

# Australian *Leptospermum* in cultivation: Interspecific hybrids

## The second of a two-part series

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Part One of this article provided an in-depth account of Australian *Leptospermum* (tea-tree) species and their cultivars in horticulture. This second part examines interspecific hybrids – crosses between different species – and the ornamental selections made from them.

Tea-tree hybrids have spontaneously arisen both in the wild and in cultivation. Some of these crosses involve distantly related species, which suggests that (for most) the barriers to hybridism are poorly developed. The natural ability of *Leptospermum* species to hybridise highlights the great potential for deliberate breeding of unique cultivars by the production of interspecific hybrids. Novel flower colour, distinct foliage, increased frost and mānuka blight resistance<sup>2</sup> and other desirable qualities can be combined through systematic breeding programmes. Thanks to breeders such as Peter Ollerenshaw in Australia, this potential is now being realised and outstanding hybrids are becoming available.

In Australia, natural interspecific hybrids in *Leptospermum* occur where their distributions and flowering periods overlap. Botanist Dr Joy Thompson listed the following natural hybrids in her 1989 taxonomic treatment:

- L. arachnoides* Gaertn. × *L. squarrosum* Gaertn.
- L. grandifolium* Sm. × *L. sphaerocarpum* Cheel
- L. juniperinum* Sm. × *L. polygalifolium* Salisb.
- L. laevigatum* (Gaertn.) F.Muell. × *L. myrsinoides* Schtdl.
- L. microcarpum* Cheel × *L. brevipes* F.Muell.
- L. minutifolium* (Benth.) C.T.White × *L. polygalifolium* ?
- L. nitidum* Hook.f. × *L. lanigerum* (Aiton) Sm.
- L. novae-angliae* Joy Thomps. × *L. gregarium* Joy Thomps. ?
- L. parvifolium* Sm. × *L. squarrosum*
- L. parvifolium* × *L. trinervium* (Sm.) Joy Thomps.

Thompson (1989) also remarked that breakdown of species boundaries may occur through hybridism between *L. gregarium* and *L. polygalifolium* subsp. *transmontanum* Joy Thomps., *L. myrtifolium* Sieber ex DC. and *L. continentale* Joy Thomps., and *L. myrtifolium* and *L. obovatum* Sweet.

In cultivation, interspecific tea-tree hybrids have been reported mainly since the 1990s, either as chance garden seedlings or, more recently, from deliberate crosses. Before then, a few astute horticulturists raised the possibilities of hybridising species of *Leptospermum*. Harrison (1974) suggested a cross between a large-

flowered New Zealand *L. scoparium* J.R.Forst. & G.Forst. cultivar and the ornamental Australian species *L. squarrosum*. Wrigley and Fagg (1979) commented on the potential of *L. rotundifolium* (Maiden & Betcher) F.Rodway ex Cheel as a parent for interspecific hybridisation. Halliwell (1981) proposed a cross between *L. rupestre* Hook.f. (which he called "*L. scoparium* var. *prostratum*") and one of the coloured forms of *L. scoparium*, to combine reddish flower colour with increased hardiness.

I know of several early attempts to hybridise Australian *Leptospermum* with New Zealand *L. scoparium*. In New Zealand, Ken Davey (New Plymouth) unsuccessfully attempted to cross a selected form of *L. laevigatum* with *L. scoparium* 'Nanum', and *L. laevigatum* with *L. scoparium* 'Red Falls' (Ken Davey, pers. comm.). At the nursery of E. F. Jenkin & Sons in Australia, attempts were made to cross *L. rotundifolium* 'Lavender Queen' with *L. scoparium* 'Lambethii' (Robert Jenkin, pers. comm.). Jenkin's lack of success may have been due to *L. 'Lambethii'* being one of the few known triploid tea-trees (Dawson, 1990, 1995, 1997b, 2010), hindering normal pairing of the chromosomes at meiosis.

### Australian-raised hybrids

The first interspecific *Leptospermum* hybrids available in horticulture arose from open-pollinated, chance garden seedlings. *L. 'Silver Fantasy'* is probably a hybrid between a cultivar of *L. scoparium* and an Australian species. *L. 'Silver Fantasy'* was given to the E. F. Jenkin & Sons Nursery in Australia by Mr Kevin Webb who raised it as a chance garden seedling. This cultivar has single dusky-pink coloured flowers and is named after its silvery foliage (Jenkin's Nursery Catalogue, 1991; Robert Jenkin, pers. comm.). The pink flower colour is probably inherited from a cultivar of New Zealand *L. scoparium* and the silvery-grey-glaucous foliage from an Australian species (such as *L. glaucescens* S.Schauer, *L. grandiflorum* Lodd., *L. laevigatum*, *L. lanigerum* or *L. sericeum* Labill.). *L. 'Silver Fantasy'* is little-known outside Australia. A more recent selection is currently being promoted in Australia under the similar name *L. scoparium* 'New Silver Fantasy'. This selection grows 2–3 m tall and has silvery-grey foliage, single clear pink flowers with red sepals and a green receptacle disk. *L. 'New Silver Fantasy'* is propagated by Larkman Nurseries, Victoria, Australia. They obtained the stock plant from a nursery in Adelaide in the early 1990s (Clive Larkman, pers. comm.). However, its origins and parentage are not known to them, including any relationship it may have with the older *L. 'Silver Fantasy'*.

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<sup>2</sup> Mānuka blight is the combined effect of scale insect infestation and sooty mould fungus.



**Fig. 1** An Australian raised hybrid between *Leptospermum polygalifolium* subsp. *tropicum* 'Pacific Beauty' and (probably) *L. scoparium*. **A**, young plant growing at Landcare Research, Lincoln. In New Zealand, this selection is known as *L. 'Pink Beauty'*. Photo: Robert Lamberts. **B**, mature plant growing in a Perth garden. In Australia it is called *L. 'Pink Cascade'*. Photo: Lesley Corbett.

**Fig. 2** *Leptospermum 'Aphrodite'*, raised at Bywong Nursery, New South Wales, Australia. Photo: Peter Ollerenshaw.

*Leptospermum 'Lemon Frost'* is reported to be an interspecific hybrid between *L. petersonii* F.M.Bailey and *L. polygalifolium*. This selection was raised in Cairns, and is widely grown in Queensland (*Australian Plants*, March 1993).

Another interspecific hybrid from Australia (Fig. 1A–B) appears to be a spontaneous cross involving *L. polygalifolium* subsp. *tropicum* Joy Thomps. 'Pacific Beauty' (a cultivar previously placed in *L. flavescens* Sm.; see Part One of this article) and another parent. Like *L. polygalifolium* subsp. *tropicum*, this hybrid is frost tender and unsuitable for growing in cooler climates. The hybrid is similar to *L. 'Pacific Beauty'* in having a cascading or arching growth form and fine leaves, but differs in having pink (rather than white) flowers. The pink flowers suggest that the other parent may be one of the numerous cultivars of New Zealand *L. scoparium* with this flower colouration (*Australian Plants*, March 1993; Elliot and Jones, 1993). Less likely is the claim that the second parent is *L. continentale* (Cornford, 1996), which only occasionally has pinkish flowers. In Australia, this hybrid is commonly known as *L. 'Pink Cascade'* and sometimes as *L. flavescens 'Pink Cascade'* (e.g., Greig, 1987; *Australian Plants*, March 1993; Elliot and Jones, 1993). It was registered with the Australian Cultivar Registration Authority by Mr G. Logan, of New South Wales in 1991–1992. In New Zealand, the name was changed to *L. flavescens 'Pink Beauty'* by Richard Ware (Plant Production, Napier). He changed the name because there is already a cultivar in New Zealand called "Pink Cascade" – but a selection of *L. scoparium*.

*Leptospermum 'Aphrodite'* (*L. spectabile* × *L. polygalifolium* ?) arose in the 1980s as a spontaneous hybrid seedling of *L. spectabile* Joy Thomps. It was raised by Peter Ollerenshaw of Bywong Nursery (Bungendore, New South Wales). This outstanding selection (Fig. 2) has a compact growth habit, attaining about 2.5 m tall and 2 m across, flowers that are 20–22 mm in diameter, and distinctive reddish-purple petals. Like other crosses involving *L. spectabile* as one parent, the large pale sepals of the calyx are prominently displayed and contrast with the overlying petals. *L. 'Aphrodite'* is said to be hardy in the cooler areas of Australia (Stewart, 1999). It first became available in the early 1990s (e.g., *Australian Horticulture*, July 1994) and has had Australian Plant Breeders Rights (PBR; *Plant Varieties Journal*, 1993, Vol. 6, No. 1, p. 26; 1993–2012) and New Zealand Plant Variety Rights protection (PVR; 1996–2010).

In contrast to these few examples of open-pollinated, chance garden hybrids, there have been deliberate efforts to produce interspecific crosses in *Leptospermum* with superior horticultural qualities.

Inspired by his discovery of *L. 'Aphrodite'*, Peter Ollerenshaw undertook an extensive programme of deliberate hybridisation in *Leptospermum*. Since about 1987, he has raised more than 50 crosses that are considered to be successful. These include, with the seed parents listed before the pollen parents:

- L. 'Aphrodite'* × *L. rupestre*
- L. 'Aphrodite'* × *L. scoparium 'Nanum Rubrum'*
- L. 'Aphrodite'* × *L. 'Pink Beauty'*. (One selection from this cross is named *L. 'Merinda'*)
- (*L. 'Aphrodite'* × *L. scoparium 'Nanum Rubrum'*) × (*L. rotundifolium* × *L. spectabile*)
- (*L. 'Aphrodite'* × *L. scoparium 'Nanum Rubrum'*) × (*L. scoparium 'Asbestos Range'* × *L. spectabile*)
- (*L. 'Aphrodite'* × *L. 'Pink Beauty'*) × (*L. spectabile* × *L. rotundifolium 'Julie Anne'*)
- L. 'Cardwell'* × *L. scoparium 'Nanum Rubrum'*
- L. 'Cardwell'* × *L. 'Rhiannon'*. (Selections of this cross are named *L. 'Daydream'*, *L. 'Love Affair'*, *L. 'Outrageous'*, *L. 'Pageant'*, *'Tickled Pink'*, and *L. 'White Wave'*)
- (*L. 'Cardwell'* × *L. 'Rhiannon'*) × *L. deuense*
- {[(*L. 'Cardwell'* × *L. 'Rhiannon'*) × *L. deuense*] × (*L. rotundifolium* × *L. spectabile*)}
- {[(*L. 'Cardwell'* × *L. 'Rhiannon'*) × *L. deuense*] × (*L. rotundifolium* × *L. spectabile*)} × [(*L. 'Cardwell'* × *L. 'Rhiannon'*) × *L. rotundifolium 'Lavender Queen'*]. (One selection from this cross is named *L. 'Riot'*)
- (*L. 'Cardwell'* × *L. 'Rhiannon'*) × *L. rotundifolium 'Lavender Queen'*. (One selection from this cross is named *L. 'Cherish'*)
- L. 'Daydream'* × (*L. macrocarpum* × *L. rotundifolium*). (This hybrid combination was sib-crossed to produce *L. 'Lipstick'*)
- L. deuense* Joy Thomps. × *L. macrocarpum* (Maiden & Betche) Joy Thomps.
- L. deuense* × *L. rotundifolium*
- L. deuense* × *L. spectabile*
- L. deuense* × (*L. rotundifolium* × *L. spectabile*)
- L. deuense* × (*L. scoparium 'Nanum Rubrum'* × *L. macrocarpum*). (One selection is named *L. 'Mesmer*



**Fig. 3** *Leptospermum* 'Cherish', raised at Bywong Nursery. Photo: Peter Ollerenshaw.



**Fig. 4** *Leptospermum* 'Lipstick', raised at Bywong Nursery. Photo: Peter Ollerenshaw.



**Fig. 5** *Leptospermum* 'Merinda', raised at Bywong Nursery. Photo: Peter Ollerenshaw.

Eyes')

*L. grandifolium* × *L. macrocarpum*

*L. grandifolium* × *L. spectabile*

*L. grandifolium* × (*L. rotundifolium* × *L. spectabile*)

*L. lanigerum* × *L. spectabile*

*L. lanigerum* × (*L. spectabile* × *L. rotundifolium* 'Julie Anne')

*L. novae-angliae* × *L. spectabile*

*L. novae-angliae* × (*L. rotundifolium* × *L. spectabile*)

*L. macrocarpum* × *L. rotundifolium*

*L. morrisonii* Joy Thomps. × *L. scoparium* 'Nanum Rubrum'

*L. polygalifolium* subsp. *polygalifolium* ×

(*L. rotundifolium* × *L. spectabile*)

*L. rotundifolium* × *L. spectabile*. (One selection is named *L. 'Rhiannon'*)

*L. 'Rhiannon'* × *L. 'Aphrodite'*

(*L. rotundifolium* × *L. spectabile*) × *L. scoparium* 'Nanum Rubrum'

*L. scoparium* 'Asbestos Range' × *L. rotundifolium*

*L. scoparium* 'Asbestos Range' × *L. spectabile*

*L. scoparium* 'Asbestos Range' × *L. scoparium* 'Nanum Rubrum'

*L. scoparium* 'Asbestos Range' × (*L. spectabile* × *L. ?*). (The second parent is an unnamed spontaneous hybrid)

(*L. scoparium* 'Asbestos Range' × *L. spectabile*) × *L. obovatum* (dwarf form)

*L. scoparium* 'Big Red' × *L. spectabile*

*L. scoparium* 'Big Red' × *L. 'Rhiannon'*

*L. scoparium* 'Karekare' × (*L. rotundifolium* × *L. spectabile*)

*L. scoparium* 'Nanum Rubrum' × *L. macrocarpum*

*L. scoparium* 'Nanum Rubrum' × *L. spectabile*

*L. scoparium* 'Pixie Pink' × *L. 'Rhiannon'*

(*L. scoparium* 'Big Red' × *L. spectabile*) × *L. rotundifolium*

*L. scoparium* var. *eximium* × *L. scoparium* 'Nanum Rubrum'. (One selection is named *L. scoparium* 'Freya')

*L. scoparium* 'Freya' × *L. rotundifolium* 'Lavender Queen'

*L. scoparium* var. *eximium* × *L. rotundifolium*

*L. scoparium* var. *eximium* × *L. 'Aphrodite'*

(*L. scoparium* 'Nanum Rubrum' × *L. macrocarpum*) ×

(*L. scoparium* 'Big Red' × *L. spectabile*)

(*L. scoparium* 'Nanum Rubrum' × *L. macrocarpum*) ×

(*L. scoparium* 'Big Red' × *L. 'Rhiannon'*)

(*L. scoparium* 'Asbestos Range' × *L. spectabile*) ×

(*L. spectabile* × *L. rotundifolium* 'Julie Anne')

*L. 'Silver Fantasy'* × (*L. rotundifolium* × *L. spectabile*)

*L. spectabile* × *L. rotundifolium* 'Julie Anne'

*L. spectabile* × *L. morrisonii* 'Burgundy'. (One selection is named *L. 'Rudolph'*)

*L. spectabile* × (*L. spectabile* × *L. ?*). (The second parent is an unnamed spontaneous hybrid).

Peter Ollerenshaw is evaluating this broad and varied range of hybrid material for horticultural potential (Peter Ollerenshaw, pers. comm.). He has released more than a dozen cultivars to date. Most have Australian Plant Breeders Rights (PBR) protection and are well documented through this process and on the Bywong Nursery website.

*Leptospermum* 'Cherish' (Fig. 3) grows 2–3 m tall and 2 m across. It produces numerous large white flowers with pink sepals and is said to be relatively hardy in Australian conditions. *L. 'Cherish'* is a selection from the controlled pollination (*L. 'Cardwell'* × *L. 'Rhiannon'*) × *L. rotundifolium* 'Lavender Queen' made by Peter Ollerenshaw in October 1998. It does not have PBR protection.

*Leptospermum* 'Lipstick' (Fig. 4) is an upright shrub growing to about 1.5 m tall and producing numerous large flowers with bright pink petals. It was selected from a cross made in October 2002, between two hybrid seedlings of similar parentage but differing flower colours: [*L. 'Daydream'* × (*L. macrocarpum* × *L. rotundifolium*)] × [*L. 'Daydream'* × (*L. macrocarpum* × *L. rotundifolium*)]. Like *L. 'Cherish'*, *L. 'Lipstick'* is relatively hardy in Australia and does not have PBR protection.

*Leptospermum* 'Merinda' (Fig. 5; originally named *L. 'Bywong Merinda'*) is a cross between *L. 'Aphrodite'* (seed parent) and *L. 'Pink Beauty'* (pollen parent) (i.e., Australian *L. 'Pink Cascade'*). Like several other hybrids raised by Peter Ollerenshaw, *L. 'Merinda'* is a rather complex cross, as both of these parents are probably already interspecific hybrids<sup>3</sup>. The Australian *Plant Varieties Journal* (1997, Vol. 10, No. 1, pp. 40–41), that accepts PBR (as *L. 'Bywong Merinda'*), does not record these parentages accurately. *L. 'Merinda'* is a semi-prostrate shrub about 1 m tall. This low stature makes it

<sup>3</sup> As previously mentioned, *L. 'Aphrodite'* is a putative cross between *L. spectabile* and another species, possibly *L. polygalifolium*, and *L. 'Pink Beauty'* / *L. 'Pink Cascade'* is probably a hybrid between *L. polygalifolium* subsp. *tropicum* 'Pacific Beauty' and *L. scoparium*.



**Fig. 6** *Leptospermum* 'Mesmer Eyes', raised at Bywong Nursery. Photo: Peter Ollerenshaw.



**Fig. 7** *Leptospermum* 'Rhiannon', raised at Bywong Nursery. **A**, mature plant growing in a Perth garden. Photo: Lesley Corbett. **B**, flowers. Photo: Peter Ollerenshaw.



**Fig. 8** *Leptospermum* 'Riot', raised at Bywong Nursery. Photo: Peter Ollerenshaw.



**Fig. 9** *Leptospermum* 'Rudolph', raised at Bywong Nursery. Photo: Peter Ollerenshaw.



**Fig. 10** *Leptospermum* 'Daydream', raised at Bywong Nursery. Photo: Peter Ollerenshaw.

well suited for small gardens and growing in containers (e.g., on patios). It produces abundant flowers (16–22 mm in diameter) with bright magenta petals. Interestingly, this cultivar produces very few seed capsules, probably as a result of its wide parentage. *L.* 'Merinda' also has New Zealand PVR protection (as *L.* 'Bywong Merinda'; granted 1999).

*Leptospermum* 'Mesmer Eyes' (Fig. 6) is a cross involving three species – *L. scoparium* 'Nanum Rubrum', *L. macrocarpum*, and *L. deuense*. As documented in the PBR application (*Plant Varieties Journal*, 2004, Vol. 17, No. 4, pp. 273–275), the first cross, *L. scoparium* 'Nanum Rubrum' (seed parent) × *L. macrocarpum* (pollen parent), was made in November 1992 and grown on to flowering. In October 1995 pollen from this hybrid was crossed with *L. deuense* (seed parent). *L.* 'Mesmer Eyes' was selected from the resultant 30 seedlings. This cultivar grows to about 1.5 m tall and 1 m across. It has large flowers (29–35 mm in diameter) with petals that open white and change to pink as they age. This colour change gives the flowers an attractive bicoloured appearance. The flowers have dark centres and stamens that are said to resemble eyelashes – hence the name "Mesmer Eyes". It is one of the more hardy selections (for Australian conditions) made by Peter Ollerenshaw, being drought and frost tolerant once established. *L.* 'Mesmer Eyes' also has New Zealand PVR protection (granted 2011).

*Leptospermum* 'Rhiannon' (Fig. 7A–B) was selected from a cross between *L. rotundifolium* (seed parent) and *L. spectabile* (pollen parent) made in December 1987 (Peter Ollerenshaw, pers. comm.; not 1990 as stated in *Plant Varieties Journal*, 1995, Vol. 8, No. 1, pp. 35–36). It is an upright growing shrub, 2 m tall and 1 m across, with dark glossy foliage and large red-purple flowers (27–30 mm). As well as its use as a garden shrub, it is

said to have a long vase life and suitable as a cut flower. Australian PBR protection was granted in 1995.

*Leptospermum* 'Riot' (Fig. 8) is an upright shrub growing to about 1.5 m tall and 1 m across. It is very floriferous with large flowers and bright carmine petals. This hybrid has an especially complex parentage, from a pollination made in November 2001. The parents are {[(*L.* 'Cardwell' × *L.* 'Rhiannon') × *L. deuense*] × (*L. rotundifolium* × *L. spectabile*)} × [(*L.* 'Cardwell' × *L.* 'Rhiannon') × *L. rotundifolium* 'Lavender Queen']. *L.* 'Riot' was released in 2009 and does not appear to have PBR protection.

*Leptospermum* 'Rudolph' (Fig. 9) is a cross made in December 1991 between *L. spectabile* (seed parent) and *L. morrisonii* 'Burgundy' (pollen parent). The flowers of this hybrid have red petals and large, light-green sepals (characters derived from *L. spectabile*). *L.* 'Rudolph' is fast growing and attains 2 to 3 m tall and about 1.5 to 2 m across, has long and narrow leaves (20 × 4 mm) and dense foliage with reddish-purple new growth that matures to a dark green (growth and foliage characters largely derived from *L. morrisonii*). *L.* 'Rudolph' is relatively cold hardy (under Australian conditions). It is protected by Australian PBR (*Plant Varieties Journal*, 1999, Vol. 12, No. 4, pp. 88–89; granted 2000).

Some of Peter Ollerenshaw's more recent releases include a series of named selections of *L.* 'Cardwell' (seed parent) × *L.* 'Rhiannon' (pollen parent). *L.* 'Daydream', *L.* 'Love Affair', *L.* 'Outrageous', *L.* 'Pageant', and *L.* 'White Wave' (all in *Plant Varieties Journal*, 2001, Vol. 14, No. 1, pp. 51–55) were the results of this cross made in 1995. *L.* 'Tickled Pink' is a repeat of this cross, made in February 1998 (*Plant Varieties Journal*, 2002, Vol. 15, No. 4, pp. 44–45).

*Leptospermum* 'Daydream' (Fig. 10) is an upright shrub growing to about 2 m tall and 1.5 m across. It has yellow green foliage and produces abundant, large bright red-



**Fig. 11** *Leptospermum* 'Love Affair', raised at Bywong Nursery. Photo: Peter Ollerenshaw.



**Fig. 12** *Leptospermum* 'Outrageous', raised at Bywong Nursery. Photo: Peter Ollerenshaw.



**Fig. 13** *Leptospermum* 'Pageant', raised at Bywong Nursery. Photo: Peter Ollerenshaw.



**Fig. 14** *Leptospermum* 'Tickled Pink', raised at Bywong Nursery. Photo: Peter Ollerenshaw.



**Fig. 15** *Leptospermum* 'White Wave', raised at Bywong Nursery. Photo: Peter Ollerenshaw.

purple flowers (26 mm in diameter). *L.* 'Daydream' has Australian Plant Breeders Rights protection (granted 2001). The cultivar name "Dreamtime" was originally proposed by Peter Ollerenshaw (*Plant Varieties Journal*, 1999, Vol. 12, No. 4, p. 14) but this was changed to "Daydream" (PBR online database; *Plant Varieties Journal*, 2001, Vol. 14, No. 1).

*Leptospermum* 'Love Affair' (Fig. 11) is a small-medium shrub growing to about 1.5 m tall and 1.5 m across. It is relatively hardy. (in Australia) and suited to smaller gardens or grown as a large container specimen. It produces an abundance of soft red-purple flowers (25 mm in diameter). Australian PBR was granted in 2001.

*Leptospermum* 'Outrageous' (Fig. 12) attains about 2 m tall and 1.5 m across. It is a fast growing shrub with drooping branches. It has large deep red-purple flowers (28 mm in diameter). Australian PBR was granted in 2001.

*Leptospermum* 'Pageant' (Fig. 13) is a low spreading shrub growing to about 1–1.5 m tall and 1.5–2 m across. As such, it is suitable for small gardens or large pots. *L.* 'Pageant' is notable for producing an abundance of large and distinctive purple flowers (26 mm in diameter). Australian PBR was granted in 2001.

*Leptospermum* 'Tickled Pink' (Fig. 14) is an upright shrub growing to about 2 m tall and 1.5 m across. It is relatively hardy and its bright green leaves and dense habit make it suitable for a screen, hedge or specimen plant. *L.* 'Tickled Pink' produces numerous vibrant pink flowers (21 mm in diameter). Australian PBR was granted in 2004.

*Leptospermum* 'White Wave' (Fig. 15) is a low growing cascading shrub reaching only about 0.5 m tall and 1 m across. It produces numerous white flowers (25 mm in diameter) and can be used in small gardens, raised

planters, on banks or cascading over retaining walls. Australian PBR was granted in 2001.

Two other *Leptospermum* breeders in Australia have produced interspecific hybrids. Geoffrey Watson of the former Clarence Peak Nursery in New South Wales developed six interspecific hybrids sold under the trademark "Aussie Blossom". His nursery is now closed but the cultivars he produced are still available (Faceys Nursery online catalogue). All are free flowering and have dwarf, dark green leaves,

a bushy growth habit, and are of relatively small stature (typically growing to 1.5 m tall and 1 m across). I have not seen any of these Australian-raised cultivars available in New Zealand.

*Leptospermum* 'Emily NAO', *L.* 'Joy', *L.* 'Martin', and *L.* 'Naoko' were selected from  $F_1$  seedlings of the same cross – between *L.* 'Cardwell' (seed parent) and the dwarf cultivar *L. scoparium* 'Nanum Rubrum' (pollen parent). All four have small flowers with receptacles that are yellow-green when young and age to reddish-brown. They are protected by Australian PBR (*Plant Varieties Journal*, 2001, Vol. 14, No. 3, pp. 10, 35–38; granted 2002).

*Leptospermum* 'Emily NAO' has flowers with white petals that have a pink blush that darkens with age. Like other selections in the Aussie Blossom range, *L.* 'Joy' grows to 1.5 m tall, but is somewhat more spreading, from 1 m to 2 m across. Flowers have pale pink blushed petals. *L.* 'Martin' has flowers with white petals that have a pale pink blush. *L.* 'Naoko' has flowers with pink petals with a dark pink blush. Filaments of *L.* 'Naoko' are red, differing from the other three selections which are pink.

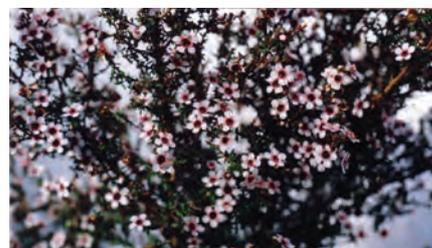
The other two selections released by Geoffrey Watson are *L.* 'Alicia Rose' and *L.* 'Stephen Rose'. Both are interspecific hybrids made in 1997, between the tall growing *L. rotundifolium* 'Jervis Bay' (seed parent) and the dwarf *L. scoparium* 'Nanum Rubrum' (pollen parent). Both are intermediate in height and are protected by Australian PBR (*Plant Varieties Journal*, 2005, Vol. 18, No. 4, pp. 32, 148–155; granted 2007). *L.* 'Alicia Rose' has flowers with dark pink coloured petals whereas *L.* 'Stephen Rose' has lighter coloured petals that are pink or white with a pale pink flush.



**Fig. 16** *Leptospermum xviolipurpureum* 'Karo Spectrobay', raised at Landcare Research, Lincoln, New Zealand. Photo: Robert Lamberts.



**Fig. 17** *Leptospermum* 'Karo Silver Ice', growing at the Christchurch Botanic Gardens, New Zealand. **A**, mature plant. **B**, close-up of flowers. Photos: Murray Dawson.



**Fig. 18** *Leptospermum scoparium* 'Pink Lady', a seed parent used in a crossing programme at Landcare Research. Photo: Murray Dawson.



**Fig. 19** *Leptospermum spectabile* 'Christmas Star', a parent used in a crossing programme at Landcare Research. Photo: Murray Dawson.

The other Australian breeder is Tony Slater of Victoria, who developed a large number of *Leptospermum* crosses intended for the cut flower trade. Slater et al. (2001, 2006, in press) have surveyed a wide range of species and cultivars for flower characteristics and vase life. Their breeding program has produced more than 2300 interspecific hybrid plants for evaluation from a range of crosses. Several selections are likely to be commercialised in the near future (Tony Slater, pers. comm.).

#### New Zealand-raised hybrids

Several interspecific hybrids have been raised at Landcare Research, Lincoln (including at the predecessor Botany Division, DSIR). The involvement of Botany Division and later Landcare Research in the selection of ornamental *Leptospermum* cultivars was an extension of research to improve understanding of genetic variation of *Leptospermum scoparium* J.R.Forst. & G.Forst. (mānuka) and *Kunzea ericoides* (A.Rich.) Joy Thomps. (kānuka) in New Zealand (e.g., Harris, 1996, 2002). As related allies of both species also occur in Australia seed of populations of them were obtained from that country. This was further extended to include other Australian species to improve understanding of the relationships of the species and genera in both countries. Plants raised from these seed lots provided the parents for the hybridisation work. Selections that were commercialised from this breeding work were given the cultivar names mentioned in the following paragraphs.

One of the first selections to be released into the nursery trade is a spontaneous hybrid between *L. spectabile* and *L. rotundifolium* 'Jervis Bay' (e.g., Harris et al. 1995; *Commercial Horticulture Supplement*, July 1999; Harris, 1999a,b). As recounted by Harris et al. (1995), seed produced from open-pollinated flowers was collected from several plants of *L. spectabile* growing at the

experimental gardens at Lincoln. This seed was sown in 1987. The resultant seedlings were reasonably uniform, except one that differed in having shorter, somewhat broader, and more oval leaves. This plant flowered for the first time in 1991, and was recognised as an obvious hybrid, with large, distinctive, violet-purple coloured flowers. A single plant of the putative pollen parent, *L. rotundifolium* 'Jervis Bay', was growing 3 m away from the seed parent. Harris et al. (1995) gave the hybrid the name *Leptospermum xviolipurpureum* 'Karo Spectrobay' (Fig. 16)<sup>4</sup>. The outstanding floral characteristics of *L.* 'Karo Spectrobay' are perhaps offset by a rather open, spreading growth habit. It had PVR protection in the European Union and is available from the UK (Burncoose Nursery online catalogue). It does not appear to be currently sold by New Zealand nurseries although it has had PVR protection here (1998–2011). I have seen a few UK websites call it "*Leptospermum juniperum* 'Karo Spectrobay'" demonstrating how quickly misspellings and misidentifications can occur in horticulture (presumably they meant *L. juniperinum* Sm., a species unrelated to its parentage). *L.* 'Karo Spectrobay' has the same parentage at the species level as Peter Ollerenshaw's cross named *L.* 'Rhiannon' and they are of similar appearance.

*Leptospermum* 'Karo Silver Ice' (Fig. 17A–B) was also raised at Landcare Research. This selection was from a deliberate cross made by Diane Percy in the mid-1980s between *L. rotundifolium* 'Jervis Bay' and *L. lanigerum* var. *lanigerum*. The parent *L. lanigerum* var. *lanigerum* was available from populations grown on in the Landcare Research experimental grounds, from seed originally collected in the wild from Mt Gingera, ACT. *L.* 'Karo Silver Ice' is named after its silvery grey-green foliage and large, ice-white petals and a green receptacle. This hybrid has a bushy growth habit and attains about 2 m in height. *L.* 'Karo Silver Ice' is commercially available

<sup>4</sup> "*xviolipurpureum*" is used to denote the hybrid combination, "Karo" is an acronym for "known and recorded origin" first coined by botanist Dr Peter Heenan, and I suggested the epithet "Spectrobay" to combine elements of the parent names.



**Fig. 20** A row of hybrids between *Leptospermum scoparium* 'Pink Lady' and *L. spectabile* 'Christmas Star', raised at Landcare Research. Photo: Murray Dawson.



**Fig. 21** *Leptospermum scoparium* 'Pink Lady' x *L. spectabile* 'Christmas Star', cross 10 with soft pink flowers. Photo: Murray Dawson.



**Fig. 22** *Leptospermum scoparium* 'Pink Lady' x *L. spectabile* 'Christmas Star', cross 15 with red flowers. Photo: Murray Dawson.

in the UK (Burncoose Nursery online catalogue). It has been sold in New Zealand (e.g., *Commercial Horticulture Supplement*, July 1999; Harris, 1999a,b) and has had PVR protection (1998–2011).

Following these successes, Warwick Harris asked me to undertake some carefully controlled crosses to produce further interspecific hybrids. A brief account of the methods used is given here. The seed parents I used for crossing attempts – *L. scoparium* 'Keatleyi', *L. scoparium* 'Pink Lady' (Fig. 18), and *L. spectabile* 'Christmas Star' (Fig. 19) – were grown as potted plants in the glasshouse. From October to December 1990, flowers were emasculated (stamens removed) as soon as each flower opened. To transfer pollen, anthers of these and other *Leptospermum* cultivars and species collected from the Landcare Research experimental grounds were tapped onto the stigmas of the seed parents every few days for the life of each flower. The hand-pollinated flowers were not bagged, but the relative isolation of seed parents in the glasshouse and the large amounts of pollen transferred onto their stigmas effectively restricted any contaminating pollen. For each cross, several flowers were pollinated and labelled with tags. Capsules were collected when or if they reached maturity. From the 11 crosses I attempted (including some reciprocal crosses), three were successful:

*L. scoparium* 'Pink Lady' ♀ x *L. spectabile* 'Christmas Star' ♂

*L. spectabile* 'Christmas Star' ♀ x *L. macrocarpum* ♂

*L. spectabile* 'Christmas Star' ♀ x *L. variable* 'Crimson Pearl' ♂.

My attempts to fertilise flowers of *L. spectabile* 'Christmas Star' with pollen from several *L. scoparium* cultivars were unsuccessful (I tried with *L. scoparium* 'Big Red', *L. Blossom*, *L. 'Crimson Glory*', *L. 'Jubilee*' and *L. 'Pink Pearl*' – these are double-flowered cultivars that produce relatively little pollen). In all these cases capsules of *L. spectabile* 'Christmas Star' abscised early in their development and contained undeveloped seed. Perhaps reciprocal crosses may have succeeded but these were not attempted. The attempted reciprocal crosses between



**Fig. 23** *Leptospermum scoparium* 'Pink Lady' x *L. spectabile* 'Christmas Star', cross 20 with dwarf foliage on an upright plant with pendulous branches – an unusual combination and not horticulturally attractive. Photo: Robert Lamberts.

*L. spectabile* 'Christmas Star' and the tetraploid cultivar *L. scoparium* 'Keatleyi' also failed, with capsules aborting from both seed parents. This attempted cross involved a difference in chromosome number (Dawson, 1990, 1995, 2009).

Although the reciprocal cross failed to set any seed, 26 hybrids of *L. scoparium* 'Pink Lady' (seed parent) x *L. spectabile* 'Christmas Star' (pollen parent) were grown on, and all are obvious hybrids (Fig. 20). The parents of this cross are markedly different from one another. The seed parent (*L. scoparium* 'Pink Lady') is a low-growing dwarf cultivar with minute leaves and pink petals. In contrast, the pollen parent (*L. spectabile*; see Part One) has distinctive long leaves and red petals with prominent sepals.

Most of the hybrids are intermediate to the parents in both the leaf length and width. Flower width of these hybrids ranges from 21 to 26 mm

in diameter, which is intermediate to the smaller flowers of *L. 'Pink Lady*' (17–18 mm), and the larger flowers of *L. 'Christmas Star*' (28 mm). The unusually large sepal size of the hybrids is inherited from *L. spectabile* 'Christmas Star', and flower colours of the hybrids range from light-pink (Fig. 21) to red (Fig. 22).

As a general rule, F<sub>1</sub> hybrids are relatively uniform. However, in these crosses there is some variation between plants. Most are upright in stature and four have dwarf foliage, of which two plants were also dwarf in stature and one has a compact and prostrate growth form. The other plant had moderately long seedling leaves that were replaced by dwarf leaves as the plant developed. Upon maturity, this plant had an unusual combination of dwarf foliage, and an upright growth habit, with some pendulous branches (Fig. 23).

None of my *L. scoparium* 'Pink Lady' x *L. spectabile* 'Christmas Star' hybrids are grown commercially. Although most are very floriferous, those that I have grown in New Zealand have a rather open habit and are susceptible to mānuka blight. Their flowers are broadly similar to some of Peter Ollerenshaw's crosses.



**Fig. 24** *Leptospermum* 'Karo Pearl Star' growing at the Christchurch Botanic Gardens. Photo: Murray Dawson.



**Fig. 25** *Leptospermum* 'Lilliput', a selected *L. rupestre* × *L. scoparium* hybrid raised by Warwick Harris. **A**, plant in flower showing its dwarf and prostrate growth habit.



**B**, close-up of flowers. Photo: Helen Nelson, www.thegodearth.co.nz.

Another cross I made, *L. spectabile* 'Christmas Star' (seed parent) × *L. macrocarpum* (pollen parent), was successful. Seventeen seedlings were raised, all with denser foliage, and leaves that differed from the seed parent. *L. macrocarpum* is closely related to *L. spectabile* (Part One), but with a more compact habit and white, cream and pink (rather than red) flowers (Thompson, 1989). This cross has not been offered for sale.

A third cross I made at that time was also successful. Nine plants of *L. spectabile* 'Christmas Star' × *L. variable* 'Crimson Pearl' were grown on. The hybrids were more similar to the pollen parent (*L. variable* 'Crimson Pearl') than they were to the seed parent (*L. 'Christmas Star'*), with shorter and usually narrower leaves. This provides good evidence for hybridity and illustrates that characters are not always intermediate, and can be closer to one parent than the other. The best seedling of this hybrid was selected by Warwick Harris, propagated from cuttings, and given the name *L. 'Karo Pearl Star'* (incorporating parts of the parent cultivar names). *L. 'Karo Pearl Star'* (Fig. 24) is a bushy shrub of medium height with medium, reddish-purple flowers (15–20 mm in diameter) and a green receptacle. It has greater blight resistance than New Zealand *L. scoparium*. Like the two other tea-tree selections released by Warwick Harris (*L. 'Karo Spectrobay'* and *L. 'Karo Silver Ice'*), *L. 'Karo Pearl Star'* has been offered for sale in New Zealand (e.g., *Commercial Horticulture Supplement*, July 1999; Harris, 1999a), has had PVR protection here (1998–2011) but is now rarely available in this country. *L. 'Karo Pearl Star'* is available in the UK (Burncoose Nursery and Trevena Cross Nurseries online catalogues).

Further interspecific crosses were made by Warwick Harris from 1990 to 1994 (Harris, 1995, 1999b, 2000). Some of the crosses that were successful include:

- L. polygalifolium* ♀ × *L. scoparium* cultivars ♂
- L. polygalifolium* ♀ × *L. spectabile* 'Christmas Star' ♂
- L. scoparium* 'Huia' (?) ♀ × *L. rotundifolium* ♂
- L. scoparium* 'Huia' (?) ♀ × *L. rupestre* ♂
- L. scoparium* 'Kiwi' ♀ × *L. spectabile* 'Christmas Star' ♂
- L. scoparium* cultivars ♀ × *L. lanigerum* ♂
- L. scoparium* ♀ (double-flowered cultivars) × *L. spectabile* ♂ (F<sub>1</sub> and F<sub>2</sub> progeny)
- L. variable* 'Crimson Pearl' ♀ × *L. scoparium* 'Red Damask' ♂.

Recently, two hybrids from Warwick Harris' 1990 series of crosses have been made available for commercial propagation (Harris, 1999b, 2000). The first is named

*L. 'Lilliput'* (Fig. 25A–B) after its small size. From crosses made in November 1990, seven hybrid seedlings were grown on, all dwarf and prostrate, inheriting their small leaves and low stature from the dwarf *L. scoparium* seed parent (a "Nanum" type cultivar which is probably *L. 'Huia'*) and their prostrate habit from *L. rupestre* (their pollen parent). Three plants survived, and the smallest and most prostrate selection with the pinkest flowers was named *L. 'Lilliput'*. Petals of *L. 'Lilliput'* are white with a pink blush that intensifies as the flowers age; these and the crimson stamens give the flowers a bicoloured appearance. *L. 'Lilliput'* is slow-growing and likely to have good cold tolerance and resistance to mānuka blight. It is well suited as a pot or rockery plant. *L. 'Lilliput'* is currently available from Hokonui Alpines, near Gore, New Zealand (Peter Salmond, pers. comm.).

The second cross to become available was also made in November 1990, between the dwarf *L. scoparium* "Nanum" type cultivar (the same seed parent as *L. 'Lilliput'*) and *L. rotundifolium* as the pollen parent. From ten F<sub>1</sub> progeny, the one with the most dwarf and compact habit was selected and named *L. 'Gulliver'*. It has retained its habit when grown in a small pot for more than ten years, has mauve-pink petals, and is under propagation at Hokonui Alpines (scheduled for release sometime in 2014, Peter Salmond, pers. comm.).

During the time that species of *Leptospermum* were first being crossed at Botany Division (now part of Landcare Research), Lincoln, other crosses were being undertaken by Ross Bicknell and his co-workers at the former New Zealand Institute for Crop & Food Research, Levin (now part of Plant & Food Research). They began in 1985, and although some of Ross Bicknell's crosses failed (between *L. scoparium* cultivars and *L. grandiflorum*, and between *L. juniperinum* and *L. macrocarpum*), three hybrid combinations were successfully raised (Ross Bicknell, pers. comm.). These are between cultivars of New Zealand *L. scoparium* and Australian species and cultivars:

- L. scoparium* 'Crimson Glory' ♀ × *L. rotundifolium* 'Jervis Bay' ♂
- L. scoparium* 'Red Ensign' ♀ × *L. rotundifolium* 'Jervis Bay' ♂
- L. scoparium* 'Crimson Glory' ♀ × *L. macrocarpum* ♂.

Selection criteria of the progeny mainly considered cut-flower qualities, so petal retention was of major importance to the breeders. Subsequent breeding involved self-fertilisation, back-crossing, and intercrossing of selected F<sub>1</sub> hybrids to produce a range of F<sub>2</sub> progeny (Bicknell,



**Fig. 26** *Leptospermum* 'Magellan', raised at Plant & Food Research, Levin, New Zealand. Photo: Chris Barnaby.



**Fig. 29** *Leptospermum* 'Cygnus', raised at Plant & Food Research, Levin, New Zealand. Photo: Phil Bendle.

1995). Some of the  $F_2$  progeny have a combination of double flowers (inherited from *L. scoparium* 'Crimson Glory') that are various shades of mauve and purple (usually more diluted than *L. rotundifolium* 'Jervis Bay', the pollen parent). These double-flowered interspecific hybrids are not currently available on the market.

Gary Burge led the trialling and selection from this breeding programme and three cultivars were initially released into the New Zealand nursery trade. All are between *L. scoparium* and *L. rotundifolium* 'Jervis Bay', and are grouped under the "Galaxy series" (e.g., *Commercial Horticulture Supplement*, July 1999; *Commercial Horticulture*, August 1999). All have large flowers inherited from *L. rotundifolium* and were claimed to be resistant to mānuka blight (*Commercial Horticulture*, August 1999), although neither of the parent species are resistant.

*Leptospermum* 'Magellan' (an  $F_2$  hybrid) grows to about 1.5 m or taller with an upright to spreading habit (Fig. 26). New foliage is a lighter green (than mature leaves) with reddish margins, and the large flowers (25–28 mm in diameter) have been described as being "lolly-pink". *L.* 'Magellan' has had New Zealand PVR (2001–2010).

*Leptospermum* 'Orion' (an  $F_1$  hybrid) has a compact, somewhat weeping growth habit and attains about 1 m in height. Its foliage is reddish-bronze and the petals are white with cerise margins.



**Fig. 27** *Leptospermum* 'Pegasus', raised at Plant & Food Research, Levin, New Zealand. Photo: Chris Barnaby.



**Fig. 30** *Leptospermum* 'Electric Red', raised at Plant & Food Research, Levin, New Zealand. Photo: Chris Barnaby.

*Leptospermum* 'Centaurus' has a bushy, wide growing habit, attaining 1.5 m tall, perhaps less. Its mature leaves are bronzy-green and it produces small flowers (15 mm in diameter) that are bicoloured white in the centres with purple-pink margins. *L.* 'Centaurus' has had New Zealand PVR (2001–2009).

*Leptospermum* 'Cygnus' (Fig. 29) is a selection of *L. scoparium* × *L. rotundifolium*. It is a medium to tall grower with an upright and distinctly narrow habit. Flowers are 20–24 mm diameter with white petals that have frilly edges and are flushed with a light pink base. New Zealand PVR was granted 2001.

*Leptospermum* 'Electric Red' (Fig. 30) is a selection of *L. scoparium* 'Crimson Glory' × *L. macrocarpum*. It is a tall grower with dark coloured leaves. Flowers are medium



**Fig. 28** *Leptospermum* 'Andromeda', raised at Plant & Food Research, Levin, New Zealand. Photo: Chris Barnaby.



**Fig. 31** *Leptospermum* 'Phoenix', raised at Plant & Food Research, Levin. Photo: Phil Bendle.

*Leptospermum* 'Pegasus' (a back-cross to *L. rotundifolium* 'Jervis Bay') is an upright selection growing to 2 m tall, again with bronzy-coloured new foliage (Fig. 27). It has large flowers (25 mm in diameter) and petals that are light pink. *L.* 'Pegasus' has had New Zealand PVR (2001–2009).

Subsequent releases in the Galaxy series include *L.* 'Andromeda', *L.* 'Centaurus', *L.* 'Cygnus', *L.* 'Electric Red', and *L.* 'Phoenix'.

*Leptospermum* 'Andromeda' is a tall upright plant with dark bronzy-green leaves (Fig. 28). It produces abundant large flowers (26 mm in diameter) with whitish petals and a pink flush. New Zealand PVR was granted 2010.



**Fig. 32** *Leptospermum* 'Wellington Dwarf', raised at County Park Nursery, UK. Photo: Paul Boosey.



**Fig. 33** *Leptospermum* 'Snow Column', raised at County Park Nursery, UK. **A**, young plant in flower. **B**, close-up of flowers. Photos: Paul Boosey.



sized (16–19 mm in diameter) and the petals are dark purple-red, aging to purple. *L.* 'Electric Red' has current PVR protection in New Zealand (granted 2006), and in the trials, was noted to be susceptible mānuka blight.

*Leptospermum* 'Phoenix' (Fig. 31) is a tall upright grower with an open habit and semi-erect branches. Young leaves have reddish margins. The flowers are large (about 30 mm in diameter), with frilly-edged purple petals. New Zealand PVR was granted 2010.

#### Hybrids from the USA

The late Professor Ray Collett of Santa Cruz, California, USA has also apparently hybridised *L. rotundifolium* 'Jervis Bay' and cultivar(s) of *L. scoparium* (Elliot and Jones, 1993). Two cultivars said to have been raised by Collett are *L.* 'Queen of Hearts' and *L. scoparium* 'Silver & Rose'. However, I do not know their parentages or what other selections he may have named.

#### Hybrids from County Park Nursery, UK

In England, the late Graham Hutchins has raised some interesting interspecific hybrids. Most have been listed in the UK *Plant Finder* since 1993 and are on the County Park Nursery online plant list.

*Leptospermum* 'Wellington Dwarf' (Fig. 32) is a compact, low-growing selection with dense hairs on new growth, grey-green leaves and white flowers. Its dwarf stature led Graham Hutchins (pers. comm.) to suggest that it could be a hybrid between *L. lanigerum* and *L. rupestre*, although it's more likely to be simply a dwarf form of *L. lanigerum*. It arose either as a seedling of *L. lanigerum* 'Wellington' in cultivation at County Park Nursery, or from the original seed batch collected by Hutchins on Mt Wellington, Tasmania in 1990 (see Part One).

*Leptospermum* 'Snow Column' (Fig. 33A–B) may possibly be another interspecific hybrid raised by County Park Nursery, although some references (UK *Plant Finder* online and County Park Nursery online plant list) give it as a straight *L. scoparium* selection. As the name suggests,

*L.* 'Snow Column' has an upright growth habit and produces small white flowers in abundance (Paul Boosey, pers. comm.).

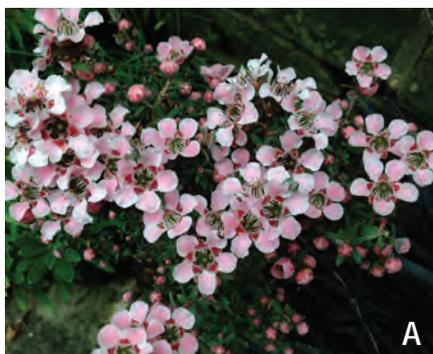
The rest of Graham Hutchins interspecific hybrids probably involve *L. scoparium* as one parent which has provided genes for pink or red flower colouration. Several of his hybrids also have *L. minutifolium* parentage, a species propagated from seed at County Park Nursery. Like most species, *L. minutifolium* remains relatively uniform when grown from seed, in contrast to more derived cultivars that will typically only remain true-to-type through cutting propagation. Hutchins previously sold this white-flowered species as *L. liversidgei* R.T.Baker & H.G.Sm., but has correctly reidentified his material (e.g., Lord, 1991)<sup>5</sup>. Over several years, Hutchins recognised four seedlings from *L. minutifolium* to be spontaneous hybrids. These all have pink flowers inherited from the pollen parents – probably cultivars of *L. scoparium* also grown at his nursery. Two putative *L. minutifolium* × *L. scoparium* hybrids were named *L.* 'Green Eyes' (Fig. 34) and *L.* 'Pink Surprise' (Fig. 35) (e.g., Lord, 1993, 1994, 1995); the two remaining seedlings are probably unnamed. The capsules of *L.* 'Green Eyes' and *L.* 'Pink Surprise' abort early in their development without producing viable seed (Graham Hutchins, pers. comm.). *L. minutifolium* is a tetraploid species with  $2n = 44$  chromosomes (Dawson, 1987, 1995). My chromosome counts of Hutchins' selections (*L.* 'Green Eyes', *L.* 'Pink Surprise' and one of the two unnamed seedlings) were all triploid with  $2n = 33$  (Dawson, 1995), confirming that they are indeed hybrids between tetraploid and diploid ( $2n = 22$ ) parents and supporting the observation of seed sterility.

Another open-pollinated cross raised at County Park Nursery is between *L. scoparium* 'Keatleyi' and an Australian species. This hybrid, named *L.* 'County Park Blush' (Fig. 36A–B), has large pale-pink flowers (up to 28 mm in diameter). Greyish-green leaves and pubescence on the branchlets and hypanthium (= receptacle, base of the sepals, petals and stamens of

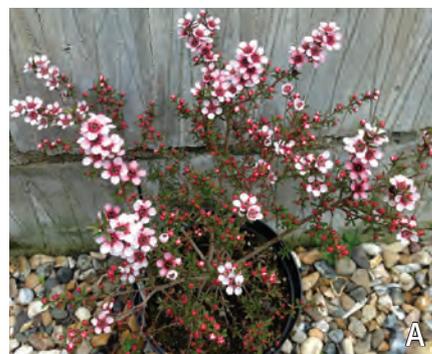
<sup>5</sup> Presumably, a listing of *L. liversidgei* × *L. scoparium* in a later *RHS Plant Finder* (Lord, 1999) reflects the earlier misidentification of *L. minutifolium*.



**Fig. 34** *Leptospermum* 'Green Eyes', raised at County Park Nursery, UK. Photo: Murray Dawson.



**Fig. 36** *Leptospermum* 'County Park Blush', raised at County Park Nursery, UK. **A**, plant in flower. **B**, close-up of flowers. Photos: Paul Boosey.



**Fig. 37** *Leptospermum* 'Haverling Hardy', raised at County Park Nursery, UK. **A**, plant in flower. **B**, close-up of flowers. Photos: Paul Boosey.



**Fig. 35** *Leptospermum* 'Pink Surprise', raised at County Park Nursery, UK. Photo: Murray Dawson.

the flower) led Hutchins to suggest that *L. lanigerum* may have been the pollen parent (Graham Hutchins, pers. comm.). However, my chromosome counts suggest that *L. lanigerum* may not have been involved in this cross after all (Dawson, 1995). *L. lanigerum* is a diploid species with  $2n = 22$  chromosomes, including plants that I obtained and counted from County Park Nursery. The seed parent, *L. scoparium* 'Keatleyi' is known to be tetraploid ( $2n = 44$ ; Dawson, 1990, 1995, 2009), so a cross between the two would be expected to produce a triploid hybrid with  $2n = 33$ . However, my chromosome count was  $2n = 44$ , indicating that the higher ploidy level has been maintained, probably through hybridisation of the seed parent with another tetraploid (rather than participation of an unreduced gamete). The identity of the original pollen parent may well be the tetraploid species *L. myrtifolium* (syn. *L. 'Cunninghamii'* hort.; see Part One).

More recently, a seedling of *L. 'County Park Blush'* has been selected by Graham Hutchins and named *L. 'Moko'*. This also has large flowers (up to 25 mm in diameter) but with paler petals. It would be interesting to determine if this is a triploid cross or a tetraploid like its seed parent.

The remaining hybrid combination raised by Hutchins is *L. rupestre* × *L. scoparium*. Hutchins selected three seedlings of this cross, with red (or reddish) flowers inherited from the putative pollen parent. These hybrids are rather open and upright in growth habit, when compared to the usual compact, prostrate form of *L. rupestre* cultivated in the UK (Graham Hutchins, pers. comm.). One of these original seedlings, or possibly a later *L. rupestre* × *L. scoparium* cross, was named *L. 'Haverling Hardy'* (Fig. 37A–B) which has darkish foliage and produces abundant flowers with crimson filaments, pink sepals and petals with a pink blush. County Park Nursery rate this

selection to be one of the hardiest tea-trees they sell, and their nursery is in the London Borough of Havering, hence the cultivar name.

As mentioned above for *L. 'Lilliput'*, crosses between *L. rupestre* and *L. scoparium* have also been made in New Zealand by Warwick Harris. As Halliwell (1981) predicted, this combination has great potential in producing outstanding, frost-hardy, red-flowered leptospermums. The  $F_1$  hybrids produced so far represent significant progress towards this goal.

#### Intergeneric hybrids

So far, I have discussed interspecific hybrids – hybrids between different species in the same genus, *Leptospermum*. Now, I will mention intergeneric hybrids – those rare hybrids between species belonging to different genera.

In the wild, no convincing intergeneric hybrids have been found between the widespread *Leptospermum scoparium* and *Kunzea ericoides*, both of the Myrtaceae family. There were suggestions of hybrids between the two species in the early botanical literature of New Zealand (Cockayne and Allan, 1934; Cockayne and Phillips Turner, 1947). Nowadays these suggestions are considered to be attempts at explaining what is now known to be large natural variation of both species. *Kunzea ericoides* and *L. scoparium* grow together at many localities throughout New Zealand and flowering periods overlap<sup>6</sup>. Although *L. scoparium* and *K. ericoides* are sometimes confused by the casual observer, there are good characters to separate them, so any hybrids in the field should be recognisable to a trained eye, especially when in flower.

Peter de Lange et al. (2005) attempted a series of artificial reciprocal crosses of these species, collected from a

<sup>6</sup> Although *K. ericoides* has a narrower flowering period than *L. scoparium*.

range of genotypes, to test the limits of this apparent incompatibility. They successfully crossed a segregate of *Kunzea ericoides* (seed parent) with *Leptospermum scoparium* (pollen parent). The resultant seedlings had weak growth and were not observed to flower.

There are several confirmed intergeneric hybrids between another *Kunzea*<sup>7</sup>, *K. sinclairii* (Kirk) W.Harris (a species confined to Great Barrier Island, New Zealand) and *L. scoparium*. One hybrid arose from a batch of seed collected from *K. sinclairii* and germinated at Landcare Research, Lincoln (Harris et al., 1992; Harris, 1993b). The hybrid apparently aborts all of its seed capsules before maturity. Warwick Harris gave this cross formal botanical recognition and the name *×Kunzpermum hirakimata* 'Karo Hobson Choice' (Harris, 1993b). Plants have been trialled at Naturally Native plant nursery, Tauranga but not sold commercially. This intergeneric cross was also recreated artificially by de Lange et al. (2005), who noted that seedlings germinated well and plants were vigorous in growth. It may have occurred previously in cultivation, at Duncan and Davies Nursery (Jim Rumbal, pers. comm.).

In Australia, Tony Slater successfully made the intergeneric cross *Leptospermum* × *Neofabricia*. This cross was unsuccessfully attempted by Peter Ollerenshaw (pers. comm.) on several occasions with *Neofabricia myrtifolia* (Gaertn.) Joy Thomps. as one parent.

Intergeneric hybrids have been reported elsewhere in the Myrtaceae. Knobloch (1972) reviews the subject of intergeneric hybridisation in plants, and cites a figure of 37 combinations in the Myrtaceae, but does not list them or provide further details.

### Summary

The nomenclature, taxonomy, horticultural characteristics, and origins of Australian species and cultivars of *Leptospermum* have been discussed (Part One). Some species have a long history of cultivation (e.g., *L. grandiflorum*, *L. grandifolium*, *L. laevigatum*, and *L. lanigerum*) while others are relatively recent introductions into horticulture (e.g., *L. spectabile* and *L. variabile*). Several species and cultivar names have become surrounded by confusion. Although I have attempted to resolve some of these problems, others remain.

There is great diversity among the cultivars and species in floral and vegetative features. Flower colour in *Leptospermum* is usually white, but a few of the 87 species have greenish-white, cream, pink, red, or purplish flowers.

Interspecific hybrids have become available to the horticultural trade. The majority have been released by Peter Ollerenshaw at Bywong Nursery in Australia. Releases in New Zealand have been made by Landcare Research and Plant & Food Research. Interspecific hybrids have also been released by the late Graeme Hutchins at County Park Nursery in the UK.

In total, more than 60 wild and cultivated interspecific hybrid combinations are known. These illustrate the potential for breeding distinctive cultivars by production

of interspecific (and possibly even intergeneric) hybrids. Although the great majority of *Leptospermum* cultivars are from New Zealand *L. scoparium*, the Australian species provide access to a wider gene pool, contributing novel genes for flower colour, different foliage, and increased frost and disease resistance. It would be particularly worthwhile to commercialise a hybrid with the strong purplish flower colour of *L. rotundifolium* 'Jervis Bay' or *L.* 'Manning's Choice' with the double flowers and/or dwarf growth habit of certain *L. scoparium* cultivars.

The opportunity remains for systematic assessment of the compatibility barriers within *Leptospermum* and also for understanding genetic barriers to crossing between *Leptospermum*, *Kunzea*, *Neofabricia* and other related genera of Myrtaceae. This would provide a sounder basis for further plant breeding to improve mānuka blight susceptibility, vase flower longevity, and other qualities to provide new ornamental tea-trees for gardeners and commercial growers.

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<sup>7</sup> Before recognising them as *Kunzea* species, both *K. ericoides* and *K. sinclairii* were formerly included as species of *Leptospermum*.

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