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RESEARCH ARTICLE

## ***Senecio pokohinuensis* (Asteraceae), a new combination for an endemic species of Mokohinau Islands, Hauraki Gulf (Tikapa Moana o Hauraki), northern Te Ika a Maui / North Island, Aotearoa / New Zealand**

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**Abstract.** Previous research has demonstrated that *Senecio repangae* subsp. *repangae* and subsp. *pokohinuensis* have independent evolutionary origins. Here, we therefore elevate subsp. *pokohinuensis* to species rank: *Senecio pokohinuensis*. Updated morphological descriptions for both species are also provided.

**Keywords:** Asteraceae, Senecioneae, *Senecio*, *S. repangae*, *S. repangae* subsp. *pokohinuensis*, *S. pokohinuensis*, new combination, taxonomy, Aotearoa / New Zealand

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### Introduction

*Senecio repangae* de Lange & B.G.Murray (Fig. 1) is endemic to Aotearoa / New Zealand and restricted to the north-eastern part of Te Ika a Maui / North Island (de Lange & Murray 1998) (Fig. 2). The species was described with two subspecies, subsp. *repangae* (Fig. 1) and subsp. *pokohinuensis* de Lange & B.G.Murray (Fig. 2) by de Lange & Murray (1998). The authors favoured the subspecies rank because both subspecies have the same chromosome number ( $2n = 100$ ), similar vegetative morphology and identical seed characters, yet are allopatric and different in floral characters. *Senecio repangae* subsp. *repangae* has pilose stems and leaves and 3–9 widely and unevenly spaced ray florets. These florets have 1–2 mm long ligules, whose margins are involute and apices are distinctly recurved and/or twisted (de Lange & Murray, 1998). *Senecio repangae* subsp. *pokohinuensis* differs by having less distinctly



Fig. 1. *Senecio repangae* de Lange & B.G.Murray. A: Flowering plant, Repanga / Cuvier Island; C: Inflorescence showing capitula and unevenly spaced ray florets, Repanga / Cuvier Island (images: A, J. Smith-Dodsworth; B, G.M. Crowcroft)

pilose, glabrescent leaves, broadly cylindric involucre, and generally more (8–14) and evenly spaced ray florets, which have (3–)4(–6) mm long ligules with plane margins and flat apices.

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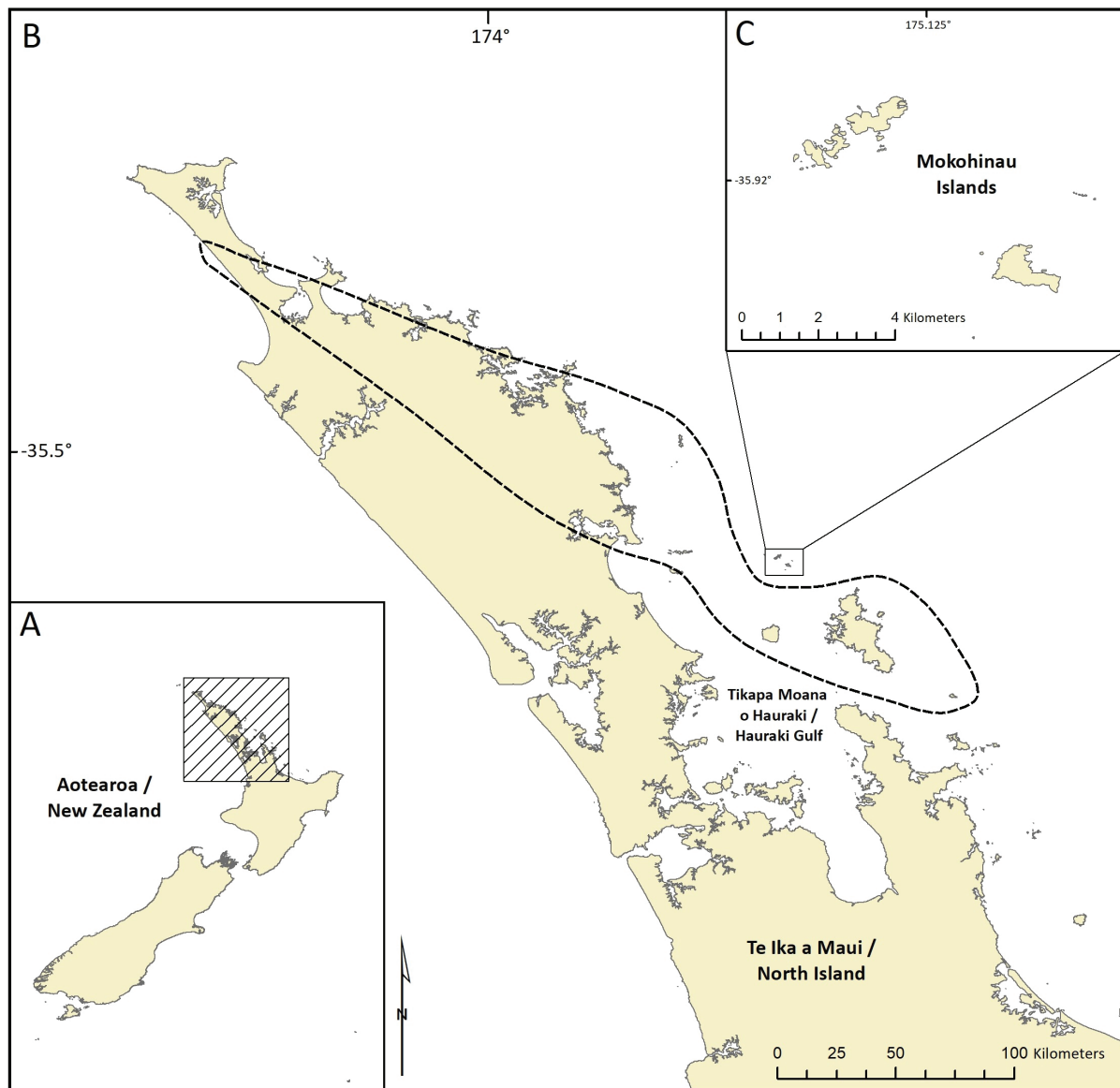


Fig. 2. Distribution of *Senecio repangae* and *S. pokohinuensis*, northern Aotearoa / New Zealand. A: Aotearoa / New Zealand, hashed box showing range of *Senecio repangae* and *S. pokohinuensis*; B: Range of *Senecio repangae* (dashed line) and *S. pokohinuensis* (box); C: Mokohinau Islands, which encompass the range of *S. pokohinuensis*

Using phylogenetic analyses of nuclear and plastid DNA sequence data, Liew et al. (2018) showed that both subspecies of *S. repangae* have an allopolyploid hybrid origin. This hypothesis was previously presented by de Lange & Murray (1998) on the basis of karyological peculiarities of these two taxa. Both subspecies originated as a result of hybridisation between a paternal parent from the Lautusoid *Senecio* group (*sensu* Liew et al., 2018;  $2n = 40$ ) and a maternal parent from the Disciform s.str. group (*sensu* Liew et al., 2018;  $2n =$

60). Their precise phylogenetic positions within the molecular phylogenies presented by Liew et al. (2018) are poorly resolved and supported, but morphological resemblance and sympatry suggest a hybrid origin of subsp. *repangae* involving *S. lautus* G.Forst. ex Willd. ( $2n = 40$ ) and *S. scaberulus* (Hook.f.) D.G.Drury ( $2n = 60$ ) (chromosome numbers for the latter two taxa from Beuzenberg, 1975). Liew et al. (2018) also considered *S. hispidulus* A.Rich. ( $2n = 60$ ; Lawrence 1980) as an alternative maternal parent, but concluded that this was

less likely, because it is a relatively recent arrival in New Zealand (Belcher, 1956; Drury, 1974). Beyond most likely involving *S. lautus* (again because of sympatry and morphological resemblance), the parentage of subsp. *pokohinuensis* is less evident. However, Liew et al (2018) considered it unlikely that either *S. hispidulus* or *S. scaberulus* was its maternal parent, because neither of these nor *S. lautus* are glaucous or glabrescent. Subspecies *pokohinuensis* and subsp. *repangae* therefore most probably originated as a result of different hybridization events involving different combinations of parental species. As such, *S. repangae* subsp. *pokohinuensis* merits elevation to species rank. The required nomenclatural action is taken here, and revised descriptions for *S. pokohinuensis* and *S. repangae* s. str. are provided.

## New Combination

***Senecio pokohinuensis* (de Lange & B.G.Murray) de Lange, comb. & stat. nov.** (Fig. 3)

**Basionym:** *Senecio repangae* subsp. *pokohinuensis* de Lange & B.G.Murray, *New Zealand J. Bot.* 36(4): 512 (1998)

**Type:** AOTEAROA / NEW ZEALAND, Te Ika a Maui / North Island, Eastern Northland and Islands Ecological Region, Taranga Ecological District, Mokohinau Islands Nature Reserve, Burgess (Pokohinu) Island, 15 Nov. 1993, *P.J. de Lange 2691* (Holotype: AK 226359; isotypes, AD, CHR, K, WAIK, WELT).

**Description:** Erect, sparingly branched, annual or short-lived perennial herb, (0.2–)0.8–1.2 m tall, arising from a stout woody rootstock. Stems sparsely pilose, glabrescent. Foliage ± shiny, glaucous-green. Leaves sparsely pilose, glabrescent. Basal leaves cuneately narrowed or shortly petiolate, broadly elliptic-oval or rhomboidal, coarsely toothed, rarely lyrate-pinnatifid. Mid-cauline leaves amplexicaul, usually deeply bifid at base, narrow, ovate, elliptic, lanceolate or oblong, pinnately lobed, 1–2-pinnatifid with the segments lanceolate to oblong, entire or few-toothed, gradually diminishing in size up the stem, becoming sessile. Uppermost leaves smaller, lanceolate, dentate or pinnatifid. Supplementary bracts (5–)7(–9), narrow, (2–)3–5 mm long; lowermost usually dentate; margins often slightly villous, apex villous. Capitulum broadly cylindrical; involucre bracts (12–)14(–20), lanceolate; 6–7(–9) mm long, usually glabrous with purple-black villous tips. Ray florets (8–)12(–14); ligules (3–)4(–



Fig. 3. *Senecio pokohinuensis* (de Lange & B.G.Murray) de Lange. Plant growing in loose greywacke gravel near lighthouse, Pokohinu / Burgess Island, Mokohinau Island group (image: T. Greene)

6) mm long, sulphur yellow, evenly spaced, margin plane, apex not recurved or twisted; apex shallowly 3–4-toothed. Disc yellow, 5–6 mm diameter. Cypsela narrowly oblong-elliptic, 2.2–3.0 mm long, grey, slightly narrowed at apex, base cuneate; ribs broad and rounded; grooves narrow, covered in hairs, hairs short, retrorse, in (3–)5–8 rows, filling grooves and most of ribs with hairs distinctly denser toward apex and between ribs. Pappus 4–5 mm, scabridulous, white to off-white, caducous.

**Distribution:** Endemic to the Mokohinau Island group, northern Hauraki Gulf (Tikapa Moana o Hauraki), northern Te Ika a Maui / North Island, Aotearoa / New Zealand (Fig. 2). There it is found on the following islands within that group (west to east): "Stack H", Atihau, Hokoromea, Motupapa, Arch Way, Motuharakeke, "Stack B", "Stack D", "Stack F", Pokohinu, Lizard and Motukino (de Lange & Murray 1998).

## Emended Description

*Senecio repangae* de Lange & B.G.Murray, *New Zealand J. Bot.* 36(4): 510 (1998) (Fig. 1)

**Type:** AOTEAROA / NEW ZEALAND, Te Ika a Maui / North Island, Coromandel Ecological Region, Mercury Islands Ecological District, Repanga / Cuvier Island, west of Landing Bay, 10 m. a.s.l., 22 October 1993, P.J. de Lange 2424 (Holotype: AK 218957, Isotype AD, CHR, K, WAIK, WELT).

**Description:** Erect, sparingly branched, annual or short-lived perennial herb, (0.2–)0.8–1.2 m tall, arising from a stout woody rootstock. Stems pilose. Foliage dull dark, grey-green. Leaves pilose. Basal leaves cuneately narrowed or shortly petiolate, broadly elliptic-oval or rhomboidal, coarsely toothed, rarely lyrate-pinnatifid. Mid-cauline leaves amplexicaul, usually deeply bifid at base, narrow, ovate, elliptic, lanceolate or oblong, pinnately lobed, 1–2-pinnatifid with the segments lanceolate to oblong, entire or few-toothed, gradually diminishing in size up the stem, becoming sessile. Uppermost leaves smaller, lanceolate, dentate or pinnatifid. Supplementary bracts (5–)7(–9), narrow, (2–)3–5 mm long; lower most usually dentate; margins often slightly villous, apex villous. Capitulum campanulate; involucre bracts (9–)13(–17), lanceolate; (8–)9(–14) mm long, usually glabrous with purple-black villous tips. Ray florets (3–)7(–9) (rarely 0); ligules (1–)2 mm long, sulphur yellow, widely and unevenly spaced, margin involute, apex recurved and/or twisted; apex shallowly 3–4-toothed. Disc yellow, 4–5 mm diameter. Cypselas narrowly oblong-elliptic, 2.5–3.0 mm long, grey, slightly narrowed at apex, base cuneate; ribs broad and rounded; grooves narrow, covered in hairs, hairs short, retrorse, in (3–)5–8 rows, filling grooves and most of ribs with hairs distinctly denser. Pappus 4.0–5.0 mm, scabridulous, white to off-white, caducous.

**Distribution:** Endemic to the northern portion of Te Ika a Maui / North Island, with a mostly easterly offshore island distribution from Te Wakatehaua, Oneroa o Tohe / Ninety Mile Beach, Te Aupouri east and south to Repanga / Cuvier Island (de Lange & Murray 1998) (Fig. 2). *Senecio repangae* is most common on Aotea / Great Barrier Island and Repanga / Cuvier Island. It appears to have declined from other locations mentioned by de Lange & Murray (1998).

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## Ethics Declaration

The authors declare no conflict of interest.

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**Реферат.** Попередньо проведені дослідження показали, що *Senecio repangae* subsp. *repangae* і subsp. *pokohinuensis* мають самостійне еволюційне походження. Тому subsp. *pokohinuensis* піднесено до видового рангу *Senecio pokohinuensis*. Наведено оновлені морфологічні описи обох видів.

**Ключові слова:** *Asteraceae*, *Senecioneae*, *Senecio*, *S. repangae*, *S. repangae* subsp. *pokohinuensis*, *S. pokohinuensis*, Нова Зеландія, нова комбінація, таксономія