

*Citation:*

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**Botany.** — "*Sloanea javanica* (Miquel) Ssyzsylvowicz, a remarkable tree growing wild in the jungle of Depok, which is maintained as a nature reserve". Contribution to the Flora of Java, part VIII.<sup>1)</sup> By Dr. S. H. KOORDERS. (Communicated by Prof. M. W. BEIJERINCK).

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**Original habitat.** Between Batavia and Buitenzorg the jungle of Depok has been constituted a permanent reserve since 1913 by the Nederlandsch-Indische Vereeniging tot behoud van Natuurmonumenten (Dutch-Eastindian Society for the Protection of Natural Monuments), and here I found on March 15<sup>th</sup> last fruits, which I immediately recognized as those of *Sloanea javanica* (Miquel) Ssyzsylvowicz. The fruits were borne by two trees, which I had "numbered" in 1914 (provided for botanical examination with a number board and registered, as 23n and 39n). This observation was especially interesting, since the original habitat of *Sloanea javanica* has remained quite unknown to botanical literature and to myself, although this javanese forest tree had already been carefully described and figured half a century ago by Miquel in the *Annales Musei botanici* 1865—1866 p. 68, table 3.

This fact, remarkable in itself, namely that an original habitat of *Sloanea javanica* should remain unknown for almost half a century, becomes all the more remarkable when considered in connection with the following facts:

Firstly, that the original habitat discovered by me namely the forest of Depok, is in the neighbourhood of a scientific centre like Buitenzorg.

Secondly, that especially in the last thirty years numerous persons, including myself, have botanized in the above jungle.

Thirdly, that this forest tree, which had escaped notice for so long, is found to be one of the largest trees of the wood.

Fourthly, that a herbarium specimen, collected by me in the forest of Depok on August 27 1898 and provided with the correct native name, has remained in the Buitenzorg Herbarium for 17 years, without having its scientific name affixed to it, although the specimen in question was within the immediate reach of anyone working in the Buitenzorg Herbarium during these years.

The material collected by me in 1898, consisting of a few dry sterile leaf twigs (Kds. n. 31118 $\beta$ ), remained quite undetermined

<sup>1)</sup> Compare Verslagen Kon. Acad. v. Wetenschappen, Amsterdam, Sept 25 1909, p 300 and Nov. 27 1909, p. 488.

for thirteen years (until 1911) among the "Indeterminata", no one having even recognized the natural order. Then, in 1911, when revising my herbarium collections for the Systematisches Verzeichniss of Mrs. KOORDERS-SCHUMACHER, the twigs came again under my eyes, and misled by an external resemblance to some species of the genus *Litsea*, and in the absence of flowers and fruits, I labelled them doubtfully as an undeterminable species of *Litsea*. Under this preliminary determination, namely as *Litsea?* spec. div. the above material (Kds. n. 31118  $\beta$ ) was first published in the Systematisches Verzeichniss (I Abteil § 1 Fam. 102, p. 34), with mention of the station and time of collection.

Recently, on March 25<sup>th</sup>, when re-examining this 17 year old herbarium material (Kds. n. 31118  $\beta$ ) I found that, without the least doubt, it was identical with the fruiting twigs collected by me on March 15<sup>th</sup> at the same spot, and then at once recognized as *Sloanea javanica*; these twigs (Kds. n. 42813  $\beta$  and 42807  $\beta$ ) were derived from two of my "numbered" trees (namely <sup>1</sup>) tree 23 $n$  and tree 39 $n$ ). The old herbarium material was also identical with a specimen consisting only of leafy twigs (Kds. n. 42814  $\beta$ ), which bore especially large leaves and had also been collected by me in the jungle of Depok on March 15<sup>th</sup>, from a very young unnumbered tree.

**Geographical distribution.** Whereas *Sloanea Sigur* may be counted among the commonest forest trees of Western and Central Java, as well as of Eastern Java, growing chiefly at an altitude of 600—1200 metres, and also occurs far outside Java. e.g. in India, *Sloanea javanica*, which is sharply differentiated from the former species by its not prickly fruits and entire petals, is so far not known outside Java, and has not been found wild in Java outside the forest of Depok.

*Sloanea javanica* is the only species of the subgenus *Phoenicospermum* (Miq.) Schumann, in Engler and Prantl's *Natürliche Pflanzenfamilien* III 6, (1890) 5. This subgenus was formerly (1865—1866) erroneously published by Miquel as a new genus, under the name *Phoenicosperma*.

**Oecological conditions.** In the very heterogeneous, shady nature-reserve of Depok, lying at an altitude of about 100 metres above sea-level, and consisting principally of evergreen trees with many

<sup>1</sup>) The letter  $n$  does not signify here number, but indicates the series to which the trees numbered 23 and 39 belong.

climbing plants and a fairly rich under-growth, *Sloanea javanica* only grows very sparsely, but is by no means rare, at least not in young specimens. Adult trees, however, are only found in very small numbers. The soil in the forest of Depok is fertile, and like the climate, it is rather moist throughout almost the entire year. With regard to rain-fall and location of this station (Depok) the following data are taken from "Regenwaarnemingen in Ned. Indië" II (1913) p. 66, published by the Royal magnetic and meteorological observatory of Batavia.

Depok is situated at an altitude of 93 metres above sea-level; 33 kilometres from the coast. Annual rainfall 3156 millimetres. Monthly rainfall maxima 487 millimetres in November and 678 millimetres in April. Monthly minima of rainfall 95 millimetres in June and 61 millimetres in August.

**Means of distribution.** The well developed, brilliantly coloured arillus of the fairly large seeds, and the brilliant colour of the fruits would already indicate that the distribution is effected by fructivorous animals. Since the arillus has, however, an extraordinarily bitter taste, many animals will probably soon drop the seeds they have taken. The very scattered occurrence and the relatively small number of specimens of this tree in the Depok forest may perhaps be thus explained to some extent. I myself have not yet observed any transport of the seeds by animals. I did indeed observe on March 31 that the numerous fruits lying below tree 39n had all, without exception, been gnawed by animals before dehiscence. The mature seeds, although damaged in some cases, were still within the fruit. As far as I have been able to ascertain, this damage to fallen fruits and also to fruits still on the tree, was probably all due to monkeys (*Semnopithecus*) occurring near Depok in large numbers. As a rule the strong woody pericarp was completely gnawed away at or near the apex of the fruit, down to the arillus of the seeds. The large embryo, which has a particularly pleasant taste, had only been eaten up in a few cases. Apparently the intensely bitter arillus, which surrounds the greater part of the seed, had protected it in most cases against the monkeys.

So it seems that *Sloanea javanica* depends for its means of distribution on exozoid seed-distribution by small mammals and large birds, which, having been attracted by the brilliant colour of the pericarp and arillus, take seeds from fruits which have opened, but soon drop them again on account of the intensely bitter taste of the arillus.

**Season of flowering and fruiting.** The two numbered trees (23*n* and 39*n*) fruited in March, the older specimen (39*n*) very abundantly. The flowering season is for Depok in the first half of the wet monsoon (October—December).

**Economic use.** According to my native guides the wood is not durable and is therefore only used as fire-wood, in spite of its large dimensions. Formerly the disc-shaped wheels of pedatis (buffalo-carts), were sometimes made from the thick plank-buttresses, found on the roots of these, as of other trees. The older of the two trees mentioned (39*n*) now within the wire fence of the nature reserve, still bears clear traces of this custom, now obsolete for many years, for evidently a wheel of a buffalo-cart has been cut out of one of the plank-buttresses. Formerly the natives of Depok also prepared an oil from the interior of the seeds (from the embryo). No other economic application of *Sloanea javanica* is known.

**Culture.** On account of its size and fine arboreal habit, and of the brilliant colour of its large fruits and seeds, this species deserves to be cultivated as ornamental tree, at least in the lower districts of Java. So far, however, *Sloanea javanica* has not been planted outside the Buitenzorg Gardens.

**Description of the species.** In 1894 Koorders and Valetón, in their "Bijdragen tot de kennis der Boomsoorten van Java", p. 240, under "Aanmerkingen", included a note on *Sloanea javanica*, of which the following is a translation: "The description of the leaves from a living specimen in the Buitenzorg Gardens (VI. C. 94); the rest according to Miquel l.c.". "The actual habitat is not known, and the tree is only known from the above gardens, so that it perhaps originates from one of the outer islands, and not from Java".

"This species is still wanting in "Herb. Kds". (Thus in Bijdragen Booms. Java I).

I further wrote in 1912 in vol. II. (p. 571) of my "Exkursionsflora von Java" the following:

"Java? Angeblich (nach Miquel l.c.) wild in Java, jedoch vermutlich dort nich ausserhalb des botanischen Gartens von Buitenzorg vorkommend. Jedenfalls sah ich noch keine einwandfreie javanische Spezimina".

The finds and observations made in 1898 and in March 1915 in the nature reserve of Depok have filled up in a gratifying manner the lacuna in our knowledge of the habitat of this rare tree.

The examination of the specimens of *Sloanea javanica* found in the forest of Depok, have shown me that the specific description and figure, published by Miquel, is in the main, correct, but requires amplification and, with regard to a few points, also correction.

I confine myself here entirely to my observations on the material from Depok (Herb. Kds. n. 42807  $\beta$ , 42814  $\beta$ , 42778  $\beta$ , etc.):

Tree attaining a height up to 25 metres. Trunk up to  $\frac{3}{4}$  metre in diameter, fairly straight and sometimes columnar, with large plank-buttresses formed by the roots, branching irregularly and only high above the ground. Crown high, dense, irregular. Bark externally dark grey, with watery sap (no latex and no resin). Leaves with dark green upper surface, lower surface bluish green; smooth and shiny on both sides. The leaves of very young plants, only 2 metres high, may attain a length of 40 centimetres, but those of the fertile branches of a very old tree, 25 metres high, are only 10—20 centimetres long. Young twigs pale green; older branches dark grey (not brown).

Fruits (ripe, but not yet dehiscent): externally a beautiful orange (not brick red). Mesocarp thick, woody, dry, grey, almost tasteless and odourless. Endocarp thin, of a beautiful purple colour. Seeds (ripe) almost completely enveloped by a fine orange yellow or orange (not red), glistening, almost odourless and very bitter arillus. Testa externally shiny black, crustaceous (not osseous). Endosperm small, opal-white, fleshy. Embryo large, pure white, odourless, of pleasant taste.

#### Literature:

*Sloanea javanica* (Miquel) Sszyszowicz in Engler's Botanische Jahrb. VI. (1885) 454; Schumann in Engler und Prantl, Natürl. Pflanzenfam. III. 6. (1890) 5; Koorders en Valeton, Bijdragen Booms. Java I. (1894) 239; Koorders und Valeton, Atlas Baumarten Java II. (1914) Fig. 433; Koorders, Exkursionsflora von Java. II. (1912) 571. (Here read line 17 from foot of p. 571 Miquel instead of: (Miq.) Sszysz.); *Phoenicosperma javanica* Miquel in Annales Mus. bot. Lugd. Bat. II. (1865—1866) 68. t. 3; *Echinocarpus tetragonus* Teijsm. et Binn., Catal. Hort. Bog. (1866) 184 (sine descript.).

**Trees grown in the Buitenzorg Gardens.** Of *Sloanea javanica* I already saw in last March correctly labelled Buitenzorg garden-herbarium specimens of two trees, cultivated in the Hortus Bogoriensis under numbers 92 and 94 in division VI. C. The latter of these two

numbered trees from the Gardens (namely 94 VI. C.), was already published by us in 1894 in KOORDERS en VALETON, Bijdragen Booms. Java I, p. 240, under the correct name *Sloanea javanica* (Miquel) Ssyzszyłowicz.

An old garden collection-label of a sterile herbarium specimen of tree 92 (VI. C.) indicates, that its numbered Hortus-tree was formerly cultivated under the incorrect, and as far as I know unpublished garden name of *Elaeocarpus stipularis* Bl. var. *latifolia*.

**Habit.** In the fruiting season this forest giant with a trunk, more than  $1\frac{1}{2}$  metres in diameter, is very striking. The dark green crown is then adorned by numerous fruits, almost as large as fists, externally orange, internally a beautiful purple and opening by four valves. These generally contain 1—2, rarely 3—4 glistening jet black, oblong, fairly large seeds, for the most part enveloped by an arillus of a fine orange yellow colour. Except on account of the large dimensions of the trunk, with the large plank-buttresses formed by the roots, this tree is not very conspicuous outside the fruiting season. Young trees easily escape the attention of the field botanist, because this species, even in the sole original habitat so far known, i.e. in the forest of Depok, only occurs very scattered and does not produce flowers and fruits until it has attained an advanced age; a further reason why young specimens are inconspicuous, is that their leaves show such a close resemblance to those of some other Javanese trees, as regards shape, size and innervation, that they are only distinguished after close scrutinizing. The latter reasons explain the fact that the original habitat of *Sloanea javanica* could have remained unknown for nearly half a century, in spite of its situation near a scientific centre like Buitenzorg, in the forest of Depok, often visited by many botanists.

Buitenzorg, April 9<sup>th</sup> 1915.

**Botany.** — “On the influence of external conditions on the flowering of *Dendrobium crumenatum* Lindl.” By Prof. F. A. F. C. WENT and A. A. L. RUTGERS.

*Dendrobium crumenatum* is a small epiphytic Orchid, occurring pretty frequently in the Dutch East Indies, and especially common in Western Java, e. g. at Buitenzorg; it has often attracted the attention of naturalists by peculiarities of its flowering<sup>1)</sup>. These

<sup>1)</sup> F. A. F. C. WENT. Die Periodicität des Blühens von *Dendrobium crumenatum* Lindl. Ann. d. Jard. bot. de Buitenzorg, Supplément II, Leyde, 1898, p. 73—77.