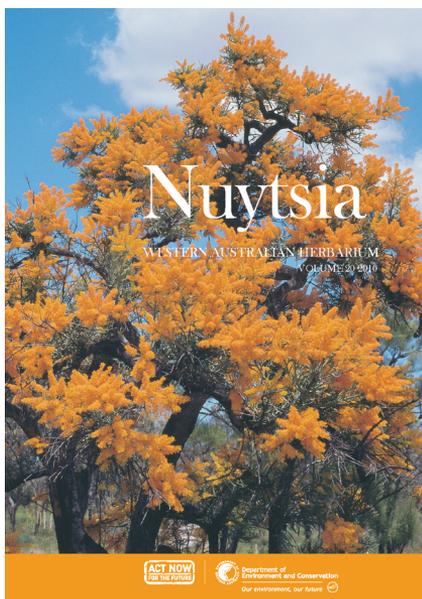


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A revision of the *Micromyrtus racemosa* complex (Myrtaceae: Chamelaucieae) of south-western Australia

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## A revision of the *Micromyrtus racemosa* complex (Myrtaceae: Chamelaucieae) of south-western Australia

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### Abstract

Rye, B.L. A revision of the *Micromyrtus racemosa* complex (Myrtaceae: Chamelaucieae) of south-western Australia. *Nuytsia* 20: 37–56 (2010). The *Micromyrtus racemosa* species complex, which is endemic to south-western Australia, is revised. The complex includes two previously named species, *M. racemosa* Benth. and *M. trudgenii* Rye. Six new taxa are described here: *M. arenicola* Rye, *M. collina*, *M. greeniana*, *M. mucronulata*, *M. prochytes* and *M. rubricalyx*. Descriptions are also given for two new taxa that are considered to be too poorly known at present to name. Also included are distribution maps and a key to all members of this complex, and an illustration of *M. mucronulata* by Charles Gardner.

### Introduction

When the south-western Australian species of *Micromyrtus* Benth. (Myrtaceae) with a 10-ribbed hypanthium were revised in Rye (2006), one difficult species group, the *M. racemosa* complex, was omitted. Since then, one member of this complex has been named, as *M. trudgenii* (Rye 2007), because of its restricted distribution on one of the ironstone habitats that were the focus of a special issue of *Nuytsia*.

Most of the great variability found in the *Micromyrtus racemosa* complex occurs in the northern half of its overall range. Specimens from the southern half of the range all belong to the typical variant of the complex, i.e. *M. racemosa* s. str., and commonly have most of their leaves well spaced and almost appressed to the stem, with leaf size tending to be smallest in the south-east. Nine atypical taxa occur in the north, all largely or fully separated geographically from one another, and most of these tend to have dense clusters of long leaves, especially *M. trudgenii*. There is also a tendency for flower size to decrease towards the south-east of the range of the complex, with the largest flowers recorded from specimens occurring in the Kalbarri area and Moresby Range in the far north-west.

### Taxonomic history

When Bentham (1867) named *Micromyrtus racemosa*, he cited only two collections belonging to the complex, and hence was in no position to assess the variation within this plant group. In contrast, more than 200 specimens of the *M. racemosa* complex are currently housed at PERTH.

Revisionary studies of *Micromyrtus* by J.W. Green were begun in the 1970s, but his two publications (Green 1980, 1983) dealt only with species occurring in central and eastern Australia. As a result of his unpublished taxonomic work on the south-western Australian species, most PERTH specimens of the *Micromyrtus racemosa* complex have been housed as *M. racemosa* var. *racemosa* ms. In addition to the type variety, Green recognised four new varieties under *M. racemosa*, but two of these belonged to a different species complex and have now been described as *M. navicularis* Rye and *M. triptycha* Rye respectively (Rye 2006). The remaining two new taxa, *M. racemosa* varieties *mucronulata* ms and *prochytes* ms, do belong to the *M. racemosa* complex but, like the two taxa already described, they appear to be too distinctive to be treated as varieties.

Since 1995 one additional manuscript name and four informal names have been established for other members of the complex. Of these taxa, the two that had the most distinctive morphology were recognised at the species level as *Micromyrtus* sp. Warriedar (S.J. Patrick 1879A) and *M. rubricalyx* ms, the former now described as *M. trudgenii* (Rye 2007) and the latter validated in this paper. Three less obviously distinct variants of the complex were given informal names as varieties of *M. racemosa*.

### Current and future studies

The aim of this revision is to describe all variants in the *Micromyrtus racemosa* complex, apart from the recently published *M. trudgenii*, and to provide names where possible. Recent collections have assisted in defining most of the new members of the complex but further collections are needed, especially of fruiting material. It is important that both the habit of the plants and the habitat occupied are carefully recorded in order for future collections to be of maximum usefulness.

### Methods

Similar methods for recording measurements were used here to those described in a previous paper (Rye 2002a). Holotypes of all new taxa are lodged at PERTH. The distribution maps were plotted manually. Images obtained during the field work undertaken in this study were made available for use on FloraBase (Western Australian Herbarium 1998–).

### Taxonomy

#### Description of the *Micromyrtus racemosa* group

*Shrubs* erect, 0.3–3 m high, with slender stems. *Leaves* usually densely arranged on the smaller branchlets. *Petioles* 0.3–1 mm long. *Leafblades* linear or very narrowly obovate in outline, 1.8–9 mm long, 0.4–1.4 mm wide, 0.25–0.6 mm thick, with apical mucro absent or up to 0.3 mm long, entire or with somewhat irregular margins, sometimes with a very narrow scarious marginal rim; lower surface flat or with an indentation along midvein and steep sides, often with two main rows of prominent oil glands and 4–18 main glands in each row; upper surface slightly convex or almost flat. *Racemes* mostly extending for 2–20 nodes, with widely spreading flowers; peduncles 0.8–3.3 mm long. *Bracteoles* caducous or deciduous, rather scarious, narrowly obovate with margins strongly incurved, 0.7–3 mm long, acute, entire. *Buds* with apex usually intermediate between hemispheric and acute (referred to below as high-hemispheric). *Flowers* 2.5–4.5 mm diam. or possibly up to 5 mm. *Hypanthium* terete, 1.4–3.7 mm long, free in distal 0.4–0.9 mm, 10-ribbed. *Sepals* fairly erect or partly spreading in

flower, erect in fruit, scarious to almost petaline, 0.1–1.5 mm long, broadly obtuse, entire, whitish or sometimes red-tinged. *Petals* widely spreading in flower, closing erect in fruit and eventually shed, more or less broadly elliptic, 1.1–2.5 mm long, white to yellow, rarely pale pink, often becoming red-tinged outside, broadly obtuse, entire. *Stamens* 10, with antipetalous ones inserted on summit of disc and antisepalous ones inserted near the middle of the free tube. *Antipetalous filaments* 0.25–0.7 mm long, slightly longer than the antisepalous filaments. *Anthers* 0.25–0.35 mm long; slits converging at base or almost parallel; gland fairly equally 3-lobed or with apical portion distinctly larger than lateral lobes. *Ovary* with 2 ovules in a terminal cavity. *Style* 0.15–0.6 mm long. *Fruit* terete, almost cylindrical but often tapering slightly from top to base, 1.5–3 mm long, 0.9–1.2 mm wide, 1-seeded; hypanthium 10-ribbed. *Seed* solitary, erect, approximately the same shape as the fruit, 1.4–2.5 mm long; testa golden brown to deep orange-brown or rarely pink-tinged, membranous.

*Distribution and habitat.* Occurs in northern and inland parts of the South West Botanical Province and in adjacent parts of the Eremaean Botanical Province, extending from Kalbarri National Park and Eurardy Station south-east to near Kondinin and inland to Diemals Station. Recorded mainly in a great variety of rocky habitats, which are favoured by most taxa, but with two of the taxa recorded entirely in sandy habitats.

*Phenology.* This complex has a long flowering season, perhaps with spasmodic flowering throughout the year, but flowering mainly from April to October, with fruiting quickly following flowering.

*Morphology.* Members of the *Micromyrtus racemosa* complex have more or less entire leaves, caducous or deciduous bracteoles, ten stamens with free (not connate) anther loculi, two ovules, a fruit that has the hypanthium terete and uniformly 10-ribbed, and petals that close to an erect position in fruit and are eventually shed. This combination of characters distinguishes the *M. racemosa* complex from all other species groups in the genus.

Differences in the measurements of the leaves and other organs are very important for separating the members of this complex (see Table 1), although some characters such as peduncle length and anther length show very little variation between taxa. Qualitative character differences are much less common, a reflection of how closely related the taxa within the complex are.

*Notes.* Members of the *Micromyrtus racemosa* complex show a pattern of geographic replacement, with only small gaps between adjacent variants but no known cases of overlap in their ranges. As well as being separated from one another, they very rarely coexist with members of other species groups within the genus. A notable exception is the co-existence of *M. mucronulata* with *M. ninghanensis* Rye. The only common species showing a large overlap in its range with the *M. racemosa* complex is *M. obovata* (Turcz.) J.W. Green. However, *M. obovata* occurs in sandy habitats and does not extend far enough north to overlap in range with the two variants of the *M. racemosa* complex that have a similar habitat. In its large area of overlap with the distribution of *M. obovata*, the *M. racemosa* complex favours rocky habitats; hence these taxa are rarely found in close proximity to one another.

All of the variants in the *M. racemosa* complex described below seem to warrant at least subspecific status, and most, if not all, of them have differentiated to a degree where it seems to be appropriate to regard them as distinct species.

**Table 1.** Morphological comparison of members of the *Micromyrtus racemosa* complex. Filament lengths were taken from the antipetalous stamens. All measurements are in millimetres and brackets indicate rare measurements.

| Taxon name     | <i>arenicola</i> | <i>collina</i> | <i>aff. collina</i> | <i>greeniana</i> | Jingamarra | <i>mucronulata</i> | <i>prochytes</i> | <i>racemosa</i> | <i>rubricalyx</i> | <i>trudgenii</i> |
|----------------|------------------|----------------|---------------------|------------------|------------|--------------------|------------------|-----------------|-------------------|------------------|
| <b>Lengths</b> |                  |                |                     |                  |            |                    |                  |                 |                   |                  |
| petiole        | 0.4–0.8          | 0.7–0.9        | 0.7–0.9             | 0.4–0.6          | c. 0.5     | 0.4–0.5            | 0.4–0.6          | 0.3–0.6(1)      | 0.6–0.8           | 0.5–0.7          |
| leaf blade     | 2.2–4            | 5–8.5          | 4–5.5               | 5–6              | 3.5–4      | 3.5–5.5            | 2.5–3.5          | 1.8–4(5.5)      | 3–6               | 4–9              |
| leaf mucro     | <0.1             | 0–0.1          | 0–0.1               | 0.1–0.3          | 0.1–0.3    | 0.1–0.15           | <0.1             | <0.1            | <0.1              | 0.1–0.15         |
| peduncle       | 1.5–2.2          | 1.5–3          | 2–2.5               | 2.5–3            | 1–1.5      | 1–2                | 1–3.3            | 1.3–3           | 1.5–2             | 0.8–2            |
| bracteole      | 1.7–2.3          | 1.5–2          | 1.4–1.7             | c. 2             | 1.5–1.8    | 1.6–2              | 0.9–1.3          | 1.1–2.3         | 2.2–3             | 0.7–1.3          |
| hypanthium     | 2.6–3.3          | 2–2.5          | 2–2.2               | 3.3–3.7          | c. 2.6     | 2.3–2.8            | 2–3.2            | 1.4–2.5         | 2.5–3             | c. 2             |
| sepal          | 0.4–0.7          | 0.4–0.6        | 0.25–0.35           | 0.5–0.7          | c. 0.3     | 0.2–0.5            | 0.1–0.35         | 0.1–0.4         | 1.1–1.5           | c. 0.2           |
| petal          | 1.5–2            | 1.5–2.2        | 1.3–1.5             | 2–2.5            | c. 1.4     | 1.5–2              | 1.3–1.5          | 1.1–2           | 1.7–2.2           | 1.3–1.6          |
| filament       | 0.3–0.4          | 0.35–0.4       | 0.25–0.35           | 0.35–0.45        | 0.35–0.4   | 0.3–0.4            | 0.4–0.7          | 0.25–0.4        | 0.3–0.4           | 0.3–0.35         |
| style          | 0.3–0.35         | 0.25–0.35      | 0.3–0.35            | 0.3–0.4          | c. 0.4     | 0.3–0.4            | 0.4–0.6          | 0.15–0.35       | 0.25–0.4          | c. 0.25          |
| fruit          | c. 2             | 1.8–2.4        | c. 2.2              | 2.5–2.7          | n.a.       | 1.8–2.5            | 2.4–3            | 1.5–2           | c. 2.5            | 2.2–2.4          |
| seed           | c. 1.7           | 1.6–2          | c. 1.7              | c. 1.8           | n.a.       | 1.5–2.3            | 2–2.5            | 1.4–1.8         | c. 1.6            | c. 2             |
| <b>Widths</b>  |                  |                |                     |                  |            |                    |                  |                 |                   |                  |
| leaf           | 0.8–1.4          | 0.7–1          | 0.8–1.2             | 0.5–0.8          | 0.5–0.6    | 0.5–0.8            | 0.6–1            | 0.5–0.8         | 1.1–1.3           | 0.4–0.6          |
| flower         | 3.5–4            | 3–4.5          | 3–4                 | 4–4.5            | 3–3.5      | 3–3.5              | 3–4              | 2.5–4           | c. 4.5            | 3–3.5            |

**Key to members of the *Micromyrtus racemosa* complex**

1. Bracteoles 2.2–3 mm long. Sepals 1.1–1.5 mm long. (Moresby Range.)..... **M. rubricalyx**
- 1: Bracteoles 0.7–2.3 mm long. Sepals 0.2–0.7 mm long
2. Leaves 4–9 mm long, 0.4–0.6 mm wide, 0.3–0.5 mm thick, terminating in a narrow mucro 0.1–0.15 mm long. Petals pale yellow or yellow. Occurs on ironstone habitats. (Blue Hills Range area.)..... **M. trudgenii**
- 2: Leaves usually differing from the above choice in being shorter, wider or thicker, or in lacking a mucro. Petals white or cream, rarely pale pink. Occurs in varied habitats from near Kalbarri to near Hyden, but not within the small area south of Yalgoo that is occupied by *M. trudgenii*
3. Base of hypanthium usually exceeding width of peduncle. Antipetalous stamens with a filament 0.4–0.7 mm long. Mature style 0.4–0.6 mm long. (Woolgorong Station to near Yalgoo.)..... **M. prochytes**
- 3: Base of hypanthium not exceeding width of peduncle. Antipetalous stamens with a filament 0.25–0.4 mm long. Mature style 0.25–0.4 mm long
4. Leaves distinctly mucronulate; mucro 0.1–0.3 mm long
5. Hypanthium 3.3–3.7 mm long, often tending to appear 5-ribbed at first (but 10-ribbed in fruit) and often somewhat compressed. Occurs in sandplain north of Geraldton. (Eurardy Station area.)..... **M. greeniana**
- 5: Hypanthium usually 2.4–2.8 mm long, obviously 10-ribbed, terete. Occurs east or south-east of Geraldton, the habitat (where known) rocky.
6. Leaves dotted with numerous small oil glands, with more than one row on each side and often 14–18 oil glands in each row; mucro stout, tapering from the acute apex of leaf, c. 0.2 mm long. (Jingemarra Station.)..... var. **Jingemarra**
- 6: Leaves with a single main row of large oil glands on each side, often with 10–12 oil glands per row; mucro narrow, arising suddenly from an obtuse apex, 0.1–0.15 mm long. (Paynes Find area.)..... **M. mucronulata**
- 4: Leaves not or scarcely mucronulate; mucro (when present) up to 0.1 mm long
7. Leaves 2.2–8.5 mm long, 0.7–1.4 mm wide. Flowers with hypanthium 2–3.3 mm long, sepals 0.25–0.7 mm long and petals 1.3–2 mm long. Occurs north of Geraldton
8. Shrub with main stem unbranched below the erect main branches or with some bare branches, occurring in rocky habitats. Leaves 4–8.5 mm long, 0.7–1 mm wide. Hypanthium 2–2.5 mm long
9. Leaves 4–5.5 mm long. Sepals 0.25–0.35 mm long. Occurs along river gorges. (Lower Murchison River.)..... *aff.* **M. collina**
- 9: Leaves 5–8.5 mm long. Sepals 0.4–0.6 mm long. Occurs on hills. (Moresby Range.)..... **M. collina**
- 8: Shrub with multiple lateral leafy branchlets on the main stem below the main erect branches, occurring in sand. Leaves 2.2–4 mm long, 0.8–1.4 mm wide. Hypanthium 2.6–3.3 mm long. (Yuna area.)..... **M. arenicola**
- 7: Leaves 1.8–4(–5.5) mm long, 0.5–0.8 mm wide. Flowers with hypanthium 1.4–2.5 mm long, sepals 0.1–0.35(–0.4) mm long and petals 1.1–1.6 mm long. Occurs east or south of Geraldton. (Mullewa area to Kondinin and Diemals Station.)..... **M. racemosa**

## New and previously named species

### 1. *Micromyrtus arenicola* Rye, *sp. nov.*

A *Micromyrtis racemosae* et *M. trudgenii* multo affinis, sed foliis latioribus, sepalis longioribus differt. Folia 2.2–4 x 0.8–1.4 mm; mucro nullus vel < 0.1 mm longus. Bracteolae 1.7–2.3 mm longae. Hypanthium 2.6–3.3 mm longum. Sepala 0.4–0.7 mm longa. Petala alba, 1.5–2 mm longa. Filamenta 0.3–0.4 mm longa.

*Typus*: c. 150 m W of a bend on Dartmoor Rd, 5.8 km E of Bulla–Whelarra road, Western Australia, 21 August 2003, *B.L. Rye* 238085 & *M.E. Trudgen* (*holo*: PERTH 06744621; *iso*: CANB, K, MEL, NSW, PERTH 07131224).

*Micromyrtus racemosa* var. north-central (*M.E. Trudgen* 2223) in Western Australian Herbarium, *FloraBase*, <http://florabase.dec.wa.gov.au> [accessed May 2009]

Erect *shrub* usually 0.7–1.4 m high but one record 2 m high, single-stemmed at the base but with multiple short leafy lateral branches and with several main erect branches, flowering on both types of branches. *Leaves* mostly antrorse, very densely arranged on the smaller branchlets. *Petioles* 0.4–0.8 mm long. *Leafblades* linear to narrowly obovate in outline, 2.2–4 mm long, 0.8–1.4 mm wide, 0.4–0.6 mm thick, acute or obtuse, not mucronate or with mucro less than 0.1 mm long, medium green; lower surface with an indentation along midvein and steep sides, with 4–7 prominent glands up to 0.2 mm diam.; upper surface shallowly concave or flat. *Racemes* mostly extending for 4–12 nodes; peduncles 1.5–2.2 mm long. *Bracteoles* narrowly ovate, 1.7–2.3 mm long. *Buds* with apex high-hemispheric. *Flowers* 3.5–4 mm diam. *Hypanthium* 2.6–3.3 mm long, 0.5–0.7 mm wide at midpoint, 1.3–1.5 mm diam. at summit, shiny and expanded markedly at summit at first, becoming less shiny and of more uniform width in fruit, free in distal 0.6–0.8 mm, 10-ribbed. *Sepals* depressed-ovate, 0.4–0.7 mm long, 0.6–0.8 mm wide. *Petals* broadly obovate, 1.5–2 mm long, white. *Antipetalous filaments* 0.3–0.4 mm long. *Anthers* 0.3–0.35 mm long; slits converging at base. *Style* 0.3–0.35 mm long. *Fruit* c. 2 x 1 mm. *Seed* c. 1.7 × 0.75 mm. (Figure 1)

*Selected specimens examined*. WESTERN AUSTRALIA: Yuna, 19 Aug. 1976, *A.M. Ashby* 5384 (PERTH); Bindoo Hill Nature Reserve, c. 1 km S along firebreak from Williamson Rd where road meets reserve on NW side, 3 Apr. 1994, *S.J. Patrick* 1771 (PERTH); 12.1 km S of a nameless road on another nameless road (MLV81S), 11.2 km N of Yuna–Tenindewa road, 21 Aug. 2003, *B.L. Rye* 238089 & *M.E. Trudgen* (PERTH); 24.7 miles [42 km] E of Binnu on a right angle bend, 13 Sep. 1978, *M.E. Trudgen* 2223 (PERTH); 1 km E of Diepeveen Rd on Ajana East Rd, 27 Sep. 2002, *M.E. Trudgen* 21744 (PERTH).

*Distribution and habitat*. Occurs in the north of the South West Botanical Province, extending from east of Binnu south to Bindoo Hill Nature Reserve. Occurs mainly in yellow or red sand, sometimes associated with sandstone outcrops, in species-rich vegetation that often includes a variety of other genera of Chamelaucieae. (Figure 2A)

*Phenology*. Flowers recorded early April to September.

*Conservation status*. This taxon appears to have a range at least 50 km long and to occur on at least two reserves.



Figure 1. *Micromyrtus arenicola*. A – habit and habitat; B – upper flowering branches. Photographs taken in current study at the type locality.

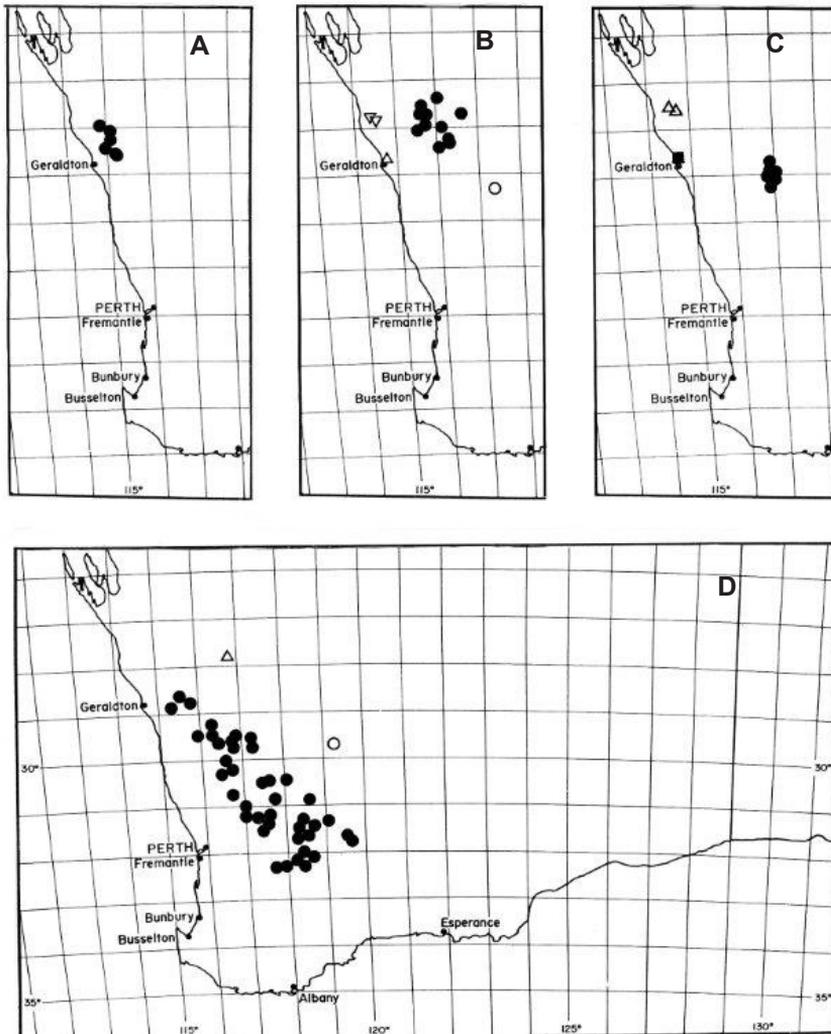


Figure 2. Distributions of members of the *Micromyrtus racemosa* complex. A – *M. arenicola*; B – *M. collina* ( $\Delta$ ), *M. aff. collina* ( $\nabla$ ), *M. mucronulata* ( $\circ$ ) and *M. prochytes* ( $\bullet$ ); C – *M. greeniana* ( $\Delta$ ), *M. rubricalyx* ( $\blacksquare$ ) and *M. trudgenii* ( $\bullet$ ); D – *M. racemosa* ( $\bullet$ ), an isolated inland locality ( $\circ$ ), *M. racemosa* var. *Jingemarra* ( $\Delta$ ).

*Etymology.* From the Latin *arena* (sandy place) and *-icola* (native of) in reference to the sandy habitat of this taxon.

*Affinities.* This taxon occurs directly north of the range of *Micromyrtus racemosa*, and is sandwiched between the ranges of *M. collina* on the west and *M. prochytes* on the east. It possibly shows the greatest approaches in morphology to these three taxa, but they all seem to be restricted to rocky habitats that are usually lateritic or granitic. *Micromyrtus arenicola* differs from *M. prochytes* in its longer sepals and other characters discussed under that taxon. It differs from *M. collina* in its shorter leaves and it has longer sepals than *M. racemosa*.

*Micromyrtus arenicola* possibly has a unique habit (Figure 1A), with short lateral leafy branches on its basal stem that have not been observed in the other taxa collected during the current study, but this character is not evident from the herbarium specimens. The same figure illustrates the unusual sandplain habitat this species favours, the only other member of the complex apparently with a preference for sandplain being *M. greeniana*. Most specimens are shorter than those of other variants, but this might reflect their greater susceptibility to fire in comparison with the taxa that occur in rocky habitats so that they are less likely to survive long enough to reach their full potential size.

*Notes.* Only one specimen had mature fruits. One recent specimen (*G.J. Keighery* 16374) is indicated on the label to be 2 m high.

## 2. *Micromyrtus collina* Rye, *sp. nov.*

A *Micromyrtis racemosae* et affinis similibus praecipue differt foliis 4–8.5 x 0.7–1.2 mm, mucrone 0–0.1 mm longo, bracteolae 1.5–2 mm longae, hypanthio 2–2.5 mm longo, sepalis 0.4–0.6 mm longis, petalis albis, 1.5–2.2 mm longis, et filamentis 0.35–0.4 mm longis.

*Typus:* East Moresby Range, Western Australia [precise locality withheld for conservation reasons], 25 August 1983, *R.J. Cranfield* 2891 (*holo:* PERTH 02502690; *iso:* CBG).

*Micromyrtus racemosa* var. north-west (*R.J. Cranfield* 2891), Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.gov.au> [accessed May 2009].

*Shrub* 0.3–1.5 m high, with the taller specimens recorded as 0.75–1 m wide. *Leaves* mostly densely or very densely arranged and widely antrorse on the smaller branchlets, sometimes also a few less spreading ones on older stems. *Petioles* 0.7–0.9 mm long. *Leaf blades* linear to narrowly obovate in outline, 5–8.5 mm long, 0.7–1 mm wide, 0.4–0.6 mm thick, acute or obtuse, not mucronate or with mucro up to 0.1 mm long, yellowish green, somewhat shiny; lower surface with a narrow indentation along midvein and steep sides, with 8–12 prominent glands up to 0.1 mm diam.; upper surface shallowly concave or almost flat. *Racemes* mostly extending for 2–14 nodes; peduncles 1.5–3 mm long. *Bracteoles* narrowly ovate or ovate, 1.5–2 mm long. *Buds* with apex high-hemispheric. *Flowers* 3–4.5 mm diam. *Hypanthium* 2–2.5 mm long, 0.5–0.6 mm wide at midpoint, *c.* 1.3 mm diam. at summit, shiny and expanded markedly at summit at first, becoming less shiny and of more uniform width in fruit, free in distal *c.* 0.7 mm, 10-ribbed. *Sepals* depressed ovate, 0.4–0.6 mm long, 0.5–0.7 mm wide. *Petals* broadly obovate, 1.5–2.2 mm long, white, turning pink with age. *Antipetalous filaments* 0.35–0.4 mm long. *Anthers* *c.* 0.3 mm long; slits converging at base. *Style* 0.25–0.35 mm long. *Fruit* 1.8–2.4 × 0.7–0.9 mm. *Seed* 1.6–2 × *c.* 0.7 mm.

*Specimens examined.* WESTERNAUSTRALIA: all from Moresby Range [precise localities withheld] 25 Aug. 2007, *J. Brooker* 151 (PERTH); 31 July 2002, *J. Brooker* 323 (PERTH); 22 Aug. 1983, *R.J. Cranfield* 2700 (PERTH); 30 May 2008, *A. Gunness* 3020 (PERTH); 29 Aug. 1980, *G.J. Keighery* 3278 (PERTH).

*Distribution and habitat.* Occurs in the Moresby Range, often on slopes of mesas, in shrub vegetation on sandy soils over laterite and other rock types. (Figure 2B)

*Phenology.* Flowers recorded from July to September.

*Conservation status.* Department of Environment and Conservation (DEC) Conservation Codes for Western Australian Flora: Priority One. This taxon is very geographically restricted, its known range being less than 30 km long.

*Etymology.* From the Latin *collinus* (inhabiting low hills).

*Affinities.* The closest relative is the poorly known taxon that is currently treated informally as *Micromyrtus* aff. *collina* and which might be sufficiently closely related to regard as a subspecies. The apparent disjunction of about 120 km between these two taxa (and in the west-coastal range of the complex as a whole) is interesting as a similar disjunction between closely related taxa has been noted in other plant groups such as the *Thryptomene stenophylla* E. Pritz. group and the *Enekbatus sessilis* Trudgen & Rye ms group. For a discussion of the morphological differences see the notes under *M. aff. collina*.

Like *Micromyrtus rubricalyx*, *M. collina* is restricted to the Moresby Range, although it is fairly widespread in the range whereas *M. rubricalyx* occurs only on its western edge. The two taxa are not known to co-exist but one of the populations of *M. collina* is found just east of where *M. rubricalyx* occurs. Differences between the two taxa are discussed under the latter.

*Notes.* Three records give the height of this taxon as only c. 0.3 m although one of these was from an area that had been burnt three years previously, which may have restricted the size of the plants. Even so, this taxon might tend to be the shortest variant in the *Micromyrtus racemosa* complex.

Its leaves, however, are amongst the largest found in the complex. A recent collection, *A. Guinness* 3020, has leaves up to 8.5 mm long and peduncles up to 3 mm long.

### 3. *Micromyrtus greeniana* Rye, *sp. nov.*

*A Micromyrtis racemosae* et affinis similis sed hypanthio longiore differt. Folia 5–6 x 0.5–0.8 mm; mucro 0.1–0.3 mm longus. Bracteolae caducae vel deciduae, c. 2 mm longae. Hypanthium 3.3–3.7 mm longum. Sepala 0.5–0.7 mm longa. Petala alba, 2–2.5 mm longa. Filamenta c. 0.4 mm longa.

*Typus:* Eurardy Station area, Western Australia [precise locality withheld for conservation reasons], 1 October 2007, *M.E. Trudgen* 22573 & *K.R. Thiele* (*holo:* PERTH 07740050; *iso:* MEL).

*Spindly shrub* 0.4–1.7 m high, width not recorded. *Leaves* mostly densely or very densely arranged and appressed to widely antrorse on the smaller branchlets, often also a few widely spreading on older stems. *Petioles* 0.4–0.6 mm long. *Leaf blades* linear to obovate in outline, 5–6 mm long, 0.5–0.8 mm wide, 0.3–0.5 mm thick, acute, medium green; lower surface with a narrow to broad indentation along midvein and steep sides, with usually numerous oil glands that are often not obvious and difficult to count; upper surface shallowly concave or almost flat; mucro 0.1–0.3 mm long, tapering from a stout base. *Racemes* often extending for 5–10 nodes; peduncles 2.5–3 mm long. *Bracteoles* narrowly ovate, c. 2 mm long. *Buds* with apex high-hemispheric. *Flowers* 4–4.5 mm diam. *Hypanthium* 3.3–3.7 mm long, c. 0.7 mm wide at midpoint, 1.2–1.5 mm diam. at summit, dull, free in distal 0.6–0.9 mm, often appearing 5-ribbed and angled (often only the antisealous ribs obvious), with short transverse markings between the ribs. *Sepals* broadly or depressed ovate, 0.5–0.7 mm long, 0.7–0.9 mm wide. *Petals* 2–2.5 mm long, white or cream. *Antipetalous filaments* 0.35–0.45 mm long. *Anthers* c. 0.35 mm long; slits ± parallel or convergent at base. *Style* 0.3–0.4 mm long. *Fruit* 2.5–2.7 × c. 1 mm. *Seed* c. 1.8 × 0.6 mm.

*Other specimens examined.* WESTERN AUSTRALIA: all from the Eurardy Station area [precise localities withheld] 29 Aug. 2003, *Wildflower Society of WA* EURA 28 (CANB, PERTH); 30 Aug. 2003, *Wildflower Society of WA* EURA 29 (PERTH); 30 Aug. 2003, *Wildflower Society of WA* EURA 30 (PERTH); 29 Aug. 2003, *Wildflower Society of WA* EURA 31 (NSW, PERTH); 29 Aug. 2003, *Wildflower Society of WA* EURA 32 (PERTH); 30 Aug. 2003, *Wildflower Society of WA* EURA 33 (PERTH).

*Distribution and habitat.* Occurs in the north of the South West Botanical Province, known from a small area on Eurardy Station, north-east of Kalbarri, in yellow sand, one record over laterite. Recorded with mallees, *Allocasuarina* or *Grevillea* dominant over varied rich vegetation including *Ecdeiocolea monostachya*. (Figure 2C)

*Phenology.* Flowers and fruits: August to October.

*Conservation status.* DEC Conservation Codes for Western Australian Flora: Priority One. This taxon is recorded from a reserve but its known range is only *c.* 10 km long.

*Etymology.* Named in honour of Dr John William Green, curator of the Western Australian Herbarium from 1975 to 1987, who revised the central Australian species and some of the eastern Australian species of *Micromyrtus* and also delimited the closely related monotypic genus *Corynanthera* J.W. Green.

*Affinities.* This species seems to be the most distinctive of all the members of the *Micromyrtus racemosa* complex, with the longest hypanthium and a tendency for the narrowest, most widely separated ribs in flower, with often only five ribs evident at first although it always has ten obvious ribs in fruit. Its closest relative is uncertain but it is similar to the as yet unnamed *M. racemosa* var. *Jingemarra* in having acute leaves terminated in a mucro 0.1–0.3 mm long and with minute oil glands tending to be numerous, although the glands are usually much less obvious than in var. *Jingemarra*.

The anther loculi are sometimes more or less parallel in this species, as they tend to be in *M. trudgenii*, but that species does not appear to be particularly closely related.

*Micromyrtus greeniana* occurs in the far north-west of the range of the *M. racemosa* complex just inland from the range of the Murchison gorges variant that is currently treated as *M. aff. collina*. It differs from that taxon and most other variants of the complex in its preference for sandy rather than rocky habitats.

#### 4. *Micromyrtus mucronulata* Rye, *sp. nov.*

A *Micromyrtis trudgenii* affinis sed foliis brevioribus complanatis, petalis albis differt. Folia 3.5–5.5 x 0.5–0.8 mm; mucro 0.1–0.15 mm longus. Bracteolae 1.6–2 mm longae. Hypanthium 2.3–2.8 mm longum. Sepala 0.2–0.5 mm longa. Petala 1.5–2 mm longa. Stamina antipetala filamentis 0.3–0.4 mm longis.

*Typus:* Paynes Find area, Western Australia [precise locality withheld for conservation reasons] 7 September 1973, *J.S. Beard* 6455 (*holo:* PERTH 01630873; *iso:* PERTH 02003570).

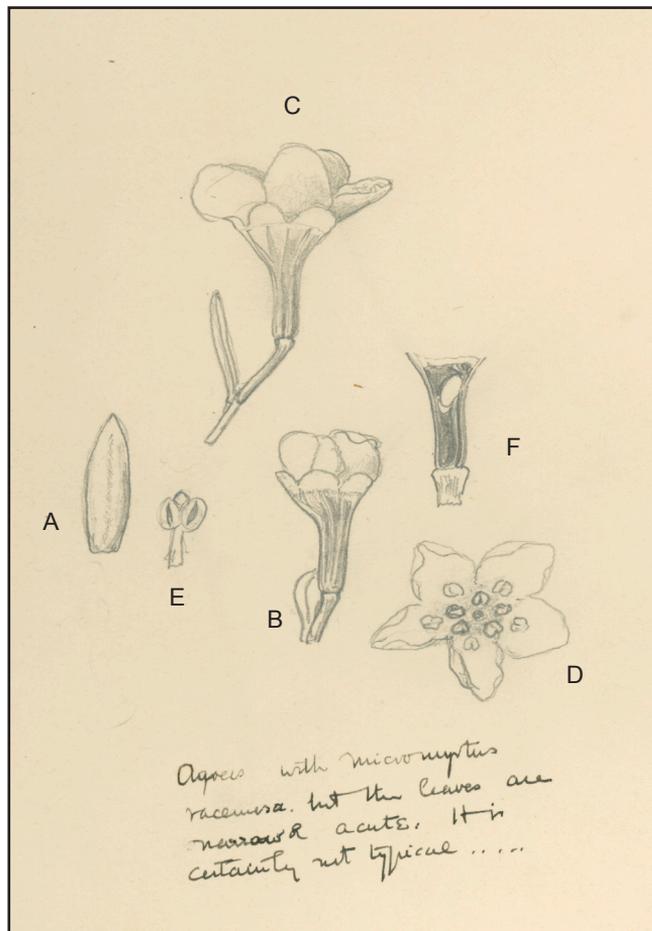


Figure 3. Pencil sketch of *Micromyrtus mucronulata* drawn by Charles Gardner on C.A. Gardner 2219. A – bracteole, B – mature bud, C – side view of flower with subtending leaf, D – top view of flower; E – anther; F – longitudinal section of ovary showing two ovules.

*Micromyrtus racemosa* var. *mucronulata* J.W. Green ms in G. Paczkowska & A.R. Chapman, *W.A. Fl.: Descr. Cat.* 399 (2000); in Western Australian Herbarium, *FloraBase*, <http://florabase.dec.wa.gov.au> [accessed May 2009]

*Shrub* 0.5–1.5 m high. *Leaves* mostly widely antrorse and very densely arranged on the smaller branchlets, with some distant and usually appressed on longer stems. *Petioles* 0.4–0.5 mm long. *Leaf blades* linear to narrowly obovate in outline, 3.5–5.5 mm long, 0.5–0.8 mm wide, 0.25–0.35 mm thick, obtuse or acute, narrowed fairly abruptly into a slender apical mucro 0.1–0.15 mm long, somewhat shiny, pale yellowish green; lower surface with an indentation along midvein and steep sides, with a main row on each side of 8–12 main glands up to 0.1 mm diam.; upper surface shallowly concave or flat. *Racemes* mostly extending for 6–17 nodes; peduncles 1–2 mm long. *Bracteoles* narrowly ovate, 1.6–2 mm long. *Buds* with apex high-hemispheric. *Flowers* 3–3.5 mm diam. *Hypanthium* 2.3–2.8 mm long, 0.5–0.7 mm wide at midpoint, c. 1.5 mm diam. at summit, free in distal c. 0.5 mm, 10-ribbed. *Sepals* depressed ovate, 0.2–0.5 mm long, 0.6–0.8 mm wide. *Petals* broadly obovate, 1.5–2 mm long, white. *Antipetalous filaments* 0.3–0.4 mm long. *Anthers* 0.25–0.35 mm long; slits converging at base. *Style* 0.3–0.4 mm long. *Fruit* 1.8–2.5 × c. 0.8 mm. *Seed* 1.5–2.3 × 0.6–0.8 mm. (Figure 3)

*Selected specimens examined.* WESTERNAUSTRALIA: all from Paynes Find area [precise localities withheld] 30 Aug. 1976, *R. Coveny* 7914 & *B.R. Maslin* (PERTH); 10 Nov. 2004, *A. Crawford* ADC 710 (K, PERTH); 23 May 2007, *D.J. Edinger* 6245 (PERTH); 9 July 1931, *C.A. Gardner* 2219 (PERTH); 18 Apr. 1992, *S.J. Patrick* 963 (PERTH); 20 Aug. 2001, *S.J. Patrick* 3950 (PERTH); 6 Aug. 1969, *Paul G. Wilson* 8615 (PERTH).

*Distribution and habitat.* Recorded in the Paynes Find area of the Eremaean Botanical Province, on the summit or lower slopes of a hill, usually with *Allocasuarina* and *Acacia* dominant, sometimes with *Micromyrtus ninghanensis* Rye. (Figure 2B)

*Phenology.* Flowers recorded from April to November, but mainly in winter and spring.

*Conservation status.* Conservation Codes for Western Australian Flora: Priority One. This taxon is very geographically restricted.

*Etymology.* From the diminutive of the Latin *mucro -onis* (sharp point), in reference to the minutely mucronate leaves.

*Affinities.* In its leaf morphology *Micromyrtus mucronulata* is closest to *M. trudgenii*, but its leaves tend to be shorter and more compressed, with a single, more prominent row of oil glands on each side of the midvein. It can also be distinguished by its white flowers and tends to have more convergent anther slits.

*Notes.* This variant of the *Micromyrtus racemosa* complex has apparently evolved in isolation on a single range of hills and has particularly fine leaves, which are the thinnest found in the complex and also among the narrowest. It is interesting that *M. ninghanensis* is also restricted to this region and the two species sometimes co-exist.

The presence of a pencil sketch by Charles Gardner (Figure 3) on his collection made in 1931 suggests that he may have been intending to name this taxon, as does his note below the sketch which reads ‘Agrees with *Micromyrtus racemosa* but the leaves are narrower & acute. It is certainly not typical’.

In 1977 John Green nominated the specimen *J.S. Beard* 6455 as the type for his manuscript name *Micromyrtus racemosa* var. *mucronulata*. Both the epithet and type specimen are retained here but the taxon is given a higher status, as a distinct species rather than a variety.

## 5. *Micromyrtus prochytes* Rye, *sp. nov.*

*A Micromyrtis racemosae* et *M. trudgenii* multo affinis sed hypanthio ad basin magis inflato, staminibus longioribus, stylis longioribus differt. Folia 2.5–3.5 × 0.6–1 mm; mucro nullus vel <0.1 mm longus. Bracteolae 0.9–1.3 mm longae. Hypanthium 2–3.2 mm longum. Sepala 0.1–0.35 mm longa. Petala alba, 1.3–1.5 mm longa. Filamenta 0.4–0.7 mm longa.

*Typus:* 54 miles [87 km] north of Mullewa, Western Australia, 24 August 1957, *J.W. Green* 1571 (*holo:* PERTH 01631292).

*Micromyrtus racemosa* var. *prochytes* J.W. Green ms (J.W. Green 1571) in G. Paczkowska & A.R. Chapman, *W.A. Fl.: Descr. Cat.* 399 (2000); Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.gov.au> [accessed May 2009]

*Shrub* erect, 0.5–2 m high, up to at least 1 m diam. *Leaves* mostly widely antrorse, very densely arranged on the smaller branchlets. *Petioles* 0.4–0.6 mm long. *Leaf blades* narrowly obovate, 2.5–3.5 mm long, 0.6–1 mm wide, 0.35–0.5 mm thick, obtuse to acute, often mucronulate but the mucro less than 0.1 mm long, bluish green, entire but with surface minutely crinkled throughout; lower surface flat or with an indentation along midvein and fairly steep sides, with 6–8 prominent glands up to 0.1 mm diam.; upper surface slightly convex or almost flat. *Racemes* mostly extending for 2–10 nodes; peduncles 1–3.3 mm long. *Bracteoles* narrowly obovate to ovate with margins strongly incurved, 0.9–1.3 mm long, yellowish brown. *Buds* with apex hemispheric. *Flowers* 3–4 mm diam. *Hypanthium* 2–3.2 mm long, somewhat swollen at base commonly to 0.5–0.6 mm, c. 0.4 mm wide at midpoint, 1.3–1.4 mm diam. at summit, free in distal 0.4–0.8 mm, 10-ribbed. *Sepals* very depressed, 0.1–0.35 mm long, 0.4–0.9 mm wide. *Petals* 1.3–1.5 mm long, white or pink (often pink at first, becoming white, then becoming deep pink or reddish with age). *Antipetalous filaments* 0.4–0.7 mm long. *Anthers* 0.25–0.35 mm long; slits converging at base. *Style* 0.4–0.6 mm long. *Fruit* 2.4–3 mm long, 1–1.3 mm wide. *Seed* 2–2.5 x 0.8–0.9 mm.

*Selected specimens examined.* WESTERN AUSTRALIA: c. 95 miles [153 km] E of Geraldton on Yalgoo road, 16 Aug. 1967, *A.M. Ashby* 2227 (PERTH); 63 km NE of Mullewa on Wandina Station, 18 June 1985, *R.J. Cranfield* 5076 (PERTH); Woolgorong Station, 16 km S of homestead, 12 July 1994, *M. Officer* 15 (PERTH); Carnarvon–Mullewa road just S of turnoff to Woolgorong Homestead, 12 Aug. 2000, *S.J. Patrick* 3719A & *A. Cochrane* (PERTH); 10 km ESE of Yuin Homestead, Nangarrong Paddock, Aug. 1995, *J.F. Taylor* 56 (PERTH); Tallering Peak, 14 Sep. 1978, *M.E. Trudgen* 2228 (PERTH); Gabyon Station, 15 Aug. 1993, *S. Van Vreeswyk* 3772 (PERTH); 100 km E of Ajana, 20 May 1966, *Paul G. Wilson* 4135 (PERTH).

*Distribution and habitat.* Occurs in the Eremaean Botanical Province, extending c. 120 km from Woolgorong Station south-east to Wurarga (west of Yalgoo), on lateritic breakaways, granite outcrops and other rocky habitats. (Figure 2B)

*Phenology.* Flowers recorded from May to September, but mainly in winter and spring.

*Conservation status.* This taxon has the second largest range known within the complex, extending for about 125 km from north to south and a similar distance from east to west.

*Etymology.* The name *prochytes* is selected because it was used as the epithet for the varietal manuscript name proposed by J.W. Green, but its etymology is uncertain. Possibly it is from the Latin *Prochytes*, an Italian island with a convoluted shape now known as Procida, perhaps in reference to the crinkled surface of the leaf. Another possibility is that it is from the Greek words *pro-* (before) and *chytos* (poured, fluid), perhaps referring to the swollen base of the hypanthium.

*Notes.* The geographic range of *Micromyrtus prochytes* is surrounded to the west and south by other members of the *M. racemosa* complex and the single collection of var. *Jingemarra* occurs on its eastern edge. Vegetatively, *M. prochytes* is distinguished by its dull, usually somewhat bluish and crinkled leaves, which never have the shiny appearance of the leaves on most *M. racemosa* specimens, although some specimens of *M. arenicola* also tend to have crinkled leaves.

Originally, *M. prochytes* was separated solely on the basis of its hypanthium being distinctly broader at the base than the peduncle, but this character varies considerably between specimens, with a few (e.g. *R.J. Cranfield* 5076) having the base of the hypanthium about the same width as the peduncle. This species has the longest stamens and style in the complex and its fruits and seeds also tend to be larger than those of other variants. A combination of characters seems necessary to reliably identify the taxon, but the range of unusual characters found in it suggests that it should be regarded as a distinct species.

**6. *Micromyrtus racemosa*** Benth., *Fl. Austral.* 3, 64 (1867). *Type*: south-western Australia, 1842–1843, *J. Drummond* coll. 2, n. 235 (*lecto*: K, *fide* Rye (2002b: 153); *isolecto*: K (two sheets), MEL 71359). See *Notes* under *M. aff. collina* for other type material examined.

*Micromyrtus racemosa* Benth. var. *racemosa* ms, Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.gov.au> [accessed May 2009].

*Illustration*. Blackall & Grieve (1980: 44).

*Shrub* 0.7–3 m high, 0.1–1.5(–3) m wide. *Leaves* mostly antrorse to appressed, sometimes densely arranged and widely antrorse on the smaller branchlets. *Petioles* 0.3–0.6(–1) mm long. *Leaf blades* narrowly obovate or obovate in outline, 1.8–4(–5.5) mm long, 0.5–0.8 mm wide, 0.3–0.4 mm thick, obtuse to acute, not mucronate or with mucro less than 0.1 mm long, yellowish green, shiny, entire; lower surface flat or with an indentation along midvein and steep sides, with 4–11 prominent glands up to 0.2 mm diam.; upper surface concave to almost flat. *Racemes* mostly extending for 4–20 nodes; peduncles 1.3–3 mm long. *Bracteoles* narrowly to broadly ovate, 1.1–1.8(–2.3) mm long. *Buds* with apex hemispheric or high-hemispheric. *Flowers* 2.5–4 mm diam. *Hypanthium* 1.4–2.5 mm long, 0.35–0.5 mm wide at midpoint, 0.8–1.3 mm diam. at summit, free in distal 0.3–0.5 mm, 10-ribbed. *Sepals* depressed ovate, 0.1–0.35(–0.4) mm long, 0.35–0.6 mm wide. *Petals* 1.1–1.6(–2) mm long, white or cream, reportedly pale pink in a very small proportion of the specimens. *Antipetalous filaments* 0.25–0.4 mm long. *Anthers* 0.3–0.35 mm long; slits converging at base. *Style* 0.15–0.35 mm long. *Fruit* 1.5–2 × 0.7–1 mm. *Seed* 1.4–1.8 × 0.6–0.8 mm.

*Selected specimens examined*. WESTERNAUSTRALIA: Elphin–Korralling road, 9 km NW of Wongan Hills, 17 July 1980, *R.J. Cranfield* 1495 (CANB *n.v.*, PERTH); 7 km W of Minnivale, 8 Oct. 1981, *L.A. Craven* 6984 (PERTH); 5 km S of Burracoppin, 23 Aug. 1995, *R. Davis* 82 (PERTH); Parker Range, c. 1.3 km NW of Mt Caudan, 15 Oct. 1994, *N. Gibson & M. Lyons* 2144 (PERTH); 12 km E of Korbel Siding, 22 July 1977, *J.W. Green* 4632 (PERTH); S side of Erdman Rr, c. 12 km SE of Narembeen, 2 Aug. 1997, *M. Hislop* 833 (PERTH); Fowlers Gully, Wongan Hills, 9 Sep. 1975, *K.F. Kenneally* 4606 (MEL *n.v.*, PERTH); 8.8 km S of Buntine East Rd and 0.2 km N of crossroads on Manuel Rd, N of Wubin, 14 Oct. 2003, *B.L. Rye* 231050 & *M.E. Trudgen* (AD, BRI, NSW, PERTH); 3 km N of Latham (between Perenjori and Wubin), 23 Aug. 1973, *M.E. Trudgen* 625 (PERTH); 8 miles [13 km] S of Mullewa on road to Morawa, 15 Sep. 1978, *M.E. Trudgen* 2237 (CANB *n.v.*, K *n.v.*, MEL *n.v.*, PERTH).

*Distribution and habitat*. Distributed from the Mullewa area south-east to the Kondinin area and Parker Range, a region that is mainly in the northern and central wheatbelt areas of the South West Botanical Province but extends slightly into the Eremaean Botanical Province, and there is also an isolated record from Diemals Station on the northern boundary of the South-western Interzone. Occurs in gravelly soils or on rocky habitats including ridges and breakaways, commonly on laterite, sometimes on granite, often in shrublands dominated by *Acacia* species. (Figure 2D)

The distribution of this species shows a remarkable correspondence with the Avon Wheatbelt IBRA region of Thackway & Cresswell (1995), with only the isolated Diemals Station record (*H. Pringle* 30152) occurring well outside that region.

*Phenology.* Flowers recorded from February to November but mainly from May to October.

*Conservation status.* Widespread and much more common than all other members of the complex.

*Chromosome number.*  $2n = c. 22$  (Rye 1979). The voucher, *M.E. Trudgen* 625, is given in full above.

*Affinities.* A very variable taxon, characterised by its small flowers and fruits but tending to be a tall plant, up to 3 m high. Its leaves vary from the smallest recorded in the complex to medium-sized. The northern part of its extensive range is surrounded by the ranges of five other members of the complex. It is not clear which of the other taxa is the closest relative of *M. racemosa*.

*Notes.* Specimens from north of the Wongan Hills area, and also some from that area, tend to have medium-sized leaves that are mostly densely arranged and spreading on the small branchlets. Some specimens from Wongan Hills have large flowers up to 4 mm diameter, with the hypanthium up to 2.5 mm long, sepals up to 0.4 mm long and petals up to 2 mm long; a few specimens from further north also have flowers of this size. In the broad south-eastern part of the taxon's distribution, the leaves tend to be short and mostly closely antrorse or appressed. Specimens from the south-east of the range also tend to have small flowers, sometimes with extremely short sepals and small petals as in *R. Campbell* 120A. However, there are also specimens with small leaves and flowers in the northern part of the species range, with no clear separation of the specimens into more than one category that could be recognised as subspecies or varieties.

## 7. *Micromyrtus rubricalyx* Rye, *sp. nov.*

*A Micromyrtis racemosae* et *M. trudgenii* multo affinis sed bracteolae longioribus, sepalis longioribus, semine fructus brevioris differt. Folia 3–6 x 1.1–1.3 mm; mucro nullus vel <0.1 mm longus. Bracteolae 2.2–3 mm longae. Hypanthium 2.5–3 mm longum. Sepala 1.1–1.5 mm longa. Petala alba, 1.7–2.2 mm longa. Filamenta 0.3–0.4 mm longa.

*Typus:* Moresby Range, Western Australia [precise locality withheld for conservation reasons], 21 August 2003, *B.L. Rye* 238078 & *M.E. Trudgen* (*holo:* PERTH 06744583; *iso:* CANB, K, MEL, NSW).

Erect spindly *shrub* 1–1.8 m high, not lignotuberous, with a single slender unbranched main stem at the base and few main branches, the stems shallowly furrowed, bark grey and thinly fibrous. *Leaves* mostly widely antrorse, very densely arranged on the smaller branchlets. *Petioles* 0.6–0.8 mm long. *Leaf blades* narrowly obovate in outline, 3–6 mm long, 1.1–1.3 mm wide, 0.4–0.55 mm thick, obtuse, somewhat shiny, yellowish green, entire; lower surface with an indentation along midvein and steep sides, with 5–8 prominent glands up to 0.1 mm diam. in each longitudinal row; upper surface shallowly concave or flat; mucro absent or less than 0.1 mm long. *Racemes* mostly extending for 8–15 nodes, with widely spreading flowers; peduncles 1.5–2 mm long. *Bracteoles* ovate or narrowly ovate and folded, 2.2–3 mm long, often red-tinged, acute, entire. *Buds* with apex high-hemispheric, often deep pink outside, paler pink inside when opening. *Flowers* *c.* 4.5 mm diam. *Hypanthium* 2.5–3 mm long, *c.* 0.4 mm wide at midpoint, *c.* 1.3 mm diam. at summit, free in distal *c.* 0.5 mm, 10-ribbed. *Sepals* with base

erect and upper part spreading in flower, somewhat scarious, narrowly oblong to ovate, 1.1–1.5 mm long, 0.4–0.6 mm wide, broadly obtuse, entire. *Petals* more or less broadly elliptic, 1.7–2.2 mm long, white when fully opened, broadly obtuse, entire. *Antipetalous filaments* 0.3–0.4 mm long. *Anthers* c. 0.3 mm long; slits converging at base; gland somewhat 2-lobed at base. *Style* 0.25–0.4 mm long. *Fruit* almost cylindrical but narrowed towards the base, c.  $2.5 \times 0.8$  mm, with an empty stalk-like base at least 0.5 mm long. *Seed* c.  $1.6 \times 0.6$  mm.

*Other specimens examined.* WESTERN AUSTRALIA: all from Moresby Range [precise localities withheld] 18 June 1996, A. Brown & S.J. Patrick 2607 (PERTH); 13 Sep. 1977, A.S. George 14871 (PERTH); 21 Aug. 2003, B.L. Rye 238079 & M.E. Trudgen (AD, BRI, DNA, HO, PERTH).

*Distribution and habitat.* Occurs in the north of the South West Botanical Province, known only from the western part of Moresby Range that is near Howatharra, occurring closer to the coast than any other populations of the *M. racemosa* complex. It is recorded on hillsides in open heath, at one site with *Acacia ericifolia* in ‘sandy loam and sandstone’. (Figure 2C)

The type location was a north-facing slope of a moderately high hill, with brown sand over orange-brown sand at depth and sandstone rocks. Scattered *Acacia acuminata* low trees over *Calothamnus* scattered tall shrubs over *Isopogon-Gastrolobium-Grevillea* heath over *Hibbertia-Melaleuca* open shrubland over introduced weeds and native herbs (*Sowerbaea*, *Stylidium*, annual Asteraceae). Associated taxa included *Synaphea*, *Burchardia*, *Neurachne*, *Nuytsia*, *Schoenus*, *Drosera* and *Allocasuarina humilis*.

*Phenology.* Flowers recorded from June to September.

*Conservation status.* Conservation Codes for Western Australian Flora: Priority Two. Known from two collections not more than 5 km apart, one from private property adjacent to a reserve and one from a nature reserve. *Micromyrtus rubricalyx* seems to be very restricted.

*Etymology.* From the Latin *ruber* (red, ruddy) and *calyx*, referring to the red-tinged outer surface of the sepals on the first two specimens collected, although the more recent type collection has the petals tending to be more reddish outside and the sepals pale. While several related Western Australian taxa often have the sepals red-tinged outside, they have much shorter sepals so this character is less noticeable.

*Notes.* A poorly known taxon, differing from all other members of the *Micromyrtus racemosa* complex in its much longer sepals, which are about half as long as its large petals. *Micromyrtus rubricalyx* also has the longest bracteoles recorded for the *M. racemosa* complex, and its leaves tend to have relatively few oil glands when their length is taken into consideration.

An unusual characteristic of this species is the considerable difference in length between the fruit and the enclosed seed. Some specimens of *Micromyrtus collina* also have this feature to a lesser degree. That species also shows the greatest similarity to *M. rubricalyx* in leaf size and, with sepals up to 0.6 mm long, has longer sepals than usual in the complex although still much shorter than the particularly long sepals of *M. rubricalyx*. Although its distribution includes Moresby Range, where *M. rubricalyx* appears to be endemic, *M. collina* mainly occurs in the eastern parts of the range whereas *M. rubricalyx* occurs in the western parts of the range, and *M. collina* probably tends to be a smaller plant.

**8. *Micromyrtus trudgenii*** Rye, *Nyctisia* 17: 326–329 (2007). *Type*: west of Paynes Find, Western Australia, 17 October 1975, J.Z. Weber 5166 (*holo*: PERTH 02503166; *iso*: AD *n.v.*, CANB, MEL).

For a description of this taxon see Rye (2007). Its distribution is included in Figure 2C.

### Taxa lacking formal names

The following taxa are considered to be too poorly known to describe adequately at present but appear to be distinctive.

### 9. *Micromyrtus aff. collina* (Murchison gorges variant)

*Shrub* c. 1 m high, [recorded 0.6–0.8 m wide]. *Leaves* mostly densely or very densely arranged and widely antrorse on the smaller branchlets, sometimes also a few less spreading ones on older stems. *Petioles* 0.7–0.9 mm long. *Leaf blades* linear to narrowly obovate in outline, 4–5.5 mm long, 0.8–1.2 mm wide, 0.35–0.5 mm thick, usually acute, not mucronate or with mucro up to 0.1 mm long, often yellowish green, somewhat shiny; lower surface with a narrow or broad indentation along midvein and steep sides, with 7–10 prominent glands up to 0.2 mm diam.; upper surface shallowly concave or almost flat. *Racemes* mostly extending for 3–6 nodes; peduncles 2–2.5 mm long. *Bracteoles* narrowly ovate or ovate, 1.4–1.7 mm long. *Buds* with apex high-hemispheric. *Flowers* 3–4 mm diam. *Hypanthium* 2–2.2 mm long, c. 0.5 mm wide at midpoint, 1.2–1.5 mm diam. at summit, shiny and expanded markedly at summit at first, becoming less shiny and of more uniform width in fruit, free in distal 0.5–0.6 mm, 10-ribbed. *Sepals* depressed ovate, 0.25–0.35 mm long, 0.4–0.6 mm wide. *Petals* broadly obovate, 1.3–1.5 mm long, white. *Antipetalous filaments* 0.25–0.35 mm long. *Anthers* c. 0.3 mm long; slits converging at base. *Style* 0.3–0.35 mm long. *Fruit* c. 2.2 x 0.8 mm. *Seed* c. 1.7 × 0.65 mm.

*Specimens examined*. WESTERN AUSTRALIA: all from Kalbarri National Park area [precise localities withheld] 17 Oct. 1992, D.R. & B. Bellairs 1651A (PERTH); 7 Aug. 1999, D. & B. Bellairs 6007 (PERTH); 21 June 1969, A.C. Burns 16 (PERTH, BRI *n.v.*, CANB *n.v.*, E *n.v.*).

*Distribution and habitat*. Occurs in the north of the South West Botanical Province, on the Murchison House Station and in Kalbarri National Park, on rocky breakaways in sand over sandstone. (Figure 2B)

*Phenology*. Flowers recorded from June to October.

*Affinities*. This taxon appears to be closely related to *Micromyrtus collina* and it is not clear whether it should be regarded as a separate species or just as a subspecies. It is well separated geographically, by a distance of about 120 km, and occurs in a somewhat different habitat. It has shorter sepals and tends to have shorter leaves and petals than *M. collina* but is known from too few specimens to be certain that these differences give a reliable separation of the two taxa.

*Notes*. The excluded syntype (see Rye 2000b) of *Micromyrtus racemosa* from Murchison River, collected by A.F. Oldfield probably in about 1858, may belong to this taxon.

**10. *Micromyrtus racemosa* var. *Jingemarra*** (R.J. Cranfield 5253a). Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.gov.au> [accessed May 2009]

*Shrub* height unknown. *Leaves* very densely arranged and widely antrorse on the smaller branchlets. *Petioles* c. 0.5 mm long. *Leafblades* linear to narrowly obovate in outline, 3.5–4 mm long, 0.5–0.6 mm wide, 0.3–0.4 mm thick, acute, with an apical mucro 0.1–0.3 mm long, yellowish green, somewhat shiny; lower surface with a narrow to broad indentation along midvein and steep sides, dotted with numerous small glands less than 0.1 mm diam., with 14–18 glands per row; upper surface shallowly concave or almost flat. *Racemes* mostly extending for 8–12 nodes; peduncles 1–1.5 mm long. *Bracteoles* ovate, 1.5–1.8 mm long. *Buds* with apex high-hemispheric. *Flowers* 3–3.5 mm diam. *Hypanthium* c. 2.6 mm long, c. 0.5 mm wide at midpoint, c. 1.5 mm diam. at summit, free in distal c. 0.6 mm, 10-ribbed. *Sepals* broadly or depressed ovate, c. 0.3 mm long, c. 0.5 mm wide. *Petals* widely spreading in flower, broadly obovate, c. 1.4 mm long, white or cream, often becoming red-tinged outside. *Antipetalous filaments* 0.35–0.4 mm long. *Anthers* c. 0.3 mm long; slits converging at base. *Style* c. 0.4 mm long. *Fruit* not seen at maturity.

*Specimen examined.* WESTERN AUSTRALIA: Jingemarra Station [precise locality withheld], 28 June 1985, R.J. Cranfield 5253a (PERTH).

*Distribution and habitat.* Occurs in the Eremaean Botanical Province, recorded on Jingemarra Station, the habitat unknown. (Figure 2D)

*Phenology.* Flowers in June and July.

*Affinities.* See notes under *Micromyrtus greeniana*. The affinities of this taxon are not clear but it certainly should not be regarded as a variety of *M. racemosa* s. str.

*Notes.* This taxon occurs just inland of the eastern extreme of the known range of *Micromyrtus prochytes*. Its habit, fruits and habitat are all unknown. More collections are needed to determine its taxonomic status, but it appears to have a unique leaf morphology.

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