XIV. NOTES ON PTELEOCARPA, INCERTAE SEDIS

J.F. VELDKAMP
Rijksherbarium, POB 9514, 2300 RA Leiden, The Netherlands

SUMMARY

Pteleocarpa Oliv. has traditionally been placed in the Boraginaceae–Ehretioideae (or Ehretiaceae), but it does not seem to belong there. Its correct position is presently unknown. There is only a single species, *P. lamponga* (Miq.) Bakh.

INTRODUCTION

Pteleocarpa Oliv. occurs in Sumatra, Peninsular Malaya, and Borneo. There are two interesting points about it, which will be discussed here: the familial position and the number of species present.

Three specific epithets have been used, suggesting three species, one in Sumatra, Malaya, and Borneo, each.

Miquel (1861) first described a species, which he provisionally placed in *Dodonaea* Mill. (Sapindaceae), as *D. ? lamponga*.

Oliver (1873) described the genus, with as the only species *P. malaccensis*, placing it in the Olacaceae. He was followed in this by Masters (1875), and King (1895). Although King stated that he could see no difference between Miquel's plant and the one described by Oliver he maintained the latter name for it.

Beccari (1877) collected and described a third species from Borneo, *P. longistyla*. Oliver also saw this and remarked that it might be the same or a closely allied species. *Pteleocarpa longistyla* would differ, according to Beccari, by slightly unequal corolla lobes, one larger than the others, stamens shorter than the corolla, anthers as long as the filaments, and styles twice as long as the ovary. He was perplexed about its taxonomic position, but thought it was best placed in the Boraginaceae–Ehretioideae.

Valeton (1886), also, excluded it from the Icacinaceae, stating erroneously that Beccari regarded it as related to the Ericaceae.

A position in the Olacaceae is said to be unacceptable on anatomical grounds by Gottwald (1982).

Gürke (1897, as *'Pteleocarpus'*) followed Beccari's suggestion of a place in the Ehretioideae without comment. Later authors have followed him, e.g. Hutchinson (1973), and Airy Shaw (1966), who placed it in the Ehretiaceae.

A few authors, obviously struck by the remarkable fine-nerved samara of *Pteleocarpa*, have associated it with *Peripterygium* Hassk. (= *Cardiopteris* Blume). This has been regarded as constituting a tribe in the Olacaceae or Icacinaceae, or as a separate family Cardiopteridaceae ('Cardiopterygaceae'; also 'Peripterygiaceae'; Williams, 1905; Sleumer, 1942). The resemblance seems rather superficial, however, as considerable differences separate these genera: *Peripterygium* has a herbaceous, climbing habit, milky juice, leaves with a palmate nervation, axillary, dichotomous inflorescences with secund branches, flowers without a disk, two very unequal stigmas, and a 1-celled ovary with 2 apical, pendulous ovules.

Dahl (1955) has shown that the pollen type is quite different from that present in the Boraginaceae. He compared *Pteleocarpa* with another climbing, samara-bearing species from Malesia of uncertain taxonomic status, *Lophopyxis* Hook.f. (Celastraceae, fide Cronquist, 1981; Lophopyxidaceae in the Celastrales, Sleumer, 1969, and 1971). These two have identical pollen types of a form also encountered in the Euphorbiaceae. A place in that family is, however, most unlikely. Much more pollen research is needed in this connection and at present I do not dare to place much value on this observation.

Gottwald (1982) made an anatomical study of the secondary xylem and compared it to the Boraginaceae and other families. He, too, observed that there is hardly any affinity to the Boraginaceae s.l. The combination of solitary vessels and unilaterally banded parenchyma form a unique combination in this family showing only a limited resemblance to *Bourreria* P.Br. (Ehretiaceae) (from tropical South America). The rather primitive wood structure would allow the placement of *Pteleocarpa* solely at the very base of the family's evolutionary development (see also Sleumer, 1942).

According to him the families previously suggested show little or no resemblance with regard to the secondary xylem. An equal, or even better match can be observed in a number of different other families, as for instance the Apocynaceae and Rubiaceae, but also Humiriaceae and Linaceae. Although these suggestions could be pursued further, they seem unlikely relations to me in first instance.

Yet, what can we make of these observations? The gross morphology appears in general in agreement with the Ehretioideae, but there is one important deviating character in the ovary. It is 2-celled, as is normal in the Boraginaceae, but the ovules are most curious. Oliver described two, one per cell, but Beccari recorded four, two in each cell, axially attached, one ascending, one descending. Beccari, as so often, has made the correct observation. Dr. W.A. van Heel (L) kindly has made a SEM study of the ovary (coll. Geesink 8974) from which it appears that there are indeed two ovular structures per cell: both are unitegmic and tenuinucellar, the upper one is much underdeveloped, apotropous, and ascending, the basal one is well-developed, epitropous, and pendulous. In the Boraginaceae there are 1 or 2 pendulous and epitropous ovules per locule.

The presence of these two types of ovules within a single locule is apparently extremely rare, I know only of two other cases, the Medusagynaceae and the Penaeaceae–Endonemeae, which are most unlikely relatives. In both, however, the upper ovule is ascending and epitropous, the lower one descending and apotropous, i.e. just the other way around (see the figures in Engler & Melchior, 1925, and Gilg, 1894, respectively). In Thonner's Key (Geesink et al., 1981) we have also mentioned pairs of ascending and descending ovules within a single locule for *Maytenus* Molina (Celastraceae), but this may be incorrect. It is usually very difficult to obtain precise information on the ovule type from the various textbooks, so such ovules may occur elsewhere as well. In discussions it has been argued that the funicle of the aborted apparently upper ovule has become twisted when it was 'discarded' and pressed upwards by the developed and more useful lower one. The dissection, however, suggests that this is not so. The upper ovule clearly has space enough and the insertion of the funicle on the placenta is at the top of this triangular body.

All these results suggest that *Pteleocarpa* is not a boraginoid genus, nor does it belong to the Icacinaceae, Olacaceae, Cardiopteridaceae, Lophopyxidaceae, and certainly not to the Sapindaceae. Its taxonomic position thus remains as perplexing as it was to Beccari. Creating a distinct family for it, by want of anything better, is hardly useful, for although it would then have a box for its own, we still don't know where to file it.

H. Weyland (1948) has described a fossil as *Pteleaecarpum* in the Rutaceae, which but for the similarity at first sight in names has little to do with the current genus. I don't think it should be regarded as a later homonym, although it does come close, as the two names have a different derivation, and are thus sufficiently differently spelled that no confusion should occur.

HOW MANY SPECIES?

A survey of specimens from the whole area has made it clear that the supposed differences cannot be maintained. As King already remarked Miquel's and Oliver's material belongs to the same taxon. As far as Beccari's distinction of a second species is concerned it appeared from a study of Bornean and non-Bornean specimens that the flowers are probably protrandrous: at anthesis the styles are short and pressed together, often more or less coherent, the stigmas carry no pollen. In late anthesis, e.g. after the corolla has dropped off, the styles are free to the base and divergent, later spiralling around each other, and the stigmas are covered by pollen grains. Beccari apparently studied flowers in the final phase.

Of the single species the typification and synonymy is then as follows:

Pteleocarpa lamponga (Miq.) Bakh. in Heyne, Nutt. Pl. 2 (1927) 1309. — *Dodonaea ? lamponga* Miq., Fl. Ind. Bat., Suppl. 1 (1861) 511. — Type: Teysmann HB 4447 (U, holo, L), Sumatra, Lampong, near Siringkebau, A° 1857/8.

Pteleocarpa malaccensis Oliver, Trans. Linn. Soc., London 28 (1873) 515. — Type: Maingay s.n. (K, holo, A), Malacca.

Pteleocarpa longistylis Becc., Malesia 1 (1877) 130, f. 8. — Type: Beccari P.B. 1611 (FI, holo), Sarawak, 1st Div., Mt. Mattang, 300 m, November 1865.

LITERATURE

Airy Shaw, H.K. 1966. A dictionary of the flowering plants and ferns, ed. 8: 959. Cambridge.

Beccari, O. 1877. Studio monographico sopra le piante della famiglia della Icacineae e delle Menispermaceae sin qui scoperte nella Malesia e nella Nuova Guinea. Icacineae. Malesia 1: 119, 130, f. 8.

Cronquist, A. 1981. An integrated system of classification of flowering plants: 712–714. New York.

Dahl, A.O. 1955. The pollen morphology of several genera excluded from the family Icacinaceae. J. Arn. Arb. 36: 159–163.

Engler, H.G.A. 1925. Medusagynaceae. In H.G.A. Engler & K.A.E. Prantl, Nat. Pfl. Fam., ed. 2, 21: 5052, t. 31 H–J. Leipzig.

Geesink, R. et al. 1981. Thonner's analytical key to the families of flowering plants. Wageningen, etc.

Gilg, E. 1894. Penaeaceae. In In H.G.A. Engler & K.A.E. Prantl, Nat. Pfl. Fam. 3, 6a: 210–213, t. 73 D. Leipzig.

Gottwald, H. 1982. First description of the wood anatomy of Antrophora, Lepidocordia and Pteleocarpa (Boraginaceae). IAWA Bull. n.s. 3 (1982) 161, f. 810.

Gürke, M. 1897. Borraginaceae. In H.G.A. Engler & K.A.E. Prantl, Nat. Pfl. Fam. 4, 3a: 86, 90, t. 36 E, F. Leipzig.

Hutchinson. J. 1973. The families of flowering plants, ed. 3: 486. Oxford.
King, G. 1895. Materials for a flora of the Malayan Peninsula. J. As. Soc. Beng. 64, 2: 98, 130.
Masters, M.T. 1875. In Hook. f., Fl. Br. Ind. 1: 591. London.
Oliver, D. 1873. Descriptions of three new genera of plants in the Malayan herbarium of the late Dr. A.C. Maingay. Trans. Linn. Soc., London 28: 515–516, t. 42.
Sleumer, H.O. 1942. Peripterygiaceae. In H.G.A. Engler & K.A.E. Prantl, Nat. Pfl. Fam. ed. 2, 20b: 400. Leipzig, Berlin.
— 1969. The genus Lophopyxis Hook. f. (Lophopyxidaceae). Blumea 16: 323.
— 1971. Lophopyxidaceae. Fl. Males. I, 7: 8991. Leiden.
Valeton, Th. 1886. Critisch overzicht der Olacineae B. et H.: 262. Groningen.
Weyland, H. 1948. Palaeontographica, Abt. B, Paläophytol. 88: 133.
Williams, F.N. 1905. Liste des plantes connues du Siam. (Suite). Bull. Hb. Boiss. II, 5: 225.