

A SYNOPSIS OF ALSEUSMIACEAE IN NEW ZEALAND, NEW CALEDONIA,  
AUSTRALIA, AND NEW GUINEA

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SUMMARY

*Periomphale* Baill. (incl. *Pachydiscus* Gilg & Schltr. and *Memecylanthus* Gilg & Schltr.) from New Caledonia is reduced to *Wittsteinia* F.v.M. from New South Wales. This genus occurs also in New Guinea. Three transfers are made. A new monotypic genus of the group *Crispiloba* is described from Queensland, based on *Randia disperma* S. Moore. A general discussion is held on the features of the group and the affinities within it. It has become clear that it has no alliance to the Caprifoliaceae but must be regarded as allied to Saxifragaceae *sensu lato*, either as a distinct family or as a subfamily. A key is given to the three genera: *Alseuosmia* from New Zealand, *Wittsteinia* from New South Wales, New Caledonia and New Guinea, and *Crispiloba* from Queensland.

INTRODUCTION

Since our revision of Caprifoliaceae in Flora Malesiana (Kern & van Steenis, 1951) I have been interested in the occurrence of Caprifoliaceae in Gondwanaland (New Caledonia and New Zealand), as the family is definitely of true Laurasian distribution, and because the southern representatives (3 small genera) were only with doubt assigned to this family, as a separate tribe.

In preparing the 7th edition of Willis' Dictionary Airy Shaw (1965) argued that the tribe should be removed from Caprifoliaceae and should be recognized as a family of its own and he added in the Dictionary (1966) that the affinity would in some respects be between Escalloniaceae and Loganiaceae. The affinity had also earlier been held in doubt by Gilg & Schlechter (Schlechter, 1906: 269-270) who described two monotypic new genera from New Caledonia and remarked that their New Caledonian material, which they arranged in Caprifoliaceae, had anatomically been examined in detail by Radlkofer (l.c. 269) who gave as his opinion that the Caprifoliaceous affinity was weak and that the morphology was anomalous for the family, but pointed to distinct affinity with the New Zealand genus *Alseuosmia*.

Later Erdtman (1952) found the pollen structure of *Alseuosmia* 'isolated' in Caprifoliaceae.

The finding among New Guinean accessions of a new species of the group raised my interest and necessitated a closer study of the New Caledonian species (Van

Steenis, 1978) for which three names were available, viz. the original *Periomphale* (with 2 species) described by Baillon (1888), who had it attributed to the Gesneriaceae, in which position it is still found in the Flora of New Caledonia by Guillaumin (1948), and the two monospecific genera *Memecylanthus* and *Pachydiscus* of Gilg & Schlechter (Schlechter, 1906). I came to the conclusion that all this material belongs to one genus, the Papuan species being clearly distinct from those of New Caledonia by its small dentate leaves and ascending habit producing many roots. How many species occur in New Caledonia was not clear, differences given were mostly vegetative – shape and size of leaves – and I had only few sheets at my disposal.

Recently I had some correspondence about the New Caledonian species with Mr. M. Schmid at Paris who very kindly checked my conclusions and emphatically agreed with my reduction of the Gilg & Schlechter genera. In passing: one of them had already been reduced by Airy Shaw (1965). Schmid's study of the abundant material at Paris (some 60 sheets) revealed a most interesting feature, namely that there occur two kinds of flowers in *Periomphale*: besides the normal more or less barrel-shaped ones there are also those in which the corolla and stamens do not expand and remain so to say in bud; their texture is firmer than that of the normal flowers. In opening such buds it appears that the stamens are well developed and also the style and stigma. He concluded that these abnormal flowers were cleistogamous. They could be found confined to a sheet, but are also found interspersed with normal flowers on one sheet, as in *Viola*. Baillon (1888) thought that the flowers are polygamous, bisexual and male, but I agree with Gardner (1978: 141) that this is erroneous.

In scanning recently the extensive papers of the important Sydney Symposium on modern classifications by three of our four great contemporaneous system makers, I observed that Thorne (1983: 111) had listed some taxa as *incertae sedis*, among which the Australian genus *Wittsteinia*: 'Often misplaced in Ericaceae or Epacridaceae but probably belongs in or near Alseuosmoideae of Saxifragaceae (fide R. Schmid, pers. comm.)'

This proved to be a most valuable suggestion, because examination of this monotypic genus from Victoria immediately showed its close affinity with *Periomphale papuana*, in its fleshy dentate leaves and ascending habit with strong roots on the stem-base. Specifically it is distinct from *P. papuana* by larger, more coarsely and more densely dentate leaves, the attenuate leaf-base with a hardly developed petiole, and hairy twigs and lower portion of the leaves. By the thick dentate leaves both species differ from the New Caledonian ones.

It is a clear demonstration of a thesis which I advanced in my plant-geographical study on East Malesia (1979: 163–164), viz. that if a Gondwana element occurs in New Caledonia and in New Guinea, the latter must have been derived from an independent Australian source. This thesis is the consequence of current geophysical theory, in which it is assumed that the breaking up of Australian Gondwanaland proceeded first by the separation of New Zealand in the Palaeocene, followed in the Eocene by the split of New Caledonia, whereas New Guinea was always a promontory of North Australia. The flora of New Caledonia had its Gondwanic nature from

the beginning, New Guinea received it from North Australia during its gradual emergence during the Tertiary. But New Caledonia and New Guinea had no contacts or exchange. It follows that, if New Caledonia and New Guinea share Gondwanic taxa, they must also occur in Australia, or have occurred in that continent. This is for example shown by *Sphenostemon* and *Corynocarpus* which both were for a long time assumed to be confined to New Caledonia and New Guinea, but were later also located in Queensland, whereby in *Corynocarpus* the Papuan species was the same as that of Queensland and different from the New Caledonian one. But it has also occurred that the taxon had become extinct in Australia but had been wide-spread before the great desiccation which started with the Pliocene. This is illustrated, for example, by the *Nothofagus* species of the *brassii* pollen type and by *Phyllocladus*. This desiccation must have wiped out a very large number of rain-forest genera of the pre-Pliocene rain-forest of Australia; some of which found refuge as relicts in rather local spots along the eastern coastal regions. In my plant-geography of East Malesia (1979) I mentioned specifically *Periomphale* as a genus which should occur in Australia. This has now fully come true and fits the theory, because the Papuan species is distinctly allied to the Australian '*Wittsteinia*' and not to the New Caledonian species of *Periomphale*.

To my surprise, but also to my satisfaction, I found that one of the two specimens of '*Wittsteinia*' also possesses the cleistogamous flowers.

Like *Periomphale* the status of *Wittsteinia* was formerly confused, as Von Mueller (1861) described it in Ericaceae-Vaccinioideae, as the only representative of this subfamily in Australia. In later systematic works *Wittsteinia* maintained this disposition, be it mostly accepted as an anomalous member. Stevens (1971: 45), who revised the subdivision of Ericaceae, found it (correctly) very aberrant in Ericaceae and consequently arranged it as a new subfamily Wittsteinoideae. There was one other opinion about it, viz. by Burt (1948) who tied it up to Epacridaceae, comparing it with the monotypic genus *Prionotis* from Tasmania and the equally monotypic genus *Lebetanthus* from subantarctic South America. But these genera have superior 5-celled ovaries and septicidal capsules. Burt's opinion was followed by Willis (1973) in his Flora of Victoria.

The congenerity of *Wittsteinia* with *Periomphale* brings along that the latter, being the younger one, must be reduced.

This is not the end of my concern with Alseuosmoideae, because six years ago Dr. van Balgooy showed me a curious plant from Queensland, described as *Randia disperma* S. Moore (1917: 305) in the Rubiaceae which, though at first sight reminding of *Randia* by its long-tubular, white corolla, could never be Rubiaceae because of lack of interpetiolar stipules and non-decussate leaves. With its 3–4-pseudowhorled leaves the foliage reminded of *Pittosporum*. Both Dr. van Balgooy and I had independently the brainwave to associate it with Alseuosmoideae, and that is, as I will argue, its true disposition. It clearly differs from the other two genera by its pure white, salver-shaped corolla with long, narrow, cylindrical tube, that in *Wittsteinia* being more or less barrel-shaped and in *Alseuosmia* narrow funnel-shaped.

Furthermore, it differs from *Wittsteinia* in that the stamens are not free but at-

tached near the apex of the tube, sharing this character with *Alseuosmia*. Its leaves are strongly 3–4(–5)-verticillate in pseudowhorls, but the phyllotaxis is rather variable in the other two genera where leaves may also show a tendency to be opposite or in a pseudowhorl. This phyllotaxis in *Alseuosmia macrophylla* had even led W.J. Hooker to suggest affinity with *Pittosporum* (see Airy Shaw, 1966).

The flowers of all three genera are heavily scented. The '*Randia*' has large, very crisped corolla lobes, but this same character occurs in feebler degree in the two other genera, where the margin may be dentate, slightly crispy or erose. All three genera possess hairs in the leaf axils, to which Radlkofer (Schlechter, 1906: 269) had already drawn attention. In flower colour *Wittsteinia* and *Alseuosmia* agree, the colour is greenish yellow, always tinged with some pink or red, or orange, that in the '*Randia*' is pure white.

The taxonomic conclusion is that there are three well-defined genera in the group; see the key below.

The feature of the floral dimorphism in *Wittsteinia* should be further investigated; field study seems indispensable for this.

As to its systematic disposition Alseuosmiaceae, created by Airy Shaw (1965), have been maintained by Gardner (1978), and also by Cronquist (1981) who found it 'best accommodated in Rosales, near the Grossulariaceae and Pittosporaceae'; that is not far from his Saxifragaceae. Thorne (1983: 107) includes the group in Saxifragaceae *sensu lato*, as one of the 13 subfamilies. The systematic position seems thus clarified: there is no affinity with the Caprifoliaceae, which differ at once by opposite leaves and imbricate corolla; furthermore in anatomy and phytochemistry (Gardner, unpubl. thesis, 1976).

Whether the group deserves family rank should be left to a thorough study of all Escalloniaceous taxa of the southern hemisphere.

The group is obviously an ancient one, as it must have existed before the breaking up of Australian Gondwanaland. It possesses also several primitive features: the variable undecided phyllotaxis and leaf margin and the variable number of floral parts (3–7) and number of ovules, the ovary being mostly 2- but also sometimes 3-celled. The pollen is also primitive, as Dr. J. Muller told me, lacking 'characters' as so many pollen from several families in the early Tertiary.

#### KEY TO THE GENERA

1. Corolla more or less barrel-shaped, greenish to yellowish, often pink-tinged, never pure white, lobes entire to fimbriate. Stamens free or more or less adnate to the very base of the corolla. Calyx persistent. Flowers of two kinds, small
  1. *Wittsteinia*
1. Corolla tubular. Stamens adnate to the apex of the corolla tube. Flowers of one kind.
  2. Corolla large, pure white, salver-shaped, tube narrow-cylindrical, lobes large and strongly fringed. Calyx stunted, persistent. Leaves constantly in pseudowhorls of 3–4(–5) . . . . . 3. *Crispiloba*

2. Corolla yellowish green to pinkish, small or fairly large, the tube narrow funnel-shaped, never narrow-cylindric, lobes not very fringed. Calyx lobed, in fruit circumscissile-caducous. Leaves not constantly in pseudowhorls of 3—4

## 2. *Alseuosmia*

### 1. WITTSTEINIA

- Wittsteinia* F.v.M., *Fragm. Phytogr. Aust.* 2 (1861) 136; Burt, *Kew Bull.* 3 (1949) 493; Stevens, *Bot. J. Linn. Soc.* 64 (1971) 45; J.H. Willis, *Handb. Pl. Vict.* 2 (1973) 497.  
*Periomphale* Baill., *Bull. Mens. Soc. Linn. Paris* no 92 (1888) 731; *Hist. Pl.* 10 (1888) 85; Guillaumin, *Fl. Nouv. Caléd.* (1948) 318; Airy Shaw, *Kew Bull.* 18 (1965) 250; Gardner, *Blumea* 24 (1978) 141; Steen., *Blumea* 24 (1978) 480.  
*Memecylanthus* Gilg & Schltr., *Bot. Jahrb.* 39 (1906) 269; Guillaumin, *Fl. Nouv. Caléd.* (1948) 342; Airy Shaw, *Kew Bull.* 18 (1965) 250; Gardner, *Blumea* 24 (1978) 139.  
*Pachydiscus* Gilg & Schltr., *Bot. Jahrb.* 39 (1906) 270; Guillaumin, *Fl. Nouv. Caléd.* (1948) 342.

Notes. The genus occurs in New Caledonia, Papua New Guinea and Victoria. The number of species in New Caledonia, for which four names have been published, is left undecided. Pending a thorough revision by my French colleagues I do not wish to make premature transfers, except for the lectotype species selected by Airy Shaw (1965: 250). I am inclined to agree with Gardner (1978: 141) that there is only one species in New Caledonia.

*Wittsteinia vacciniacea* F.v.M., *Fragm. Phyt. Aust.* 2 (1861) 136; *Pl. Indig. Col. Victoria* 1 (1864—5) t. 51; J.H. Willis, *Handb. Pl. Vict.* 2 (1973) 497.

*Wittsteinia papuana* (Steen.) Steen., *comb. nov.* — *Periomphale papuana* Steen., *Blumea* 24 (1978) 481.

*Wittsteinia balansae* (Baill.) Steen., *comb. nov.* — *Periomphale balansae* Baill., *Bull. Mens. Soc. Linn. Paris* no 92 (1888) 732; Guillaumin, *Fl. Nouv. Caléd.* (1948) 318.

### 2. ALSEUOSMIA

- Alseuosmia* A.Cunn., *Ann. Mag. Nat. Hist.* 2 (1839) 209; Allan, *Fl. New Zealand* 1 (1961) 554; Airy Shaw, *Kew Bull.* 18 (1965) 249; Gardner, *Blumea* 24 (1978) 139.

Notes. There is no unanimity of opinion about the number of species, the field being free for lumpers and splitters. Allan l.c. distinguishes 8 species. As usual in New Zealand genera, hybridization between different species is reported, creating a complicated situation, briefly discussed by Allan, l.c.

### 3. CRISPILOBA, *gen. nov.* — Fig. 1.

Frutex. Rami teretes, in axillis foliorum pilis brunneis indutae; planta ceterum glabra. Folia, corollae et ovaria translucen-ti-brunneo-punctata. Folia in pseudoverticillis

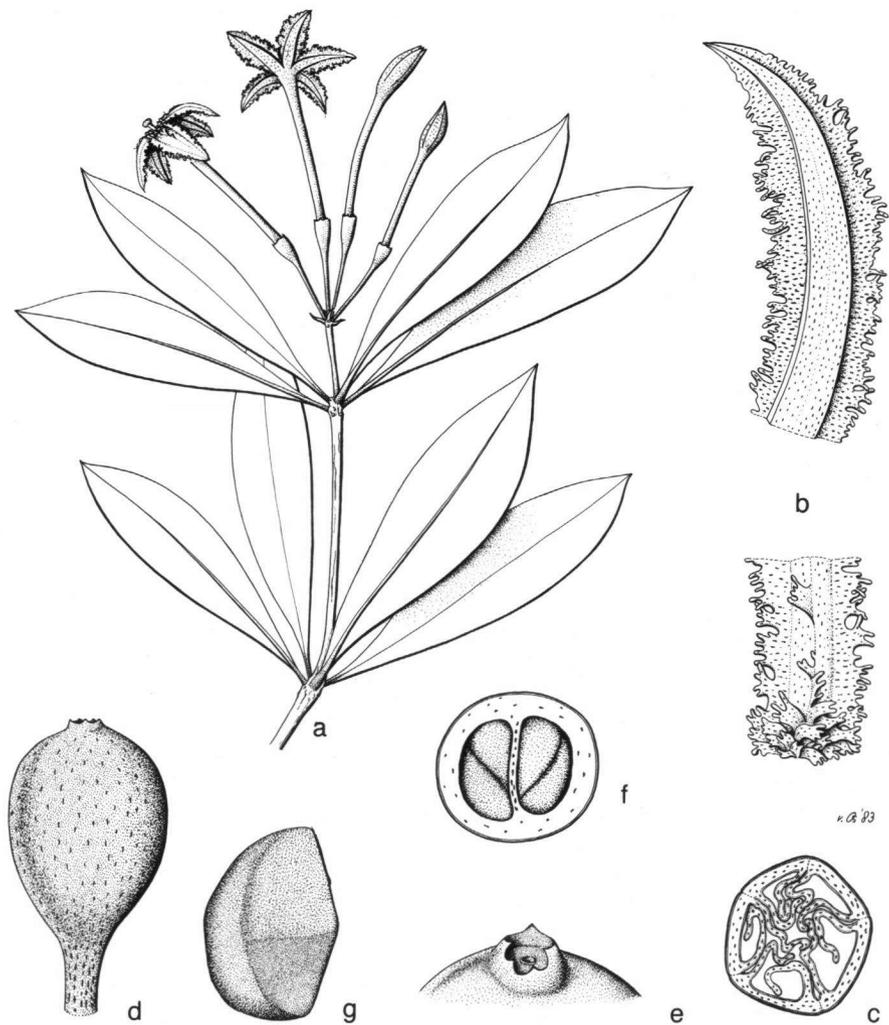


Fig. 1. *Crispiloba disperma* (S. Moore) Steen. a. Habit, x  $\frac{1}{2}$ ; b. corolla lobe, above, apical part from outside, below, lower part from inside, enlarged; c. CS of bud in lower part, x 6; d. fruit, x  $1\frac{1}{2}$ ; e. apex of fruit, x 6; f. CS of fruit, x  $1\frac{1}{2}$ ; g. seed, x 3 (a B. Gray 1904, b–g B. Gray 945).

3–4(–5)-meris disposita, integra, penninervia, venatione valde obscura. Flores ad ramulos breves terminales, solitarii, interdum 2–4 e gemma apicali orti (gemma ipsa bracteis ad foliis reductis obsita), (?4–)5-meri, odoratissimi. Pedicelli elongati, exarticulati. Calyx brevis, late tubulosus, abruptus, persistens, denticulis 5 brevissimis. Corolla hypocrateriformis, puralba, tubo cylindrico elongato, ore dense emergentibus irregularibus modo trichomatium instructo; lobi 5, valvati, oblongo-lanceolati, acumi-

nati, margine late crispato-alati, in gemma induplicato-valvato. Stamina 5, ad orem corollae tubi inserta, cum lobis corollae alternantia, medifixa, introrsa, longitudinaliter dehiscentia; filamenta brevissima. Ovarium inferum, 2-loculare, ovulis per loculo 2-3; stylus crassus, exsertus; stigma appanato-orbiculari-incrassatum, breviter 2-lobum. Bacca 2-locularis, seminibus 2-5, plano-convexis; endospermium copiosum; testa duplicata.

QUEENSLAND. Monotypic.

Note. In the original description of *Randia disperma* Moore (1917: 305) stated that the flowers were 4-merous. In the specimens I have seen they are 5-merous.

### 1. *Crispiloba disperma* (S. Moore) Steen., *comb. nov.* — Fig. 1.

*Randia disperma* S. Moore, J. Bot. 55 (1917) 305; Gibbs, l.c. 298. — Type: *L.S. Gibbs 6307* (BM), Bellenden Ker range.

Shrub, 1½–4 m. Internodes terete, 2–12 cm. *Leaves* obovate-oblong to oblanceolate, 5–20 by 2–5 cm, cuneate towards the base merged into the 3–15 mm long petiole, apex short-acute or -acuminate; venation faint on both surfaces, the midrib slightly sulcate, poorly prominent beneath. *Inflorescences* terminal, rarely sessile, mostly on a 2 cm long peduncle on top of which are (1–)4(–5) flowers in a whorl supported by small bracts or by reduced leaves. Pedicels slender, c. 2 cm. *Flowers* (?4–)5-merous. *Calyx* tube 2–3 mm high, not set off against the receptacle covering the ovary, persistent, very shortly 5-dentate. *Corolla* in mature bud slightly thickened towards the apex, valvate, the lobes on each side with a rather wide, very fringed wing, and an interrupted similar fringe on the midrib of the inside, the wings closely folded and packed filling the bud; in open flower c. 2 cm long, tailed at apex, expanding the fringed wings. Corolla brown-dotted (? tannin), the tube 2½–4½ cm, 1¾–3 mm wide with very fine brown lengthwise lines (? tannin). Throat of corolla thickly set with worm-like or irregularly shaped colleter-like appendages, between which the short filaments of the anthers; anthers medio-dorsifixed, dehiscing lengthwise, 3 mm long. *Ovary* smooth, campanulate, c. ½ cm high, 2-celled, each cell with 2–3 ovules. *Berry* obovoid to ellipsoid, 1½–2 by 1–1½ cm (fresh; 1¾ by ½ cm dry), blue-black (fresh), 2-celled, sometimes 1 cell containing 2 seeds and the other cell barren, but sometimes 1 cell containing 2 seeds and the other 3 of which one small. *Seeds* ± planoconvex, black, to 8 by 5 mm, 3 mm thick, filled with endosperm; seed coat of two layers, the inner one thin and brown, the other black with radial structure.

QUEENSLAND. Bellenden-Ker Range, an often locally common rain-forest understorey shrub, often on slopes and spurs, mostly on red basaltic soils, 500–1100 m altitude. The flowers are heavily perfumed, which put Miss Gibbs (in Moore, 1917: 298) on to it: 'A most delicious scent made me hunt round till I found a group of *Randia disperma*.' L.S. Smith (14683) noted that the base of the lower branches is often decumbent and rooting.

Specimens seen: Mt Bellenden-Ker, *L.S. Smith 14683*, fl.; *Brass 18335*; T.R. 146, Table Land L.A., *Hyland 8316*; Atherton, State F.R. 310, *Hyland 3616*, fl.; State F.R. 310 Gillies

L.A., *B. Gray* 945 & 948, fl. fr.; ditto, *B. Gray* 1904, 17°13'S, 145°41'E; Upper Parrot Creek, Annan R., *Brass* 20311, fl. – Flowers February–March, June, September, fruits March.

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