

# *Lomandra beaniana* Jian Wang ter (Laxmanniaceae), a new species for south-eastern Queensland and north-eastern New South Wales, Australia

Jian Wang<sup>1</sup>

## Summary

Jian Wang (2023). *Lomandra beaniana* Jian Wang ter (Laxmanniaceae), a new species for south-eastern Queensland and north-eastern New South Wales, Australia. *Austrobaileya* **13**: 105–111. *Lomandra beaniana* Jian Wang ter is described, illustrated and compared to the morphologically similar species *L. multiflora* (R.Br.) Britten. Notes are provided on its affinities, distribution including a map, habitat and phenology. A conservation status of Least Concern is recommended. An identification key is provided for the five species comprising the informal *L. multiflora* group.

Key Words: Laxmanniaceae; *Lomandra*; *Lomandra beaniana*; *Lomandra multiflora*; flora of Australia; flora of New South Wales; flora of Queensland; taxonomy; new species; identification key

<sup>1</sup>Queensland Herbarium and Biodiversity Science, Department of Environment and Science, Brisbane Botanic Gardens, Mt Coot-tha Road, Toowong, Queensland 4066, Australia. Email: jian.wang@des.qld.gov.au

## Introduction

The genus *Lomandra* Labill. (Laxmanniaceae) includes 61 species to date (CHAH 2023; Wang 2023a,b). There are 57 species endemic to Australia, two endemic to Australia and New Guinea and one endemic to New Caledonia (Lee & Macfarlane 1986; Wang 2023b). *Lomandra* has had various family placements over the past decades, including Xanthorrhoeaceae in ‘Flora of Australia’ (Lee 1966; Lee & Macfarlane 1986), Dasypogonaceae (Briggs 1986; Chase *et al.* 1995) and Laxmanniaceae (Chase & Stevens 1998; Wang 2023a). The genus is more often placed in a broadly circumscribed Asparagaceae under subfamily Lomandroideae Thorne & Reveal (Chase *et al.* 2009; Gunn *et al.* 2020; Govaerts *et al.* 2022), but the family Laxmanniaceae is retained here following the systematics applied at BRI, where a narrower circumscription of monocot families is preferred.

*Lomandra* was revised by Lee & Macfarlane (1986) for ‘Flora of Australia’, and these authors recognised 15 species and four subspecies from Queensland. There are currently 20 species recognised in

Queensland, as well as three non-autonymic subspecies (Wang 2023a). A taxonomic review of *Lomandra* in Queensland is underway.

*Lomandra multiflora* (R.Br.) Britten belongs to the Section *Lomandra*, Series *Lomandra* (Lee & Macfarlane 1986). It includes two subspecies, *L. multiflora* (R.Br.) Britten subsp. *multiflora* and *L. multiflora* subsp. *dura* (F.Muell.) T.D.Macfarl., the former is found throughout eastern Queensland, New South Wales, Victoria, and parts of the Northern Territory. The latter is found in South Australia only.

Examination of herbarium material of *Lomandra*, especially from New South Wales and Queensland, has revealed the existence of a distinctive species, herein described as *L. beaniana* Jian Wang ter. Collections of *L. beaniana* have been either filed to date under indeterminate *Lomandra* or mostly included under *Lomandra multiflora* subsp. *multiflora*.

*Lomandra beaniana* together with *L. patens* A.T.Lee, *L. decomposita* (R.Br.) Jian Wang ter & A.R.Bean and *L. ramosissima*

Jian Wang *ter*, share a common characteristic with *L. multiflora*, i.e., whorled floral branches and flower clusters. A key is given to distinguish the differences among all these five species (the informal *L. multiflora* group), including the two subspecies of *L. multiflora*. *Lomandra beaniana* is notably different from all the other four similar species in the almost terete or subterete leaves of the male and female plants.

**Materials and methods**

This study is based on morphological examination of *Lomandra* herbarium

material, especially specimens identified as *Lomandra multiflora* subsp. *multiflora*, as well as undetermined *Lomandra* species at BRI and specimens received on loan from CANB, DNA, MEL, NSW, and NT. All measurements are based on dried material, except the dimensions of flowers which are based on material reconstituted with boiling water. Dimensions of measurements are inclusive, i.e., 1.0–1.7 is given as 1–1.7.

Common abbreviations in the specimen citations are Mt (Mount), SF (State Forest) and NP (National Park).

**Taxonomy**

**Key to the *Lomandra multiflora* group**

- 1 Leaves almost terete or subterete, 1.2–2 mm diameter . . . . . **L. beaniana**
- 1. Leaves flat, slightly concavo-convex or plano-convex, 2–6 mm wide . . . . . 2
- 2 Male inflorescence usually twice- or more branched; female inflorescences twice-branched . . . . . 3
- 2. Male inflorescence usually unbranched or once- or twice branched; female inflorescences unbranched or once-branched . . . . . 4
- 3 Scape and rachis glabrous; fruiting styles 1.8–2.5 mm long . . . . . **L. patens**
- 3. Scape and rachis verrucous; fruiting styles 0.2–0.5 mm long . . . . . **L. ramosissima**
- 4 Male inflorescence usually twice branched, male buds globular . . . . . **L. decomposita**
- 4. Male inflorescence usually unbranched or once-branched, male buds ellipsoid. . . . . 5
- 5 Male flowers sessile or on pedicels to 2 mm long . . . . . **L. multiflora** subsp. **dura**
- 5. Male flowers on pedicels 3–8 mm long . . . . . **L. multiflora** subsp. **multiflora**

***Lomandra beaniana* Jian Wang *ter*, sp. nov.**

**Type:** Australia. Queensland. BURNETT DISTRICT: Near fire tower site, State Forest 12, near Wondai, 28 September 1996, *A.R. Bean* 10796 (holo: BRI [AQ0572338]; isotype: MEL 275717).

Plants are glabrous and form tussocks with condensed ascending rhizomes, each tussock usually comprising 1 to 5 tufts. Each tuft is 8–12 mm in diameter at the base with leaves arranged distichously or irregularly. **Leaves** firm and upright. Leaf sheath margins at first membranous or cartilaginous, fraying into strips or fibres 8–17 cm long, white, pale, straw-coloured to reddish brown. **Leaf blades** glaucous, smooth to scabrid, almost terete or subterete, flattened out towards the tips;

with 30–50 fine parallel veins on the surface; the margins mostly minutely serrulate; leaf apex usually rounded to obtuse without teeth; leaves of male and female plants are similar, (19–)30–78 cm long, (0.6–)1.2–2 mm diameter. Male and female inflorescences similar in appearance being paniculate. **Male inflorescence** 1 per tuft, usually shorter than the longest leaf; 24–60 cm long; the scape rounded or flattened, smooth and usually minute verruculose, 10–26(–37) cm long, 0.08–0.2 cm broad, light green, whitish-brown or light purple; the primary rachis rounded, 4-angled, channelled or slightly to strongly longitudinal ribbed, smooth and minutely verruculose, 9–26(–37) cm long, same colour as the scape; bearing numerous branches and flower clusters; branches and

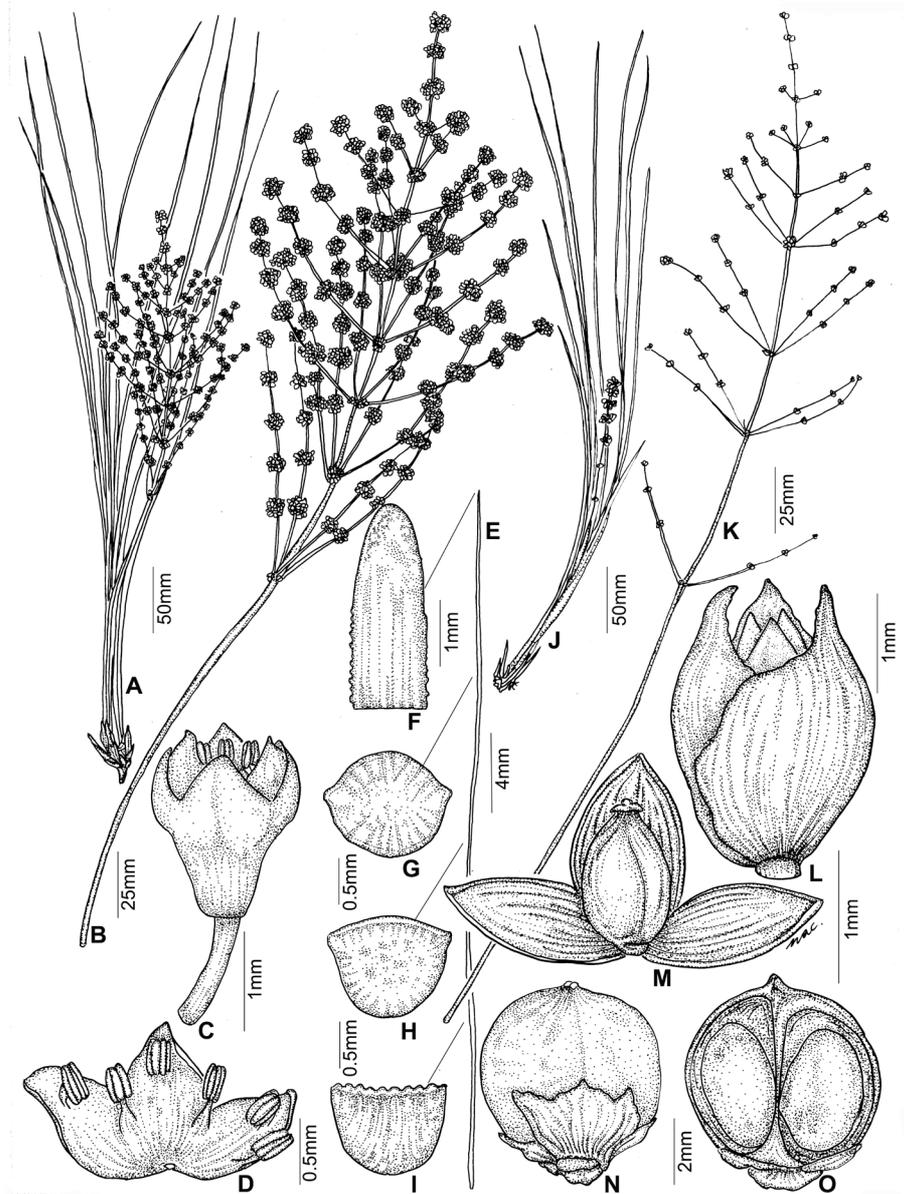
flower clusters appearing whorled, opposite or near opposite at nodes; inflorescence branches rounded, angled, channelled, or slightly to strongly longitudinal ribbed, smooth and minutely verruculose, usually 2–11(–18) cm long; flower clusters with branches 2–5 cm apart on the primary rachis, 1–3.3 cm apart on the secondary rachis (first branch), inflorescences occasionally developing a tertiary rachis (second branch) 0.5–1.8 cm apart. Bracts of inflorescences usually 3 or 4, long- to short-deltoid, 3–8 mm long, 1.5–2.3 mm wide at the widest point, with 1–5 veins; bracts of branches and flower clusters usually 2–4, long- to short-deltoid, 1–5 mm long, 0.5–2.5 mm wide at the widest point, with single mid vein, longest at the basal node of rachis, shorter upwards along primary rachis as well as on secondary and tertiary rachis.

**Male flowers** in groups of 10–30, usually at similar age within each cluster; bracteoles 3, cucullate, 1–1.3 mm long and 1.4–1.7 mm broad, membranous, completely encircling each flower. Male flowers pedicellate; the mature pedicels 2.5–3.5 mm long, 0.15–0.2 mm wide, terete, pale yellow. The flower bud ellipsoid, green and/or purple tinged at anthesis, becoming campanulate. Perianth segments 6, with distinct outer and inner whorls; outer tepals (sepals) 3, elliptical, thin, free except at the very base, uniform in size and texture, 2.5–2.8 mm long, 1–1.4 mm wide, pale yellowish with a purple tinge; inner tepals (petals) 3, elliptical to broadly elliptical, free except on the basal 1/5–1/4 portion, uniform in size and texture, 2.5–2.6 mm long, 1.1–1.4 mm wide, brown to dark brown except the margins which are bright yellow to creamy yellow. Stamens 6, 3 adnate basally to the inner tepals, 3 alternating with them and adnate basally to antetepals, the filament poorly formed, 0.2–0.4 mm long, 0.15–0.2 mm diameter; anthers all similar, versatile, 0.4–0.5 mm long and 0.2–0.3 mm wide, creamy yellow to bright yellow. Pistillode poorly formed, *c.* 0.2 mm long and 0.15 mm diameter, hyaline or pale yellow. **Female inflorescences** 15–55 cm long, 0.1–0.2 cm broad; the scape cylindrical or slightly flattened, scabrous, yellowish green, whitish brown, or light purple, 7–33 cm long, 0.1–0.25

cm broad; the primary rachis cylindrical, slightly flattened, 4- or irregular angled or channelled or slightly to strongly longitudinal ribbed, scabrous or rarely minute verruculose, (7–)20–46 cm long, bearing numerous branches and flower clusters, occasionally unbranched; branches and flower clusters appearing whorled or opposite at nodes; inflorescence branches cylindrical, slightly flattened, 4- or irregular angled or slightly longitudinal ribbed, scabrous or rarely minute verruculose, 1–12 cm long; flower clusters with branches 1–6.5 cm apart on the primary rachis. Female inflorescences occasionally not developing a third rachis (second branch). Bracts of inflorescences usually 3 or 4, long- to short-deltoid, 4–13(–18) mm long, 2–3 mm wide at the widest point, with 3–5(–7) veins; bracts of branches and flower clusters usually 3 or 4, long- to short-deltoid, 1.5–6 mm long, 1.5–2 mm wide at the widest point, with 1–5 veins, longest at the basal node of rachis, shorter upwards along primary rachis as well as on secondary rachis, shorter and narrower distally. **Female flowers** usually in group of 3–10, similar ages within each cluster; each flower subtended by 1–3 cucullate bracteoles, 1–1.5 mm long, 0.5–2 mm wide, membranous, white, or pale yellow with purple tinges in the middle, completely encircling the flower base. Female flower sessile or very shortly pedicellate, the pedicels *c.* 0.5 mm long and 0.4 mm wide; outer 3 tepals (sepals) broadly ovate, 1.5–3.5 mm long, 0.6–1.8 mm wide, creamy to pale yellow with purple tinges at the apex, adnate at the base; inner 3 tepals (petals) ovate, 2–2.5 mm long, 1–1.6 mm wide, adnate near the base. Staminodes 6, attached inside the centre and lower margin of each inner tepal, whitish-transparent, *c.* 0.3 mm long and 0.2 mm wide. Pistil conspicuous, styles short and fused with 3 stigmatic lobes; ovary urn-shaped, 1.5–2 mm long, 1–1.1 mm wide; locules 3; ovules 1 per loculus. **Fruits** sessile, in groups of 1–9 of similar ages. Fruiting styles 0.2–0.3 mm long. Capsules 5–6 mm long, 5–5.5 mm diameter, carpels transversely wrinkled at maturity, green to brownish green with yellowish margins outside, light green to whitish yellow inside; the 6 hardened perianth segments persistent,

2–2.5 mm long, 1.6–2 mm wide; the hardened bracts occasionally persistent, 1–1.5 mm long, 0.8–1.5 mm wide. **Seeds** 1 per locule, ovoid, 3.5–4 mm long by 1.5–2.1 mm wide, 2-angled

on inner face, rounded on outer face, smooth or slightly rough, translucent, whitish brown. **Fig. 1.**



**Fig. 1.** *Lomandra beaniana* (A–I ♂, J–O ♀). A. tuft with inflorescence. B. inflorescence. C. flower. D. flower spread open. E. leaf. F. distal part of leaf showing its flattened apex. G–I. cross sections of leaf. J. tuft with inflorescence. K. inflorescence. L. unopened flower with a short pedicel. M. flower spread open. N. unopened fruit. O. side section of fruit. A–D from Wang *et al.* 1022 (BRI); E from Wang *et al.* 1234 (BRI); F–I from Bean 27807 (BRI); J & K from Bean 33768 (BRI); L & M from Moss *s.n.* (BRI AQ779532); N & O from Bean 19620 (BRI). Del. N. Crosswell.

**Additional selected specimens examined: Queensland.** WARREGO DISTRICT: Mt Maria, *s.dat.*, in 1876, *Bailey s.n.* (BRI [AQ118363]); Orkadilla SF, Jun 2022, *Wang JW1234*, *Hudson & Hede* (BRI). MARANOVA DISTRICT: 0.5 km E of Mt Elliot HS, *c.* 40 km N of Mungallala, Jun 2008, *Bean 27807* (BRI); Chesterton Range NP, *c.* 120 m from track which runs between Winneba house and track marker #24, 6.1 km from Winneba house on a bearing of 335 degrees, Jun 2022, *Wang JW1275*, *Hudson & Hede* (BRI). LEICHHARDT DISTRICT: 10 km S of Isla Gorge Lookout, 37 km by road S of Theodore, Jun 1971, *Johnson 7177* (NSW); Lonesome Section, Expedition NP, Dawson River lookout to North, Aug 2003, *Semple 596* (BRI); 1.8 km NW of Cracow on Cracow Gold Mine Lease, Nov 2003, *Thompson & Gleeson MUN024* (BRI); 61 km N of Injune towards Rolleston, along Carnarvon Developmental Road, Nov 2006, *Crisp 10164 & Morris*, (BRI, CANB). PORT CURTIS DISTRICT: Headwaters of Boyne River, SF 391, Bobby Range, May 1995, *Thompson & Turpin CAL247* (BRI). DARLING DOWNS DISTRICT: Texas, Sep 1910, *Boorman s.n.* (NSW 50980); Barakula Forest near Chinchilla, Aug 1957, *McGillivray 331* (NSW); Bracker SF, *c.* 3.5 km S of Forestry Tower, Oct 1994, *Sparshott KMS335 & Sparshott* (BRI); Kerimbilla SF 3, 50 km NE of Goondiwindi, Aug 2009, *Forster PIF36049 & Thomas* (BRI); Pozieres Road, W of Cottonvale, Jan 2021, *Bean 33768* (BRI). BURNETT DISTRICT: Mt Perry, *s.dat.*, *Keys s.n.* (BRI [AQ118331]); 'Narayan', E of village, Oct 1966, *Tohill N2* (BRI); Steep ridge leading to Castle Mt, Cania Gorge, *c.* 36 km NW of Monto, Nov 1976, *Stanley s.n.* (BRI [AQ 14049]); Dead End Lookout, Coomingleh SF, Oct 1983, *Henderson H3009*, *Guymer & Dillewaard* (BRI); Gayndah Road, Hivesville, Oct 1989, *McKenzie s.n.* (BRI [AQ 470187]); Eastern section of SF 132 Allies Creek, S of Mundubbera, Nov 2002, *Bean 19620* (BRI); Perry River, *c.* 2.1 km ESE of Mt Perry township, *c.* 19 km W of Booyal, Aug 2003, *Moss s.n.* (BRI [779532]). WIDE BAY DISTRICT: E side of Cooloola Coast Road, 49 km S of Maryborough, Sep 1989, *Jobson 940 & Lum* (MEL); Kinkuna NP on western old road, 12 km from fire break, Jun 1994, *Brushe JB1025*, *Tweedie & Melzer* (BRI); SF 645, N of Gin Gin, Feb 1995, *Bean 8394* (BRI); Burrum Coast NP, Woodgate Section, Oct 1996, *Forster PIF19926 & Leiper* (BRI). MORETON DISTRICT: Mt Gravatt, Brisbane, May 1967, *Clifford s.n.* (BRI [AQ252807]); Beerwah SF, Sep 1980, *Dillewaard 90 & Olsen* (BRI); *c.* 1 km from housing development at Collingwood Park, Ipswich, Nov 1983, *Williams 83055* (BRI); Hartmann Park, Crows Nest, Oct 1994, *Bean 7937 & Thompson* (BRI); Plunkett Conservation Reserve, Cedar Creek, Logan City, Plunkett Hill near Wickham Forest Reserve, Quinzeh Creek Road, Sep 2016, *Moss & Roberts P001* (BRI); Near Camira Fire Station, Old Logan Road, Jul 2020, *Wang s.n.* (BRI [AQ1020110]); Bungaree, Crows Nest NP, Sep 2020, *Wang JW1022*, *Hudson & Hogan* (BRI). **New South Wales.** NORTH WESTERN SLOPES: Attunga SF, Nov 1987, *Hosking s.n.* (NSW 598024). CENTRAL WESTERN SLOPES: Burrendong Arboretum, Sep 1973, *Althofer s.n.* (NSW 151520); West Cookey's Plains SF, Yarrabandai, Jul 1976, *Cunningham 4713 & Milthorpe* (NSW); Eulimore Springs, Eugowra, Sep 2000, *Welsh s.n.* (NSW 597850).

**Distribution and habitat:** *Lomandra beaniana* is endemic to south-eastern Queensland, and north-eastern New South Wales, where it is widespread, extending from near Byfield in Queensland, south to near Molong in New South Wales (**Map 1**). The species occurs from near sea level to 700 m elevation in open forest and woodland dominated by a variety of *Eucalyptus* and *Corymbia* species on diverse sandy to loamy substrates derived from granite, quartz and sandstone.

**Phenology:** Male flowering for *Lomandra beaniana* has been recorded mainly from June to December, but can occur as early as April. Female flowering has been recorded from May to October, and fruiting starts from September and October. Mature fruits were collected in October, November, and January.

**Notes:** *Lomandra beaniana* is putatively related to other species in the *L. multiflora* group of eastern and north-eastern Australia but differs in having almost terete or subterete leaves. It further differs from *L. multiflora* subsp. *multiflora* in having shorter pedicels of male flowers (2.5–3.5 mm vs 4–12 mm). It is also distinguished from *L. multiflora* subsp. *dura* in having longer male flower pedicels (2.5–3.5 mm vs 0–2 mm). It differs from *L. decomposita* in having ellipsoid male flower buds and larger flowers (2.5–2.8 mm long by 1–1.4 mm wide vs 1–1.1 mm long by 0.7–0.8 mm wide). Although *L. beaniana* is within the same group as *L. patens* and *L. ramosissima*, it has a dissimilar appearance and can be further distinguished in having once-branched female inflorescences. Female inflorescences of the latter two species are twice- or more branched.

**Conservation status:** *Lomandra beaniana* can be a common species where it occurs. It is recorded from several National Parks and is not known to be at risk. Therefore, it is assessed as **Least Concern** using the IUCN (2022) criteria.

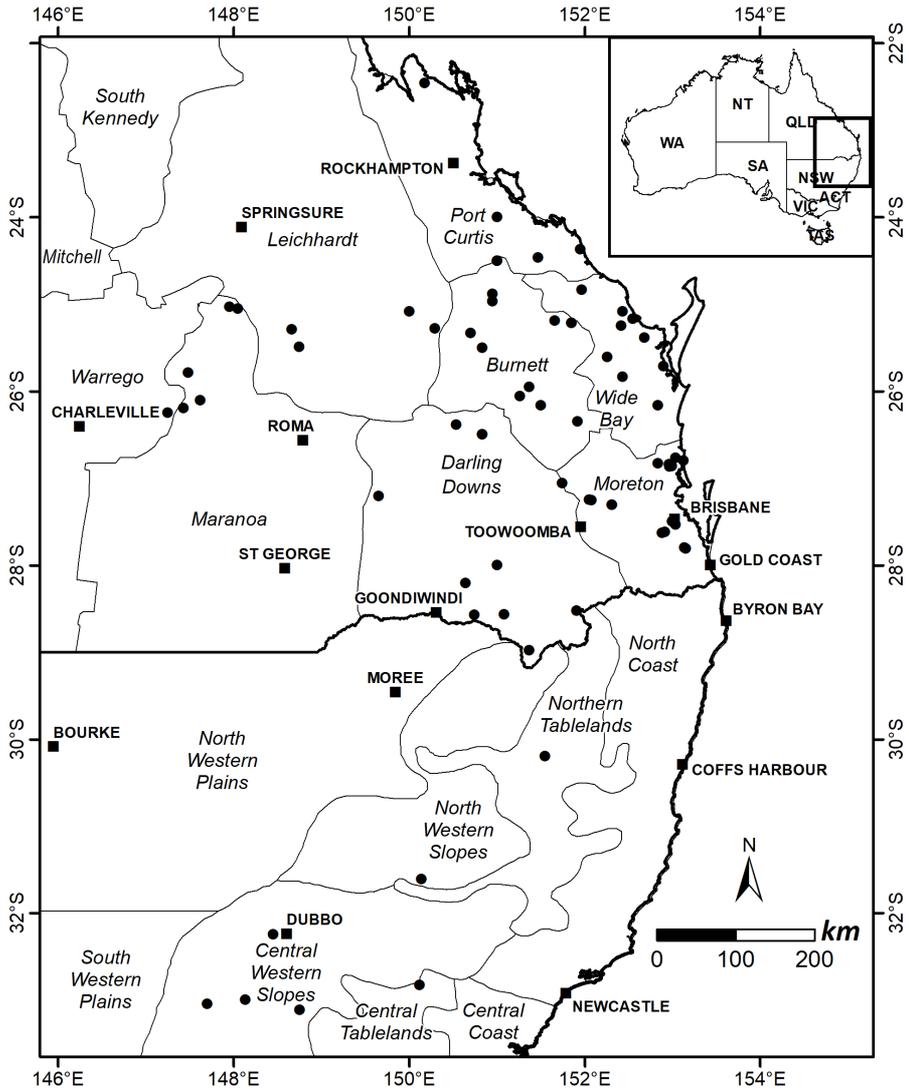
**Etymology:** This specific epithet honours Mr Tony Bean of the Queensland Herbarium. Tony has been a taxonomist and my colleague for many years. He has named and published c. 250 species and collected more than 35,000 plant specimens for Australian and international herbaria.

### Acknowledgements

I am grateful to the following staff at the Queensland Herbarium who have helped in the preparation of this manuscript: Ms Nicole Crosswell for the illustrations; Ms Jiaorong Li for the distribution map. I also wish to thank Dr John Conran for reviewing and commenting on the manuscript, and the Directors of CANB, CNS, DNA, JCT, MEL, NSW and NT for providing loan specimens.

### References

- BRIGGS, B. (1986). Chromosome numbers in *Lomandra* (Dasygongonaceae). *Telopea* 2: 741–744.
- CHAH (2023). *Australian Plant Census*. <http://biodiversity.org.au/nsl/servicers/apc>, accessed 10 February 2023.
- CHASE, M.W. & STEVENS, P.F. (1998). An ordinal classification for the families of flowering plants. *Annals of the Missouri Botanical Garden* 85: 531–553.
- CHASE, M., DUVAL, M.H., HILLS, H.G., CONRAN, J.G., COX, A.V., EGUIARTE, L.E., HARTWELL, J., FAY, M.F., CADDICK, L., CAMERON, K. & HOOT, S. (1995). Molecular phylogenetics of Liliaceae. In P.J. Rudall *et al.* (eds.), *Monocotyledons: Systematics and Evolution*, pp. 109–137. Royal Botanic Gardens, Kew: London.
- CHASE, M.W., REVEAL, J.L. & FAY, M.F. (2009). A subfamilial classification for the expanded Asparagalean families Amaryllidaceae, Asparagaceae and Xanthorrhoeaceae. *Botanical Journal of the Linnean Society* 161: 132–136.
- GOVAERTS, R., ZONNEVELD, B.J.M. & ZONA, S.A. (2022). *World Checklist of Asparagaceae*. Facilitated by the Royal Botanic Gardens, Kew. <https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:30275682-2>, accessed 10 February 2022.
- GUNN, B.F., MURPHY, D.J., WALSH, N.G., CONRAN, J.G., PIRES, J.C., MACFARLANE, T.D. & BIRCH, J.L. (2020). Evolution of Lomandroideae: Multiple origins of polyploidy and biome occupancy in Australia. *Molecular Phylogenetics and Evolution* 149 (106836): 1–16.
- IUCN STANDARDS AND PETITIONS COMMITTEE (2022). *Guidelines for Using the IUCN Red List Categories and Criteria. Version 15.1. Prepared by the Standards and Petitions Committee*. Downloadable from <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>.
- LEE, A.T. (1966). Xanthorrhoeaceae. *Contributions from the New South Wales National Herbarium, Flora Series* 34: 16–42.
- LEE, A.T. & MACFARLANE, T.D. (1986). *Lomandra*. In A.S. George (ed.), *Flora of Australia* 46: 100–141. Australian Government Publishing Service: Canberra.
- WANG, J. (2023a). *Lomandra grayi* Jian Wang *ter* (Laxmanniaceae), a new species from north-east Queensland, Australia. *Austrobaileya* 13: 1–6.
- (2023b). *Lomandra hispidula* (Asparagaceae), a remarkable new species from south-eastern Queensland, Australia. *Kew Bulletin* 78: 223–228.



**Map 1.** Distribution of *Lomandra beaniana* ● showing distribution in Queensland Pastoral Districts and New South Wales botanical regions.