PACIFIC CAPSULAR MYRTACEAE 2.
THE METROSIDEROS COMPLEX: M. COLLINA GROUP

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INTRODUCTION

Rumphius (Herb. Amboin. 3, 1743, 19, t. 7) was the first to use the name *Metrosideros*, but of the 6 species he listed only the first, *M. vera*, belongs to the *Myrtaceae*.

The same species is assumed to be the basis of *Nani* Adanson (Adanson, Familles des Plantes 2, 1763, 88). Adanson did not list any species, but the assumption is based on the description and the fact that Rumphius had given the vernacular name of his *Metrosideros vera* as 'Nani tree'.

Banks *(in sched.)* applied the name *Metrosideros* to 12 species (Banks *ex* Gaertn., Fruct. 1, 1788, 170, t. 34), but Gaertner made no reference to Rumphius' earlier use of the name nor to any of the species he included. The genus was poorly defined and later authors transferred the first 6 species to other genera, some to *Eucalyptus*, others to *Angophora*, *Melaleuca*, and *Callistemon*.

Later authors treated *Nani* Adanson as a synonym of *Metrosideros* Banks *ex* Gaertn., although in merging the two generic concepts, *Nani* should take precedence.

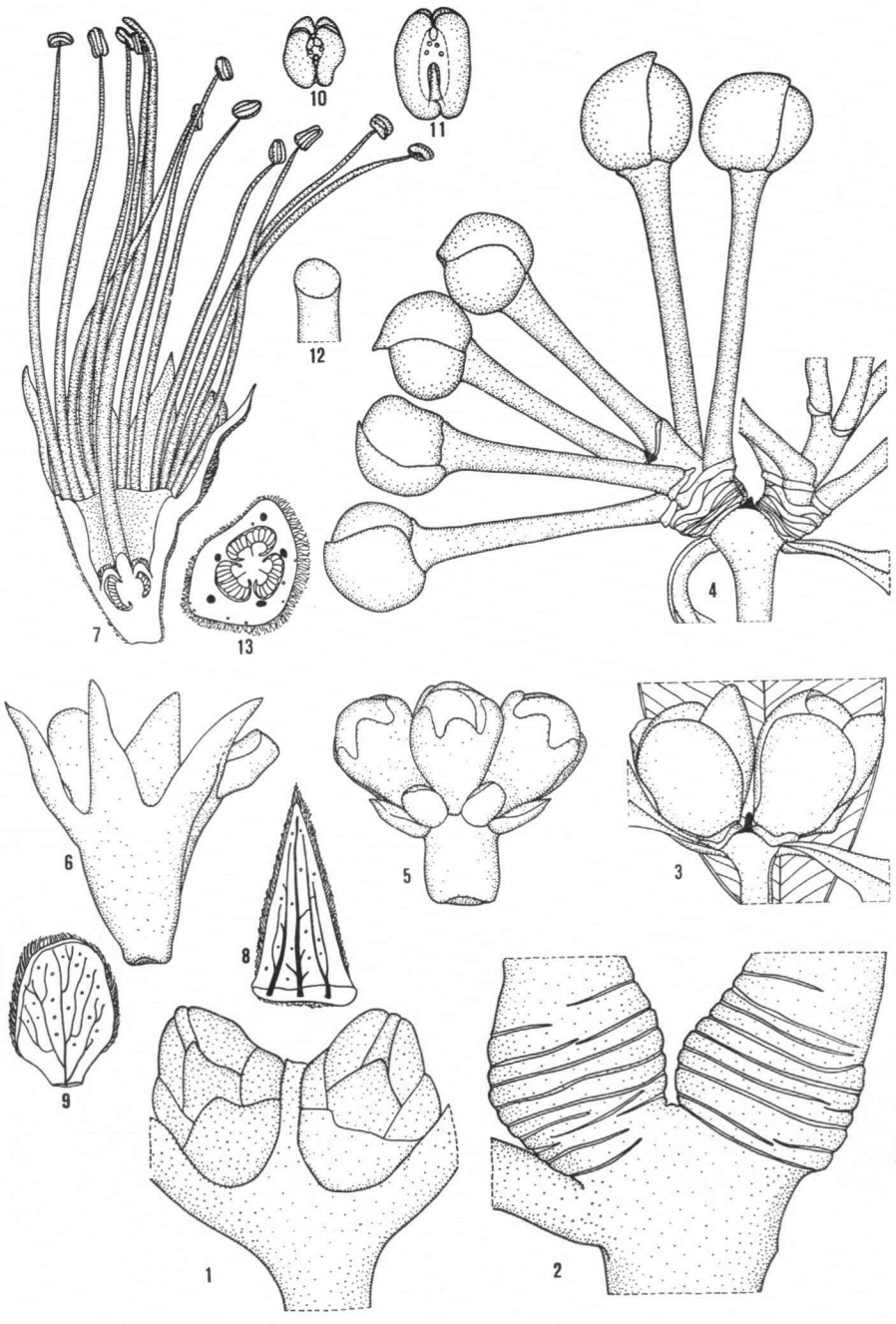
At the 1930 International Botanical Congress *Metrosideros* Banks *ex* Gaertn. was conserved against *Nani* Adanson and *M. scandens* Sol. *ex* Gaertn. [syn. *M. perforata* (J. R. et G. Forst.) A. Rich.] designated as the conserved type. However, Rock (Board of Agric. and For. T. H. Bull. 4, 1917, 12) had earlier designated *M. spectabilis* Sol. *ex* Gaertn. [syn. *M. collina* (J. R. et G. Forst.) A. Gray] as the type species of *Metrosideros* Banks *ex* Gaertn., and Dawson (Taxon 17, 1968, 600) proposed that Rock's type species be reinstated. See also Taxon 19 (1970) 292.

As *Metrosideros* Banks *ex* Gaertn. has never been clearly defined there must be doubt, not only about the status of the approximately 40 species currently referred to it, but also about several supposedly related or synonymous genera — *Nani* Adanson, *Ballardia* Pancher *ex* Baillon, *Tepualia* Hook. *f.*, *Mearnsia* Merrill, and *Kania* Schlechter.

The present paper is the first in a series concerned with what might be termed the *Metrosideros* complex. Before attempting to define or redefine the genera concerned with consequent name changes, the groups of what the author regards as related species in the complex will be described, but not given formal status. It is hoped that the comments of other botanists on the evidence presented will assist the author with the eventual formal treatment of the complex.

DESCRIPTION OF THE METROSIDEROS COLLINA GROUP

Many-stemmed trees or shrubs; aerial roots frequent and some species initially epiphytic; branching predominantly sympodial (fig. 1, 2) in mature plants; young parts, at least, more or less pubescent with whitish to grey hairs, although young plants may be com-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pletely glabrous; vegetative (fig. 1) and compound inflorescence[1]) (fig. 3) buds protected by several to many pairs of caducous scales; young stems rectangular to elliptic in section; bark of older stems rough and fissured; leaves microphyllous or smaller, decussate, petiolate, pinnately veined with 2 or 3 marginal veins, when mature glabrous above and glabrous to pubescent below.

Compound inflorescences axillary in pairs adjacent to (fig. 3, 4) and sometimes at the nodes below abortive branch apices; each compound inflorescence (fig. 4) consisting of an axis terminating in a dormant vegetative bud and bearing, immediately above the bud scale scars, several decussate pairs of cymose 1—3 (rarely-more)-flowered inflorescences subtended by caducous bracts; single flowers bearing a pair of bracteoles, groups of 3 flowers (fig. 5) with the central flower ebracteate and each lateral flower subtended by a bract and bearing 2 bracteoles; bracts and bracteoles mostly broad ovate to orbicular.

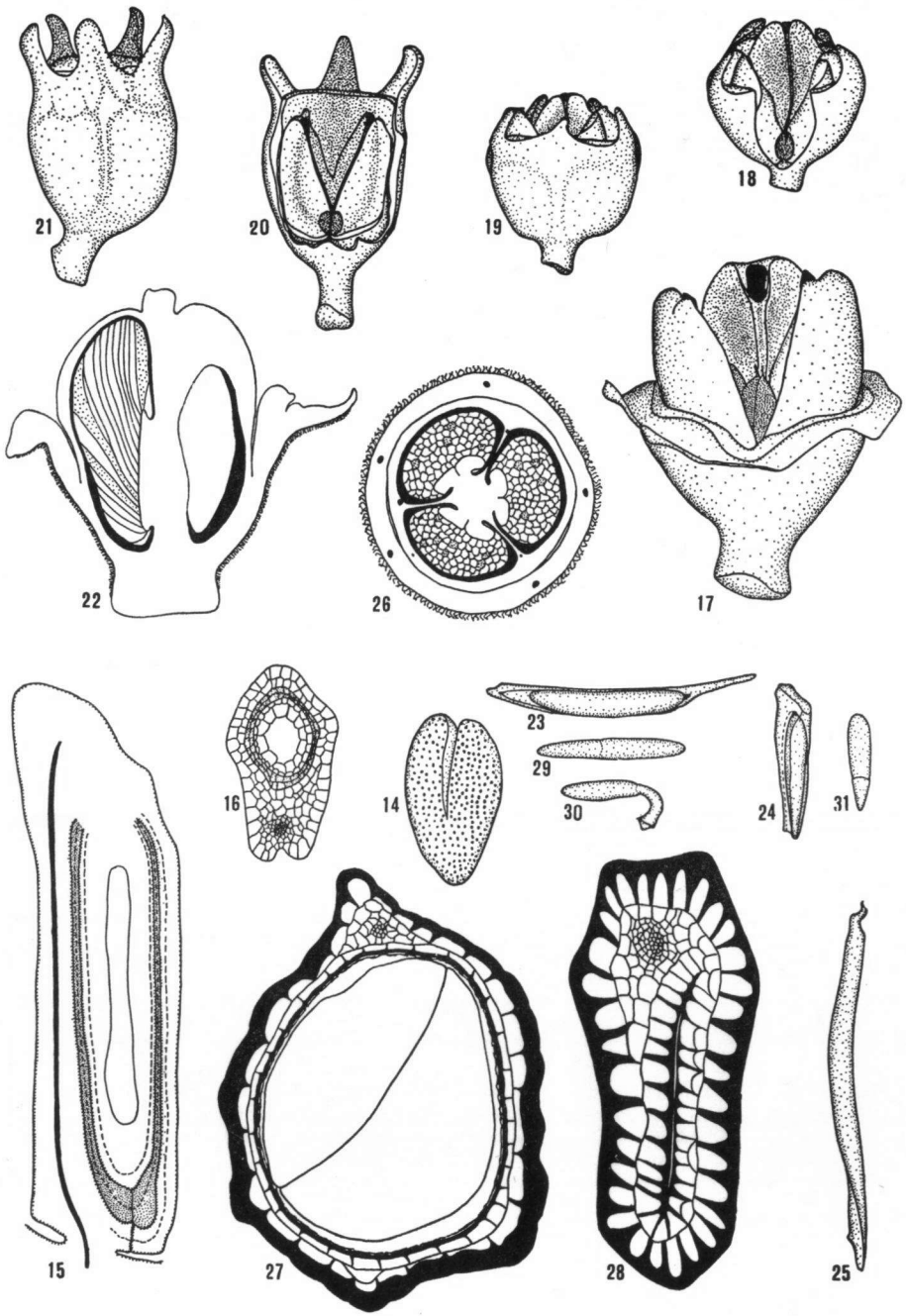
Flowers (fig. 6, 7) shortly pedicellate or sessile; sepals (fig. 8) 5, equal, acute to rounded; petals (fig. 9) persistent, 5, equal, rounded, mostly red, sometimes yellow or white; exterior hypanthium, back of sepals and petals, and top of ovary glabrous to densely pubescent; petal margins often ciliate; stamens same colour as petals, 3 or more times their number and at least twice their length, in a single whorl set behind a rim formed distally from the hypanthial lining; anthers (fig. 10, 11) dorsi-fixed, versatile, pollen sacs longitudinal, dehiscence longitudinal, 2 or more crowded oil glands on the connective above insertion of the filament; hypanthium extending above ovary; style stout, as long as or a little longer than the stamens, usually set into a hollow at the top of the ovary; stigma (fig. 12) flat to convex, the same width as or only slightly wider than the style; filaments and style glabrous; ovary nearly superior to semi-inferior (fig. 7), mostly 3-loculed (fig. 13), sometimes a few flowers in a compound inflorescence 4-loculed; placentas (fig. 14) axile; ovules (fig. 15, 16) numerous, linear, close-set all over the surface of the placenta and perpendicular to it, anatropous with 2 integuments each of 2 layers and a 2-layered nucellus; all ovules potentially fertile.

In the mature fruit the free part of the capsule extended well beyond (fig. 17), to (fig. 18, 19), or a little below (fig. 20, 21) the level of the hypanthial rim; the base of the style and the placentas becoming widely separated by extension of the tissue between them (cf. fig. 7 and 22).

Seeds (fig. 23, 24, 25) narrow-linear, many times longer than broad, oriented more or less vertically; fertile seeds few, randomly disposed (fig. 26); testa of fertile seeds (fig. 27) derived from the outer integument only, the outer cells being flattened tangentially with

[1]) It is often difficult to define an inflorescence and even more difficult to distinguish a simple from a compound inflorescence. In this series of papers a group of flowers in which the main axis terminates in a flower is regarded as a simple inflorescence, but when the axis terminates in a vegetative bud the inflorescence is regarded as compound.

Figs 1—13. — 1. *Metrosideros excelsa*. Pair of dormant vegetative buds with scales; the abortive stem apex is situated between the buds; × 3½. — 2. *M. excelsa*. Bases of a pair of branches showing bud scale scars; × 3½. — 3. *M. salomonensis*. Pair of compound inflorescence buds; abortive stem apex black; × 2. — 4. *M. salomonensis*. Compound inflorescence with 3 pairs of simple inflorescences; the scales of each simple inflorescence enclose 3 flower buds; the abortive stem apex and dormant apex of the compound inflorescence are blacked in; × 2. — 5. *M. oreomyrtus*. 3-flowered inflorescence at bud stage; × 2. — 6. *M. humboldtiana*. Exterior view of flower with stamens and style removed; × 4. — 7. *M. humboldtiana*. L. S. flower; × 4. — 8. *M. humboldtiana*. Sepal showing veins and oil glands; × 5. — 9. *M. humboldtiana*. Petal showing veins and oil glands; × 5. — 10. *M. oreomyrtus*. Ventral view of anther; filament broken away; × 10. — 11. *M. excelsa*. Ventral view of anther; × 10. — 12. *M. humboldtiana*. Stigma; × 10. — 13 *M. humboldtiana*. T. S. ovary; × 6.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their outer walls thickened and lignified, the inner cells similar in form but their outer walls not so greatly thickened; tannin appearing in the testa cells at a late stage; sterile seeds (fig. 28) consisting of outer integument only with the outer cells elongated radially and heavily thickened on the outer, radial, and sometimes inner walls; inner cells, when present, smaller, isodiametric, with heavily thickened walls.

Embryo (fig. 29, 30, 31) straight; hypocotyl equal to or shorter than the cotyledons; cotyledons same width as the hypocotyl and appressed adaxially.

Dehiscence loculicidal and seed release entirely through the free part of the capsule.

Pollen tricolporate.

DISTRIBUTION

New Zealand	—	*M. excelsa, M. robusta, M. umbellata.*
Kermadecs	—	*M. kermadecensis* (close to *M. excelsa*).
Lord Howe I.	—	*M. nervulosa, M. sp.*
New Caledonia	—	*M. nitida, M. engleriana, M. engleriana* var. *microphylla* (probably warrants specific status), *M. oreomyrtus, M. humboldtiana.*
New Hebrides	—	2 or 3 little known species.
Solomon Is	—	*M. salomonensis, M. sp.*
Fiji	—	*M. collina* var. *vitiensis* (probably warrants specific status).
Samoa	—	*M. gregoryi, M. collina.*
Rarotonga	—	*M. collina.*
Tahiti	—	*M. collina.*
Marquesas	—	*M. sp.*
Rapa	—	*M. sp.*
Hawaii	—	*M. polymorpha, M. macropus, M. tremuloides, M. rugosa.*
Bonin Is	—	*M. boninensis.*

Total of about 26 species.

In New Zealand species of the group occur in lowland rain forest and in the tropics generally in montane rain forests.

Figs. 14—31. — 14. *M. excelsa.* Placenta; large dots indicate positions of attachment of ovules; × 15. — 15. *M. excelsa.* L. S. ovule; inner integument stippled; boundaries between cell layers indicated by dashed lines; × 200. — 16. *M. excelsa.* T. S. ovule; inner integument stippled; × 200. — 17. *M. kermadecensis.* Empty fruit; placentas dark stippled; remains of style black; × 4. — 18—19. *M. engleriana* var. *microphylla.* Empty fruits; in fig. 18 part of hypanthium cut away; × 4. — 20—21. *M. engleriana.* Empty fruits; in fig. 20 part of hypanthium cut away; × 4. — 22. *M. kermadecensis.* L. S. fruit; fertile seeds stippled; lignified tissue black; × 4. — 23. *M. excelsa.* Fertile seed; × 8. — 24. *M. engleriana.* Fertile seed; × 8. — 25. *M. excelsa.* Sterile seed; × 8. — 26. *M. kermadecensis.* T. S. fruit; fertile seeds stippled; lignified tissue black; × 4. — 27. *M. excelsa.* T. S. fertile seed; × 130. — 28. *M. excelsa.* T. S. sterile seed; × 130. — 29—30. *M. excelsa.* Embryos; fig. 30 shows germinating embryo with fringe of root hairs developing at junction of hypocotyl and radicle; × 8. — 31. *M. engleriana.* Embryo; × 8.