New names and combinations for some *Melaleuca* (Myrtaceae) species and subspecies from the south-west of Western Australia considered rare or threatened

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Abstract

F.C. Quinn, K.J. Cowley, B.A. Barlow and K.R. Thiele. New names and combinations for some *Melaleuca* (Myrtaceae) species and subspecies from the south-west of Western Australia considered rare or threatened. Nuytsia 8(3): 333-350 (1992). The paper describes or makes new combinations for several species and subspecies of *Melaleuca* considered to be rare or threatened. Six species and two subspecies, *Melaleuca araucarioides*, *M. fissurata*, *M. ordinifolia*, *M. pomphostoma*, *M. ringens*, *M. sculponeata*, *M. viminea* subsp. *appressa* and *M. huegelii* subsp. *pristicensis* are described as new. *M. tenella* Bentham is reduced to a subspecies of *M. incana* R. Br. and *M. densa* var. *pritzelii* Domin is raised to specific rank.

Introduction

Like many other medium-sized and large genera of the Autochthonous Sub-element of the Australian flora, *Melaleuca* has a major centre of species richness in the Southwest Botanical Province of Western Australia. It is probable that the genus comprises 250-300 species, of which about half probably occur in the Southwest Botanical Province. As a consequence, much of the systematic research necessary to provide a comprehensive inventory of the genus is concentrated on this region. Our research indicates that many of the species in this area have relatively small distribution areas.

Among the many taxa which have been distinguished, there are several which appear to require documentation as rare or threatened. The purpose of this paper is to make names available for a number of these species and subspecies, as a step in expediting full documentation of the conservation status of each. Some of these have already been listed, as undescribed species, in the work on rare or threatened Australian plants by Briggs and Leigh (1988). Others are recognised as new for the first time in this paper, and conservation codes are suggested for them also.

The recommendations for conservation status suggested here are in accordance with the criteria set out by Briggs and Leigh (1988). With respect to the species dealt with here, the following designations are relevant:

Code	Explanation
2	geographic range less than 100 km
3	geographic range more than 100 km
K	poorly known
C	population reserved
E	endangered
V	vulnerable
-	adequacy of reserve unknown

Of the ten taxa dealt with in this paper, the codes which have been suggested include 2K (1 taxon), 2KC- (1), 2E (2), 2V (1), 3K (2), 3KC (1), and 3KC- (2).

All of the species and subspecies dealt with here occur in the Southwest Botanical Province of Western Australia. The four letter codes used in qualifying the geographic occurrences of the taxa refer to the natural regions of Australia delineated by Barlow (1987). These codes are useful in quantifying the distributions of plant species on an Australia-wide basis. Because these taxa all occur in an area where there is now a very complex mosaic of natural vegetation and cleared agricultural land, there is clearly an urgent need for additional field work in order to clarify the conservation status of each taxon.

Taxonomy

The taxa dealt with below have been arranged in alphabetical order. Because our revision of *Melaleuca* is still in progress, we have not yet finalised an infra-generic classification of the genus. The classification of Bentham (1867) appears to be artificial, and we have therefore avoided referring species to Bentham's sections. The taxa dealt with here belong to a number of distinct species groups within the genus. These species groups all have geographic distributions which are essentially temperate Australian. They also all have centres of species richness in the south west province of Western Australia.

1. Melaleuca araucarioides Barlow, sp. nov. (Figure 1a)

Species nova *M. blaeriifoliae* Turcz. proxima, sed foliis ternatis, stylis brevioribus, fructibus plerumque minoribus differt.

Holotypus: Western Australia: Esperance Region: About 1 km W of Kog's Corner on the Cape Riche to Highway road, 34°36'S 118°45'E, *Cowley & Quinn* 151, 7.x.1988 (CANB 383935). *Isotypi*: BRI, K, MEL, PERTH.

Shrub to 1.5 m high, young shoots lanuginose and the rachis occasionally tomentose, otherwise glabrous. Leaves ternate, semi-appressed and crowded in 6 regular rows along the axis; lamina narrowly elliptic to narrowly obovate, slightly rounded abaxially and flat or channelled adaxially, 1.7-3.5 mm long, 0.7-1.8 mm wide, obtuse and inflexed at the apex, slightly reflexed and attenuate at the base into a petiole 0.3-0.8 mm long; venation obscure; glands obscure or slightly pustulate. Inflorescence a basal or terminal spike or head of 8-17 crowded monads, to 10 mm long, terminal heads often predominantly male flowers; bracts 0.8-1.3 mm long, 0.4-0.8 mm wide, persistent to flower

senescence. Hypanthium cup-shaped, rounded at the base, 0.8-1.2 mm long. Sepals 0.5-0.8 mm long, membranous at the margin, persistent to mature fruits. Stamens 1.8-5 mm long including a claw 0.8-1.4 mm long, 3-4(5) per bundle, filaments cream to yellow. Style to 5.5 mm long; ovules c. 22 per loculus. Fruits shortly bell-shaped, compressed by mutual pressure, 2.5-3.5 mm long, 2-4.3 mm diam. with thickened, rounded and outspread persistent sepals.

Distribution and ecology. Confined to the Ongerup-Cape Riche area, NW of Albany (ESPR) with a geographic range on current knowledge of less than 100 km. Occurs in well drained sandy or loamy soils in heaths or open eucalypt woodlands. Flowering has been recorded in July and October. Figure 2a.

Distinction from related species. Melaleuca araucarioides is closely related to *M. blaeriifolia*, from which it can readily be distinguished by its ternate phyllotaxy, shorter style and smaller fruits. In *M. blaeriifolia* the style is 8-9 mm long and the fruits are 3.5-5 mm in diameter and 3.5-4 mm long. The very regular arrangement of the leaves into 6 rows is particularly distinctive.

Conservation status. We recommend that the conservation status of this species should be Poorly Known (code 2K of Briggs and Leigh 1988) as it is only known from eight collections, only two of which have been made in the last fifteen years. It also appears to be geographically restricted and from our field observations is probably rare.

Etymology. The specific epithet alludes to the superficial resemblance of the leafy shoots to those of the gymnosperm genus *Araucaria* Juss.

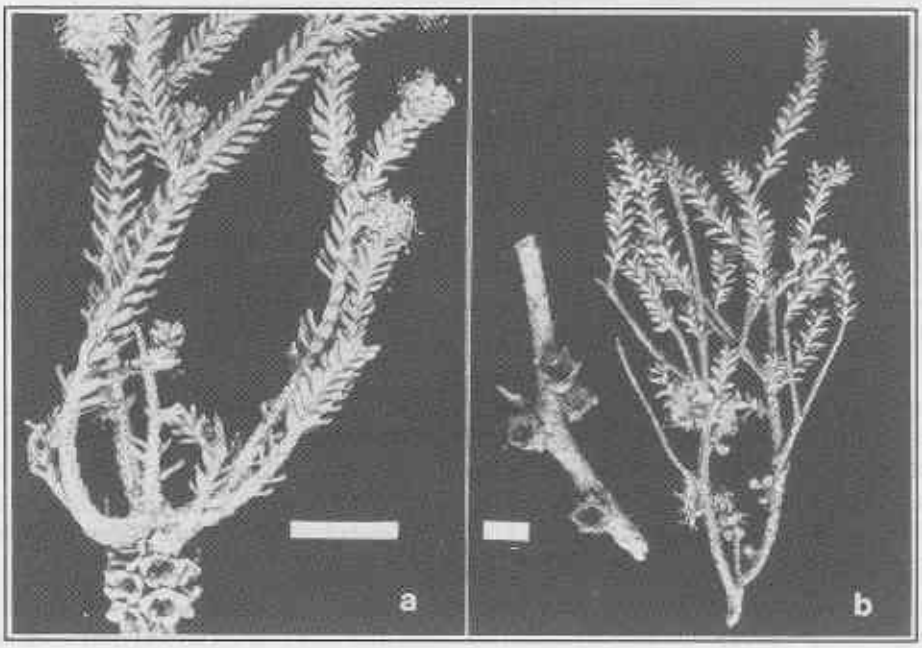

Figure 1. a, *Melaleuca araucarioides*, portion of plant (*Cowley & Quinn* 151). b, *M. fissurata*, portions of plant (left piece, *van der Moezel* PGV120; right piece, *Wilson* 7000). Scale bars = 1 cm

Additional specimens examined. WESTERN AUSTRALIA: c. 6 km S of Jerramungup on road to Albany, *Cowley & Quinn* 146, 7.x.1988 (CANB); 10 miles (16 km) N of Cape Riche, *Gardner s.n.*, 12.x.1942 (PERTH); 8 miles (13 km) SE of Ongerup, *Newbey* 1277, 12.vii.1964 (PERTH); 10 km S of Boxwood Hills, *Newbey* 4264, 19.vii.1974 (PERTH); Kojaneerup East Road, *Pfeiffer s.n.*, 18.vii.1969 (PERTH); cultivated at Glenmorgan, Qld, from seed collected at Cape Riche, *Gordon* 2358, x.1962 (PERTH); Nova Hollandia, *Drummond* 5th coll. 167, no date (KW, photo in CANB).

2. Melaleuca fissurata Barlow, sp. nov. (Figure 1b)

Species nova *M. lateriflorae* Benth. proxima, sed fructibus aspri fissuratis, foliis carinatis retroflexis brevioribus differt.

Holotypus: Western Australia: Esperance Region: 29 km SSW of Tadpole Lake, c. 65 km ENE of Lake King, 32°32'S 119°54'E, *Newbey* 5535, 13.viii.1979 (PERTH).

Low shrub to 1.5 m tall, rough-barked, the inflorescence minutely pubescent, otherwise glabrous. Leaves spirally arranged, spreading; lamina broadly elliptic, somewhat thickened and keeled abaxially, 4.0-5.0 mm long, 1.5-2.0 mm wide, obtuse at the apex, broadly tapering to a stout petiole 0.5-0.7 mm long, veinless or with 1-2 faint, fine lateral veins on either side of the keel; glands obscure or prominent, scattered. Inflorescence a lateral cluster of 1-5(10) flowers on old wood; bracts ovate, c. 1 mm long, c. 0.8 mm wide, persistent to anthesis. Hypanthium broadly cup-shaped, 1.2-1.5 mm long, glabrous, smooth or verrucose. Sepals rounded-triangular, 1.2-1.4 mm long, deciduous before fruit maturity. Stamens white, 5.0-10.0 mm long including a broad claw c. 1.5 mm long, 10-12 per bundle. Style c. 5.5 mm long; ovules not seen. Fruit cup-shaped, c. 4 mm long, 5.5-8.0 mm diam. with a rough, fissured, dark bark-like surface; valves enclosed.

Distribution and ecology. Known from Mt Ney to Lake King, N of Esperance in the South West Botanical Province of Western Australia with a geographic range on current knowledge of c. 260 km. Occurs in shrub mallee or woodland on sand or sandy loam usually over clay or clay loam. Flowering is predominantly in July and August. (Figure 2b)

Distinction from related species. Melaleuca fissurata is most closely related to *M. lateriflora* differing markedly in its very roughly textured, fissured, corky fruit and keeled, retroflexed, shorter leaves. *M. lateriflora* has erect, sometimes slightly channelled leaves (5)7-20(25) mm long. The two species overlap for a small part of their ranges but, maintain their morphological distinction, reinforcing the appropriateness of specific rank for *Melaleuca fissurata*.

Conservation status. We support Briggs and Leigh (1988) who cited this species as *M.* sp. 2 (Mt. Ney-Lake King) in assigning a conservation status of Poorly Known (code 3K) as it is only known from 7 collections. This species appears to occur in small populations in apparently localised and specific habitats making it very vulnerable to disturbance. Further field work is needed to confirm its status, particularly to examine whether or not the Lake King population is disjunct from other known populations.

Etymology. The specific epithet is derived from the Latin *fissuratus* (fissured) and refers to the surface texture of the fruit.

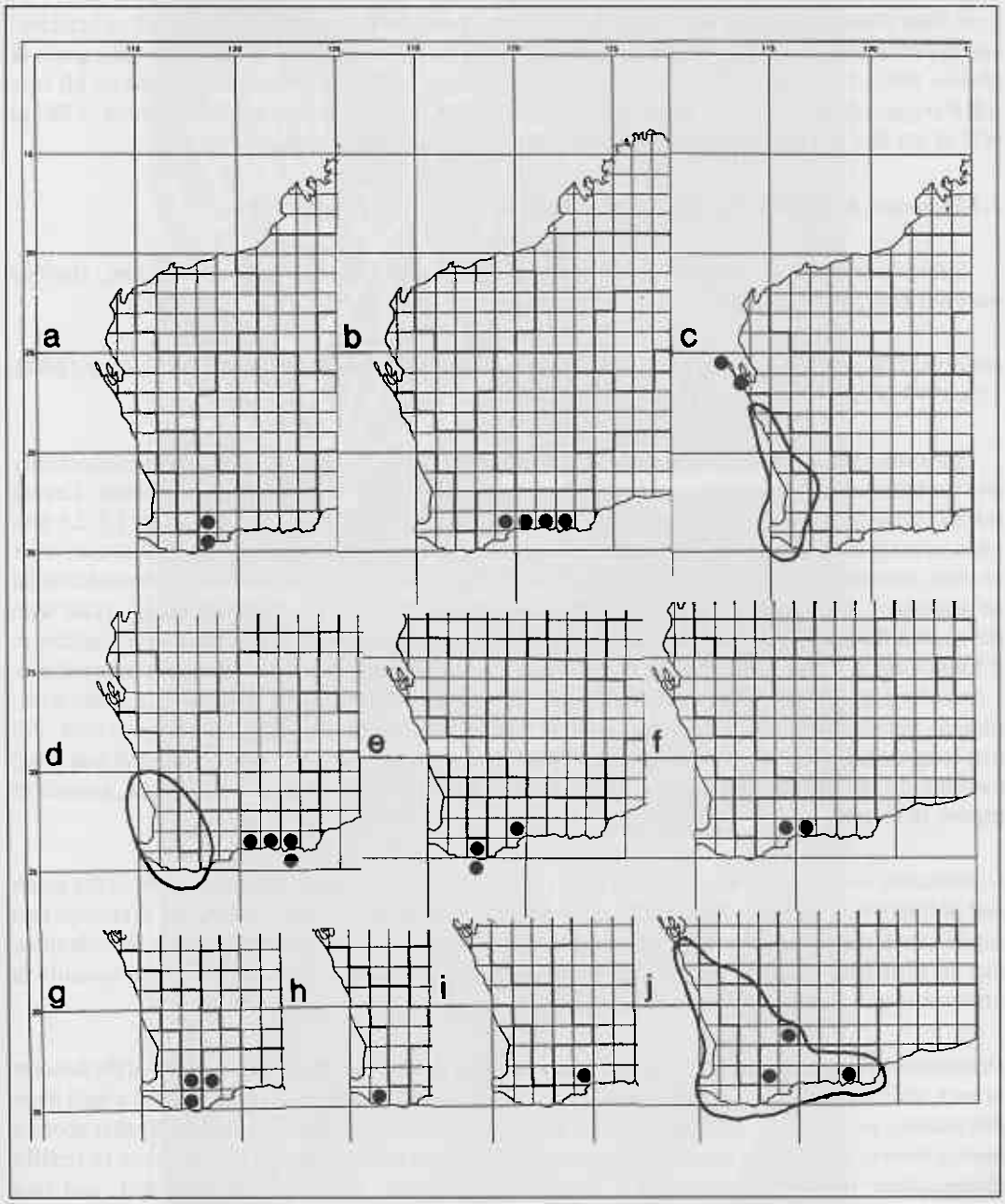

Figure 2. Distributions of the species shown as occurrences in 1° cells. a, *M. araucarioides*. b, *M. fissurata*. c, *M. huegelii* subsp. *pristicensis* with the outline showing the range of the typical species. d, *M. incana* subsp. *tenella* with the outline showing the range of the typical species. e, *M. ordinifolia*. f, *M. pomphostoma*.. g, *M. pritzelii*. h, *M. ringens*. i, *M. sculponeata*. j, *M. viminea* subsp. *appressa* with the outline showing the range of the typical species.

Additional specimens examined. WESTERN AUSTRALIA: 33 km WSW of Lake King township, *Wilson* 7000, 10.viii.1968 (CANB, PERTH); 13 km ENE of Scadden on Cox Rd, *van der Moezel s.n.*, 1.vii.1984 (PERTH); Ridley Rd, 5.4 km from Ridley-Truslove Rd junction, c. 20 km NE of Scadden, *van der Moezel* 120, 17-18.viii.1982 (CANB, PERTH); 9.2 km due SSW of Mt Ridley, *Burgman & McNee* 1863, 8.viii.1983 (PERTH); 15 km due SW of Mt Ney, 5 km NE of Burdett Rd on Mt Ney Rd, *Burgman & McNee* 1657, 3.viii.1983 (CANB, PERTH); 30.75 km N of Mt Beaumont, 9.58 km NW of Mt Ney Rd on Clyde Rock Rd, *Burgman & Layman* 3061, no date (PERTH).

3. Melaleuca huegelii subsp. **pritsicensis** Barlow, subsp. nov. (Figures 3a-e)

Subspecies nova *M. huegelii* Endl. subsp *huegelii* proxima, sed rhachidi breviore, floribus malvinis paucioribus differt.

Holotypus: Western Australia: Murchison Region: Tamala Station, 26°42'S 113°43'E, *Beard* 6800, 11.x.1973 (PERTH). *Isotypi*: PERTH, CANB.

Spreading shrub or tree 0.9-2 (rarely to 5) m tall, inflorescence axis pubescent at flower bases only and the bracteoles, hypanthium, anthers and stems with few long hairs, otherwise glabrous. Leaves spirally arranged; lamina ovate or triangular, flat to weakly keeled, 1.8-4.0 mm long, 1.5-2.5 mm wide, acute to acuminate at the apex, slightly contracted and sessile or weakly peltate at the base; veins several, sometimes obscure; glands fine, in rows. Inflorescence subbasal on lateral stems or terminal on main axes, a spike of 1-12 triads spirally arranged on an axis (5)10-20(30) mm long; triads with the central flower higher than the laterals, forming a triangular group; bracts broadly triangular, c. 2.5 mm long, c. 2 mm wide, foliose, green to scarious, deciduous; bracteoles narrowly triangular, c. 1.5 mm long, (0.2)0.6-1.2 mm wide, deciduous. Hypanthium cup-shaped, c. 2 mm long, c. 2 mm wide, ribbed. Sepals triangular, 0.8-1.0 mm long, persistent to mature fruit. Stamens mauve to pink, 2-3 mm long including a claw 3-5 mm long and 0.5-0.6 mm wide, 9-13 per bundle. Style 8-9 mm long; ovules c. 12 per loculus. Fruit globular, c. 3 mm long, 3.5-4.0 mm diam., weakly lobed, smooth to papery in texture; valves deeply recessed.

Distribution and ecology. Restricted to Dirk Hartog Island and around Tamala Station, in the south end of Shark Bay in South West Botanical Province of Western Australia (MRCH). Although this subspecies has a geographic range on current knowledge of more than 100 km, existing records show that the distribution may be disjunct. It occurs in heathlands in sand. Flowering is predominantly in September and October. (Figure 2c)

Distinction as a subspecies. In *M. huegelii*, the triangular rather than linear arrangement of the flowers in each triad is distinctive, and the species may be more closely related to other species which have this pattern, including *M. adnata* Turcz. and *M. eleuterostachya* F. Muell., than with other species having more or less peltate leaves. The populations from the northern part of the range can be readily distinguished in several characters. Strong ecogeographic divergence is indicated, and two subspecies have been distinguished accordingly. The new subspecies differs consistently from the typical one in its much shorter and fewer-flowered inflorescence, and in the mauve to pink rather than white or cream staminal filaments. The typical *M. huegelii* has inflorescence axes of (25)40-80(130) mm and usually 50-140 triads in each flower spike. The sharp distinction between the two subspecies suggests that substantial genetic divergence has occurred. The differences shown by subsp. *pristicensis* are presumably adaptive, reflecting a lower level of resource allocation to seed production and perhaps a different pollinator.

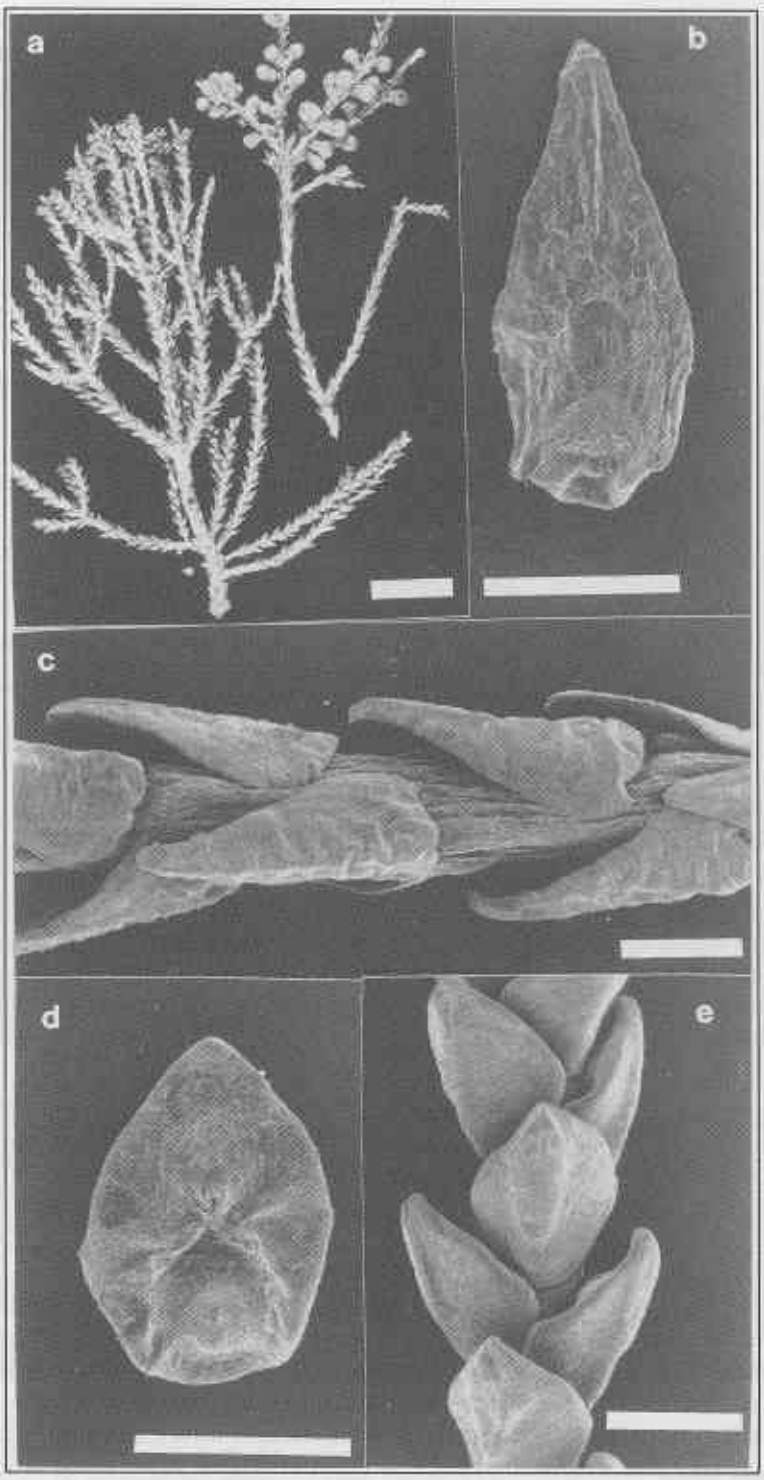

Figure 3. *Melaleuca huegelii* subsp. *pristicensis*. a, portions of plant (*George* 11566). b-e, Scanning Electron Micrographs (SEMs), showing variations in leaf form. b, abaxial surface of leaf from indeterminate shoot (*George* 11566). c, indeterminate shoot (*George* 11566). d, abaxial surface of leaf from lateral shoot (*George* 11566). e, lateral shoot (*George* 11566). Scale bars = 1 cm

Conservation status. We recommend that the conservation status of this speices should be Poorly Known (code 3K of Briggs and Leigh, 1988). Even though the geographic range for this species is more than 100 km, it seems to occur only in small populations at each locality in apparently localised and specific habitats.

Etymology. The subspecific epithet is derived from *pristix* (shark) and refers to its occurrence in the Shark Bay area.

Additional specimens examined. WESTERN AUSTRALIA: MRCH: just S of Cape Inscription, Dirk Hartog Island, *George* 11566, 5.ix.1972 (CANB, K, MEL); inland of Sandy Point, Dirk Hartog Island, *Beard* 7091, 18.x.1974 (PERTH); between Carrarang and Tamala, *Beard* 7079, 16.x.1974 (PERTH); 16 miles SW of Tamala, *Demarz* 5169, 8.ix.1974 (PERTH); 22 km on Tamala Rd, *Demarz* 8998, 2.x.1981 (PERTH); 3 miles W of Tamala, *Davies s.n.*, 13.x.1960 (PERTH).

4. Melaleuca incana subsp. **tenella** (Bentham) Barlow, comb. et stat. nov. (Figure 4a)

Melaleuca tenella Bentham, Fl. Aust. 3:160 (1867); *Myrtoleucodendron tenellum* (Bentham) Kuntze, Revis. Gen. Pl. 241 (1891). *Type*: Western Australia: Phillips River, *Maxwell s.n.* (holo: K; iso: CANB, MEL 602187, MEL 602188).

Shrub 1 m, the inflorescence axis tomentose, otherwise glabrous. Leaves ternate or displaced ternate, often slightly keeled, reflexed from the petiole and incurved towards the axis; lamina narrowly ovate, flat to compressed, (3.5)7-9 mm long, 0.5-0.9 mm wide, obtuse and often thickened at the apex, attenuate at the base into a petiole 0.5-1 mm long; venation obscure or only the midvein evident; glands 10-15 on the abaxial surface towards the centre of the lamina, uniformly large. Inflorescence a basal or terminal spike or head of 10-35 crowded monads, 5-25 mm long, with the terminal heads often predominantly of male flowers; bracts 1.2-2 mm long, 0.9-1.3 mm wide, persistent to anthesis. Hypanthium cylindrical with an elongated base in hermaphrodite flowers, conical in male flowers, 1.5-2 mm long. Sepals 0.5-0.7 mm long, membranous at the margins, persistent to mature fruit. Stamens 3.5-6 mm long including a claw 0.5-1 mm long, (3)4-8(10) per bundle with filaments white to yellow. Style 5-8 mm long; ovules c. 25-32 per loculus. Fruits shortly bell-shaped with an elongated base, sometimes compressed by mutual pressure, 1.8-4 mm long, 3-5 mm diam., with persistent rounded thickened outspread sepals.

Distribution and ecology. Found on the coast and in adjacent inland areas from near Esperance to Cape Le Grande National Park in the south-west of Western Australia (ESPR). Associated with swampy and moist areas. Flowering is from August to October. (Figure 2d)

Distinction as a subspecies. There is a disjunction in the distribution of *M. incana* which corresponds closely with the occurrence of two distinct morphological forms (Figure 2d). Whilst the more easterly of these was described as a distinct species, *M. tenella*, by Bentham, the differences appear to be relatively minor consequences of ecogeographical divergence, and there is some evidence of introgression (see below). The two entities are accordingly treated as subspecies. *Melaleuca incana* subsp. *tenella* differs from subsp. *incana* in the glabrous, smaller leaves, as well as in having slightly shorter stamens, more obscure venation and fewer leaf glands, as summarized in the description above. *M. incana* subsp. *incana* usually has pubescent leaves that are (3.5)7-15(17) mm long and 1-1.5(3) mm wide and have c. 40-100 small and c. 20 larger leaf glands, while the stamens range from (3.5)6-8.5 mm long.

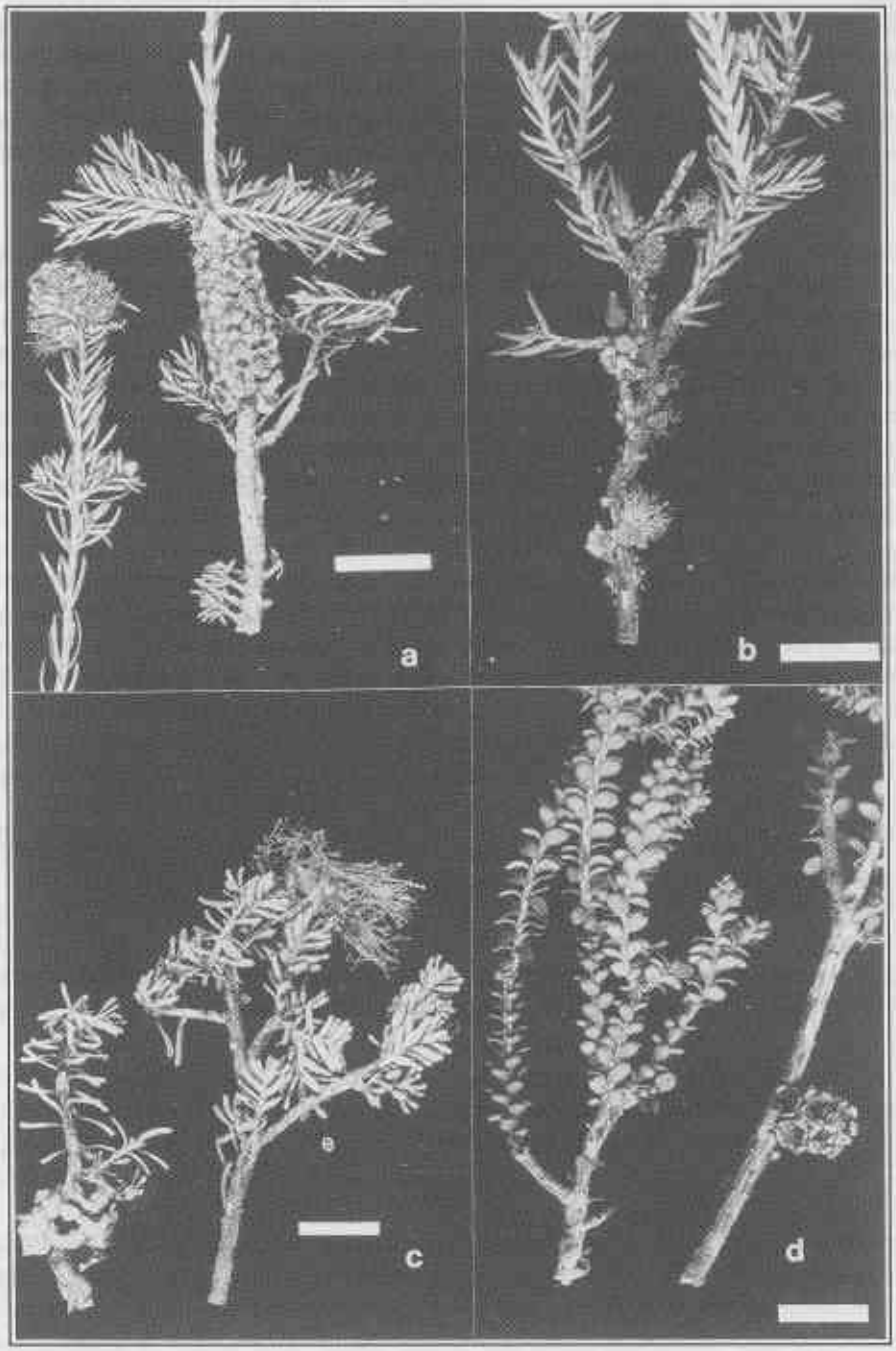

Figure 4. a, *Melaleuca incana* subsp. *tenella*, portions of plant (*Jackson* 1273). b, *M. ordinifolia*, portion of plant (*Burbidge* 2457). c, *M. pomphostoma*, portions of plants (flowering piece, *Wittwer* 415; fruiting piece, *Newbey* 4913). d, *M. pritzelii*, portion of plant (*Cowley & Quinn* 108). Scale bars = 1 cm

There are a few collections from within the geographical range of *M. incana* subsp. *incana* which resemble *M. incana* subsp. *tenella*. However, they all show minor differences from the morphology of subsp. *tenella* in its disjunct eastern area, and have not been included in this subspecies. It is possible that the divergence of the two subspecies is relatively old, and may have had a different geographical basis from that which now distinguishes them. Whilst it may not be relevant to this hypothesis, it is notable that the type localities of *M. incana* and its subsp. *tenella* are both outside the known present-day ranges of the two subspecies as indicated by more recent collections.

Misapplied name. The name *M. microphylla* has sometimes been misapplied to *M. incana* subsp. *tenella*, which differs from that species in its tomentose rachis and ternate leaves.

Conservation status. We recommend the conservation status of this subspecies should be Poorly Known (code 2KC- of Briggs and Leigh, 1988) on the basis that there are herbarium specimens collected from proclaimed reserves but from populations of unknown size. *Melaleuca incana* subsp. *tenella* is poorly known and appears to have a restricted geographic range. This subspecies is known to be represented by populations within a national park and another reserve, though the adequacy of reservation is unknown.

Additional specimens examined. WESTERN AUSTRALIA: ESPR: 0.4 km N of Fisheries Rd on Coolinup Rd, Reserve 27354, *Burgman* 4407, x.1984 (PERTH); c. 50 km E of Esperance, *Kuchel* 1674, 11.ix.1964 (AD, CANB); 7 miles from Esperance at junction of Ravensthorpe and Norseman roads, *Wrigley s.n.*, 2.xi.1968 (CBG); 6 miles N of Esperance, *leg. ign. s.n.*, 18.ix.1950 (AD); Buyi Billanak Homestead, c. 12 km SE of Condingup Peak, *Jackson* 1273, 21.ix.1968 (CANB); 3 km N of Duke of Orleans Bay, *Wilson* 8108, 30.ix.1968 (CANB, PERTH); N of Mount Le Grand, *Eichler* 21229, 11.ix.1971 (CANB, AD); near "yate" swamp, 3.4 miles E of Cape Le Grand National rd, N of Lucky Bay, *Weston* 9576, 3.x.1974 (CANB, PERTH); Cape Le Grande, *Lullfitz* 3565, 23.viii.1964 (PERTH); between Cape Le Grande and Lucky Bay, *Gardner* 14120, 2.ix.1962 (CANB, PERTH).

5. Melaleuca ordinifolia Barlow, sp. nov. (Figure 4b)

Species nova *M. apodocephalae* Turcz. proxima, sed foliis decussatis brevioribus, inflorescentiis monadibus paucioribus bracteis minoribus, sepalis longioribus, staminibus longioribus pluribus differt.

Holotypus: Western Australia: Esperance Region: near Hamersley River crossing, Ongerup-Ravensthorpe road, 33°46'S 119°36'E, *Newbey* 5075, 28.ix.1977 (CANB 313531). *Isotypi*: CANB, PERTH.

Low shrub usually less than 1 m tall, the young shoots moderately pubescent with crisped hairs and soon glabrescent and the inflorescence axis and hypanthium white-pubescent, otherwise glabrous. Leaves decussate, nearly erect at 30°, crowded in 4 regular longitudinal series; lamina narrowly ovate, compressed concavo-convex, straight or slightly incurved, (4.0)4.5-5.5(7.0) mm long, 1.0-1.5 mm wide, obtuse at the apex, slightly contracted at the base into a stout petiole c. 0.5 mm long; veins and glands obscure. Inflorescence a lateral cluster of 1-3 flowers on old wood; bracts triangular to ovate, to 1.5 mm long and 1.0 mm wide, persistent to anthesis. Hypanthium broadly cylindric, c. 1.5 mm long. Sepals obtusely triangular, thick, erect, c. 1.0 mm long, deciduous before fruit maturity. Stamens white, 5.0-5.5 mm long including a very short claw c. 0.5 mm long, 8-12 per bundle. Style 6.5-7.5 mm long;

ovules 27-31 per loculus. Fruit shortly cup-shaped, 3-4 mm long, 4-5 mm diam., dark-coloured, somewhat rough and fissured below a papery epidermis, slightly sinuate and not narrowed at the aperture; valves enclosed.

Distribution and ecology. Found in the south-west of Western Australia from Cranbrook to the Hammersley River (LUWN, ESPR). The range is possibly disjunct. Occurs in mallee shrubland on loams and clays. Flowering is predominantly from August to October. (Figure 2e)

Distinction from related species. Melaleuca ordinifolia is probably closely related to *M. apodocephala* and *M. brevifolia* Turcz., although the latter two have spiral phyllotaxy while the former has decussate phyllotaxy. *Melaleuca ordinifolia* is entirely sympatric with *M. brevifolia* and with *M. apodocephala* subsp. *apodocephala*, and appears to completely maintain its identity in the field. It is readily distinguished from most other decussate-leaved species by its short, compressed, channelled leaves crowded into four regular rows and by its rough-textured fruit surface.

Conservation status. We recommend that the conservation status of this species, listed by Briggs and Leigh (1988) as *M.* sp. *1* (Cranbrook-Hammersley River), should be Poorly Known (code 3KC- of Briggs and Leigh, 1988) on the basis of a herbarium specimen collected from Stirling Range National Park but from a population of unknown size. Although *Melaleuca ordinifolia* appears to have a geographic range more than 100 km, it seems to only occur in highly specific and localised habitats. Of the 7 collections seen there is only one collection since 1977 and this was from the Stirling Range National Park.

Etymology. The specific epithet is derived from the Latin *ordinis* (methodical arrangement) and alludes to the regular arrangement of the leaves.

Additional specimens examined. WESTERN AUSTRALIA: LUWN: near Pootenup, *Newbey* 1861, 24.ix.1965 (PERTH); E from Solomons Well, Stirling Range, *Morrison s.n.*, 28.ix.1902 (PERTH); sandplain S of Pootenup, *Burbidge* 2457, 11.ix.1947 (CANB); Cranbrook, *Diels s.n.*, no date (PERTH); c. 500 m W of junction of Salt River Rd with Red Gum Pass Rd on Salt River Rd, Stirling Range National Park, *Cowley & Quinn* 169, 9.x.1988 (CANB); cultivated at Glenmorgan, Qld, from seed collected at Albany, W.A., *Gordon* 6040, x.1962 (PERTH).

6. Melaleuca pomphostoma Barlow, sp. nov. (Figures 4c)

Species nova *M. bracteosae* Turcz. proxima, sed stomatibus prominentibus staminibus pluribus longioribus ungue staminum longiore stylo longiore differt.

Holotypus: Western Australia: Esperance Region: Below W end of Eyre Range, c. 33°51' 119°59', *George* 9296 (PERTH). *Isotypus*: CANB.

Dense shrub to 1.5 m high, young shoots and rachis tomentose, and branchlets minutely lanuginose, otherwise glabrous. Bark grey, rough and thick. Leaves spirally arranged, spreading; lamina narrowly elliptical to narrowly ovate, compressed especially towards the apex, (3)5-8(10) mm long, 1-2 mm wide, covered with very numerous white pustulate stomata, obtuse at the apex, attenuate at the base into a petiole 0.5-1 mm long; venation obscure; glands obscure. Inflorescence a basal or terminal spike of up to 10 crowded monads, up to 15 mm long; bracts and bracteoles to 1 mm long and 1 mm wide, persistent to anthesis. Hypanthium cylindrical with a somewhat elongated base, 2.5-3

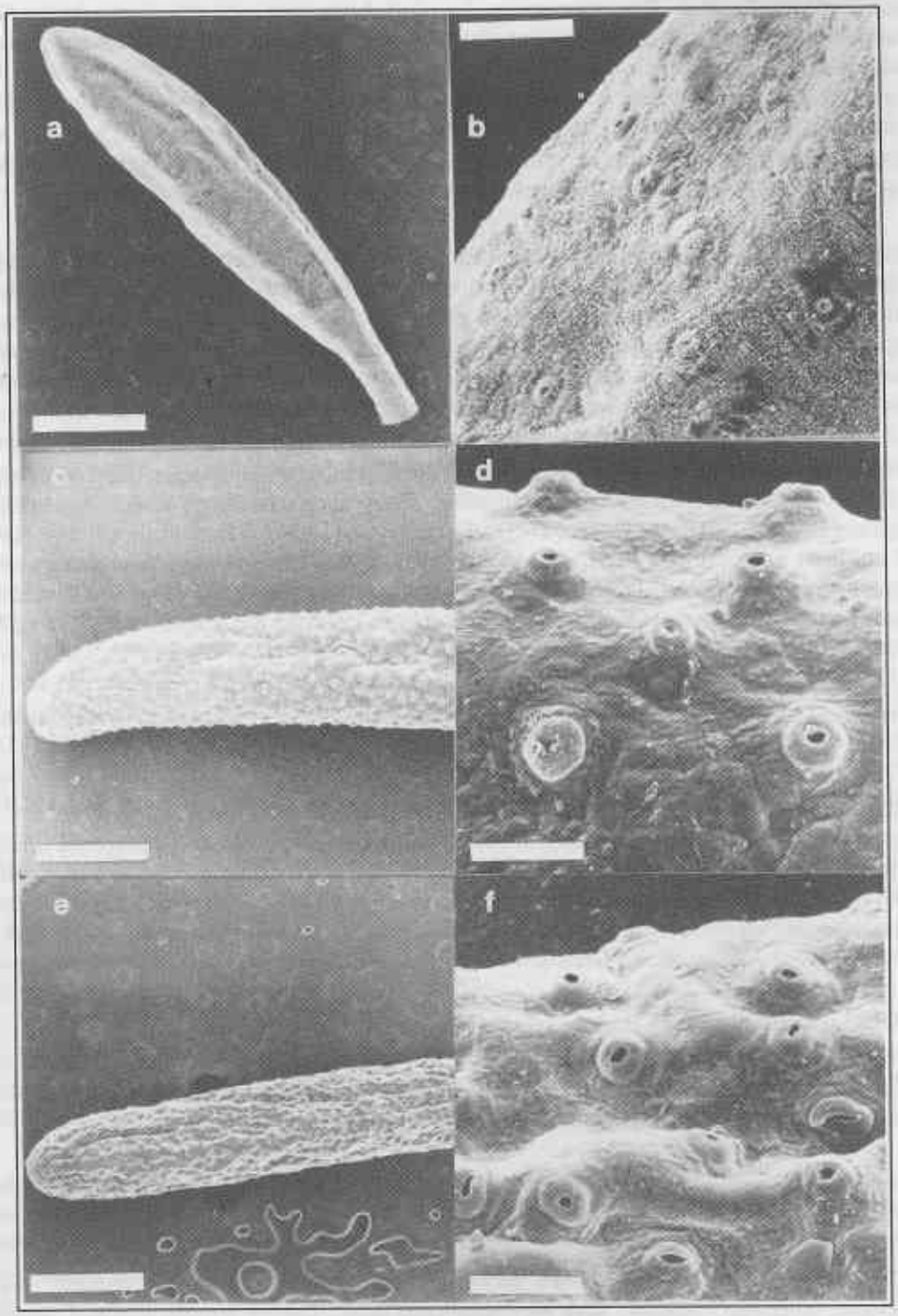

Figure 5. SEMs showing leaf surface characters. a, c, e, abaxial whole leaf surface. b, d, f, abaxial leaf surface showing stomata. a, b, *M. bracteosa* (*Barlow* 4231). c, d, *M. pomphostoma* (*George* 9296). e, f, *M. bracteosa* x *M. pomphostoma* (*Short, Amarena* & *Fuller* 2696). Scale bars = 1 cm

mm long. Sepals 1-1.5 mm long, membranous at the margins, persistent to mature fruits. Stamens (8)10-14 mm long including a claw 4.5-8 mm long, 12-18 per bundle, with filaments greenish-yellow. Style 9-15 mm long; ovules 30-50 per loculus. Fruits broadly bell-shaped with an elongated base, sometimes compressed by mutual pressure, 3-5 mm long, 4-7 mm diam., usually with thickened and outspread sepals.

Distribution and ecology. Distributed in a small area in south-western Western Australia, near Ravensthorpe and the Eyre Range, with most of the collections being from the eastern end of Fitzgerald River National Park (ESPR). Flowering has been recorded in April, May and August. (Figure 2f)

Distinction from related species. Melaleuca pomphostoma is most closely related to *M. bracteosa* and differs from that species mainly in its conspicuous stomata, more numerous, longer stamens and different leaf shape. Although barely visible with a hand lens, the differences between the stomata of *M. pomphostoma* and *M. bracteosa* are striking and consistent. One putative hybrid has been recorded between *M. pomphostoma* and *M. bracteosa*, and the stomata of that specimen are intermediate between the two putative parents (Figure 5). *M. bracteosa* has (3)7-11 stamens per bundle and they are 3.5-5 mm long. Its keeled leaves range from being very narrowly elliptic to very narrowly obovate.

Conservation status. We recommend that the conservation status of this species should be Poorly Known (code 2KC- of Briggs and Leigh, 1988) on the basis of herbarium specimens collected from Fitzgerald River National Park but from populations of unknown size. The species is known from only 6 collections and has a geographic range of less than 100 km. It is represented by populations within a national park, although adequacy of reservation is unknown.

Etymology. The specific epithet is derived from the Greek *pomphos* (blister) and *stoma* (mouth), and alludes to the distinctive pustular stomata on the lamina.

Additional specimens examined. WESTERN AUSTRALIA: ESPR: 1.9 km E of jnctn of Moir Rd & Track joining Ravensthorpe/Hopetoun Rd, c. 7 km S of Ravensthorpe, *Fox* 86/168, 6.ii.1986 (CANB); Ravensthorpe, cultivated in Qld by D.M. Gordon, *Gray* 2129, 1961 (PERTH); Phillips River Reserve, Eyre and Whoogarup Range Area, *Kessell* 870, 20.v.1969 (PERTH); 7 km W of East Mt Barren, *Newbey* 4913, 2.xi.1975 (PERTH); 98 (28?) miles from Ravensthorpe, *Wittwer* 415, 27.viii.1965 (PERTH).

7. Melaleuca pritzelii (Domin) Barlow, comb. et stat. nov. (Figure 4d)

Melaleuca densa var. *pritzelii* Domin, Mem. Soc. R. Sci. Boheme (Vestn. Kral. Ceske Spolecn. Nauk) 2: 90 (1923). *Type*: NW Plantaginet, in arenosis, *Pritzel* 696 (holo: ?PR, not seen; iso: BRI 230687, E, K, PERTH).

Shrub to 1.2 m tall, with the inflorescence axis and hypanthium tomentose and young shoots tomentose soon glabrescent, otherwise glabrous. Leaves decussate and sometimes ternate, strongly spreading; lamina broadly ovate or sometimes obovate, flat but keeled, 1.2-2.5(4.1) mm long, 1.2-2.0(3.5) mm wide, acute at the apex, sessile; midvein sometimes prominent but venation obscure; glands punctate. Inflorescence lateral on old wood or terminal (usually male flowers only), a cluster of 10-15 flowers with axis rarely growing on after anthesis; bracts broadly ovate, 1.6-2.0 mm long,

0.8-1.3 mm wide, early deciduous. Hypanthium funnel-shaped, 1.4-1.9 mm long. Sepals transversely ovate, scarious, glandular, 0.8-1.0 mm long, persistent to mature fruit. Stamens light cream, 3.6-6.5 mm long including a claw (1.2)1.5-2.5 mm long, 2-4 per bundle. Style 5.5-8.2 mm long; ovules 22-27 per loculus. Fruit cup-shaped, 2.0-2.4 mm long, 3.6-4.0 mm diam., papery in texture; valves deeply recessed below the aperture.

Distribution and ecology. Distributed in south-western Western Australia from near Ongerup to near Pootenup (BENC, LUWN, ESPR). Occurs in mallee heath or tall shrubland on shallow, poorly drained sands over clay. Flowering occurs in August and September. (Figure 2g)

Distinction from related species. Melaleuca pritzelii is probably not closely related to *M. densa* R.Br. even though Domin first described it as a variety of the latter species. It is quite distinctive in its combination of leaf and inflorescence characters and its status as a distinct species is clearly indicated.

Conservation status. We support Briggs & Leigh (1988) who cited this species as *M.* sp. *4* (Ongerup and Pootenup) in assigning a conservation status to this species of Endangered (code 2E). An extensive search in 1986 by B.A.B. in an area near Ongerup revealed only 2 plants. At other sites visited by F.C.Q. and K.J.C. in 1988 only one or a few plants were found. As each of the populations is apparently limited to a few plants, the risk of this species disappearing altogether is very high.

Additional specimens examined. WESTERN AUSTRALIA: BENC: 19 km E Katanning, *Cole & McDonald* 2011H, 15.ii.1986 (CANB); 19 km E of Katanning on Douglas Rd towards Nyabing, *Cowley & Quinn* 108, 3.x.1988 (CANB). LUWN: Gordon River, Tambellup, *Newing s.n.*, i.1964 (PERTH); near Pootenup, *Newbey* 1862, 24.ix.1965 (PERTH); 11-14 km by road from Kendenup on Red Gum Pass Rd, *Barlow* 4228, 24.x.1986 (CANB); c. 10.3 km S of Stirling Range Rd junction with Red Gum Pass Rd on Red Gum Pass Rd., *Cowley & Quinn* 168, 9.x.1988 (CANB). ESPR: 11-13 km E of Ongerup, *Barlow* 4268, 25.x.1986 (CANB); 11 km E of Ongerup, *Newbey* 4781, 5.ix.1975 (PERTH); 23 km E of Ongerup, *Newbey* 4292, 15.viii.1974 (CANB, PERTH); 7.5 miles NE of Ongerup, *Newbey* 342, 19.viii.1962 (PERTH); 10 miles E of Ongerup, *Newbey* 383, 26.viii.1962 (PERTH).

8. Melaleuca ringens Barlow, sp. nov. (Figure 6a)

Species nova *M. viminea*e Lindley proxima, sed unguibus staminum brevioribus, ramulis tomentosis, inflorescentiis semper terminalibus, foliis plerumque latioribus differt.

Holotypus: Western Australia: Leeuwin Region: Point d'Entrecasteaux, 300 m below the lighthouse, 34°50'S 116°00'E, *Cowley & Quinn* 183, 10.x.1988 (CANB 383963). *Isotypi*: AD, BRI, G, K, MEL, PERTH.

Shrub to 3 m high, the rachis and young shoots tomentose, the stems sparsely pubescent, otherwise glabrous. Leaves spirally arranged, densely crowded and spreading; lamina elliptic, flat, 4.5-6.6 mm long, 1.8-3.0 mm wide, obtuse to almost acute at the apex, truncate at the base with a petiole 0.9-1.1 mm long; midvein distinct with other venation obscure; glands obscure. Inflorescence of 10-60 monads densely arranged into terminal spikes 9-30 mm long; bracts 1.5-2.5 mm long, 1.0-1.5 mm wide, early deciduous. Hypanthium cylindrical with an elongated base, c. 1.8 mm long. Sepals 0.8-1.0 mm long, entire or narrowly membranous at the margins, persistent to mature fruit. Stamens 4.8-7.0 mm long including a claw 0.9-1.3 mm long, 7-11 per bundle with filaments cream. Style 8-11 mm

long; ovules 20-25 per loculus. Fruits cylindrical to bell-shaped, compressed by mutual pressure, 4-5 mm long, 4-7 mm diam.,with thickened erect or outspread sepals.

Distribution and ecology. Known only from Point d'Entrecasteaux, Western Australia (LUWN). Occurs in sands over limestone on exposed high ridges or clifftops. Flowering has been recorded in September and October. (Figure 2h)

Distinction from related species. Melaleuca ringens is probably closely related to *M. viminea* from which it differs in its strictly terminal inflorescences, shorter staminal claw, tomentose branchlets and wider leaves. *M. viminea* has leaves 0.6-2.0 mm wide and a staminal claw of more than 1.5 mm long. *Melaleuca ringens* also resembles some specimens of *M. densa*, but can be distinguished by its spiral leaves and strictly terminal inflorescences.

Conservation status. We recommend that the conservation status of this species should be Vulnerable (code 2V of Briggs and Leigh, 1988). Due to its very limited known distribution (only found at Point d'Entrecasteaux), *M. ringens* may be vulnerable to localised threats. The species should, however, be further surveyed in an effort to locate additional populations.

Etymology. The specific epithet is derived from the Latin *ringens* (gaping), and refers to the very open fruit aperture.

Additional specimens examined. WESTERN AUSTRALIA: LUWN: Point D'Entrecasteaux, at the lighthouse, *Cowley & Quinn* 183A, 10.x.1988 (CANB); Point D'Entrecasteaux, at the lighthouse, *Eichler* 23052, 22.viii.1982 (CANB, PERTH); Point D'Entrecasteaux, along the road to the lighthouse just below the top of the hill, *Eichler* 23054, 22.ix.1982 (CANB); locality not known, voucher for compatability tests PERTH Oct. 1984, parent #28, *Kenneally s.n.* (= *Barlow* 3835), 9.x.1984 (CANB); Point D'Entrecasteaux, *Newbey* 3152, 31.i.1968 (PERTH); cultivated from seed collected from Point d'Entrecasteaux, *Newbey* 3655, 4.xi.1972 (PERTH).

9. Melaleuca sculponeata Barlow, sp. nov. (Figures 6b, c)

Species nova *M. brevifoliae* Turcz. proxima, sed foliis decussatis basi peltatis, glandulis non prominentibus differt.

Holotypus: Western Australia: Esperance Region: "Giraween" farm, c. 65 km W of Ravensthorpe, 33°27'S 119°20'E, *Hnatiuk* 800128, 3.x.1980 (PERTH).

Shrub 0.4 m tall, lignotuberous, multistemmed, the young shoots tomentose and the inflorescence axis with short crisped hairs, otherwise glabrous. Leaves decussate, erect; lamina narrowly elliptic or oblong, convex abaxially, concave adaxially, 1.9-3.1 mm long, 0.8-1.1 mm wide, obtuse or very shortly mucronate at the apex, obtuse at the base, sessile and attached peltately near the base; venation obscure; glands 6-8 visible on the abaxial surface, more or less in two rows, not prominent. Inflorescence a lateral cluster of c. 10 flowers on old wood. Fruit depressed-globular, slightly compressed by mutual pressure, 2-2.5 mm long, 3-4 mm diam., smooth, contracted and entire at the aperture, 2- or 3-locular with 25-30 seeds per loculus; valves deeply enclosed. Other characters unknown.

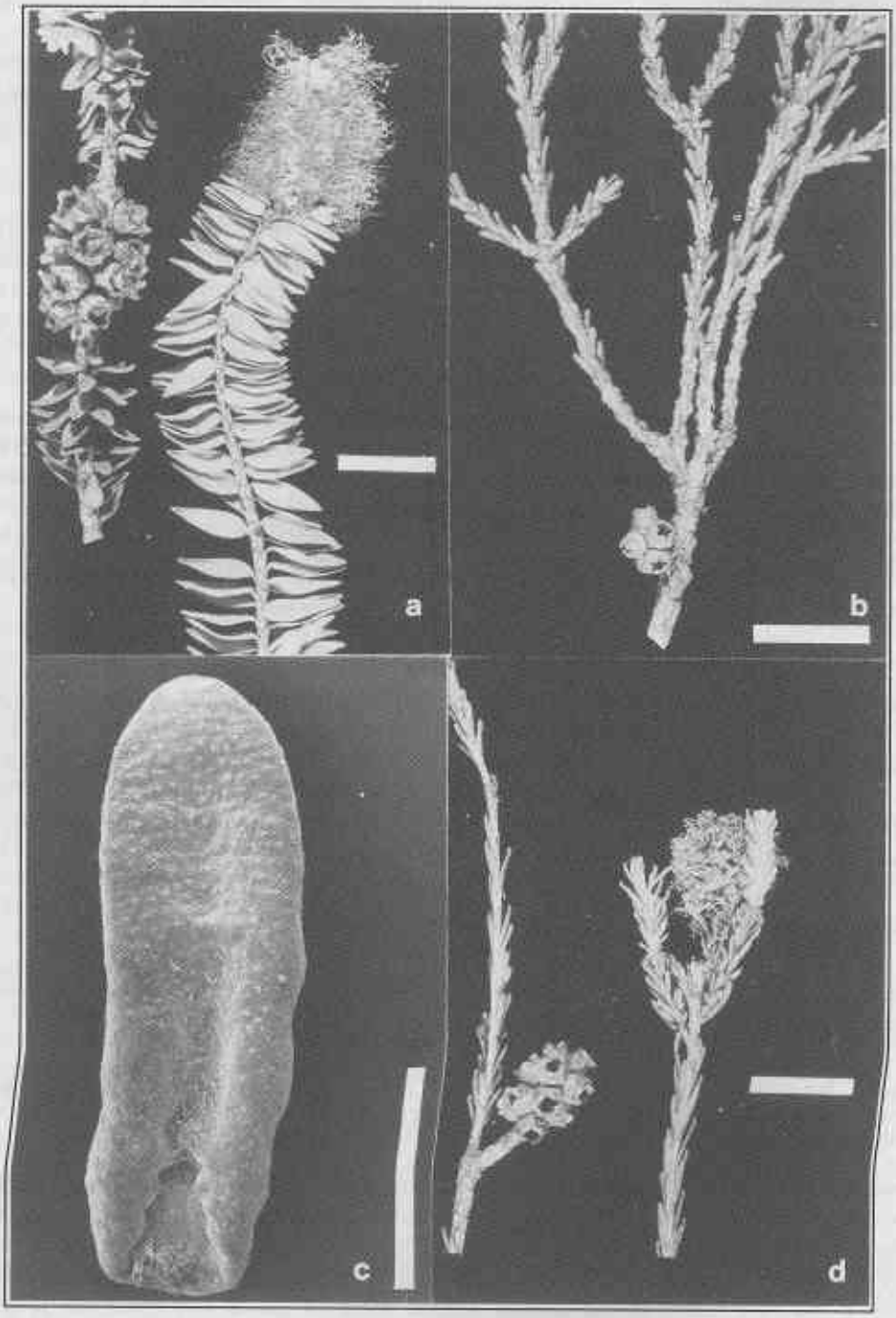

Figure 6. a, *Melaleuca ringens*, portions of plants (flowering piece, *Eichler* 23054; fruiting piece, *Cowley & Quinn* 183A). b,c, *M. sculponeata*. b, portion of plant (*Hnatiuk* 800128). c, SEM showing abaxial surface of leaf (*Hnatiuk* 800128). d, *M. viminea* subsp. *appressa*, portions of plant (*Newbey* 4864). Scale bars = 1 cm

Distribution and ecology. Known from the type locality only, near Ravensthorpe (ESPR). Recorded from regenerating mallee heath on light grey sand over clay. (Figure 2i)

Distinction from related species. Although known only from a single non-flowering specimen, *M. sculponeata* appears to be distinct from all other species in the genus in its combination of peltate leaves (Figure 6c) and determinate lateral inflorescences. It is possibly allied to *M. brevifolia*, differing in the decussate, peltate leaves which do not have prominent, raised glands.

Conservation status. We recommend that the conservation code for this species, listed by Briggs and Leigh (1988) as *M.* sp. *3* (W of Ravensthorpe), should be Endangered (code 2E of Briggs and Leigh, 1988). *Melaleuca sculponeata* is known from only one locality on a roadside verge surrounded by wheatfields. It is from an area reasonably well explored botanically and now extensively cleared for agricultural purposes, and therefore is under serious threat owing to loss of habitat.

Etymology. The specific epithet is derived from the Latin *sculponea* and alludes to the resemblance of the detached leaf to the shape of a wooden shoe.

10. Melaleuca viminea subsp. **appressa** Barlow, subsp. nov. (Figure 6d)

Subspecies nova *M. vimineae* Lindley subsp. *vimineae* proxima, sed foliis aggregatis appressis apicibus inflexis, staminibus brevioribus, stylis brevioribus differt.

Holotypus: Western Australia: Esperance Region: 16 km E of Ongerup, 33°57'S 118°37'E, *Newbey* 4864, 21.x.1975 (CANB 285751).

Shrub 1.3-4.5 m high, the young shoots sparsely lanuginose, the hypanthium and rachis usually tomentose, otherwise usually glabrous. Leaves spiral (rarely ternate), moderately densely arranged, appressed; lamina linear to narrowly elliptic or narrowly ovate, flat or slightly compressed, 5-9 mm long, 0.6-2.0 mm wide; obtuse and slightly inflexed at the apex; attenuate at the base into a petiole 0.8-1.2 mm long; venation usually obscure, rarely with the midvein evident; glands usually obscure, rarely pustulate. Inflorescence of 10-50 monads relatively densely arranged into both long basal spikes and terminal spikes or heads, 8-40(50) mm long, often with the terminal heads predominantly of male flowers; bracts 1.5-4 mm long, 1-2 mm wide, persistent to anthesis. Hypanthium cylindrical with an elongated base in hermaphrodite flowers, conical in male flowers, 1-2.5 mm long. Sepals triangular, 0.5-1 mm long, membranous at the margins, sometimes persistent in mature fruit. Stamens 5-5.5 mm long including a claw 2-3 mm long, (5)8-11(13) per bundle, with filaments cream. Style 6-7 mm long; ovules 50-80 per loculus. Fruits shortly cylindrical to bell-shaped, 3-4 mm long, 2-4 mm diam., bluntly toothed at the rim.

Distribution and ecology. Known from near Ongerup, Mt Burdett and NW of Skeleton Rock (BENC, ESPR), with a possibly disjunct distribution. Occurs near creeks or wet depressions in clayey soils, possibly associated with granite. Flowering has been recorded in September and October. (Figure 2j)

Distinction as a subspecies. Melaleuca viminea is an extremely variable species. Much of this variation has no clear geographic basis, and is presumably the result of an unusual level of heterozygosity for morphological character states. However, within the total range of variation two more or less homogeneous entities with individual geographic integrity stand out from the general residual range of polymorphy, and three subspecies have accordingly been recognised. One of these,

described here as subsp. *appressa*, is considered to merit coding as a threatened taxon. *Melaleuca viminea* subsp. *appressa* differs from the other subspecies by its appressed leaves which are incurved at the apex, and its distinctly shorter floral parts. The collection from Mt Burdett has slightly shorter, wider leaves which are more incurved at the apex than the other collections, but is clearly referrable to this subspecies.

Conservation status. We recommend that the conservation status of this subspecies should be Poorly Known (code 3KC- of Briggs and Leigh, 1988) on the basis of a herbarium specimen collected from Mt Burdett Nature Reserve but from a population of unknown size. Subspecies *appressa* is known from only 4 collections and has a possibly disjunct distribution over more than 100 km. One population occurs within a proclaimed Nature Reserve although adequacy of reservation is unknown.

Etymology. The subspecific epithet is derived from the Latin *appressus*, and refers to the appressed leaves of this taxon.

Additional specimens examined. WESTERN AUSTRALIA: BENC: c. 2 km SW of junction of Emu Fence Road and Brennand Road, *Barlow & Fox* 4133, 8.x.1986 (CANB). ESPR: c. 1 km past sign for Mt Burdett Nature Reserve on road to Mt Burdett & Mt Wittenoom (Kendall's Road), *Cowley & Quinn* 35, 28.ix.1988 (CANB); 16 km E of Ongerup, *Newbey* 4610, 25.xi.1974 (PERTH).

Acknowledgements

The conservation coding for all taxa was determined during consultation with John Briggs. We thank Emile Brunoro, David Coltman and Julie Faulkner for assistance with macrophotography. Scanning electron microscopy was carried out in the facility of the Division of Entomology, CSIRO. Advice on the latin diagnoses was provided by Ms Jane Bellemore (ANU). The Directors of AD, BRI, CANB, MEL, NSW and PERTH kindly made specimens available for study. Support of the Australian Biological Resources Study is gratefully acknowledged.

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CORRECTION

Correction to "New names and combinations for some *Melaleuca* (Myrtaceae) species and subspecies from the south-west of Western Australia considered rare or threatened " by F.C. Quinn, K.J. Cowley, B.A. Barlow and K.R. Thiele, Nuytsia 8(3): 333-350 (1992).

In the above paper, a new subspecies *Melaleuca huegelii* subsp. *pristicensis* Barlow, subsp. nov. was described. In the heading on page 338 the spelling '*pritsicensis*' was printed. This was a typographical error and the correct spelling is '*pristicensis*'. **- Editor.**

CONSERVATION CODES FOR WESTERN AUSTRALIAN FLORA

R: Declared Rare Flora - Extant Taxa (= Threatened Flora = Endangered + Vulnerable)

Taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

X: Declared Rare Flora - Presumed Extinct Flora

Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

1: Priority One - Poorly Known Taxa

Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

2: Priority Two - Poorly Known Taxa

Taxa which are known from one or a few (generally <5) populations, at least some of which are believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

3: Priority Three - Poorly Known Taxa

Taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.

4: Priority Four - Rare Taxa

Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.