A partial revision of the south-western Australian species of *Micromyrtus* (Myrtaceae: Chamelaucieae)

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Abstract

Rye, B.L. A partial revision of the south-western Australian species of *Micromyrtus* (Myrtaceae: Chamelaucieae). *Nuytsia* 16(1): 117–147 (2006). This partial revision of the genus *Micromyrtus* Benth., deals mainly with species that have a ten-ribbed hypanthium, but excludes the *M. racemosa* complex. All of the new species are endemic to the south-west of Western Australia. Eight taxa are named: *M. acuta* Rye, *M. chrysodema* Rye, *M. clavata* J.W. Green ex Rye, *M. elobata* subsp. *scopula* Rye, *M. placoides* Rye, *M. navicularis* Rye, *M. redita* Rye and *M. triptycha* Rye. A key is given for Western Australian members of the genus. *Micromyrtus* is compared with its close relative *Corynanthera* J.W. Green, and the morphological specialisations of both genera and their possible affinities to other genera in tribe Chamelaucieae are discussed. The compressed winged diaspore of *Corynanthera*, which has the peduncle fused to both the bracteoles and fruit, is of particular interest, and an illustration compares it with diaspores from five- and ten-ribbed species of *Micromyrtus*.

Introduction

A recent revision of the south-western Australian species of *Micromyrtus* Benth. (Myrtaceae) with a five-ribbed hypanthium (Rye 2002a) omitted one new species, which is described here. The current paper deals primarily with the ten-ribbed species of *Micromyrtus* and completes the coverage of the south-western taxa except for one difficult species complex comprised of *Micromyrtus racemosa* Benth. and its closest relatives. The *M. racemosa* complex will be treated in a later publication.

Just after the paper revising the five-ribbed species of *Micromyrtus* had gone to press, two specimens that had been misplaced for some time were rediscovered at PERTH. They represent a new species. Green (1980: 203) cited one of these specimens under his description of *Micromyrtus flaviflora* (F. Muell.) F. Muell. ex J.M. Black, although his determinavit dated 13 September 1978 bore the note "Unusually small leaves", showing that he considered the material to be atypical. This specimen resulted in the erroneous locality of Wialki being given for *M. flaviflora* in the key presented in Rye (2002a). There was also a printing error in this portion of the key, with the ovule numbers for *M. flaviflora* placed on the wrong line of the key. Other new data relevant to the five-ribbed species described previously are also presented here.

While the primarily five-ribbed species of *Micromyrtus* are widely distributed on mainland Australia, all of the ten-ribbed taxa are restricted to the south-west of Western Australia, where they form the higher proportion of the taxa. One of the primarily ten-ribbed taxa, *Micromyrtus serrulata*, was newly described

in Green's (1980) treatment of the genus in arid and semi-arid regions, but none of the other ten-ribbed species has been included in any of the recent revisions and flora treatments of the genus. It should be noted that the ribbing of some species is obscure or variable so that strict categorisation of all taxa as either five- or ten-ribbed is not possible.

Molecular studies of members of tribe Chamelaucieae of the Myrtaceae by Lam *et al.* (2002) included two eastern Australian species of *Micromyrtus*. These species formed a strongly supported clade within the tribe but showed no obvious close relationship with other genera that were sampled. More extensive sampling of members of the tribe, particularly of *Micromyrtus* species, is presently being undertaken. Results published so far (Wilson *et al.* 2004) indicate two clades, one comprised of *Micromyrtus elobata* and the monotypic genus *Corynanthera* J.W. Green and the other containing all the other species of *Micromyrtus* sampled. The morphological specialisations of *Corynanthera* are examined here in relation to *Micromyrtus* species, and the possible affinities of these genera to other members of the Chamelaucieae are briefly discussed.

Methods

All measurements were from dry herbarium collections, with leaf and bracteole measurements taken from the largest of these structures on each specimen. The apex of the mature flower buds in *Micromyrtus* varies from hemispheric to conic, with the intermediate state referred to here as 'high-hemispheric'. Petal length and most other floral measurements were taken from well pressed mature flowers. Peduncle and style measurements were taken from mature flowers and from fruits. Fruit measurements include the adnate portions of the hypanthium and disc but do not include the length of the free portion of the hypanthium and the persistent sepals.

Conservation codes given here are as defined at the end of this *Nuytsia* issue. Botanical provinces are as defined by Beard (1980). Distributions were plotted on maps showing the interim biogeographic regions of Thackway & Cresswell (1995) and the following abbreviations are used here for these regions:

AW – Avon Wheatbelt	CAR – Carnarvon	COO – Coolgardie	ESP – Esperance Plains
GS – Geraldton Sandplain	MAL – Mallee	MUR – Murchison	YAL – Yalgoo

Comparison of *Micromyrtus* and *Corynanthera*

Micromyrtus and the monotypic *Corynanthera* appear on morphological grounds to form a single natural group in the Myrtaceae. The two genera are similar in their habit, inflorescence, flower shape, stamen number and arrangement, gynoecium and fruit characters. *Corynanthera* has two notable specialisations that distinguish it from *Micromyrtus*, these being its anther type and its dispersal unit. The highly modified anthers in *Corynanthera* have a long-stalked gland and highly fused thecae, with the anther dehiscing by a single central pore. Among the *Micromyrtus* species, members of the *M. triptycha* complex show the greatest similarity to *Corynanthera* in the degree of specialisation of their anthers, but not in other characters such as stamen insertion and bracteole persistence. It appears that their anther specialisation arose independently of the kind found in *Corynanthera*.

The diaspore of *Corynanthera* (Figure 1A) is a highly compressed and laterally winged structure that includes the bracteoles and peduncle and encloses a single very compressed seed *c.* 1.8 mm long. Each

lateral wing extends along the margin of the peduncle and the full length of the keel of the bracteole, usually becoming broadest towards the top. The compressed peduncle is fused both to the flower and the bracteoles so that the base of the diaspore cannot be separated into its component parts without tearing. This peculiar fusion is no doubt what led Green (1979: 371) to describe the flowers as sessile when in fact they have peduncles *c.* 0.5 mm long.

No diaspores of the type found in *Corynanthera* are known in other genera of the Chamelaucieae, although this is not the only genus known to have fusion of the peduncle and bracteoles. In many species of *Calytrix* Labill., the bracteoles are persistent and united to the extended summit of the peduncle to form a sleeve-like structure known as a cheiridium, which usually has the bracteoles connate as well (Craven 1987). The cheiridium is generally not part of the diaspore, but serves a protective function for the fruit until the diaspore is released. In contrast, in *Corynanthera* the peduncle and bracteoles are involved in the dispersal of the fruit as they form part of the diaspore.

Being highly compressed and very light, the diaspores of *Corynanthera* would be readily dispersed by strong winds, which may be a factor triggering their release from the plant. Certainly the inflorescences borne towards the ends of the very spindly stems in this species are well exposed to the wind.

In *Micromyrtus* the diaspore usually consists of just the flower minus its petals and stamens, although a few species have persistent petals. Compressed flowers and diaspores have arisen more than once in *Micromyrtus*. Four of the species described in an earlier paper (Rye 2002a), for example *M. uniovula* Rye (Figure 1F,G), have a very compressed 5-ribbed hypanthium with two abaxial sepals, two lateral sepals and one adaxial sepal, with all of the ribs opposite sepals.

A different kind of very compressed diaspore occurs in several of the species described in the current paper, such as *M. acuta*, which is illustrated in Figure 1D,E. These species either have a 10-ribbed hypanthium or a reduced number of ribs but always with at least some of them opposite petals. On one side of the flower they have a lateral rib directly opposite a petal and the other side they have either a lateral rib opposite a sepal or two semi-lateral ribs opposite a sepal and petal. *Corynanthera* is different again, having the upper part of the flower somewhat compressed as well as the base, with two large abaxial sepals and three small adaxial sepals.

Previous descriptions of the hypanthium ribbing in *Corynanthera* are somewhat inaccurate. According to the protologue, the hypanthium has five faint longitudinal ribs opposite the sepals, suggesting that the species might be closer to some of the 5-ribbed species of *Micromyrtus* than to the 10-ribbed species. Actually the hypanthium in *Corynanthera* has 4, 6 or 8 main ribs, the 8-ribbed version as illustrated in Figure 1B,C. The most prominent ribs are the two lateral ribs, the central abaxial rib (opposite the abaxial petal) and the central adaxial rib (opposite the central adaxial sepal), with a further two intermediate ribs often present on one or both surfaces. In Rye (2002a) the lateral ribs of *Corynanthera* were interpreted as being opposite sepals only. However, they seem to represent the amalgamation of two ribs that are only separated at the top where they terminate both with the lateral petals and the adjacent abaxial sepals. The total number of ribs could therefore be considered to be a maximum of ten if each of the lateral ribs were counted as two ribs. Evidence from the pattern of ribbing suggests that *Corynanthera* has greater affinities with the 10-ribbed than with the 5-ribbed species of *Micromyrtus*, supporting Green's (1979) assessment of the affinities of his new genus.

In the molecular data to date (Wilson *et al.* 2004) only *Micromyrtus elobata* falls in the same clade as *Corynanthera*. *Micromyrtus elobata* shows no obvious strong morphological similarities to single it out as being the only species closely related to *Corynanthera*, although it does have a 10-ribbed

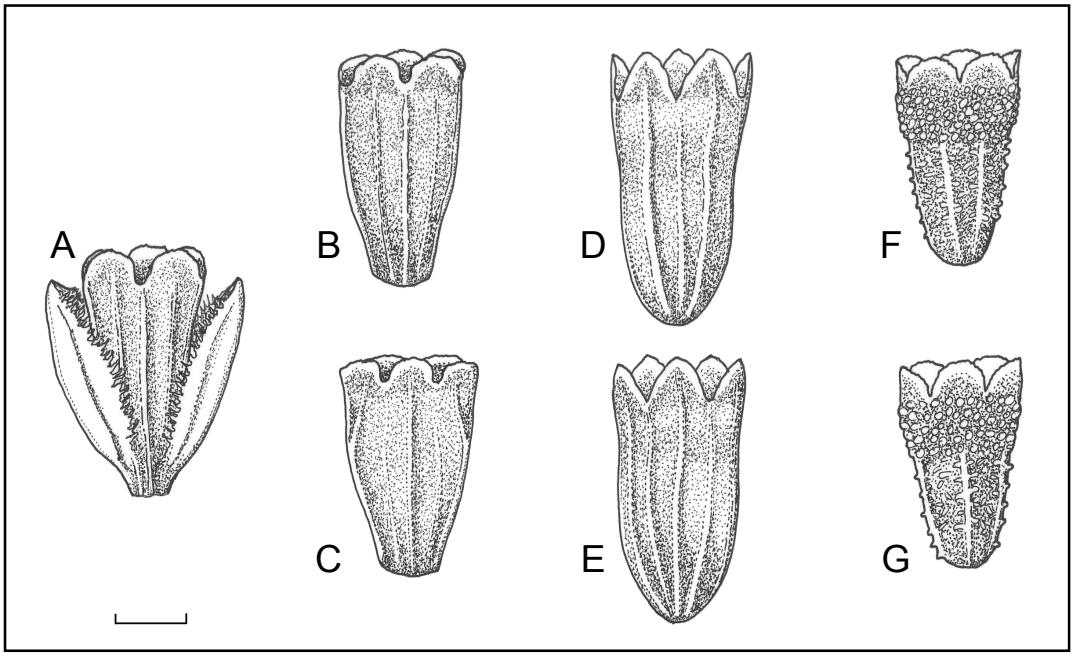

Figure 1. A–C. *Corynanthera flava*. A – whole diaspore; B – abaxial surface of young fruit torn from the peduncle; C – adaxial surface of young fruit. D, E. Diaspore of *Micromyrtus acuta*. D – abaxial surface; E – adaxial surface. F, G. Diaspore of *Micromyrtus uniovula*. F – abaxial surface; G – adaxial surface. Scale bars are 1 mm long. Drawn by Lorraine Cobb from *E.A. Griffin* 8206 (A–C), *B.L. Rye* 231018 *& M.E. Trudgen* (D, E) and *R.J. Cranfield* 7903 *& P.J. Spencer* (F, G).

hypanthium and a somewhat modified anther. Unpublished data using the nuclear ETS region now has resulted in a single clade for all of the *Micromyrtus* species, but unfortunately no sequence could be obtained for *Corynanthera*, probably because of primer incompatibility (Peter Wilson pers. comm.).

Interestingly, the known distributions of *Corynanthera* and *Micromyrtus* are parapatric (Rye 2002a: Figure 1A). *Micromyrtus rogerii* J.W. Green ex Rye has been collected just north and just south of the distribution of *Corynanthera flava* J.W. Green but not within its range, *M. uniovula* occurs just north of its range and *M. racemosa* extends along its eastern boundary.

Affinities of *Micromyrtus*

As noted in the previous section, *Micromyrtus* and *Corynanthera* have many similarities but differ in their anther morphology and a number of characters related to their diaspores. A further difference is that the style is more broadly based in *Corynanthera* than it is in *Micromyrtus*.

There is still no clear indication, either from the morphology or molecular data, which genera apart from *Corynanthera* show the greatest affinites to *Micromyrtus*. Bentham (1867) considered *Micromyrtus* to be closely allied to *Thryptomene sens. lat.* (including *Aluta* Rye & Trudgen), but it can be readily separated by the arrangement of its stamens, position of its ovules, and its generally very spindly habit. In *Micromyrtus*, pollen is released from slits that tend to meet at the base of the anther, whereas in *Thryptomene sens. lat.*, the slits (or more commonly the lines on which dehiscence by pores occurs) converge towards the summit of the anther.

Micromyrtus is not closely related to *Malleostemon* J.W. Green, a genus that is superficially similar in its stamen arrangement, uniloculate ovary and high placement of the placenta. As noted by Green (1983), the geniculate stamens and the tendency for the style base to be obliquely inserted into a slight depression indicate that *Malleostemon* has affinities with genera such as *Babingtonia* (Lindl.) Benth. and *Scholtzia* Schauer rather than with *Micromyrtus*, and this is confirmed by molecular data (e.g. Lam *et al.* 2002).

The strictly regular arrangement of stamens opposite both the sepals and petals, often in two distinct whorls, with the antipetalous whorl being retained when stamen number is reduced, is one of the main diagnostic characters of *Micromyrtus*. The closest approach to this strict arrangement of ten stamens is seen in some species with reniform seeds from several genera, such as the species that are currently known as *Rinzia carnosa* (S. Moore) Trudgen and *Baeckea clavifolia* S. Moore. The 10-staminate species of *Malleostemon*, such as *M. peltiger* (S. Moore) J.W. Green, have a more irregular arrangement of the stamens opposite the sepals and petals, suggesting a more recent development of this trait than that seen in *Micromyrtus* species.

No other suggestions based on morphology have been made in the literature regarding the affinities of *Micromyrtus*. Now that the over-emphasis on the unilocular ovary has been removed by expanding the limits of the tribe Chamelaucieae to include the subtribe Baeckeinae (Wilson *et al.* 2005), detailed morphological comparisons of *Micromyrtus* with multi-locular genera are more likely to be undertaken. This may eventually lead to a better understanding of the affinites of the genus.

Generic description

Micromyrtus Benth. *in* G. Bentham & J.D. Hooker, *Gen. Pl.* 1: 700 (1865); *Thryptomene* sect. *Micromyrtus* (Benth.) F. Muell., *Fragm. Phyt. Austral.* 8: 13 (1873).

Type: Micromyrtus drummondii Benth. *nom. superfl.* = *Micromyrtus obovata* (Turcz.) J.W. Green; lectotype, *fide* B.L. Rye, *Nuytsia* 15: 102 (2002a).

Description of the genus as given in Rye (2002a: 103) except for the following additions or modifications. *Shrubs* tending to be spindly and open, usually with very slender stems, glabrous or largely glabrous. *Leaves* concolorous or paler on adaxial surface. *Peduncles* slightly to distinctly dorsi-ventrally compressed. *Bracteoles* caducous to persistent. *Flowers* orientated with a sepal directly opposite the axis (i.e. adaxial) and a petal abaxial. *Hypanthium* 5–10-ribbed or 5-angled. *Anthers* distinctly 2-celled in most species but appearing 1- or 3-celled in a few taxa. *Ovary* with a small ovule-bearing cavity either close to the summit or nearer the middle (but never below the middle); placenta shortly above the middle to subterminal within the cavity. *Fruit* 1- or 2-seeded.

Size and distribution. Currently 45 named species are recognised in the genus, which is endemic to mainland Australia, occurring both in the arid zone and in moderately high rainfall zones (see Rye 2002a: Figure 1A). *Micromyrtus* has its greatest concentration of species in the south-west of Western Australia but is absent from the extreme south-west. A second concentration of species occurs in eastern Australia, particularly in the region encompassing southern Queensland and northern New South Wales.

Habit. *Micromyrtus* species tend to have a very spindly habit. Most plants are obviously single-stemmed at the base, with the main stem slender and its branches very slender. However, mature plants

may have several branches arising at, or just above, ground level (Figure 2B). Often the habit is very open (Figure 2E), although older plants of some taxa can become quite bushy (Figure 2A). Mechanical damage to the upper part of the plant, often seen in roadside plants after the verge has been graded, can lead to multiple stems from the base. Fires may also result in this kind of regeneration. The type specimen of *M. rogeri* is clearly fire-tolerant as it has very numerous very slender stems arising from a very thick base that has been blackened by fire. The lignotuber in *M. rogeri* is an above-ground structure and no examples are known of below-ground lignotubers in the genus. The fire tolerance of most species has not been recorded.

Inflorescence and floral characters. Peduncles are 1-flowered in all taxa but are regarded as being reductions from an axillary peduncle bearing more than one flower rather than being equivalent to axillary pedicels. The flowers are often recurved and the adnate part of the hypanthium is often somewhat to very dorsiventrally compressed. Three of the south-western species have the petals forming a cone with an acute apex to the flower buds, as shown in the photograph of *M. elobata* (Figure 2D). Other species have the bud apex hemispheric and broadly obtuse, as in *M. navicularis* (Figure 2F) or intermediate in shape with the apex somewhat raised and narrowly obtuse.

Fruit characters. The ovary is much longer than the ovules, with the remainder of the cell containing a loose spongy tissue, which breaks down or is displaced during the growth of the fertilised ovule or ovules. A solitary mature seed usually fills the entire cell at maturity, the hypanthium expanding outwards to accommodate the mature fruit but showing little or no elongation. Two-seeded fruits are common in *Micromyrtus rogeri* but very rare or unknown in other *Micromyrtus* species except for *M. clavata*, in which 2-seeded fruits are often present but are certainly not as numerous as 1-seeded fruits. In south-western species the seed is usually about twice or more than twice as long as wide, and the testa is a membranous, often loose, envelope that is shiny and coloured off-white to golden brown or reddish, with a minute reticulate pattern. Inside this envelope, the seed surface is dull white or off-white and fairly smooth.

The fruit is enclosed in the adnate portions of the hypanthium and disc and is capped by the free portion of the hypanthium and the persistent sepals. In all but one of the 10-ribbed species the petals close to an erect position in fruit and are shed before the fruit matures. *Micromyrtus sulphurea* is unusual in having persistent widely spreading petals, which presumably facilitate the dispersal of the nuts. In this respect it is similar to the five-ribbed species *M. imbricata* Benth.

Key to Western Australian taxa of *Micromyrtus*

1. Ovules 6–10.
  2. Hypanthium 5-angled, prominently rugose. Stamens 5.
    3. Peduncles 1.5–2.5 mm long. Hypanthium 2.3–3.6 mm long.
    (Burnabinmah Station to central Australia.) ..... **M. flaviflora**
    3. Peduncles 0.6–1.1 mm long. Hypanthium 1.2–1.5 mm long.
    (Wongan Hills to Wialki.) ..... **M. redita**
  2. Hypanthium 5-ribbed but otherwise fairly smooth. Stamens 10.
    4. Filaments filiform, less than 0.1 mm wide. Sepals with margin not recurved.
    (East of Warburton.) ..... **M. helmsii**
    4. Filaments lorate, over 0.3 mm wide. Sepals with margin strongly recurved.
      5. Leaves more or less broadly elliptic, 1–2.5 mm long. Sepals with large fimbriate auricles obscuring the hypanthium.
      (Gibson Desert to far west of South Australia.) ..... **M. fimbrisepala**

5. Leaves more or less narrowly oblong-elliptic, 2.5–4 mm long. Sepals with small denticulate auricles, the hypanthium clearly visible. (Cundeelee to Rawlinson Range.) ..... **M. hymenonema**

1. Ovules 1 or 2.

6. Ovule 1.

7. Stamens 5. Petals very narrowly clawed. (Norseman area.) ..... **M. papillosa**

7. Stamens 10. Petals fairly broadly clawed or broad-based.

8. Leaves oblong-elliptic. Adnate portion of hypanthium narrowed towards base, rounded on abaxial surface, with adaxial rib very prominent. (Three Springs area.) ..... **M. uniovula**

8. Leaves obovate. Adnate portion of hypanthium the same width throughout, almost flat on abaxial surface, with adaxial rib not prominent. (Ninghan Station area.) ..... **M. ninghanensis**

6. Ovules 2.

9. Hypanthium pentagonal in TS and expanding to a broad summit (i.e. somewhat obconic), each angle with a prominent rib opposite a sepal.

10. Hypanthium ribs broad and rounded. Petals widely spreading and becoming reddish in fruit. (Ravensthorpe to Cape Arid National Park.) ..... **M. imbricata**

10. Hypanthium ribs narrow, sharply angled. Petals closing to a fairly erect position or spreading at base but incurved distally in fruit.

11. Hypanthium 1.5–2.5 mm long. Petals 1.9–2.4 mm long, widely spreading in fruit at least in basal half, the distal half sometimes curved inwards. (Mt Manning Range to Comet Vale to Coolgardie.) ..... **M. monotaxis**

11. Hypanthium 0.8–1.6 mm long. Petals 1.1–2 mm long, closing to a straight erect position in fruit.

12. Peduncles 0.5–1.5 mm long. Stamens 10. Style 0.35–0.8 mm long. (Wubin to Lake Grace.) ..... **M. obovata**

12. Peduncles 1.3–2 mm long. Stamens 5–10. Style 0.1–0.25 mm long. (Merredin to Coolgardie to Newdegate to Kumarl.) ..... **M. erichsenii**

9. Hypanthium terete or 5-angled to very compressed, if pentagonal in TS then with fairly straight sides (i.e. more cylindrical than obconic), scarcely ribbed to distinctly 10-ribbed.

13. Stamens 5.

14. Hypanthium rugose distally and densely bearded below. Stamens *c.* 2.5 mm long. (Gibson Desert.) ..... **M. barbata**

14. Hypanthium somewhat rugose-reticulate throughout. Stamens *c.* 0.5 mm long. (Leinster area.) ..... **M. chrysodema**

13. Stamens 10.

15. Leaves densely and shortly fimbriate.

16. Peduncles 0.8–1.3 mm long. Bracteoles deciduous. Hypanthium very compressed, with 2 abaxial, 1 adaxial and 2 lateral ribs. (Arrino area) ..... **M. rogeri**

16. Peduncles 0.2–0.5 mm long. Bracteoles persistent. Hypanthium somewhat compressed, 10-ribbed. (Melita Station to near Karonie.) ..... **M. serrulata**

15. Leaves entire or denticulate.

17. Flower buds with apex conic, i.e. appearing acute from side view. Bracteoles usually persistent.

18. Hypanthium with adnate portion somewhat compressed. Sepals reduced to a narrow ring.

19. Leaves acute. (Salmon Gums to Fitzgerald River National Park to Israelite Bay.) ..... **M. elobata** subsp. **elobata**

19. Leaves with a subterminal protrusion that exceeds or equals the apex. (Kumarl to SW of Balladonia) ..... **M. elobata** subsp. **scopula**

18. Hypanthium with adnate portion very compressed. Sepals small but distinct, 0.4–0.6 mm long.

20. Hypanthium scarcely swollen laterally in bud, 10-ribbed in flower. Sepals 0.4–0.5 × 0.5–0.8 mm. (Paynes Find area.) ..... **M. acuta**

20. Hypanthium laterally swollen (compressed-urceolate) in bud, scarcely ribbed or with 5 ribs opposite the petals. Sepals 0.5–0.6 × 0.8–1 mm. (Tallering Peak to Cue.) ..... **M. placoides**

17. Flower buds with apex hemispheric or high-hemispheric, i.e. broadly or narrowly obtuse. Bracteoles usually caducous or deciduous.

21. Anthers longer than the filaments; cells fused into a 3-lobed structure.

22. Leaves 0.5–0.7 mm wide, with one main row of obvious oil glands and sometimes a partial second row of glands. Hypanthium 1.5–2.3 mm long. (Ravensthorpe Range.) ..... **M. navicularis**

22. Leaves 1–2.3 mm wide, with 2–4 main rows of oil glands, the glands sometimes inconspicuous. Hypanthium 1.9–3 mm long. (Maya to Newdegate area.) ..... **M. triptycha**

21. Anthers shorter than or rarely as long as the filaments; cells together forming a 2- or 4-lobed structure but not closely fused.

23. Petals yellow, widely spreading in fruit. (Wooramel River to Wiluna to Paynes Find.) ..... **M. sulphurea**

23. Petals white to yellow, closing erect in fruit and shed before fruit matures.

24. Hypanthium compressed or very compressed, with ribs usually not very obvious or the adaxial ones more obvious than the abaxial ones.

25. Hypanthium 2.5–3.5 mm long, compressed, with ribs not very obvious. Sepals 0.1–0.2 mm long, erect in fruit. (Rason Lake to Cundeelee area.) ..... **M. stenocalyx**

25. Hypanthium 1.4–2.2 mm long, the adaxial ribs often more prominent than the abaxial ones. Sepals 0.25–0.5 mm long but strongly incurved in fruit and then appearing to be absent. (Ninghan Station to Leonora.) ..... **M. clavata**

24. Hypanthium not very compressed, fairly prominently and equally 10-ribbed. (Kalbarri National Park to Diemal Station to Kondinin.) ..... **M. racemosa** complex

Update to the previous revision

Field observations and new collections have provided extra data for some of the species previously described in Rye (2002a), particularly for *M. monotaxis* Rye and *M. obovata*, which together with their close relative *M. erichsenii* are referred to here as the *M. obovata* complex. These data are presented here.

All new species descriptions are presented in the following section of this paper. Three of the species described there, *Micromyrtus chrysodema, M. redita* and *M. stenocalyx*, are relevant to the earlier

revision of Rye (2002a). *M. chrysodema* and *M. redita* are new species that both appear to be related to *M. flaviflora*, the former being the rediscovered species mentioned in the introduction to the current paper and the latter an entirely new species collected for the first time in 2004.

Micromyrtus stenocalyx was included in the key to 5-ribbed taxa in Rye (2002a) but was not described then, as it had previously been treated by Green (1980). However, this species is variable in its ribbing, which is weak and sometimes not present at all, and may be 5- or 10-ribbed. It appears to have greater affinities to some of the 10-ribbed taxa than the 5-ribbed taxa and so is probably more relevant to the current paper.

New data for the *Micromyrtus obovata* complex

Examination of new (*K. Honczar* C23, *L.W. Sage & F. Hort* 2042) and existing fruiting material of *Micromyrtus monotaxis* has revealed that the sepals and petals are widely spreading (previously described as being fairly erect in fruit) although the petals of some specimens are curved inwards part way along their length. The sepal and petal orientation of this species is a very useful means of distinguishing it from its two closest relatives *M. obovata* and *M. erichsenii*, both of which have the petals and sepals erect in fruit.

Despite the large amount of herbarium material previously available for *M. obovata*, mature seeds were rare or absent, suggesting a very low seed set in this species. However, freshly collected material from one specimen (*B.L. Rye* 231088 *& M.E. Trudgen*) contained a reasonable quantity of seeds indicating that seed set is not always as poor as previously reported. The seeds were 1.6–1.7 × *c.* 0.9 mm, larger than previously recorded and of a similar size to those of the new material of *M. monotaxis*, which were found to be 1.5–1.7 × *c.* 0.9 mm. The seeds of all three species can probably be distinguished, however, as those of *M. erichsenii* are smaller, 1.1–1.4 × 0.5–0.8 mm, and those of *M. monotaxis* are distinctly shaped, having the summit more convex and the base narrower than in the other two species.

New data for *Micromyrtus rogeri* and *M. uniovula*

A newly collected specimen of *Micromyrtus rogeri* (*M.E. Trudgen* 22126) has mature compressed fruits *c.* 2.1 mm long and 1.8 mm wide, which together with the attached free hypanthium and sepals are *c.* 3.5 mm long. Three dissected fruits each contained two erect seeds, one on each side of a central furrow. The seeds were not very compressed and were *c.* 1.5 mm long and *c.* 0.6 mm wide. This is the only species of *Micromyrtus* known to produce such a high proportion of 2-seeded fruits.

Previously, the habit of *Micromyrtus uniovula* was recorded on herbarium specimens as 0.2–0.4 m high. Two more recent collections give the height as up to 0.6 m. A large population, which extends along a laterite ridge for *c.* 200 m, was sampled in the current study (*B.L. Rye* 239019 *& M.E. Trudgen*) and found to be comprised of spindly, mostly open shrubs, up to 1.3 m high. A few low and widely spreading plants of *c.* 0.4 m were also present.

Micromyrtus uniovula appears to have very low seed set, with no mature seeds having been observed in this species. Despite three recent collections (*S.J. Patrick* 4040, 4055 & 4486) of the species having been made well into the fruiting period, all of the mature fruits examined lacked a seed.

Species and subspecies descriptions

Micromyrtus acuta Rye, *sp. nov.*

Bracteolae persistentes. Alabastri apex conicus. Hypanthium c. 2.5 mm longum, parte inferiore dorsiventraliter compressum, costis 10, 5 abaxialibus, 3 adaxialibus et 2 lateralibus. Sepala aliquantum erecta, petalis multo breviora, integra. Petala alba, in fructu decidua. Stamina 10, obdiplostemona, brevissima. Ovula 2.

Typus: 20 km south-west of Paynes Find, Western Australia, 2 September 1977, *J.W. Green* 4651 (*holo:* PERTH 01751433; *iso:* CANB, K, MEL).

Shrub erect, 0.8–2 m high, single-stemmed at base or multi-branched from ground level or just above. *Leaves* antrorse, moderately densely arranged distally on the branchlets. *Petioles* 0.3–0.4 mm long. *Leaf blades* oblong-obovate in outline, 1.5–1.8 × 0.6–0.8 mm, very thick, broadly obtuse, entire; lower surface rather flat along midvein and with steep sides, rugose, with 4–6 prominent oil glands less than 0.1 mm diam. in each longitudinal row; upper surface flat or shallowly convex. *Raceme*s mostly extending for 3–8 nodes, the flowers antrorse to almost patent; peduncles 0.7–1.1 mm long. *Bracteoles* persistent, herbaceous with narrow more or less scarious margins, narrowly ovate, 1.1–1.4 mm long, acute, entire. *Buds* with apex conic. *Flowers* tending to be recurved, 4–5 mm diam.; hypanthium very dorsiventrally compressed in adnate part, the free portion more open, narrowly urceolate in outline, *c.* 2.5 mm long, 0.8–1.3 mm wide; adnate portion slightly to distinctly 10-ribbed, tending to have 3 abaxial ribs, 2 lateral ribs and 5 adaxial ribs but sometimes with 2 semi-lateral ribs on one side, not prominently patterned between the ribs, more or less flat or slightly concave on abaxial surface, slightly convex to flat on adaxial surface; free portion 0.5–0.7 mm long, becoming uniformly lined with 10 longitudinal indentations. *Sepals* fairly erect in flower and fruit, rather scarious, broadly to depressed ovate, 0.4–0.5 mm long, 0.5–0.8 mm wide, white, almost acute to broadly obtuse, entire. *Petals* widely spreading in flower, deciduous in fruit, more or less elliptic to ovate, 1.5–2 mm long, fairly narrow or broad at base, white, acute, entire. *Stamens* 10, the 5 antipetalous ones inserted at summit of disc and with the anther at the throat, the 5 antisepalous ones inserted distinctly lower in the tube and included; filament 0.3–0.35 mm long. *Anthers* 0.3–0.35 mm long; slits very oblique; gland narrower than the full anther (i.e. exceeded laterally by the cells), with 2 or 4 lateral lobes distinctly smaller than the apical portion. *Ovary* with 2 ovules in a more or less central cavity. *Style c.* 0.35 mm long. *Fruit* not seen at maturity. (Figure 2A–C)

Other specimens examined. WESTERN AUSTRALIA: 16 km SW of Paynes Find, 23 Aug. 1974, *A.C. Beauglehole* 49161 (PERTH); 20 km SW of Paynes Find, 24 June 1995, *S.J. Patrick* 2292 (PERTH); Whitewells Station, on low granites SW of homestead, 6 Oct. 2003, *S.J. Patrick* 4849A (PERTH); Whitewells Station, 7.4 km E of western boundary fence, SW of homestead, 10 Oct. 2003, *S.J. Patrick* 4975 (PERTH); Lake Monger Lookout, off Rabbit Proof Fence Rd, not far N of Wanarra Rd, 29°29.530'S, 116°37.206'E, 13 Oct. 2003, *B.L.Rye* 231018 & *M.E. Trudgen* (PERTH); 14 km W of Warriedar Homestead, 26 Sep. 1986, *Paul G. Wilson* 12262 (PERTH).

Distribution and habitat. Occurs on both sides of the border between the South West Botanical Province and Eremaean Botanical Province, extending from west of Lake Monger east to near Paynes Find: YAL. The habitat at the Lake Monger Lookout was of outcropping partially laterised granite and grey-tan silty fine to coarse sand, with *Allocasuarina-Acacia* high open shrubland over *Micromyrtus* (to 1.7 m high) open shrubland over *Cryptandra-Calytrix* low open shrubland over *Lepidosperma-*

Austrodanthonia-Lomandra very open grass-sedge-herbland. No other detailed habitat descriptions are available but at all localities the species is recorded with granite and/or laterite. (Figure 3A)

Phenology and insect associations. Flowers July to October. Two uncommon kinds of scale-forming insect larvae are present. Very compressed scales with a white long-ciliate border, and longer thicker ones of a more advanced stage, are attached at the base of the inner surface of many leaves on the type specimen. More elongated glabrous brown scales are attached, mostly to the inside base of the leaf blades just above the petiole, on *S.J. Patrick* 4975.

Conservation status. Conservation Codes for Western Australian Flora: Priority One. Known from at least four localities with a range *c.* 90 km long.

Etymology. From the Latin *acutus* – sharp-pointed or acute, referring to the acute apex to the flower buds and often acute apex also on the individual sepals.

Notes. Although it does not occur in the Cue area, this taxon has been known for some time by the manuscript name *Micromyrtus cuensis* J.W. Green ms. That was because it was previously considered conspecific with a very closely related taxon from the Cue area, described below as *Micromyrtus placoides*. Since Green annotated a specimen (*J.W. Green* 4651) from the Paynes Find area as the type of *M. cuensis* ms., it seemed best not to use that name for the new taxon that actually occurs in the Cue area. These two taxa could possibly be treated as subspecies but show significant floral differences as well as a geographic separation of about 200 km. See notes under *M. placoides*.

Micromyrtus chrysodema Rye, *sp. nov.*

Bracteolae deciduae vel persistentes. Alabastri apex hemisphericus. Hypanthium c. 2.5 mm longum, 5-angulatum, parte inferiore 5-costatum, parte superiore 10-costatum. Sepala erecta, petalis multo breviora, integra. Petala alba. Stamina 5, filamentis antheris longioribus. Ovula 2.

Typus: near Leinster [precise locality withheld], Western Australia, 11 March 2004, *P.G. Armstrong* POA33 (*holo:* PERTH 07214340; *iso:* NSW).

Shrub densely branched, height unknown. *Leaves* closely antrorse to fairly widely spreading, densely arranged on the smaller branchlets. *Petioles* 0.2–0.3 mm long. *Leaf blades* mostly narrowly oblong to obovate in outline, *c.* 1.6 × 0.6 mm, *c.* 0.35 mm thick towards apex, broadly obtuse, mucronulate and sometimes with a few minute teeth around the apex; lower surface shallowly convex towards base with a flat inconspicuous midvein, becoming thicker and with a raised obvious midvein towards apex, each side of the midvein with an irregular row of 4–8 main glands less than 0.1 mm diam.; upper surface almost flat. *Racemes* mostly extending for 1–4 nodes, the flowers usually widely antrorse; peduncles 1.2–1.6 mm long. *Bracteoles* deciduous or persistent, rather scarious, *c.* 1.3 mm long, acute, entire. *Buds* with apex hemispheric. *Flowers* probably 3.5–4 mm diam.; hypanthium with adnate portion 5-angled, 5-ribbed towards the base but 10-ribbed at summit, the longer ribs opposite the sepals, *c.* 2.5 mm long, *c.* 1.1 mm wide at midpoint, *c.* 1.3 mm wide at summit, free in distal *c.* 0.4 mm, 5-angled to 10-ribbed, the degree of ribbing varied, the ribs opposite the sepals usually more obvious or longer than those opposite the petals. *Sepals* erect in flower, scarious, depressed ovate, *c.* 0.35 mm long, *c.* 0.5 mm or more wide, broadly obtuse, entire. *Petals* with claw erect and remainder probably widely spreading in flower, almost circular or depressed obovate, *c.* 1.5 mm long, white, broadly clawed, broadly obtuse, apparently entire but crisped.

Stamens 5; filament *c.* 0.4 mm long. *Anthers c.* 0.3 mm long; slits oblique; gland with its lateral lobes similar in size to the apical part of the gland. *Ovary* with 2 ovules in a terminal cavity. *Style* not seen at maturity. *Fruit* not seen.

Distribution and habitat. Collected from near Leinster in the Eremaean Botanical Province of Western Australia: MUR. Recorded on red sandplain with *Eucalyptus gongylocarpa* emergent from scrub dominated by *Acacia aneura* over low scrub and *Triodia*. (Figure 3B)

Phenology. The type material collected in March was mostly in young bud but had a few flowers open.

Conservation status. Conservation Codes for Western Australian Flora: Priority One. Known from a single population with about 30 plants spread sparsely within a 1 km radius. The species occurs well inland in a poorly known area so there is a reasonable chance that further populations would be found if the region were surveyed.

Etymology. From the Greek *chrysos* – gold and *demos* – district, referring to the occurrence of this species in the goldfields area of Western Australia.

Affinities. This recently discovered and still very poorly known species appears to be very distinctive. *Micromyrtus chrysodema* is one of six Western Australian taxa with five stamens, and molecular data (Peter Wilson pers. comm.) suggest that its closest affinities are with one of the other 5-staminate species, *M. flaviflora*. It is readily distinguished from that species by its fewer ovules and the lack of prominent rugose patterning on its hypanthium.

Micromyrtus clavata J.W. Green ex Rye, *sp. nov.*

Bracteolae caducae vel deciduae. Alabastri apex hemisphericus. Hypanthium c. 1.5–2 mm longum, ex parte inferiore dorsiventraliter compressum, costis adaxialibus magis numerosis et magis prominentibus quam costis abaxialibus. Sepala in fructu incurva, petalis multo breviora, integra. Petala alba, in fructu decidua. Stamina 10, obdiplostemona, brevia. Ovula 2.

Typus: 30 miles [48 km] south of Paynes Find on Great Northern Highway, Western Australia, 27 August 1967, *J.V. Blockley* 492 (*holo:* PERTH 01630776).

Shrubs erect, 0.3–1.8 m high, up to at least 1 m diam., single-stemmed at base and often multi-branched from ground level of just above. *Leaves* antrorse to almost appressed, fairly densely arranged on the smaller branchlets. *Petioles* 0.2–0.3 mm long. *Leaf blades* mostly obovate in outline, 1.3–2 × 0.7–1 mm, thick, broadly obtuse, entire; lower surface flat or with an indentation along midvein and the fairly steep sides with 4–6 prominent glands up to 0.1 mm diam.; upper surface shallowly concave to almost flat. *Racemes* mostly extending for 1–7 nodes, the flowers usually widely antrorse; peduncles 0.5–1.1 mm long. *Bracteoles* caducous or deciduous, rather scarious, 0.5–0.7 mm long, red-green, acute, entire. *Buds* with apex hemispheric. *Flowers* 3–3.5 mm diam.; hypanthium with adnate portion dorsiventrally compressed, 1.4–2.2 mm long, 0.7–0.9 mm wide at midpoint, 1.2–1.4 mm wide at summit, free in distal 0.25–0.5 mm, usually 10-ribbed but sometimes with only some of the ribs obvious, tending to have 5 abaxial ribs, 2 lateral ribs and 3 adaxial ribs (but sometimes appearing to have 5 ribs on each surface and no ribs strictly lateral, or to have 3 lateral ribs), with the ribs on adaxial surface often more prominent than the abaxial ones, somewhat concave on abaxial surface. *Sepals* fairly erect in flower, strongly incurved in fruit, scarious, depressed ovate, 0.25–0.5 mm long, 0.4–0.6 mm wide, obtuse, entire. *Petals* with claw erect and remainder widely spreading in flower, deciduous in fruit, almost circular or depressed obovate, 1.3–

1.4 mm long, white, rather narrowly clawed, broadly obtuse, entire. *Stamens* 10, the antipetalous ones inserted on summit of disc, the antisepalous ones inserted near the middle of the free tube; filament 0.4–0.5 mm long. *Anthers c.* 0.3 mm long; slits very oblique (*c.* half way between transverse and longitudinal); gland 3-lobed, with its very prominent lateral lobes similar in size to the apical part of the gland. *Ovary* with 2 ovules in a terminal cavity. *Style* 0.2–0.4 mm long. *Fruit* somewhat compressed to almost terete, 1.6–2.3 mm long, 1–1.2 mm wide, 1- or 2-seeded; hypanthium often without obvious ribs. *Seeds* more or less wedge-shaped, convex except where adjacent to a second seed, the adjacent surface tending to be flat, 1.4–2 × 0.7–0.8 mm; testa pale golden brown, with a slight pattern of indentations corresponding with oil glands on the fruit casing.

Other specimens examined. WESTERN AUSTRALIA (all PERTH): Hospital Rocks, 30 miles [48 km] W of Riverina, 11 Sep. 1973, *J.S. Beard* 6522; 16 km SW of Paynes Find, 23 Aug. 1974, *A.C. Beauglehole* 49163; 50 miles [80 km] SW of Paynes Find, 8 Sep. 1938, *W.E. Blackall* 3850; Fields Find, near Thundelarra Homestead, 25 May 1971, *W. Carr s.n.*; Yendang Rock, Walling Rock Station, 9 Sep. 1988, *R.J. Cranfield* 7249; Hospital Rock, 7 Sep. 1989, *R.J. Cranfield* 7758; 3 km SW of Niagara Dam, 6 July 1995, *R.J. Cranfield* 9866; 53 km N of Paynes Find on the Mount Magnet road, 16 Oct. 1981, *L.A. Craven* 7136; 221 mile peg on Paynes Find–Mount Magnet road [83 km N of Paynes Find], 19 July 1966, *A.R. Fairall* 1784; 281 mile peg on Paynes Find–Mount Magnet road [27 km N of Paynes Find], 20 July 1966, *A.R. Fairall* 1798; 51 km SW of Paynes Find, near Mt Singleton, 2 Sep. 1977, *J.W. Green* 4653; NW slope of unnamed hill immediately to the NW of Yandhanoo Hill, Ninghan Station, 2 Aug. 2000, *M. Hislop* 2082; 63 miles [101 km] NE of Wubin, 24 Aug. 1965, *K.R. Newbey* 2024; 20 km SW of Paynes Find, 22 Aug. 2001, *S.J. Patrick* 3966; summit of hill *c.* 1.5 km SE of Six Mile Well, Ninghan Station, 23 Aug. 2001, *S.J. Patrick* 3974; *c.* 1.5 km W of Warro Well along fenceline and *c.* 100 m S of fence, Ninghan Station, 24 Aug. 2001, *S.J. Patrick* 3982; W of Paynes Find, E side of road around gravel extraction area, 10 Aug. 2002, *S.J. Patrick* 4227; Great Northern Highway, 2 km N of Ninghan turnoff, 29 Aug. 2003, *S.J. Patrick* 4709 *& A Crawford*; 41.3 km N of Paynes Find, 29 Aug. 2003, *S.J. Patrick* 4711; 66 miles [106 km] N of Wubin, 30 July 1974, *E. Wittwer* 1252 .

Distribution and habitat. Eremaean mainly: AW, COO, MUR, YAL. Extends from Ninghan Station (west of Paynes Find) east to Melita Station (near Leonora). Commonly recorded in red or brown sandy soils, often on granite outcrops or on laterite. The vegetation has rarely been recorded, but *Acacia* species were noted as the dominant shrubs at two localities. (Figure 3C)

Phenology and insect associations. Flowers June to September. Fruits recorded August to October. Fruits and seeds were measured from *L.A. Craven* 7136 and *R.J. Cranfield* 7758. White wax scales are attached to the leaves of a number of specimens, for example *A.C. Beauglehole* 49163. Long-ciliate scales, similar to those found on *Micromyrtus acuta*, occur on the inner surface of some leaves of *S.J. Patrick* 4227. The insect larvae are protected within these scales by their position, sandwiched between the leaves and stems with only the tangled white cilia visible.

Etymology. From the Latin *clavatus* - club, in reference to the leaf shape.

Notes. Micromyrtus clavata appears to produce more two-seeded fruits than all other south-western species except for *M. rogeri*, and its one-seeded fruits often show evidence of a second seed having partially developed. This taxon is distinguished from all other 10-ribbed species by its strongly incurved sepals in fruit. It has been confused with *M. racemosa* but is readily distinguished by its more compressed hypanthium with the adaxial ribs tending to be more prominent than the abaxial ones. It also has a more prominently lobed anther, a characteristic it shares with *M. placoides* and *M. acuta*, which tend to have a more strongly compressed hypanthium. *M. clavata* differs from those two species in having the adaxial surface of the hypanthium strongly multi-ribbed. *Micromyrtus clavata* has apparently been found in

close proximity with *M. acuta*, as both are recorded from 16 km south-west of Paynes Find (*A.C. Beauglehole* 49161, 49163). Evidence of a close relationship between these two species is the occurrence on both of very unusual scales with a border of long tangled white cilia. Insect larvae of this kind have not been found on any other species.

Micromyrtus elobata (F. Muell.) Benth., Fl. Austral. 3, 64 (1867). – *Thryptomene elobata* F. Muell., Fragm. Phyt. Austral. 4: 63 (1864). *Type:* sandy places inland of Israelite Bay, [Western Australia], *G. Maxwell* (*lecto:* MEL 71324, *fide* Rye (2002b: 153)). *Other collections:* Israelite Bay, [Western Australia], *G. Maxwell* (*lectopara:* MEL 71325).

Shrubs usually erect, 0.1–1.5 m high, up to *c.* 1 m diam., single-stemmed at the base. *Leaves* closely antrorse to almost patent, fairly densely arranged on the smaller branchlets. *Petioles* 0.3–0.8 mm long. *Leaf blades* very narrowly to broadly obovate, usually narrowly obovate or obovate, 1–6 × 0.8–1.5 mm, often prominently keeled towards apex, entire or denticulate; lower surface convex and sometimes fairly steep-sided, sometimes with an indentation along midvein, with 2–10 prominent glands less than 0.2 mm diam.; upper surface concave to almost flat. *Racemes* mostly extending for up to 16 nodes, the flowers antrorse or widely antrorse; peduncles 0.3–1.1 mm long. *Bracteoles* often persistent in young fruit but usually shed before fruit matures, with a herbaceous keel and broad scarious sides, narrowly ovate to broadly obovate, 1.5–2.8 mm long, acute or acuminate, entire but sometimes with the erect or incurved keel produced into a subterminal point. *Anthopodium* often long. *Buds* with apex conic. *Flowers* 3–5 mm diam.; hypanthium somewhat compressed on adnate portion, prominently 10-ribbed. *Sepals* apparently absent in flower, reduced to a narrow scarious margin less than 0.2 mm long (although summit of hypanthium tends to become lobed in fruit and apparently forms distinct largely herbaceous sepals), entire. *Petals* with claw erect and remainder widely spreading in flower, deciduous in fruit, broadly obovate, 1.5–2.5 mm long, white, somewhat folded, acute, entire. *Stamens* 10, the antipetalous ones inserted on summit of disc, the antisepalous ones inserted near the middle of the free tube and included or reaching throat; filament 0.2–0.25 mm long. *Anthers* 0.2–0.25 mm long; slits very oblique (almost transverse); gland with apical portion much larger than the 2 lateral lobes. *Ovary* with 2 ovules in a cavity just above the middle. *Style* 0.2–0.4 mm long. *Fruit* almost terete, 1.2–2.3 mm long, 0.7–1 mm wide, 1-seeded; hypanthium longer than the fruit, prominently 10-ribbed, often with a reticulate pattern of glands or slightly transverse ridges between the ribs. *Seed* obovoid-conic (top truncate), 1.4–1.5 × *c.* 0.6 mm; testa golden brown with a deep reddish tinge.

Phenology and insect associations. Flowers and fruits recorded all year. Galls in the form of stem swellings (e.g. on *G.F. Craig* 266B) or terminal swellings (e.g. on *K.R. Newbey* 7318) are sometimes present. Scale-forming insects seem to be uncommon, but black sculptured scales are present on the leaves of *A.S. George* 11287 and white wax scales on *M.A. Burgman* 1104 & *S. McNee*.

Notes. This is an extremely variable taxon with two main variants, which are described here as subspecies as they are largely geographically separated, although they possibly intergrade.

a. Micromyrtus elobata (F. Muell.) Benth. subsp. **elobata**

Illustration. Blackall & Grieve (1980: 43).

Shrubs usually erect and 0.3–1.5 m high, up to *c.* 1 m diam. *Leaves* closely antrorse to almost patent, fairly densely arranged on the smaller branchlets. *Petioles* 0.3–0.8 mm long. *Leaf blades* very narrowly

to broadly obovate, usually narrowly obovate or obovate, 1.5–6 mm long, 0.8–1.5 mm wide, always wider than thick, acute or almost acute, slightly mucronulate to distinctly pointed, the point often recurved and up to 0.25 mm long, prominently keeled towards apex but keel not exceeding apex, with a narrow hyaline margin that is slightly to fairly prominently denticulate laterally (especially where the leaf is broadest), with teeth often *c.* 0.1 mm long, or rarely with hyaline margin more or less absent or entire; lower surface convex and sometimes fairly steep-sided, sometimes with an indentation along midvein, with 4–10 prominent glands less than 0.2 mm diam.; upper surface concave to almost flat. *Racemes* mostly extending for 3–16 nodes; peduncles 0.3–1.1 mm long. *Bracteoles* somewhat to much shorter than the mature flower and fruit, narrowly ovate to broadly obovate, 1.5–2.8 mm long, acute or acuminate, the apical point up to 0.35 mm long. *Anthopodium* 0.3–1.5 mm long, sometimes greatly expanded at the base. *Flowers* 3–5 mm diam.; hypanthium 1.7–2.3 mm long above the anthopodium. *Petals* 1.5–2.5 mm long. *Fruit* 1.5–2.3 mm long; hypanthium 1.6–2.5 mm long above the anthopodium. *Seed* obovoid-conic (top truncate), 1.4–1.8 × 0.6–0.7 mm; testa golden brown with a deep reddish tinge. (Figure 2D)

Selected specimens examined (of large-leaved variant). WESTERN AUSTRALIA: 60 km SW of Israelite Bay ruins, opposite Mt Baring, 7 Jan. 1979, *B. Barnsley* 375 (PERTH); 6 miles [10 km] NW of Gibson, 8 July 1068, *P.J. Cole* 409 (PERTH); 30 km NE of Esperance on Dempster Rd, 26 Nov. 1985, *D.B. Foreman* 1225 (PERTH); Lort River, Dec. 1940, *C.A. Gardner s.n.* (PERTH); NW of Whoogarup Range, Fitzgerald River National Park, 17 Mar. 1972, *A.S. George* 11287 (PERTH); 10 km W of Munglinup, 21 Sep. 1977, *J.W. Green* 4669 (PERTH); Young River, *G. Maxwell or A. Oldfield* (K); 7 km WNW of Quoin Head, 1 Nov. 1975, *K.R. Newbey* 4905 (PERTH); 10.5 km NW of Gibson Soak Hotel on Coolgardie–Esperance highway, 8 Aug. 2003, *Peter G. Wilson* 1633 & *G.M. Towler* (PERTH).

Selected specimens examined (of small-leaved variant). WESTERN AUSTRALIA: 15 km S of Salmon Gums on the Esperance road, 21 Oct. 1981, *L.A. Craven* 7214 (PERTH); junction of Lagoon and Kendall Rds, *c.* 7 km E of Scadden, 10 Nov. 1992, *A.M. Lyne* 1115, *L.A. Craven & F. Zich* (PERTH); 72 km W of Salmon Gums, 11 Nov. 1979, *K.R. Newbey* 6475 (PERTH); 9 km E of Scaddan on Norwood Rd, 26 May 1982, *P. van der Moezel* 11 (PERTH); Truslove Reserve, 7 km SE of Truslove, 15 Jan. 1981, *Paul G. Wilson* 11825a (PERTH).

Distribution and habitat. Occurs in the south-eastern portion of the South West Botanical Province: ESP, MAL. Extends along the south coast from Fitzgerald River National Park east to near Israelite Bay and inland to Salmon Gums. Occurs in deep sand and a variety of other sandy soils often with clay also present, commonly on low-lying plains or on dunes, and also fairly commonly recorded in lateritic habitats. The vegetation at some locations is dominated by mallees (*Eucalyptus*). (Figure 3A)

Notes. A very variable taxon. Specimens that have very small leaves tend to be from the more inland localities and overlap in range slightly with the inland subspecies, while the largest-leaved specimens are from the most mesic situations including the far south-west of the species range. Correlated to some degree with leaf length are floral characters, including anthopodium and hypanthium length and degree of protrusion of the flowers from the bracteoles.

At one extreme are short-leaved specimens (for example those cited separately above), with a short anthopodium, short broad hypanthium and broad relatively persistent bracteoles extending more or less to the summit of the hypanthium. At the other extreme, specimens such as *A.S. George* 11287 have flowers with a long anthopodium and a long narrow hypanthium distinctly exceeding narrow bracteoles, which tend to be lost before the fruiting stage. There appears to be a full range of intermediates; no discontinuities could be found that would justify the description of additional infraspecific taxa.

b. Micromyrtus elobata subsp. **scopula** Rye, *subsp. nov.*

A subspecie typica foliis, pedunculis et floribus plerumque minoribus, carina folii projecto subterminali ornata differt.

Typus: 13.9 km along Kau Rock Rd from Coolinup Rd, north-east of Esperance, Western Australia, 21 October 1997, *Peter G. Wilson* 1420 (*holo:* PERTH 05715814; *iso:* NSW).

Shrubs usually erect, 0.1–0.4(1) m high, up to *c.* 0.5 m diam. *Leaves* widely antrorse, crowded on the smaller branchlets. *Petioles* 0.15–0.3 mm long. *Leaf blades* narrowly to broadly obovate, 1–2.5 mm long up to *c.* 1 mm wide, sometimes about as thick as wide, with a subterminal protrusion of the prominent keel equalling or usually exceeding the apex, usually entire; lower surface fairly steep-sided, with an indentation along midvein, with 2–5 main glands less than 0.2 mm diam. and some smaller glands on each side; upper surface concave to almost flat. *Racemes* mostly extending for 1–5 nodes, the flowers antrorse, often subsessile at first; peduncles 0.3–0.5 mm long, broad and compressed. *Bracteoles* broadly ovate, 1.8–2.3 mm long, acute or acuminate, entire. *Anthopodium* 0.05–0.3 mm long. *Flowers* 3–3.5 mm diam.; hypanthium 1.3–1.6 mm long above the anthopodium. *Petals* 1.5–1.7 mm long. *Fruit c.* 1.3 mm long; hypanthium 1.4–2 mm long, prominently 10-ribbed, with patterning between the ribs. *Seed* not measured.

Other specimens examined. WESTERN AUSTRALIA: no locality, 28 Mar. 1983, *M.A. Burgman* 1084 *& S. McNee* (PERTH); 121.5 km S of Balladonia, 33°15'52"S, 123°00'03"E, 19 Aug. 1995, *R.J. Cranfield* 10155 (PERTH); Kumarl, May 1938, *L.A. Horbury* 49 (PERTH); SW margin of Dundas Nature Reserve, 14 Dec. 1990, *G.J. Keighery* 12587 (PERTH); 38 km NNE of Mt Ridley, 8 Mar. 1980, *K.R. Newbey* 6689 (PERTH); 30 km W of Ponier Rock, 80 km SW of Balladonia Motel, 14 Sep. 1980, *K.R. Newbey* 7318 (PERTH); 12 km S of Mt Buraminya, *c.* 110 km NE of Esperance, 9 Nov. 1980, *K.R. Newbey* 7997 (PERTH).

Distribution and habitat. Occurs in the far south-east of the South West Botanical Province: ESP, MAL. Extends from Kumarl east to *c.* 80 km SW of Balladonia and south-east to Kau Rock Rd. Occurs in deep aeolian sand. The vegetation, where recorded, is dominated by mallees (*Eucalyptus*). (Figure 3B)

Phenology. Flowers recorded from August to October. Mature fruits and seeds measured from *R.J. Cranfield* 10595.

Conservation status. Conservation Codes for Western Australian Flora: Priority Three. Known from Dundas Nature Reserve and about eight other localities in a poorly known region. The taxon is likely to be more common than the few available collections suggest.

Etymology. From the Latin *scopulus* – pointed or projecting rock, referring to the shape of the projection on the leaves.

Notes. This taxon is similar to the inland variant of subsp. *elobata* but usually can be readily identified by its unusual leaves. However, one somewhat intermediate specimen is *M. Hislop* 1253 collected from south-west of Mt Ney.

In addition to its odd leaves, subsp. *scopula* has a very short peduncle and anthopodium, short broad hypanthium and broad bracteoles extending beyond the summit of the hypanthium.

Micromyrtus navicularis Rye, *sp. nov.*

Micromyrto triptychi affinis sed foliis angustioribus magis navicularibus et distributione magis meridionali et orientali differt.

Typus: north side of Mt Short, 14 km north-north-west of Ravensthorpe, Western Australia, 8 August 1968, *P.G. Wilson* 6936 (*holo:* PERTH 01630849; *iso:* CANB *n.v.*, K *n.v.*, PERTH 01630830).

Shrub erect, 0.5–1.6 m high, single-stemmed at the base, with long leaves on short spreading lower branches almost patent and forming 4 dense rows, far exceeded by tall spindly stems bearing shorter and usually more appressed leaves. *Petioles* 0.3–0.5 mm long. *Leaf blades* very narrowly obovate from side view, very concave adaxially, with a rounded somewhat incurved apex, 3–4.5 × 0.5–0.7 mm, entire or minutely denticulate towards the apex; lower surface very convex, with usually 8–14 prominent glands up to 0.15 mm diam. in each row, with 1 main row on each side of the midrib, sometimes with a partial second row; upper surface very concave, the margins at middle of leaf incurved towards one another. *Racemes* mostly extending for 6–20 nodes, present on both the lower lateral branchlets and the upper more erect ones; peduncles 1–2 mm long. *Bracteoles* caducous or deciduous, rather scarious, usually very narrowly oblong, folded to a more or less linear shape, 1.3–1.8 mm long, pale lime green to yellowish brown, entire, the apex usually strongly incurved but sometimes acute. *Buds* with apex hemispheric. *Flowers* 3–4 mm diam.; hypanthium with adnate portion dorsiventrally compressed, 1.6–2.3 mm long, 0.4–0.6 mm wide at midpoint, 0.8–1.2 mm wide at summit, free in distal 0.4–0.6 mm, 10-ribbed, usually not very clearly patterned between the ribs. *Sepals* erect in flower and fruit, somewhat scarious, depressed ovate or almost semicircular, 0.2–0.4 mm long, 0.35–0.5 mm wide, broadly obtuse, more or less entire. *Petals* with claw erect and remainder widely spreading in flower, deciduous in fruit, obovate, 1.3–1.8 mm long, white inside, sometimes turning partially deep pink outside, broadly obtuse, more or less entire, with some prominent glands on outer surface. *Stamens* 10, the antipetalous ones inserted on summit of disc, the antisepalous ones inserted near the middle of the free tube; filament 0.1–0.2 mm long. *Anthers* 0.3–0.4 mm long, with the cells forming a rounded-triangular to almost globular structure divided by slits into 3 more or less equal-sized parts; slits very oblique or more or less transverse; gland erect, very broad (projecting laterally beyond the cells), with 2 lateral lobes smaller than the apical portion. *Ovary* with 2 ovules in cavity in upper half but distinctly below the summit of ovary cell. *Style c.* 0.4 mm long. *Fruit* not compressed, 1.8–2.2 mm long, 0.7–0.8 mm wide, 1-seeded; hypanthium often becoming distinctly rugose and grey but sometimes darker and more brownish and smoother, with less obvious ribs when fully expanded. *Seed* narrowly obovoid-conic, 1.4–1.7 × 0.6–0.7 mm; testa medium golden-brown to dark red-brown. (Figure 2E, F)

Selected specimens examined. WESTERN AUSTRALIA: 1 km E of Mt Desmond, 9 Jan. 1979, *B. Barnsley* 452 (PERTH); 5 km E of Eldverton Rd, Ravensthorpe Range, 2 Apr. 1998, *M. Bennett* 99 (PERTH); right turn 10.8 km from Ravensthorpe on Esperance road, and walk S over ridge then ESE on bulldozed track, 24 Apr. 1999, *M. Bennett* 466 (PERTH); northern foothills of Mt Short, 20 Sep. 1977, *J.W. Green* 4668 (PERTH); lower slopes of Mt Short, 21 Sep. 1977, *E.N.S. Jackson* 3433 (PERTH); on Mt Short Rd, 1.0 km E of King Rd, and 2.65 km E of Newdegate–Ravensthorpe road, 33°27'26.9"S, 119°59'36.6"E, 8 Dec. 2003, *B.L. Rye* 231204 (PERTH) & 231205 (MEL, PERTH); old gravel pit, 3–4 km up Eldverton Rd from Esperance road, *c.* 12 km E of Ravensthorpe, 2 Aug. 1998, *E. Tink* 244 (PERTH); Mt Desmond, 18 Nov. 1976, *E. Wittwer* 1886 (PERTH).

Distribution and habitat. Restricted to the range of hills near Ravensthorpe: ESP. Occurs on the slopes of lateritic hills, sometimes also with granite present, the soil usually sandy with gravel or lateritic pebbles, the dominant species often mallees. (Figure 3C)

Phenology. Flowers recorded from July to January and also in April and May. Mature fruits and seeds measured from *E.M. Bennett* 2399 and *B.L. Rye* 231204, 231205.

Conservation status. Conservation Codes for Western Australian Flora: Priority Three. Very localised but probably fairly secure in the Ravensthorpe Range.

Etymology. From the Latin *navicularis* – boat-shaped, referring to the leaves. This is of similar meaning to the unpublished epithet of *carinata* that had previously been chosen for this taxon, a name that cannot be used as it has already been published for an eastern Australian species of *Micromyrtus*.

Affinities. This is one of four closely related but geographically distinct taxa that are referred to here as the *Micromyrtus triptycha* complex (see notes under *M. triptycha*). *Micromyrtus navicularis* is distinguished by its very narrow leaves, with the glands are commonly in only one row on each side of the leaf, whereas other members of the *M. triptycha* complex have several main rows of oil glands, and *M. navicularis* has the shortest hypanthium, down to 1.5 mm long, in the complex. It also appears to have the greatest dimorphism of its leaves, which are larger and more obviously 4-ranked on lower lateral branches than on the upper more erect branches, both of which produce flowers.

Notes. Previously known by two manuscript names. For a long time this species was housed at PERTH as *Micromyrtus racemosa* var. *carinata* J.W. Green ms., a name which was also used for some northern specimens in the *M. triptycha* complex. In 2002 the four geographically separated members of the *M. triptycha* complex were all treated informally as subspecies, with the name *Micromyrtus triptycha* subsp. *carinata* Rye ms. being applied to *M. navicularis*. However, this taxon appeared to be more distinctive than the others in its morphology and so is now distinguished as a distinct species.

Boat-shaped leaves occur to varying degrees in all members of the *Micromyrtus triptycha* complex, with the incurved margins varying from slightly divergent through erect to convergent in the lower half of the leaf, although the distal part often tends to be broader because the margins are more divergent there. *M. navicularis* has this characteristic particularly well developed, with its leaf margins erect to convergent.

Micromyrtus placoides Rye, *sp. nov.*

Micromyrto acuto optime affinis sed floribus grandioribus, hypanthio latiore et minus distincte costato in ambitu urceolato, glandula supra antheram multi-lobata differt.

Typus: 1.8 miles [2.9 km] along road to Tallering Peak from main track, Western Australia, 14 September 1978, *M.E. Trudgen* 2229 (*holo:* PERTH 02418312; *iso:* AD, CANB, K, MEL, all *n.v.*).

Shrub 0.5–2.3 m high, up to at least 1 m wide, sometimes widely spreading with several stems or branches from the base. *Leaves* antrorse, moderately densely arranged distally on the branchlets. *Petioles c.* 0.3 mm long. *Leaf blades* oblong-obovate to almost circular in outline, 1.3–2.2 × 0.8–1.3 mm, thick, broadly obtuse, glabrous; lower surface strongly convex or flattened along the midvein and with steep sides, with 5–9 prominent glands up to *c.* 0.1 mm diam. in each longitudinal row; upper surface flat. *Buds* with apex conic or nearly so. *Racemes* mostly extending for 4–7 nodes, the flowers antrorse to almost patent; peduncles 0.4–0.8 mm long. *Bracteoles* persistent, herbaceous and often with narrow more or

less scarious margins, ovate, 1.4–2 mm long, acute, entire, with prominent glands. *Flowers* tending to be recurved, 5–5.5 mm diam.; hypanthium with adnate portion very dorsiventrally compressed, the free portion more open, urceolate in outline and with the abaxial surface concave and adaxial surface convex, *c.* 3.3 mm long, *c.* 2 mm wide, free in distal 0.8–1 mm, scarcely ribbed or with 5 definite ribs opposite the petals (but central abaxial rib compressed for most of its length), with a fine reticulate pattern. *Sepals* fairly erect in flower and fruit, rather scarious, depressed ovate, 0.5–0.6 mm long, 0.8–1 mm wide, green to deep red-brown with a white margin, usually broadly obtuse, entire. *Petals* widely spreading in flower, deciduous in fruit, broadly obovate, *c.* 2 mm long, white, becoming broadly obtuse, entire. *Stamens* 10, the 5 antipetalous ones inserted at summit of disc and slightly exserted from the throat with a filament *c.* 0.35 mm long, the 5 antisepalous ones inserted distinctly lower in the free tube (almost half way down) but the latter still almost reaching the throat with a filament *c.* 0.5 long, all borne well above the style. *Anthers c.* 0.35 mm long; slits very oblique; gland very broad (extending laterally beyond the cells) and compact, multi-lobed, with up to 8 main lateral lobes of similar size or at least 4 main lobes and a number of smaller ones. *Ovary* with 2 ovules in an almost central cavity (slightly above centre). *Style c.* 0.5 mm long. *Fruit* not seen at maturity.

Other specimens examined. WESTERN AUSTRALIA: Cue, July 1926, *C.A. Gardner s.n.* (PERTH); top of middle gorge at Tallerang, Mullewa, 14 Apr. 2003, *J. Docherty* 225 (PERTH); Mt Narryer, *c.* 1 km NNW of main peak, 26 Aug. 1996, *A.S. George* 17273 (NSW, PERTH); below W side of Mt Narryer, 8 Aug. 1997, *A.S. George* 17335 (PERTH); Weld Range, slopes below Telecom tower, 3 Aug. 1995, *S.J. Patrick* 2387 *& A. Brown* (PERTH).

Distribution and habitat. Occurs in the Eremaean Botanical Province, in a similar habitat to *M. acuta* but possibly also on granite, extending from Mt Narryer in the north to near Tallering Peak in the south-west and Cue in the south-east: MUR, YAL. (Figure 3A)

Phenology and insect associations. Flowers July to September. Translucent brown scales occur on the leaves of several specimens, including *J. Docherty* 225.

Conservation status. Conservation Codes for Western Australian Flora: Priority One. This species is known from scattered collections over a distance of *c.* 230 km. Since it occurs in a relatively remote and poorly collected region, *M. placoides* is likely to be more common than the few current collections suggest.

Etymology. From the Greek *plako* plate and *–oides* like, referring to the highly compressed, plate-like adnate portion of the hypanthium

Notes. Previously known by the informal geographic name *Micromyrtus* sp. Murchison (*M.E. Trudgen* 2229). This species is very closely related to *M. acuta*, the most significant difference between them being in the hypanthium, which is broader and distinctly extended laterally beyond the free portion of the hypanthium in *M. placoides* so as to have an urceolate shape in outline in the flower buds as well as in the mature flowers. In *M. placoides* the hypanthium is also more strongly convex/concave and has a more reticulate rather than ribbed patterning on the adaxial and abaxial surfaces.

Another difference is that the anther gland is broader and has more numerous lobes than in *M. acuta*. As far as can be determined from the few available collections of the two taxa, *M. placoides* also has larger flowers, with a longer hypanthium, larger more obtuse sepals, and longer stamens and style. It also tends to have more herbaceous and more prominently glandular bracteoles.

Micromyrtus redita Rye, *sp.nov.*

Micromyrto flavifloro affinis sed foliis maturibus crassioribus, floribus et pedunculi minoribus differt.

Typus: Wongan Hills, Western Australia, date unknown [possibly collected in late September 1983], *P. Roberts* 244 (*holo:* PERTH 06254705).

Shrub densely branched, height unknown. *Leaves* antrorse to appressed, mainly on the lateral branchlets. *Petioles c.* 0.2 mm long. *Leaf blades* narrowly oblong-elliptic to elliptic-obovate, 1.2–2.4 × *c.* 0.6mm, broadly obtuse, entire; lower surface irregularly convex, often somewhat ridged towards apex and more flattened towards the base, with 2–6 prominent glands less than 0.2 mm diam. in a longitudinal row on each side of midvein; upper surface slightly concave to slightly convex, often with a longitudinal furrow down the centre. *Racemes* mostly extending for several nodes, the flowers widely antrorse to patent; peduncles 0.6–1.1 mm long. *Bracteoles* caducous or deciduous, not seen. *Flowers c.* 3 mm diam.; hypanthium slightly expanded abaxially and slightly compressed adaxially, 5-angled, 1.2–1.5 mm long, narrowed at base, *c.* 0.8 mm wide at midpoint, *c.* 1.4 mm wide at summit, free in distal *c.* 0.3 mm, somewhat 5-angled, rugosely patterned throughout. *Sepals* 5, erect in flower and fruit, slightly more scarious than the petals, depressed ovate, 0.4–0.5 mm long, 0.8–0.9 mm wide, reddish, very broadly obtuse, entire or minutely denticulate-laciniate. *Petals* 5, widely spreading in flower, then becoming erect, broadly or very broadly obovate, 1.3–1.5 mm long, distinctly clawed at base, white or pink-tinged, broadly obtuse, entire. *Stamens* 5, equal; filament *c.* 0.4 mm long. *Anthers c.* 0.3 mm long; slits somewhat oblique; gland globular. *Ovary* with 6–8 ovules in a more or less terminal cavity. *Style c.* 0.5 mm long. *Fruit* not seen at maturity, not compressed; hypanthium 5-angled, rugose.

Other specimen examined. WESTERN AUSTRALIA: Wialki, *s. dat.* [collected prior to 1978], *F.H. Uther Baker* (PERTH).

Distribution and habitat. Collected from Wongan Hills and Wialki in the South West Botanical Province of Western Australia. It is not clear whether the locality Wongan Hills refers to the town by that name or to the range of hills north of the town. No habitat information has been recorded on either of the specimens. (Figure 3B)

Phenology and insect associations. Flowering time unknown but one specimen may have been collected in late September, as some collections of other species by P. Roberts were made at that time in Wongan Hills. The specimen from Wialki has a sculptured black scale on one of its leaves.

Conservation status. Conservation Codes for Western Australian Flora: Priority One. Known only from two undated collections with vague localities. The known range of the taxon is in a largely cleared region of the wheatbelt. This, together with the paucity of collections, suggests that the taxon is very rare and could possibly be extinct. A survey of the region for *Micromyrtus redita* is urgently needed.

Etymology. From the Latin *reditus* – returned, referring to the fact that the specimens of this taxon were once lost.

Affinities. Micromyrtus redita is closely related to *M. flaviflora*, which differs in its longer peduncles, larger flowers, more glaucous and flattened leaves with usually more numerous oil glands, and usually

more prominently rugose hypanthium. Although *M. flaviflora* tends to have longer stamens, its style is of about the same length.

The two species are allopatric, with the new species restricted to the South West Botanical Province whereas *M. flaviflora* is widespread in the arid zone, extending from Burnabinmah Station in the Eremaean Botanical Province of Western Australia eastwards into south-western Northern Territory and the far north-west of South Australia. There is a disjunction of *c.* 200 km between the known ranges of the two taxa, as well as a considerable distance (*c.* 135 km) between the two known localities of the new species.

Notes. Recently housed under the informal name *Micromyrtus* sp. Avon (*P. Roberts* 244). This species is very poorly known, as its habit, habitat, flowering time, mature fruit and seed are unknown, and its localities are not precisely given.

As noted by Green (1980), *Micromyrtus flaviflora* is a very variable species, showing a number of changes in its morphology from west to east over its wide range. Two main variants can be distinguished, the typical one in the east of the range and an atypical western variant that was once regarded as the distinct species *M. trachycalyx* F. Muell. Possibly these two taxa should be recognised formally at the subspecific level, but they appear to intergrade too fully for this to be feasable.

The typical eastern specimens of *M. flaviflora* differ from the new species in their yellow petals and denticulate to fimbriate margins to the leaves and petals, but have a similar leaf shape. The atypical variant occurs in the region closest to the range of *M. redita* and tends to be similar to the new species in its flower colour and entire leaves but differs in the more obovate shape of its leaves.

Micromyrtus serrulata J.W. Green, *Nuytsia* 3: 199–201 (1980). *Type:* 32 km east of Karonie, Trans-Australia Railway, Western Australia, 9 November 1963, *A.S. George* 5951 (*holo:* PERTH 01631322; *iso:* PERTH 01631330).

Illustration. Green (1980: Figures 113–120).

Shrub 0.4–1.5 m high, erect or somewhat spreading. *Leaves* widely antrorse to appressed, rather densely arranged distally on the branchlets. *Petioles* 0.3–0.4 mm long. *Leaf blades* narrowly to broadly obovate, 1.8–3.3 × 0.7–1.5 mm, broadly obtuse, ciliolate, the cilia less than 0.1 mm long; lower surface angled-convex, glandular all over, with 7–9 usually very prominent glands up to *c.* 0.1 mm diam. in each main longitudinal row; upper surface shallowly concave, often somewhat paler than lower surface. *Racemes* mostly extending for 1–7 nodes, the flowers antrorse or widely antrorse; peduncles 0.2–0.5 mm long. *Bracteoles* persistent, with a green herbaceous keel and wide scarious margins, more or less elliptic, 2–3 mm long, narrowly obtuse or almost acute, denticulate. *Buds* with apex hemispheric. *Flowers* 4–6 mm diam., with several small processes < 0.1 mm long opposite the petals; hypanthium narrowly conic but with adnate portion somewhat compressed, 1.7–2.2 mm long, *c.* 0.5 mm wide at midpoint, 1.3–2 mm wide at summit, free and quite widely spreading in distal 0.5–0.7 mm, prominently 10-ribbed. *Sepals* widely spreading in flower and more erect in fruit, somewhat scarious, depressed ovate, 0.7–1.3 mm long, 1.4–2 mm wide, minutely denticulate. *Petals* with claw erect and remainder widely spreading in flower, closing erect in fruit, possibly sometimes deciduous, broadly obovate, 1.5–2.4 mm long, white, broadly obtuse, more or less entire. *Stamens* 10, the antipetalous ones inserted on summit of disc and antisepalous ones distinctly lower (somewhat above middle of free tube); filament 0.6–0.9 mm long. *Anthers c.* 0.35 mm long; slits very oblique (often closer to transverse than longitudinal); gland large, somewhat 3-lobed and

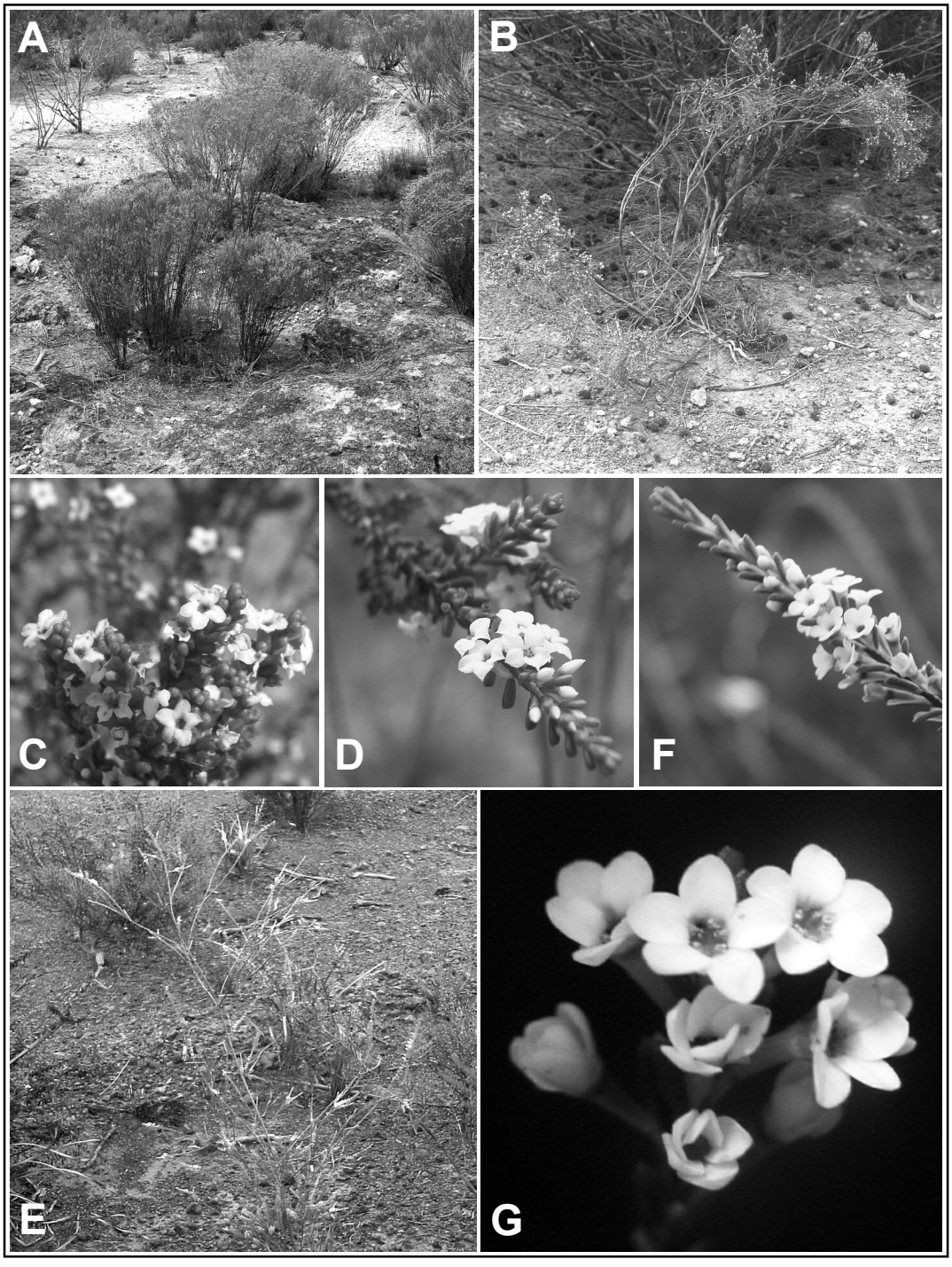

Figure 2. Photographs of *Micromyrtus* species. A–C. *M. acuta*, voucher *B.L. Rye* 231018 & *M.E. Trudgen*. A, B – habit, C – flowers; D – *M. elobata* subsp. *elobata*, flowering stem, voucher *B.L. Rye* 231226; E, F. *M. navicularis*, voucher *B.L. Rye* 231205. E – habit, F – flowering stem; G – flowers of northern variant of *M. triptycha* complex, voucher *B.L. Rye* 239105 & *M.E. Trudgen*.

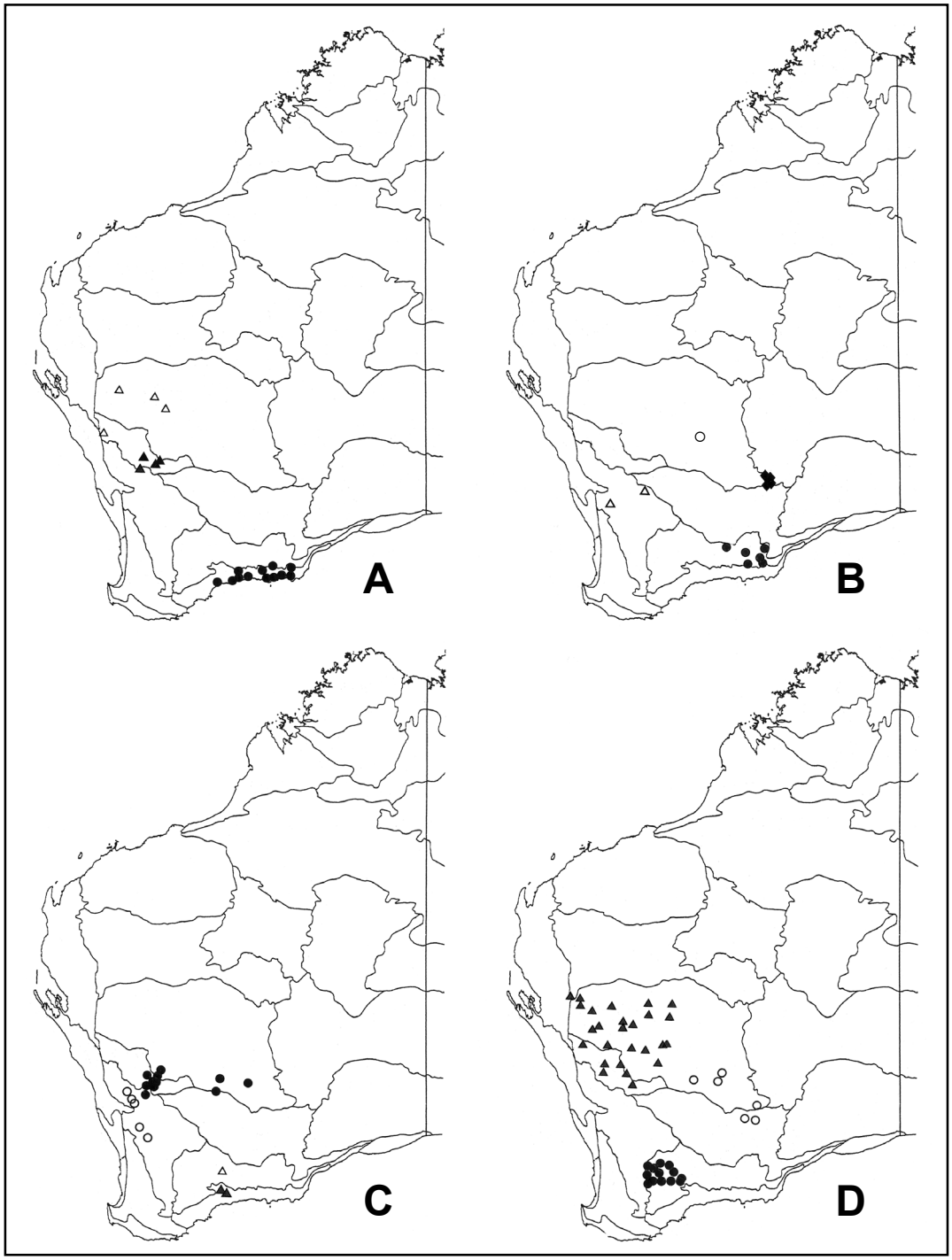

Figure 3. Distribution maps. A – *Micromyrtus acuta* (▲) , *M. elobata* subsp. *elobata* (●) and *M. placoides* (△); B – *Micromyrtus chrysodema* (○), *M. elobata* subsp. *scopula* (●), *M. stenocalyx* (♦) and *M. redita* (△); C – *Micromyrtus clavata* (●), *M. navicularis* (▲), northern variant of *M. triptycha* complex (○) and Ironcaps variant of *M. triptycha* complex (△); D – *M. serrulata* (○), *M. sulphurea* (▲) and *M. triptycha* (●).

tuberculate-glandular at base, with elongated apical portion protruding inwards beyond the cells. *Ovary* with 2 ovules in a cavity above the middle but distinctly below the summit. *Style* 0.6–1 mm long. *Fruit* not seen at maturity.

Other specimens examined. WESTERN AUSTRALIA: Niagara Dam Nature Reserve, 5 Sep. 1990, *A. Chapman & D. McMillan* 90-32 (PERTH); Cardunia Rocks Nature Reserve, 24 Mar. 1992, *A. Chapman* 6/92 (PERTH); W edge Melita Station, 13 June 1988, *R.J. Cranfield* 6979 (PERTH); 1.6 km SE of Alexandra Bore, Jeedamya Station, 16 June 1988, *R.J. Cranfield* 7021 (PERTH); 15 km W of Niagara Dam, 6 July 1995, *R.J. Cranfield* 9859 (PERTH); Cardunia Rock, 11 Aug. 1981, *K.R. Newbey* 8484 (PERTH); Site 57, Mavis Rock, 42 km W of Queen Victoria Spring, Queen Victoria Spring Nature Reserve, 26 July 1992, *D.J. Pearson* 2132 (PERTH); Nippon highway, 76.7 km W of Argus Corner, *c.* 0.7 km E of Kirgella Rocks, 5 Aug. 2003, *Peter G. Wilson* 1619 *& G.M. Towler* (PERTH).

Distribution and habitat. Eremaean Botanical Province: COO, MUR. Extends from Melita Station south-east to near Karonie. Recorded mainly from brownish or reddish sandy and clayey soil over granite, in mixed *Acacia* shrublands, also with *Eucalyptus petraea* recorded at one locality. (Figure 3D)

Phenology and insect associations. Flowers recorded June to November. Scale-forming insects are present on the leaves of many specimens. *R.J. Cranfield* 7021 has two kinds of scales, sculptured black scales with a very narrow white margin and white wax scales.

Conservation status. Conservation Codes for Western Australian Flora: Priority Three. Known from about seven localities, including three nature reserves, over an area extending *c.* 300 km.

Notes. Green (1980) described *Micromyrtus serrulata* from the type collection, which was the only one known at that time. While there are now at least seven additional collections, good fruiting material is still needed for this species. From some young and very old fruits that are present, it appears that the petals are more persistent than in most species of *Micromyrtus* but this needs confirmation. *M. serrulata* is one of the few south-western species with distinctly ciliolate leaves, and it has larger sepals than the other taxa except for one unnamed member of the *M. racemosa* complex.

Micromyrtus stenocalyx (F. Muell.) J.W. Green, *Nuytsia* 3: 201 (1980). *–Thryptomene stenocalyx* F. Muell., Fragm. Phyt. Austral. 10, 23–24 (1876). *Type:* ad scaturigines victoriae [Victoria Springs, Western Australia], *J. Young* (*holo:* MEL 70798 *n.v.*).

Illustrations. Blackall & Grieve (1980: 46) [as *Thryptomene stenocalyx*]; Green (1980: Figures 121–128).

Shrub 0.3–1.5 m high, often straggling or widely spreading. *Leaves* widely antrorse to appressed, rather densely arranged distally on the branchlets. *Petioles* 0.3–0.4 mm long. *Leaf blades* obovate or broadly obovate in outline, 1.3–3 × 0.8–1.3 mm, very thick, broadly obtuse, entire, with margins sometimes forming a narrow projecting rim; lower surface varying from steeply-sided and sometimes indented along midvein to smooth and strongly convex, with 3–5 usually very prominent glands up to *c.* 0.2 mm diam. in each longitudinal row; upper surface almost flat or somewhat convex on margin but deeply depressed along centre-base. *Racemes* mostly extending for 2–12 nodes, the flowers antrorse or widely antrorse, becoming patent in fruit; peduncles 0.6–1.4 mm long. *Bracteoles* caducous, rather herbaceous, narrowly ovate, 1–1.5 mm long, often reddish, acute, entire, with prominent glands. *Buds* with apex hemispheric.

Flowers 2.5–3 mm diam.; hypanthium somewhat compressed in the adnate portion, 2.5–3.5 mm long, *c.* 0.5 mm wide at midpoint, 1–1.2 mm wide at summit, free in distal 0.4–0.5 mm, with ribs apparently absent or 5- or 10-ribbed but ribs not very prominent, when 5-ribbed the ribs opposite the sepals, somewhat rugose. *Sepals* erect in flower and fruit, scarious, very depressed and rim-like, 0.1–0.2 mm long, 0.4–0.6 mm wide, entire. *Petals* with claw erect and lamina widely spreading in flower, closing erect in fruit, broadly obovate, 0.9–1.3 mm long, white, broadly obtuse, entire, with a few very large oil glands visible on outer surface. *Stamens* 10, the antipetalous ones inserted on inside of summit of disc and antisepalous ones distinctly lower near middle of free tube, all borne well above the style; filament 0.4–0.6 mm long. *Anthers c.* 0.3 mm long; slits very oblique (about half way between parallel and transverse); gland small, almost equally 3-lobed. *Ovary* with 2 ovules in a more or less terminal cavity. *Style c.* 0.4 mm long. *Fruit* cylindrical, the most mature seen *c.* 2.5 × 0.7 mm. *Seed* not seen at maturity but apparently *c.* 2 mm long.

Selected specimens examined. WESTERN AUSTRALIA: 8 km NE of Queen Victoria Spring, 17 Oct. 1995, *D.J. Edinger* 999 (PERTH); Queen Victoria Spring, in Queen Victoria Spring Nature Reserve, 19 Apr. 1996, *D.J. Edinger* 1233 (PERTH); 18 miles [29 km] N of Cundeelee, 21 Sep. 1963, *A.S. George* 5879 (PERTH); 10 km NE of Cundeelee, 2 July 1966, *D.W. Goodall* 2995 (PERTH); Queen Victoria Spring, Aug. 1975, *B.M.J. Hussey s.n.* (PERTH); 25 km NNE of Queen Victoria Spring, 2 Sep. 1988, *D.J. Pearson* 501 (PERTH); 6 km SE of Queen Victoria Spring, Queen Victoria Spring Nature Reserve, 7 Sep. 1992, *D.J. Pearson* 2785 (PERTH); 26 km NNW of Queen Victoria Spring, Queen Victoria Spring Nature Reserve, 8 Dec. 1992, *D.J. Pearson* 3086 (PERTH); Great Victoria Desert, PNC road, 35.4 km W of Cable Haul Rd, 4 Aug. 2003, *Peter G. Wilson* 1618 *& G.M. Towler* (PERTH).

Distribution and habitat. Eremaean Botanical Province: COO, GVD, MUR. Extends from east of Rason Lake south-west to Queen Victoria Spring Nature Reserve. Recorded on the crest or lower down on dunes or undulating sandplains, in yellow or rarely red soils, the vegetation dominated by mallee eucalypts or smaller shrub species, often with *Triodia* hummock grass. (Figure 3B)

Phenology. Flowers recorded April, July to December, especially August to October. Fruits recorded in October and November.

Conservation status. Conservation Codes for Western Australian Flora: Priority Three. Occurs in one large nature reserve, where it appears to be widespread, and its known range extends over 200 km.

Notes. This species sometimes has only five ribs opposite the sepals but appears to be a primarily 10-ribbed species.

Micromyrtus sulphurea W.V. Fitzg., *J. W. Austral. Nat. Hist. Soc.* 2: 19 (1904). *Type:* on rocky hillside 0.5 mile [0.8 km] west of Mount Magnet, Western Australia, September 1903, *W.V. Fitzgerald* (*holo vel iso:* PERTH 01631357; *iso:* PERTH (ex B) 01631365).

Illustrations. Blackall & Grieve (1980: 44); line drawing on the holotype.

Shrub commonly stunted and 0.2–0.4 m high, often widely spreading, sometimes erect and 0.5–1.5 m high. *Leaves* mostly widely antrorse or antrorse, densely arranged on the smaller branchlets. *Petioles* up to 0.3 mm long. *Leaf blades* usually narrowly oblong to narrowly obovate in outline, 2–4 × 0.5–0.7 mm, often thick, broadly obtuse and mucronulate, entire, concolorous; lower surface deeply convex with

very steep sides, sometimes with an indentation along midvein towards base, with 5–10 prominent glands less than 0.2 mm diam.; upper surface convex to shallowly concave, usually almost flat. *Racemes* mostly extending for 2–10 nodes, the flowers antrorse or widely antrorse, tending to become patent in fruit; peduncles (0.6)0.8–1.5(2) mm long. *Bracteoles* caducous, scarious, ovate or narrowly ovate, 1–1.8 mm long, pale brown and sometimes tinged reddish, acute to acuminate, entire. *Buds* with apex hemispheric. *Flowers* 3.5–4.5 mm diam., with several filiform processes 0.1–0.3 mm long opposite each petal; hypanthium with adnate portion almost terete, (1.5)2–3 mm long, 0.5–0.7 mm wide at midpoint, 1.4–1.7 mm wide at summit, free in distal 0.3–0.5 mm, with several fairly obvious ribs on adaxial surface, somewhat concave and less distinctly ribbed on abaxial surface. *Sepals* widely spreading in flower and fruit, somewhat scarious, depressed or very depressed, 0.2–0.4 mm long, 0.5–0.9 mm wide, yellow, broadly obtuse, entire to dentate. *Petals* widely spreading in flower and fruit, very broadly obovate, 1.2–1.4 mm long, sulphur-yellow, broadly obtuse, more or less entire. *Stamens* 10, the antipetalous ones inserted on inside or rarely on top of summit of disc, the antisepalous ones inserted near the middle of the free tube or higher, rarely subterminal (on inside just below summit of disc); filament 0.6–0.9 mm long. *Anthers* *c.* 0.35 mm long; slits very oblique (closer to transverse than longitudinal); gland with 2 small lateral lobes and a large apical portion. *Ovary* with 2 ovules in a cavity towards the centre of ovary, distinctly below the summit of the ovary cell. *Style* 0.5–1 mm long. *Fruit* obconic, *c.* 1.8 × 0.8 mm, 1-seeded; hypanthium 10-ribbed. *Seed* narrowly obovoid-obconic, 1.3–1.5 × *c.* 0.6 mm; testa cream or very pale golden brown.

Selected specimens examined. WESTERN AUSTRALIA: 6 km S of Mt Edon, Maranalgo Station, 26 Nov. 1992, *R.J. Cranfield* 8632 (PERTH); near Youanmi, 17 Oct. 1966, *C.A. Gardner* 19027 (PERTH); near track beside Wooramel River, 10.1 km SE of Callythara Springs Homestead, 31 Aug. 1995, *G.J. Keighery & N. Gibson* 1046 (PERTH); Curbur Station, 10.5 km NNE of homestead, Carnarvon–Mullewa road, 11 Aug. 2000, *S.J. Patrick & A. Cochrane* 3689 (PERTH); 35 miles [56 km] E of Meekatharra, 10 Sep. 1957, *N.H. Speck* 778 (PERTH); Mt Barloweerie, *c.* 20 km S of Wooleen Homestead, 13 Oct. 1975, *J.Z. Weber* 5073 (PERTH).

Distribution and habitat. Eremaean Botanical Province: CAR, MUR, YAL. Extends from Wooramel River east to near Wiluna and south to Marangalgo Station (near Paynes Find). Occurs on lateritic or granitic breakaways and other rocky locations, often in *Acacia* shrubland. (Figure 3D)

Phenology. Flowers recorded mainly August to October. Fruits recorded October to November.

Notes. This species differs from all other ten-ribbed species of *Micromyrtus* in its spreading persistent petals, and is the most obviously yellow-flowered species in that group.

Micromyrtus sulphurea is a very variable species, with some geographical trends evident. The more inland (eastern) specimens tend to be larger plants, sometimes with a longer style, although they may tend to have a shorter hypanthium than the western specimens. There is often evidence of infection, apparently by a fungus, on the young shoots of some of the eastern specimens.

Some 4-merous flowers are present on a specimen from near Sandstone (*H. Demarz* 2624) but these are outnumbered by 5-merous flowers. One specimen from east of Meekatharra (*A. Strid* 20202) has particularly short flowers (hypanthium *c.* 1.5 mm long) and the antisepalous stamens are subterminal on the disc.

Micromyrtus triptycha Rye, *sp. nov.*

Micromyrtus racemosa var. *latifolia* J.W. Green ms.

Bracteolae caducae vel deciduae. Alabastra ad apicem hemisphaerica. Hypanthium c. 2–3 mm longum, 10-costatum, parte adnata in statu florenti compressa sed in statu fructifero tereti. Sepala erecta, petalis multo breviora. Petala alba, in fructu decidua. Stamina 10, obdiplostemona, brevissima, antheris filamentis longioribus, triangulara. Ovula 2.

Typus: 15.8 miles [25.4 km] east of Lake Grace, Western Australia, 27 September 1975, *J.W. Green* 4453 (*holo:* PERTH 01630857; *iso:* PERTH 01630865).

Shrub often low (0.1–0.5 m) and usually widely spreading, sometimes erect and 0.7–1.4 m high, often multi-stemmed from near the base and often with decumbent to prostrate branches. *Leaves* closely antrorse to patent, fairly densely arranged on the smaller branchlets. *Petioles* 0.4–0.5 mm long. *Leaf blades* narrowly obovate or obovate, 2–6 × 1.2–2.3 mm, broadly obtuse, entire or rarely minutely denticulate; lower surface convex, with usually 6–10 prominent glands up to 0.1 mm diam. in each row, with 2–4 main rows on each side of the midrib; upper surface concave, tending to be paler than lower surface. *Racemes* mostly extending for 6–16 nodes; peduncles 0.5–1.3 mm long. *Bracteoles* usually caducous or deciduous, rather scarious, closely folded and often appearing more or less linear (very narrowly obovate to almost ovate when opened out), 1.2–2.2 mm long, often pale yellowish brown, acute, entire. *Buds* with apex hemispheric. *Flowers* 3–4.3 mm diam.; hypanthium dorsiventrally compressed in adnate portion, 1.9–3 mm long, 0.6–0.8 mm wide at midpoint, 0.8–1.1 mm wide at summit, free in distal 0.4–0.6 mm, 10-ribbed, all ribs similar or rarely with the 5 ribs opposite the sepals more prominent than the ribs opposite the petals, tending to be patterned between the ribs with faint transverse ridges delimiting pits or glands; free portion 0.5–0.6 mm long, not much expanded, sometimes with only 5 of the ribs obvious. *Sepals* erect in flower and fruit, scarious, very broadly or depressed ovate, 0.3–0.5 mm long, 0.5–0.7 mm wide, broadly obtuse, usually entire, sometimes denticulate. *Petals* with claw erect and remainder widely spreading in flower, deciduous in fruit, obovate, 1.3–2 mm long, white or cream, sometimes pink-tinged, broadly obtuse, more or less entire, with some prominent glands on outer surface. *Stamens* 10, the antipetalous ones inserted on summit of disc, the antisepalous ones inserted near the middle of the free tube; filament 0.1–0.2 mm long. *Anthers* 0.3–0.4 mm long, with the cells forming a rounded-triangular to almost globular structure divided by slits into 3 more or less equal sized parts; slits very oblique or more or less transverse; gland erect, very broad (projecting laterally beyond the cells), with 2 lateral lobes smaller than the apical portion. *Ovary* with 2 ovules in cavity in upper half but distinctly below the summit of ovary cell. *Style* 0.3–0.4 mm long. *Fruit* not compressed, 1.6–2.2 × 0.8–1 mm, 1-seeded; hypanthium becoming rounded out, with the ribs less obvious or no longer visible. *Seed* obovoid-conic or narrowly so, 1.3–2 × 0.7–0.8 mm; testa medium golden-brown to dark red-brown.

Selected specimens examined. WESTERN AUSTRALIA: Newdegate–Lake Grace road, 15 Apr. 2003, *T.J. Alford* 221 (Perth); Dragon Rocks Nature Reserve, 17 Aug. 1998, *E. Bennett & K. Del Fante* DS7.20 (PERTH); 0.4 km W on unnamed track, 7.6 km N of Creek Rd/Old Newdegate Rd on Tarco Rd, *c.* 34.5 km ESE of Newdegate, 8 Nov. 1996, *B.J. Lepschi* 3257 *& T.R. Lally* (PERTH); Corrigin road, Dump 1, near Kulin, 28 Sep. 1995, *S. Murray* KKS206 (PERTH); 16 km W of Lake King, 8 Oct. 1974, *B.L. Powell* 74113 (PERTH); 16 km from Hyden on road to Newdegate, 1 Jan. 1983, *A. Strid* 21877 (PERTH); 10.5 miles [17 km] E of Newdegate, 28 Aug. 1973, *M.E. Trudgen* 689 (PERTH); *c.* 25 km W of Lake Grace near Tarin Rock, 11 Oct. 1974, *D.J.E. Whibley* 5314 (PERTH).

Distribution and habitat. Endemic to the South West Botanical Province, extending from near Harrismith north-east to near Hyden and east to near Lake King: AW, ESP, MAL. Occurs mainly in yellow or brown sandy soils but also recorded from more reddish soils perhaps with some clay present, often with gravel, sometimes at the base or on the slopes of lateritic rises, commonly dominated by mallees (*Eucalyptus*) or various tall shrub species, including *Allocasuarina*. (Figure 3D)

Phenology. Flowers mainly April to November, also recorded December and January. Mature fruits and seeds rarely seen, measured from *T.J. Alford* 221and *A.S. George* 14437 and almost mature ones from *R.A. Saffrey* 472.

Conservation status. A relatively commonly collected taxon that does not appear to be at risk.

Chromosome number. n = 11, voucher: *B.L. Powell* 74113 (not previously published) and 2n = *c.* 22 [as *Micromyrtus* sp. aff. *racemosa*], voucher *M.E. Trudgen* 689 (Rye 1979).

Etymology. From the Greek *triptychos* three-fold, triple, referring to the 3-celled appearance of the anthers. Instead of the distinctly doubled cells found in the anthers of most *Micromyrtus* species, this species and its closest relatives (i.e. the *M. triptycha* complex) appear to have anthers with three equal parts arranged similarly to, but less rounded than, those of *Corynanthera*. There do still appear to be two slits, however, suggesting that the upper parts of the two cells have become reduced and closely fused into a single structure of approximately the same size as the still distinct lower parts of each cell. The pollen is released to form a large central mass, and the very broad gland projects laterally on each side of the upper part of the anther cell 'triangle'.

Affinities. The closest named relative of *M. triptycha* is *M. naviculare*; see notes under that species. Previously all members of the *M. triptycha* complex were confused with *Micromyrtus racemosa*, which can be readily distinguished by its thicker leaves and its simpler anthers that are obviously 2-celled and are exceeded in length by the filament. Somewhat less obvious differences in *M. racemosa* are the usually more prominently 10-ribbed hypanthium and the more or less terminal ovule cavity.

The *M. triptycha* complex is similar to *M. rogeri* in having the filament so reduced that it is only about half as long as the anther, but its anther morphology (see under etymology section) is unique in the genus.

Notes. The description given above for *Micromyrtus triptycha* applies only to plants occurring in the main area of distribution of the *M. triptycha* complex; these specimens were previously known as *M. racemosa* var. *latifolia* J.W. Green ms. and later as *M. triptycha* subsp. *triptycha* ms. Although the plants from this geographic area are very variable, they were thought to consistently differ from other members of the complex in their growth habit, as the label data on the specimens commonly describe them as prostrate or very low-growing. They also tend to have the broadest and least prominently dotted leaves and bracteoles, and the hypanthium is more uniformly tubular (i.e. the least flared at the summit). However, at the only two populations sampled in the current study, the plants were erect and up to 1.4 m high. Some of the specimens collected previously are from graded road verges and may have abnormal growth habits as a result. In view of this new information, it appears that more data are needed before the taxonomy of all members of the complex can be finalised.

Separate descriptions are given below of the specimens from the two other main areas of distribution of the complex not covered in the above descriptions of *M. navicularis* and *M. triptycha*. Scale-forming insects seem to be rare or absent in all members of the complex.

a. Northern specimens of *M. triptycha* complex

Shrub erect, spindly, 0.5–1.4 m high, with a single slender basal stem commonly c. 10 mm diam. or with multiple slender branches or stems from the base. *Petioles* 0.4–0.8 mm long. *Leaf blades* narrowly obovate or obovate, 2.5–5 × 1–1.5 mm, entire; lower surface convex, with usually 8–11 prominent glands up to 0.15 mm diam. in each row, with 2 or 3 main rows on each side of the midrib; upper surface concave. *Racemes* mostly extending for 20–30 adjacent nodes; peduncles 0.7–2 mm long. *Bracteoles* caducous to fairly persistent but absent from mature fruits, somewhat scarious, closely folded and almost narrowly obovate from side view, broadest towards the apex, 1.5–2.2 mm long, acute, entire. *Buds* with apex hemispheric. *Flowers* 3–3.5 mm diam.; hypanthium dorsiventrally compressed in adnate portion, 2.3–3 mm long, *c.* 0.6 mm wide at midpoint, *c.* 1.3 mm wide at summit, fairly equally 10-ribbed, sometimes somewhat patterned between the ribs with faint transverse ridges delimiting pits or glands; free portion 0.5–0.6 mm long, not much expanded, with ribs tending to be faint. *Sepals* erect in flower and fruit, scarious, very broadly or depressed ovate, 0.3–0.5 mm long, 0.5–0.7 mm wide, broadly obtuse, more or less entire. *Petals* with claw erect and remainder widely spreading in flower, deciduous in fruit, obovate, 1.4–1.6 mm long, white or pale yellow, broadly obtuse, more or less entire, with some prominent glands on outer surface. *Stamens* 10, the antipetalous ones inserted on summit of disc, the antisepalous ones inserted near the middle of the free tube; filament 0.15–0.25 mm long. *Anthers* 0.3–0.4 mm long, with the cells forming a rounded-triangular to almost globular structure divided by indentations into 3 more or less equal sized parts; slits oblique; gland erect, very broad (projecting laterally beyond the cells), with 2 lateral lobes smaller than the apical portion. *Ovary* with 2 ovules in cavity in upper half but distinctly below the summit of ovary cell. *Style c.* 0.3 mm long. *Fruit* not compressed, 2.3–2.4 mm long, *c.* 0.8 mm wide, 1-seeded; hypanthium becoming rounded out and with less obvious or indistinct ribs. *Seed* narrowly obovoid-conic, 1.9–2 × *c.* 0.75 mm; testa medium golden-brown to dark red-brown. (Figure 2G)

Other specimens examined. WESTERN AUSTRALIA: between Maya and Wubin, 3 Sep. 1938, *W.E. Blackall* 3764 (PERTH); 6.6 km NW of Wongan Hills towards Piawaning, 27 Aug. 1976, *R. Coveny* 7822 *& B.R. Maslin* (PERTH); 4 miles [6.5 km] S of Maya, 22 Aug. 1957, *J.W. Green* 1504 (PERTH); Maya Railway Siding, 16.1 km S of Latham on the Wubin–Mullewa road, 20 Sep. 1985, *N. Hoyle* 308 (PERTH); 100 m W of NE corner of Manmanning Nature Reserve, *c.* 17 km S of Cadoux, 11 Sep. 1998, *G.J. Keighery & N. Gibson* 6155 (PERTH); Wongan Hills Experimental Farm, Reserve 18672, Craig Rd, *c.* 6.5 km N of Wongan Hills, 24 Oct. 1984, *K.J. Knight* 357 (PERTH); 1 mile [1.6 km] NNW of Maya on Goomalling–Mullewa road, 22 July 1953, *R. Melville* 4287 *& J. Calaby* (PERTH); Dowerin, May 1959, *B. Rosier* 37 (PERTH); Maya East Rd, near the intersection with a road running along the eastern side of the railway line at Maya, 29°52.734'S, 116°30.125'E, 10 Sep. 2003, *B.L. Rye* 239104, 239105 *& M.E. Trudgen* (PERTH); 30 miles [48 km] N of Wubin on Mullewa road, 9 Sep. 1962, *F.W. Went* 127 (PERTH).

Distribution and habitat. Extends from Maya south-east to Dowerin: AW. The Maya locality had yellow-brown fine sand and a large area had been cleared and was (in 2003) extremely species-rich in Myrtaceae and other plant groups. Habitat information for other specimens suggest that the species is always found in sandy soils that are often yellowish, at two localities recorded as being over laterite or gravel. (Figure 3C)

Phenology. Flowers July to October, also recorded in May. Mature fruits and seeds rarely seen but measured from *K.J. Knight* 357 and *B. Rosier* 37.

Affinities. This taxon differs from all other members of the *Micromyrtus triptycha* complex in its more northern distribution, which is separated by about 150 km from the closest of the southern populations

of the complex. Its leaves tend to be more prominently oil-dotted and narrower than those of typical *M. triptycha* but broader than those of the *M. navicularis* and the variant from the Ironcaps area. It generally has a longer hypanthium than the latter two taxa resulting in usually longer flowers, fruits and seeds, and tends to have longer sepals, but has similar-sized petals and hence a similar flower diameter.

Notes. Currently housed at PERTH as *M. triptycha* subsp. *longiflora* Rye ms. Specimens from the furthest north near Maya (e.g. *J.W. Green* 1504) tend to have the thickest leaves, and have very prominently gland-dotted leaves and bracteoles. One of these northernmost populations was visited in the current study. Flower colour in this population was either white or pale yellow. Some individuals had caducous bracteoles that were shed from the buds while others had relatively persistent bracteoles that were often still present on immature fruits.

b. Specimens of *M. triptycha* complex from Ironcaps region

Shrub erect, spindly, 1.5–3 m high, presumably single-stemmed at base but lower parts of plants not seen. *Petioles* 0.5–0.6 mm long. *Leaf blades* narrowly obovate, 4–5.3 × 1.1–1.3 mm, entire; lower surface convex, with usually 10–14 prominent glands up to 0.1 mm diam. in each row, with 2 or 3 main rows on each side of the midrib; upper surface concave, tending to be paler than lower surface. *Racemes* mostly extending for 7–26 nodes; peduncles 1.5–3 mm long. *Bracteoles* usually caducous or deciduous, rather scarious, closely folded and often appearing linear (very narrowly obovate to narrowly oblong when opened out), 1.5–2.4 mm long, pale and yellowish, acute, entire. *Buds* with apex hemispheric. *Flowers* 3–3.5 mm diam.; hypanthium with adnate portion dorsiventrally compressed, 1.9–2.3 mm long, *c.* 0.5 mm wide at midpoint, 0.9–1.1 mm wide at summit, free in distal 0.4–0.6 mm, distinctly 10-ribbed, tending to be patterned between the ribs with faint transverse ridges delimiting pits or glands. *Sepals* erect in flower and fruit, scarious, very broadly or depressed ovate, 0.2–0.35 mm long, 0.3–0.5 mm wide, broadly obtuse, more or less entire. *Petals* with claw erect and remainder widely spreading in flower, deciduous in fruit, obovate, *c.* 1.4 mm long, white, broadly obtuse, more or less entire, with some prominent glands on outer surface. *Stamens* 10, the antipetalous ones inserted on summit of disc, the antisepalous ones inserted near the middle of the free tube; filament *c.* 0.2 mm long. *Anthers* 0.3–0.4 mm long, with the cells forming a rounded-triangular to almost globular structure divided by slits into 3 more or less equal sized parts; slits very oblique or more or less transverse; gland erect, very broad (projecting laterally beyond the cells), with 2 lateral lobes smaller than the apical portion. *Ovary* with 2 ovules in cavity in upper half but distinctly below the summit of ovary cell. *Style c.* 0.35 mm long. *Fruit* not compressed, *c.* 1.8 mm long, *c.* 0.85 mm wide, 1-seeded; hypanthium brown, 10-ribbed, smooth between the ribs. *Seed* obovoid-conic, *c.* 1.4 × 0.8 mm; testa dark red-brown.

Specimens examined. WESTERN AUSTRALIA: 1 km N of South Ironcap, 18 Oct. 1995, *R.J. Cranfield* 10595 (PERTH); on northern side of gridline, *c.* 25 m north-east of South Ironcap, 7 Sep. 1996, *N. Gibson & K. Brown* 3082 (PERTH); ridgeline of South Ironcap, 1 Sep. 1986, *S.D. Hopper* 5375 (PERTH); Middle Ironcap, 12 Oct. 1976, *G.J. Keighery* 885 (PERTH).

Distribution and habitat. Apparently restricted to the Ironcaps region (east of Hyden and north of Lake King): MAL. This taxon is recorded on the ridgeline, upper slopes or base of lateritic or banded ironstone rocks. (Figure 3C)

Phenology. Flowers recorded August to October. Mature fruits and seeds measured on *N. Gibson & K. Brown* 3082.

Conservation status. Conservation Codes for Western Australian Flora: Priority One. This taxon apparently has a very restricted distribution as it is known from only three localities over a distance of *c.* 11 km.

Affinities and notes. Currently housed at PERTH as *M. triptycha* subsp. *elata* Rye ms., this taxon is the tallest member of the *Micromyrtus triptycha* complex, reportedly 1.7–3 m high, but full details of its habit are still not known. It appears to occupy a similar habitat type to that of *M. navicularis*, although in a more inland area of distinctly lower rainfall. *M. navicularis* is readily distinguished by its narrower leaves and usually has a shorter hypanthium.

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