

Tetramolopium ornans Ngugi (Asteraceae), a new species from the Wet Tropics of Queensland, Australia

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Summary

Ngugi, L.B. (2023). *Tetramolopium ornans* Ngugi (Asteraceae), a new species from the Wet Tropics of Queensland, Australia. *Austrobaileya* 13: 112–117. *Tetramolopium ornans* is described as a new species from the Wet Tropics of north Queensland. It is distinguished from the related *T. vagans* Pedley by the presence of sparse hairs on the cypselae and longer leaves with an acuminate apex. Notes are provided on distinctive features, habitat, phenology and conservation status, along with detailed illustrations, images and a distribution map.

Key Words: Asteraceae; *Tetramolopium*; *Tetramolopium ornans*; *Tetramolopium vagans*; flora of Australia; flora of Queensland; Wet Tropics; new species; taxonomy

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Introduction

Tetramolopium Nees is a genus of subshrubby perennials belonging to the family Asteraceae, tribe Astereae. It is distributed across the Oceania/Pacific area including Australia, New Guinea, Hawaii, and the Cook Islands. The taxa comprising Astereae are globally widespread, primarily in the temperate regions of the world (Barkley 2006), with centres of diversity in southwestern North America, the Andes of South America, South Africa, Australia and New Zealand (Funk 2005). Astereae are mainly characterised by triangular to subulate style-branch appendages, anthers that are basally obtuse with triangular appendages, helianthoid pollen with one-layered sexine that fuses only with the nexine at the margins of the colpi, and a single-layered testa epidermis with cells thickened on three sides (Grau 1977).

The classification of *Tetramolopium* has undergone several revisions over the years, partly based on the results of molecular phylogenetic studies. The genus is based on a species found in Hawaii (Nees von Esenbeck 1832). *Tetramolopium* was merged with *Vittadinia* A.Rich by Gray (1861), but

was reinstated by Bentham (1873). The circumscription of the genus now includes species with a shrub or subshrub habit, predominantly alternate and crowded leaves that are either sessile (New Guinea species) or petiolate (Hawaiian species), and with capitula that are either solitary or arranged in corymbose terminal capitulescences, with phyllaries arranged in three to four overlapping rows (Koster 1966).

Taxonomic studies over the last 40 years have revealed the presence of 25 *Tetramolopium* species in New Guinea (van Royen 1981), 11 in Hawaii (Lowrey 1986) and one in the Cook Islands (Lowrey *et al.* 2005). The genus was divided into three sections based on morphological characteristics. These sections are *T.* section *Alpinum* Lowrey, comprising alpine or subalpine species with tubular disc corollas and cylindric involucre; *T.* section *Tetramolopium*, comprising decumbent species with funnel-shaped yellow disc corollas; and *T.* section *Sandwicense* Lowrey, comprising upright species with funnel-shaped disc corollas that are maroon or pinkish in colour.

In Australia, the genus was first recognised with the description of *Tetramolopium vagans* Pedley in *T. Section Alpinum* (Pedley 1993). This species is found in the area around Mt Barney in subtropical southeast Queensland. It grows in rocky rhyolite crevices and outcrops, often associated with scattered vegetation and *Eucalyptus* trees. At this time, Pedley mentioned the possibility of a further *Tetramolopium* species in Australia based on a single fragmentary collection by David Fell in 1988 from Mt Bowen in the southern Wet Tropics of north Queensland.

In a first comprehensive molecular phylogeny, most species of *Tetramolopium* were nested within *Vittadinia*, but Australian *T. vagans* showed no close affinity to the *Vittadinia* group (Lowrey 2001 *et al.*). In Australia, *Tetramolopium* currently includes only one described species, *T. vagans*, and the phrase name species *T. sp.* (Mt Bowen (D.G.Fell+ DGF1224) (Holland 1994), which has also variously been cited as *T. sp. 1* (Mt Bowen (D.G.Fell+ DGF1224) (Briggs 1996) and *T. sp.* Mt Bowen (D.G.Fell+ DGF1224) Qld Herbarium (CHAH 2011).

The Australian *Tetramolopium* species are of conservation concern with both listed as Vulnerable under Queensland's *Nature Conservation Act 1992* (NCA 2022). Sufficient material is now available to describe *T. sp.* (Mt Bowen D.G.Fell+ DGF1224) as new to science under the name *T. ornans*. This will also facilitate in part its conservation. It is noted that further molecular phylogenetic studies of Australian Asteraceae may yet reveal the need to re-circumscribe genus limits, but on present knowledge, the species is best accommodated in the genus *Tetramolopium*.

Materials and methods

This study is based on morphological examination of herbarium collections held at the Queensland Herbarium (BRI) and specimens loaned from the Australian National Herbarium (CANB). The measurements for corolla, stamens and style are based on reconstituted dried material, while all other measurements were from dried material using a ruler or microscope (Olympus

SZ40) eyepiece graticule. A stereomicroscope (Nikon SMZ25) was used to clearly visualise and characterise the corolla tube indumentum. Scanning Electron Microscopy (SEM) (Phenom Pure by ThermoFischer) was used to examine the shape of the pollen. The distribution map was compiled from localities and/or geocode information provided on the labels of specimens at BRI and CANB and mapped using ArcGIS Desktop Software version 10.8.2 (2021) from Esri Inc.

Taxonomy

Tetramolopium ornans Ngugi, *sp. nov.*

Similar to *T. vagans* Pedley, but differs by the presence of sparse hairs on cypselae versus long dense hairs on cypselae of *T. vagans*; ray corolla tube with minute hairs only on the upper part versus minute hairs distributed on the entire ray corolla tube of *T. vagans*; leaves longer, 20–38 mm long, with acuminate apex versus leaves shorter (10–15 mm long) with acute apex in *T. vagans*; and with distribution in Wet Tropics of north Queensland versus distribution of *T. vagans* in southeastern Queensland. **Type:** Australia. Queensland. NORTH KENNEDY DISTRICT: Hinchinbrook Island, *c.* 1 km N of Mt Diamantina, 8 December 2000, *J. Kemp TH2622* (holo: BRI [AQ0494446] iso: CANB).

Tetramolopium sp. (Mt Bowen (D.G.Fell+ DGF1224): Holland (1994, 1997, 2002, 2007, 2010); Holland & Bean (2013, 2016).

Tetramolopium sp. 1 (Mt Bowen (D.G.Fell+ DGF1224): Briggs (1996).

Tetramolopium sp. (Mt Bowen D.G.Fell+ DGF1224) Qld Herbarium: CHAH (2011).

A subshrub to approximately 40 cm tall. Stems semi-erect, caespitose, longitudinally ridged, glabrous but rough with several persistent sheaths of shed leaves, becoming woody on maturity. Phyllotaxy alternate and spiral, internodes compressed, leaves consequently appearing crowded especially near the terminal part of the shoot as the mature leaves senesce and die. Leaves thick, linear, 20–37 mm long and 0.7–0.8 mm wide, green, glabrous, 1-veined with vein indented adaxially and prominent abaxially;

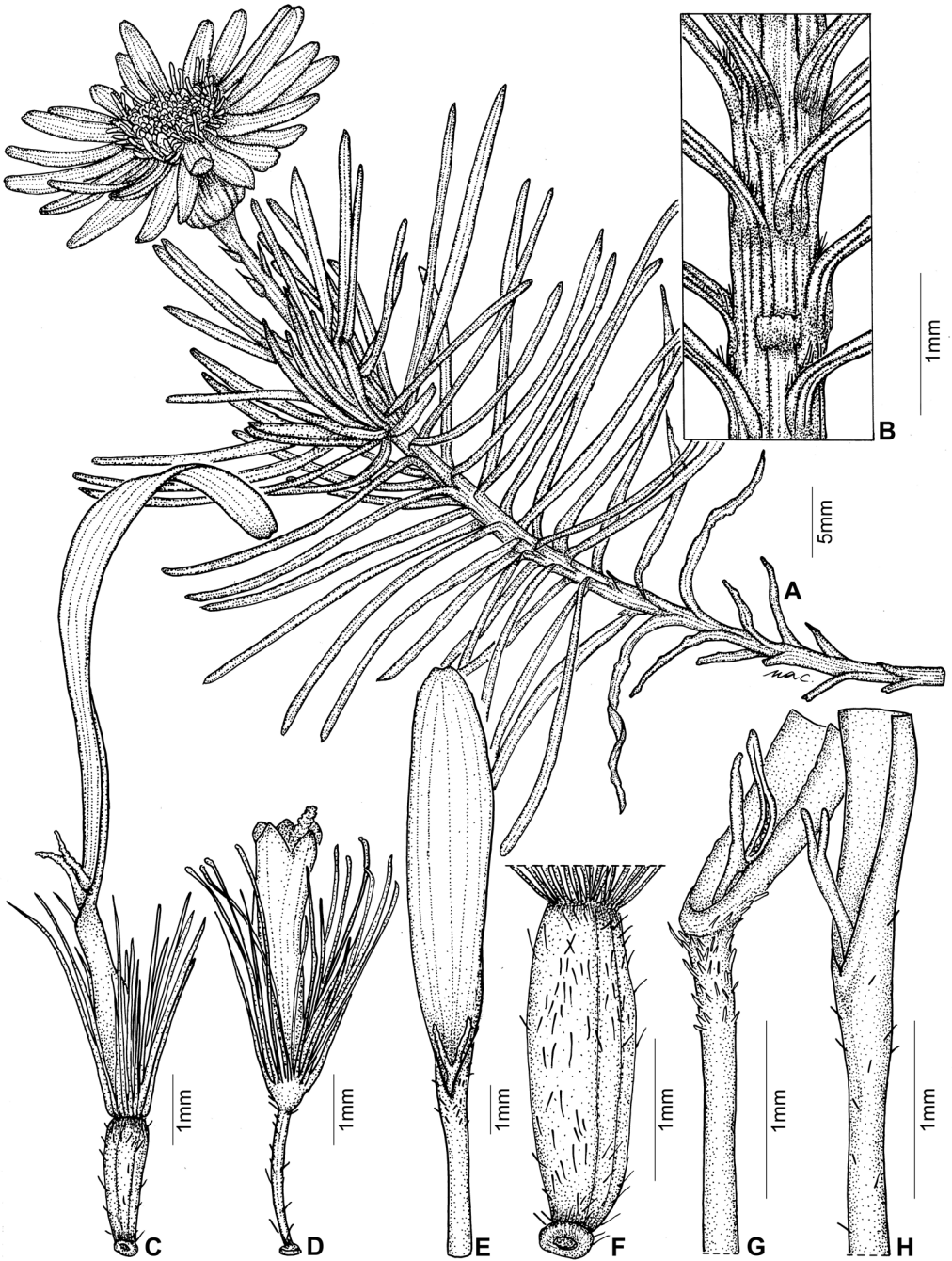


Fig. 1. *Tetramolopium ornans*. A. flowering stem. B. young stem showing ridges and leaf base like sheath. C. ray floret. D. disc floret. E. ligule. F. cypselae showing short sparse hairs G. ray floret corolla tube showing minute hairs on upper side. *T. vagans* H. ray floret corolla tube showing hairs distributed throughout. A–E & G from *Espe* s.n. (BRI [AQ1035453]); F from *Kemp TH2822* (BRI); H from *Ngugi May01* (BRI). Scales as indicated. Del. N. Crosswell.

apex acute with brownish tinge; base sheath-like, green to purplish in colour; margins entire. Capitula terminal, solitary, 10–27 mm diameter with ray florets; peduncles 8–23 mm long, green, glabrous, with 5–8 small bracts along their length; peduncle bracts subulate, 1.5–3 mm long. Mature capitula cylindrical when fresh, spread open when dried, 11–12 mm diameter. Involucral bracts graduated in length, 4–6 mm long, inner longer than outer, 4 or 5 series, 1-veined; abaxial surface glabrous, 0.5–0.9 mm diameter, green; apex acute, green or sometimes purplish; margin hyaline. Receptacle 2.1–2.5 mm diameter. Ray florets 23–30, female; corolla tube 2.4–3 mm long with minute hairs on the upper part; ligule linear, 6–10 mm long, 1–2.5 mm wide, mauve to white, tip with 2 or 3 lobes; style

glabrous, with branches 0.5–0.9 mm long; cypselae 1.2–2.5 mm long and 0.2–0.6 mm diameter, cylindric to flattened, fertile, brown when mature, indumentum 0.2–0.6 mm long, sparse, prominently 1–3 ribbed. Pappus 3–3.2 mm long, barbed, white. Disc florets *c.* 37, 5.4–6.1 mm long, narrowly funnel-shaped, yellow, glabrous, functionally male; lobes five, 0.4–0.8 long, narrowly triangular; stamens and style slightly longer than corolla tube; anthers 1.2–1.5 mm long, appendages with apex acute; style branches 0.2–0.8 mm long; cypselae and pappus similar to those of ray florets, except cypselae empty and infertile; cypselae with 1 or 2 prominent nerves, 1–1.9 mm long and 0.2 mm diameter, indumentum sparse, 0.1–0.2 mm long; pappus 2.7–3.2 mm long, white, bristles barbellate. Pollen tricolporate. **Fig. 1.**



Fig. 2. *Tetramolopium ornans*. A. habitat at Bishops Peak B. flowering stem showing cylindrical capitulum (indicated by the blue arrow) C. mature capitulum. Photos: B. Espe.

Additional specimens examined: **Australia.** Queensland. NORTH KENNEDY DISTRICT: Main ridge of Mt Bowen, Hinchinbrook Island, Jul 1988, *Fell DF1224* & *Swain* (BRI); Bishops Peak, 32 km S of Cardwell, eastern ridge, Nov 1991, *Halford Q703* (BRI); Bishops Peak, Aug 2001, *Williams TH4948* (BRI); Bishops Peak,

Girringun National Park, 20 km N of Ingham, Jun 2021, *Williams 2181 et al.* (BRI); *ibid*, Sep 2022, *Espe s.n.* (BRI [AQ1035453]); Cardwell Range, E slopes of Bishops Peak, approximately 0.5 km E of summit, Aug 1996, *Telford 12156* (CANB); Cardwell Range, lower slopes of Bishop Peak, Jun 1997, *Lyne 2374* (CANB).

Distribution and habitat: *Tetramolopium ornans* is endemic to the Wet Tropics of north Queensland and is found on the summits of Mt Bowen and Mt Diamantina of Hinchinbrook Island and on Bishops Peak (**Map 1**). It grows in crevices of granite rocks in montane heath with species of *Xanthorrhoea*, *Allocasuarina* and *Banksia* (**Fig. 2**).

Phenology: Flowers or fruits of *Tetramolopium ornans* have been recorded from June to December.

Conservation status: *Tetramolopium ornans* has a restricted distribution and habitat and is currently listed under its previous phrase name as **Vulnerable** under the *Nature Conservation Act 1992* of Queensland.

Etymology: The specific epithet *ornans* is derived from the Latin word “ornatus” which means adorned or decorated, referring to the ornamental habit of this *Tetramolopium* on steep rocky granite mountain slopes.

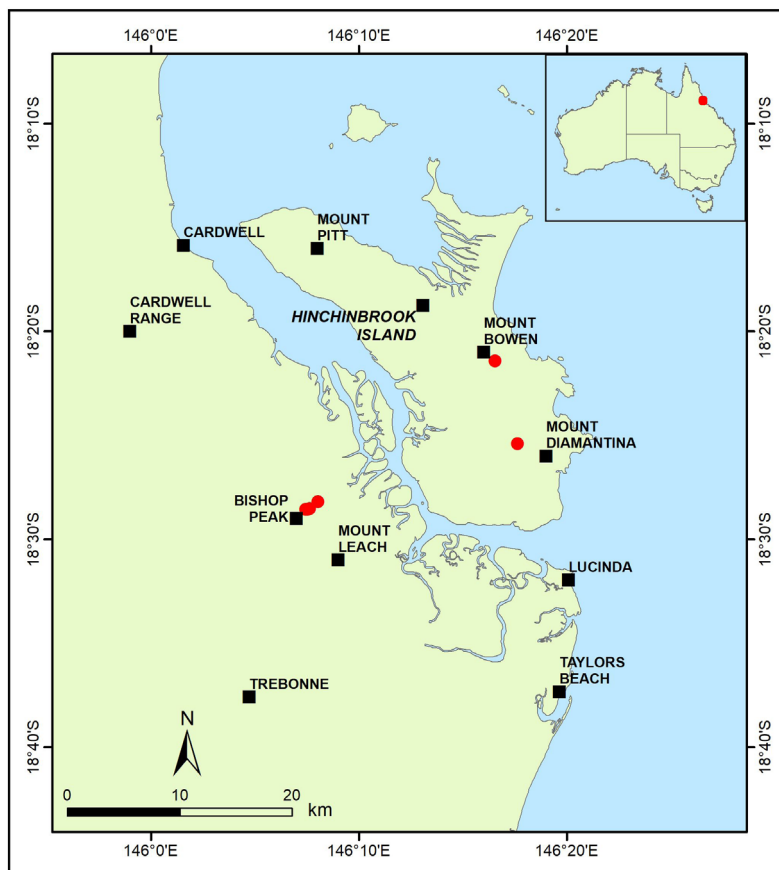
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Map 1. Distribution of *Tetramolopium ornans* based on cited herbarium specimens.