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*angustifolia* and *Patersonia*  
*occidentalis* var. *latifolia*  
(Iridaceae)

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Environment and Conservation  
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## Reinstatement of *Patersonia occidentalis* var. *angustifolia* and *Patersonia occidentalis* var. *latifolia* (Iridaceae)

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### Abstract

Gibson, N. Reinstatement of *Patersonia occidentalis* var. *angustifolia* and *Patersonia occidentalis* var. *latifolia* (Iridaceae). *Nuytsia* 16(1): 21–27 (2006). *Patersonia occidentalis* R.Br. var. *angustifolia* Benth. and *Patersonia occidentalis* R.Br. var. *latifolia* (F.Muell.)Benth. are reinstated and a lectotype for *P. occidentalis* var. *angustifolia* is selected. Both *P. occidentalis* var. *angustifolia* and *P. occidentalis* var. *latifolia* are endemic to south-west Western Australia. *P. occidentalis* var. *angustifolia* occurs along drainage lines and in seasonal swamps while *P. occidentalis* var. *latifolia* occurs in drier habitats generally on clays or loams associated with laterite, granite or sandstone. The three varieties can be separated using a combination of leaf width, scape length and leaf aspect ratio.

### Introduction

Since Brown (1810) named *Patersonia occidentalis* it has been recognised that the taxon encompasses significant morphological variation. Bentham (1873) recognised three varieties, two of which (var. *latifolia* and var. *angustifolia*) were synonymized by Geerinck (1974) and Cooke (1986), while the third (var. *eristophana* (F.Muell.)Benth.) is considered to be a synonym of the closely related *P. limbata* Endl. (Cooke 1986). While commenting on wide variation in morphological characters, Cooke (1986) was unable to differentiate any infraspecific taxa due to the continuous nature of the variation. During a regional quadrat-based flora survey of the southern Swan Coastal Plain (Gibson *et al.* 1994) a narrow leaf form of this taxon was noted to preferentially occur along creeklines and in swamps. This form was assigned the phrase name '*Patersonia* sp. Swamp form (N. Gibson & M. Lyons 544)' (Paczkowska & Chapman 2000). Subsequently, all *Patersonia occidentalis* material in HO, MEL and PERTH was examined to determine if this narrow leaf form warrants taxonomic recognition.

### Materials and methods

In total 440 collections were examined including photos of the Brown syntypes from BM. For 316 of the collections there was sufficient material to measure leaf length, leaf width, scape length (to base of spathe), spathe length and spathe width. The longest leaf and largest flower of each collection was measured. The data was normalized and an association matrix based on Euclidean distance was calculated. This matrix was ordinated using non-metric multi-dimensional scaling (MDS), and analysis of similarity (ANOSIM) was used to test differences in rank association between presumed taxa. All analyses being undertaken in Primer Ver. 6.1.5 (Clarke & Gorley 2006). Leaf aspect ratio (leaf length / leaf width) was subsequently calculated and compared between the presumed taxa.

## Results

The ordination confirmed wide and continuous variation in leaf and flower characters in *Patersonia occidentalis* with no clear separation of any groups in the ordination space. Examination of the all relevant type material suggested that two of the varieties named by Bentham (var. *angustifolia* and var. *latifolia*) fell at the extremes of the ordination space. He discriminated these taxa primarily on leaf width but examination of types showed that syntypes of var. *angustifolia* also had consistently longer scapes and an isotype of var. *latifolia* (*Oldfield*, MEL 40536) had a short scape.

The collections were divided into three groups. Group 1 – with narrow leaves (<5.5 mm) and long scapes (>750 mm) and included the syntypes of var. *angustifolia*; group 2 – those with short scapes (<750 mm) and wide leaves (>7 mm) and included the isotype of var. *latifolia*, and the remainder (group 3) with leaf widths <7 mm and scapes of <750 mm and included all other available type material. (Figure 1)

A one-way ANOSIM analysis was used on the association matrix to test if significant differences in rank similarity did occur between these three groups. This procedure determined significance by Monto-Carlo permutation of the original association matrix (Clarke & Gorley 2006).

Significance differences were found between the three groups (Global  $R=0.549$ ,  $P<0.001$ ) and pairwise tests showed highly significant differences between all three groups (group 1 v groups 2,  $R=0.950$ ,  $P<0.001$ ); group 1 v group 3,  $R=0.678$ ,  $P<0.001$ ; groups 2 and 3  $R=0.457$ ,  $P<0.001$ ). Leaf aspect ratio was also highly significantly different between the groups (95% confidence intervals were: group 1, 170.4 – 242.9; group 2, 41.6 – 53.1; group 3, 93.2 – 104.5).

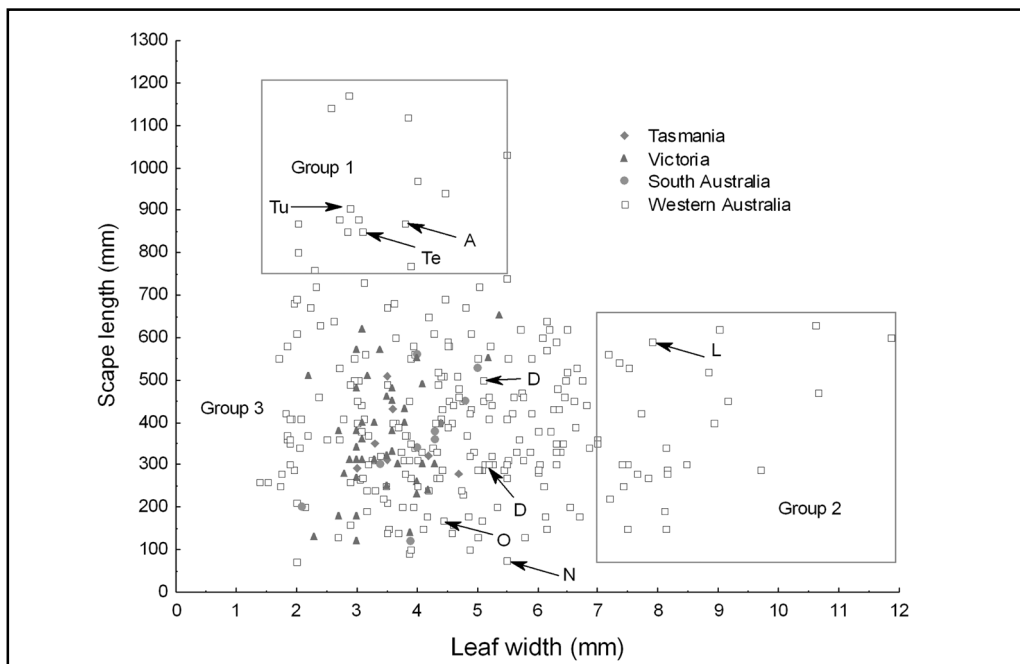


Figure 1. Plot leaf width against scape length for 316 collections. Collections from Tasmania (◆); Victoria (▲); South Australia (●); Western Australia (□). The three groups of collections corresponding to Bentham's varietal classification are shown. Type material arrowed: A – lectotype *P. occidentalis* var. *angustifolia* (MEL 40598); D – syntypes *P. diesingii* (MEL 40592, MEL 40593); L – isotype *P. occidentalis* var. *latifolia* (MEL 40536); N – lectotype *P. nana* (MEL 40595); O – lectotype *P. occidentalis* var. *occidentalis* (BM 5613); Te – isolectotype *P. tenuispatha* (MEL 40597); Tu – isolectotype *P. turfosa* (MEL 40596).

## Discussion

While there are no clearly distinct morphological groupings within *Patersonia occidentalis* the multivariate analysis supports the reinstatement of both *P. occidentalis* var. *angustifolia* and *P. occidentalis* var. *latifolia* as leaf, scape and spathe characters shows consistent differences from each other and the typical form. Given the gradational changes in all characters measured, varietal rank is considered to be appropriate.

Both *P. occidentalis* var. *angustifolia* and *P. occidentalis* var. *latifolia* are restricted to south-west Western Australia (Figure 1). *P. occidentalis* var. *angustifolia* is apparently confined to streamlines and swamps. In Western Australia *P. occidentalis* var. *occidentalis* occurs widely across the landscape in both upland and wetland situations, while *P. occidentalis* var. *latifolia* is generally found in drier habitats.

The original collection designated as '*Patersonia* sp. Swamp form (N. Gibson & M. Lyons 544)' has a short scape and is best considered a narrow leaf form of *P. occidentalis* var. *occidentalis*.

## Taxonomy

***Patersonia occidentalis*** R.Br., *Prodr.* 304 (1810). *Type*: Bay I [Lucky Bay], South Coast [Western Australia], Jan. 1802, *R. Brown* (*lecto*: BM 5613 in part, *fide* D. Geerinck, *op. cit.* 52; *lectopara*: BM 5613 left hand element, BM 5614, BM 5615).

*Distribution*. South-west Western Australia from south of Shark Bay to Israelite Bay, in south-east South Australia, Victoria and northern and eastern Tasmania (Cooke 1986).

*Notes*. Three intergrading varieties can be recognized based on leaf width, scape length and leaf aspect ratio.

### ***Patersonia occidentalis*** R.Br. var. ***occidentalis***

*Patersonia longiscapa* Sims ex Sweet, *Fl. Australasica* t. 39 (1828). *Type*: cultivated in England from seed collected from south coast of Australia by W. Baxter, *n.v.* While no type material has been found the illustration and description in Sweet *op. cit.* clearly falls within the circumscription of *P. occidentalis* var. *occidentalis*.

*Patersonia sapphirina* Lindley, *Edw. Bot. Reg.* 25: t. 60 (1839). *Type*: cultivated in England from seed obtained by Mangles, *n.v.* The lack of type material and the absence of a scale on the illustration in Lindley *op. cit.* make it difficult to definitively assign this material.

*Patersonia diesingii* Endl. in J.G.C. Lehmann, *Pl. Preiss.* 2: 30 (1846). *Type*: Perth [Western Australia], 16 July 1839, *Preiss* 2356 (*lecto*: S, *n.v.*, *fide* D. Geerinck, *op. cit.* 51; *isolecto*: FI, *n.v.*, *fide* D. Geerinck *op. cit.* 51, !MEL 40593, !MEL 40592, P *n.v.*, *fide* D. Geerinck *op. cit.* 51).

*Patersonia flaccida* Endl. in J.G.C. Lehmann, *Pl. Preiss.* 2: 30 (1846). *Type*: In solo fertili planitie prope fluvium Saltrive [Salt River], York, 26 Mar. 1840, *Preiss* 2355 (*lecto*: BR, *n.v.*, *fide* D. Geerinck *op. cit.* 51).

*Patersonia nana* Endl. in J.G.C. Lehmann, *Pl. Preiss.* 2: 30 (1846). *Type*: In arenosis ad Stirling's-terrace, Plantagenet, 23 Sept. 1840, *Preiss* 2346 (*lecto*: !MEL 40595, *fide* D. Geerinck *op. cit.* 52).

*Patersonia occidentalis* var. *aemulans* Domin, *J. Linn. Soc. Bot.* 41: 254 (1912). *Type*: Slab Hut Gully on way to Cranbrook [Western Australia], 1909, *Dorrien-Smith*; *holo*: K, *n.v.*, *fide* Domin *op. cit.*

Tufted *herb*. *Leaves* ensiform, 10–90 cm long, 1.5–7.0 mm wide, finely veined, glabrous, leaf aspect ratio (25–) 93–105 (–345) : 1. *Scape* 7–74 cm, glabrous. *Spathes* elliptic, 28–56 (–70) mm long, 3.7–14.9 mm wide in flower, glabrous.

*Selected specimens examined*. WESTERN AUSTRALIA: Boulder Hill, Two Peoples Bay, 6 Oct. 1992, *A.R. Annels* 2612 (PERTH); Nannup, 10 June 1996, *R. Davis* 1161 (PERTH); N of Thistle Cove, E of Esperance, 21 Jan. 1966, *A.S. George* 7530 (PERTH); Fitzgerald River below Roes Rock, 18 Dec. 1970, *A.S. George* 10528 (PERTH); Scott National Park, 9 Apr. 1990, *N. Gibson & M. Lyons* 218 (PERTH); Wheatbelt, Ronnerup Lake (Reserve 39422), 22 Nov. 1994, *M. Graham* G204-20 (PERTH); Hi Vallee property, Warradarge, 23 Oct. 1999, *M. Hislop* 1707 (PERTH); 19.7 km S of Northcliffe on Windy Harbour Rd, 10 Jan. 1995, *E.D. Kabay* 1359 (PERTH); Lowlands property, 8 km WNW of Serpentine, 13 Sep. 1992, *B.J. Keighery & N. Gibson* 825 (PERTH); North Jindong Road, c. 2 km S of Bussell Highway, 15 Oct. 1992, *B.J. Keighery & N. Gibson* 1077 (PERTH); 60.4 km W along State Barrier Fence Access from NW Coastal Highway, 26 Aug. 1994, *G.J. Keighery & N. Gibson* 1512 (PERTH); Kodjilup Nature Reserve, 21 Oct. 1997, *G.J. Keighery & N. Gibson* 2738 (PERTH); 3 km S of Mount Barker, 25 Oct. 1977, *K.F. Kenneally* 6500 (PERTH); c. 3.3 km S of Tambellup, 1998, *F. Obbens* 359/98 (PERTH); Beverley Airfield Reserve, 10 Oct. 2000, *M. Ochtman* 442 (PERTH); Carousel Swamp, opposite Cannington Station, 3 Oct. 1996, *L.W. Sage* 786B (PERTH); 4 km south of Hutt R along NW coastal highway, 31 Aug. 1982, *P.S. Short* 1600 (MEL); McKenzie Rd, W of Narrogin town, 29 Oct. 2002, *G. Warren & P. Rose* 685 (PERTH). SOUTH AUSTRALIA: Lofty Ranges, Dec. 1851 (MEL); c. 8 km NE of Myponga, 5 Dec. 1977, *N.N. Donner* 5975 (HO); Swamps near Mt Benson, 1895, *Dr Engelhart s.n.* (MEL); Square waterhole c. 3 km S of Mt Compass, 3 Apr. 1974, *E.N.S. Jackson* 2465 (MEL); Onkaparinga River, Dec. 1898, *Mueller* (MEL); St Vincents Gulf/Lofty Ranges, *Mueller* (MEL); Clarendon, 6 Nov. 1881, *O. Tepper* 261 (MEL); Clarendon, Swampy Creek, 6 Nov. 1881, *O. Tepper* 262 (MEL); Forest Reserve, Knott Hill, 15 Jan. 1985, *H.P. Vonow* 358 (HO). VICTORIA: Frankston to Skye, 7 Nov. 1901 (MEL); near Mt Abrupt, Grampians (MEL); Lower Glenelg R area, Kentbrush heathland, N of Mt Kincaid, 2 Nov. 1968, *A.C. Beauglehole* 29378 (MEL); Nooramung Wildlife Res, Snake Is, 25 km SSW Yarram, 5 Dec. 1978, *A.C. Beauglehole s.n.* (MEL); Grampians, Jimmy's Creek area, 26 km S of Halls Gap PO, 6 Dec. 1979, *A.C. Beauglehole* 66936 (MEL); Kargenon Flora Reserve, 7 Nov. 1982, *A.C. Beauglehole* 71174 & *L.K. McElmore* (MEL); Mirranalwa Gap, Grampians, 20 Nov. 1972, *B. Conn s.n.* (MEL); Boronia Primary School Flora Res., 29 Nov. 1986, *B.J. Conn* 2560 (MEL); Otway Region, Great Ocean Rd, 5.5 km from Apollo Bay, 9 May 1983, *G.E. Earl* 201 & *D.M. Parkes* (MEL); Emerald, Nov. 1904, *J.P. McLennan s.n.* (MEL); Port Phillip, *Mueller s.n.* (MEL); Port Phillip, Victoria, *Mueller* (HO); Wilson's Promontory, Norman Point, 15 Dec. 1958, *T.B. Muir* 625 (MEL); On the Frankston-Cranbourne Rd, 4 miles from Cranbourne, 9 Nov. 1961, *T.B. Muir* 2507 (MEL); Gippsland, E of Andersons Inlet, 5 m from Tarwin Lower, 14 Oct. 1961, *T.B. Muir* 2357 (MEL); On Kirkpatrick Rd, c. 2 km N of Maclesfield, 20 May 1977, *A.M. Opie, A.B. Wellington, R.A. Hosks s.n.* (MEL); Grampians, 26 Apr. 1986, *S.T.W. Partett* 91 (MEL); Oberon Bay Swamp, Wilsons Promontory, 14 Nov. 1908, *A. St John s.n.* (MEL). TASMANIA: West Tamar, c. 5 miles from Greens Beach (HO); E of Hardwich Hill, 24 Nov. 1984, *A.M. Buchanan* 1780 (HO); Low Head, Georgetown, Dec. 55, *W.M. Curtis* (HO); New communications tower, Waterhouse, 18 Nov. 1975, *D.I. Morris* (HO); 1 km SW of Cape Naturaliste, 13 Oct. 1983, *A. Moscal* 3432 (HO); Near One Tree Hill, 21 Nov. 1983, *A. Moscal* 4261 (HO); 2 km E of Croppies Point, 24 Nov. 1983, *A. Moscal* 4420 (HO); Black Rock Pt, 26 Nov. 1983, *A. Moscal* 4488 (HO); Kelso, 2 Dec. 1975, *M. Thompson* (HO).

*Distribution and habitat.* Widespread and common in south-west Western Australia but largely absent from the Avon-Wheatbelt and northern Mallee bioregions. Also occurring in South Australia, Victoria and Tasmania. Occurs most commonly in woodlands and shrublands on a variety of soil types, but also recorded from the edge of seasonal wetlands.

*Conservation status.* Common and well conserved.

*Notes.* Differs from var. *angustifolia* by its shorter scape and lower leaf aspect ratio (generally 93–105 : 1). Differs from var. *latifolia* by its narrower leaves and higher leaf aspect ratio.

***Patersonia occidentalis*** R.Br. var. ***angustifolia*** Benth., *Fl. Austral.* 6, 403 (1873). *Type:* Murchison River [Western Australia], *Oldfield* (*lecto*, here designated: MEL 40598. *Other material:* [Western Australia] *Preiss* 2358 (cited in error by Benthham as 2338), *lectopara:* !MEL 40596, !MEL 40597, P (two sheets), S).

*Patersonia tenuispatha* Endl. in J.G.C. Lehmann, *Pl. Preiss.* 2, 31 (1846). *Type:* near Whitefield station, York [Western Australia], 15 Mar. 1840, *Preiss* 2358 p.p. (*lecto:* P, *n.v.*, *fide* D. Geerinck *op. cit.* 51; *isolecto:* !MEL 40597).

*Patersonia turfosa* Endl. in J.G.C. Lehmann, *Pl. Preiss.* 2, 31 (1846). *Type:* Mt. Eliza, Perth [Western Australia], 21 Jan. 1839, *Preiss* 2358 p.p. (*lecto:* S, *n.v.*, *fide* D. Geerinck *op. cit.* 51; *isolecto:* !MEL 40596, P, *n.v.*, *fide* D. Geerinck *op. cit.* 51).

Tufted *herb.* Leaves ensiform, 42–105 cm long, 2.0–5.5 mm wide, finely veined glabrous, leaf aspect ratio (105–) 170–243 (–352) : 1. Scape 76–120 cm, glabrous. *Spathes* elliptic, 30–53 mm long, 5.5–11.4 mm wide in flower, glabrous.

*Specimens examined.* WESTERN AUSTRALIA: Lower Shannon Bridge on Preston Road, 21 Nov. 1994, *A.R. Annels* 4968 & *R.W. Hearn* (PERTH); E of Bibra Lake, Nov. 1979, *P. Bridgewater* s.n. (PERTH); S side of Fishermen Rd, 6.9 km by road SE of beach at Broke Inlet, 21 Nov. 1990, *N. Gibson* & *M. Lyons* 852 (PERTH); Harry Waring Marsupial Reserve, S of Thomsons Lake Nature Reserve, 9 Oct. 1992, *N. Gibson* & *M. Lyons* 1494 (PERTH); Ralph Rd, Pemberton, near Warren National Park, 21 Nov. 1993, *Graham* 2143 (PERTH); Wonnerup Road reserve, 8 km ESE from the Bussell Hwy, 16 km E of Busselton, 16 Oct. 1992, *B.J. Keighery* & *N. Gibson* 827 (PERTH); Along Bambun Road, c. 0.5 km from Highway, 7.5 km S of Gingin, 16 Nov. 1992, *B.J. Keighery* & *N. Gibson* 1078 (PERTH); Yallingup Siding near Busselton, 15 Oct. 1992, *B.J. Keighery* & *N. Gibson* 1079 (PERTH); Lowlands property near SW boundary, c. 9 km WNW of Serpentine, 6 Nov. 1993, *B.J. Keighery* & *N. Gibson* 1123 (PERTH); Near corner of Fawcett and Bulla Rds, 3 km SW of Waroona, 29 Sep. 1990, *B.J. Keighery* & *N. Gibson* 1151 (PERTH); c. 18 km NW of Pemberton, Nelson Location 5049, 28 Dec. 1981, *T.D. Macfarlane* 729 (PERTH); South of Swan River, in Darling Ranges, Nov. 1877, *Mueller* (MEL); *Preiss* 2358 (MEL); Between Moates Lake and Gardner Lake, Two Peoples Bay Nature Reserve, 21 Oct. 1975, *G.T. Smith* & *L.A. Moore* s.n. (PERTH).

*Distribution and habitat.* Endemic to south-west Western Australia from the Murchison River to Two Peoples Bay east of Albany, associated with seasonal wetlands or drainage lines. Except for the Oldfield collection (MEL 40598), all recent collections occur between Perth and Two Peoples Bay. The Oldfield locality may be in error.

*Conservation status.* Not well collected but likely to be overlooked, not considered threatened.

*Notes.* Differs from typical variety by a longer scapes (>750 mm) and high leaf aspect ratio (generally 170–243 : 1). Differs from var. *latifolia* by it narrower leaves (<7mm) and long scapes.

*Lectotypification.* The lectotype selected (*Oldfield*, Murchison River, MEL 40598) was the most complete of the available type material in MEL. While not marked as seen by Bentham, a search of BM and K failed to find any duplicates of this collection.

***Patersonia occidentalis* var. *latifolia*** (F. Muell.) Benth., *Fl. Austral.* 6: 403 (1873). *Type:* Champion Bay [Western Australia], *Oldfield* (*holo:* K, *n.v.*, *fide* D. Geerinck, *op. cit.* 51; *iso:* !MEL 40536).

Tufted herb. *Leaves* ensiform, 20–66 cm long, 7–12 mm wide, finely veined glabrous, leaf aspect ratio (25–)42–53 (–91) : 1. *Scapes* 15–63 cm, glabrous. *Spathes* elliptic, 31–54 mm long, 5.2–14.1 mm wide in flower, glabrous.

*Selected specimens examined* (all PERTH). WESTERN AUSTRALIA: Red Bluff, S of Murchison River mouth, 27 Sept. 1962, *J.S. Beard* 2028; Jarrahdale, Aug. 1939, *W.E. Blackall* s.n.; Commonage Road, 4 Dec. 1996, *N. Casson & T. Annels* SC 33.13; Kalbarri National Park, 11 Oct. 1986, *R.S. Cowan* A 276; 19 km N Muirs Highway, 18 Feb. 1998, *R. Davis* 6029; 6.6 km N Brookton Highway, 22 Mar. 2001, *R. Davis* 9586; on Dwarlaking Road, 26 Oct. 2000, *R. Davis* WW 34–40; Mt Lesueur, 12 Oct. 1957, *C.A. Gardner* s.n.; Boat Harbour, 26 Nov. 1990, *N. Gibson & M. Lyons* 923; Kalbarri National Park, 3 Oct. 1991, *W. Greuter* 22505; Stirling Range National Park, 23 Oct. 1991, *W. Greuter* 23124; 10 km SW of Lake Indoon, 14 Sept. 1977, *R. Hnatiuk* 770987; Port Gregory Rd, 27 Sept. 1985, *N. Hoyle* 465; c. 32.9 km S of Northampton, 22 Aug. 1983, *C.M. Lynch* 82; Kalamunda National Park, 1 Nov. 2000, *K. Macey* 266; 2.3 km SE of North Bannister, 3 Jan. 1982, *T.D. Macfarlane* 741; Armadale Settlers Common, 14 Oct. 1996, *A. Markey* 36; Byford Regional Open Space, 19 Oct. 1996, *A. Markey* 348; Ellis Brook Valley, 10 Dec. 1996, *A. Markey* 583; Kingston Block, 6 Oct. 1998, *E.D. Middleton* K 157; off Trigwell Bridge Rd, 12 Aug. 1997, *G. Paull* 1593; c. 22.5 miles from Dongara toward Eneabba, 22 Sept. 1972, *M.E. Phillips* s.n..

*Distribution and habitat.* Endemic to south-west Western Australia from south of Shark Bay to the Stirling Range, generally on upland areas or drier slopes with clay or loam soils associated with laterite, granite or sandstone but has also been recorded from growing on sand.

*Conservation status.* Not well collected but likely to be overlooked, not considered threatened.

*Notes.* Differs from both the typical variety and var. *angustifolia* by its wider leaves (>7 mm) and low leaf aspect ratio (generally 42–53 : 1).

### Acknowledgements

Assistance was provided by ABLO officers P. Short, P. Weston and A. Wilson in supplying photos of the Brown syntypes and checking collections at BM and K, and J. Ross rechecked type material held in MEL. Managers of HO, MEL and PERTH allowed access to their collections. Paul Wilson and an anonymous referee offered valuable comments on an earlier draft.



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