

Flora of Singapore precursors, 7. A newly diagnosed species of *Neonauclea* (Rubiaceae: Naucleae) now extinct in Singapore and notes on *Neonauclea excelsa* and *N. calycina*

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ABSTRACT. *Neonauclea kranjiensis* K.M.Wong & W.W.Seah, a newly diagnosed species from Singapore, is described. It most resembles *Neonauclea excelsa* (Blume) Merr. from which it differs in its smaller, narrowly elliptic leaves as well as smaller mature flowering heads. The taxa known as *Neonauclea excelsa* and *N. calycina* (DC.) Merr. in Java, Peninsular Malaysia and parts of Borneo are just one species to which the name *Neonauclea excelsa* must be applied. *Neonauclea calycina* continues to be recognised as a species in the Philippines pending further study.

Keywords. Borneo, Java, Malesia, *Neonauclea kranjiensis*, Peninsular Malaysia, taxonomy

Introduction

The revision of *Neonauclea* Merr. (Rubiaceae) for the *Tree Flora of Malaya* (Wong, 1988, 1989) was published simultaneously with Ridsdale's revision of *Neonauclea* (Ridsdale, 1989). Both authors accepted *Neonauclea excelsa* (Blume) Merr. but, in addition, Ridsdale (1989) also accepted and enumerated *Neonauclea calycina* (DC.) Merr. This paper discusses the variation in material from Java, Peninsular Malaysia and parts of Borneo assigned to either of the two species by Ridsdale (1989) and how they are not distinct. This paper also addresses some taxonomic problems and the complex nomenclatural history of *Neonauclea excelsa* and *N. calycina*.

In addition, Wong (1988, 1989) listed several unnamed species from the Malay Peninsula that he referred to with numerals. Among them, *Neonauclea* sp. 2 is represented by a single Singapore collection and diagnosed as a hitherto unnamed species. It is here described as *Neonauclea kranjiensis* K.M.Wong & W.W.Seah.

Neonauclea excelsa vs. *N. calycina*

In order to assess the distinction, or otherwise, between *Neonauclea excelsa* and *N. calycina*, available herbarium material and type material of both has been consulted. However, the type specimen sheets of *Neonauclea excelsa* that were originally deposited

in the Leiden Herbarium (L) were lost at sea while being sent on loan (Ridsdale, 1989, 2008). It was then thought that the original material was no longer available. Fortunately, duplicates of the collection deposited in the Utrecht Herbarium (U) have been traced; the U collection was transferred to Leiden in 2009, a year following the report by Ridsdale (2008), and it appears he was unaware of their existence. A lectotypification is performed here.

For his revision, Ridsdale (1989) relied only on a photograph of the type specimen of *Neonauclea calycina*, which he stated was deposited in L, but this could not be traced. De Candolle (1830), who published the basionym *Nauclea calycina*, wrote that he saw the material in Haenke's herbarium, which is now incorporated into the Herbarium of the National Museum in Prague (PR). No possible type material has been found in the Geneva herbarium (G-DC). However, duplicates of the collection are in the Göttingen Herbarium (GOET). As more than one sheet of the type material exists in the PR herbarium, a second step lectotypification is proposed following the first step lectotypification by Ridsdale (1989).

According to Ridsdale (1989), *Neonauclea excelsa* has been confused with *N. calycina*. He distinguished them based on the development of the lower parts of the apical portion of the calyx appendages. In his comparison, *Neonauclea excelsa* has lower parts that are hardly developed, whereas *N. calycina* has well-developed lower parts. He also listed other characteristics such as the absence or presence of interfloral bracteoles, position of breakage of the calyx shafts, shape of the upper parts of the apical portion of the calyx, as well as pubescence of the corolla lobes. However, after examining the specimens deposited in K, L and KEP that had been attributed to either of these species collected from Java, Peninsular Malaysia and parts of Borneo, no consistent differences could be found in the characters mentioned above. In addition, there are specimens determined by Ridsdale as either *Neonauclea excelsa* or *N. calycina* but which conformed in other characteristics to the other species. Therefore, we conclude that the material from Java, Peninsular Malaysia and parts of Borneo belongs to one species, but with variable corolla hairiness, and that the two names applied by Ridsdale (1989) refer to the same species. This material does differ in leaf shape (broadly elliptic versus narrowly elliptic) from specimens collected from the Philippines, the type provenance of *Neonauclea calycina*. Although the material from Java, Peninsular Malaysia and some Bornean material is variable in the pubescence of the corolla lobes, the Philippine material, on the other hand, appears to consistently have glabrous corolla lobes. Merrill (1915) also upheld a distinction between Javan-Malayan material and Philippine material, although he did not discuss reasons. It is a fact that the material representing these two taxa are very much incomplete and in many cases poorly preserved. The only certain way to better understand the variation involved, particularly in *Neonauclea calycina*, is to conduct wider field studies, which are outside the scope of this study. Pending further studies we leave these two species as distinct but conclude that the name *Neonauclea calycina* is misapplied in Java, Peninsular Malaysia and some parts of Borneo and that this material is *N. excelsa*.

Finally, it is important to note that although Ridsdale (1989) did not include the Malay Peninsula in the distribution statement of *Neonauclea excelsa*, he determined

several specimens with pubescent corolla lobes collected from Peninsular Malaysia as that species and included a taxon from the Malay Peninsula, *Nauclea purpurascens* auct. non Korth.: Ridley, Fl. Malay Penins. 2 (1923) 9, under the synonymy of the species. Therefore, this seems to have been an unintentional omission.

Neonauclea excelsa (Blume) Merr., J. Wash. Acad. Sci. 5: 539 (1915). – *Nauclea excelsa* Blume, Bijdr. Fl. Ned. Ind. 1009 (1826). – TYPE: Indonesia, Java, flowers, C.L. Blume, s.n. (lectotype U [U0226663] (fl), designated here; isolectotypes U [U0226661 (fl), U0226662 (fl)]).

Neonauclea calycina auct. non (Bartl. ex DC.) Merr.; Ridsdale, Blumea 34: 200 (1989), p.p.

Neonauclea calycina (Bartl. ex DC.) Merr, J. Wash. Acad. Sci. 5: 539 (1915). – *Nauclea calycina* Bartl. ex DC., Prodr. 4: 346 (1830). – TYPE: Philippines, Luzon, flowers, 1792, T. Haenke s.n. (lectotype PR [Herbarium Musei Nationalis Prague Evid číslo 612228, Invent číslo 4724A] (fl), first step designated by Ridsdale (1989), second step designated here; isolectotypes GOET [GOET010390] (fl), PR [Herbarium Musei Nationalis Prague Evid číslo 612229, Invent číslo 4724B (ster), Herbarium Musei Nationalis Prague Evid číslo 612230, Invent číslo 4724C (fl)]).

A new *Neonauclea* species from Singapore

While working on an account of the genus for the *Flora of Singapore* project, it was discovered that a single specimen collected from Singapore and enumerated as *Neonauclea* sp. 2 by Wong (1988, 1989) was still unnamed. This is represented by only one collection thus far. An annotation on the specimen states that Ridsdale determined this collection as *Nauclea subdita* (Korth.) Steud. This is not possible because *Nauclea* has fused flower hypanthia in its inflorescence head, whereas *Neonauclea* (as in the numbered taxon) has free hypanthia in its inflorescence head (Wong, 1988, 1989; Ridsdale, 1989). In addition, the *Nauclea* peduncle is typically slender and without special distensions, whereas in *Neonauclea*, the peduncle is usually stout and distally swollen at a distinct node bearing typically large peduncular bracts (Wong, 1988, 1989). The numbered taxon has the latter type of peduncle.

An attempt to identify the specimen using the taxonomic key provided in Ridsdale (1989) was made and *Neonauclea excelsa* was the closest match. However, after comparing the two taxa, it was concluded that *Neonauclea* sp. 2 differs significantly from *N. excelsa* and represents a new species. In *Neonauclea excelsa*, the leaves are elliptic to obovate, (5.5–)10–26.2 × (3–)5.6–13 cm, and the flowering heads are 15–17 mm (across calyces) and 30–40 mm (across corollas). In contrast, for *Neonauclea* sp. 2, the leaves are more narrowly elliptic, 6–8.5 × 2.5–3.5 cm, and the flowering heads measure 6 mm (across calyces) and 13–17 mm (across corollas).

Neonauclea sp. 2 does not match any other *Neonauclea* species enumerated for the region. This unnamed species is described below.

Taxonomy

Neonauclea kranjiensis K.M.Wong & W.W.Seah, **sp. nov.**

This new species most closely resembles *Neonauclea excelsa* (Blume) Merr. in its calyx lobes which consist of an obturbinate apical portion that detaches in a mass from the tops or variously along the lengths of the calyx shafts leaving irregular fragments, and semi-persistent calyx shafts that remain until the fruiting stage; however, it differs from *N. excelsa* in its narrowly elliptic leaves of up to 8.5×3.5 cm (those in *N. excelsa* are elliptic to obovate, up to 26.2×13 cm) as well as much smaller mature flowering heads which are 6 mm diameter across calyces (those in *N. excelsa* 15–17 mm) and 13–17 mm diameter across corollas (those in *N. excelsa* 30–40 mm). – TYPE: Singapore, Kranji, 1894, flowers, *H.N. Ridley 6511* (holotype SING [SING0251857]). (Fig. 1)

Tree. *Stipules* unknown. *Leaves* narrowly elliptic, $6\text{--}8.5 \times 2.5\text{--}3.5$ cm, chartaceous to subcoriaceous, more or less glabrous on both surfaces, secondary veins 7–8, flat to slightly raised above, distinctly raised below, often with glabrous to sparsely hairy domatia in their axils on the lower leaf surface, tertiary veins reticulate, indistinct, apex acute to broadly acuminate, midrib sunken above, raised below, base cuneate; petioles 5–10 mm long. *Flowering heads* typically in groups of 3, terminal, each measuring 6 mm (across calyces) and 13–17 mm (across corollas); peduncles 15–40 mm long; receptacles densely hairy; interfloral bracteoles absent; hypanthia 1 mm, sparsely hairy; calyx cups mutually free, calyx lobes with a deciduous apical portion and a persistent shaft that remains until the fruiting stages, shafts basally free, densely hairy, apical portion obturbinate, 0.7–1 mm, ochre-coloured, papillate, detaching in a mass from the tops or variously along the length of the calyx shafts leaving irregular fragments; corolla funnel-shaped, 4–5.5 mm long; corolla lobes 1–1.5 mm long, with scattered hairs; anthers not seen; style exserted; stigma ovoid. *Fruiting heads* unknown.

Habitat and distribution. Only known from a locality that was likely to have been freshwater swamp forest or a slightly brackish water habitat, now no longer in existence.

Etymology. The species is named after its type locality, Kranji, in Singapore.

Provisional IUCN conservation assessment. There is no evidence of the species having been found or collected elsewhere in the region after a review of *Neonauclea* material deposited in the K, KEP, and SING herbaria. In Singapore, the last and only collection of the species was made in 1894, therefore we consider it as Extinct (EX).

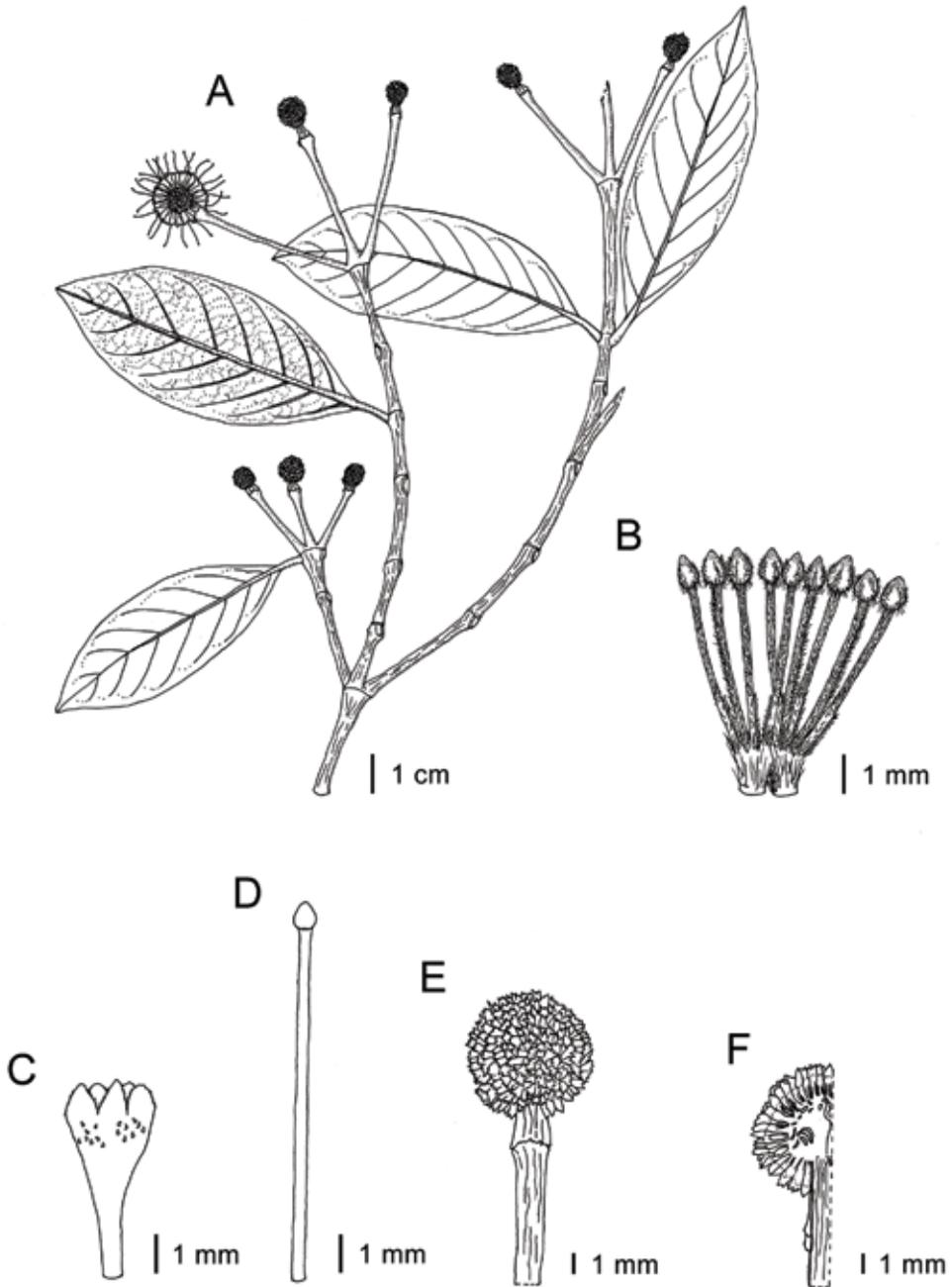


Fig. 1. *Neonauclea kranjiensis* K.M.Wong & W.W.Seah. **A.** Habit. **B.** Flowers showing laterally free hypanthia with reconstructed calyx shafts. **C.** Corolla showing pubescence. **D.** Style with globose to obovoid stigma. **E.** A head of individual fruitlets tightly packed together but not laterally fused. **F.** Longitudinal section of the infructescence showing individual (free) fruitlets on the hairy receptable. Drawn by Evonne Tay from the holotype *Ridley 6511*.

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