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*ASSOCIATION OF SOCIETIES FOR GROWING  
AUSTRALIAN PLANTS*

*MELALEUCA AND ALLIED GENERA STUDY GROUP*

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*NEWSLETTER NO : 33 March 2007*

*Dear members,*

*Firstly , I must apologise for the lateness of this newsletter but I have been awaiting receipt of details of the report on “ New combinations in Melaleuca for Australian species of Callistemon ( Myrtaceae.) ”. A copy of the current changes is attached. . A number of specific epithets have been changed but some species have had only the genus name changed. *Callistemon viminalis* has been officially recognised previously as *Melaleuca viminalis*. *Callistemon citrinus* has likewise been previously recognised and is now *M. citrina*. Lyn Craven is currently working on a paper describing a few new species of callistemons in *Melaleuca*. Lyn suggests that horticulturalists continue to use “ callistemon ” as the common name. Have fun getting used to the new names!!*

*It is still very dry here but we don't have that all on our own. There appears to be many parts of Australia in more dire straits than we are. We have only lost a couple of plants so far. It has been amazing how most have hung on with virtually no additional water. Callistemons , or Melaleucas as they will be known in future, appear to be one of the toughest as they are still flowering happily along despite the lack of moisture. We have had more flowers on the Callistemons this year than I can recall in previous years. Callistemon plants are still looking fresh and green and have lost very few leaves when compared to some species from other genera - *Eucalyptus*, *Lophostemon*, *Backhousia* and *Syzygium* to name a few. We have been able to keep our fern garden going so far with use of washing machine water etc. The most colourful plants in the garden at present are *Portulacas*( not native ones). We have a number in various colours growing in containers along the top of a retaining wall and they flower heavily every day. The Melaleucas are holding up well to the dry weather although my *M. teretifolius* still hasn't flowered for me!! Our *Leptospermum* “ Little Lemon Scent ” is doing very well and has flowered a couple of times during the year. We planted 4 Melaleuca “ Little Red ” at our daughters place. They have grown extremely well and have developed really dark red foliage colouring even though they have not had any supplementary*

watering. The soil at their place is based on granite. It tends to be fairly clayey but retains fairly good drainage properties and doesn't get waterlogged or excessively wet. *Callistemon pauciflorus* has been flowering for some months and is still producing a few buds. The flowers of this are not large but give a bright splash of colour to the garden as they are produced in quite large numbers.

### LEPTOSPERMUM CULTIVARS

Bywong Nursery has developed a number of *Leptospermum* cultivars over a number of years. Some of these are listed below :

*Leptospermum* "Aphrodite" - this appeared at Bywong Nursery in a batch of *Leptospermum spectabile* seedlings. Grows to 2.5 metres high and up to 2 metres across.

Flower colour - bright pink in spring

Uses - ideal as a fast growing dense screen. Can be trimmed as hedge

Fauna - attracts large numbers of native insects when in flower which, in turn, attracts native birds and other wildlife

Maintenance - trim and fertilize after flowering. Severe pruning can be carried out if necessary

*Leptospermum* "Mesmer Eyes" - developed in a breeding programme from a cross between *L. scoparium nanum rubrum*, *L. macrocarpum* and *L. deuense*. Grows to 1.5 metres tall and 1 metre across

Flower colour - large flowers in spring which open white and change to pink as they age.

Uses - good for small gardens or large pots. Ideal in a feature spot where the two-toned flowers produce a good display.

Fauna - attracts a wide range of nectar feeding insects which in turn attract birds and other wildlife.

Maintenance - trim and fertilise after flowering as required.

*Leptospermum morrisonii* "Burgundy" - selected from a wild population for its foliage colour. Grows to 3 metres high and up to 1.5 metres across.

Flower colour - large white flowers during summer. Noted for its striking burgundy coloured new growth.

Uses - good for a fast growing screen or hedge. Useful for cut foliage in floral arrangements.

Fauna - attracts a wide range of nectar feeding insects.

Maintenance - grows best in full sun. Tolerates wet soils and frosty conditions.

*Leptospermum* "White Wave" - developed in a breeding programme from a cross between *L.* "Cardwell" and *L.* "Rhiannon". Grows to 0.5 metres high and 1 metre wide.

Flower colour - white flowers in spring.

Uses - this is the perfect plant for small gardens and large tubs. It is ideal for use on banks and cascading over retaining walls.

Fauna - plants in flower attract a wide range of nectar feeding insects, birds and other wildlife.

Maintenance - trim and fertilise after flowering if required.

Leptospermum "Tickled Pink" - developed in a breeding programme from a cross between L. "Cardwell" and L. "Rhiannon". Grows to about 2 metres tall and approx. 1.5 metres wide.

Flower colour - vibrant pink flowers in spring.

Uses - the bright green leaves and growth habit make this an ideal plant for a screen, hedge or specimen plant.

Fauna - the mass of flowers attracts large numbers of insects, birds and other wildlife.

Maintenance - trim regularly to promote a dense hedge. Can be cut back severely if required. Fertilise after flowering.

Leptospermum "Rudolph" - developed in a breeding programme from a cross between a selected burgundy leaved form of L. morrisoni and L. spectabile. Grows to about 3 metres tall and up to 2 metres across. New growth is purplish in colour.

Flower colour - large red flowers are produced during summer.

Uses - the appealing leaf colour and growth habit make this plant ideal for screens and hedges. It is cold hardy and will tolerate poorly drained soils.

Fauna - attracts a wide range of nectar feeding insects and birds.

Maintenance - prune and fertilise after flowering to promote fresh new growth which, in turn, will provide flowers in the following year

Leptospermum "Rhiannon" - developed in a breeding programme from a cross between L. rotundifolium and L. spectabile. An upright shrub growing to a height of 2 metres and a width of 1 metre.

Flower colour - large pink flowers in late spring.

Uses - suitable for planting in native gardens and shrubberies. Ideal for use as a cut flower. The flowers last well when the stems are cut as the buds are just beginning to open.

Fauna - attracts a wide range of insects when in flower.

Maintenance - prune after flowering to promote dense growth and more flowers.

Leptospermum "Pageant" - developed in a breeding programme from a cross between L. "Cardwell" and L. "Rhiannon". Grows to approx 1 to 1.5 metres tall by 1.5 to 2 metres across.

Flower colour - purple flowers in spring.

Uses - ideal for small gardens or large pots. It is ideal for a feature spot where the unusual purple colour makes a good show.

Fauna - attracts a wide range of nectar feeding insects which, in turn, attracts a wide range of birds and other wildlife.

Maintenance - trim and fertilise after flowering as required.

Leptospermum "Outrageous" - developed in a breeding programme from a cross between L. "Cardwell" and L. "Rhiannon". Grows to 2 metres tall by 1.5 metres across.

Flower colour - deep red flowers in spring

Uses - plant where it can make an impact. Useful as a screen or informal hedge. Suits most soils.

Fauna - attracts a wide range of nectar feeding insects which, in turn, attracts birds and other wildlife.

*Maintenance - trim and fertilise after flowering as required.*

*Leptospermum "Merinda"* - developed in a breeding programme from a cross between *L. "Pink Cascade"* and *L. "Aphrodite"*. Grows to about 1 metre.

*Flower colour - magenta flowers in spring.*

*Uses - ideal for small gardens, courtyards and pots. Gives a bright splash of colour in spring.*

*Fauna - attracts a wide range of insects*

*Maintenance - trim and fertilise after flowering as required.*

*(Editors note) - L. "Merinda" grows and flowers very well in Brisbane area. Flowers are produced in great profusion and the flowering period usually lasts for some months. It tends to grow larger than the 1 metre listed. Most of the plants of this species I have seen are up to 2 metres tall and, in some cases, taller. It appears to be tolerant of a wide range of soil types.*

*Leptospermum "Love Affair"* - developed in a breeding programme from a cross between *L. Cardwell* and *L. "Rhiannon"*. Grows to about 1.5 metres by 1.5 metres across. It prefers full or part shade.

*Flower colour - soft pink flowers are produced in spring.*

*Uses - ideal for small gardens or large containers.*

*Fauna - attracts a wide range of nectar feeding insects which, in turn, attract birds and other wildlife.*

*Maintenance - trim and fertilise after flowering as required*

*Leptospermum "Freya"* - developed in a breeding programme from a cross between a Tasmanian form of *L. scoparium* and *L. scoparium nanum rubrum*. Grows to approx. 1-1.5 metres tall and 1 metre across. It is cold hardy and will grow in moist soil types.

*Flower colour - soft pink flowers are produced in spring for a period of some time*

*Uses - suitable for small gardens or narrow areas where space is limited.*

*Fauna - attracts nectar feeding insects.*

*Maintenance - light trimming and fertilising is recommended after flowering.*

*Plants should be inspected regularly for attack by webbing caterpillars*

*Leptospermum "Daydream"* - developed in a breeding programme from a cross between *L. "Cardwell"* and *L. Rhiannon*. A medium to tall upright shrub with light green foliage. Grows to about 2 metres tall and up to 1.5 metres across. It is suited to most positions but prefers full sun or part shade.

*Flower colour - bright purple/red flowers in spring.*

*Uses - useful as a fast growing screen.*

*Fauna - attracts insects and birds when in flower.*

*Maintenance - trim and fertilise after flowering as required.*

## MELALEUCA IRBYANA

*Melaleuca irbyana* (swamp tea-tree) has a limited distribution in north-eastern New South Wales and south-eastern Queensland. It occurs only in a small number of restricted sites within each of these regions. In Queensland *M. irbyana* forms a

thicket which is almost entirely composed of *M. irbyana* in the upper to mid layers. In NSW *M. irbyana* occurs only in mixed *Melaleuca* forests with two other species - *M. nodosa* and *M. sieberi*. The difference between these single species thickets in Qld and the mixed *Melaleuca* stands in NSW is due to differences in soil type

The swamp tea-tree forest of S.E Qld occurs primarily to the south of Ipswich City. The swamp tea-tree forest of S.E Qld is a low open forest dominated by a dense thicket of *M. irbyana* with or without an emergent tree layer of *Eucalypts*. *M. irbyana* forms a canopy 8 – 12 metres high. Common tree species which penetrate above the canopy of *M. irbyana* are *Eucalyptus crebra*, *Eucalyptus melanophloia*, *Eucalyptus moluccana* and *Eucalyptus tereticornis*. The understorey flora beneath thickets of *M. irbyana* includes very few shrubs because of the low light and the heavy clay soils in which *M. irbyana* grows. Instead the understorey comprises a range of native forbs, grasses, twiners and sedges. One plant species from this community, Slender Milkvine (*Marsdenia coronata*) is listed as vulnerable.

The areas where swamp tea-tree occurs are characterised by seasonally inundated alluvial plains with seasonally cracking grey soils. These soils are heavy, coarse, low in nutrients and form localised small depressions and mounds. The subsoils are highly erosive, saline, acidic and dominated by magnesium. Since the soils are heavy in texture they have poor drainage and become waterlogged after heavy rainfall, sometimes for prolonged periods. This soil type is locally common south of Ipswich and does not appear in any other part of the State. The swamp tea-tree forest provides habitat for a range of native vertebrate fauna. Thickets of *M. irbyana* provide shelter and nesting sites for forest-dwelling bird species. The abundance of fallen logs provides habitat for ground dwellings reptiles and frogs abound during wet seasons when temporary ponds form on the waterlogged soils. No nationally threatened animals are known to occur in swamp tea-tree forest.

Patches of Swamp Tea-tree forest of S.E Qld can be considered to be in good condition if all components of the vegetation structure are well represented. This includes : a thicket of Swamp Tea-tree as a middle canopy, emergent eucalypts above the swamp Tea-tree and understorey herbs and vines beneath the swamp Tea-tree canopy.

The present extent of swamp Tea-tree forest in S.E Qld is estimated at 644 hectares. The pre-European extent of the swamp Tea-tree forest is estimated at 2474 hectares. The Swamp Tea-tree forest of S.E Qld is subject to demonstrable threats , notably fragmentation, edge effects from surrounding pastoral and urban lands , clearing, grazing, and invasion by weeds and feral animals. This ecological community occurs primarily as small patches. About 78% of patches are less than 5 hectares in size with only 2 patches exceeding 20 hectares in size

Weeds are a problem in disturbed sites. More than 40 species of introduced plants are known to have established in the ecological community. Many of the weed species are tolerant of the understorey conditions or colonise the edge of patches. Weeds of particular concern are Lantana (*Lantana camara*) and Creeping Lantana (*Lantana montevidensis*) .

*Melaleuca irbyana* is an attractive shrub or small tree with papery bark which can grow from 4 to 10 metres in height. The crown is dense with tiny-leaved (2 to 4mm long) foliage. White flowers, which are highly scented, are produced in profusion during spring and early summer.

### **Kunzea pomifera**

A recent article on ABC "Landline" referred to the commercial use of the fruit of *K. pomifera*, commonly known as "Muntries". The first plantings were made about 1998 on a property at Mount Pleasant in South Australia. Since then they have combined with a neighbouring farm and currently have a total of about 2500 plants on both properties. Harvest lasts about 6 weeks but, unlike many other berry fruits, muntries do not have to be picked immediately they are ripe as they will last on the plant for six weeks or so without deteriorating. The bushes are not prickly and the fruit is not squashy so it can be easily picked. The berries taste like spicy apples and it is expected that they will eventually be sent to all parts of Australia. This year's harvest is expected to be in the vicinity of 2 tonnes. Currently they are being grown only in NSW, SA and Vic but there has been crops planted in Qld which are expected to start bearing fruit within the next couple of years. Muntries are a spreading to prostrate shrub but they have been successfully trained on to trellises to make picking easier. Sample shipments have been sent to Canada and there has been an enquiry about supply of them to Germany where a pharmacy company is interested in extracting for the antioxidant levels. Muntries contain at least double the amount of antioxidants as blueberries. At present there are about 10-12 growers supplying the existing market.

One of the advantages of muntries is their versatility... They can be eaten raw without fuss or in desserts or with cooked meats. Apparently they are particularly tasty with lamb or pork. Jams and chutneys are common but there is some experimental work being carried on production of muntrie berry wine.

### **Leptospermum in Hawaii**

In Hawaii several *Leptospermum* species have been cultivated in the past for use in forestry plantings and in more recent times for use in landscaping. Previously 3 species of *leptospermum* were known from Hawaii but after a revision of species in 1999 several other species were identified and some misidentifications were corrected, resulting in a total of 5 species – *L. laevigatum*, *L. morisonii*, *L. petersonii*, *L. polygalifolium* and *L. scoparium*. *L. scoparium*, *L. laevigatum*, *Leptospermum laevigatum*, *L. scoparium* and possibly other species are widely cultivated in residential areas of Maui, especially in cooler climates and higher elevations (1000 – 4000 feet) of Kula, Pukalani, Makawao, Olinda, Pi'iholo and Ha'iku. Very little spread has been seen from these plantings except for a few seedlings under one planting in Kula.

In Hawaii at least 5 species of *Leptospermum* are now documented as naturalised. *L. laevigatum* and *L. scoparium* were both planted on Lana'i during forestry efforts in part to stabilise eroding soils. Both species stayed put for a long time and then began to spread, with *L. scoparium* being the most aggressive of the two. With thick

shrubby growth, not much else can grow beneath *Leptospermum* infestations. Seeds are light and numerous, being spread on the wind.

In South Africa *L. leavigatum* was originally cultivated as a hedge plant but is now spreading into natural areas.

### Financial report

Receipts		Expenditure	
<i>Balance as per</i>			
<i>bank statement – 6/06/2006</i>	- \$392.75	<i>Reg.Post</i>	- \$24.45
<i>Membership</i>	- \$293.60	<i>Photocopy – NL 32</i>	- \$40.00
<i>Donation</i>	- \$10.00	<i>Postage – NL 32</i>	- \$37.40
		<i>Petty cash</i>	- \$88.95
		<i>Postage - seeds</i>	- \$14.65
	<i>Total</i>		
	- \$ 696.35		
		<i>Total</i>	\$205.45
	<i>Less expenditure</i>		
	\$205.45		
	\$490.90		
	<i>Balance as per bank statement – 05/03 07</i>		\$ 490.90

### Membership list

The current membership list is as follows :

*APS Tasmania, c/- J. Taylor, 446 Manuka Road, Kettering Tas 7155*  
*APS(SGAP VIC ) c/- C. Densley, 9 Koirot-Port Fairy Road, Killarney, VIC 3283*  
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*Regards for now*

*Col Cornford*



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## New Combinations in *Melaleuca* for Australian Species of *Callistemon* (Myrtaceae)

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**ABSTRACT.** The Australian species of the bottlebrush genus *Callistemon* R. Brown are not sufficiently distinct from *Melaleuca* L. for *Callistemon* to be maintained as a separate genus. The primary character states used to justify maintenance of *Callistemon* are that its staminal filaments are free and not grouped. This breaks down as fused filaments in five groups, the defining features of *Melaleuca*, occur in some *Callistemon* species. Therefore, it is concluded that the two genera should be combined. The following new names are proposed for species being treated in a forthcoming account of *Melaleuca* for *Flora of Australia*: *M. faucicola* Craven, *M. flammea* Craven, *M. orophila* Craven, *M. paludicola* Craven, *M. salicina* Craven, *M. virens* Craven, and *M. williamsii* Craven. The following new combinations are established as transferred from *Callistemon*: *M. brachyandra* (Lindley) Craven, *M. chisholmii* (Cheel) Craven, *M. comboynensis* (Cheel) Craven, *M. flavovirens* (Cheel) Craven, *M. formosa* (S. T. Blake) Craven, *M. montana* (S. T. Blake) Craven, *M. pachyphylla* (Cheel) Craven, *M. pearsonii* (R. D. Spencer & Lumley) Craven, *M. phoenicea* (Lindley) Craven, *M. pityoides* (F. Mueller) Craven, *M. polandii* (F. M. Bailey) Craven, *M. recurva* (R. D. Spencer & Lumley) Craven, *M. shiressii* (Blakely) Craven, and *M. subulata* (Cheel) Craven. The following new combinations are also established from *Metrosideros*: *Melaleuca linearifolia* (Link) Craven, *M. linearis* var. *pinifolia* (Wendland) Craven, *M. pallida* (Bonpland) Craven, and *M. rugulosa* (Schlechtendal ex Link) Craven. Issues concerning a name in *Melaleuca* for the accepted species presently known as *Callistemon glaucus* (Bonpland) Sweet are mentioned.

**Key words:** Australia, *Callistemon*, *Melaleuca*, Myrtaceae.

*Callistemon* R. Brown is a well-known genus of Myrtaceae Adanson, cultivated widely in tropical to moderately temperate climates for its showy bottlebrush-shaped inflorescences. Within the family, *Callistemon* is closely related to *Melaleuca* L., from which it has been distinguished by contemporary

authors (e.g., Johnson & Briggs, 1983; Byrnes, 1984; Barlow, 1986) on the basis of its stamens being dispersed around the hypanthium rim and the staminal filaments being free. *Melaleuca* has the stamens 5-grouped on the hypanthium, opposite the petals and fused for part, sometimes the greater part, of their length. *Callistemon* occurs indigenously in Australia and New Caledonia. The New Caledonian species assigned to *Callistemon* represent a different lineage to the species of that genus occurring in Australia and have also been transferred to *Melaleuca* (Craven & Dawson, 1998).

There was varying acceptance of *Callistemon* at generic level in the 19th century. In part this may have been because Brown (1814: 547) gave the genus an inauspicious beginning with the words: "The maximum of *Melaleuca* exists in the principal parallel, but it declines less towards the south than within the tropic, where its species are chiefly of that section which gradually passes into *Callistemon*, a genus formed of those species of *Metrosideros* [Banks ex Gaertner] that have inflorescence similar to that of *Melaleuca*, and distinct elongated filaments." Although Mueller (1864) treated species under the name *Callistemon*, he regarded the genus as being artificial. Bentham (1867: 118) treated *Melaleuca* and *Callistemon* as separate genera in *Flora Australiensis*, but he did comment that *Callistemon* "passes gradually into *Melaleuca*, with which F. Mueller proposes to reunite it." Baillon (1876) included *Callistemon* and two other genera (i.e., *Conothamnus* Lindley and *Lamarckea* Gaudichaud) in *Melaleuca*, recognizing them at sectional level; such a broad view of *Melaleuca* apparently has not been accepted by any subsequent worker.

It can be determined by virtue of their taxonomy, that a majority of taxonomists who studied *Callistemon* and *Melaleuca* in the 20th century accepted *Callistemon* as a valid genus (e.g., Cheel, 1924, 1925; Cheel & White, 1924; Blake, 1958, 1968; Briggs & Johnson, 1979; Carrick & Chorney, 1979; Johnson & Briggs, 1983; Byrnes, 1984; Barlow, 1986; Lumley &

Spencer, 1988, 1990; Molyneux, 1993; Spencer & Lumley, 1986a, b, 1991; Spencer, 1996). Briggs and Johnson (1979: 202) advocated taking the New Caledonian *Callistemon* species from that genus and treating them as either a separate genus or as part of *Melaleuca*. The morphological features supporting such an action were not given by Briggs and Johnson (1979), but from the context it seems that the *Melaleuca*-like leaves possessed by the New Caledonian callistemons were regarded by them as being taxonomically significant. Dawson (1978), as part of a study of the capsular-fruited Myrtaceae of the Pacific Ocean region, gave a combined generic description of *Melaleuca* and *Callistemon* on the grounds that they shared many features, although he (Dawson, 1992) treated them separately in a floristic treatment for New Caledonia. Craven and Dawson (1998) considered that the endemic New Caledonian species of the complex should be placed in the same genus and effected the transfer of the New Caledonian *Callistemon* species to *Melaleuca*. More recently, Craven and Lepschi (1999) noted that the circumscription of *Melaleuca* sensu Austral. auct. overlapped that of *Callistemon*.

Morphologically, there is very little evidence that can be advanced in support of the continued separate recognition of *Callistemon* and *Melaleuca*. The traditional feature of staminal filaments being free and dispersed in *Callistemon*, but fused and 5-grouped in *Melaleuca* breaks down, and fused, 5-grouped staminal filaments occur in some *Callistemon* species, as noted by several authors (Dawson, 1978; Johnson & Briggs, 1983; Byrnes, 1984; Craven & Dawson, 1998). The species in which this can be observed are the Australian *C. glaucus* (Bonpland) Sweet and *C. viminalis* (Solander ex Gaertner) G. Don, and the New Caledonian *C. buseanus* Guillaumin and *C. gnidioides* Guillaumin (the stamens in the latter sometimes being free). In *M. nervosa* (Lindley) Cheel the stamens are usually in the typical fused, 5-grouped condition, but rarely the filaments may be inserted directly on the hypanthium rim (i.e., no staminal ring or bundle claw is present), in which case they may be loosely 5-aggregated or dispersed around the hypanthium rim with no clustering evident. Orlovich et al. (1999) studied floral development in seven *Melaleuca* and four *Callistemon* species, with special attention being paid to the androecium. Although most of the species studied fell into two distinct groups based upon androecium development, corresponding to the typical melaleucoid and callistemonoid conditions, Orlovich et al. (1999) stated that there was a continuum between the two extremes and that there was no obvious point in this continuum for suggesting a division.

In the broader-leaved species of *Callistemon* the leaf venation is pinnate, whereas in *Melaleuca* the broader-leaved species of the *M. leucadendra* (L.) L. group have longitudinal venation (although it is pinnate in young seedlings of at least some species (Blake, 1968; Craven, unpublished data). Pinnate venation is not uncommon elsewhere in *Melaleuca* (e.g., *M. hypericifolia* Smith), and an intermediate longitudinal-pinnate condition can also occur (e.g., *M. elliptica* Labillardière and *M. groveana* Cheel & C. T. White). Another feature that may at first seem to separate the two genera is the presence of small processes or flaps on the distal, inner, fruiting hypanthial wall of many *Melaleuca* species. The flaps are in an antesealous position (although the sepals per se usually have fallen) and may have a protective function against predation of the seed or may have a controlling function during seed shedding. These flaps are usually absent in *Callistemon*, but are present in *C. glaucus*, for example. In some cases, the flaps may be variably present within a species; in *M. fulgens* R. Brown flaps occur in some specimens but not in others.

Our knowledge and understanding of the inter-relationships of the lineages within *Melaleuca* and its closer relatives will benefit from gene sequence research. The first such studies published are analyses of nrDNA sequence data from the 5 S and ITS-1 spacer regions (Ladiges et al., 1999; Brown et al., 2001) sourced from representatives of the *Beaufortia* suballiance sensu Briggs and Johnson (1979; modified in Johnson & Briggs, 1983). The *Beaufortia* suballiance is an informal taxon and is equivalent to the tribe Melaleuceae Burnett as defined by Wilson et al. (2005). Ladiges et al. (1999) sampled species of *Melaleuca* and *Callistemon* from Australia and New Caledonia for their study. Their analyses suggested that on the 5 S data the species studied fell into two major clades: the first clade containing some of the Australian melaleucas and all the Australian callistemons, and the second clade containing the New Caledonian melaleucas and callistemons, as well as most of the Australian melaleucas and all of the other sampled Melaleuceae genera. The jackknife values show that there is moderate to strong support for some of the higher level clades, but little support for the lower level clades. The ITS-1 data resulted in a topology with generally similar jackknife support, but with more major clades indicated; however, given the lack of lower level support, the tree may not be robust. Greater jackknife support is evident in the tree Ladiges et al. (1999) derived from analysis of a combined 5 S and ITS-1 data set, but even then lower level support is not strong. In suggesting that the endemic New Caledonian species of *Melaleuca* and *Callistemon* be

treated as a new genus, Ladiges et al. (1999) offered no morphological evidence supporting such an action, presumably coming to their conclusion solely on the basis of the 5 S and ITS-1 data.

The nrDNA research reported upon by Ladiges et al. (1999) was extended to include 72 ingroup (i.e., Melaleuceae) taxa by Brown et al. (2001), with a single outgroup taxon, *Lophostemon confertus* (R. Brown) P. G. Wilson & J. T. Waterhouse. The topology of the tree obtained from analysis of the combined data by Brown et al. (2001) is generally similar to that obtained by Ladiges et al. (1999) with two major clades evident. In one clade the New Caledonian species again form a clade sister to a group of Australian-centered *Melaleuca* species within a clade that contains some other *Melaleuca* species and all the sampled genera other than *Melaleuca* and *Callistemon*, i.e., *Beaufortia* R. Brown, *Calothamnus* Labillardière, *Conothamnus*, *Eremaea* Lindley, *Lamarchea*, *Phymatocarpus* F. Mueller, and *Regelia* Schauer. In the other clade, the Australian *Callistemon* species form a clade sister to a group of Australian *Melaleuca* species. The position of one species, *M. foliolosa* Benthams, was unresolved. Ladiges et al. (1999) and Brown et al. (2001) did not find evidence that paralogy was occurring, although this was not investigated per se in either study.

The significance of hybridization for molecular sequence studies in *Melaleuca* needs to be taken into account. There is some evidence in the literature that, where hybridization has occurred, inferred phylogenies derived from sequence data may be incongruent with the known relationships of the parental taxa. Fuertes Aguilar et al. (1999) in a study of *Armeria* Willdenow (Plumbaginaceae) found that cladistic analyses of ITS sequence data were incongruent with morphological relationships and concluded that introgression was responsible for the observed molecular pattern. The majority of *Armeria* species are diploid, and Fuertes Aguilar et al. (1999) believed that concerted evolution was acting to homogenize ITS in the introgressant populations. Hybridization and other issues relevant to the use of ITS for phylogenetic reconstruction in plants have been discussed by Álvarez and Wendel (2003), who concluded that the complex and unpredictable evolutionary behavior of ITS reduced its suitability for phylogenetic analysis.

The available evidence indicates that polyploidy, a good indicator of hybridization, may be a relatively infrequent phenomenon in *Melaleuca* and *Callistemon*. Perusal of the recorded chromosome counts for the two genera indicates that the great majority of species are diploid with  $2n = 22$  (Rye, 1979; W3Tropicos, 2006) and with a few recorded instances of  $2n = 24, 33, 44, 66$  (James, 1958; W3Tropicos,

2006). Rye (1979) recorded 71 counts being  $2n = 22$ , three of  $2n = 24$ , four of  $2n = 33$ , four of  $2n = 44$ , and one of  $2n = 66$ . Hybridization in nature has been noted in *Melaleuca* and *Callistemon* in the following instances: in the *M. leucadendra* species group (Blake, 1968; Cumming, pers. comm.); between *M. bracteata* F. Mueller and *M. styphelioides* Smith (Lepschi, pers. comm.); between diverse species of the *M. scabra* R. Brown group, i.e., *M. leuropoma* Craven and *M. systema* Craven (Craven, pers. obs.); between several species of the *M. uncinata* R. Brown complex (Broadhurst et al., in prep.); between *M. aspalathoides* Schauer and *M. holosericea* Schauer (Lepschi, pers. comm.); between *M. barlowii* Craven and *M. nematophylla* F. Mueller ex Craven (Craven, pers. obs.); between diverse species of the *M. laxiflora* Turczaninow group (Craven, pers. obs.); between *C. citrinus* (Curtis) Skeels and *C. subulatus* Cheel (Craven, pers. obs.); and is suggested between *M. alternifolia* (Maiden & Betche) Cheel and *M. linariifolia* Smith (Butcher et al., 1994, 1995). Many of the foregoing instances of hybridization are documented by herbarium specimens deposited in CANB. In several of the above instances (i.e., hybrids between *M. leuropoma* and *M. systema*, *M. barlowii* and *M. nematophylla*, and *C. citrinus* and *C. subulatus*), hybrid swarms were present indicating that the hybrids were fertile; whether or not backcrossing to either or both parents was also occurring was not known. Herbarium specimens identified as putative hybrids, or as being intermediate, between the following other species pairs are deposited in CANB: *M. araucarioides* Barlow and *M. bracteosa* Turczaninow, *M. arcana* S. T. Blake and *M. quinquenervia* (Cavanilles) S. T. Blake, *M. bracteosa* and *M. pomphostoma* Barlow, *M. coroncarpa* D. A. Herbert and *M. lateriflora* Benthams, *M. decussata* R. Brown and *M. gibbosa* Labillardière, *M. lasiandra* F. Mueller and *M. nervosa*, *M. monantha* (Barlow) Craven and *M. tamariscina* Hooker, and *M. raphiophylla* Schauer and *M. viminea* Lindley. Given that hybridization in *Melaleuca* is relatively widespread at the present time, it is not unreasonable to expect that it has been occurring over a long period. If hybrids are at least partly fertile and the existence of hybrid swarms are evidence of this, it may be expected that hybridization may have been accompanied by lineage sorting and/or concerted evolution leading to the introgression of foreign DNA into a particular species' lineage. Future molecular sequence studies should be designed to test for such introgression.

Based upon my observations of the morphology of all species of *Melaleuca* and *Callistemon*, together with representative species of the other genera of the Melaleuceae Burnett, i.e., *Beaufortia*, *Calothamnus*,

*Conothamnus*, *Eremaea*, *Lamarchea*, *Petraeomyrtus* Craven, *Phymatocarpus*, and *Regelia*, it is my conclusion that the species of *Melaleuca* and *Callistemon* should be placed within the same genus. In the following section the accepted taxa of *Callistemon* for which names are not yet available in *Melaleuca* are transferred to that genus.

In the case of the Western Australian species *Callistemon glaucus*, there is a prior applicable name in *Melaleuca*, *M. paludosa* R. Brown, that is not being taken up for the species. The name *M. paludosa* (Brown, 1812) is a taxonomic synonym of, and has nomenclatural priority for, this plant (Lumley & Spencer, 1988). Lumley and Spencer (1988), however, rejected the use of the epithet *paludosa* for the western species in *Callistemon* on the basis that the epithet had been persistently applied to an eastern Australian species, *C. paludosus* F. Mueller, published in 1858 (Mueller, 1858). The Mueller name is based on a misapplication by Schlechtendal (Lumley & Spencer, 1988) to the eastern species. Although there is no nomenclatural impediment to using *M. paludosa* for the western species, the name has never been used for the species since its description and it would create further, unnecessary confusion to do so now. Given that rejection of a name is possible under the *International Code of Botanical Nomenclature* (Greuter et al., 2000), a case is being prepared for the rejection of *M. paludosa* against *Metrosideros glauca* Bonpland and all other names based upon it.

1. ***Melaleuca brachyandra*** (Lindley) Craven, comb. nov. Basionym: *Callistemon brachyandrum* Lindley, J. Hort. Soc. London 4: 112. 1849. TYPE: England. Cultivated [Provenance: Australia, 1843, *comm. G. Grey*], *leg. ign. s.n.* (holotype, CGE not seen; isotype, CGE photo).
2. ***Melaleuca chisholmii*** (Cheel) Craven, comb. nov. Basionym: *Callistemon chisholmi* Cheel, Proc. Linn. Soc. New South Wales 50: 260. 1925. TYPE: Australia. Queensland: Thompson River Fall, 26 Aug. 1921, *J. R. Chisholm s.n.* (holotype, NSW; isotypes, BRI not seen, CANB).
3. ***Melaleuca comboynensis*** (Cheel) Craven, comb. nov. Basionym: *Callistemon comboynensis* Cheel, Proc. Linn. Soc. New South Wales 68: 184. 1943. TYPE: Australia. New South Wales: Upper Lansdowne, in crevices of rocks, 6 May 1925, *E. Cheel s.n.* (lectotype, designated here, NSW).

There are two other authentic collections in NSW, one of them a wild-collected collection (Comboyne, *E. C. Chisholm 280*) and the other a specimen from a plant cultivated from seed of the lectotype collection (Cultivated, Ashfield, Sydney, 25 Jan. 1943, *E. Cheel*

*s.n.*). The date and locality attributed to the Cheel collection cited as type in the protologue, i.e., December 1926, is different from that given on the lectotype, but it appears that Cheel may not have been overly concerned with accuracy in the documentation aspects of taxonomic research. In any event, it has been thought desirable to lectotypify the name rather than to accept as a holotype the (apparently only) wild-collected collection that Cheel made.

4. ***Melaleuca faucicola*** Craven, nom. nov. Replaced name: *Callistemon pauciflorus* R. D. Spencer & Lumley, *Muelleria* 6: 295, f. 2. 1986. TYPE: Australia. Northern Terr.: Serpentine Gorge, Heavitree Range, 5 Aug. 1985, *H. I. Aston 2564* (holotype, MEL; isotypes, CANB, DNA not seen, MEL, PERTH not seen).

A new specific epithet is required as *pauciflora* is preempted in *Melaleuca* by *M. pauciflora* Turczaninow. The new epithet is derived from the Latin "faux," throat, hence gorge, and "-cola," inhabitant or dweller, in reference to the habitat in which this species occurs.

5. ***Melaleuca flammea*** Craven, nom. nov. Replaced name: *Callistemon acuminatus* Cheel, in J. H. Maiden, Ill. N.S.W. Pl. 63, t. 23. 1911. TYPE: Australia. New South Wales: on rocky mountain slopes, Crawford River, 11 km from Bulahdelah, 19 Oct. 1902, *E. Cheel s.n.* (lectotype, designated here, NSW).

The specimen designated lectotype above is of good quality and possesses buds, flowers, and young fruit, whereas Cheel's other syntype (Alum Mountain, Bulahdelah, Oct. 1907, *J. H. Maiden s.n.*, NSW) is in early flower. A second sheet from Crawford River (without collector or date) is not considered to represent syntype material.

Use of the epithet *acuminata* in *Melaleuca* is preempted by *M. acuminata* F. Mueller, and a new name is required. The epithet *flammea* is derived from the Latin "flammeus," fiery or fiery-red, in reference to the staminal filament color in this species.

6. ***Melaleuca flavovirens*** (Cheel) Craven, comb. nov. Basionym: *Callistemon rugulosus* var. *flavovirens* Cheel, in J. H. Maiden, Ill. N.S.W. Pl. 3: iv [in key]. 1911. *Callistemon flavo-virens* (Cheel) Cheel, Proc. Linn. Soc. New South Wales 50: 263. 1925. TYPE: Australia. New South Wales: Boonoo Boonoo, in creek bed into waterfall, Nov. 1904, *Boorman s.n.* (lectotype, designated here, NSW; isotype, BRI).

There is other syntype material in NSW (Queensland, Stanthorpe, Nov. 1904, *Boorman s.n.*), but this represents *Melaleuca pallida* (Bonpland) Craven. The material designated above as lectotype of *Callistemon rugulosus* var. *flavovirens* conforms with the protologue, and its choice as such maintains the usual application of the epithet.

7. ***Melaleuca formosa*** (S. T. Blake) Craven, comb. nov. Basionym: *Callistemon formosus* S. T. Blake, Proc. Roy. Soc. Queensland 69: 83, fig. 1C. 1958. TYPE: Australia. Queensland: near Kingaroy (near Edenvale Railway Station), low plateau, remnant of mixed low forest on red loam, Sep. 1954, S. T. Blake 19704 (holotype, BRI; isotypes, AAU, CANB, MEL).
8. ***Melaleuca linearifolia*** (Link) Craven, comb. nov. Basionym: *Metrosideros linearifolia* Link, Enum. Pl. Hort. Reg. Berol. 2: 26. 1822. *Callistemon linearifolium* (Link) DC., Prodr. 3: 223. 1828. TYPE: Germany [Apparently cultivated in Berlin of Australian provenance] (holotype, G-DC not seen).
9. ***Melaleuca linearis*** Schrader & Wendland var. ***pinifolia*** (Wendland) Craven, comb. et stat. nov. Basionym: *Metrosideros pinifolia* Wendland, Coll. Pl. 1: 53, t. 16. 1807. *Callistemon pinifolium* (Wendland) Sweet, Hort. Brit. (Sweet). 155. 1826. TYPE: Germany. Cultivated at Hannover (type, Wendland, Coll. Pl. 1: 53, t. 16. 1807, the figure and description).
- A specimen has not been located, and the name is here typified by the plate and description.
10. ***Melaleuca montana*** (S. T. Blake) Craven, comb. nov. Basionym: *Callistemon montanus* S. T. Blake, Proc. Roy. Soc. Queensland 69: 84, fig. 1D. 1958. TYPE: Australia. Queensland: Springbrook, 900 m, 12 Jan. 1931, W. Rudder *s.n.* (holotype, BRI; isotypes, CANB, NSW).
11. ***Melaleuca orophila*** Craven, nom. nov. Replaced name: *Callistemon teretifolius* F. Mueller, Linnæa 25: 387. 1853. TYPE: Australia. South Australia: Lake Torrens district, Elders Range, F. Mueller *s.n.* (lectotype, designated here, MEL ex hb. Steetz; isotype, MEL).

Mueller also described this species in the text of an account of his exploration (Mueller, 1853). It seems that both descriptions were published in April 1853, but that which appeared in *Linnæa* is accepted here

as the protologue as it contains the technical description of the taxon. There are two sheets of apparently the same Mueller collection in MEL that are available for typification purposes, one each from the Mueller and Steetz herbaria. The sheet from the Steetz herbarium is more ample and is here designated lectotype.

The new epithet is required as *teretifolia* is preempted in *Melaleuca* by *M. teretifolia* Endlicher; the epithet is derived from the Greek "oros," mountain, and "philos," loving, hence mountain-loving.

12. ***Melaleuca pachyphylla*** (Cheel) Craven, comb. nov. Basionym: *Callistemon pachyphyllus* Cheel, in J. H. Maiden, Ill. N.S.W. Pl. 61, t. 22. 1911. TYPE: Australia. New South Wales: Bulahdelah, Oct. 1902, E. Cheel *s.n.* (lectotype, designated here, NSW).

Only three of the syntypes of *Callistemon pachyphyllus* have been seen: that designated lectotype above, a collection by Cheel (about 2.4 km from Bulahdelah, 18 Oct. 1902, NSW), and a collection by Baeuerlen (Wardell, Jan. 1892, No. 728, NSW). The lectotype is the specimen used for the illustration forming part of the protologue, has adequate flowers, fruit, and foliage, and conforms well with Cheel's concept of the species; for these reasons it is considered that lectotypification is feasible without all syntypes having been seen.

13. ***Melaleuca pallida*** (Bonpland) Craven, comb. nov. Basionym: *Metrosideros pallida* Bonpland, Descr. Pl. Malmaison 101, t. 41. 1816. *Callistemon pallidum* (Bonpl.) DC. Prodr. 3: 223. 1828. TYPE: France. Cultivated at the Jardin de la Malmaison, May 1815, A. J. A. Bonpland *s.n.* (holotype, P).
14. ***Melaleuca paludicola*** Craven, nom. nov. Replaced synonym: *Callistemon sieberi* DC., Prodr. (DC.) 3: 223. 1828. *Callistemon salignus* var. *sieberi* (DC.) F. Mueller, Fragm. 4: 55. 1864. *Callistemon salignus* f. *sieberi* (DC.) Siebert & Voss, Vilm. Blumengärtn. ed. 3, 1: 312. 1896. TYPE: Australia. New South Wales: 1825, F. W. Sieber 637 (lectotype, designated by Lumley & Spencer, 1988: 413, G not seen; isotypes, PRC, W both not seen).

A new epithet is required as *sieberi* is preempted in *Melaleuca* by *M. sieberi* Schauer. The epithet *paludicola* is derived from the Latin "palus," swamp or marsh, and "-cola," inhabitant or dweller.

15. *Melaleuca pearsonii* (R. D. Spencer & Lumley) Craven, comb. nov. Basionym: *Callistemon pearsonii* R. D. Spencer & Lumley, *Muelleria* 6: 293, f. 1. 1986. TYPE: Australia. Queensland: Blackdown Tableland, Mimosa Creek, 14 Oct. 1984, *R. D. Spencer 84* (holotype, MEL; isotypes, BRI not seen, NSW).
16. *Melaleuca phoenicea* (Lindley) Craven, comb. nov. Basionym: *Callistemon phoeniceum* Lindley, *Bot. Reg. App.*, Vols 1–23, x. 1839. TYPE: Australia. Western Australia: *J. Drummond s.n.* (lectotype, designated here, CGE not seen; isotype, CGE photo).
- The type material in CGE consists of material of two collections mounted on the same sheet, that designated lectotype above and *J. Mangles s.n.* The Mangles collection is less adequate than Drummond's as it is in the late bud/flower expansion stage of development, whereas the Drummond specimen is in full flower.
17. *Melaleuca pityoides* (F. Mueller) Craven, comb. nov. Basionym: *Callistemon pityoides* F. Mueller, *Australas. Chem. Drugg.*, Suppl. 5: 94. 1883. *Callistemon sieberi* var. *pityoides* (F. Mueller) Cheel, in *J. H. Maiden, Forest Fl. N.S.W.* 7: 59, in obs. 1917. TYPE: Australia. Victoria: Ovens River, Dec. 1882, *C. L. F. Falck s.n.* (lectotype, designated by Lumley & Spencer, 1988: 414, MEL).
18. *Melaleuca polandii* (F. M. Bailey) Craven, comb. nov. Basionym: *Callistemon polandii* F. M. Bailey, *Queensland Fl.* 6: 2003, pl. 88. 1902. TYPE: Australia. Queensland: Bloomfield River Mission Station [received at BRI, Jan. 1902], *W. Poland s.n.* (holotype, BRI).
19. *Melaleuca recurva* (R. D. Spencer & Lumley) Craven, comb. nov. Basionym: *Callistemon recurvus* R. D. Spencer & Lumley, *Muelleria* 7: 255, f. 2. 1990. TYPE: Australia. Queensland: Mt. Stewart, E of Herberton, on granite, May 1977, *R. Russell s.n.* (holotype, BRI).
20. *Melaleuca rugulosa* (Schlechtendal ex Link) Craven, comb. nov. Basionym: *Metrosideros rugulosa* Schlechtendal ex Link, *Enum. Pl. Hort. Berol. Alt.* 2: 27. 1822. *Callistemon rugulosum* (Schlechtendal ex Link) DC., *Prodr. (DC.)* 3: 223. 1828. TYPE: Germany. Cultivated in Berlin Botanic Garden, 1826, *C. F. Otto s.n.* (neotype, designated by Lumley & Spencer, 1988: 411, G-DC not seen).
21. *Melaleuca salicina* Craven, nom. nov. Replaced name: *Metrosideros saligna* Smith, *Trans. Linn. Soc. London, Bot.* 3: 272. 1797. *Callistemon*

*salignum* (Smith) Sweet, *Hort. Brit.* 155. 1826. TYPE: Australia. New South Wales [Precise locality not known], *leg. ign. s.n.* (holotype, LINN not seen; isotypes, K, LIV).

A new epithet is required as *saligna* is preempted in *Melaleuca* by *M. saligna* (J. F. Gmelin) Blume. The epithet *salicina* has a similar meaning to “*saligna*” (willow-like) and also is derived from the generic epithet of the willow genus, *Salix*.

22. *Melaleuca shiressii* (Blakely) Craven, comb. nov. Basionym: *Callistemon shiressii* Blakely, *Austral. Nat.* 10: 257. 1941. TYPE: Australia. New South Wales: Narara [1.6 km W of railway station], 26 Dec. 1929, *W. F. Blakely & D. W. C. Shiress s.n.* (holotype, NSW; isotype, CANB).

Wilson (pers. comm., 1996) has provided some insights into the typification of this species: “the protologue reads, in part, ‘W. F. Blakely and D. W. C. Shiress, 5/1927, and 26/2/1929, the type.’ I take the wording to indicate that the second specimen is to be considered as holotype. There is, however, no specimen that matches this precisely, but there is one that is dated 26/12/1929 and I am convinced that this is the intended type, the date in the protologue being a typographic error. (In fact, our copy of the journal has a ‘1’ pencilled in before the 2.)” Wilson’s interpretation is accepted for the type citation above.

23. *Melaleuca subulata* (Cheel) Craven, comb. nov. Basionym: *Callistemon subulatus* Cheel, *Proc. Linn. Soc. New South Wales* 50: 259. 1925. TYPE: Australia. New South Wales: bed of the Nattai River, via Colo, Oct. 1912, *E. Cheel s.n.* (holotype, NSW).
24. *Melaleuca virens* Craven, nom. nov. Replaced name: *Metrosideros viridiflora* Sims, *Bot. Mag.* 52: t. 2602. 1825. *Callistemon viridiflorum* (Sims) Sweet, *Hort. Brit. (Sweet)* 155. 1826. *Callistemon salignus* var. *viridiflorus* (Sims) F. Mueller, *Fragm.* 4: 55. 1864. *Callistemon salignus* f. *viridiflorus* (Sims) F. Mueller ex Siebert & Voss, *Vilm. Blumengärtn. ed.* 3, 1: 312. 1896. TYPE: Cultivated in England, the provenance being Australia (lectotype, designated here, Sims, *Bot. Mag.* 52: t. 2602. 1825).

A new epithet is required as *viridiflora* is preempted in *Melaleuca* by *M. viridiflora* Solander ex Gaertner. The word “*virens*” is derived from the Latin “*viridis*,” green, in reference to the replaced epithet. A specimen has not been located, and the name is here lectotypified by the plant and description.

25. *Melaleuca williamsii* Craven, nom. nov. Replaced name: *Callistemon pungens* Lumley & R. D. Spencer, *Muelleria* 7: 253, f. 1. 1990. TYPE: Australia. New South Wales: ca. 0.3 km along road to Armidale from jct. with road from the Armidale/Dorrigo Road to Hillgrove (ca. 4 km from hwy.), 21 Nov. 1983, P. F. Lumley 1150 (holotype, MEL; isotypes, CANB, K not seen, NE, NSW not seen).

A new specific epithet is required as *pungens* is preempted in *Melaleuca* by *M. pungens* Schauer. The new epithet is in memory of John Beaumont Williams (1932–2005) of Armidale, New South Wales, who generously made available to me his extensive field knowledge of this group of plants as it occurs in the New England region of New South Wales.

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#### Literature Cited

- Álvarez, I. & J. F. Wendel. 2003. Ribosomal ITS sequences and plant phylogenetic inference. *Molec. Phylogen. Evol.* 29: 417–434.
- Baillon, H. E. 1876. *Melaleuca* L. *Hist. Pl. (Baillon)* 6: 359–360.
- Barlow, B. A. 1986. *Melaleuca* L. Pp. 935–946 in J. P. Jessop & H. R. Toelken (editors), *Flora of South Australia*, Vol. 2. South Australian Government Printing Division, Adelaide.
- Bentham, G. 1866 [1867]. *Myrtaceae*. Pp. 1–289 in *Flora Australiensis*, Vol. 3. Lovell Reeve, London.
- Blake, S. T. 1958. New and critical genera and species of *Myrtaceae* subfamily *Leptospermoideae* from eastern Australia. *Proc. Roy. Soc. Queensland.* 69: 75–88.
- . 1968. A revision of *Melaleuca leucodendron* and its allies (Myrtaceae). *Contr. Queensland Herb.* 1: 1–114.
- Briggs, B. G. & L. A. S. Johnson. 1979. Evolution in the *Myrtaceae*—Evidence from inflorescence structure. *Proc. Linn. Soc. New South Wales* 102: 157–256.
- Brown, G. K., F. Udovicic & P. Y. Ladiges. 2001. Molecular phylogeny and biogeography of *Melaleuca*, *Callistemon* and related genera (Myrtaceae). *Austral. Syst. Bot.* 14: 565–585.
- Brown, R. 1812. *Melaleuca paludosa*. Pp. 410–411 in W. T. Aiton (editor), *Hortus Kewensis*, Vol. 4. London.
- . 1814. General remarks, geographical and systematical, on the botany of Terra Australis. Pp. 533–594 in M. Flinders (editor), *A Voyage to Terra Australis*, Vol. 2. G. and W. Nicol, London.
- Butcher, P. A., J. C. Doran & M. U. Slee. 1994. Intraspecific variation in leaf oils of *Melaleuca alternifolia* (Myrtaceae). *Biochem. Syst. Ecol.* 22: 419–430.
- , M. Byrne & G. F. Moran. 1995. Variation within and among the chloroplast genomes of *Melaleuca alternifolia* and *M. linariifolia* (Myrtaceae). *Pl. Syst. Evol.* 194: 69–81.
- Byrnes, N. B. 1984. A revision of *Melaleuca* L. (Myrtaceae) in northern and eastern Australia, 1. *Austrobaileya* 2: 65–76.
- Carrick, J. & K. Chorney. 1979. A review of *Melaleuca* L. (Myrtaceae) in South Australia. *J. Adelaide Bot. Gard.* 1: 281–319.
- Cheel, E. 1924. Notes on *Melaleuca*, with descriptions of two new species and a new variety. *J. Proc. Roy. Soc. New South Wales* 43: 189–197.
- . 1925. Two new species of *Callistemon*, with notes on certain other species. *Proc. Linn. Soc. New South Wales* 50: 259–266.
- & C. T. White. 1924. On a new species of *Melaleuca* (family Myrtaceae) from southern Queensland. *Proc. Roy. Soc. Queensland* 36: 41–43.
- Craven, L. A. & J. W. Dawson. 1998. *Callistemon* of New Caledonia transferred to *Melaleuca* (Myrtaceae). *Adansonia, sér. 3* 20: 191–194.
- & B. J. Lepschi. 1999. Enumeration of the species and infraspecific taxa of *Melaleuca* (Myrtaceae) occurring in Australia and Tasmania. *Austral. Syst. Bot.* 12: 819–927.
- Dawson, J. W. 1978. Pacific capsular Myrtaceae 13, *Melaleuca* and *Callistemon* (New Caledonia). *Blumea* 24: 119–122.
- . 1992. *Melaleuca* Linné, *Callistemon* R. Brown. Pp. 216–245 in *Flore de la Nouvelle-Calédonie et Dépendances*, Vol. 18. Muséum National d'Histoire Naturelle, Paris.
- Fuertes Aguilar, J., J. A. Rosselló & G. N. Feliner. 1999. Molecular evidence for the compilospecies model of reticulate evolution in *Armeria* (Plumbaginaceae). *Syst. Biol.* 48: 735–754.
- Greuter, W., J. McNeill, F. R. Barrie, H. M. Burdet, V. Demoulin, T. S. Filgueiras, D. H. Nicolson, P. C. Silva, J. E. Skog, P. Trehane, N. J. Turland & D. L. Hawksworth (editors). 2000. *International Code of Botanical Nomenclature (Saint Louis Code)*. *Regnum Veg.* 138.
- James, S. H. 1958. Apomixis in the Genus *Callistemon* R. Br. M.Sc. Thesis, Univ. Sydney.
- Johnson, L. A. S. & B. G. Briggs. 1983. Myrtaceae. Pp. 175–185 in B. D. Morley & H. R. Toelken (editors), *Flowering Plants in Australia*. Rigby Press, Adelaide.
- Ladiges, P. Y., G. I. McFadden, N. Middleton, D. A. Orlovich, N. Treloar & F. Udovicic. 1999. Phylogeny of *Melaleuca*, *Callistemon*, and related genera of the *Beaufortia* suballiance (Myrtaceae) based on 5 S and ITS-1 spacer regions of nrDNA. *Cladistics* 15: 151–172.

- Lumley, P. F. & R. D. Spencer. 1988. Nomenclatural notes on *Callistemon* R. Br. (Myrtaceae). *Muelleria* 6: 411–415.
- & ———. 1990. Two new species of *Callistemon* R. Br. (Myrtaceae). *Muelleria* 7: 253–257.
- Molyneux, W. 1993. A new species of *Callistemon* R. Br. (Myrtaceae) from East Gippsland. *Muelleria* 8: 61–64.
- Mueller, F. 1853. The vegetation of the districts surrounding Lake Torrens. *Hooker's J. Bot. Kew Gard. Misc.* 5: 105–109.
- . 1858. *Callistemon paludosus*. *Fragm.* 1: 14.
- . 1864. *Callistemon salignus*. *Fragm.* 4: 54–55.
- Orlovich, D. A., A. N. Drinnan & P. Y. Ladiges. 1999. Floral development in *Melaleuca* and *Callistemon* (Myrtaceae). *Austral. Syst. Bot.* 11: 689–710.
- Rye, B. L. 1979. Chromosome number variation in the Myrtaceae and its taxonomic implications. *Austral. J. Bot.* 27: 547–573.
- Spencer, R. D. 1996. *Callistemon, Melaleuca*. Pp. 1022–1034 in N. G. Walsh & T. J. Entwisle (editors), *Flora of Victoria*, Vol. 3. Inkata Press, Melbourne.
- & P. F. Lumley. 1986a. *Callistemon* R. Br. Pp. 894–897 in J. P. Jessop & H. R. Toelken (editors), *Flora of South Australia*, Vol. 2. South Australian Government Printing Division, Adelaide.
- & ———. 1986b. Two new species of *Callistemon* R. Br. (Myrtaceae). *Muelleria* 6: 293–298.
- & ———. 1991. *Callistemon*. Pp. 168–173 in G. J. Harden (editor), *Flora of New South Wales*, Vol. 2. Univ. New South Wales Press, Sydney.
- W3Tropicos, ver. 1.5. 2006. Index to Plant Chromosome Numbers. <http://mobot.mobot.org/W3T/Search/ipcn.html>, accessed 10 September 2006.
- Wilson, P. G., M. M. O'Brien, M. M. Heslewood & C. J. Quinn. 2005. Relationships within Myrtaceae sensu lato based on a *matK* phylogeny. *Pl. Syst. Evol.* 251: 3–19.