

Notes on Sapotaceae

(Written July 1965)

by

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It was through the misidentification by Leiden for a certain Malayan species of *Sapotaceae* and the rather unusual circumstances connected with it that the following notes came to be written. In trying to identify it myself later, I had to consult the *Precursores* for this family to some extent and as a result noticed a number of minor details with which I cannot agree. I have, however, to acknowledge the good work that has been accomplished by the authors of these *Precursores*.

I. A Misunderstood Species of Sapotaceae

On 21st May 1953 I collected at Tanjong Gul, Singapore, a sterile *Sapotaceae*, Sinclair S.F.N. 39640, and also numbered Sinclair 7446 in my own series. It was growing by the sea-shore at the foot of the grassy wooded sea-cliffs. Incidentally Tanjong Gul is the station for a number of rare plants in Singapore such as *Vatica wallichii*, *Casearia capitellata*, *Adinobotrys erianthus*, *Rhizophora stylosa*, *Diospyros styraciformis*, *Urceola torulosa*, *Ipomoea digitata*, *I. illustris*, *Knema corticosa* (*globularia*), *Ficus consociata* var. *murtoni*, *F. xylophylla*, *Athyrium prescottianum* and *Dipteris conjugata*. Haji Mohamed Nur, herbarium assistant at that time, made various suggestions as to its identity. The sheets bear the names *Payena*, *Planchonella obovata* and *Madhuca sericea* but I deleted them all in turn, not being satisfied. It was eventually sent on loan to Leiden with the rest of the *Sapotaceae* when they were being revised for *Flora Malesiana* and returned in due course with the remarks *cf. Myristicaceae*. Dr. P. van Royen had also seen it as his initials and the date 8-4-61 were inscribed on the sheet. As it happened I had revised and published the Malayan species of *Myristicaceae* by 1958 and would not have mistaken the present plant with its white sap for one of the *Myristicaceae*. Perhaps the person who wrote *cf. Myristicaceae* on the sheet was not looking at collectors' names but was more concerned with the appearance of the specimen itself.

On looking among the named *Sapotaceae* then back from loan, I noticed that it resembled two sheets, both named *Payena grandiflora* Ridley by van Royen — (1) Ridley 6497 from Sungei Morai, Singapore and (2) Ridley 11371 from? Sumatra, but cultivated in the Botanic Gardens, Singapore.

I picked out these two sheets and my own sterile specimen and sent them again to Leiden so that van Royen could see them side by side. I wrote on the species cover "Dr. v. Royen — Please return these three mounted sheets to Singapore. The two specimens

collected in Singapore near the sea-shore are obviously the same as the Sumatran one. I think you overlooked them and did not see the connection. I cannot at present check if you have kept *Payena grandiflora* as a good species since our copy of your publication has gone to the binders and they usually keep such things for a long time. Can you please re-examine and annotate?"

— J. Sinclair.

This material was returned later with other *Sapotaceae* but without any comments or further annotations. I do not think van Royen saw it at all. It was about that time he left Leiden to take up an appointment with the Forestry Department at Lae. In fact I can recall receiving a letter from someone at Leiden informing me of his departure and of the fact that he had not been able to examine a duplicate of *Palaquium beccarianum* which I had sent to him for checking. Our own specimen of this was sent to him later at Lae and I only came across it the other day in the herbarium when writing this article. But returning to the subject of the unidentified plant I had nothing further to expect until the 3rd of November 1963 when it eventually flowered at Tanjong Gul.

The Tanjong Gul specimens are indeed *Payena grandiflora* Ridley and Ridley cites the following specimens with his description — (1) *Ridley 6497* (SING) Sungei Morai, Singapore; (2) *Goodenough 1268* (SING) Panchur, Malacca and (3) *Ridley 113711* (SING) cultivated in Botanic Gardens, Singapore, believed to have come from Sumatra. The last mentioned specimen actually bears the number *11371* on the label of the Singapore sheet and not *113711* as stated in the publication. Ridley says that the species is described mainly from the tree in the Botanic Gardens, i.e. *Ridley 11371* and adds that this fine species has been confused with *Payena maingayi* by King and Gamble in the *Materials*. But there are four sepals in its flowers and not five as stated by him.

In the revision of *Payena* in *Blumea* 9, 1 (1958) 89–138, the author A.C. van Bruggen has sunk *Payena grandiflora* Ridley under *P. maingayi* Cl. On page 107 he states that on account of Ridley's erroneous remark about the sepals (*Ridley loc. cit.* 29) "Sepals ovate, subobtus, nearly half an inch long 5, . . ." Lam transferred *P. grandiflora* to the genus *Diploknema*. In our opinion it is evident that this species is quite identical with *P. maingayi*. I must point out now that van Bruggen annotated most of our specimens of *Payena* while van Royen, who wrote up *Madhuca*, annotated most of the latter. There are, however, occasional sheets of *Payena* which van Royen named. Lam was in a way nearer to the truth when he regarded it as a good species and also when he removed it from *Payena*; the sepals are, indeed, half an inch long. One of the syntypes, *Goodenough 1268*, is actually *Payena maingayi*, but the other two are one species, namely *Payena grandiflora* of Ridley which was based, as pointed out above, mainly on *Ridley 11371*. It was not the custom then to choose a holotype and so I have now to make *Ridley 11371* the lectotype of *Payena grandiflora* and to exclude *Goodenough 1268*.

I was not, however, satisfied that *Payena* was the correct genus and after investigation found that the specimens really belong to *Madhuca* chiefly because of the structure of the flower and the number of its parts. I cannot call the species *Madhuca grandiflora* because a *Madhuca grandiflora* Fletcher already exists. A new name must therefore be chosen so I have adopted the epithet *Madhuca decipiens* J. Sinclair.

Madhuca decipiens J. Sinclair, **nom. nov.**

Basionym: *Payena grandiflora* Ridley in J. Roy. As. Soc. Str. Br. 61 (1912) 28 *excl. spec. Goodenough 1268*; Ridley, Fl. Mal. Pen. 2 (1923) 262 *excl. Goodenough 1268 = P. maingayi* Cl.

Isonym: *Diploknema grandiflora* (Ridley) H.J. Lam in Bull. Jard. Bot. Btzg 7, 1 and 2 (1925) 185 *excl. Goodenough 1268* et in Bull. Jard. Bot. Btzg 8, 4 (1927) 463.

Shrub (6–10 ft) 2–3 m high with copious white sap. *Leaves* dark green and glossy above with a paler midrib, pale yellowish green and dull beneath, drying greyish brown to dark brown above and pale yellow beneath, becoming greyish when old. *Sepals* 4, greyish tomentulose outside, glabrous inside and on the margins of the two inner ones as well, the outer two ovate, 1 cm long and 8 mm broad, the inner two narrower, 1 cm long and 7 mm broad and distinct from the outer in having a carinate midrib on the outside. *Corolla* white, thin in texture, 1 cm long in bud and 1.5 cm long when mature (i.e. it protrudes 5 mm beyond the calyx when mature) split down $\frac{2}{3}$ -way into the 9–12 acuminate lobes, tomentulose except for the free parts of the lobes. *Stamens* 26–31 and in three rows, the very short filaments only 0.75 mm long, densely hirsute, the anthers 2 mm long, their slender appendages 1.5 mm long, both sparsely covered with 0.5–1 mm long whitish hairs. *Ovary* densely tomentose with 10 loculi and one ovule in each loculus; style 1 cm long, its basal third with short adpressed, greyish white hairs, the rest glabrous; pedicels 1.5–2.5 cm long and 1.5–2 mm thick, minutely pubescent.

- JOHORE: Gunong Pulai, Md Nur & Kiah S.F.N. 7785 (SING) not "*Md Mutkiah*" as stated by Lam l.c. 186.
- SINGAPORE: Sungei Morai, Ridley 6497 (SING); Tanjong Gul, Sinclair 7446, also numbered Sinclair S.F.N. 39640 (SING) sterile and Sinclair 10761 (A, E, G, K, L, LAE, SING) in flower.
- CULTIVATED: Cultivated in Bot. Gard. Sing. probably from Sumatra, Ridley 11371 (SING) quoted as 113711.
- TYPE MATERIAL: Lectotype of *Payena grandiflora* Ridley = Ridley 11371 (SING).

The above description is taken from *Sinclair 10761* and duplicates of it are being distributed. Three shrubs were seen in all. Lam is right when he says that the Johore specimen cited above is not *Payena maingayi* but probably belongs to the present, i.e. Ridley's species. He, however, did not read the handwriting on the label correctly, see above under JOHORE. I at first thought that this species might be confined to the sea-shore as both Tanjong Gul

and Sungei Morai are sea-shore localities. Apparently this is not the case as Gunong Pulai is a mountain. The present species is very different from *Payena maingayi*, the latter a tall forest tree, reaching at least 70 feet high and which I have seen in Bukit Timah Nature Reserve, Singapore. The leaves of *P. maingayi* are much thinner in texture, dry blackish above, and have a dark rusty, scaly, powdery pubescence on the under-surface like those of *Chrysophyllum cainito*. Those of the *Madhuca* are much paler beneath, a pale yellow which becomes greyish when old and tends to disappear; furthermore they are finely reticulate on both surfaces with longer and stouter petioles. There is a number of differences also in the flowers, especially in the larger number of petals, stamens and loculi. But it will be seen without dissecting them that those of the *Madhuca* are slightly larger with stouter pedicels and more coriaceous sepals.

I was not so interested, however, in comparing this *Madhuca* with *P. maingayi* as in trying to find out its proper place among the other *Madhuca* species. It soon became apparent that it did resemble one other species and this investigation led to further unexpected discoveries as I had then to consult rather closely the *Precursores* on *Payena* and *Madhuca*. From this consultation I found also that there were some minor points in which I cannot quite agree with all that has been written in the *Precursores*. It seems best to discuss the relationship of *Madhuca decipiens* under the next heading since some name changes result.

II. On the Relationship of *Madhuca decipiens*; A New Combination in *Madhuca* and *Madhuca dubardii* H. J. Lam redefined

I soon found a near relative to the above species in *Payena selangorica* King and Gamble, the type being Ridley 7387 (SING) from Bukit Kutu, Selangor, Malaya (young fruiting material). In fact this is a miniature edition of *Madhuca decipiens*, a very similar but more elegant species. The rather similar leaves are smaller and their petioles are also reduced proportionately in length and thickness. Ridley 7387 is the only authentic specimen in the Singapore herbarium named *P. selangorica*, the only one quoted under the original description by King and Gamble in the *Materials*, page 175 and also the only one quoted in the *Precursores*, page 131. But if *P. selangorica* is so like *Madhuca decipiens* then it must surely be a *Madhuca* and this can indeed be seen from a comparison of the actual specimens. Van Bruggen in the *Precursores*, page 133 states that its status is still doubtful and that according to the present material it could belong to *Madhuca* or *Ganua* as well, . . . etc. A search was then made among our *Madhuca* material to see if any other specimens of it could be located under some other name. Four sheets were found and the specimens were in flower. From these I am able to confirm that it is a *Madhuca*. Two of these sheets are named *Madhuca dubardii* H. J. Lam var. *dubardii*, namely Strong 11115 and Strugnell 11116 and the other two Abdul Rahman 10527 and Symington

24097 *Madhuca dubardii* var. *lanceolata* H. J. Lam. The *Abdul Rahman* specimen 10527 (SING) is the type of the var. *lanceolata*. In my opinion, however, these specimens are all very uniform and represent only one species which should not have been divided into two varieties. The leaves are narrowly elliptic and acute at the apex; those with the apex damaged tend to be obovate and obtuse at the apex. I find the same thing applies in my specimens of *Madhuca decipiens*. A Penang specimen, *Paul s.n.*, named by van Royen and quoted by him in the *Precursores*, page 105 under *M. dubardii* var. *dubardii* is, however, not that species but *Palaquium curtisii* (K. & G.) H. J. Lam instead. The leaves are slightly juvenile and match those of a similar specimen of *P. curtisii* from Penang wrongly named *P. gutta* (Hooker f.) Baillon by van Royen. This is *Curtis s.n.* date 25th October, 1900.

The type of *M. dubardii* H.J. Lam (1925) was based on material from Suan Lamba, Sabah (British North Borneo) namely *Agama 538* (BO holotype, K). Suan Lamba is not in Sarawak as is stated by van Royen. I then got together all the named and unnamed sheets of this species in our herbarium from all the Sabah localities which I could find. Two of these are quoted under *dubardii* by van Royen himself in the *Precursores*, page 105, namely *Cuadra A2148* and *Puasa 10076*. The former bears the *determinavit* slip of van Royen who saw this sheet; the latter, the SING duplicate, was not sent to him as it was discovered later among unmounted material, but he has seen its K and L duplicates. I found two other sheets of *dubardii* namely *Castro 3793* and *Sales 4311* which had been wrongly named and quoted as *Payena acuminata* var. *acuminata* by van Bruggen on page 103 of his *Precursores* on *Payena*. Having made a careful comparison of the Sabah material of *M. dubardii* with that of the Malay Peninsula I find that they represent two distinct species. The Malay Peninsula material is not different from *Payena selangorica* but the latter is a *Madhuca* and a new combination is necessary.

***Madhuca selangorica* (King & Gamble) J. Sinclair, comb. nov.**

Basionym: *Payena selangorica* King & Gamble, Mat. Fl. Mal. Pen. 17 in J. As. Soc. Bengal 74, 2 Extra Nr. (1906) 175; *idem* Addenda-Corrigenda (1908) 873; Ridley, Fl. Mal. Pen. 2 (1923) 264; Lam in Bull. Jard. Bot. Btzig 7, 1 and 2 (1925) 132 et l.c. 8, 4 (1927) 439; van Bruggen in Blumea 9, 1 (1958) 131 f. 11.

Synonyms: *Madhuca dubardii* (non H. J. Lam 1925) H.J. Lam in Bull. Jard. Bot. Btzig 8, 4 (1927) 444 f. 18; van Royen in Blumea 10, 1 (1960) 104 *quoad spec. selangorenses tantum*.

M. dubardii var. *lanceolata* H. J. Lam in Bull. Jard. Bot. Btzig 8, 4 (1927) 446 f. 18; van Royen in Blumea 10, 1 (1960) 105 — **syn. nov.**

Sepals 7 mm long and 5 mm broad, medium brown tomentulose to tomentose outside, rugose when dry, the inner two with glabrous margins and carinate on the outside like those of *M. decipiens*. *Corolla* 5 mm long and split down $\frac{3}{4}$ -way into 8 lobes, the latter acute at the apex, adpressed sericeous on the outside and at the

base inside. *Anthers* 16, hirsute with an acute apex (not produced into a slender process as in *decipiens* but the flowers examined were in a slightly younger stage). *Ovary* tomentose with 8 loculi and a 5 mm long style; pedicels sulcate, 2 cm long and 1 mm thick.

SELANGOR :

Bukit Kutu, Ridley 7387 (SING); Ayer Hitam Reserve, Kajang, Abdul Rahman 10527 (SING); Bukit Tunggul Reserve, Strong 11115 (SING); Ampang Reserve, Selangor, Strugnell 11116 (SING); Sungei Lalang, Kajang, Symington 24097 (SING).

DISTRIBUTION :

Selangor in Malaya. Van Royen in *Blumea* l.c. 105 mentions a specimen from West Coast, Sumatra. This is not in Herb. Sing. and I have not seen it at the time of writing.

TYPE MATERIAL :

Payena selangorica K. & G., Ridley 7387 (SING holotype). *M. dubardii* var. *lancoolata* H.J. Lam, Abdul Rahman 10527 (SING holotype).

As pointed out *M. selangorica* is smaller in all its parts than *M. decipiens*. The colour of the under-surface of the leaves is of a paler yellow in *decipiens*, that in *selangorica* being more rusty. Later on when the scales tend to fall off the colour changes to an ashy grey in both. There are 9–12 corolla lobes in *decipiens* as against 8 in *selangorica*. The lobes are acuminate at the apex in the former and acute in the latter. The anthers are more numerous also, 26–31 as against 16 in *selangorica*. In *decipiens* they are produced at the apex into a slender filiform process; in *selangorica* they are simply acute and not produced. The anthers were not quite mature in the flowers of *selangorica* which I examined, but I do not think they will increase very much more at the apex.

Madhuca dubardii H.J. Lam in Bull. Jard. Bot. Btzig 7, 1 and 2 (1925) 162 f. 43 [non *M. dubardii* Lam et vars Lam l.c. (1927) 444 f. 18=*M. selangorica* (K. & G.) Sinclair]; van Royen in *Blumea* 10, 1 (1960) 104 *quoad spec. borneenses tantum*.

Sepals 5 mm long and 4 mm broad, pale brown-tomentulose when dry, the two inner ones with a groove on the outside in place of the mid-vein. *Corolla* 4 mm long and split down $\frac{3}{4}$ -way into about 9 lobes, the latter obtuse at the apex, pubescent at the base inside but not outside and not on the free lobes. *Anthers* 16–19 with a few scattered hairs, acuminate at the apex, some with a slender process. *Ovary* densely tomentose with 10–11 loculi; style 4 mm long; pedicels sulcate, 1.5–1.8 cm long and 1 mm thick.

SABAH (BRITISH NORTH BORNEO) :

Suan Lamba, Agama 538 (BO, K); Balaching River, Sandakan, P. Castro 3793 (SING); Sekong River valley, Sales 4311 (SING); the remainder Kinabatangan:—Kori timber camp, Austin Cuadra A2148 (SING); Supu Forest Reserve, Puasa 10076 (SING); Daramakud timber camp, Kadir bin Abdul SAN 16864 (SING).

DISTRIBUTION :

So far confined to Sabah.

TYPE MATERIAL :

Madhuca dubardii H. J. Lam, Agama 538 (BO holotype, K) not seen by me at the time of writing.

I hereby exclude all the Malay Peninsula, Selangor specimens of *M. dubardii* and *M. dubardii* var. *lanceolata* from this species. They are, as has been pointed out *M. selangorica*. The differences between *M. selangorica* and *M. dubardii* are here expressed in tabular form.

	<i>Madhuca selangorica</i>	<i>Madhuca dubardii</i>
Leaves	Mostly narrowly elliptic, less often obovate; upper surface finely reticulate with raised veins and reticulations, mostly glossy when dry; lower surface when young a rusty brown colour due to scales, the veins very faint	Mostly obovate, less often elliptic; broader at the middle; upper surface smooth and dull without the veins and reticulations being visible or if present then very faint, the veins sunk; lower surface paler and more yellowish, the veins more prominent
Petioles	2-2.3 cm long, proportionately longer than in <i>dubardii</i> depending on the size of the blade	1-1.5 cm long, the blade-petiole ratio proportionately less than in <i>selangorica</i>
Flowers	Larger, 7 mm long and 5 mm broad, medium brown, tomentulose to tomentose	Smaller, 5 mm long and 4 mm broad, paler brown, tomentulose, the tomentum less
Pedicels	2 cm long	1.5-1.8 cm long
Calyx	7 mm long and 5 mm broad, rugose, the inner two with a carinate mid-vein on the back (outside)	5 mm long and 4 mm broad, smooth and not rugose, the inner two with a sulcate mid-vein on the back
Corolla	5 mm long, densely pubescent at the base inside and adpressed-sericeous outside except towards the apices of the lobes; lobes acute at the apex	4 mm long, pubescent only at the base, glabrous outside and inside higher up; lobes obtuse at the apex
Anthers	2 mm long, hairy, acute at the apex but not produced into a filiform appendage	2.5 mm long, much less hairy, the apex acuminate or sometimes produced into a slender appendage
Ovary	8 loculi observed (probably 10 also)	10-11 loculi

III. On the Identity of *Payena ridleyi* Gandoger

It was, when trying to identify my specimens of *Madhuca decipiens* from Tanjong Gul, that I noticed a doubtful species *Payena ridleyi* Gandoger at the end of A.C. van Bruggen's *Precursores* on *Payena* in *Blumea* 9, 1 (1958) 133. The type of that species is there stated to be *Ridley 6698*, Singapore, and van Bruggen adds: —“Not having seen the type specimen we can not refer it to one of the known species; moreover, the description is quite insufficient. There is a possibility that it is identical with *P. maingayi* (1882) according to the remark that the leaves are twice as long as those of *P. costata*=*P. lucida*.” As I did not then know the identity of my Tanjong Gul specimens there was the possibility that they might be identical with Gandoger's species if that could be found. By some kind of intuition and remembering that I had once written *Madhuca sericea* on the sterile sheet, *Sinclair S.F.N. 39640* and scored it out later, I went straight to the genus cover of *Madhuca sericea* in the herbarium and found the missing Ridley's number there. It had been identified and labelled as *Madhuca sericea* (Miq.) Lam by van Royen who revised *Madhuca*. I do not know whether van Bruggen, the author of *Payena* in the *Precursores*, saw it or not. However, the collector is not Ridley himself but Mat, his collector. All inscriptions on the label are in Ridley's handwriting. Mat is Ahmad bin Hassan M.B.E. who is still alive and probably nearly ninety years old. He collected this specimen, “a big tree”, according to the label, on 15th May 1894, some 71 years ago at Chan Chu Kang, Singapore. Sometimes we find on labels of plants collected in the past in Malaya the names of native collectors instead of those of the botanists with whom they worked, e.g. Alvins = Cantley's collector, Haniff = Curtis, and Mohamed Nur or Haniff = I. H. Burkill's collectors. The specimen in Singapore will be the isotype of *Payena ridleyi* Gandoger, the holotype will be a duplicate of this at Lyons. I have thus to record this species as a new synonym of *Madhuca sericea*.

Madhuca sericea (Miquel) H.J. Lam in Bull. Jard. Bot. Btzg 7, 1 and 2 (1925) 163 and 264 f. 44; Ridley, Fl. Mal. Pen. 5 (1925) Suppl. 319; Lam, l.c. 8, 4 (1927) 446; van Royen in *Blumea* 10, 1 (1960) 70.

Basionym: *Payena? sericea* Miq. Fl. Ind. Bat. 2 (1859) 1039.

Synonym: *Payena ridleyi* Gandoger in Bull. Soc. Bot. France 65 (1918) 56; van Bruggen in *Blumea* 9, 1 (1958) 133 —
syn. nov.

SINGAPORE:

Chan Chu Kang, *Mat 6698* (LY, SING).

TYPE MATERIAL:

Payena sericea Miq., *Horsfield s.n.* (BO).
Payena ridleyi Gandoger (*Ridley Mat 6698* (LY holotype, SING)).

IV. On Other Missing Specimens

There are other cases of missing specimens which could not be located. The reason again seems to be that mentioned above where it was not realized that the collections of certain botanists could also be that of their native collectors.

In the *Precursores* for *Ganua* by J. van den Assem in *Blumea* 7, 2 (1953) 380 is stated:—"Of some specimens from British North Borneo (*Apostal* 22, *Wood* 1261, 1889) and from Sarawak (*Garaman* 2311, 2789), annotations by Lam were found in the Rijksherbarium. Unfortunately, however, the specimens themselves could not be traced anymore, which is the more regrettable since they would mean new localities. Merrill . . . etc."

Garaman was a collector of Haviland and the Singapore specimen labelled *Haviland* 2311 was sent to Leiden for revision and determined personally by van Royen as *Payena havilandii* King and Gamble. *P. havilandii* is a synonym of *P. obscura* Burck, but it is certainly not that species. It is probably quite correctly determined as *Ganua monticola* by Lam. It is very similar to a sterile specimen, *Anderson SAR* 2683 wrongly named *Payena lucida* by van Royen and quoted by van Bruggen. Both have the under-surface of the leaves very pale when dry. The locality of the *Haviland* or *Garaman* specimen 2311 now required is Sk near Kuching, Sarawak, 10th June 1893. Tree. Pedicels pink, calyx yellowish.

V. Some Notes on *Payena* species

When trying to solve the identity of the Tanjong Gul species mentioned previously I had to look through the other *Payena* species in the Singapore Herbarium. I sometimes found that the species in certain covers did not always form a uniform series. I extracted those which appeared wrongly named and after a little manipulation and rearrangement got a clear picture. The changes are only minor ones but I feel they ought to be recorded.

1. *Payena acuminata* (Blume) Pierre in Bull. Mens. Soc. Linn. Paris (1885) 528; van Bruggen in *Blumea* 9, 1 (1958) 100 f. 2.

var. *acuminata*

MALAY PENINSULA PAHANG: Sungei Mai Estates, *Kadim & Mahmood Nos. 15* (K, L, SING) and 32 (A, BO, K, L, SING).

This species has not been recorded previously from Pahang so the above collections appear to be the first records. They were collected in March 1959 after the revision of *Payena* appeared in *Blumea*.

I must point out that a sheet *Corner S.F.N.* 30276 from Keman, Trengganu is identical with *Moysey & Kiah S.F.N.* 33749 from Ulu Brang, Trengganu. One can see at a glance that they are the same, yet the first has been incorrectly identified and quoted by van Bruggen as *Payena lucida* when it should have been *P. acuminata* var. *acuminata*.

2. **Payena lucida** (G. Don) A. DC. Prodr. 8 (1844) 197; van Bruggen in *Blumea* 9, 1 (1958) 111.

I have added to our collections of *Payena lucida* another sheet, *Derry 937* from Malacca, wrongly named and quoted as *Madhuca sericea* by van Royen. I spotted it as out of place among the specimens of *M. sericea* by its very obtuse, almost orbicular sepals in contrast to the sharply acute ones of this *Madhuca*. It was in young flower-bud with as yet very short pedicels, but in *P. lucida* these seem to lengthen rapidly as the flowers mature. There are many specimens of this very distinct species in Herb. Sing. and they form a very uniform series throughout the covers marked "Malay Peninsula" in our collection. I am afraid I cannot say this about the specimens named *lucida* from the Malay Islands, especially Borneo. In fact I do not see any specimens either from Borneo or Sumatra in our collection which I can identify with *lucida* and it may be that *lucida* is not found in Borneo at all. I have sorted out a series from Borneo which looks more or less uniform but differs from *lucida* in the finer and more closely spaced nerves and in the line of interarching of the nerves much nearer to the margin of the leaf than in that species. I discuss this series here below under 3. *Payena* sp. but I do not know for certain to which species it belongs.

3. *Payena* sp.

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| BRUNEI: | Ulu Ropan, Belalong watershed, <i>Ashton BRUN 5245</i> (SING). |
| WEST BORNEO: | Melawi Tjatit, B. Tengkujung, <i>bb26347</i> (SING). |
| EAST AND NORTH-EAST BORNEO: | Peak of Balikpapan, Beoul, <i>Kostermans 7331</i> (SING); Loa Djanan, west of Samarinda, <i>Kostermans 6747</i> (SING); Loa Haur, west of Samarinda, <i>Kostermans Nos. 6941</i> (SING) and <i>9899</i> (SING); Pleihari, S. Alang, <i>bb14197</i> (SING); Pasir S. Ongka, <i>bb25638</i> (SING); Bulungan, <i>bb26158</i> (SING). |
| P. NUNUKAN: | Southern part, <i>Kostermans 9204</i> (SING). |
| SABAH: | Tawau Residency: —Merotai Besar, Tawau, <i>Aban Gibot SAN 31292</i> (SING).
Sandakan Residency: —Bettotan, Sandakan, <i>Puasa 4558</i> (SING). |

West Coast Residency:—Kundasan, 10 miles west of Ranau, *Wood & Kapis SAN 16392* (SING); west of Tenompok Pass by roadside, *Smythies SAR 10951* (SING); Tenompok, *Clemens Nos. 27974; 28178; 28538* and *28688* (all SING); Dallas, *Clemens 26715* (SING).

Interior Residency:—Kaingaran, 10 miles from Tambunan, *Wood & Charington SAN 17028* (SING); Bukit Tenom, *Wood & Wyatt-Smith A4392* (SING).

The above are the specimens I have sorted out as probably consisting of one species which is not *Payena lucida*. One of them, *bb14197*, is named *Payena endertii* by van Bruggen and a fruiting twig of it is figured in *Blumea* 9, 1 (1958) 125. The fruits are glabrous, black, very hard and ovoid. Most of our specimens are in flower. The only other one in fruit is *Aban Gibot SAN 31292* (immature fruit). Lam in 1925 described *P. endertii* from Sumatra with two syntypes, *For. Bur. Lab. E1051* and *For. Bur. Lab. T.B. 452* but in 1927 he included some Bornean specimens in this species. Consequently van Bruggen has chosen *E1051* from Sumatra as the lectotype. The only Sumatran specimen that we have here is one of the syntypes *T.B. 452* and it is in flower. From it I am not entirely convinced that it is the same species as *bb14197* and the rest of the Bornean specimens. Unfortunately there is no other authentic material of *P. endertii* known from Sumatra except these two syntypes and they are not in fruit. That means we do not know what the fruit of the Sumatran specimens is really like. The specimen of *T.B. 452* is very like *P. lowiana* Pierre. The type of *P. lowiana* came from Perak in the Malay Peninsula but this species is also distributed in Sumatra and Borneo. Its fruits are glabrous, hard and black but more elongate than those of *14197*. Young fruits, however, would look more like those of *bb14197*. Could the Sumatran material of *P. endertii* be *P. lowiana*? The Bornean specimens which I have sorted out are very like *Payena lanceolata* Ridley var. *lanceolata* except for their ovoid fruits and smaller flowers. If the Bornean species is not *lanceolata* and not *endertii*, could it be an undescribed species? This is a matter for the authors of the *Precursores* and perhaps they may wish to re-examine the material.

Of the above sorted material the following in my opinion are wrongly named *P. lucida* by van Bruggen:—*bb26158*; *Clemens Nos. 27974* and *28688*; *Kostermans 6941* and *Wood & Wyatt-Smith A4392*. The following are wrongly named *P. leerii*:—*Kostermans Nos. 6747* and *7331* by van Royen and *bb26347* by van Bruggen. *Clemens 26715* is wrongly named *obscura* by van Bruggen and cannot be that because the veins of the leaf are almost at right angles to the midrib. The following were returned without identification slips:—*bb25638*; *Clemens Nos. 28178* and *28538* and *Puasa 4558*. Some of the Clemens' and Kostermans' numbers had already been determined as *P. endertii* before they

were sent to Leiden either by their collectors or by those who prepared the typed labels as *P. endertii* is part of the typed script there. The remainder of the specimens quoted by me were not sent to Leiden since they were only acquired after the publication of the *Precursores*.

4. *Payena lowiana* Pierre in Bull. Mens. Soc. Linn. Paris (1885) 525; van Bruggen in *Blumea* 9, 1 (1958) 126.

BRUNEI: Kuala Belalong, Temburong, Ashton BRUN 462 (SING).

EAST AND NORTH-EAST
BORNEO:

Central Kutei, Belajan River, near Long Bleh, Kostermans 10222 (SING).

SABAH:

Mostyn Estate, Lahad Datu, Wood & Wyatt-Smith 44299 (SING).

This species has not been recorded previously from either Brunei or Sabah.

The flowers of *T.B.* 452, one of the syntypes of *P. endertii* from Sumatra, are very similar to those of *P. lowiana*. Both have rusty obtuse sepals. Once more, as has been suggested above, could the Sumatran material of *P. endertii* be the same as *P. lowiana*?

5. *Payena lanceolata* Ridley in J. Roy. As. Soc. Str. Br. 79 (1918) 93; van Bruggen in *Blumea* 9, 1 (1958) 128.

var. *lanceolata*

A fruiting specimen from Sumatra without locality collected by Burck *s.n.* is this species rather than *P. leerii* as quoted in *Blumea l.c.* page 123. The leaves are too narrow for *leerii* and the fruit agrees with that of *lanceolata*.

6. *Payena leerii* (T. & B.) Kurz in J. As. Soc. Bengal 40, 2 (1871) 69; van Bruggen in *Blumea* 9, 1 (1958) 121 f. 8.

Basionym: *Azoala leerii* T. & B. in Nat. Tijdschr. Ned. Ind. 6 (1854) 116.

Synonyms: *Isonandra microphylla* de Vriese in Nat. Tijdschr. Ned. Ind. 21 (1860) 312 — **syn. nov.** *Payena microphylla* (De Vriese) Pierre in Bull. Mens. Soc. Linn. Paris (1885) 531; van Bruggen in *Blumea* 9, 1 (1958) 120 f.7 — **syn. nov.**

When I remove the following Singapore Island specimens named and quoted as *Payena obscura* by van Bruggen from their genus cover and place them with *P. leerii* I then get a very uniform selection of the two species and can see at a glance most of their differences: —*Ngadiman S.F. Nos.* 35908; 36431 and 36456; *Ridley* 9203 all from Bukit Timah Nature Reserve and *Ridley* 4957 from Bajau. The specimens of *leerii* from Singapore Island are correctly named

and it was noticed that they are all from Bukit Timah Nature Reserve. In fact all the specimens from Bukit Timah are *leerii* and not *obscura*. The latter is not known from Singapore Island, yet both species are found in other parts of the Peninsula. It did seem rather strange having specimens named *leerii* and *obscura* which looked alike and yet both coming from a small area like Bukit Timah Nature Reserve. It seemed equally strange when *Ngadiman S.F.N.* 35800 is quoted twice in the *Precursores*, once on page 118 as *obscura* and again on page 123 as *leerii*. In the index of collectors' numbers it is given correctly as *leerii*.

Payena obscura has larger and more coriaceous leaves than *leerii*. Its flowers and fruits are larger also, the sepals being more pubescent and of a rusty colour. Juvenile leaves of *leerii* may be as large as those of *obscura* but they are not so thick and leathery. This may be seen in a specimen *Price s.n.* from Pulau Rimau, Sumatra. Another very similar sterile specimen with slightly larger leaves, *Daud 10857* from Pulau Lavau, Sumatra is cited as *lucida* but I think it should be *leerii*.

Looking through the covers of *leerii* one at first gets the impression that the flowers are slightly variable in size but this is actually due to their age more than anything else. This is well illustrated by looking at *Smythies SAR 7804* from Berakas Forest Reserve, Brunei. The material has quite young flowers. They have increased considerably in very similar material, *Anderson SAR 2163* from the same locality. Here most of the flowers have the developing ovaries now visible, protruding some distance beyond the sepals, but these flowers are still not so large as those of *obscura*. Berakas Forest Reserve covers a very small area. The Anderson material from Berakas is named *P. microphylla*. There is another sheet of *microphylla*, *bb28096* from East Borneo in the Singapore herbarium. Other specimens exactly like these two are named *leerii*. I can see no difference between *microphylla* and *leerii* and even van Bruggen himself states that the two are nearly related. I have accordingly made a formal reduction above.

7. *Payena pseudoterminalis* H. J. Lam in Bull. Jard. Bot. Btzg 7, 1 and 2 (1925) 260 et *l.c.* 8, 4 (1927) 439 f. 17; van Bruggen in *Blumea* 9, 1 (1958) 119.

A.C. van Bruggen states on page 119 of his *Precursores* that *Payena pseudoterminalis* is a close relative of *P. leerii*, a species which shows almost the same type of inflorescences; generally the tertiary nerves of the leaf are much fainter or completely invisible in the first-mentioned species. But under *P. leerii* in the key on page 98, he says "tertiary nerves of leaves faint or hardly visible below".

There is an isotype of *P. pseudoterminalis*, namely *bb7190* from Sumatra in the Singapore herbarium. This specimen is large enough but has been badly dried without pressure; its leaves are folded double and not one of them has been laid out flat. The Leiden holotype seems to have been more carefully prepared. At least one gets this impression from Lam's drawing, figure 17.

Although *P. pseudoterminalis* is close to *leerii* its leaves are much narrower and have a fine pubescence. In fact they are of the same shape as those of *lanceolata*. Could this species be synonymous with *lanceolata*? I am not able to prove this for lack of better material.

There are three sheets from Indragiri, Sumatra which are obviously similar, the leaves having dried black. The flowers are in a young stage, all rusty-tomentulose. In fact these three are not different from two other sheets also from Indragiri with sterile specimens, *Curtis 3631* and *Curtis s.n.* which have been, in my opinion, correctly named *leerii*. Yet the first three sheets have been named differently. Two of them, *bb27452* and *bb27500* are quoted as *obscura* and the other *Buwalda 6430* as *pseudoterminalis*. They are not *pseudoterminalis* as they do not have narrow elliptic leaves. I do not understand how these specimens, all from the same locality and so similar, should bear three different identifications.

8. *Payena obscura* Burck in Ann. Jard. Bot. Btzig 5 (1886) 60; van Bruggen in *Blumea* 9, 1 (1958) 117.

Synonyms: *P. havilandii* King & Gamble, Mat. Fl. Mal. Pen. 17, J. As. Soc. Bengal 74, 2 (1960) Extra Nr. 169. *P. longipedicellata* Brace ex King & Gamble, Mat. Fl. Mal. Pen. l.c. (1906) 169; van Bruggen in *Blumea* 9, 1 (1958) 115 f.6 — **syn. nov.**

Haviland 3035 figured on page 116 of *Blumea* 9, 1 (1958) as *Payena longipedicellata* is one of two syntypes of that species. The other syntype *King 2940* is now the lectotype. The Singapore duplicate of *Haviland 3035* is not really different from *P. havilandii* (of which there are five sheets in Singapore, these five making up two syntypes) except that its pedicels are longer. Its flowers are older than those of *havilandii* and will naturally tend to have longer pedicels just as in *lucida* where the pedicels lengthen considerably as the flowers mature. The leaves of *Haviland 3035* are not different from those of *havilandii* or from the other specimens of *obscura* from Penang and Sarawak. *Payena longipedicellata* should never have been created and I have no hesitation in reducing it to *obscura*.

I must point out that *Clemens 26329* from Dallas named *lucida* by van Bruggen is *obscura*. This specimen has pedicels about the same length as those of *Haviland 3035*.

POSTSCRIPT

(Written April 1966)

A postscript to this paper is necessary to explain why I have made no reference to Dr. Charles Baehni's "Mémoires sur les Sapotacées, III Inventaire des genres", *Boissiera*, vol. 2 (1965). This contribution had not yet appeared when I wrote my notes in July 1965. In fact it was not received in Singapore until 19th March 1966 and I did not see it before mid-April. My notes were sent to the Editor of the *Gardens' Bulletin Singapore* in July 1965 but are still with the press at the time of writing this postscript.

Their aim as pointed out in the first paragraph of the text was to draw attention to some minor details in the *Precursores* on *Sapotaceae*, stating where I did not agree with the authors on *Payena* and to find a name for a member of the same family collected at Tanjong Gul, Singapore. There was no intention there to criticise Baehni's work, then non-existent or at least not available to the public. This aim still stands for I do not intend making any alterations to what I have already written, notwithstanding the profound changes that Baehni has made in the system of classification of the *Sapotaceae*. I must, however, point out that I cannot agree with several changes that he proposes and I am inclined at present to maintain *Payena* as a distinct genus. He has included it in *Madhuca*.

I laid out a series of specimens from the genera he has included in *Madhuca* and another of the plants he calls *Isonandra* in order to test them for uniformity. Many of the *Madhuca* species in the sense of the *Precursores* and of the authors of *Sapotaceae* for *Flora Malesiana* now go into his *Isonandra*. These two lots which I laid out are, alas, far from uniform and I can never agree that they each represent one genus. Each bundle is most mixed! It is quite ridiculous putting *Palaquium obovatum* in *Isonandra* and *Palaquium obtusifolium* with very similar leaves and venation in *Madhuca*. *Payena leerii* and *P. lancifolia* are so very similar; in fact I have difficulty in separating them when sterile. They both have a long narrow scar on the seed extending from one end to the other of its length. It is true that his drawings of these two species also show similar scars, but he places *P. leerii* in *Madhuca* and *P. lancifolia* in *Isonandra*. He says in the key that the scar is narrow and long in *Madhuca* and narrow and short in *Isonandra*, but here as pointed out above both of these *Payena* species have the scars long and narrow. Most of his so-called *Isonandra* species are illustrated with short scars and on page 189 fig. 137 of his publication he depicts the well-known *Palaquium obovatum* (his *Isonandra*

obovata) with a short obovate scar extending three quarters way along the length of the seed. I checked on this species which I pass every day and collected from the tree 22 seeds. I found that every one of these has the scar extending along the entire length of the seed almost from end to end and in no case did the scar terminate three quarters way up as shown by Baehni.

It seems to me that he has laid too much stress on this character of the seed for distinguishing genera and has been carried away with it. Leaf characters are not used at all. The authors of *Flora Malesiana Precursores* often use leaf characters for the separation of species and have not neglected them for identifying genera. I feel that in this family much more attention should be paid to leaf characters.

Most of the *Payena* species mentioned here by me have rather similar leaves and appear to be a uniform lot. *Madhuca sensu* van Royen is a large genus and certain species may have to be removed from it. But the great majority of them form a very uniform series all with a distinct type of leaf which has a reddish tinge, the midrib glossy and smooth, the veins very distinct beneath and the twigs pale and angled towards the apex. Some of the species are so close that I have difficulty in distinguishing them. If they are so close surely then they must all belong to the same genus whatever name future systematists may give it. Most of these species belong to van Royen's groups 2 and 3 on pages 4-6 of the *Precursores* on *Madhuca*, thus:—*M. aristulata*, *burckiana*, *cuneata*, *elmeri*, *glabrescens*, *korthalsii*, *laurifolia*, *longistyla*, *malaccensis*, *mindanaensis*, *montana*, *ovata*, *penangiana*, *pedicellata*, *pubicalyx*, *sepilokensis*, *sericea*, *spectabilis*, *woodii* and others which are not in the Singapore herbarium and which I have not yet seen.

In the genus *Ganua* there is a group of species with fine, close, slender veins in the leaves. To this lot belong *G. curtisii*, the type of the genus, *G. motleyana* and several others. In another group the leaves have long petioles, the veins very prominent on the lower surface, there raised and arising at a wide angle, (often 90°) with bold sweeping curves, and the reticulations beneath equally prominent. Here belong *G. hirtiflora*, *kingiana* and *prolixa* etc., but there are similar species in a few other genera. I do think that some of them should be removed and placed in this group because of their rather different vegetative characters. Some of these species were also formerly placed in a genus *Dasyaulus*. They should be studied more carefully in relation to each other.