

A taxonomic revision of the Western Australian endemic species *Kennedia coccinea* (Fabaceae)

Terena R. Lally

Australian National Herbarium, Centre for Plant Biodiversity Research,
GPO Box 1600, Canberra, ACT 2601
Email: Terena.Lally@csiro.au

Abstract

Lally, T.R. A taxonomic revision of the Western Australian endemic species *Kennedia coccinea* (Fabaceae). *Nuytsia* 20: 201–215 (2010). Two new subspecies are described in *Kennedia coccinea*; *K. coccinea* subsp. *esotera* Lally and *K. coccinea* subsp. *calcaria* Lally. Distribution maps are provided for all the subspecies, and photographs of the type specimens for the new subspecies.

Introduction

As part of a revision of the subtribe Kennediinae (Phaseoleae, Fabaceae), several preliminary papers are being prepared. The genus *Kennedia* Vent., the initial focus of this revision, comprises 16 known taxa, 13 of which occur in south-west Western Australia. Of these 13 taxa, *Kennedia coccinea* (Curtis) Vent. is one of the more widespread, occurring throughout much of the south-west portion of the state in a range of habitats. Like many species of *Kennedia*, *K. coccinea* has a long history of cultivation, having been initially grown in Europe as a glasshouse plant in the late 1800s and early 1900s. It continues to be a popular horticultural subject today, especially in Australia (Elliot & Jones 1993, Wrigley & Fagg 2003).

Within the genus, *K. coccinea* is recognisable by its umbellate to very shortly-racemose inflorescences of few to many flowers, sometimes on a distinct peduncle. It is the only species with the wing petals longer than the keel petals, and differently coloured wing and keel petals.

Kennedia coccinea exhibits considerable morphological variation throughout its range, with differences in habit, vegetative and reproductive features evident between populations. Some of this variation appears to be environmentally induced or possibly ontogenetic, but certain characters (e.g. flower number, inflorescence type and stigma morphology) appear to be more stable and are also geographically correlated. Extensive field and herbarium studies by the author indicate that the recognition of additional taxa within *K. coccinea* is warranted, and the species is here considered to comprise three subspecies. The rank of subspecies has been adopted as variation in morphology is geographically and ecologically correlated, but areas of overlap and apparent intermediates between the taxa are known.

Kennedia coccinea has a complicated nomenclatural history, exacerbated by its popularity as a horticultural subject in the 19th century, and is the subject of a proposal to conserve the name with a conserved type (Lally & Orchard 2008). This proposal has been followed with respect to the species nomenclature used here. Should this proposal prove unsuccessful, the necessary nomenclatural adjustments will be made in the above-mentioned revision of the subtribe.

Methods

This study is based on examination of dried herbarium specimens (flowers reconstituted where necessary) from CANB, MEL and PERTH, supplemented with extensive field observations on numerous populations throughout the range of the species. The distribution maps were created using ArcGIS Desktop Version 9.3 and show *IBRA Bioregions Version 6.1* (Department of the Environment, Water, Heritage and the Arts 2010). Electronic data for the maps were supplied by MELISR database (National Herbarium of Victoria 2010) and WAHERB database (Western Australian Herbarium 2010).

Taxonomy

Kennedia coccinea (Curtis) Vent., *Jard. Malmaison* 2: 105, t. 105 (1805) *nom. cons. prop.* *Glycine coccinea* Curtis, *Bot. Mag.* 8: t. 270 (1794); *Zichya coccinea* (Vent.) Hügel, *Bot. Arch.* 1: pl. 1, subt. 1 (1837); *Caulinia coccinea* (Vent.) F.Muell., *Fragm.* 7: 128 (1871). *Type*: not cited (*lecto* (here designated): the plate in Ventenat, *Jard. Malmaison* 2: 105, t. 105 (1805)), *typ. cons. prop.*

Kennedia inophylla Lindl., *Edwards's Bot. Reg.* 17, t. 1421 (1831); *Zichya inophylla* (Lindl.) Hügel, *Bot. Arch.* 1: pl. 1, subt. 3 (1837); *Caulinia inophylla* (Lindl.) Kuntze, *Revis. gen. pl.* 1: 171 (1891); *Kennedia coccinea* var. *inophylla* (Lindl.) Domin, *Věstn. Král. České Společn. Nauk, Tř. Mat.-Přir.* 2: 42 (1923). *Type*: 'This fine species appears to have been first raised from New Holland seeds in the Royal Gardens at Kew. Mr Low, in whose Nursery our drawing was made, informs us that it was received from Mr Aiton ... under the name of *Kennedyia inophylla*' (*lecto* (here designated): CGE (the 4 pieces on bottom left hand side of sheet) *n.v.*, image at CANB). *Other material*: no locality, *Lindley s.n.* (probable *syntype*: K!).

Kennedia dilatata Cunn. ex Lindl., *Edwards's Bot. Reg.* 18, t. 1526 (1832); *Zichya dilatata* (Cunn. ex Lindl.) Pritz., *Icon. bot. index* 1181 (1855). *Type*: 'A native of south-west coast of New Holland, where its seeds were gathered by Baxter. Our drawing was made in Mr Knights Nursery in April last.' (*lecto* (here designated): CGE, *n.v.*, image at CANB).

Kennedia coccinea var. *elegans* Paxton, *Paxton's Mag. Bot.* 2: 99, pl. 186 (1835). *Type*: not cited (*lecto* (here designated): the plate, *Paxton's Mag. Bot.* 2: 99, pl. 186 (1835)).

Zichya tricolor Lindl., *Edwards's Bot. Reg.* 25, t. 52 (1839). *Type*: 'The plant now figured was sent by Mr Young, ... of Milford near Godalming.' (*lecto* (here designated): CGE, *n.v.*, image at CANB).

Zichya angustifolia Lindl., *Edwards's Bot. Reg.* 25, subt. 52 (1839); *Kennedia coccinea* var. *angustifolia* (Lindl.) Diels in Engl., *Bot. Jahrb. Syst.* 35: 273 (1904). *Type*: '... Captain Mangles, who received the specimens from Swan River.' (*lecto* (here designated): CGE, *n.v.*, image at CANB).

Zichya pannosa Paxton, *Paxton's Mag. Bot.* 8: 147, pl. (1841); *Kennedia pannosa* (Paxton) Daveau in Bois, *Dict. hort.* 1: 743 (1893–1899). *Type*: 'lately introduced by various parties from the Swan River settlement, Australia, and now cultivated in most nurseries. We procured our drawing, however, from Messrs Young, of Epsom, in May 1840.' (*lecto* (here designated): the plate, *Paxton's Mag. Bot.* 8: 147, pl. (1841)).

Zichya villosa Lindl., *Edwards's Bot. Reg.* 27, misc. p. 41, no. 81 (1841); *Kennedia coccinea* var. *villosa* (Lindl.) Domin, *Věstn. Král. České Společn. Nauk, Tř. Mat.-Přír.* 2: 42 (1923). *Type*: 'Mr Standish of Bagshot has sent specimens for examination. It is from the Swan [River].' (*lecto* (here designated): CGE, *n.v.*, image at CANB).

Kennedia eximia Lindl. ex Paxton, *Paxton's Mag. Bot.* 16: 35, pl. fig. 1 (1849); *Caulinia eximia* (Lindl. ex Paxton) F.Muell., *Fragm.* 7:128 (1871). *Type*: '...raised by Messrs Knight and Perry, from seeds received from Swan River about four years ago, through Mr Drummond.' (*lecto* (here designated): the plate, *Paxton's Mag. Bot.* 16: 35, pl. fig. 1 (1849)).

[*Kennedia dilatata* Sweet, *Hort. brit.* 481 (1826), *nom. inval.*, *nom. nud.*]

[*Kennedia heterophylla* Sweet, *Hort. brit.* 481 (1826), *nom. inval.*, *nom. nud.*]

[*Kennedia inophylla* Sweet, *Hort. brit.* 481 (1826), *nom. inval.*, *nom. nud.*]

Twining, climbing, scrambling or prostrate *shrubs*; *stems* to 4 mm diameter, with sparse to moderately dense, appressed or spreading to ascending or erect, white and sometimes ginger hairs, to glabrescent. *Leaves* discolorous, upper surface green to dark green or grey-green, sometimes glossy, lower surface dull grey-green, petioles 6–60(–70) mm long; *leaflets* 3 or rarely 5, narrowly to broadly ovate, obovate, linear to broadly elliptic or hastate, 5–23(–40) lateral veins, with sparse to dense, appressed or spreading to ascending, white or sometimes ginger hairs on both surfaces, hairs sometimes denser and more erect on lower surface, to glabrescent on upper surface; petiolules 0.5–3(–4) mm long; terminal leaflet larger than laterals, 11–83(–140) mm long, (3–)7–55 mm wide, lateral leaflets 8–68(–100) mm long, (3–)7–41 mm wide; apex rounded or emarginate, apiculate or rarely acuminate; base cuneate or rounded; *stipules* leaf-like, reflexed at 90° or retrorsely appressed against stem, triangular to broadly triangular, 1.7–5 mm long, 1.3–3.2 mm wide, upper surface with moderately dense, spreading to ascending, white or sometimes ginger to brown hairs, lower surface glabrous; apex acute or acuminate; *stipels* rarely absent, narrowly triangular, 1–3 mm long, 0.5–1 mm wide, lower pair sometimes slightly longer than upper, with dense, appressed, white or ginger hairs; apex acute. *Inflorescences* shortly racemose or umbellate, 3–30(–40)-flowered; *peduncle* terete or sometimes more or less flattened, 60–230(–300) mm long, with sparse to moderately dense, appressed or spreading to ascending or erect, white or ginger hairs. *Flowers* 9.5–16 mm long, pedicels 1.5–10(–12) mm long, with dense, ascending or erect, white and ginger to brown hairs; *subtending bracts* caducous, leaf-like, concave, ovate, 1.5–4.5(–6) mm long, 0.4–2.5(–3) mm wide, hairs as for stipules; apex acute or acuminate, sometimes with a pair of early caducous, narrowly ovate to linear inner bracts. *Calyx* cup-shaped to more or less gibbous, 5–8(–9) mm long, including lobes 2–4 mm long, with dense, appressed to spreading, ginger or brown to dark brown hairs, occasionally with white hairs towards base, sometimes overtopped with longer, ascending to spreading, brown hairs. *Corolla* orange-pink, red and pink; *standard* asymmetric, broadly ovate to obovate, (9.5–)9.8–16 mm long, including claw 2.8–4 mm long, (7.8–)8–15 mm wide, orange-red to pink, or orange-pink or rarely entirely pink, all with yellow-green eye, margin red; apex emarginate; base cuneate or rounded,

with a single semi-circular to deltoid callus or area of thickened tissue on inner face of petal at apex of claw; *wings* narrowly obovate, 8.9–14 mm long, including claw 3–4.5 mm long, 1.2–5 mm wide, intense pink; apex rounded; *keel* obovate with distinct pocket on one side, 8–11 mm long, including claw 3.6–5 mm long, 2.7–4 mm wide, red, darker at apex, whitish at base; apex rounded or shortly beaked. *Staminal* filaments to 9.8 mm long. *Ovary* with moderate dense to dense, appressed, white hairs throughout, with longer, ascending to erect, white or sometimes ginger hairs on one side; *style* bent 90° near base, glabrous or with sparse, white hairs basally, stigma capitate or appendaged, with transparent hairs mainly at base and sometimes at apex of appendage. *Pods* sessile, narrowly oblong, flattened or sometimes inflated, with thickened margins, 25–72 mm long, 4–10 mm wide, pale brown to black, with moderately dense, appressed to spreading, white or sometimes ginger hairs; apex acuminate. *Seeds* oblong-elliptic, 2.8–5(–5.2) mm long, 1.5–2.5 mm wide, mottled fawn, brown or dark brown, dull or glossy.

Distribution and ecology. *Kennedia coccinea* is widespread in, and endemic to, the south-west of Western Australia, extending from near Eneabba in the north, south to Augusta, inland to near York, Northam and Brookton, and east along the coast to near Israelite Bay.

This species grows in a range of habitats, from sand over limestone in coastal heath, sandy loam or loam and gravels in jarrah (*Eucalyptus marginata*), marri (*Corymbia calophylla*), karri (*E. diversicolor*) or wandoo (*E. wandoo*) forest or woodland, and lateritic gravelly sands in mallee heath.

Kennedia coccinea is the most floriferous species of the genus, a trait which has ensured its continued popularity as a horticultural subject since it was originally introduced to European gardens in 1803 (Elliot & Jones 1993). It can survive up to six years in cultivation, sometimes longer (Lally, pers. obs.), and as a pioneering species after soil disturbance or fire, it produces massed displays of prolific growth which persist for two or three years, before succumbing to competition (Silsbury & Brittan 1954).

Phenology. Flowering has been recorded from July to December, mature fruit from November to March.

Key to the subspecies of *Kennedia coccinea*

1. Inflorescences umbellate or rarely very shortly racemose, 3–12-flowered; plants prostrate, not scrambling or twining.....subsp. **esotera**
- 1: Inflorescence shortly racemose, (7–)13–30+-flowered; plants twining, scrambling or prostrate
2. Plants twining, scrambling or rarely prostrate; stigma capitate; apex of keel petal rounded; occurs on gravels, loams or sands in forested areas..... subsp. **coccinea**
- 2: Plants prostrate, scrambling or (very rarely) loosely twining; stigma appendaged; apex of keel petal shortly beaked; occurs on sands in coastal heath..... subsp. **calcaria**

Kennedia coccinea (Curtis) Vent. subsp. **coccinea**

Illustrations. Wheeler (1987) p. 277, Figure 89; Nevill (1998) p. 47; Wheeler *et al.* (2002) p. 761, cover; all as *Kennedia coccinea*.

Twining, scrambling or rarely prostrate *shrubs*. *Leaves*: petioles 13–60 mm long; *leaflets* narrowly to broadly ovate, obovate, linear-elliptic to broadly elliptic or very rarely hastate; terminal leaflet larger than laterals, 20–83(–140) mm long, (3–)7–45(–51) mm wide; lateral leaflets 15–68(–100) mm long, (3–)7–32 mm wide; apex apiculate, acute, or rarely acuminate, rounded or sometimes emarginate with apicule; *stipules* 1.7–5 mm long, 1.3–3 mm wide. *Inflorescences* shortly racemose, (7–)9–30(–40)-flowered. *Flowers* 11–15 mm long, pedicels (3–)4–10(–12) mm long; *subtending bracts* 2.2–4.5(–6) mm long, (0.9–)1.2–2.5(–3) mm wide. *Corolla*: *standard* (9.5–)12.5–16 mm long, including claw 3–4 mm long, (7.8–)8.5–15 mm wide; *wings* (9–)11–14 mm long, including claw 3–4.3 mm long, 1.2–1.9 mm wide at narrowest, (2.2–)3.2–5 mm wide at broadest; *keel* (8.7–)9–10.5 mm long, including claw 4–5 mm long, (2.9–)3.1–4 mm wide, apex rounded. *Stigma* capitate. *Pods* (31–)45–72 mm long, 4–7.5 mm wide, brown to dark brown, rarely black. *Seeds* 2.8–5 mm long. (Figure 1A)



Figure 1. Habit and habitat of the different subspecies of *Kennedia coccinea*. A – *K. coccinea* subsp. *coccinea* (T.R. Lally 1556 & I.P. Lally); B – *Kennedia coccinea* subsp. *calcaria* (The Gap Road, Torndirrup National Park, 15 Oct. 1999, T.R. Lally 1566 & I.P. Lally (CANB, MEL, PERTH)); C – *K. coccinea* subsp. *esotera* (Neds Corner Road, near Yerritup Creek crossing, 16 Oct. 1999, T.R. Lally 1581 & I.P. Lally (CANB, MEL, P, PERTH)).

Selected specimens examined. WESTERN AUSTRALIA: Rosedale Rd, 3.5 km NW of Chidlow, 8 Nov. 1996, *M.G. Allen* 353 (PERTH); Darling Range, 25.5 miles from Perth towards Brookton, along Brookton Hwy, 7 Oct. 1968, *E.M. Canning s.n.* (CBG); Gleneagle Forest, Kinsella Road, between Albany and Brookton Highways, near Canning Road, 21 Oct. 1981, *M.G. Corrick* 7847 (AD, MEL); Gingarup Brook, c. 6 km E of Mundijong, 4 Oct. 1965, *N.N. Donner* 1448 (AD, CANB); Northam, 1892, *A. Eaton s.n.* (MEL); Kalamunda, 19 km E of Perth, 3 Sep. 1985, *R. & M. Hamilton* 169 (CBG, MEL); Big Brook (Pemberton), Sep. 1916, *M. Koch* 2245 (MEL, NSW); 33.5 km along Hassell Hwy from Bakers Junction towards Jerramungup, 15 Nov. 1995, *T.R. Lally* 895 & *B.J. Lepschi* (AD, PERTH); 3.7 km NW of South Western Hwy on Argyle Rd/Hurst Rd, c. 8.5 km NW of Donnybrook, 18 Oct. 1996, *T.R. Lally* 1259 & *B.J. Lepschi* (BRI, CANB, MEL, PERTH); c. 20-30 metres S of corner of Bushby Rd and Caves Rd, W of Karridale, 13 Oct. 1999, *T.R. Lally* 1542 & *I.P. Lally* (CANB, PERTH); 15.3 km S of Northcliffe towards Windy Harbour, 14 Oct. 1999, *T.R. Lally* 1556 & *I.P. Lally* (CANB, K, MEL, PERTH); Napier River crossing on Chester Pass Rd, 15 Oct. 1999, *T.R. Lally* 1572A & *I.P. Lally* (CANB, K, L, MEL, PERTH); 12.2 km from corner of Nanga Brook Rd and Coff's Rd, c. 5 km SSE of Dwellingup on Nanga Rd, 18 Oct. 1999, *T.R. Lally* 1604A & *I.P. Lally* (CANB, E, MEL, NY, PERTH); outskirts of Manjimup, 7 Jan. 2000, *T.R. Lally* 1645 & *N.G. Lally* (CANB, K, PERTH); Muirilup Conservation Park, 13 km from Northcliffe, 7 Jan. 2000, *T.R. Lally* 1650 & *N.G. Lally* (CANB, BISH, E, PERTH); 0.6 km S of Wooroloo on Government Rd, 12 Jan. 2000, *T.R. Lally* 1667 & *N.G. Lally* (CANB, MEL, PERTH); Carroll Road, 11.8 km E from Waroona Town Hall, 23 Oct. 1985, *L. Nunn* 440 (CANB, PERTH); Cape Leeuwin, on east slope, 7 Sep. 1971, *S. Paust* 193 (PERTH); 1 km N of Yarloop, South Western Hwy, 12 Oct. 1985, *J.H. Ross* 2955 (CBG, HO, MEL, PERTH); Porongorup National Park, track to Castle Rock, 15 Sep. 1983, *J. Taylor* 1819 & *P. Ollerenshaw* (CBG, MO, PERTH); Walpole-Nornalup National Park, near Circular Pool, 23 Sep. 1992, *J.R. Wheeler* 3277 (PERTH); 7 km E of Mt Barker, 19 Sep. 1964, *P.G. Wilson* 3348 (AD, PERTH).

Distribution and habitat. Widespread from Northam, south to Augusta and east to near Albany (Figure 2). There are several old (late 1800s) records from Port Gregory, near Geraldton, and also from Bremer River, Esperance and east of Esperance. The habitats at these localities are unusual for subsp. *coccinea*, and as there are no recent collections of this taxon from these areas, these localities are considered doubtful. *Kennedia coccinea* subsp. *coccinea* occurs in sands, gravels or loams associated with eucalypt forests and shrublands.

Conservation status. This taxon has a wide distribution in the south-west, and is well conserved in several National Parks and Conservation Parks. It is locally common in suitable habitat and is not considered to require a conservation listing.

Affinities. This subspecies is distinguished from subsp. *esotera* by its twining habit, many-flowered, shortly racemose inflorescences, capitate stigmas, and rounded keel petal apices. The leaves in this taxon are also generally larger, darker green and thinner-textured than in subsp. *esotera* and subsp. *calcaria*. Populations of subsp. *coccinea* east of the Darling Scarp, between Brookton and Mount Barker, may approach subsp. *esotera*, in their smaller, obovate leaves and sometimes prostrate habit. These populations differ from subsp. *esotera* by having the many-flowered, shortly racemose inflorescences typical of subsp. *coccinea*. Post-fire or other disturbance regrowth of subsp. *coccinea* could be confused with subsp. *calcaria*, as both share a prostrate habit, and coarsely textured and sometimes densely hairy leaves. However, subsp. *coccinea* can be distinguished in these instances by its capitate stigmas (appendaged stigmas in subsp. *calcaria*), rounded keel petal apex (shortly beaked in subsp. *calcaria*), narrower mature pods (4–7.5 mm wide versus 7–10 mm wide in subsp. *calcaria*) and usually brown to dark brown pods (black in subsp. *calcaria*).

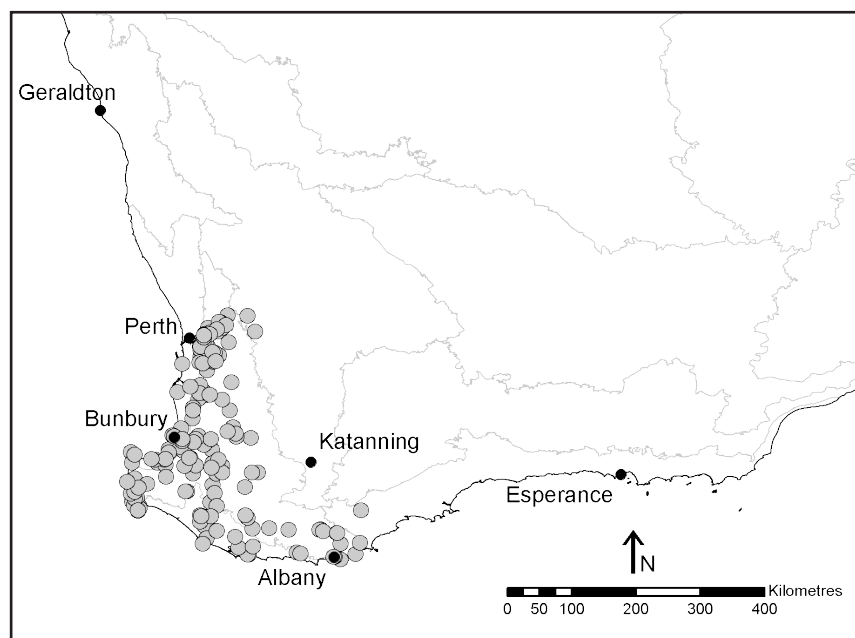


Figure 2. Distribution of *Kennedia coccinea* subsp. *coccinea* in Western Australia.

Notes. Unusual populations of this subspecies occur at Karridale near Augusta (represented by *T.R. Lally* 1540 & *I.P. Lally* (AUA, CANB, E, K, L, MO, NY, PERTH) and *A. Strid* 21392 (PERTH)). Plants in these populations exhibit most features of subsp. *coccinea* (twining habit and thin-textured, dark green leaves), and occur in eucalypt forest, typical habitat for this taxon. However, stigmas in plants from this population are appendaged, a character otherwise exhibited by subsp. *calcaria* and subsp. *esotera*. These plants are included in subsp. *coccinea* on the basis of vegetative characters and habitat. A population south-south-east of Dwellingup (represented by *T.R. Lally* 1604A & *I.P. Lally*) has the standard petal all pink, as opposed to the more usual orange with pink edges, but is otherwise typical for this taxon.

Additional variation in leaf shape, indumentum and texture is also evident in subsp. *coccinea*, however this variation is not sufficiently discrete or constant to allow for the recognition of additional taxa. Some geographical correlation with this variation is apparent, but this is not absolute, and all forms can occur within the same population, especially for plants in vigorous post-disturbance growth phases. In more established populations the following forms are recognisable.

Perth area form: Leaves obovate, coarsely textured, with < 8 obvious lateral veins, leaf apex emarginate, apiculate. Leaves with moderately dense to dense, erect hairs on both surfaces, or less commonly the hairs sparse and appressed, to glabrescent on upper surface. Pods brown to dark brown, more or less flat. Occurs mostly in the Perth area and along the Darling Scarp north to Northam and south to Pinjarra. Representative specimens are *T.R. Lally* 1263 & *B.J. Lepschi* (BRI, CANB), *T.R. Lally* 1610 & *I.P. Lally* (AD, AUA, CANB, K, MEL, MO, MU, P, PERTH, US, W) and *A. Travers* 6 (CANB, PERTH).

Southern form: Leaves narrowly ovate to ovate, thinly textured, with 7–20 more or less obscure lateral veins, leaf apex acute. Leaves with sparse to moderately dense, appressed to ascending, or less

commonly erect hairs on both surfaces, to glabrescent. Pods dark brown to sometimes black, somewhat inflated. Throughout the range of the subspecies, but infrequent in the Perth area. Representative specimens are *L. Nunn* 440, *R. Pullen* 9872 (CANB) and *P.G. Wilson* 3348.

Narrow-leaved form: Leaves linear-elliptic to narrowly ovate, thinly textured, with 15–40 more or less obscure lateral veins, leaf apex acute. Leaves with sparse to moderately dense, usually appressed, sometimes ascending hairs on both surfaces. Pods as for Southern form. Sporadically distributed throughout the range of the subspecies, apparently uncommon, and is most likely to occur in the cooler, denser forests in the south-west part of the subspecies' range. Representative specimens are *T.R. Lally* 1540 & *I.P. Lally* (AUA, CANB, E, K, L, MO, NY, PERTH), *T.R. Lally* 1554 & *I.P. Lally* (CANB, PERTH) and *T.R. Lally* 1556 & *I.P. Lally*.

Kennedia coccinea (Curtis) Vent. subsp. ***calcaria*** Lally, *subsp. nov.*

Affinis subsp. *coccinea*, sed habitu prostrato, stigmatate appendiculato et carina petalo apice breviter rostrato, differt.

Typus: carpark at end of Salmon Holes Road, from Frenchman Bay Road, Torndirrup National Park, south of Albany, Western Australia, 15 October 1999, *T.R. Lally* 1568 & *I.P. Lally* (*holo*: CANB 680794; *iso*: AD, K, MEL, MO, NSW, NY, PERTH).

Zichya sericea Benth. in Endl. *et al.*, *Enum. pl.* 40, sub. 2 (Apr. 1837), *nom. illeg.* (non Hügel (Feb. 1837)). *Type*: Nov. Holl., *Ferd. Bauer s.n.* (*holo*: W0006143).

Kennedia coccinea subsp. Coastal (T.R. & I.P. Lally TRL 1568) Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.gov.au> [accessed 22 February 2010]

Illustrations. Craig (1995) p. 46, pl. 136; Corrick & Fuhrer (1996) p. 66, pl. 172; both as *Kennedia coccinea*.

Prostrate, scrambling or (very rarely) loosely twining *shrubs*. *Leaves*: petioles 20–60 mm long; *leaflets* broadly ovate, broadly elliptic or occasionally hastate; terminal leaflet larger than laterals, 35–87 mm long, 20–55 mm wide; lateral leaflets 29–65 mm long, 15–41 mm wide; apex apiculate, rounded, sometimes emarginate or rarely truncate (all with apicule); *stipules* 3.5–4.3 mm long, 2.2–3.2 mm wide. *Inflorescence* shortly racemose, 13–30-flowered. *Flowers* 12–16 mm long, pedicels 2.5–6.5(–8) mm long; *subtending bracts* 3–3.5 mm long, 0.4–1.7 mm wide. *Corolla*: *standard* 13–16 mm long, including claw 3–4 mm long, 10–15 mm wide; *wings* 11.2–13.5 mm long, including claw 3.3–4.5 mm long, 1.3–2.2 mm wide at narrowest, 3.8–4.8 mm wide at broadest; *keel* 9–11 mm long, including claw 4–5 mm long, 2.8–3.5 mm wide, apex shortly beaked. *Stigma* appendaged. *Pod* 50–68 mm long, 7–10 mm wide, black. *Seeds* (3.8–)4–4.9(–5.2) mm long. (Figures 1B, 3)

Selected specimens examined. WESTERN AUSTRALIA: Boat Harbour, Denmark, 21 Oct. 1983, *P. Armstrong* 83/11 (PERTH); 6 miles inland of Cervantes, 17 Sep. 1976, *J.S. Beard* 7842 (NSW, PERTH); Rockingham Rd, 21 Sep. 1957, *A.M. Baird s.n.* (PERTH); no 2 Track, Southern Beekeepers Reserve, c. 6 km NE of Cervantes, 2 Sep. 1986, *A.H. Burbidge* 4010 (CANB, PERTH); c. 12.2 miles from Young's Siding toward Albany along coast (lower) road, 12 Oct. 1968, *E.M. Canning* WA/68 6325 (CBG, NSW); Boggy Lake, Nov. 1958, *D. Churchill* 169 (PERTH); near Windy Harbour, Sep. 1967, *C.H. Gittins* 1747 (NSW); Frenchman's Bay, Albany, 26 Oct. 1985, *N. Hoyle* 1336 (PERTH);



Figure 3. Holotype of *Kennedia coccinea* subsp. *calcaria* Lally (CANB 680794).

Deep River, Dec. 1912, *S.W. Jackson s.n.* (NSW, PERTH); golf course, Augusta, 1 Oct. 1982, *G.J. Keighery* 5358 (PERTH); Ludlow Rd, Tuart Forest National Park, W of Capel, 15 Sep. 1994, *G.J. Keighery* 13584 (PERTH); 0.4 km from Frenchman Bay Rd on Salmon Holes Rd, Torndirrup National Park, 15 Oct. 1999, *T.R. Lally* 1570 & *I.P. Lally* (CANB, L, PERTH, US); Frenchman Bay Rd, c. 50 metres S of Symers Rd, 15 Oct. 1999, *T.R. Lally* 1571 & *I.P. Lally* (CANB, K, MEL, PERTH); carpark at end of Salmon Holes Rd, from Frenchman Bay Rd, Torndirrup National Park, 8 Jan. 2000, *T.R. Lally* 1657 & *N.G. Lally* (AUA, CANB, K, MEL, PERTH, US); Frenchman Bay Rd, c. 50 metres S of Symers Rd, 8 Jan. 2000, *T.R. Lally* 1658 & *N.G. Lally* (AD, CANB, K, MEL, PERTH, US); 13 km from Albany along road to Frenchman Bay, 1 Sep. 1986, *P.S. Short* 2619, *M. Amerena* & *B.A. Fuhrer* (CANB, MEL); 3 miles E of Jurien Bay, 1 Sep. 1966, *R.V. Smith* 66/173 (CBG, HO, MEL); Walpole-Nornalup National Park, Hush Hush Beach, 27 Oct. 1992, *J.R. Wheeler* 3353 (PERTH); Torbay Inlet, on east headland, 12 Oct. 1968, *J.W. Wrigley* WA/68 4509 (CBG).

Distribution and habitat. Extends along the coast from Jurien Bay in the north, and to Albany in the south (Figure 4). Occurs in sand over limestone in coastal heath vegetation.

Conservation status. This taxon is distributed along coastal areas in the south-west, and is well conserved in several National Parks. It is locally common in suitable habitat and is not considered to require a conservation listing.

Affinities. Similar to subsp. *coccinea*, sharing the densely-flowered shortly racemose inflorescences, but differing chiefly by its prostrate habit, appendaged stigma, and shortly beaked keel petal apex. The leaves in subsp. *calcaria* are also generally coarsely textured, dull grey-green, and the vegetative parts are covered with moderately dense to dense, erect, white or ginger hairs, giving the plant a silvery or velvety appearance. Although post-disturbance regrowth populations of subsp. *coccinea* can also

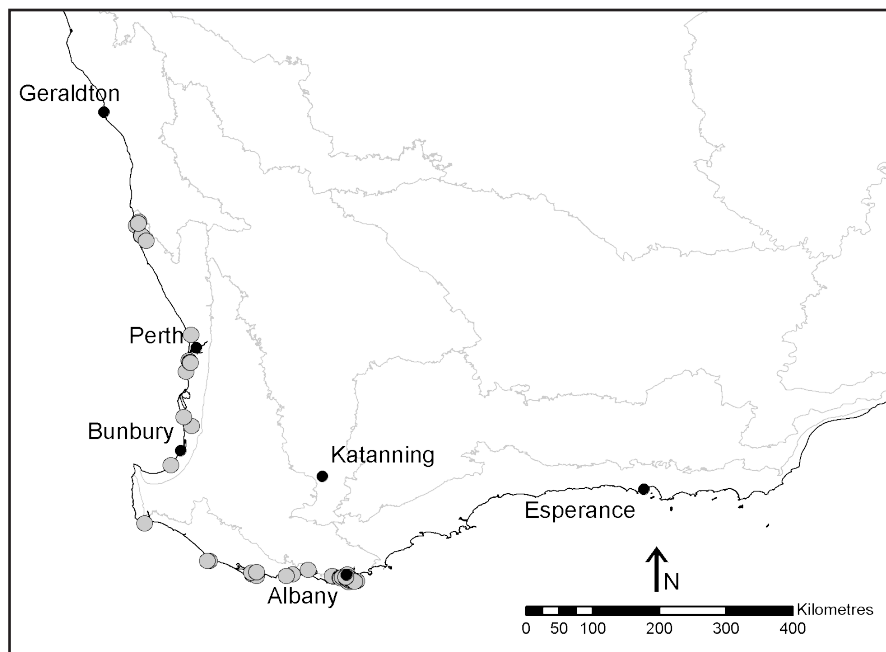


Figure 4. Distribution of *Kennedia coccinea* subsp. *calcaria* in Western Australia.

have coarsely textured, hairy leaves, they are darker green, and the vegetative parts are less robust. *Kennedia coccinea* subsp. *calcaria* may also be confused with subsp. *esotera*, with which it shares a prostrate habit, appendaged stigma and shortly beaked keel petal apex, but subsp. *esotera* differs in its 3–12-flowered umbellate inflorescences (13–30-flowered and shortly racemose in subsp. *calcaria*), shorter flowers (9.5–14 mm long versus 12–16 mm long) and less coarse habit.

Etymology. The subspecies name is derived from the Latin *calcarium* (of lime), in reference to the occurrence of this subspecies on coastal limestone.

Notes. Of the populations of this taxon north of Perth, there are several in the Cervantes and Jurien Bay area (represented by *J.S. Beard* 7842, *A.H. Burbidge* 4010 and *R.V. Smith* 66/173) with the robust prostrate habit of subsp. *calcaria*, but plants in these populations lack the appendaged stigma and beaked keel apex typical of this taxon. These populations are included here under subsp. *calcaria* as they exhibit the typical robust, prostrate habit of this taxon, and they also occupy typical habitat for subsp. *calcaria*. Several collections from the Albany area included here (represented by *E.M. Canning* 68/6325, *D. Churchill* 169, *T.R. Lally* 1571 & *I.P. Lally*) exhibit most of the typical features of this subspecies, but plants are less robust, and are also twining on nearby vegetation, a feature more typical of subsp. *coccinea*. These populations occur in forested areas close to the coast, and the more closed vegetation may be an influencing factor for the expression of these characters.

Kennedia coccinea (Curtis) Vent. subsp. ***esotera*** Lally, *subsp. nov.*

Affinis subsp. *coccinea*, sed habitu prostrato et inflorescentiis umbelliformis, paucifloribus, differt.

Typus: 11 km north of Boxwood Hill along Highway 1 towards Jerramungup, Western Australia, 22 September 1979, *M.D. Crisp* 6081, *J. Taylor* & *R. Jackson* (*holo:* CANB CBG 7908370; *iso:* AD *n.v.*, NSW *n.v.*, PERTH 02871580)

Kennedia coccinea subsp. Inland (T.R. & I.P. Lally TRL 1584) Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.gov.au> [accessed 22 February 2010]

Prostrate *shrubs*. *Leaves:* petioles 6–25 mm long; *leaflets* hastate, obovate or rarely broadly ovate; terminal leaflet larger than laterals 11–50 mm long, 10–32 mm wide, lateral leaflets 8–40 mm long, 7–24 mm wide, apex rounded or emarginate, apiculate; *stipules* 1.8–3.3 mm long, 1.4–2.8 mm wide. *Inflorescences* umbellate or rarely very shortly racemose, 3–12-flowered. *Flowers* 9.5–14 mm long, pedicels 1.5–5 mm long; *subtending bracts* 1.5–2.5 mm long, 0.6–1.2 mm wide. *Corolla:* *standard* 9.8–13 mm long, including claw 2.8–4 mm long, 8.5–12 mm wide; *wings* 9.5–12 mm long, including claw 3.5–4.5 mm long, 1.2–1.8 mm wide at narrowest, 3.2–4.8 mm wide at broadest; *keel* 8.2–9.5 mm long, including claw 3.6–5 mm long, 2.5–3.2 mm wide, apex beaked. *Stigma* appendaged, less commonly capitate. *Pods* (immature) 25–55 mm long, 6–9 mm wide, black. *Seeds* (immature) 3.3–3.7 mm long. (Figures 1C, 5)

Selected specimens examined. WESTERN AUSTRALIA: Merivale Rd, 8 km W of Mt Merivale, c. 13 km E of Esperance, 19 Aug. 1995, *W.R. Archer* 1908953 (MEL, PERTH); Mt Ragged, 26 Sep. 1995, *S. Barrett* 510 (PERTH); South Stirling Rubbish Reserve, Chillinup Rd, Albany, 28 Aug. 1985, *E.J. Croxford* 4201 (PERTH); 156 mile peg, Eneabba Rd [c. 27 km S of Eneabba], 22 Sep. 1972, *H. Demarz* 3935 (PERTH); c. 8 km NW of Young River crossing on Ravensthorpe–Esperance

main road, 26 Sep. 1968, *N.N. Donner* 2779 (AD, CANB, PERTH); Fitzgerald River National Park, c. 23 km along the Rabbit Proof Fence no. 2, SE of the turnoff from the Jerramungup-Ravensthorpe Rd, 7 Sep. 1971, *Hj. Eichler* 21053 (AD, CANB); junction of York and Northam Rds, 14 Oct. 1956, *J.W. Green* 523 (PERTH); 20 km ENE of Collie Cemetery, 20 Aug. 1997, *A. Gundry* 354 (PERTH); c. 10 km by road NNE of Kalgan River crossing by Chester Pass Rd, 14 Sep. 1977, *E.N.S. Jackson* 3324 (AD, CBG); Yerritup Creek crossing on Neds Corner Rd, c. 2.5 km N of South Coast Highway, 16 Oct. 1999, *T.R. Lally* 1580 & *I.P. Lally* (CANB, PERTH); 4.2 km N of Jonegatup Rd on Farmers Rd, c. 10 km NE of Munglinup, 29 Oct. 1997, *B.J. Lepschi* 3800 & *B.A. Fuhrer* (AD, CANB, PERTH); Cape Arid, *s. dat.*, *F. Mueller s.n.* (MEL); Kojonup, 24 Sep. 1953, *N. Rainbow s.n.* (NSW); Cape Le Grand National Park, E of Esperance, 22 Oct. 1969, *R.D. Royce* 8789 (CANB, PERTH); 20 km from Esperance towards Gibson, 10 Sep. 1983, *J.M. Taylor* 1620 & *P. Ollerenshaw* (AD, CBG, MEL, PERTH); Two Peoples Bay, 10 Sep. 1971, *S. Paust* 449 (PERTH); near Porongurup township, N of Porongurup Range, 29 Sep. 1966, *P.G. Wilson* 4270 (CANB, PERTH); 45 km W of Israelite Bay, 1 Oct. 1968, *P.G. Wilson* 8153 (CANB, PERTH).

Distribution and habitat. Scattered from just south of Eneabba, inland through the wheatbelt to Albany, including the Stirling Range, and east to near Israelite Bay (Figure 6). Compared to the other subspecies of *K. coccinea*, this taxon appears to be relatively uncommon, with few recent (post-1980) collections. Extensive field work by the author during 1999 and 2000 failed to re-locate many populations based on older collections. *Kennedia coccinea* subsp. *esotera* occurs in sand, loam or gravel, in open eucalypt forest, mallee-heath or scrub. Many collections have been made from open, disturbed sites such as roadsides.

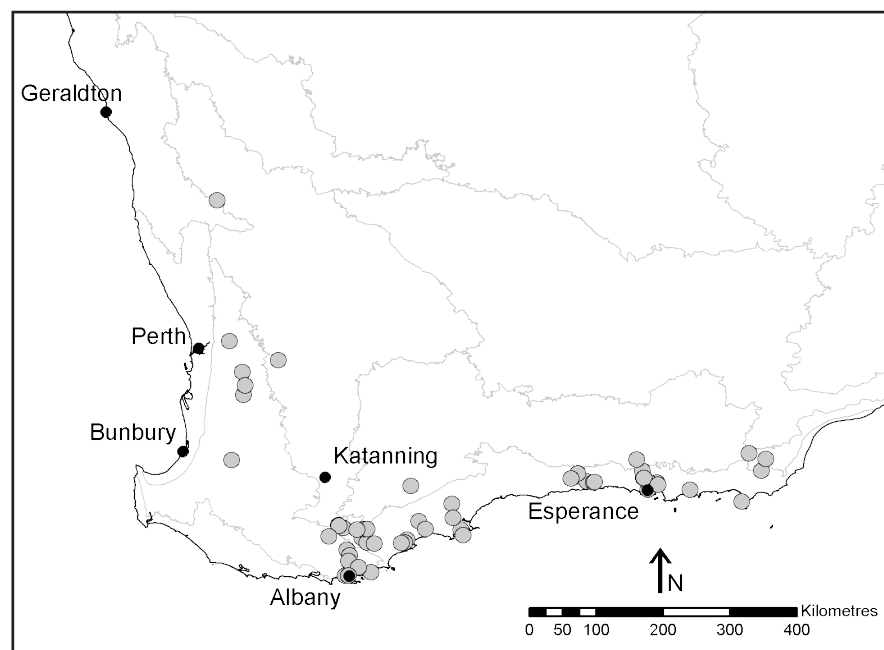


Figure 6. Distribution of *Kennedia coccinea* subsp. *esotera* in Western Australia.

Conservation status. This taxon has a scattered distribution in the south-west, and is well conserved in several National Parks. Although no conservation coding is recommended here, its status should be re-examined in the future as it is not abundant at any of its currently known populations.

Affinities. *Kennedia coccinea* subsp. *esotera* shares a prostrate habit, appendaged stigma and shortly beaked keel petal apex with subsp. *calcaria*, but differs in its 3–12-flowered umbellate inflorescences (13–30-flowered and shortly racemose in subsp. *calcaria*), generally shorter flowers (9.5–14 mm long versus 12–16 mm long in subsp. *calcaria*) and less robust habit. *Kennedia coccinea* subsp. *coccinea* differs from subsp. *esotera* by its strongly twining habit, many-flowered, shortly racemose inflorescences, capitate stigma, rounded keel petal apex, and generally dark green, thin-textured leaves.

Etymology. The subspecies name is derived from the Greek *esoteros* (inner), in reference to the distribution of this subspecies, occurring inland.

Notes. As with subsp. *coccinea*, some additional morphological variation is evident in subsp. *esotera*, but this variation is not sufficiently discrete to allow for the recognition of any additional taxa.

Eastern form: Leaves usually hastate, less often obovate or elliptic, flowers 10–14 mm long, stigma appendaged, keel petal apex shortly beaked. Occurs in the Stirling and Porongurup Ranges, eastwards to Israelite Bay. Representative specimens are *M.D. Crisp* 6081, *J. Taylor & R. Jackson, S.J. Forbes* 1107 (CANB, MEL) and *T.R. Lally* 1581 & *I.P. Lally* (CANB, MEL, P, PERTH).

Northern form: Leaves obovate, flowers 9.5–11(–13) mm long, stigma appendaged or capitate, keel petal apex shortly beaked or rounded. Occurs from the Eneabba area southwards to Albany, although known only from a few widely scattered collections, many from vague localities which could not be re-located. Mature plants of this form tend to be rather unobtrusive, which may account for the lack of recent collections. Representative specimens are *E.M. Canning* WA/68 3715 (CBG), *J.W. Green* 523 and *N. Hoyle* 1437 (CANB, PERTH).

Names of uncertain application

No type material has been located for the following names, but the descriptions indicate that they are likely referable to *Kennedia coccinea sens. lat.*

Kennedia sericea G.Don, *Gen. hist.* 2: 343 (1832). *Type:* ‘Native of New Holland...Clt. 1823.’

Zichya molly Hügel ex Benth. in Hügel, *Bot. Arch.* 1: pl. 1 (Feb. 1837); *Kennedia coccinea* var. *molly* (Hügel ex Benth.) Domin, *Věstn. Král. České Společn. Nauk, Tř. Mat.-Přír.* 2: 42 (1923). *Type:* ‘...welcher von dem Herausgeber am Schwanenflusse auf der Südwestküste von Neu Holland entdeckt...’

Zichya sericea Hügel, *Bot. Arch.* 1: pl. 1, subt. 2 (Feb. 1837); *Kennedia coccinea* var. *sericea* Domin, *Věstn. Král. České Společn. Nauk, Tř. Mat.-Přír.* 1921–22: 42 (1923). *Type:* unknown.

Acknowledgements

Thanks are due to Paul Wilson and Tony Orchard for their willing assistance with the complex nomenclature associated with this species, Gillian Perry for advice on the conservation proposal, Laurie Adams for providing Latin diagnoses, Serkan Alasya for taking the specimen images and Nunzio Knerr for preparing the distribution maps. Alex Chapman, Jenny Tonkin, Jeremy Bruhl and Tony Orchard, Australian Botanical Liaison Officers (ABLO) variously between 1999 to 2009, for photographing specimens at 14 herbaria between them. Thanks also to the curators and staff of AD, B, BRI, G, G-DC, GENT, H, HAL, HO, K, LY, M, MEL, MPU, NA, NSW, NY, PERTH, PH, US and W for providing specimens or photographs of specimens from their holdings, and to Brendan Lepschi for helpful comments on the manuscript.

References

- Corrick, M.G. & Fuhrer, B.A. (1996). *Wildflowers of southern Western Australia*. (Five Mile Press: Noble Park, Vic.)
- Craig, G.F. (1995). *Native plants of the Ravensthorpe Region*. (Ravensthorpe Wildflower Show: Ravensthorpe, WA.)
- Department of the Environment, Water, Heritage and the Arts (2010). *Interim Biogeographic Regionalisation of Australia (IBRA) Bioregions Version 6.1*. <http://www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/index.html> [accessed 16 April 2010].
- Elliot, W.R. & Jones, D.L. (1993). *Encyclopaedia of Australian plants suitable for cultivation* Vol. 6. (Lothian: Melbourne.)
- Lally, T.R. & Orchard, A.O. (2008). Proposals to conserve the names *Glycine coccinea* (*Kennedia coccinea*) and *Kennedia prostrata* (Fabaceae) with conserved types. *Taxon* 57: 655–656.
- Nevill, S. (1998). *Guide to the wildflowers of south western Australia*. (Simon Nevill Publications: South Fremantle, WA.)
- National Herbarium of Victoria (2010). *Royal Botanic Gardens Board, Melbourne, MELISR database, 12 April 2010*.
- Silisbury, J.H. & Brittan, N.H. (1954). Distribution and ecology of the genus *Kennedia* Vent. in Western Australia. *Australian Journal of Botany* 3: 113–135 (1954).
- Western Australian Herbarium (2010). *WAHERB database, 6 April 2010*. (Department of Environment and Conservation: Kensington, WA.)
- Wheeler, J.R. (1987). *Kennedia*. In: Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S. & Macfarlane, T.D. *Flora of the Perth region*. Vol. 1, pp. 275–278. (Western Australian Herbarium: Perth.)
- Wheeler, J., Marchant, N. & Lewington, M. (2002). *Flora of the south west: Bunbury–Augusta–Denmark*. Vol. 2: Dicotyledons. (Australian Biological Resources Study: Canberra.)
- Wrigley, J.W. & Fagg, M. (2003). *Australian native plants: cultivation, use in landscaping and propagation*. 5th ed. (Reed New Holland: Sydney.)

