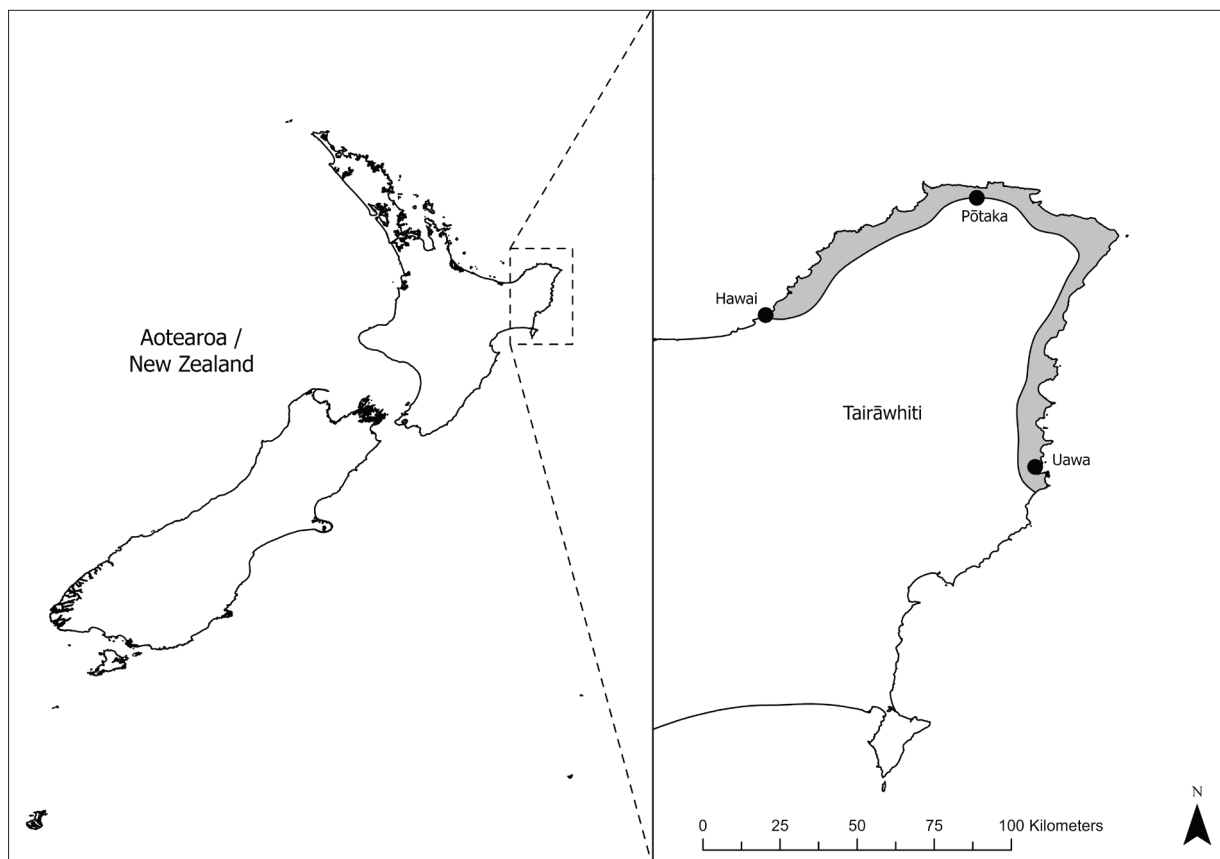
## Materials and Methods

This article is based on the study of live plants cultivated over the last one to three decades in Auckland, Hamilton, and Wellington, Te Ika a Māui /

North Island, Aotearoa / New Zealand by the corresponding author. Field work to examine *Leptospermum* variation, ecology, and zones of sympatry, were undertaken from throughout the northern part of Te Ika a Māui / North Island, Tairāwhiti / East Cape, Taranaki and north-west Nelson, Te Waipounamu / South Island. Examination of fresh specimens was supplemented by study of herbarium specimens held at AK, CHR, OTA, WELT, and UNITEC (herbarium acronyms follow Thiers, 2008–continuously updated). Except for those measurements of stature and branch / branchlet widths taken from live plants in the wild, dimensions have been derived from dried material held in AK and UNITEC supplemented with some measurements taken from extremes in CHR and WELT.

## Taxonomic Concept

Formal taxonomic recognition has been informed by investigations of genetic variation within New Zealand *Leptospermum* (Koot et al., 2022; Chagné et al., 2023). Insights into genetic structure from those studies have been synthesised with observational data from field work, plant collection, cultivation of wild-collected plants, and herbarium-based investigations to inform species circumscriptions that explain the distribution of character data from these data sources. Species rank has been accorded where tag name entities are widespread, sympatric, and even syntopic with accepted *Leptospermum* species, and exist as morphologically discrete and stable units (Schmid et al., 2023). Both genetic studies (Koot et al., 2022; Chagné et al., 2023) recovered a distinct genetic entity centred on the East Coast of the North Island. When plotted on linear discriminants axes, the East Coast plants form the most isolated genetic cluster among New Zealand *Leptospermum* (Chagné et al., 2023), and in dendrograms East Coast plants form a distinct cluster sister to other central North Island populations (Koot et al., 2022). In ancestry analyses East Coast plants are recovered as forming their own ancestral population, with limited evidence for admixture with geographically proximate populations (Koot et al., 2022; Chagné et al., 2023). In splits networks, however, the East Coast plants are nested among central North Island plants (Buys et al., 2019; Koot et al., 2022; Chagné et al., 2023). These patterns both are robust to data source and analysis method. With regards to *L. tairawhitiense*, the close relationships



**Fig. 1.** Distribution of *Leptospermum tairawhitiense* G.J. Atkins, de Lange & M.A.M. Renner in Aotearoa / New Zealand. Shaded area shows generalised distribution of *L. tairawhitiense*

with geographically proximate populations, the fact that *L. tairawhitiense* forms a discrete genetic cluster, the presence of morphological character differences, some of which are unique to *L. tairawhitiense*, ecological differences and geographic range restriction, in combination with the sympatric and even syntopic occurrence with other *Leptospermum* species, may all be explained by *L. tairawhitiense* having and maintaining a separate evolutionary identity from other *Leptospermum*. Possibly, *L. tairawhitiense* has originated via peripatric speciation from an isolated ancestral population. Genetic data obtained to date suggest limited ongoing genetic contact with other New Zealand *Leptospermum* species (Chagné et al., 2023), but this is not incompatible with the existence and maintenance of a distinct evolutionary identity for these East Coast plants (de Queiroz et al., 1998). Other interpretations are possible, but the fact remains that within the range of the Aotearoa / New Zealand endemic *Leptospermum scoparium*,

distinct entities that co-habit are widespread, morphologically stable, and often biochemically distinct. Little purpose is served maintaining a single variable species, while recognising within it an informal taxonomy of distinct morpho- or chemodemes of potential economic and cultural importance (de Lange, Schmid, 2021; Douglas et al., 2004; McDonald et al., 2018; Porter, Wilkins, 1998; Porter et al., 1998; Schmid et al., 2023) that require conservation management (de Lange et al., 2018).

## Taxonomy

### *Leptospermum tairawhitiense* G.J. Atkins, de Lange & M.A.M. Renner, sp. nov.

**Type** — [Figs. 2–3]: AOTEAROA / NEW ZEALAND, Te Ika a Māui / North Island, Tairāwhiti / East Cape, Anaura Bay Road, Latitude 38.294165 S, Longitude 178.303725 E, 123 m a.s.l., P.J. de Lange 15510 & L.K.M. Fisher, 31 Oct 2022. Abundant on

regenerating slip scar above road. Holotype of two elements representing a single gathering spread over two sheets comprising adult flowering, fruiting material (AK386385A), and a sucker (AK386385B) arising from the trunk base of the same plant (AK386385A) and spreading 10–30 (or more) cm from the parent plant. Foliage fine, patent, glaucescent, reddish or dark green. Flowers often with pink stamen filaments. **Holotype:** AK386385A & B (portions from the same plant spread over two sheets); **Isotypes:** NSW, UNITEC, WELT.

Life Science Identified (LSID): urn:lsid:ipni.org:names:77320385-1

**Diagnosis:** Distinguished from *Leptospermum scoparium* s. str., *L. hoipolloi* (a species with which it grows) and *L. repo* by the shortly and densely branching growth habit; the often suckering growth habit; leaves patent, arising at (70–)85–90° from the stem; lamina narrow-lanceolate, elliptic-lanceolate, rarely narrowly ovate (3.0–)4.8–6.2(–9.0) × (1.0–)1.3(–2.1) mm, coloured dull green to dark green, red-tinged, ± glaucescent (new growth yellow-green, red-tinged, glaucescent); flowers subcampanulate, 8–14 mm in diameter, with 5(–8) white petals, 5.0–7.0 × 4.6–6.4 mm and 20–32 stamens with white or pink filaments; capsules up to 6.8 × 5.5 mm (unopened), 7.2 × 4.6 mm (opened). *Leptospermum tairawhitiense* is also biochemically distinct from all other members of the *L. scoparium* complex in that it has much greater levels of triketones (up to 32.5%) in its leaves.

**Growth habit** (Figs. 4, 5) — erect shrubs up to 4 m tall, bases sometimes suckering, and when so forming thickets up to 2 m wide. **Trunk** — slender, usually unbranched at base, up to 0.2 m d.b.h., branched or not from base. **Bark** — usually loosely attached, chartaceous to semi-coriaceous, flaking readily, shards irregular, often with sinuous margins, adaxially charcoal grey or grey, abaxially reddish. **Branches** — 3 or more, erect, semi-erect or widely spreading, with numerous branchlets, young stems glabrescent, initially copiously covered in (0.10–0.22–)0.25(–0.40) mm long, white, straight to slightly flexuous, sericeous, antrorse-appressed, caducous hairs. **Vegetative bud scales** — 3–8, mostly shedding soon after vegetative growth commences, rarely persistent, (0.4–)0.6–0.8(–1.0) × (0.3–)0.6–0.7(–1.0) mm, amber to red-brown, scarious, oblong to ovoid, inner surface smooth, glossy, outer often entire, sometimes with frayed, lacerate margins, glabrescent. **Leaves** — crowded along

branchlets, spicy-scented when crushed, divergent to spreading (arising at angles of (70–)85–90° from axis, in mature plants), semi-glossy yellow-green to dull dark green, usually red-tinged in seedlings, maturing, dull green to dark green, red-tinged, ± glaucescent (new growth, or if plants stressed, yellow-green, red-tinged, glaucescent); lamina (3.0–)4.8–6.2(–9.0) × (1.0–)1.3(–2.1) mm, narrow-lanceolate, elliptic-lanceolate, rarely narrowly ovate, flat to weakly concave, acute or sometimes acuminate, usually cuspidate, acumen if present up to 0.2–0.4 mm long, bases cuneate to attenuate, margins minutely denticulate; surfaces on young growth sericeous hairy either near base and along midrib, and along leaf margin, maturing glabrescent or with adaxial and abaxial surfaces sparsely covered with hairs, these (if present) either persisting on mature leaves or ± persisting on basal portion of leaf and along portions of leaf margin (especially toward base); oil glands numerous, more evident when dry. **Perules** — 4–6, shedding at bud burst, (0.3–)0.4–0.8(–1.1) × (0.4–)0.6–0.8(–1.0) mm, glabrous, hyaline, amber to pale red-brown, scarious, orbicular, margins usually entire or sometimes frayed, inner surface smooth, glossy. **Inflorescence** — monadic on short axillary brachyblasts or on long, 400 mm long or more, terminal shoots. **Prophylls** — caducous, 2, 0.1–0.2 mm long, oblong, midrib scarcely developed, green to red-green when fresh, tan when dry, abaxial surface densely invested in white sericeous hairs. **Pedicels** — sessile or subsessile, 0.1–0.2 mm long at anthesis, sometimes elongating to 1.3 mm after anthesis, terete, sparsely invested with antrorse-appressed, sericeous white hairs. **Flower buds** — clavate, tholiform, spheroidal, with calyx lobes not meeting. **Flowers** — living flowers subcampanulate, when fully expanded (8–)10(–14) mm in diameter. **Hypanthium** — green, obconic, obconic-funnelform, (2.5–)3.9–4.2(–4.8) wide, by (2.2–)3.3(–4.0) mm, terminating in a thicker rim bearing five calyx lobes; surface smooth, finely glandular punctate, glabrous. **Calyx lobes** — 5, erect to sub-erect, 0.8–1.2 × 0.9–1.4 mm, green, broadly deltoid, subacute. **Sepals** — sub-erect to ± spreading, caducous, 3.0–4.5 × 3.6–4.8 mm, white, green-white, or pink-tinged, tabular-obtuse, sometimes subacute, apices often weakly cucullate, oil glands evident, colourless. Receptacle initially pink, colour intensifying to dark red at anthesis. **Petals** — 5(–8)5.0–6.6(–7.0) × 4.6–6.4 mm, white,



Fig. 2. Holotype of *Leptospermum tairawhitiense* G.J. Atkins, de Lange & M.A.M. Renner (AK386385A), specimen spread over two sheets, AK386385A and AK386385B (Fig. 3)



Fig. 3. Holotype of *Leptospermum tairawhitiense* G.J. Atkins, de Lange & M.A.M. Renner (AK386385B), specimen spread over two sheets, AK386385A (Fig. 2) and AK386385B



**Fig. 4.** *Leptospermum tairawhitiense* G.J. Atkins, de Lange & M.A.M. Renner. A: Growth habit, Waipapa Stream, Tairāwhiti / East Cape, Te Ika a Māui / North Island; B: Foliage, Waipapa Stream, Tairāwhiti / East Cape, Te Ika a Māui / North Island; C: Maturing leaves, showing indumentum, which is shed at the leaves, Lottin Point, Tairāwhiti / East Cape, Te Ika a Māui; D: Mature leaves, note the angle the leaves are positioned from the branchlet axis, Lottin Point, Tairāwhiti / East Cape, Te Ika a Māui / North Island; E: Opening flower, Waipapa Stream, Tairāwhiti / East Cape, Te Ika a Māui / North Island; F: Fully opened flower with spreading petals (unusual in this species) showing pink stamen filaments, Lottin Point, Tairāwhiti / East Cape, Te Ika a Māui / North Island (all images: P.J. de Lange)

orbicular, apex obtuse, rotund, sometimes subtruncate, margins entire or finely crimped, oil glands not evident. **Stamens** — (20–)28(–32), arranged in 1(–2) whorls adnate to receptacular rim, filaments white or pink. Antisepalous stamens (2–)3(–4), antipetalous (2–)4–5(–6). Antisepalous stamens on filaments 1.0–1.8 mm long, incurved, erect or in mixtures of both. Antipetalous stamens erect or weakly incurved, sometimes petaloid, on filaments (3.0–)4.6–6.0 mm long, occasional inner whorl of 2 stamens present, these erect or

incurved, 2.0–3.3 mm long, positioned at base of the outermost antipetalous pair. Anthers dorsifixed 0.3–0.5 × 0.12–0.16 mm, ovoid, latrorse, pink or dark red. Pollen white to cream. Anther connective gland c. 0.19 mm long, amber, or pale pink, narrowly obovoid. **Ovary** — 5(–7)-locular, each loculus with 70 or more ovules, set in 8 rows on each placental lobe. Style (2.6–)3.8–4.5 mm long at anthesis, elongating to 5.2 mm after anthesis, green, pink, darkening to red, at anthesis; stigma (0.40–)0.50–0.8 mm in diameter at anthesis, expanding to



**Fig. 5.** *Leptospermum tairawhitiense* G.J. Atkins, de Lange & M.A.M. Renner. A: Mostly andromonoecious flowers showing subcampanulate shape, Tapuaeroa (Hikurangi Access) Road, Tapuaeroa River, Tairāwhiti / East Cape, Te Ika a Māui / North Island; B: Flowers showing subcampanulate shape, Tikapa Road, Tairāwhiti / East Cape, Te Ika a Māui / North Island; C: Mature, unopened capsule, Waipapa Stream, Tairāwhiti / East Cape, Te Ika a Māui / North Island (all images: P.J. de Lange)

1.0 mm following anthesis, flat, initially green, or pink, darkening red at anthesis, finely papillate rugulose. **Fruits** — persistent, woody, (4.5–)5.6(–6.8) × (3.6–)5.5 mm (unopened), (4.8–)5.8(–7.2) × (3.8–)4.6 mm (opened), pale grey, broadly obcoic or hemispherical / globose, centre often with persistent

style remnant, valves 5(–7), exerted as a dome, indented at centre, ± symmetrical with base. Valves opening on dead branches or following fire. **Seeds** — 2.2–2.4(–2.8) × 0.19–0.22 mm, linear, linear-cuneiform, curved, flexuous to sigmoid, laterally compressed, or terete, 2–4-angled, apex truncate



or acute, testa dull or glossy, orange-brown, glabrous, longitudinally striate.

**Representative specimens (out of 50 seen).**

Aotearoa / New Zealand, Tairāwhiti / East Cape. Pōtaka, *P.J. de Lange 15498 & L.K.M. Fisher*, 29 Oct 2022, UNITEC 13634; Lottin Point Road, *P.J. de Lange 15499 & L.K.M. Fisher*, 28 Oct 2022, UNITEC 13635; Wharekaihihika, *P.J. de Lange 15500 & L.K.M. Fisher*, 29 Oct 2022, UNITEC 13636; Matakaoa Point, *P.J. de Lange 15506 & L.K.M. Fisher*, 30 Oct 2022, UNITEC 13642; East Cape Lighthouse, *G.I. Collet s.n.*, Dec 1965, CHR 183258; near Poroporo River, Tikitiki — Rangitukia Road, *P.J. de Lange 4652*, 8 Nov 2000, AK 286289; near Tikitiki, Poroporo Road, Poroporo River, *P.J. de Lange 15502 & L.K.M. Fisher*, 30 Oct 2022, UNITEC 13638; Raukūmara Range, Tapuaeroa (Hikurangi Access) Road, Tapuaeroa River, *P.J. de Lange 15503 & L.K.M. Fisher*, 30 Oct 2022, UNITEC 13639; Waiapu River, Tikapa Road, *P.J. de Lange 15504 & L.K.M. Fisher*, 30 Oct 2022, UNITEC 13640; Waiapu River, Ruatōria, Waiomatatini Road, *P.J. de Lange 15505 & L.K.M. Fisher*, 30 Oct 2022, UNITEC 13641; Ruatōria, *W.R.B. Oliver s.n.*, Nov 1926, WELT SP029275; Ruatōria, Whakaangi Road, *D. Grant s.n.*, Aug 1964, CHR 134301; State Highway 35, South of Ruatōria, Ahiahi Tatua, *P.J. de Lange 15507 & L.K.M. Fisher*, 31 Oct 2022, UNITEC 13643; State Highway 35, Road to Waipiro Bay, *P.J. de Lange 15508 & L.K.M. Fisher*, 31 Oct 2022, UNITEC 13644; State Highway 35, Mangahauini River, near Tokomaru Bay, *P.J. de Lange 15509 & L.K.M. Fisher*, 31 Oct 2022, UNITEC 13645; Anaura Bay, Anauru Bay Scenic Reserve, *G. Atkins EC2007, n.d.*, CHR 79468; State Highway 35, South of Ūawa (Tolaga Bay), Whangaroa Road, *P.J. de Lange 15511 & L.K.M. Fisher*, 31 Oct 2022, UNITEC 13646.

**Etymology:** The epithet “*tairawhitiense*” is taken from ‘te tai rāwhiti’ meaning the ‘coast of the sunrise’ which is the te reo Māori name for the East Cape region of Te Ika a Māui / North Island, of Aotearoa / New Zealand (Clarkson, Garnock-Jones, 1996) in which the new species is endemic. In accordance with Recommendation 60D.1 (Turland et al., 2018; Gardner, 1998) we have elected to Latinise “Tairāwhiti” to make clear that the name refers to a geographic location, and not an indigenous vernacular.

**Distribution** (Fig. 1): Endemic to Aotearoa / New Zealand where it is endemic to the Tairāwhiti / East Cape, occurring in a narrow band from Hawai

along the coastline, river valleys, river beds and lower foothills of the Raukūmara Range, increasing in abundance from Pōtaka east and thence south along the eastern portion of Tairāwhiti / East Cape to just south of Ūawa (Tolaga Bay).

**Habitats and co-associated flora species:** *Leptospermum tairawhitiense* is a species of river flats, in places prone to frequent flooding, coastal shrublands and occasionally in reverting pasture on hill slopes. In these habitats it mostly associates with *Kunzea robusta* de Lange & Toelken, *Coriaria arborea* Linds. var. *arborea* and *Coprosma robusta* Raoul. On alluvium along flood prone rivers, it is often the sole woody shrub present, or the dominant one.

**Phenology:** *Leptospermum tairawhitiense* has one of the shortest flowering times of the Aotearoa / New Zealand species. Although sporadic flowering may be found throughout the year, peak flowering occurs in a short period of time in October and November, with occasional plants flowering into mid-December.

**Affinities:** *Leptospermum tairawhitiense* forms its own clade (Koot et al., 2022) and is further distinguished by its unique chemistry (Douglas et al., 2004). Plants are easily separated from other Te Ika a Māui / North Island *Leptospermum* by their short (3.0–9.0 × 1.0–2.1 mm c.f. 5.0–15.0 × 0.3–2.0 mm (in *L. repo*), 5.0–30.0 × 2.2–6.0 mm (in *L. hoipolloi*), narrowly elliptic to lanceolate, adaxially dull green to dark green, red-tinged, ±glaucous (new growth yellow-green, red-tinged, glaucous) leaves that arise at 70°–90° from the branchlet axis (Fig. 4B–D). Plants can vary from having seemingly leafy branchlets that obscure the branchlets (Fig. 4A) to ones that appear less leafy on account of the width of, and colouration of the leaves. Due to the disposition of the leaves, and their size and width, the flowers in this species are very conspicuous, and appear larger than they really are. Of those species in Te Ika a Māui / North Island, *Leptospermum tairawhitiense* has the smallest flower size range, 8–14 mm diameter, c.f. 10–15 mm in *L. repo* and 18–30 mm in *L. hoipolloi*. Unusually for Aotearoa / New Zealand *Leptospermum*, the flowers of *L. tairawhitiense* are usually subcampanulate, rather than spreading at anthesis. Like in *Leptospermum repo*, the petals of *L. tairawhitiense* are white (Figs. 4F; 5A, B), though in common with the other species the stamen filaments may be white or pink (Figs. 4F; 5A, B), and in those with pink filaments this can give the erroneous impression that the petals are also

pink-tinged. The capsules of *L. tairawhitiense* are also smaller (4.8–7.2 × 3.8–4.6 mm) than those in *L. repo* (5–9 × 5–6 mm) and *L. hoipolloi* (8.8–16.6 × 9.3–18.0 mm). *Leptospermum tairawhitiense*, unusually for the Aotearoa / New Zealand members of the genus, often but not always produces root suckers, in places forming clonal patches on the flood prone river beds, alluvial terraces and slip scars this species favours. Root suckering has also been reported in *Leptospermum scoparium* s. l. by Burrell (1965) who noted that plants which had been trampled or burnt may sucker. However, we have only seen one specimen of *Leptospermum scoparium* s. str. (OTA7221, *J.F. Burrell s.n.*, 4 Mar 1963 ex Leith Saddle) exhibiting this, which was a seedling cultivated at the University of Otago. While not unique to *L. tairawhitiense*, root suckering is best developed in this species.

Throughout its range, *Leptospermum tairawhitiense* is widely sympatric and even syntopic with *L. hoipolloi* and *L. scoparium* s. str. Key differences between *L. tairawhitiense* and *L. hoipolloi* are noted above. As far as it is known, *Leptospermum repo* and *L. tairawhitiense* are wholly allopatric; no specimens of *L. repo* have been found in herbaria from the Tairāwhiti / East Cape region, presumably because the peat bog habitat *L. repo* requires is not well developed there (or it has been destroyed prior to serious botanical exploration of that region). Some specimens of *L. tairawhitiense* have leaf shapes and dimensions comparable to those in *L. repo*. However, morphologically they are readily separated (see above), have different ecological preferences, chemistry, and belong to separate clades (Koot et al., 2022).

*Leptospermum scoparium* s. str., as circumscribed and illustrated by de Lange & Schmid (2021; Fig. 9), morphologically differs from *L. tairawhitiense* by the broadly ovate, oval to orbicular, or broadly elliptic, ovate-elliptic leaves that are sharply acuminate ranging from 3–20 × 3.0–15 mm, rather than narrowly elliptic to lanceolate, and ranging from 3.0–9.0 × 1.0–2.1 mm. The flowers of *L. scoparium* s. str. are variable in size with some populations, notably those within the main axial mountains of Te Ika a Māui / North Island, and Te Waipounamu / South Island, having similar dimensions to *L. tairawhitiense*, though none have subcampanulate flowers (Fig. 5A, B). Otherwise, the upper size range for *L. scoparium* s. str. flowers is 24 mm diameter and 14 mm in *L. tairawhitiense*. While *L. tairawhitiense* has white petals, those of *L. scoparium* though usually

white, may also be pink-tinged, pink, or even red. As noted above, root suckering, though uncommon in *L. scoparium* s. str., has been reported (Burrell, 1965). In contrast, root suckers are more commonly developed in *L. tairawhitiense*. Chemically, *L. scoparium* s. l. does not have the elevated triketone levels reported by Douglas et al. (2004) and, as currently circumscribed, belongs to different clusters: (CSNI (Central and Southern North Island), NESI (North East South Island), SWSI (South West South Island) (Koot et al., 2022). While the status of those plants referred to *L. scoparium* s. l. within those clusters still needs examination, their relationship, morphologically, chemically, and genetically, to *L. tairawhitiense* is unequivocal: they are distinct from that species.

**Conservation Status:** *Leptospermum tairawhitiense*, as *L. aff. scoparium* (d) (AK286289; East Cape), was one of several tag name entities whose conservation status was assessed by de Lange et al. (2018) following the detection of the rust *Austropuccinia psidii* (G. Winter) Beenken in Aotearoa / New Zealand in May 2017. *Austropuccinia* causes myrtle rust disease, which inflicts serious damage to the young growth, flowers and fruits of its host and will ultimately cause death (Carnegie et al., 2016). At the time the assessments for de Lange et al. (2018) were undertaken, the risk posed by *Austropuccinia* was unknown but believed to be severe. As such, the precautionary principle of Townsend et al. (2008) was invoked and all indigenous *Myrtaceae* received high threat assessments. Therefore, the panel assessed *L. aff. scoparium* (d) (AK 286289; East Cape) as ‘Threatened / Nationally Vulnerable’ qualified ‘DP’ [Data Poor] and ‘De’ [Designated] because good data on population size and trend was lacking, and because the actual threat from *Austropuccinia* was anticipated but not confirmed (de Lange et al., 2018). Since that assessment was made, there has been no evidence of myrtle rust disease in wild populations of *Leptospermum tairawhitiense*, though this species is attacked in cultivation (author’s pers. obs.) so the rust remains a future threat. However, with the formal description of *L. tairawhitiense* and the apparent absence of wild occurrences of myrtle rust disease on this species, a reappraisal of the conservation status is necessary.

*Leptospermum tairawhitiense* is a naturally localised endemic mostly confined to the north and north-eastern portion of Tairāwhiti / East Cape. Field work during October / November 2022 noted

numerous populations across this area, many in secure habitats, and others, whilst on private land, unlikely to be threatened by development due to their use for the mānuka honey and oil industry. While a confident population size estimate was not obtained, it is assumed that there are up to 20,000 mature individuals (on the assumption that not all are the result of clonal clustering) in the wild and that, at least for now, the total population is stable (if not increasing due to plantings for the honey and essential oil industry). Using these criteria, we recommend a conservation status of 'At Risk / Naturally Uncommon'. However, we still lack exact population sizes and trends, so we recommend that this assessment be qualified 'DPS' [Data Poor Population Size] and 'DPT' [Data Poor Trend] as per the revisions of (Rolfe et al., 2019). Obviously, this threat assessment will change if *Austropuccinia psidii* is found infecting wild plants.

#### Key to *Leptospermum* of Aotearoa / New Zealand

1. Leaves ovate, shortly oblong or orbicular (up to 20 mm long), sharply acute, or long acuminate, glabrescent ..... *Leptospermum scoparium*
  - Leaves, linear, linear-lanceolate, filiform, lanceolate, elliptic-lanceolate (3–30 mm long) sometimes acute or acuminate, glabrescent, or hairy .. 2
2. Leaves up to 30 × 4 mm, hairy, or glabrescent, dull to semi-glossy, red-green, green to dark green, sometimes glaucescent, lanceolate, elliptic-lanceolate. Flowers white, white streaked or tinged pink, pink or red up to 30 mm diameter (when fresh). Trees (up to 10 m tall), shrubs or decumbent with trailing, prostrate stems ..... 3
  - Leaves up to 15.0 × 1.3(–2.1) mm, glabrescent, glossy, or dull, red-green, glaucescent, yellow-green, green, or dark green. Flowers white, up to 15 mm diameter (when fresh). Trees or shrubs (up to 6 m tall) erect, either sparingly or spindly-branched or densely branched ..... 5
3. Leaves 5.0–22.0 × 2.2–3.1 mm; lamina lanceolate to elliptic lanceolate; young and mature leaves dull to semi-glossy, usually green to dark green (sometimes glaucescent); surfaces on young leaves hairy near base and along midrib, and leaf margin, mature leaves ± glabrescent with hairs ± persisting on basal portion of leaf and along portions of leaf margin. Flowers up to 24 mm diameter when fresh.

Trees (up to 10 m tall) or shrubs .....  
 ..... *Leptospermum hoipolloi* f. *hoipolloi*

– Leaves 5.6–30.0 mm long by 2.2–6.0 mm wide, lamina elliptic lanceolate to broadly lanceolate; young leaves silver-white, silvery-grey, or grey, mature leaves red-green, green, or dark green, mature leaves densely sericeous hairy. Flowers up to 30 mm diameter when fresh. Shrubs (up to 3 m tall) or decumbent with prostrate, trailing branches that often layer on contact with soil) ..... 4

4. Branches decumbent, prostrate, widely spreading (often laying on contact with soil), forming circular patches. Leaves silver-white to silvery-grey, 5.6–24.0 × 2.2–3.8 mm. Flowers up to 24 mm diameter when fresh, usually white, sometimes pink-tinged, or pink. Shrubs up to 1 m tall .....  
 ..... *Leptospermum hoipolloi* f. *procumbens*

– Branches erect. Leaves silvery-grey or dark grey, 6.0–30.0 × 4.2–6.0 mm. Flowers up to 30 mm diameter when fresh, usually white tinged or streaked pink or pink or occasionally red. Shrubs up to 3 m tall) ..... *Leptospermum hoipolloi* f. *incanum*

5. Leaves linear, linear-lanceolate, filiform, up to 15 mm long and 2 mm wide, glossy, yellow-green, green to dark green, glabrescent (new growth glossy yellow-green, bronze-green or dark green); flowers flat, staminal filaments usually white, or very rarely with pink. Trees up to 6 m tall, or shrubs, single stemmed without root suckers, confined to peat bogs ..... *Leptospermum repa*

– Leaves narrow-lanceolate, elliptic lanceolate, rarely narrowly ovate, up to 9 mm long and 2 mm wide, semi-glossy or dull, dull green to dark green, red-tinged, ± glaucescent (new growth yellow-green, red-tinged, glaucescent); flowers cupped, with staminal filaments pink or white. Shrubs up to 4 m tall, often with root suckers, growing in river flats, on alluvium, slip scars or regenerating coastal vegetation ..... *Leptospermum tairawhitiense*

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## Ethics Declaration

The authors declare no conflict of interest.

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***Leptospermum tairawhitiense* (Myrtaceae), новий вид з Аотеароа / Нової Зеландії, виділений з групи *Leptospermum scoparium* s. l.**

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**Реферат.** *Leptospermum tairawhitiense* G.J. Atkins, de Lange & M.A.M. Renner sp. nov. (Myrtaceae) виділено з видового комплексу *L. scoparium* J.R. Forst. & G. Forst. (sensu lato). Новий вид є ендемічним для Східного мису Північного острова Аотеароа / Нової Зеландії. Новоописаний вид є генетично відмінним від *L. scoparium* sensu lato, *L. hoipolloi* L.M.H. Schmid & de Lange і *L. repo* de Lange & L.M.H. Schmid, а за хімічним складом відрізняється надзвичайно високим рівнем трикетонів. Морфологічно *Leptospermum tairawhitiense* відрізняється від цих видів за такими вегетативними ознаками: короткими і густо розгалуженими пагонами; частими кореневими пагонами; відхиленими листками, що відходять від стебла під кутом 70–90°; вузьколанцетними, еліптично-ланцетними або зрідка вузькояйцеподібними листками, (3,0–)4,8–6,2(–9,0) мм завдовжки та (1,0–)1,3(–2,1) мм завширшки, темно-зеленими або темно-зеленими, з червоним відтінком, ± сизуватими (у молодій порослі — жовто-зеленими, з червоним відтінком, сизуватими); щодо генеративних ознак, новоописаний вид відрізняється чашоподібними квітками, дрібнішими у порівнянні з іншими видами, 8–14 мм у діаметрі, з 5(–8) білими пелюстками, 5,0–7,0 × 4,6–6,4 мм, і 20–32 тичинками з білими або рожевими нитками. Коробочки *Leptospermum tairawhitiense* до 6,8 мм завширшки і 5,5 мм заввишки у закритому стані, з випнутими клапанами, що складають половину висоти коробочки у профіль, а у відкритому стані виступають за край коробочки. Запропоновано оцінку природоохоронного статусу згідно з класифікацією загроз, прийнятою у Новій Зеландії, та наведено ключ для визначення видів роду *Leptospermum* Аотеароа / Нової Зеландії.

**Ключові слова:** *Leptospermum*, *Myrtaceae*, Аотеароа / Нова Зеландія, новий вид, таксономія