

A review of the genus *Lythrum* (Lythraceae) in Western Australia, including typification of *L. paradoxum*

B.J. Lepschi

Western Australian Herbarium, Department of Conservation and Land Management,
Locked Bag 104, Bentley Delivery Centre, Western Australia 6983.
Present address: Australian National Herbarium, Centre for Plant Biodiversity Research,
GPO Box 1600, Canberra, ACT 2601, Australia.

Abstract

B.J. Lepschi. A review of the genus *Lythrum* (Lythraceae) in Western Australia, including typification of *L. paradoxum*. *Nuytsia* 13 (2): 273–282 (2000). The species of *Lythrum* (Lythraceae) occurring in Western Australia are reviewed, and two native and one naturalized taxon are recognized. Both of the native species, *L. paradoxum* Koehne and *L. wilsonii* Hewson, are new records for the State. *Lythrum hyssopifolia* L., regarded as native in eastern Australia, is treated as introduced in Western Australia. A further species, the exotic *L. junceum* Banks & Sol., is known from only one old record and is no longer considered to be naturalized in Western Australia. A key is provided for all taxa, and the distribution of the three extant species is mapped. A neotype is also selected for *L. paradoxum*.

Introduction

Lythrum L. (Lythraceae) is a cosmopolitan genus of approximately 35 species, represented in Australia by four indigenous and one introduced species (Hewson 1990). The genus has not been comprehensively treated since Koehne (1903), but the Northern Territory species were reviewed by Mitchell (1976) and all Australian species were treated in the "Flora of Australia" by Hewson *loc. cit.*

Two species of *Lythrum* are recorded for Western Australia: *L. hyssopifolia* and *L. junceum* (Hewson 1990). However, recent field and herbarium work by the author and colleagues has revealed the occurrence of two additional species in the state, *L. paradoxum* and *L. wilsonii*, and has also brought to light additional information on the morphology and distribution of these species and *L. hyssopifolia*. This information is presented as part of a review of *Lythrum* in Western Australia.

Materials and methods

This study is based on examination of herbarium collections from AD, CANB, DNA and PERTH, with selected material from BRI and NSW. All measurements were made from herbarium material

(reconstituted where necessary). Conservation codes used are those adopted by the Department of Conservation and Land Management (see the end of this issue for definitions of conservation codes). Introduced taxa are denoted with an asterisk.

Taxonomic treatment

Information presented here for previously described species is restricted to new data regarding morphology, distribution and affinities (and typification in the case of *Lythrum paradoxum*). However, a full description of *L. wilsonii* is provided, as recent collections of this species from Western Australia have expanded the range of morphological variation previously known for this taxon (e.g. Hewson 1990, Highet & Wilson 1991).

Lythrum L., Gen. Pl. 1: 446 (1753).

See Koehne (1903) and Hewson (1990) for generic descriptions.

Key to the species of *Lythrum* in Western Australia

- 1 Inflorescence a single flower (very rarely some 2-flowered inflorescences may occur)
 - 2 Hypanthium with pigmented spots at base, petals 4–6 mm long. Stamens 10–12, 5–6 included and the remainder exerted. Stoloniferous perennial **2. *L. junceum**
 - 2: Hypanthium without pigmented spots at base, petals 2–4 mm long. Stamens 4–6 and included, or rarely 8–12 (with 4–6 included and the remainder barely exerted) **1. *L. hyssopifolia**
- 1: Inflorescence of (1)2–7 flowers
 - 3 Stamens 8–12, exerted. Plants glabrous **3. L. paradoxum**
 - 3: Stamens 4–6, included to exerted. Plants frequently minutely scabrous **4. L. wilsonii**

1. *Lythrum hyssopifolia L., Sp. Pl. 1: 447 (1753).

Illustrations. Jessop (1986: Figure 461 B); Rye (1987: Figure 132 A–D); Hewson (1990: Figure 33 G–I); Jeanes (1996: Figure 185 J–I).

Descriptions. Jessop (1986); Rye (1987); Hewson (1990); Jeanes (1996). See also under notes below.

Selected specimens examined. WESTERN AUSTRALIA: Oxbow Lake, Warriup, 17 Nov. 1982, G.J. Keighery 5777 (PERTH); base of Yellowdine Rock, c. 500 m WNW of Yellowdine Roadhouse, 1 Dec. 1997, B.J. Lepschi 3854 (PERTH); 19.4 km ENE of Jerramungup on road to Ravensthorpe, 27 Oct. 1997, B.J. Lepschi & B.A. Fuhrer 3732 (CANB, PERTH); c. 29 km WNW of Esperance on road to Munglinup, 29 Oct. 1997, B.J. Lepschi & B.A. Fuhrer 3807 (PERTH); 16.1 km S of Grass Patch on road to Scaddan, 30 Oct. 1997, B.J. Lepschi & B.A. Fuhrer 3808 (AD, PERTH); c. 11.5 km WNW of Shackleton, 9 Feb. 1997, B.J. Lepschi & T.R. Lally 3392 (AD, CANB, PERTH); c. 1 km NE of Howatharra Hill Reserve, 21 miles [c. 34 km] N of Geraldton, 22 Oct. 1976, D. & N. McFarland s.n. (PERTH 04362497); Belleview [Bellevue], 26 Nov. 1953, R.D. Royce 4500 (PERTH); Yanchep

National Park, 21 Dec. 1965, *E.M. Scrymgeour* 193 (PERTH); Nut Rd, Walpole–Normalup National Park, 15 Dec. 1991, *J.R. Wheeler* 2966 (PERTH).

SOUTH AUSTRALIA: Yundi, 20 Feb. 1977, *R. Bates* 2602 (AD); Myrtlebank, c. 4 km SE of Adelaide, 11 Nov. 1970, *T.J. Smith* 1882 (AD).

NEW ZEALAND: Ramsgate Terrace, Mairangi Bay, 11 Dec. 1973, *E.B. Bangerter* 5124 (AD; AK *n.v.*).

CZECH REPUBLIC: near Mikulov, 28 Aug. 1963, *M. Deyl* 258 (AD; PR *n.v.*).

UNITED STATES OF AMERICA: Camel Highlands, opposite Yankee Point, 17 July 1963, *E.K. Balls* 12070 (AD).

Distribution. Recent treatments (e.g. Rye 1987, Hewson 1990) give a relatively restricted distribution of *L. hyssopifolia* in Western Australia, bounded approximately by Yanchep, Albany and York. However, *L. hyssopifolia* is considerably more widespread in this state, extending as far north as the Howatharra area (c. 20 km N of Geraldton), east to at least Yellowdine, and as far as Esperance and Grass Patch in south coastal and near-coastal districts (Figure 1). The collections, however, are concentrated in the south-west corner of the state (in the area outlined above), with only patchy records outside of this area. This is almost certainly due to under-collecting, and further field work in the eastern wheatbelt and western goldfields regions during late spring and summer should reveal additional populations of this species.

Lythrum hyssopifolia also occurs in New South Wales, Queensland, South Australia, Tasmania and Victoria, where it is apparently native. Populations in Western Australia are treated as introductions (Rye 1987, Hewson 1990). The species is also widespread throughout much of the rest of the world, including southern Europe where it is regarded as indigenous (Holm *et al.* 1979, Jessop 1986, Hewson 1990).

Habitat. *Lythrum hyssopifolia* has been recorded growing in damp to inundated soils (ranging from sands to clays), in a variety of habitats and vegetation types, ranging from more or less undisturbed areas such as natural wetlands and watercourses, through to highly disturbed sites (e.g. artificial drains, roadsides, suburban gardens, etc.). It is also an occasional weed of irrigated summer crops (Hussey *et al.* 1997), but is of negligible economic importance in this regard. *Lythrum hyssopifolia* occupies similar habitats in eastern Australia, where it is also recorded as an infrequent crop weed (e.g. Cunningham *et al.* 1981).

Phenology. Flowering and fruiting recorded between October and February.

Notes. Descriptions of *L. hyssopifolia* in the Australian literature (see above) record the inflorescence of this species as consisting of a solitary flower borne in the leaf axils. However, as noted by Koehne (1903), the inflorescence in *L. hyssopifolia* may very rarely consist of two flowers. This condition has been observed in Australian (e.g. *Bates* 2602, *Keighery* 5777, *Wheeler* 2966), as well as extra-Australian material (e.g. *Balls* 12070, *Bangerter* 5124, *Deyl* 258). The frequency of two-flowered inflorescences on individual plants of *L. hyssopifolia* is also very low, usually with only a single such inflorescence per individual.

Lythrum hyssopifolia has been confused with *L. paradoxum* and *L. wilsonii*, but all three taxa are amply distinct. *Lythrum paradoxum* differs from *L. hyssopifolia* in flower and stamen number as well as stamen exertion (although there may be some overlap in the first two characters), while *L. wilsonii* differs from *L. hyssopifolia* in a number of vegetative and floral features; see under that taxon for further discussion.

2. ***Lythrum junceum** Banks & Sol., in A. Russell, Nat. Hist. Aleppo, 2nd edn, 2: 253 (1794).

Illustrations. Jessop (1986: Figure 461 C); Hewson (1990: Figure 33 D–F); Jeanes (1996: Figure 185 G–H).

Descriptions. References as for *L. hyssopifolia*. See also under notes below.

Selected specimens examined. WESTERN AUSTRALIA: East Perth, Oct. 1902, C. Andrews s.n. (PERTH).

SOUTH AUSTRALIA: Tantanoola, Nov. 1991, R. Bates 26328 (AD); near McLaren Vale, c. 25 km SSW of Adelaide, 4 Mar. 1956, R.N. Oram s.n. (AD 96413093; E, MEL, NSW n.v.).

VICTORIA: 10.5 miles [c. 17 km] NW of Petersborough, 21 Jan. 1969, J. Anderson 341 (AD; MEL n.v.); Condah Swamp area, Macarthur–Myamin road, 11 Feb. 1969, A.C. Beauglehole & A.E. Orchard 30520 (AD; MEL n.v.); Bridgewater Lakes, 21 Jan. 1993, J.M. Dalby 93/06 (AD; MEL n.v.).

Distribution. Known in Western Australia from a single old collection. This species does not appear to have become established in Western Australia, and should be excluded from the flora record for the state. Naturalized in South Australia and Victoria, and also recorded from New South Wales and Queensland on the basis of single, old specimens (Hewson 1990). Apparently indigenous to the Mediterranean region and south-western Europe, and widespread elsewhere (Holm *et al.* 1979, Hewson 1990).

Notes. As with *L. hyssopifolia*, the inflorescence in *L. junceum* has been described in the Australian literature as a solitary flower in the axil of a leaf, but two-flowered inflorescences are occasionally produced (Koehne 1903, Webb 1968). Like *L. hyssopifolia*, such inflorescences would appear to be rare, but have been observed in Australian material (e.g. Bates 26328).

Lythrum junceum can easily be distinguished from all other *Lythrum* species in Western Australia by its stoloniferous habit, the presence of dark-pigmented spots at the base of the hypanthium and large petals.

3. **Lythrum paradoxum** Koehne, *Bot. Jahrb. Syst.* 23 Beibl. 56: 19 (1897). *Type citation:* Australia interior, in cl. Mitchell expeditione collecta (vidi in Herb. cl. Martius [= BR; see Stafleu & Cowan 1979]). Brisbane (num ibi collecta?) comm. J.M. Bailey (vidi in museo reg. Berol. [= B]). *Type:* in spring 20 km SE of Arkaroola, South Australia, 16 April 1990, R. Bates 22952 (*neo:* AD 99026150, here nominated; *isoneo:* I n.v.).

Illustrations. Koehne (1903: Figure 9 C); Hewson (1990: Figure 33 J–L).

Descriptions. Koehne (1897, 1903); Hewson (1990).

Specimens examined. WESTERN AUSTRALIA: Fanny's Peak [Mt Fanny], c. 85 km S of Giles Meteorological Station on road to Warburton Mission, 29 Aug. 1973, B. Lay 865 (AD, PERTH).

NORTHERN TERRITORY: Ross River Tourist Resort, 6 Apr. 1983, P.K. Latz 9839 (CANB, DNA); Amburla Station, 18 Oct. 1974, A.S. Mitchell 166 (DNA).

SOUTH AUSTRALIA: McKinlay Creek E of Nepabunna, Gammon Ranges National Park, 16 Apr. 1990, R. Bates 22971 (AD, CANB; MY n.v.); creek near Balacanoona Homestead, 12 Dec. 1974, L.D. Williams 6405 (AD).

Distribution. In Western Australia *L. paradoxum* has been recorded from one site south of Giles, close to the Northern Territory and South Australian borders (Figure 1). *Lythrum paradoxum* also occurs in the drier parts of the Northern Territory, Queensland and South Australia (Hewson 1990). The central desert areas of Western Australia have been inadequately surveyed botanically, and it is likely that further populations of *L. paradoxum* will be found in suitable habitat in this and neighbouring arid regions (*cf. L. wilsonii*, below).

Hewson (1990) referred to a collection of this species (*Weld Blundell* 13), which she suggested may have originated from the Kimberley region of Western Australia. The collection is labelled "Gordon Downs", and indeed there is a homestead of the same name south-east of Halls Creek near the Northern Territory border. However, according to information received from the Queensland Herbarium (BRI), the *Weld Blundell* collection originates from another pastoral property, also called Gordon Downs, approximately 50–70 km N of Emerald in central Queensland (see also McLaughlin *et al.* 1979). Twelve other *Weld Blundell* collections are held at BRI, all from the Queensland locality, and this is undoubtedly where *Weld Blundell* 13 was collected.

Typification. Hewson (1990) commented on the need to typify the name *L. paradoxum*, but was unable to examine any type material. Searches at B and BR did not reveal any type material of *L. paradoxum*, and it is likely that the Bailey syntype seen by Koehne at B was destroyed during the Second World War (B. Leuenberger pers. comm.). Further searches at BM, BRI, CGE, E, K, M and W were also unsuccessful. In the absence of any type material, a neotype has been designated which preserves both the original and current (*sensu* Hewson 1990) circumscription of the taxon.

Habitat. The sole Western Australian collection of *L. paradoxum* is recorded as growing in a "rocky gully". In eastern Australia *L. paradoxum* occurs on damp, generally sandy soils on creeks and other ephemeral or permanent drainage areas. There is no information available on associated vegetation for the Western Australian specimen, and data is similarly sparse for eastern Australian collections. However, *L. paradoxum* has generally been recorded growing with various grasses, sedges and herbs characteristic of damp sites.

Phenology. The specimen from Western Australia, collected in August, is in flower and fruit. Examination of material of *L. paradoxum* from eastern Australia indicates the species may produce flowers and fruits in any month of the year, possibly in response to rain. This is likely to be the case in Western Australia as well, but further collections are required.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority Three. *Lythrum paradoxum* is poorly collected in Western Australia, but is not considered to be under threat given its widespread occurrence in adjacent parts of eastern Australia. Additionally, the area from which *L. paradoxum* has been recorded in Western Australia is remote and under-collected, and it is likely that additional populations of this taxon will be found with further survey activity.

Notes. *Lythrum paradoxum* is sometimes confused with *L. hyssopifolia*, but the two species are easily distinguishable. See notes under *L. hyssopifolia*.

4. *Lythrum wilsonii* Hewson, Fl. Australia 18: 322 (1990).

Lythrum sp. Towrana (*R.J. Cranfield* 2183).

Illustration. Hewson (1990: Figure 33 M–O).

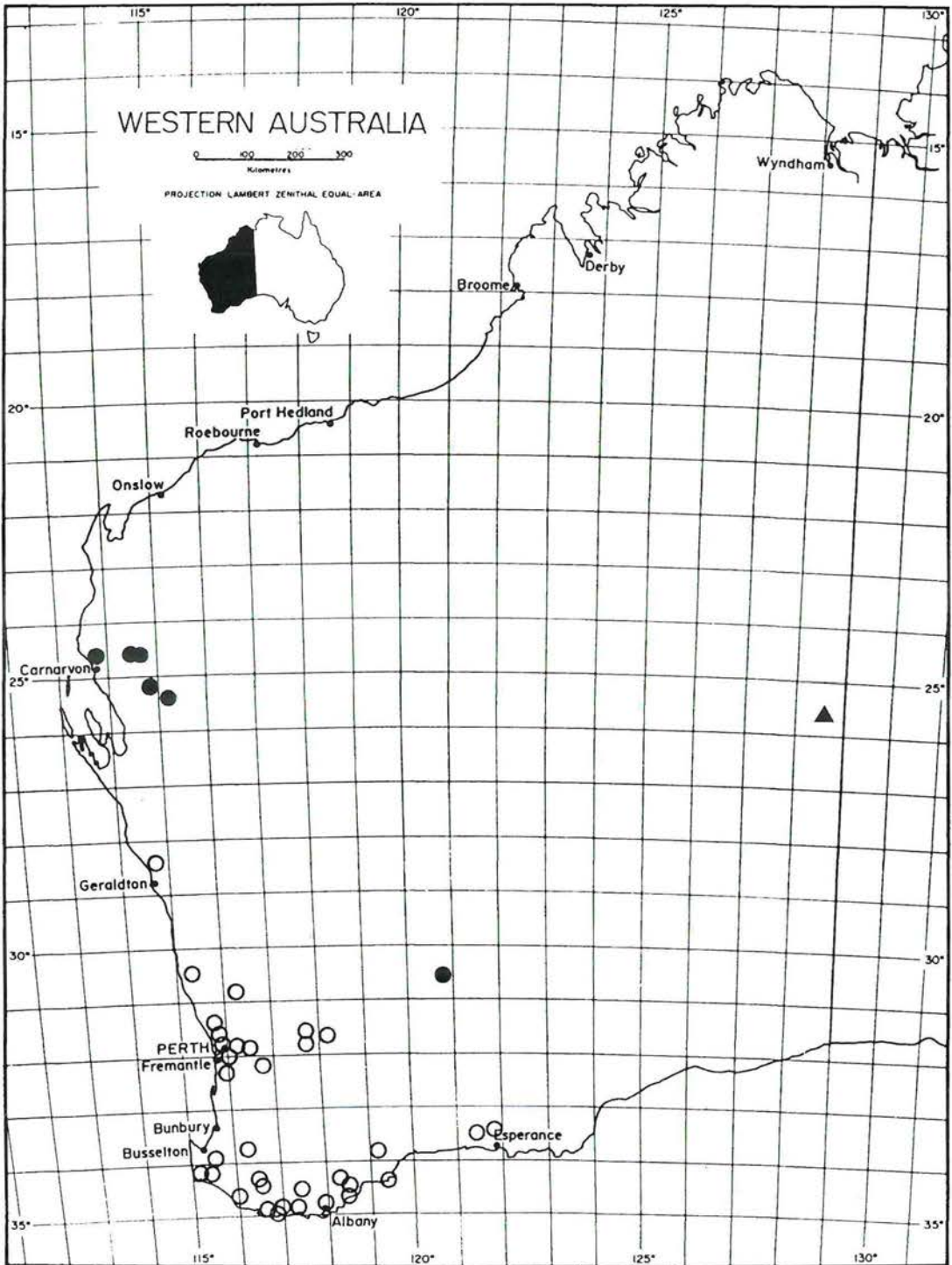


Figure 1. Distribution of *Lythrum hyssopifolia* ○, *L. paradoxum* ▲, and *L. wilsonii* ● in Western Australia. The single early record of *L. junceum* is not mapped (see text).

Ascending to erect annual or perennial *herb*, 4.5–35 cm tall, stems angled, sometimes woody at base. *Leaves* alternate, frequently opposite at the lower nodes (especially in depauperate plants), sessile to shortly petiolate; petiole 0–0.8 mm long; lamina narrowly elliptic to elliptic or rarely narrowly ovate, 2.7–24.5 mm long, 1–6.7 mm broad; base attenuate to narrowly cuneate; apex acute to rarely obtuse; margins, midvein (and very rarely the lamina also) usually minutely scabrous. *Inflorescence* of 1–7 flowers in bracteate cymes inserted in the upper leaf axils. *Bract* 1 (though sometimes absent in 1-flowered inflorescences and from the central flower of few-flowered inflorescences), very narrowly ovate to subulate, 0.8–1 mm long, margin frequently minutely scabrous. *Pedicels* 0.7–1.2 mm long, lengthening to 1.7 mm long in fruit. *Bracteoles* 2, inserted in the proximal *c.* 1/3 of the pedicel (though sometimes absent, especially from the central flower of few-flowered inflorescences), linear to linear-subulate, 0.4–0.7 mm long, margin frequently minutely scabrous. *Hypanthium* narrowly obconical to narrowly campanulate or (less often) more or less fusiform; 3–4.5 mm long, 0.6–1.2 mm wide, longitudinally ribbed, frequently minutely scabrous. *Accessory sepals* 4(–6), narrowly triangular, 0.6–1.5 mm long, frequently minutely scabrous. *Primary sepals* 4(6), semitransversely elliptic to truncate, shortly apiculate, 0.3–0.5 mm long. *Petals* 4(6), obovate to elliptic, pink to lilac, mauve or purple, 2–3.5 mm long. *Stamens* 4(6), included (not exceeding the primary sepals) or exserted (exceeding the primary sepals and approximately level with the apices of the accessory sepals); filaments 0.6–3.2 mm long, anthers *c.* 0.3 mm long. *Ovary* cylindrical to more or less fusiform, 1.5–1.8 mm long, style 0.7–1.5 mm long, stigma capitate. *Capsule* cylindrical to more or less fusiform, 2.5–4 mm long. *Seeds* numerous, angular-obovoid, light brown to reddish brown, *c.* 0.5 mm long.

Selected specimens examined. WESTERN AUSTRALIA: Rowles Lagoon, 7 Nov. 1993, *G. Barrett s.n.* (PERTH); 2 km NE of Towrana Homestead, 30 Apr. 1982, *R.J. Cranfield* 2183 (PERTH); 3.5 km due W from North West Coastal Highway–Quobba Rd intersection, 24 Aug. 1995, *G.J. Keighery & N. Gibson* 2037 (BRI, CANB, K, MEL, PERTH); Chagra Well, Jimba Jimba Station, 29 Aug. 1995, *G.J. Keighery & N. Gibson* 2038 (CANB, PERTH); unnamed claypan on Boolathana Station, on fence *c.* 0.5 km NNE of Innaman Tank, 24 Aug. 1995, *G.J. Keighery & N. Gibson* 2039 (PERTH).

NORTHERN TERRITORY: Lake Surprise, 32 km SW of Tennant Creek, 6 May 1994, *P.K. Latz* 13705 (DNA); Ilparpa Swamp, Alice Springs, 22 Feb. 1995, *P.K. Latz* 14034 (DNA).

QUEENSLAND: Georgina River, Sep. 1910, *E.W. Bick* 100 (BRI); Braidwood, Jundah, July 1960, *M.M. Cole s.n.* (BRI).

NEW SOUTH WALES: Roo Roo Station, Wentworth, 8 Sep. 1975, *I. Eade s.n.* (NSW); Willow Point Station, 65 miles [*c.* 104 km] N of Wentworth, 18 Mar. 1959, *L.A.S. Johnson & E.F. Constable s.n.* (NSW).

SOUTH AUSTRALIA: Wirrigilpina Swamp, 43 km WSW of Stuart Creek Homestead, 2 Mar. 1984, *F.J. Badman* 655 (AD); Clayton River, *c.* 95 km N of Marree, 15 Nov. 1955, *R. Hill* 484 (AD; GZU, MY *n.v.*); Roxby Downs Station, *c.* 60 km N of Pimba, 27 Mar. 1973, *B. Lay* 713 (AD; AK *n.v.*); Goyder Lagoon, 64 miles [*c.* 105 km] SSW of Birdsville, 24 June 1966, *D.R. Smyth* 65 (AD; SYD *n.v.*).

Distribution. In Western Australia, *L. wilsonii* has been recorded from two widely disjunct areas: the Carnarvon–Gascoyne Junction district, and Rowles Lagoon, *c.* 70 km NW of Kalgoorlie (Figure 1). This disjunction is probably not a true representation of the distribution of this species in Western Australia, and is likely to be the result of inadequate collecting (*cf.* *L. hyssopifolia* and *L. paradoxum*, above). *Lythrum wilsonii* also occurs widely in the arid and semi-arid regions of New South Wales, the Northern Territory, Queensland and South Australia (Hewson 1990).

Habitat. Collections of *L. wilsonii* from Western Australian have been made from similar habitats to those recorded throughout the rest of the species range in eastern Australia, namely damp soils (predominantly clays), on the margins of ephemeral or permanent waterbodies. Vegetation communities

recorded in Western Australia include herbland, samphire associations, shrubland and eucalypt woodland. This is again similar to what has been recorded in eastern Australia.

Phenology. Flowering and fruiting has been recorded during August, November and April in Western Australia. As with *L. paradoxum* (above), eastern Australian populations of *L. wilsonii* have been recorded flowering and fruiting in all months of the year, possibly in response to rain. Once again, this may also apply to populations in Western Australia, but there are insufficient collections to confirm this.

Conservation status. While currently known from only a few sites in Western Australia, *L. wilsonii* is not considered to be under threat. It occurs widely in eastern Australia, and, as with *L. paradoxum*, further surveys of suitable habitat in arid and semi-arid areas of Western Australia are likely to reveal additional populations.

Notes. Individuals of *L. wilsonii* from the Carnarvon area (e.g. Cranfield 2183, Keighery & Gibson 2037–2039) differ slightly in stamen morphology from plants elsewhere in the species range. In 'typical' *L. wilsonii*, the stamens are included within the hypanthium (i.e. not exceeding the primary sepals), with the filaments 0.6–1.6 mm long, while in plants from the Carnarvon area the stamens are exerted (i.e. exceeding the primary sepals and approximately level with the apices of the accessory sepals), with the filaments 2.6–3.2 mm long. However, two collections from northern South Australia (Badman 655, Lay 713) exhibit intermediate stamen morphology. In these plants the stamens are included to barely exerted, and the filaments are 2–2.1 mm long. Plants from the Carnarvon area could potentially be afforded separate taxonomic status, but this is not considered appropriate at this stage, given the existence of apparently intermediate individuals and the frequent plasticity of floral morphology in the Lythraceae (Hewson & Beesley 1990). Variation in staminal morphology (and also stamen number) is also known to occur in *L. hyssopifolia*, in which there may be 4–6 included stamens and occasionally 4–6 additional (barely) exerted stamens (Koehne 1903, Hewson 1990). Further collections of *L. wilsonii*, particularly from Western Australia, would assist in clarifying this variation.

Lythrum wilsonii is superficially similar to *L. hyssopifolia*, and the two species are sometimes confused. Both taxa have a similar overall morphology, but *L. wilsonii* can be distinguished most readily by its inflorescence, which consists of 1–7 flowers, as opposed to *L. hyssopifolia*, in which the inflorescence usually consists of a single flower (very rarely two flowers may be present in some individuals). Single-flowered inflorescences are not infrequent in *L. wilsonii*, especially in young or depauperate plants, and some difficulty may be experienced in separating such individuals from *L. hyssopifolia*. However, plants of *L. wilsonii* generally bear at least two or three inflorescences of two or more flowers, whereas in *L. hyssopifolia* two-flowered inflorescences are comparatively rare, and it is unusual to find more than one such inflorescence per individual. Leaf shape and (to some extent) stamen number also help to separate *L. wilsonii* and *L. hyssopifolia*, although there is some overlap in these characters. Leaves in *L. wilsonii* are narrowly elliptic to elliptic, rarely narrowly ovate, whereas in *L. hyssopifolia* leaves tend to be narrowly oblong in overall shape (though occasionally narrowly ovate or rarely narrowly elliptic). *Lythrum wilsonii* has 4–6 (usually 4) stamens, while *L. hyssopifolia* may have either 4–6 or rarely 8–12 stamens.

In her descriptions, Hewson (1990) records *L. wilsonii* as being "minutely scabrous", and *L. hyssopifolia* as "glabrous". Examination of herbarium collections of *L. hyssopifolia* by the present author have shown that the vegetative and floral parts of this taxon are also frequently minutely scabrous, and as a result this character is not exclusively diagnostic for *L. wilsonii*. *Lythrum wilsonii* and *L. hyssopifolia* also exhibit some broad ecological differences, with *L. wilsonii* occurring around

natural waterbodies in arid and semi-arid areas, and *L. hyssopifolia* occupying predominantly disturbed habitats, mostly in the more mesic parts of southern Australia. *Lythrum hyssopifolia* does occur within the range of *L. wilsonii*, at least in New South Wales and South Australia, but there would appear to be no documented instances of actual sympatry.

Hewson (1990), when describing *L. wilsonii*, did not speculate on its relationships, apart from a comment that "...the two endemic species [i.e. *L. paradoxum* and *L. wilsonii*] belong in sect. *Mesolythrum* Koehne, an Australian section." This was presumably based on the treatment of Koehne (1903), in which *L. wilsonii* keys out to sect. *Mesolythrum* (in subg. *Hyssopifolia* Koehne) on the basis of flower number, i.e.: (1)3–7 flowers as opposed to 1(2) flowers for the other sections. As mentioned above, *L. wilsonii* is morphologically similar to *L. hyssopifolia*, but it is not certain whether this is indicative of any close relationship between the two taxa. The main similarity between *L. wilsonii* and *L. paradoxum* is flower number, which is inherently variable and may not give a true indication of relationships. Koehne's (1903) classification is in need of revision, and the relationships of the Australian species of *Lythrum* should be considered as part of a wider study aimed at presenting a modern monographic treatment of the genus.

Acknowledgements

I am grateful to Neil Gibson, Greg Keighery and Mike Lyons for their efforts in collecting material of *L. wilsonii* in the Carnarvon area, and to David Halford and Rod Henderson for information regarding the Weld Blundell collection of *L. paradoxum*. Thanks are also due to Alex Chapman, Beat Leuenberger and Ernst Vitek for searching for type material on my behalf at CGE, B and W respectively. The curators of AD, BM, BR, BRI, DNA, E, K, M and NSW are thanked for allowing me to examine collections in their care or for facilitating searches for type material.

References

- Cunningham, G.M., Mulham, W.E., Milthorpe, P.L. & Leigh, J.H. (1981). "Plants of Western New South Wales." (Soil Conservation Service of New South Wales: Sydney.)
- Hewson, H.J. (1990). *Lythrum*. In: George, A.S. (ed.) "Flora of Australia." Vol. 18, pp. 100–104, 322. (Australian Government Publishing Service: Canberra.)
- Hight, J. & Wilson, P.G. (1991). *Lythrum*. In: Harden, G.J. (ed.) "Flora of New South Wales." Vol. 2, pp. 198–200. (University of New South Wales Press: Sydney.)
- Holm, L., Pancho, J.V., Herberger, J.P. & Plucknett, D.L. (1979). "A Geographical Atlas of World Weeds." (John Wiley & Sons: New York.)
- Hussey, P., Keighery, G.J., Cousens, R.D., Dodd, J. & Lloyd, S.G. (1997). "Western Weeds." (Plant Protection Society of Western Australia: Victoria Park.)
- Jeanes, J.A. (1996). Lythraceae. In: Walsh, N.G. & Entwistle, T.J. (eds) "Flora of Victoria." Vol. 3, pp. 909–911. (Inkata Press: Melbourne.)
- Jessop, J.P. (1986). Lythraceae. In: Jessop, J.P. & Toelken, H.R. (eds) "Flora of South Australia." Vol. 2, pp. 889–891. (Government Printer: Adelaide.)
- Koehne, E. (1897). Lythraceae. In: Urban, I. (ed.) *Plantae novae americanae imprimis Glaziovianae*. I. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie*, 23 Beiblatt 57: 18–36.
- Koehne, E. (1903). Lythraceae. In: Engler, A. (ed.) "Das Pflanzenreich." Vol. IV no. 216, pp. 1–326. (H.R. Englemann: Weinheim.)
- McLaughlin, W., Lloyd, P.L. & Hodges, H.M. (1979). Peak Downs Shire Handbook. Unpublished report for the Queensland Department of Primary Industries.

- Mitchell, A.S. (1976). A summary of the family Lythraceae in the Northern Territory (with additional comment on the Australian material). *Journal of the Adelaide Botanic Gardens* 1: 55-59.
- Rye, B.L. (1987). Lythraceae. In: Marchant, N.G. *et al.* "Flora of the Perth Region." Vol. 1, pp. 366-367. (Western Australian Department of Agriculture: Perth.)
- Stafleu, F.A. & Cowan, R.S. (1981). Taxonomic Literature. Vol. 3. *Regnum Vegetabile* 105: 1-980.
- Webb, D.A. (1968). *Lythrum*. In: Tutin, T.G. *et al.* (eds) "Flora Europaea." Vol. 2, pp. 300-303. (Cambridge University Press: Cambridge.)