I. A MONOGRAPH OF THE GENUS ISONANDRA

by

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> "We have all along considered it as trifling with nature to separate species on slight or variable grounds, nor could we ever understand the "*cui bono*" for which so much ingenuity in splitting hairs has been wasted".
>
> R. Wight and G. A. Walker—Arnott, Prodromus Florae Peninsulae Indiae Orientalis, 1834, p. XXI.

Introduction.

At the instigation of the Director of the "Rijksherbarium" at Leiden, Prof. Dr H. J. Lam, who was puzzled by the problem of the delimitation of the genus *Isonandra* towards other genera, especially *Palaquium*, I assumed the task to compose a monograph of *Isonandra*. For this study material was kindly put at our disposal by the directors of several institutes, which enabled me to check up the type-specimens of all species, except that of *Isonandra emarginata* H. J. Lam, which failed to turn up even at Singapore and at Borneo. However, the *Isonandra*-character of this species is doubtful: it is more like *Palaquium*.

It is my pleasant duty to express my sincere thanks to the directors of the institutes mentioned underneath, for their valuable cooperation. Our thanks also due to Mr T. P. Nedungadi, M. A. of the Embassy of India at The Hague, whose kind intermediary enabled me to consult detailed maps of India and Ceylon.

The abbreviations proposed by Lanjouw and used in the enumeration of the specimens in this paper have been added between brackets:

Bogor, Herbarium Bogoriense, Kebun Raya Indonesia (BO).
Calcutta, The Royal Botanic Garden and Herbarium (CAL).
Edinburgh, Royal Botanic Garden (E).
Genève, Institut de Botanique Systématique de l'Université (G).
Glasgow, Botanical Dept. Herbarium, The University (GL).
Jamaica Plain (Mass.), Arnold Arboretum of Harvard University (A).
Kew, Herbarium, Royal Botanic Gardens (K).
Leiden, Rijksherbarium (L).
New York, New York Botanical Garden (NY).
Paris, Muséum National d'Histoire Naturelle, Phanérogamie (P).
Singapore, Straits Settlements, Botanic Gardens (SING).
Stockholm, Naturhistoriska Riksmuseet (S).
Utrecht, Botanisch Museum en Herbarium (U).
Washington (D.C.), U.S. National Herbarium, Smithsonian Institution (US).

Historical Notes.

The genus *Isonandra* has been created by R. Wight in his Icones Plantarum (1840). He established it for specimens from the Deccan Peninsula and distinguished the genus from others with the following remarks:

"This genus is readily distinguished from all others of the order by its perfectly symetrical flowers, and the stamens all perfect (hence the name) in place of one half sterile. In habit and also in structure, it is allied to *Sideroxylon*, but the quaternary, not quinary, arrangement of the flowers and the absence of abortive stamens in any form, sufficiently separate them." (Ic. Pl. II, in explanation of plates 359 and 360.)

As species *I. lanceolata* and *I. villosa* were mentioned. In Ic. Pl. IV *I. perrottetiana* DC and *I. candolleana* Wight were added (tab. 1219 and 1220).

The quaternary arrangement of the flower was accepted as one of the principal characteristics of *Isonandra*. Also A. De Candolle (Prod. VIII, 1844, 187) stresses the quaternary number. He is the intellectual father of *I. perrottetiana* and *I. wightiana*.

G. H. K. Thwaites (En. Pl. Zeyl., 1864, 176) makes a distinction between two sections: the first having a "calyx 6-partitus", the second "calyx 4-partitus". The first section coincides with *Palaquium*, a name which is not used by Thwaites, in the second he combines all the species known from Ceylon in *I. wightiana*, recognizing two varieties: var. *angustata* and var. *montana*. Regarding this lumping mentioned more will be said underneath.

C. B. Clarke (in Hooker, Fl. Brit. Ind. III, 1882, 538) enumerates all the species mentioned by the earlier authors, adding *I. stocksii*.

G. King and J. S. Gamble (Journ. As. Soc. Beng. LXXIV, 1906, 165) added *I. perakensis* and the doubtful *I. rufa*, both species from the Malay Peninsula.

In 1909 M. Dubard was the first to give a survey of *Isonandra* in Deccan and Ceylon ("Sur les Isonandra des Indes orientales", Bull. Mus. Nation. d'Hist. Nat., XV, 27—30; also in: Rev. Gén. de Bot. 21, 1909, 392—393).

As has been done by previous authors, Dubard also stresses the 4-merous flower-whorls as the primary characteristic:

"Le genre *Isonandra*, créé par Wight, pour des espèces des Indes orientales, est très bien défini par les caractères floraux. La fleur est construite sur le type 4 et le nombre des pièces des verticilles offre une constance presque parfaite." (l. c. 27.)

However, it is added:

"L'ovaire est généralement à 4 loges opposées aux lobes du calice, quoique ce nombre s'élève parfois à 5." (ibid.)

The following species are distinguished by Dubard:

I. lanceolata Wight. With this species *I. wightiana* DC. and some varieties were combined.

I. compta Dub. (Syn.: *I. wightiana* DC. var. *compta* Thw.).

I. perrottetiana DC., according to Dubard identical with *I. candolleana* Wight.

I. alphonseana Dub. A new species of Dubard, which he assumes to be the same as pictured in Ic. Pl. 1219 (*I. perrottetiana* Wight not of DC.). In this way an error of Wight's was considered corrected. As will be pointed out later on, the contrary is true: an error of Dubard's has been created!

I. villosa Wight.

I. stocksii Clarke.

(*I. diplostemon* Clarke. This species, as Dubard rightly remarks, cannot be maintained as *Isonandra*. It is the same as *Diospyros obovata* Wight, Ic. Pl. 1226. Cf. the present mon. p. 577).

Regarding the problem of *I. alphonseana* Dub. we may refer to our discussion under *I. perrottetiana* DC. and the solution proposed there.

Dubard's observation of the quinary ovary is valuable. However, already Wight himself indicated the appearance of the quinary number in certain whorls of the flower. In Ic. 1220 (*I. candolleana*) an ovary with 5 cells is pictured and, in addition, a flower with 5 petals. Yet, it seems that Wight considered these phenomena exceptions, since he never directly stressed them: his description merely states: "corolla deeply 4 cleft".

Accordingly, it was generally accepted for a long time, that the quaternary number of the flower parts of *Isonandra* was a trustworthy character to separate the genus from *Palaquium*, which is generally 6-merous. In addition, the latter genus was distinguished by its generally larger leaves and longer pedicels, and the albuminous seed. However, in the course of time specimens were discovered in which the quaternary number was not always constant. This made the difference between the two genera more and more vague and this point has been given due attention in the present study.

The first who tried to give a solution was L. Pierre, who around 1890 created the section *Coronisia* as a transitional group. This section was never stressed, however; it was only cursorily mentioned in his "Notes Botaniques", p. 8: In connection with *Galactoxylon*, which shows a tendency towards *Palaquium*, Pierre observes:

"Je n'ai pas parlé à dessein du nombre des parties, qui se présente, chez le *Palaquium*, assez variable. J'ai établi, en effet, une section *Coronisia* pour quelques espèces ayant 4—5 sépales, 4—5—7 pétales et 10—14 étamines tenant à la fois de l'*Isonandra* et du *Palaquium*."

Chiefly the name *Coronisia* may be found as a generic name on his herbarium labels in Beccari's Borneo material, and in the extensive, almost illegible, notes accompanying them. Several of these notes have been used by Dubard, who proposed three groups: *Isonandra* proper, *Palaquium* without albuminous seed, and *Palaquium* with albumen:

"Tous les caractères floraux (de *Palaquium Edenii* Pierre mss., M.J.) sont ceux d'un *Palaquium*, et cependant la graine jeune présente un albumen parfaitement développé renfermant vers son sommet un embryon petit mais bien différencié, avec cotylédons et radicule très distincts. Cette plante ne diffère plus alors d'un *Isonandra* que par le nombre des parties de la fleur. Si les graines de tous les *Palaquium* décrits étaient parfaitement connues, il est probable qu'on pourait relever la présence d'un albumen chez un certain nombre d'entre elles: il y aurait alors lieu de séparer en un groupe spécial ces *Palaquium* albuminés formant transition naturelle entre les *Isonandra* et les *Palaquium* dépourvus d'albumen. Il conviendrait alors ou de créer un genre intermédiaire pour les *Palaquium* albuminés ou de fondre en un seul genre les *Palaquium* et les *Isonandra* en y pratiquant 3 sections correspondant respectivement aux *Isonandra*, aux *Palaquium* albuminés et aux *Palaquium* dépourvus d'albumen." (Bull. Soc. Bot. de France, Mém. 16, 1909, 22).

In the Rev. Gén. Bot., 21, 1909, 398, however, Dubard foresees a possible combination of the two genera:

"En résumé, ce groupe des *Isonandrées* ne renferme que deux genres bien définis: les *Isonandra* et les *Palaquium* différant par le nombre des parties de la fleur et par la présence ou l'absence, d'albumen dans la graine; mais, comme nous l'avons constaté, ces caractères ne sont peut-être pas aussi tranchés qu'il semble au premier examen; certaines *Palaquium* paraissent pourvus d'un albumen, d'autres présentent certaines réductions dans le type floral; dès lors, la limite entre les deux genres devient moins nette et il n'est pas impossible qu'on soit amené plus tard à les combiner entre eux."

As will be shown underneath, the present study proposes to maintain the separation of the two genera.

Independently from the researches of Pierre, H. J. Lam in 1925—1927 examined specimens from Borneo, describing some of them as new species, viz. *I. gracilis*, *I. emarginata*, and *I. borneensis*. The former two, however, appeared to be conspecific with Pierre's *Coronisia* species: *C. beccariana* Pierre (ined.) is identical with *I. gracilis* H. J. Lam; and *C. multiflora* Pierre (ined.), afterwards published by Dubard as *Palaquium multiflorum* Pierre, seems to be identical with *I. emarginata* H. J. Lam, the publication of Dubard having priority. (Cf. the present mon. p. 578).

Meanwhile, Gamble in his Flora of the Presidency of Madras, IV, 1921, 760, stated once more the 4-merous flowers, ignoring the deviations. His new species, *I. montana* Gamble, however, does not occur in Madras, but only in Ceylon (cf. p. 572).

In 1938 Ch. Baehni published in Candollea VII his: "Mémoires sur les Sapotacées", but his attention was not particularly directed to *Isonandra*. He is inclined to combine *Isonandra* with *Madhuca* (l. c. 451 and 473). This is not the place to discuss the matter: we may refer to the reaction to his ideas by Lam in 1939 (Rec. trav. bot. Néerl. XXXVI, 1939, 509 ss.). Lam maintains *Isonandra* as a separate genus. Whether this is correct, is to be decided by an investigator who is able to survey the whole family and familiar with its structure. Yet, Baehni's publication has greatly stimulated our interest in the problems connected, such as the genus problem in general, the limitation of species etc. This is of some importance to the present monograph, since it means a considerable help in giving shape to our opinion concerning the delimitation of the genus and its species and showed the way to disentangle the "*Isonandra*-problem".

In contradiction to Baehni's opinion, who assumes only the individual as a reality, and to whom the genus and species merely are abstract and therefore subjective notions, it is my opinion, that both genus and species — as, in fact, all taxa — are realities in this sense that they are limited by natural discontinuities rather than by human concepts.

The delimitation of the genus.

When we find transitions between taxa which till nowadays were considered different groups, we can in some cases include them all into one and the same taxon, but in others the number of transitions is insignificant in comparing that of the groups they connect. The point is whether their proportion allows a taxonomic distinction between the main groups, or whether the number of transitions is so large that such a distinction is not justified.

This is what we have to find out in the case of *Isonandra*. There are undubitable transitions between this genus and *Palaquium*. Pierre, Dubard and Lam directed the attention to them. The questions arise: is *Isonandra* to be maintained as a separate genus or is it to be inserted in *Palaquium*; and if so, as a section? Or have certain *Isonandra* species to be kept separate as a section, either of *Isonandra* or of *Palaquium*?

The result arrived at in the present paper is, that *Isonandra* should be maintained as a separate genus. There are too many differences between *Palaquium* and *Isonandra* than that a combination of the two would be justified. *Isonandra* is to be distinguished from *Palaquium* by its generally smaller leaves, its sessile or short-pedicelled small flowers, and its albuminous seed. Moreover, the flowers are never 6-merous, but 4—5 merous, and the anthers and style are hardly protruding from the corolla.

Yet, the close relationship between the two genera is unmistakable. Some *Palaquium* species have albuminous seeds e. g. *P. edenii* (Pierre) Dubard (Mém. 16, p. 22; Rev. Gén. p. 397) and *P. walsurifolium* (Pierre) Dubard (ibid.). Other *Palaquium* species are not constantly 6-merous: *P. multiflorum* (Pierre) Dubard (Mém. 16, p. 23), 5—6—7 merous; *P. crassifolium* (Pierre) Dubard (ibid.), 4—6 merous; *P. ridleyi* King and Gamble, emend. H. J. Lam mss., 4—6 merous and most probably with albuminous seed; *P. galactoxylon* (Müller) (Bentham and Hooker) H. J. Lam (Bull., 1925, 107), 5—6 merous, cf. Pierre, Not. bot., 1890, 6; Dubard, Rev. Gén. 1909, p. 397.

The transitional species are chiefly from Malaysia, especially from Borneo. *P. galactoxylon* is a native of N. Queensland.

This means that *Isonandra* is centred in India, Ceylon and western Malaysia, whilst Borneo may be considered the (taxonomically) transitional area.

The delimitation and distribution of the species.

The same problem returns in the delimitation of the species. The genus *Isonandra* as we see it, appears to us as highly variable. We observe in the material transitional forms between species which once were considered well distinct. These transitions have also been stated by others, e. g.:

Thwaites (l. c. 178): "I was at one time disposed to regard some of the forms of this most variable plant (*I. wightiana* DC., M. J.) as distinct, but further observation and the examination of a large number of specimens, satisfy me that they all belong to one species. I have little doubt, too, that Dr. Wight's *Is. lanceolata* is a form of the present plant, for I have examples of it extremely like his figure."

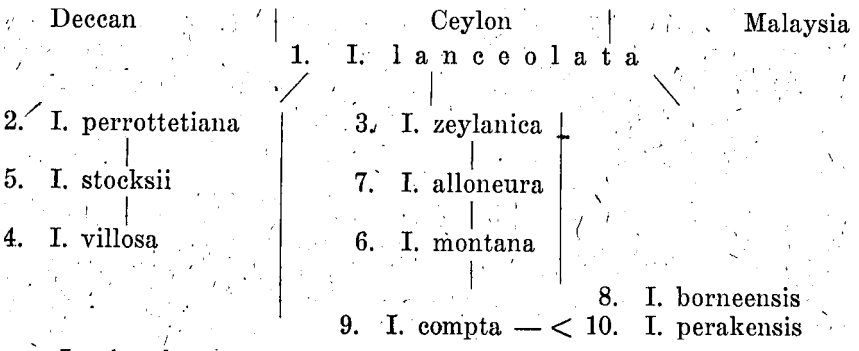
Beddome (For. Man. Bot., 1869, 141): "This tree (*Bassia wightiana* DC. syn. *Isonandra*, M. J.) is most abundant throughout our western forests and in Ceylon, from

somewhat below 2000 feet elevation up to 6000; it is most variable in its foliage, but with many observation I have no hesitation, (as proposed by Dr. Thwaites,) in uniting all Dr. Wight's species; in fact they run so one into another that they cannot be classed as varieties, except perhaps the form with the leaves fulvo-tomentose beneath (*I. compta* Dub. ?, M. J.), which is rare (only observed by me on the Tinnevelly mountains), but this form has the leaves sometimes lanceolate."

Clarke (l. c. 538): "In the opinion of Thwaites and Beddome, who are well acquanted with this genus in the field, all the Indian species of Wight and A. DC. are varieties of one."

Thus, these authors are inclined to unite all species they were acquainted with. In the present paper I have tried to recheck this opinion and to test the value of the concentration points of certain characters. As has already been stated by previous authors (e. g. Dubard, Lam, Baehni), an important character is found in the tertiary nervation. It is our impression that this holds true, at least for *Isonandra*, in which we found it of primary importance. Another valuable feature is the acuminate leaf-tip. Regarding the flowers we did not find essential differences, e. g. it is true that the pilose anther-tips, a point greatly stressed by Dubard, are most conspicuous in *I. perrottetiana* DC., but they are not absent in the other species. Therefore, the main character used in the key, is the shape of the leaves and the nervation.

The interrelation of the *Isonandra* species may perhaps be indicated as follows:

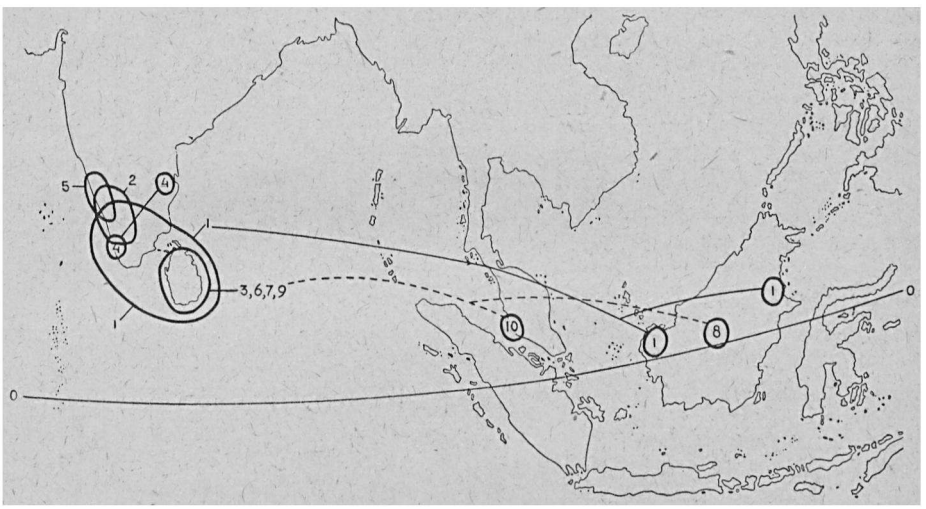


In the above statement (see *Map 1*) all known species are mentioned. *I. lanceolata* is the only one represented in all three regions. The Ceylon species *I. compta* seems closely related to *I. perakensis* from Perak and to *I. borneensis* from Borneo. As is well known, relations between the flora's of Ceylon and Malaysia — rather than with that of India — are not unusual.

Discussion.

We must here make a remark about the numbering of the plants in the different collections. As an example we take the herbarium of Wight, who has himself numbered his plants. It turned out, that these numbers do not indicate that the specimens were taken from the same tree: they are nothing but numbers in a catalogue. It is therefore possible — indeed, it is often found — that plants bearing the same number in the herbaria of, say, Kew, Paris and Leiden, really hail from different trees, and possibly are even representing different species. The

case of Wight's expedition, of which the plants (no *Isonandra*) were distributed in 1832—1833, and of which the results are laid down in Wight-Arnott's Prodromus, shows the method of Wight's numbering: the Prodromus enumerates the plants "arranged according to the natural system". The numbers of the Wight specimens increase practically regularly from No. 1 to 1375. Since, of course, it is very improbable that Wight has collected his plants in the sequence of a natural system, the logical conclusion must be that the numbers are those of a catalogue, added to the specimens when at home, not numbers given to them in the field. These numbers are indicated in the Prodromus as: "cat. n. ...".



Map 1. Areas of *Isonandra* species — 1. *lanceolata*; 2. *perrottetiana*; 3. *zeylanica*; 4. *villosa*; 5. *stocksii*; 6. *montana*; 7. *alloneura*; 8. *borneensis*; 9. *compta*; 10. *perakensis*.

This method is also used by Wight in the following period, of which, however, no catalogue was published. In this period also *Isonandra* was collected. The *Isonandra* specimens are numbered (on the labels): 1732, 1733, 1734, etc. Under No. 1735 we find two plants, one from Valla Candoo December 1850, the other from Cochin April 1849.

The same must be said of the Ceylon plants collected by Thwaites; as an example we take C. P. (Ceylon Plants) 45. Various and different specimens bear this number, and on comparing the dates of collection, we feel sure, that the specimens must be from different trees. We have found the years 1853, 1854, 1863, 1864, 1866, etc., as the year of collection, all under the same number C. P. 45.

Warned and taught by these facts, we have paid no heed to this kind of numbers, but only to the characters of the specimens. Still, of course, the same numbers often indicate the same species, but this is to be considered mere coincidence.

So as to avoid confusion and to enable a right indication of the sheets examined by me, I have provided every sheet with a Monograph Number (*Mon. Nr. ...*), which is mentioned in the enumeration of the

sheets. I omitted all invaluable numbers. In the last-named cases, which are frequent, the Monograph Number should be considered the official indication.

A confirmation of these experiences about the numbering of plants was found in a paper by C. B. Clarke, entitled "Collector's numbers" (Journal of Botany, 1893, 135—138), to which my attention was kindly drawn by Dr H. C. D. de Wit. The paragraph concerned reads as follows:

"...It is supposed that each collector affixes his fieldnumbers continuously, during his whole life, not repeating any number twice; that he places the same number on all the pieces cut from one tree or shrub; and that, in regard to small plants, he affixes the same number to a series of these only when, from their being collected at the same time and place, he feels morally certain that they are all one species and one form....

But unfortunately, while many of the best collections, as Balansa, Mandon, Curtiss (sic!, M. J.), Thwaites, are properly numbered, the majority of collections, especially the European collections are not....

The worst of all plans is that adopted by Wallich and by many modern European collectors. In this plan a quantity of material from various localities is got together; it is the sorted into genera, then into species; all the material of one (supposed or estimated) species is well mixed, and then issued under one number. If a sheet of this kind has to be named, it is necessary to examine every scrap on the sheet (a tedious waste of time). If the happens that several species (or varieties, or even "forms") are mixed under the number, it is useless for citation. The numbers of Wallich, as to the "type" sheet in his large paper collection, are cited sometimes in the *Flora of British India*; but the chief value of such citations is to direct a person in London where to go to see the "type" of the species described. It is not at all safe to name Wallich's sheets at Calcutta from such citations....."

Regarding the proper numbering of the collection of Thwaites, however, I think I may have also reason to doubt the value of his numbers, as I have pointed out above.

Another note may be made regarding the localities. It is my impression, that sometimes on old sheets the locality is written in an uncritical manner: it may be suspected that, after the determination of the plants, the locality indicated in the litterature has been added, e. g. in the three sheets 1837 No. 2148 (GL), *I. lanceolata*, with the locality: Quilon. (*Mon. Nr. 25, 26, 27*). It is, however, impossible to verify this.

The descriptions are all given in Latin. Most of them are emendated descriptions. Whenever it was deemed useful, descriptions of the "type" specimens of the species accepted, and of the principal synonyms are added.

ISONANDRA.

Isonandra Wight, Ic. Pl. II, 1840, tab. 359, 360 and IV, 1850, tab. 1219, 1220; A. De Candolle, Prodr. VIII, 1844, 187; Wight's Indian Botany, II, 1850, tab. 148-b. B (except the 6-celled ovary); Walpers, Ann. Bot. Syst. I, 1850, 496; Miquel, Flora van Ned. Indië II, 4, 1857, 1037; Dalzell and Gibson, Bombay Flora, 1861, 139; Thwaites, Enum. Pl. Zeyl., 1864, 176; Beddome, For. Man. Bot., 1869, 141; Eichler, Blüthendiagramme I, 1875, 332; Bentham and Hooker, Gen. Pl. II, 1876, 657; Kurz, For. Fl. Br. Burma II, 1877, 119; Hartog, Journ. of Bot. 1878, 69; Radlkofer, Sitzungsber. Bair. Akad. Wiss., 1881, 305; Clarke in Hooker, Fl. Brit. Ind. III, 1882, 538; Burck, Ann. Jard. Bot. Buit. V, 1886, 20; Radlkofer in Durand, Index Gen. Phan., 1888, 256; Engler, Bot. Jahrb., 1890, 496 ss, passim;

Pierre, Notes Bot., 1890, 8; Boerlage, Handl. Fl. Ned. Ind. II, 1, 1891, 302; Baillon, Hist. d. Pl. XI, 1892, 301; Trimen, Fl. Ceyl. III, 1895, 77; Engler-Prantl, Nat. Pfl. fam. IV, 1, 1897, 134 and 127, fig. 67 H; King and Gamble, Journ. As. Soc. Beng. 74, 1906, 165; Cooke, Fl. Bomb. II, 1908, 91; Dubard, Bull. Mus. Nation. Hist. Nat. XV, 1909, 27; Rev. Gén. Bot. 21, 1909, 392; Bull. Soc. Bot. Fr., Mém. 16, 1909, 21; Gamble, Fl. Madr. IV, 1921, 760; Ridley, Fl. Mal. Pen. II, 1923, 260; Lam, Bull. Jard. Bot. Buit., Sér. III, Vol. VII, 1—2, 1925, 108 et 258 and Vol. VIII, 4, 1927, 418; Baehni, Candollea VII, 1938, 451; Lam, Rec. Trav. Bot. Néerl. XXXVI, 1939, 520.

Several *Palaquium* species (formerly *Dichopsis*) were originally described as *Isonandra*. For this (and other) synonymy we may refer to the species dealt with in this study, and to the list of *Isonandra* names given at the end. For the bibliography regarding these species, cf. Lam, Bull. Jard. Bot. Buit., ll. cc.

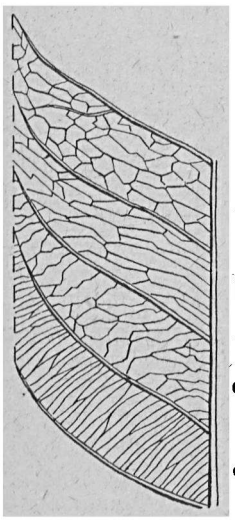
Arbores parvae vel mediocres, lactescentes; *ramuli* teretes, 0.25—0.7 cm in diam.; *stipulae* parvae, mox deciduae; *folia* coriacea generatim parva (usque ad 15 cm longa), plerumque ad apices ramulorum conferta, pennivenia, nervis secundariis ante marginem folii deflectentibus et nonnumquam furcatis, in nervum intramarginalem confluentibus; nervi tertiarii inter sese transversaliter paralleli aut reticulati aut transversaliter vel longitudinaliter reticulati; *inflorescentiae* in axillis foliorum, aliquando caducorum et tunc juxta ramulos, insertae, saepe pluriflorae, floribus sessilibus vel breviter pediccllatis, pedicello cum sepalis extus ferrugineo-pubescentibus; *sepala* 4—5 biseriata, calyci subaequilonga, exteriora generatim paulo majora interioribus, obtuse deltoidea vel oblonga, plerumque 0.2—0.4 cm alta; *corolla* 4—5-loba generatim glabra, lobis imbricatis; *stamina* 8—10, plerumque 8, subaequalia, quasi uniserialia fauce infixa, in alabastro 4 epipetalia 4 alternipetalibus longiora, filamentis vittaeformibus; antherae dorsifixae extrorsae, haud vel vix e corolla exsertae, glabrae vel, praesertim in apice, pilosae; staminodia nulla; *ovarium* hispidum conoideum in stylum cylindricum glabrum contractum, vix vel paulo e corolla exsertum, 4—5-loculare, loculis 1-ovulatis, episepalibus[1]), ovulis anatropis axis centralis apice insertis, epitropis; *fructus* baccati, oblongi vel rotundati, glabri, monospermi, styli rudimento coronati; *seminis* cicatrix longa angusta, testa crustacea, salva cicatrice, nitida; embryo albuminosum, cotyledones planas includens; radicula longa cylindrica exserta.

10 species in Deccan, Ceylon, the Malay Peninsula and Borneo.

The species from the Sandwich Islands, mentioned by Bentham and Hooker, l. c. 1876, 658: "Huc etiam pertinere videtur species in ins. Sandvicensibus ab Hillebrandtio lecta" is not *Isonandra*, but *Nesoluma polynesicum* (Hillebr.) H. Baillon. Cf. Hillebrand, Fl. Haw. Isl., 1888, 277; Baillon, o. c. 1892, 279; Lam and Meeuse, Occ. Pap. Bish. Mus. XIV, 9, 1938 (Monograph of the Genus Nesoluma).

Type species: *Isonandra lanceolata* Wight.

[1]) Observation in *I. perrottetiana* DC., lecto-type, *Mon. Nr. 165* cf. p. 564.



Regarding the nervation, the following terminology is used in the key:

The midrib of the leaves is called the primary nerve, etc.

For the tertiary nerves distinction is made between 4 types:

a. reticulate (neither transversally nor longitudinally), e.g. *I. montana* Gamble.

b. longitudinally reticulate (nerves not closely together, somewhat ascending and passing into reticulation), e.g. *I. alloneura* Jeuken.

c. transversally reticulate (nerves not closely together, descending, passing into reticulation), e.g. *I. stocksii* Clarke.

d. transversally parallel (nerves closely together, mutually parallel), e.g. *I. lanceolata* Wight.

Key to the species.

1.a. Leaves glabrous on both sides, or sparsely tomentose beneath 2
b. Leaves densely tomentose beneath 13
2.a. Tertiary nerves transversally parallel, conspicuous 3
b. Tertiary nerves not transversally parallel or inconspicuous 7
3.a. Leaf-tip acuminate; tertiary nerves generally perpendicular to the midrib, near the margin a little descending, sometimes more perpendicular to the secundary nerves . . . . . 1. **I. lanceolata** Wight, s.l., p. 557
b. Leaf-tip rounded, or more or less acute, not conspicuously acuminate . . 4
4.a. Leaves narrowly ovate to lanceolate, 4—10 × 1—2.5 cm, cuneate at base, tertiary nerves with a tendency to reticulation
1. **I. lanceolata** Wight, f. **angustata**, p. 559
b. Leaves elliptical to oblong, sometimes obovate, or orbicular 5
5.a. Leaves orbicular, shortly acuminate, 2—4 × 1.5—2.5 cm, secondary nerves 4—5
1. **I. lanceolata** Wight, f. **rotunda**, p. 560
b. Leaves not orbicular, larger 6
6.a. Leaves elliptical to oblong, sometimes obovate, generally not acuminate, 3—10 × 1.5—4.5 cm, tertiary nerves near the midrib perpendicular to it, for the rest more so to the secondary nerves; petiole 0.5—1.0 cm, anthers pilose, fruit oblong, Deccan . . . . . 2. **I. perrottetiana** DC., p. 563
b. Leaves obovate, shortly acuminate, 6—10 × 2—4.7 cm, tertiary nerves perpendicular to the midrib, for the rest slightly descending; petiole 1.3—1.5 cm, anthers glabrous, fruit globose, Borneo
1. **I. lanceolata** Wight, var. **gracilis**, p. 561
7.a. Leaf-tip long acuminate (about 1 cm), tertiary nerves transversally reticulate; sepals oblong . . . . . 3. **I. zeylanica** Jeuken, p. 567
b. Leaf-tip rounded or shortly acuminate 8
8.a. Leaves narrowly ovate to lanceolate, 4—10 × 1—2.5 cm, cuneate at base, tertiary nerves transversally-parallel with a tendency to reticulation
1. **I. lanceolata** Wight, f. **angustata**, p. 559
b. Leaves obovate or elliptical to oblong 9
9.a. Tertiary nerves transversal or inconspicuous 10
b. Tertiary nerves reticulate or longitudinally reticulate 12
10.a. Leaves elliptical to oblong, sometimes obovate, 3—10 × 1.5—4.5 cm, tertiary nerves mutually parallel with a tendency to reticulation, inflorescences not on thick dwarf shoots in the axils of fallen leaves; anthers pilose
2. **I. perrottetiana** DC., p. 563

b. Leaves obovate, inflorescences sessile on short thick dwarf shoots in the axils of fallen leaves 11

11.a. Leaves broadly obovate, 4—11 × 3—6 cm, rounded to obtuse at either end, waxy especially at the underside, secondary nerves 11—15, tertiary nerves not closely together, parallel with a tendency to reticulation, sometimes inconspicuous 4. **I. villosa** Wight, p. 568

b. Leaves obovate, 7—12 × 3—6 cm, obtuse at tip, not waxy but dark brownish when dry, secondary nerves 8—10, tertiary nerves transversally reticulate 5. **I. stocksii** Clarke, p. 570

12.a. Leaves small, 4—6 × 2—3 cm, broad at tip, obovate, acute at base, lowerside yellowish-brown when dry, secondary nerves 5—7, ascending from the midrib at an angle of about 45°—60°, tertiary nerves reticulate, ovary nearly glabrous 6. **I. montana** Gamble, p. 571

b. Leaves 6—8 × 2.5—4 cm, leaf-tip shortly and bluntly acuminate, secondary nerves 6—7, ascending from the midrib at an angle of about 55°—60°, tertiary nerves longitudinally reticulate . . . . . 7. **I. alloneura** Jeuken, p. 572

13.a. Tertiary nerves transversally parallel, leaves small, 2—5.8 × 1.2—3.2 cm, obovate, acute at base, rounded or shortly acuminate at tip; secondary nerves about 11; flowers small, 0.2 cm long . . . . . 8. **I. borneensis** H. J. Lam, p. 574

b. Tertiary nerves inconspicuous or more or less longitudinally reticulate, secondary nerves 7—10 14

14.a. Leaves glossy beneath, spathulate to oblong, shortly acuminate, secondary nerves 7—8; flowers subsessile, sepals 0.3 cm long, tertiary nerves more or less longitudinally reticulate . . . . . 9. **I. compta** Dubard, p. 574

b. Leaves dull, elliptical to oblong, blunt at tip, secondary nerves 8—10, tertiary nerves inconspicuous, sepals 0.25—0.3 cm long 10. **I. perakensis** King and Gamble, p. 577

1. Isonandra lanceolata (not of Thwaites) Wight, (type-species), Ic. Pl. II, 1840, tab. 359; A. De Candolle, Prodr. VIII, 1844, 187; Clarke in Hooker, Fl. Brit. Ind. III, 1882, 539; Trimen, Fl. Ceyl. III, 1895, 77; Engler-Prantl, Nat. Pfl. fam. IV, 1, 1897, 132, fig. 69, U, V; Dubard, Bull. Mus. Hist. Nat. XV, 1909, 27; Rev. Gén. Bot. 21, 1909, 393 and 392, fig. 1; Gamble, Fl. Madr. IV, 1921, 761; Lam, Bull. Jard. Bot. Buit., Sér. III, Vol. VII, 1—2, 1925, 110 et 259 and Vol. VIII, 4, 1927, 421; Baehni, Candollea VII, 1938, 451 — *I. wightiana* DC., Prodr. VIII, 1844, 187; Thwaites, Enum. Pl. Zeyl., 1864, 177; Clarke, l. c., 1882, 539; Trimen, l. c., 1895, 77; Dubard, Bull. Mus. Hist. Nat. XV, 1909, 27 — *I. wightiana* DC. (resp. *I. lanceolata* Wight) var. *angustata* Thwaites, Enum. Pl. Zeyl., 1864, 177; Clarke, l. c., 1882, 540; Trimen, l. c., 1895, 78; Dubard, Bull., 1909, 28 — *I. wightiana* DC. forma *foliis longis acuminatissimis,* auct. ign., in schedula, 1866 — *Bassia wightiana* DC., ex Beddome, For. Man. Bot., 1870, 141 — *I. lanceolata* Wight var. *anfractuosa* Clarke, l. c., 1882, 539; Gamble, l. c., 1921, 761 — *I. wightiana* DC. (resp. *I. lanceolata* Wight) var. *major* Clarke, l. c., 1882, 539; Trimen, l. c., 1895, 78 — *I. wightiana* DC. var. *acuminata* (Gardner mss.) Clarke, l. c., 1882, 540; Dubard, Bull., 1909, 28 — *Palaquium beccarianum* Pierre, in schedula, between 1872 and 1890 — *I. gracilis* H. J. Lam, Bull. Jard. Bot. Buit., Vol. VIII, 4, 1927, 418 and 419, fig. 7 — *I. lanceolaria* Wight, in schedulis (= *I. lanceolata* Wight var. *anfractuosa* Clarke).

Synonyma-excludenda: *Sideroxylon tomentosum* Roxb., Pl. Cor. I, 1795, 28; A. De Candolle, l. c., 1844, 188; Clarke, l. c., 1882, 539 (=*Planchonella tomentosa* [Roxb.] Pierre, Not. Bot., 1890, 36) — *Sideroxylon wightianum* Wall., cat. No. 4154 in A. De Candolle, l. c., 1844, 188; Clarke, l. c., 1882, 539; Index Kew. (= *Planchonella tomentosa* [Roxb.]

Pierre, Not. Bot., 1890, 36) — *Sideroxylon wightianum* Hook. and Arn., Bot. Beech. Voy., 1841, 196, tab. 41; Index Kew. (see the discussion, p. 563) — *I. perrottetiana* DC., cf. Thwaites, l. c., 1864, 177; Trimen, l. c., 1895, 77 (see p. 562) — *I. candolleana* Wight, cf. Thwaites, l. c., 1864, 177; Trimen, l. c., 1895, 77 (= *I. perrottetiana* DC.).

Varietates excludendae: *I. wightiana* DC. (resp. *I. lanceolata* Wight) var. *compta* (Thw.) Clarke (= *I. compta* [Thw.] Dubard) — *I. wightiana* DC. (resp. *I. lanceolata* Wight) var. *montana* Thw. (= *I. montana* Gamble).

Descriptio specici emendata. — *Ramuli* teretes, glabri vel in imis apicibus minute ferrugineo-pubescentes; *folia* utrinque glabra vel subtus minute in costis pubescentia, breviter petiolata, petiolo usque ad 1.5 cm longo, oblongo- vel obovato-lanceolata, basi acuta vel attenuato-cuneata, apice obtuse acuminata; costa media subtus prominens; nervi secundarii 4—13, subtus prominentes, de costa angulo circiter 60° adscendentes, in nervum intramarginalem confluentes; nervi tertiarii permulti, tenuissimi, inter sese transversaliter paralleli, generatim costa media perpendiculares, prope marginem generatim leviter descendentes; *inflorescentiae* 2—10-florae in foliorum axillis insertae; *flores* breviter pedicellati, pedicellis circiter 0.2—0.7 cm longis; *sepala* 4—5, deltoidea, 0.2—0.3 cm longa, intus glabra; *corolla* glabra, 4-, interdum 5-loba, vix vel paulo e calyce exserta; *stamina* 8—10, circiter 0.2 cm longa; *antherae* glabrae vel paulo pilosae, circiter 0.1 cm longae; *ovarium* 4—5-loculatum, 0.1—0.2 cm altum; *fructus* oblongo-ovoidei vel globosi, *semina* 1—2 in fructu. — Deccan, Ceylon and Borneo. — *Fig. 1.*

Var. α **lanceolata.**

Descriptio variationis typicae emendata. — *Folia* utrinque glabra vel subtus minute in costis pubescentia, breviter petiolata, petiolo circiter 0.1 cm longo, ovali-oblonga vel oblongo-lanceolata, interdum obovata, basi acuta, apice obtuse acuminata, acumen 0.2—2 cm, generatim circiter 1 cm longum, magnitudine variabili, 2—23 cm longa, 1.5—10 cm lata; nervi secundarii 4—12; *inflorescentiae* 6—10-florae; pedicelli florum circiter 0.2—0.5 cm longi; *sepala* 4—5, circiter 0.3 cm longa; *corolla* 4-, interdum 5-loba; *stamina* 8, interdum 10; antherae glabrae vel paulo pilosae aut ad apicem aut ad basin aut in ambabus locis; *ovarium* 4—5-loculatum; fructus oblongo-ovoideus, 0.8—1.8 × 0.6—0.9 cm, *semen* 1 in fructu. — Deccan, Ceylon and Borneo.

Descriptio lecto-typi, *Herb. Wight No. 1732* (K), *Mon. Nr. 32* — *Ramuli* glabri, lenticellati; *folia* ad ramulorum apices conferta, utrinque glabra, oblongo-lanceolata, acumen 0.5—0.7 cm longum, supra fusca, subtus ferruginea, circiter 5—10 cm longa, 1.8—3 cm lata, petiolo 0.6—1.0 cm longo; nervi secundarii 5—9, paulo curvati, prope marginem maiori curvatione apicem folii versus juxta marginem currentes; *pedicelli* alabastrorum 0.25 cm longi, post anthesin usque ad fructum 0.5 cm; *sepala* 4 circiter 0.25 cm longa, intus glabra, obtuso-deltoidea; *corolla* 4-loba, 0.1 cm exserta; *stamina* 8; antherae apice acutae, glabrae attamen aliquando paulo pilosae, 0.1 cm longae, supra corollam non exsertae; *ovarium* 4-loculatum circiter 0.1 cm altum; stylus circiter 0.15 cm longus; *fructus* unicus

styli rudimento coronatus, 1.0 cm longus, calyx persistens patens. — *Fig. 1a.*

Descriptio lecto-typi *I. wightianae* DC., in herb. Genève, cum inscriptione *Wallich Cat. 4153 C.*, 1829, *Mon. Nr. 52.* — *Ramuli* glabri, lenticellati, in apice tantum minute ferrugineo-pubescentes; *folia* ad ramulorum apices conferta, utrinque glabra, ovali-oblonga, apice manifeste acuminata, acumine 0.5 cm longo, basi acuta, supra fusca, subtus ferruginea, circiter 6—10 cm longa, 3—5 cm lata, petiolo 0.7—1.0 cm longo; nervi secundarii 7—8; *inflorescentiae* circiter 6-florae; pedicelli alabastrorum 0.25 cm longi, post. anthesin 0.3 cm; *sepala* 4 circiter 0.3 cm longa, intus

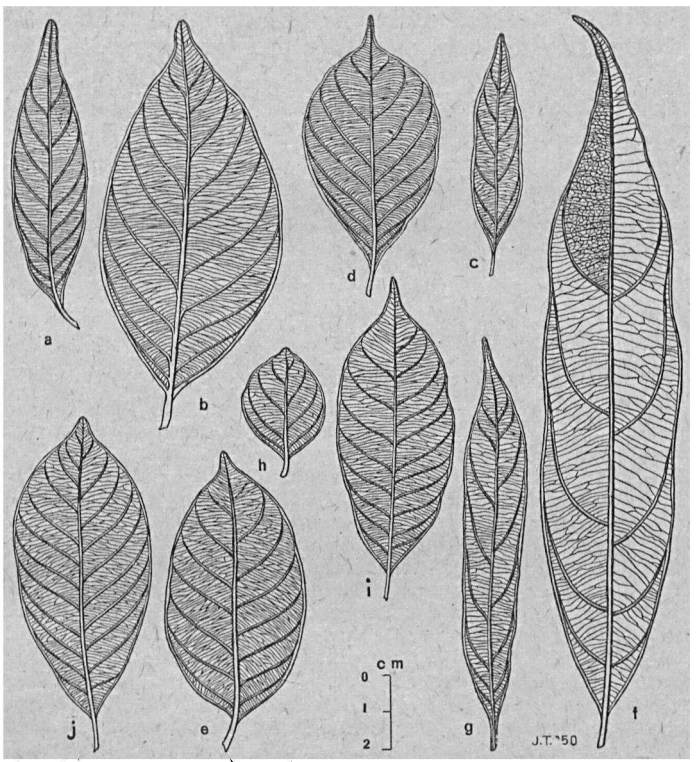


Fig. 1. *I. lanceolata.* Leaves of the varieties and forms — a. var. *α lanceolata*, Mon. Nr. 32 (type); b. *I. wightiana*, Mon. Nr. 52 (type); c. forma *angustata*, Mon. Nr. 113; d. forma *anfractuosa*, Mon. Nr. 17; e. forma *acuminata*, Mon. Nr. 69; f. forma *major*, Mon. Nr. 112; g. forma *acuminatissima*, Mon. Nr. 110; h. forma *rotunda*, Mon. Nr. 96; i. forma *borneensis*, Mon. Nr. 118; j. var. *β gracilis*, Mon. Nr. 120.

glabra, obtuso-deltoidea; *corolla* glabra 0.2 cm supra calicem exserta, 4-loba; *stamina* 8, in alabastro epipetalia alternipetalibus longiora, per anthesin subaequalia e corolla non exserta; antherae paulo pilosae ad basin et forsan ad apicem; *fructus* et *semen* ignoti. — *Fig. 1b.*

Formae distinguendae:

a. forma **angustata** (syn.: var. *angustata* Thw.): folia lanceolata, ab infra-medio apicem versus angustata, vix acuminata, 4—10 × 1—2.0 cm;

lamina subtus delicatule subparallelim venulosa. *Type Mon. Nr. 113.* — Ceylon. — *Fig. 1c.*

b. forma **anfractuosa** (syn.: var. *anfractuosa* Clarke): folia 7—20 × 4—10 cm, aliquando obovata, abrubte et subacute acuminata, acumine circiter 0.7—1.5 cm longo; nervi secundarii 8—12, subtus valde prominentes; nervi tertiarii generatim abrupte flexi et nervis secundariis perpendiculares; sepala magis acuta. *Type Mon. Nr. 17.* — Deccan. — *Fig. 1d.*

c. forma **acuminata** (syn.: var. *acuminata* [Gardner] Clarke): folia obovata, 5—10 × 2—5.3 cm, acumen 0.6—1 cm longum. *Type Mon. Nr. 69.* — Deccan, Ceylon. — *Fig. 1e.*

d. forma **major** (syn.: var. *major* Clarke): folia 15.5—23.5 × 3—4.5 cm; nervi secundarii 5—6, acumen 2 cm longum. *Type Mon. Nr. 112.* — Ceylon. — *Fig. 1f.*

e. forma **acuminatissima** (syn.: forma *foliis longis acuminatissimis*, auct. ign.): folia 11—19 × 1.7—2.4 cm, apice acuminatissima, acumine circiter 2 cm longo; basi attenuata; nervi secundarii 7—8. *Type Mon. Nr. 110.* — Ceylon. — *Fig. 1g.*

f. forma **rotunda** (f. nova): folia 2—4 × 1.5—2.5 cm, apice breviter acuminata, acumine 0.1 cm longo; nervi secundarii 4—5, fructus 0.8 × 0.6 cm. *Type Mon. Nr. 96.* — Ceylon. — *Fig. 1h.*

g. forma **borneensis** (f. nova): folia 6—10 × 2.3—4 cm, acumen 0.3—0.6 cm longum; nervi secundarii et tertiarii etiam supra prominentes, tertiarii irregulariter transversaliter paralleli. *Type Mon. Nr. 118.* — Borneo. — *Fig. 1i.*

DECCAN: Mont. Nilghiri and Kurg, *G. Thomson*, Herb. Lugd. Bat. 908225—179, fl., *Mon. Nr. 1* (L); *G. Thomson*, buds, *Mon. Nr. 2* (P); Wight, *Mon. Nr. 3*, and on same sheet: *Mon. Nr. 4* (P); *G. Thomson*, fl., *Mon. Nr. 5* (CAL); *G. Thomson*, fl., *Mon. Nr. 6* (K); *G. Thomson*, fl., *Mon. Nr. 257* (S); *G. Thomson*, 1861, fl., *Mon. Nr. 7* (G); fl., *Mon. Nr. 140* (K); Wynaad, Manantoddy, *M. A. Lawson*, fl., Oct. 1885, *Mon. Nr. 8* (K); South Malabar, Attapadi Hills, 3000 ft, *Fischer 2385*, fl., 31 Oct. 1910, *Mon. Nr. 9*, f. *anfractuosa*, (CAL); Coimbatore Dt., Izerpadi (? M. J.), *Barber 3821*, fl., 20 Oct. 1901, *Mon. Nr. 10*, f. *anfractuosa*, (CAL); Anamalai Hills, 4000 ft, *Beddome*, fl., *Mon. Nr. 11* and on same sheet: fl., *Mon. Nr. 12* (K); Monica, *Barber 3898*, fl. and fr., 29 Oct. 1901, *Mon. Nr. 13* (CAL); Valparai, *Barber 4000*, old fl., 8 Nov. 1901, *Mon. Nr. 14*, f. *anfractuosa*, (CAL); Lyerpadi, *Barber 5439*, fl., 22 April 1903, *Mon. Nr. 15*, f. *anfractuosa*, (CAL); Cochin, fl., April 1849, *Mon. Nr. 16*, f. *anfractuosa*, and on same sheet: Valla Candoo, fl., December 1850, *Mon. Nr. 17*, f. *anfractuosa*, *lecto-type* of *I. lanceolata* Wight, var. *anfractuosa* Clarke, ("Herb. Wight 1735, Isonandra lanceolaria Wt.") (K); Cooiloor, *M. Rama Rao 920*, fl., 22 Febr. '13, *Mon. Nr. 18* (CAL); Travancore, Peetmerd 3500 ft, *Bourdillon 187*, fr., 3 April '94, "a small tree, evergreen forests", *Mon. Nr. 19* (CAL); Travancore, *Bourdillon*, sine num., buds, *Mon. Nr. 20* (CAL); Merduston 2000 ft, *Bourdillon 597*, buds and fl., 2 April '95, " small tree, evergreen forests, moderate elevation", *Mon. Nr. 21* (K); Chiminujie 4000 ft, *Bourdillon 876*, old fl., 16 May '96, "a medium sized tree of the evergreen forests", *Mon. Nr. 22* (CAL); idem, *Mon. Nr. 23* (CAL); Shewagherry Hills, fr., Aug. 1836, *Mon. Nr. 24* (GL); Quilon, fl., Oct. 1835, *Mon. Nr. 25*, f. *acuminata*, (GL); Quilon, fl., Oct. 1835, *Mon. Nr. 26*, f. *anfractuosa*, (GL); Quilon, fl. and fr., Oct. 1835, *Mon. Nr. 27*, f. *anfractuosa*, (GL); Quilon, fr., June 1836, *Mon. Nr. 28* (K); Quilon, fl., Oct. 1835, *Mon. Nr. 29*, f. *anfractuosa*, (E); Quilon, *Gardner*, fl., *Mon. Nr. 30*, and on same sheet: Cochin, *Thustone*, fl., *Mon. Nr. 31* (K); Courtallum, ("Herb. Wight 1732"), fl., Aug. 1835, *Mon. Nr. 32*, *lecto-type*, (K); Bolimputty, fl., Nov. 1852, *Mon. Nr. 33*, f. *anfractuosa*, and on same sheet: Courtallum, fl., Aug. 1835, *Mon. Nr. 34*, f. *anfractuosa*, ("Herb. Wight 1735, Isonandra lanceolaria Wt"), (K); Courtallum, fl., Aug. 1835, *Mon. Nr. 35*, f. *anfractuosa*, and on same sheet: fl. and fr., *Mon. Nr. 36* (NY); Courtallum, fl., Aug. 1835, *Mon. Nr. 37* (GL); the same indication in: fl., *Mon. Nr. 38* (GL);

fl., *Mon. Nr. 39* (E); fl., *Mon. Nr. 40* (K); fl., *Mon. Nr. 41* (GL); fl. and fr., *Mon. Nr. 42* (GL); fl. and fr., *Mon. Nr. 43* (E); buds and fr., *Mon. Nr. 44*, f. *anfractuosa*, and on same sheet: fl., *Mon. Nr. 45* (E); fl., *Mon. Nr. 46* (CAL); fl. and fr., *Mon. Nr. 47* (CAL); fl., *Mon. Nr. 258*, f. *anfractuosa* (S); Malabar, fr. June 1836, *Mon. Nr. 48* and on same sheet: Courtallum, fl., Aug. 1835, *Mon. Nr. 49* (GL); Tinnevelly Dt., Kannikatti, *Barber 2979*, fl., May 1901, *Mon. Nr. 50* (CAL); idem, *Barber 2977*, fl. and fr., May 1901, *Mon. Nr. 51* (CAL); Unknown district: *Wallich*, 1829, Herb. Wight cat. n. 4153 C, ("*Sideroxylon tomentosum* Roxb."), fl., *Mon. Nr. 51, lecto-type* of *I. wightiana* DC. (G); 4154, *Sideroxylon wightianum* Wall. ("*Isonandra Wightiana* Alph. DC.", in the handwriting of DC), fl., *Mon. Nr. 53* (K); fl., *Mon. Nr. 54* (P); Herb. Lugd. Bat. 908.225—169, fl., *Mon. Nr. 55* (L); fl., *Mon. Nr. 56* (CAL); fl., *Mon. Nr. 57* (GL); Herb. Lugd. Bat. 908.225—146, fl., *Mon. Nr. 58*, f. *anfractuosa* (L); fl., *Mon. Nr. 59*, f. *anfractuosa* (P); fl., *Mon. Nr. 60* (G); *H. Heyn 4153*, fl., *Mon. Nr. 61* (CAL); fl. *Mon. Nr. 62* (CAL); fl. and fr., *Mon. Nr. 63*, f. *anfractuosa* (K); fl., *Mon. Nr. 64* (E); fl., *Mon. Nr. 65*, and on same sheet: fl., *Mon. Nr. 66*, f. *anfractuosa* (CAL); fl., *Mon. Nr. 67*, f. *anfractuosa*, and on same sheet: fl., *Mon. Nr. 68*, f. *anfractuosa*, (A).

CEYLON: *Gardner*, fl., *Mon. Nr. 69*, f. *acuminata, lecto-type* of *I. wightiana* DC. var. *acuminata* (Gardner) Clarke, (K); Colombo, *Mc. Reu*, fl., *Mon. Nr. 70*, f. *acuminata*, (K); old fl., *Mon. Nr. 71*, f. *acuminata*, and on same sheet: *Col. Walker, Sir W. J. Hooker* 1838, fl. and fr., *Mon. Nr. 72* (K); fl., *Mon. Nr. 73*, on same sheet: fl., *Mon. Nr. 74* and: *Mrs. Gen. Walker*, fl., *Mon. Nr. 75*, f. *acuminata* (NY); *Walker 1461*, fl. and fr., *Mon. Nr. 76* (GL); *Walker*, fl., *Mon. Nr. 77* (P); fl., *Mon. Nr. 78*, and on same sheet: old fl. and fr., *Mon. Nr. 79* (CAL); *Walker*, fl., *Mon. Nr. 80*, f. *acuminata* (GL); *Walker 1461*, fl. and fr., *Mon. Nr. 81* (E); Galagama, *Thwaites (C. P. 192)*, Febr. 1846 and *Mrs. Walker*, fl., *Mon. Nr. 82* and fl., *Mon. Nr. 83* (K); *Col. Walker*, fl., *Mon. Nr. 84* (K); *Walker*, fl., *Mon. Nr. 85* (P); *Walker*, fl., *Mon. Nr. 86* (CAL); *Thwaites*, 1854, fl., *Mon. Nr. 87*, and on same sheet: *Mon. Nr. 88* (P); fl., *Mon. Nr. 89* (P); *Dr. Kelaart*, fl. and fr., *Mon. Nr. 90* (K); *Willis*, fl., *Mon. Nr. 91* and on same sheet: fl., *Mon. Nr. 92* (A); fl., *Mon. Nr. 93*, and on same sheet: *Mon. Nr. 93a*, f. *rotunda* (GL); Herb. Bog. 23708, *Mon. Nr. 94*, and on same sheet: *Mon. Nr. 95* (BO); *Walker*, Herb. Lugd. Bat. 908.225—186, fl., *Mon. Nr. 96*, f. *rotunda, type-specimen*, (L); *Walker*, fl., *Mon. Nr. 97*, f. *rotunda* (GL); *Mackinzie*, 1839, fl., *Mon. Nr. 98*, f. *rotunda*, (K); Herb. Bog. 23709, buds, *Mon. Nr. 99*, f. *rotunda* (BO); Herb. Bog. 23711, buds, fl. and old fl., *Mon. Nr. 100*, f. *rotunda* (BO); *Gardner 527*, buds and fl., *Mon. Nr. 101* (K); fl., *Mon. Nr. 102*, and on same sheet: *Walker*, fl. and fr., *Mon. Nr. 103*, f. *rotunda* (K); Herb. Lugd. Bat. 908.225—182, fl., *Mon. Nr. 104* (L); *Walker*, fr., *Mon. Nr. 105*, f. *rotunda*, and on same sheet: Adams Peak, *Thwaites*, fl., March 1846, *Mon. Nr. 106* (K); Herb. Lugd. Bat. 908.225—192, *Mon. Nr. 107* and fl., *Mon. Nr. 108* (L); *Thwaites*, 1866, fl., *Mon. Nr. 109*, f. *acuminatissima* (G); Pardoonlah, *Thwaites*, fl., Sept. 1864, *Mon. Nr. 110*, f. *acuminatissima, type-specimen*, (K); *Thwaites*, 1868, fl., *Mon. Nr. 111*, f. *acuminatissima* (P); Hinidoon, *Thwaites*, buds, fl. and fr., *Mon. Nr. 112*, f. *major, lecto-type* of *I. wightiana* DC., var. *major* Clarke, (K); Galagama, *Thwaites*, fl. Febr. 1846, *Mon. Nr. 113*, f. *angustata, lecto-type* of *I. wightiana* DC., var. *angustata* Thw., and on same sheet: fl., *Mon. Nr. 113a*, f. *angustata* (K); *Thwaites*, fl., *Mon. Nr. 114*, f. *angustata* (G); *Thwaites*, fl., *Mon. Nr. 115*, f. *angustata*, and on same sheet: fl., *Mon. Nr. 116*, f. *angustata* (G); *Thwaites*, 1854, fl., *Mon. Nr. 117* (P); *Walker*, fl., *Mon. Nr. 180* (K); fl., *Mon. Nr. 187* (CAL); fl., *Mon. Nr. 189* (CAL); old fl. and fr., *Mon. Nr. 226* (G); *Mon. Nr. 229* (P).

BORNEO: Res. W. Borneo, Distr. Mempawah, kamp. Mandor, alt. 5 m, *Beck 7*, N. I. For. Serv., bb. 15337, 4 June 1931, nom. nat. Njato burung, young tree ± 16 m high, *Mon. Nr. 118*, f. *borneensis, type-specimen*, (BO); idem, *Mon. Nr. 118a* (L), *co-type*.

Habitat: in evergreen forests, 2000—6000 ft, forma *borneensis* is a low-country form, in old forests, in swamps, peat-ground, few specimens together.

Var. *β* **gracilis** (H. J. Lam) Jeuken, var. nov. — *I. gracilis* H. J. Lam, Bull. Jard. Bot. Buit., Sér. III, Vol. VIII, 4, 1927, 418 and 419, fig. 7 — *Palaquium beccarianum* Pierre, sectio *Coronisia* Pierre, (= *Coronisia beccariana, Isonandra* vel *Coronisia vaga, Palaquium vagum*), nom. nuda in schedula.

Folia utrinque glabra, obovato-lanceolata, basi attenuato-cuneata, apice brevissime obtuse acuminata, supra saepe atro-livida, subtus fusca, circiter 6—10 cm longa, 2—4.7 cm lata, petiolo sulcato 0.6—1.5 cm longo; nervi secundarii 12—13; *inflorescentiae* 2—3-florae; alabastrorum pedicelli 0.3 cm longi, post anthesin 0.7 cm, in fructu 1 cm longi; calycis *sepala* 4—5, 0.2 cm longa; corolla 4(—5?)-loba; *stamina* 8—9, non exserta, antherae glabrae, acuminatae; *ovarium* 4-loculatum; *fructus* globosi, 1 cm longi; *semina* 1—2 in fructu. — Borneo. — *Fig. 1j.*

BORNEO: *Beccari 2490*, fl., *Mon. Nr. 119*, *type-specimen* of *Palaquium beccarianum* Pierre, (P); Res. S. and E. Division, Samenggaris, *Amdjah 985*, fl. and fr., Dec. 1912, *Mon. Nr. 120*, *type-specimen* of *I. gracilis* H. J. Lam (BO); idem, *typ. dupl.*, *Mon. Nr. 121* (L), *Mon. Nr. 122* (U), Herb. Bog. 23703—23706, *Mon. Nr. 123—126* (BO); Res. Z.O. Borneo, Distr. Berauw, near Karai, *v. d. Zwaan 1217*, N.I. For. Serv. bb. 19165, alt. 75 m, fr., 17 June 1934, nom. nat. *petanang*, tree 24 m alt., *Mon. Nr. 127* (BO); Res. W. Borneo, Distr. Pamangkat, near Paloh, alt. 5 m, *Bianchi 8*, N.I. For. Serv., bb. 11336, fl. and fr., 11 Febr. 1927, tree ± 24 m, fruit green, nat. nom. *murun*, leaves lanceolate, 6—10 × 2—3 cm, *Mon. Nr. 178* (BO) and *Mon. Nr. 179* (L).

Habitat: alt. 5—75 m and also in hilly regions, common and scattered, in old dry forests.

Discussion.

1. As constant and specific features of *I. lanceolata* Wight are considered the acuminate leaf-tip in combination with the transversally parallel tertiary nerves.

2. The present species differs from *I. perrottetiana* DC. by the acuminate leaf-tip (in *I. perr.* rounded), and from *I. zeylanica* Jeuken by the transversally parallel tertiary nervation (in *I. zeyl.* transversally reticulate).

3. The identity of *I. lanceolata* Wight and *I. wightiana* DC. has already been stated by Trimen (Fl. Ceylon III, 1895, 78):

"I cannot see how to separate *I. Wightiana*, A. DC., from this (*I. lanc.*, M. J.). The plant is extremely variable in foliage, but not otherwise."

and by Dubard (Bull. Mus. Hist. Nat. XV, 1909, 27):

"L'*I. Wightiana* A. D. C., de Ceylan, me paraît être une forme à peine différente de l'espèce précédente (*I. lanc.*, M. J.); la description du prodrome n'offre guère de ressource, pour les distinguer. Il n'y a pas lieu de tenir compte de faibles différences dans la forme des feuilles, le mode de nervation restant parfaitement identique; la villosité du calice est bien la même de part et d'autre, malgré l'erreur de de Candolle, au sujet de l'*I. lanceolata* (A. DC. in Prodr. VIII: "lobisque calycinis ovatis subacutis glabris." M. J.); l'opinion de Clarke sur l'étroite affinité des formes précédentes doit donc prévaloir (see the present paper, p. 552, M. J.), et je pense qu'il faut sans hésiter supprimer l'*I. Wightiana* de la nomenclature; ce serait même une variété tellement peu accentuée qu'on peut douter de son existence réelle."

Both type-specimens show the same characters. The distinction as to the glabrous or pilose anthers is of little value, a has been pointed out in the introduction. I therefore support the conclusion of Trimen and Dubard about the identity of the two species.

4. *Sideroxylon tomentosum* Roxb. (Pl. Cor. I, 28; cf. A. DC., l. c., 1844, 188; Clarke, l. c., 1882, 539) is not a synonym of *I. lanceolata* Wight, resp. *I. wightiana* DC., as is proved by the following points:

a. Roxburgh, l. c., 1795, 28: "*Nectary:* five petals alternate with the filaments, waved, length of the stamens. *Stamens* five."

b. Don's Gard. Dict. IV, 1838, 28, to which refers A. DC., l. c., refers again to Roxburgh, l. c.

The presence of staminodes is no *Isonandra* character. It is *Planchonella tomentosa* (Roxb.) Pierre, Not. Bot., 1890, 36.

5. *Sideroxylon wightianum* Wall. (Cat. No. 4154) is not a synonym of *I. lanceolata* Wight resp. *I. wightiana* DC. (cf. A. DC., l. c., 1844, 188; Clarke, l. c., 1882, 539; Index Kew.), on account of the following points:

a. Don's Gard. Dict. IV, 1838, 28: "S. Wightianum Wall. No. 4154 appears to be only a more glabrous variety of S. tomentosum."

b. The name of Wallich seems to be a nomen nudum, so we have to rely on the remark made by Don.

I therefore conclude that also this species is *Planchonella tomentosa* (Roxb.) Pierre.

6. *Sideroxylon wightianum* Hook. and Arnott (Bot. Beech. Voy., 1841, 196, tab. 41) is not a synonym of *I. wightiana* DC. (cf. Index Kew.), on account of the following points:

a. The tabula in Hooker and Arnott, l. c., depicts a 5-merous flower, 5 staminodes and 5 stamens.

b. A. DC., l. c., 1844, 178: "... staminibus sterilibus lanceolatis integris lobos corollae aequantibus ..."

The staminodes make it impossible to insert the species in *Isonandra*.

Note. A. De Candolle (l. c., 1844, 178) makes the following remark:

"S. Wightianum Wall. (num. 4154 nec 4147 ut scrips. Hook. et Arn.) est genus Isonandra, habitu foliisque simillimum, sed floribus quaternariis, staminibus omnibus fertilibus. An confusio quaedam in speciminibus Wallichianis?"

The question is solved in our remark 5.

7. Regarding var. *gracilis*, it is true that the nervation of the leaves is *lanceolata*-like, but the secondary nerves are more numerous. The main character however, lies in the variable number of the flower parts, which induced Pierre to create his section *Coronisia*.

It is beyond doubt that *Palaquium beccarianum* Pierre is conspecific with *I. gracilis* H. J. Lam. Independently both authors studied the same species. Pierre solved the problem in terms of *Palaquium*, Lam in terms of *Isonandra*. I examined the type-specimens of both. Only Lam has published his species in accordance with the Int. Rules of Bot. Nomenclature.

8. The correct orthography is *I. lanceolata*, not *lanciolata*, as is found sometimes in literature.

2. Isonandra perrottetiana DC., Prodr. VIII, 1844, 188; Wight, Ic. Pl. IV, 1850, tab. 1219; Walpers, Ann. Bot. Syst. I, 1850, 497; Wight, Spic. Neilgh. II, 1851, tab. 142; Thwaites, Enum. Pl. Zeyl., 1864, 177; Clarke in Hooker, Fl. Brit. Ind. III, 1882, 539; Trimen, Fl. Ceyl. III, 1895, 77; Dubard, Bull. Mus. Hist. Nat. XV, 1909, 29; Rev. Gén. Bot. 21, 1909, 393; Gamble, Fl. Madr. IV, 1921, 761; Lam, Bull. Jard. Bot. Buit., Sér. III, Vol. VII, 1—2, 1925, 110 et 258 and Vol. VIII, 4, 1927, 421 — *I. candolleana* Wight, Ic. Pl. IV, 1850, tab. 1220; Walpers, l. c., 1850, 496; Thwaites, l. c., 1864, 177; Dalzell and Gibson, Bomb. Fl., 1861, 139; Clarke, l. c., 1882, 539; Trimen, l. c., 1895, 77; Cooke, Fl. Bomb. II, 1908, 91; Dubard, Bull., 1909, 29; Rev. Gén., 1909, 393; Gamble, l. c., 1921, 761;

Lam, l. c., 1925, 110 et 258 — *I. alphonseana* Dubard, Bull., 1909, 29; Rev. Gén., 1909, 393; Lam, l. c., 1925, 258 and 1927, 421.

Synonyma excludenda: *I. wightiana* DC., cf. Thwaites, l. c., 1864, 177 — *I. lanceolata* Wight, cf. Thwaites, l. c., 1864, 177.

Descriptio speciei emendata. — *Ramuli* teretes, glabri, juvenilibus ferrugineo-pubescentibus; *folia* utrinque glabra, juvenilibus ferrugineo-pubescentibus, elliptico-oblonga, apice obtusa, basi acuta, circiter 3—10 cm longa, 1.5—4.5 cm lata, petiolo sulcato 0.5—1.0 cm longo; costa media subtus prominens; nervi secundarii 9—12, tenui, subtus prominentes, angulo circiter 55° de costa adscendentes, in nervum intramarginalem confluentes; nervi tertiarii permulti, tenuissimi, inter sese transversaliter paralleli, in initio costa media, mox autem nervis secundariis fere perpendiculares, aliquando tendentia ad reticulationem; *inflorescentiae* circiter 8-florae in foliorum axillis insertae vel flores dense conferti in fasciculis quasi amplexicaulibus, sessiles vel breviter, circiter 0.1 cm, pedicellati; *calyx* 0.2—0.3 cm longus; sepala 4—5, intus glabra, deltoideo-rotundata; *corolla* 4—5-partita, usque ad 0.3 cm longa, exserta, lobis rotundatis vel apice truncatis, glabris vel in apice tantum pilosis; *stamina* 8—10, circiter 0.15 cm longa; antherae saltem ad apicem, plerumque etiam ad basin et inter thecas pilosae; *ovarium* 4—5-loculatum (in uno flore 6-loc.), 0.1 cm altum; ovula ovoidea; *fructus* circiter 1.5—2 cm longus, oblongo-ovoideus. — Deccan. — *Fig. 4a.*

Descriptio lecto-typi, Perrottet, 1840 (G), *Mon. Nr. 165* — *Arbor* 3—6 m alta et ultra, ramosa; *ramis* subpatulis; *folia* fusca, circiter 6—10 cm longa, 3—4.5 cm lata, petiolo sulcato 0.5—1.0 cm longo; nervi secundarii 10—12; nervi tertiarii transversaliter paralleli; *sepala* 4, fere 0.3 cm longa, intus glabra; *corolla* 4-partita, lobis ovato-rotundatis, vix pilosis, albis (sic in annotatione A. DC. in schedula; Perrottet annotat: "flores flavidi"), in floribus junioribus 0.1 cm supra calycem exsertis; *stamina* 8; antherae filamento aequilongae, basi obtusae, apice angustiores, ad apicem et ad basin pilosae; *ovarium* 4-loculare, loculis episepalibus; *fructus* et *semen* ignoti.

Note. A. DC. in Prodr., l. c., 1844, 188: "Folia... minime in acumen producta, minus membranacea (quam in *I. wightiana* DC., M. J.), nervis tertiariis minus distinctis."

Descriptio lecto-typi *I. candolleanae* Wight, in herb. Kew., Avelanche, 1846, *Herb. Wight 1734*; *Mon. Nr. 134.* — *Folia* fusca, supra atro-brunnea, nitida, 3—6 cm longa, 1.2—2 cm lata, petiolo sulcato circiter 0.5 cm longo; nervi secundarii 9—10; nervi tertiarii transversaliter paralleli; *pedicelli* florum circiter 0.15 cm longi; *calyx* 0.2 cm longus, sepala 4, interdum 5 parvo sepalo extus adjuncto, intus glabra; *corolla* 4-partita, in floribus junioribus 0.1 cm supra calycem exserta, lobis ovato-rotundatis, glabris, apice truncatis et paulo pilosis; *stamina* 8; antherae basi obtusae, apice angustiores, ad apicem, ad basin et inter thecas valde pilosae; *ovarium* 4—5-loculatum; *fructus* et *semen* ignoti.

Note. In Ic. Pl. 1220, fig. 2, a corolla with 5 lobes is also pictured.

Descriptio lecto-typi *I. alphonseanae* Dubard, *Herb. Wight, 1736* (K), *Mon. Nr. 167.* (For the justification of this choice, see the discussion, p. 565) — *Folia* fusca, circiter 6—9 cm longa, 2.3—3.7 cm lata, petiolo sulcato 0.7—1.0 cm longo; nervi secundarii 10—11; nervi tertiarii

transversaliter paralleli; *inflorescentiae* in axillis foliorum aliquando caducorum eoque modo etiam juxta ramulos positae; pedicelli florum 0.1 cm longi; *calyx* 0.2 cm longus; sepala 4, intus glabra; *corolla* 4-partita, lobis ovato-rotundatis, glabris, non exsertis; *stamina* 8, antherae basi obtusae, apice angustiores, ad apicem et ad basin pilosae; *ovarium* 4-loculare; *fructus* et *semen* ignoti.

Note. In Ic. Pl. 1219, fig. 6, a 5-celled ovary is pictured.

DECCAN: Coorg, *Perree 27*, 1919, *Mon. Nr. 128* (CAL); Kodanad 6000 ft, *Gamble 16731*, fr., Sept. 1885, *Mon. Nr. 129* (K); Neilgherries circa Dodabetta, *Perrottet, 1840*, fl., "arbor 10—20 pedalis et ultra, ramosa, ramis subpatulis; flores flavidi", *Mon. Nr. 165, type-specimen*, (G); Sisparah 6000 ft, *Gamble 14415*, old fl., May 1884, *Mon. Nr. 130* (K) and *Mon. Nr. 131* (CAL); S.E. Wynaad 3000 ft, *Lawson*, fl., Nov. 1884, *Mon. Nr. 132* (K); (Herb. Wight 1734), Chispauray, fl., April 1846, *Mon. Nr. 133*, and on same sheet: Avelanche, fl., April 1846, *Mon. Nr. 134, lecto-type* of *I. candolleana* Wight, (K); Neilgherries, fl., *Mon. Nr. 135* (K); fl., *Mon. Nr. 136*, and on same sheet: *Gardner*, fl., *Mon. Nr. 137* (K); Nilgiris, *Beddome*, fl., *Mon. Nr. 138* (CAL); Neilgherries, *Gardner*, 1847, fl., *Mon. Nr. 139*, (and on same sheet: fl., *Mon. Nr. 140, I. lanceolata* Wight), (K); Neilgherries, *Gardner*, 1847, fl., *Mon. Nr. 141* (K); Avelanche, fl., *Mon. Nr. 142* (CAL); Coimbatore, *Fischer 913*, fl., 20 Mar. 1906, *Mon. Nr. 143* (CAL) and *Mon. Nr. 144* (CAL) and *Mon. Nr. 145* (K); Anamalai, Lyerpadi 4000 ft, *Fischer 3716*, fl., 6 April 1914, leaves more like *I. lanceolata*, but flowers like *I. perr.*, especially by the dark pilose anthers, *Mon. Nr. 146* (CAL); Anamalai Hills, Konal-ar, 6400 ft, *Fischer 3727*, buds an old fl., 22 April 1914, *Mon. Nr. 147* (CAL); Pulney Hills, Madura Dt., Kodaikanal 7000 ft, *Anglade S.J. 603*, fl., Nov., *Mon. Nr. 148* (G); Kodaikanal 1000—8000 ft, *Anglade*, fl., *Mon. Nr. 149* (A); Pulneys, Kodaikanal Shola, *Bourne 396*, fl. and fr., 12 June 1897, "fruit ellipsoid orange", *Mon. Nr. 150* (K) and *Mon. Nr. 151*, "fruit about 1 in long", (CAL); Periya Shola, *Bourne 1122*, fl., 21 April 1898, *Mon. Nr. 152* (K) and *Mon. Nr. 153* (K); nr. Chiminujie, 4000 ft, *Bourdillon 567*, fl., 5 April '95, " A small tree, common at the higher elevations, evergreen forests", *Mon. Nr. 154* (K) and *Mon. Nr. 155* (CAL); Travancore, *Bourdillon* sine num., fl., *Mon. Nr. 156* (CAL); Mutthu, Kuli Vazal, 4500 ft, *Bourdillon 789*, fl., 24 Mar. '96, "A medium sized tree found only at the higher elevations", *Mon. Nr. 157* (CAL) and *Mon. Nr. 159* (one flower with 6-celled ovary) (K). On the same sheet as Mon. Nr. 159: Neilgherries, *Adam*, fl., *Mon. Nr. 158* (K); Near Chiminujie, 4000 ft, *Bourdillon 950*, fl., 6 Apr. '98, "A small tree with milky juice, Evergreen forests", *Mon. Nr. 160* (CAL); Kulkuntal, 5000 ft, *Meebold 701. 13094*, fr., Dec. 1910, "fruit orange", *Mon. Nr. 161* (CAL); Santhanpara 4—5000 ft, *Meebold 597, 13289*, buds, Dec. 1910, *Mon. Nr. 162* (CAL) and *Mon. Nr. 255* (S); Vellyengry Hill, (Herb. Wight 1783), fl., April 1850, *Mon. Nr. 163* (K); High Wavy Mountain, 4000—5000 ft, *Blatter and Hallberg 48*, old fl., May 1917, "fl. white", *Mon. Nr. 164* (CAL); Pen. Ind. Or., unknown loc., (Herb. Wight 1736), fl., *Mon. Nr. 166*, on same sheet: fl., *Mon. Nr. 167, lecto-type* of *I. alphonseana Dubard*, and fl., *Mon. Nr. 168* (K); Herb. Lugd. Bat. 908.225—170, fl., *Mon. Nr. 169* (L); fl., *Mon. Nr. 170* (CAL); Herb. Lugd. Bat. 908.225—144, fl., *Mon. Nr. 171* (L); fl., *Mon. Nr. 172* (P); fl., *Mon. Nr. 173* (G); fl., *Mon. Nr. 174*, and on same sheet: fl., *Mon. Nr. 175* (P); fl., *Mon. Nr. 176* (CAL); fl., *Mon. Nr. 177* (CAL); fl., *Mon Nr. 256* (S).

Habitat: alt. 2000—7000 ft, in evergreen forests, common.

Discussion.

1. Regarding *I. alphonseana* Dubard, this species has been created as a result of the comparison between the icones of Wight and the description of A. De Candolle. In his description of *I. perrottetiana* DC. the author states: "Antherae apice pilosae" (l. c. 188). In the picture given by Wight (Ic. Pl. IV, 1219), however, the anther-tips of *I. perrottetiana* DC. are glabrous, not pilose.

Considering that this is another species which Wight erroneously as-

sumed to be *I. perrottetiana* of De Candolle, Dubard (following Clarke) identified the picture of Wight as *I. perrottetiana* Wight. However, finding that this was an incorrect combination, he created a new name: *I. alphonseana* Dubard (= Ic. Pl. 1219). The next picture, Ic. Pl. 1220, named by Wight: *I. candolleana* — the anther-tips are pilose — should, according to Dubard, be called *I. perrottetiana* DC.

Dubard refers to a remark of Clarke concerning the relation between *I. candolleana* Wight and *I. perrottetiana* Wight (not of DC):

"(*I. candolleana* Wight). Only distinguishable from the next (*I. perr.* Wight, M. J.) by the hairy anther-tips and more membraneous leaves. A. DC. says his *I. Perottetiana* had the anthers pilose at the tips, but Wight split this species into two, whereof his *I. Candolliana* has the anther-tips pilose, his *I. Perottetiana* has them glabrous." (Clarke, l.c., 1882, 539).

Nowhere Dubard indicates, that he has actually seen a specimen of his *I. alphonseana*. It therefore seems likely, that his new species was created merely on account of the literature. Now, what is the truth?

In the material received from the Kew herbarium the specimens are found which were very probably used by Wight for his Icones: the number Herb. Wight 1734, *Mon. Nr. 134*, bears the name "*Isonandra Candolleana* Wt", written, as can be assumed, by Wight himself, since the handwriting is very much resembling that of Wight in the handwritings collection kept in the Rijksherbarium. This number 1734 from Kew must therefore have served as an example to Ic. 1220, *I. candolleana* Wight, and it has, accordingly, been chosen as the lecto-type of that synonym. The anther-tips are pilose, as could be confirmed by me.

The number Herb. Wight 1736 from Kew (*Mon. Nr. 167*) bears, written by the same hand, the name "*Isonandra Perotetiana* A. D.C." and must have served as an example to Ic. 1219 of the same name. Now it appeared that also this specimen has the anthers pilose not only at the tips, but also at the base. Wight's sketch as to this point is insufficient. This is not surprising, since Dubard himself drew the attention to another slight inaccuracy: In Ic. 539 (*I. lanceolata* Wight) the anthers are pictured glabrous; Dubard remarks that they are more or less hairy (Bull., 1909, 28, note 3).

The reason why Dubard has created his new species *I. alphonseana*, on account of the glabrous anther-tips only, does not hold. Actually the anthers are pilose. Therefore, *I. alphonseana* has to be considered a superfluous synonym of *I. perrottetiana* DC.

2. Regarding the identity of *I. candolleana* Wight and *I. perrottetiana* DC., Wight remarks at Ic. 1220 (*I. candolleana*):

"This seems almost too nearly allied to the former (Ic. 1219, *I. perr.*, M. J.), but still the two plants when lying side by side seem perfectly distinct, even more so than in the figures; they besides occupy different stations, and I have never met with them together."

However, laying side by side the type specimen collected by Perrottet, and the Kew specimina Herb. Wight 1734 and 1736, there seems to be no reason to regard them to represent different species. The differences readily fall within the specific variability. In a way the specimen of Perrottet is intermediate between 1734 and 1736, both in habit and, to a certain extent, in the tertiary nervation. Moreover, the material

collected later on and therefore not known at Wight's time, shows slight transitions between the different specimens of this species, which justifies, in spite of the words of Wight quoted, our conclusion about the identity.

Thus, the result is:

I. alphonseana Dubard is a superfluous name.

I. perrottetiana DC. = Ic. Pl. 1219 = Herb. Wight 1736 (K).

I. candolleana Wight = Ic. Pl. 1220 = Herb. Wight 1734 (K) = *I. perrottetiana* DC.

Note. Wight remarks, that *I. perrottetiana* DC. (Ic. 1219) occurs in the "Neilgherries, in jungles, about Sisparah and the Avalanche". The number 1734 (K) has both names as localities. For that reason, it might have served as an example to Ic. 1219. However, the dark pilosity, darker than in 1736, points to Ic. 1220, for which Wight mentions the locality: "Neilgherries, about Ootacamund and Pycarrah, in clumps of jungle". All this is of no influence on the conclusion mentioned.

3. Both in the literature and on the sheets various spellings may be found, such as: perotetiana, perrotetiana, perottetiana. The name of the collector being Perrottet, the correct orthography is, of course, *perrottetiana*. Similarly we should spell: *candolleana*, not (as was done by Wight): *candolliana*.

4. Wight remarks under *I. candolleana* Wight: "lobes of the calyx very unequal, exterior ones much larger and hairy". This feature occurs in all the type-specimens mentioned above. Also the inner sepal-whorl is hairy outside.

5. In some cases there was also found a tendency to an acuminate leaf-tip. This could be expected, since the present species is closely related to *I. lanceolata* Wight. However, the typical condition is a rounded leaf-tip.

3. Isonandra zeylanica Jeuken, species nova. — *I. wightiana* DC., in schedulis.

Descriptio speciei. — *Ramuli* teretes, glabri, innovationibus minute ferrugineo-pubescentibus; *folia* utrinque glabra, lanceolata, apice acuminata, basi acuta, supra fusca, subtus fulva vel virida, circiter 7.5—13 cm longa, 2.0—3.5 cm lata, petiolo levissime alato circiter 1 cm longo; costa media subtus prominens; nervi secundarii 5—8, subtus prominentes, angulo 55°—60° de costa adscendentes, prope marginem apicem versus deflectentes vel in partem adscendentem et partem descendentem bifurcati, parte adscendenti magis conspicua; nervi tertiarii transversaliter reticulati; *inflorescentiae* 6—10-florae in foliorum axillis insertae; pedicelli florum 0.1 cm longi; *calyx* 0.25—0.4 cm longus; sepala 4, oblonga, intus fere glabra, praesertim prope marginem paulo pubescentia; *corolla* 0.3 cm alta, 4-loba, lobis apice rotundatis, glabris; *stamina* 8, non exserta; antherae apice pilosae, acutae, 0.15 cm longae; *ovarium* circa 0.2 cm altum, 4-loculatum; stylus circiter 0.1 cm exsertus; *fructus* 1.4 cm longus, 0.5 cm latus, oblongus. — Ceylon. — *Fig. 2.*

Descriptio typi, Walker, *Mon. Nr. 181* (K). — *Calyx* 0.4 cm longus; *ovarium* alte conoideum, stylus brevis, 0.05—0.1 cm longus.

CEYLON: *Walker*, fl., *Mon. Nr. 181, type-specimen* (K) (on the same sheet: fl., *Mon. Nr. 180, I. lanceolata* Wight); fl., *Mon. Nr. 182* (GL); *Gardner 526*, fl., *Mon. Nr. 183* (K); Herb. Lugd. Bat. 908.225—154, fl., *Mon. Nr. 184* (L); *Thwaites*, fl.,

Mon. Nr. 185 (G); fr., *Mon. Nr. 186* (on same sheet: fl., *Mon. Nr. 187, I. lanceolata* Wight) (CAL); fl., *Mon. Nr. 188* (on same sheet: fl., *Mon. Nr. 189, I. lanceolata* Wight), and also on same sheet: old fl., *Mon. Nr. 190* (CAL); *Thwaites*, 1853—55, fl., *Mon. Nr. 191* (G); *Thwaites*, fl., *Mon. Nr. 192* (G); Adams Peak, *Thwaites*, fl., March 1846, *Mon. Nr. 193* (K); fl., *Mon. Nr. 195* (on same sheet: old fl., *Mon. Nr. 194, I. alloneura* Jeuken) (G).

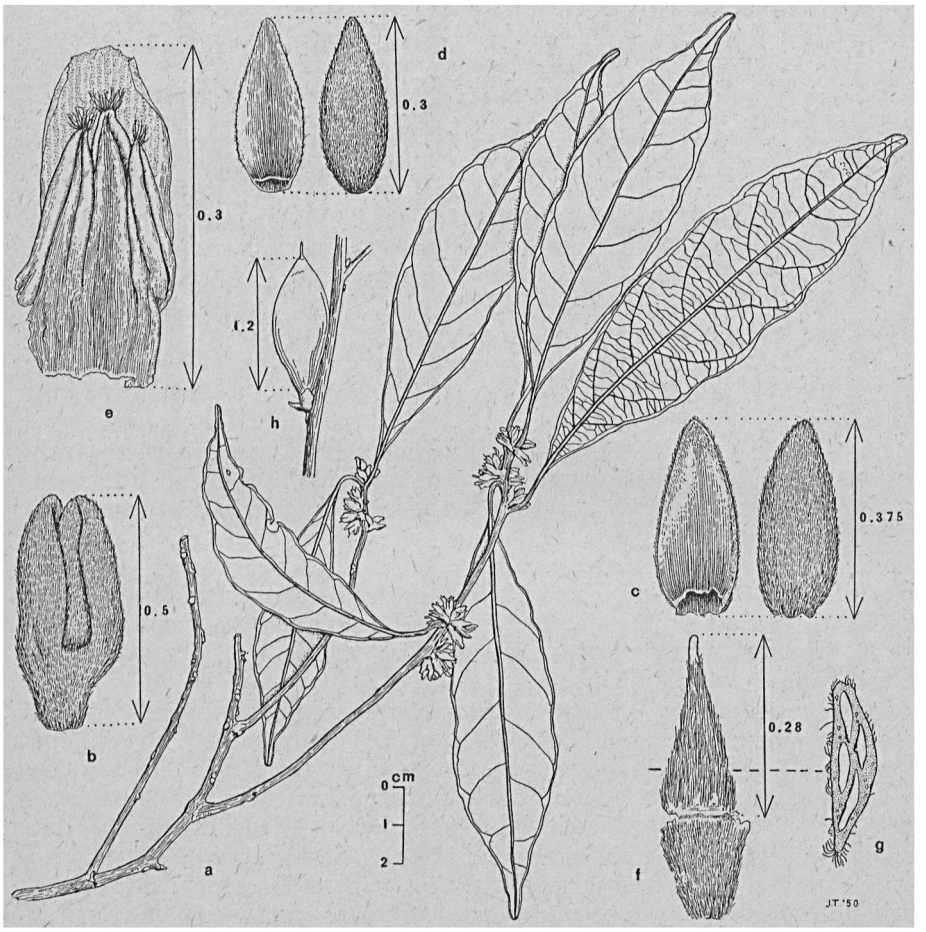


Fig. 2. *I. zeylanica* — a. branchlet with leaves and flowers; b. flower; c. outer sepal, inside and outside; d. inner sepal, idem; e. part of corolla with stamens; f. ovary; g. cross-section of the ovary; h. fruit. a—g from the type-specimen, Mon. Nr. 181; h. from Mon. Nr. 186.

Discussion.

The present species differs from *I. lanceolata* Wight by the transversally reticulate tertiary nervation (in *I. lanceolata* Wight transversally parallel). The specimens of the species were mostly determined *I. wightiana* DC., but comparison with the type-specimen of *I. wightiana* DC. shows that they represent a different, new, species.

4. Isonandra villosa Wight, Ic. Pl. II, 1840, tab. 360; A. De Candolle,

Prodr. VIII, 1844, 188; Clarke in Hooker, Fl. Brit. Ind. III, 1882, 538; Dubard, Bull. Mus. Hist. Nat. XV, 1909, 29; Rev. Gén. Bot. 21, 1909, 393; Gamble, Fl. Madr. IV, 1921, 761; Lam, Bull. Jard. Bot. Buit., Sér. III, Vol. VII, 1—2, 1925, 109 et 258 and Vol. VIII, 4, 1927, 421.

Descriptio speciei emendata. — *Ramuli* teretes, usque ad 0.7 cm in diam., virgulis cicatricibusque foliorum scabri, juniores ferrugineo-pubescentes; *stipulae* deltoideo-acutae, 0.1 cm longae, mox deciduae; *folia* utrinque glabra, cerata, supra nitida, subtus opaca, obovata vel late elliptica, ferè orbicularia, apice et basi rotundata, 4—11 cm longa, 3—6 cm lata, petiolo sulcato circiter 0.3—0.6 cm longo; costa media subtus basi prominens, apice inconspicua; nervi secundarii 11—15 subtus vix prominentes, angulo circiter 60° de costa adscendentes, prope marginem apicem folii versus deflectentes; nervi tertiarii inconspicui, transversaliter subparalleli, ad reticulationem inclinantes, nervis secundariis fere perpendiculares vel ab iis angulo 100°—140° descendentes, subdense conferti; *inflorescentiae* circiter 5-florae in axillis foliorum plerumque caducorum et super virgulas usque ad 0.5 cm longas praesertim juxta partem superiorem ramulorum positae; florum pedicelli circiter 0.1 cm longi, post anthesin 0.2 cm; *calyx* 0.25—0.3 cm longus; sepala 4, intus glabra; *corolla* circiter 0.1 cm exserta, glabra, extus basi tubi et apice loborum paulo pilosa, 4-loba, lobis rotundatis, apice truncatis; *stamina* 8 circiter 0.1 cm longa; antherae apice et parcius basi pilosae, apice obtusae; *ovarium* 4-loculatum, 0.1 cm altum; *fructus* 0.7—1.0 cm longus, oblongo-ovalis; embryonis radicula circiter 0.15 cm longa. — Deccan: Veligonda Hills. Kambakkam Hill, Quilon. — *Fig. 4b.*

Note. Fide Wight and A. De Candolle: "flores aurantiaci". Fide Fischer 4760: "corolla white".

Descriptio lecto-typi, *Herb. Wight 1733* (K), *Mon. Nr. 202.* — Folia 4—8 cm longa. Cetera descriptioni emendatae congruit.

DECCAN: Nellore Dt., Veligonda Hills, *Ramaswami 1400*, fl., 28 July 1914, *Mon. Nr. 196* (CAL) and *Mon. Nr. 197* (K); Chingleput Dt., Kambakkam Hill, 1800 ft, *Fischer 4760*, fl., 30 Aug. 1922, "corolla white", *Mon. Nr. 198* (CAL) and (number of Fischer not indicated) *Mon. Nr. 199* (US) and (number of Fischer not indicated) *Mon. Nr. 200* (K); Chingleput Dt., Kambakkam Hill, 2100 ft, *Fischer 4786*, fr., 7 April 1923, *Mon. Nr. 201* (CAL); (Herb. Wight 1733), fl. and fr., *Mon. Nr. 202, lecto-type,* and on same sheet: fl., *Mon. Nr. 202a* and: fl. and fr., *Mon. Nr. 202b* (K); fl. and fr., *Mon. Nr. 203* (K); Herb. Lugd. Bat. 908.225—196, fl. and fr., *Mon. Nr. 204* (L); fl. and fr., *Mon. Nr. 205* (P); fl. and fr., *Mon. Nr. 206* (GL); fl., *Mon. Nr. 207* (GL); fl., *Mon. Nr. 208* (E); fl., *Mon. Nr. 209* (CAL); Quilon, *Wight*, fl., *Mon. Nr. 210* (K).

Discussion.

1. The present species is very constant. It differs from *I. stocksii* Clarke by the more or less waxy leaves (in *I. stocksii* not waxy), the more numerous secondary nerves and the more strictly parallel tertiary nervation.

2. Wight remarks in his description (Ic. Pl. II, 1840, ad tab. 360): "young branches, petioles and under surfaces of the leaves clothed with rusty brown villi". On the other hand Clarke (l. c., 1882, 539) writes: "leaves... glabrous", and remarks: "The most glabrous species of the genus. In Wight's specimen (figured in Ic. t. 360) the young leaves and shoots are as described above, and no part of the plant is villous." Also

Gamble (l. c., 1921, 760) describes in his key the plant as glabrous, and says: "quite glabrous in spite of its name."

The lecto-type was chosen because of the label "1733. *Isonandra villosa* Wt." presumedly written in Wight's handwriting (cf. the discussion under *I. perrottetiana* DC.). This specimen has the leaves glabrous, but was apparently more or less scorched during the process of drying. It shows a rusty brown colour, which may have induced Wight to give the description mentioned above, and the so inappropriately chosen name.

3. In the description by A. De Candolle (l. c., 1844, 188) it reads: "corollae profunde 5-fidae..." This is probably a mistake for "4-fidae", at least no 5-merous corollae were found by me.

4. The attention may be directed to the disjunct area between the extremes: Quilon and the Veligonda Hills.

5. Isonandra stocksii Clarke in Hooker, Fl. Brit. Ind. III, 1882, 539; Cooke, Fl. Bomb. II, 1908, 91; Dubard, Bull. Mus. Hist. Nat. XV, 1909, 29; Rev. Gén. Bot. 21, 1909, 393; Gamble, Fl. Madr. IV, 1921, 761; Lam, Bull. Jard. Bot. Buit., Sér. III, Vol. VII, 1—2, 1925, 110 et 259 and Vol. VIII, 4, 1927, 421.

Descriptio speciei emendata. — *Ramuli* teretes, usque ad 0.6 cm in diam., virgulis inflorescentiarum caducarum cicatricibusque foliorum scabri, juveniles ferrugineo-pubescentes; *folia* utrinque glabra, nitida, obovata, apice obtusa, basi magis acuta, fusca, circiter 7—12 cm longa, 3—6 cm lata, petiolo sulcato 0.6—1 cm longo; costa media subtus prominens; nervi secundarii 8—10, subtus prominentes, angulo circiter 65°—70° de costa adscendentes, ante marginem in partem adscendentem et partem descendentem bifurcati, parte adscendenti magis conspicua; nervi tertiarii transversaliter reticulati; *inflorescentiae* 4—5 florae multae juxta ramulos super virgulas, floribus sessilibus vel perbreviter pedicellatis; *calyx* 0.2 cm longus, sepala 4, intus glabra; *corolla* 4-loba, lobis rotundatis, apice truncatis, glabris; *stamina* 8; antherae apice et basi pilosae; *ovarium* 4-loculatum, 0.1 cm altum cum stylo 0.2 cm longo post anthesin; *fructus* et *semen* ignoti. — Deccan. — *Fig. 4c.*

Descriptio lecto-typi, Malabar, Concan. Coll. Stocks, Law, etc. (K), *Mon. Nr. 211.* — Cum descriptione speciei modo data congruit.

DECCAN: Malabar, Concan etc. *Stocks, Law etc.*, buds and old fl., *Mon. Nr. 211, lecto-type* (K); Malabar, Concan etc., *Stocks, Law etc.*, old fl., *Mon. Nr. 212* (K); *Warree*, old fl., *Mon. Nr. 213* (CAL); *Gibson*, old fl., *Mon. Nr. 214* (CAL).

Discussion.

1. The species differs from *I. perrottetiana* DC. by the obovate leaves and especially by the secondary and tertiary nervation: the secondary nerves splitting into two parts near the margin, the tertiary ones being transversally reticulate. *I. perrottetiana* DC. has the secondary nervation curving towards the leaf-tip, the tertiary transversally parallel.

2. The species differs from *I. villosa* Wight by the not waxy leaves, and also by the secondary and tertiary nervation. Clarke remarks (l. c., 1882, 539):

"This (*I. stocksii*, M. J.), by the leaves clustered at the summits of the branches, and by the inflorescence, approaches *I. villosa*, but the primary and secondary nervation (in our terminology the secondary and tertiary nervation, M. J.) of the leaves is different."

In *I. villosa* Wight the nervation is on the lower-side of the leaf not so distinctly prominent, especially towards the tip; the secondary nerves are more numerous and the tertiary ones are more distinctly transversally parallel though little conspicuous.

3. The species differs from *I. montana* Gamble by the larger leaves and also by the secondary and tertiary nervation. In *I. montana* the secondary nerves are fewer and the tertiary ones are strictly reticulate. The leaf-tip is also often shortly acuminate.

4. Cooke (l. c., 1908, 91) made the following remark:

"*Isonandra Stocksii*, C. B. Clarke, in Hook.f. Fl. B. I. v. 3, p. 539, is stated in the Fl. B. I. to occur in the Konkan, but it has never, so far as I know, been found there by any botanists. Neither Talbot nor Woodrow have seen it. There are 2 specimens in Herb. Kew., the tickets on which are *printed* ones on which appear the words "Hab. Malabar, Concan &c. Coll. Stocks, Law &c."

There is therefore no certainty as to the locality from which these specimens came, and they are not authenticated by the signatures of either Law or Stocks."

The two specimens from the Calcutta Herbarium do not mention any solution either, no locality being indicated on their labels.

5. Gamble (l. c., 1921, 761) indicates as locality: "Deccan, N. Coimbatore, in Shola forests (Fischer)". However, this specimen of Fischer is *I. perrottetiana* DC., (*Mon. Nr. 143, 144 and 145*), but tends to *I. stocksii* Clarke.

6. Isonandra montana Gamble, Fl. Madr. IV, 1921, 761 — *I. wightiana* DC. var. *montana* Thwaites, Enum. Pl. Zeyl., 1864, 177; Clarke in Hooker, Fl. Brit. Ind. III, 1882, 540; Dubard, Bull. Mus. Hist. Nat. XV, 1909, 28 — *I. lanceolata* Wight var. *montana* Thwaites in Trimen, Fl. Ceyl. III, 1895, 78.

Descriptio speciei emendata. — *Ramuli* teretes, glabri, scabri, in imis apicibus ferrugineo-pubescentes; *folia* glabra, opaca, et fulvo-ferruginea, obovato-spathulata, apice obtusa vel brevissime acuminata, basi acuta, 4—6 cm longa, 2—3 cm lata, petiolo 0.4—0.7 cm longo; costa media subtus prominens; nervi secundarii 5—7, subtus prominentes, angulo circiter 45° irregulariter de costa adscendentes, ante marginem saepe furcati; nervi tertiarii subtus conspicui, reticulati, sinuosi et confluentes; *inflorescentiae* circiter 10-florae juxta partem superiorem ramulorum in axillis foliorum plerumque caducorum positae, floribus sessilibus vel breviter, usque ad 0.1 cm, pedicellatis; *calyx* 0.3 cm longus, sepala 4, intus glabra, longe deltoidea, apice obtusa; *corolla* 4-loba non exserta, lobis rotundatis glabris; *stamina* 8 non exserta; antherae apice et basi parce pilosae, apice obtusae; *ovarium* 4-loculatum, parce pilosum, 0.1 cm altum; stylus longitudine ovario aequilongus; *fructus* et *semen* ignoti. — Ceylon. — *Fig. 4d.*

Descriptio lecto-typi, Ceylon, Thwaites (K), *Mon. Nr. 215.* — Congruit cum descriptione speciei supra data.

CEYLON: *Thwaites* (C. P. 3092), fl., *Mon. Nr. 215, lecto-type,* (K); *Thwaites,* fl., *Mon. Nr. 216* (G); *Thwaites,* fl., *Mon. Nr. 217* (G); *Thwaites,* 1853—55, fl., *Mon. Nr. 218* (G); *Thwaites* 1854, fl., *Mon. Nr. 219* (P); fl., *Mon. Nr. 220* (CAL); *Thwaites,* (C. P. 2411), fl., *Mon. Nr. 221,* (*I. montana* Gamble × *I. compta* Dubard?) (K).

Discussion.

1. The species differs from *I. compta* Dubard by the dull, glabrous leaves, the irregular secondary nervation, the reticulate tertiary nervation and by the inflorescence, but it is nearly similar in the obovate-spathulate leaves. *I. compta* has the leaves tomentose and shining beneath, a more regular secondary nervation, an inconspicuous and more or less longitudinally reticulate tertiary nervation, and the inflorescences not so conspicuously arranged along the branchlets.

2. The species seems also related to *I. perakensis* King and Gamble, but differs from it by the inflorescences arranged along the branches, the glabrous leaves (in *I. perakensis* the leaves are tomentose beneath), the obovate-spathulate leaves with shortly acuminate leaf-tip and by the sessile flowers. *I. perakensis* has the leaves elliptical and blunt at tip.

3. The ovary is sparsely pilose or almost glabrous, an uncommon feature in the genus.

4. Dubard (l. c., 1909, 28) is inclined to see a hybrid in the present species: "...je ne serais pas éloigné de considérer cette forme comme un hybride entre l'*I. lanceolata* et la variété *Compta* de Thwaites (= *I. compta* Dubard, M. J.) ..."

However, since the features are constant, it seems better to consider it with Gamble a distinct species.

5. According to Gamble (l. c., 1921, 761) the species should occur also in Deccan: "W. Ghâts, hills of Travancore, in evergreen forests, above 4,000 ft. (Bourdillon)."

This must be a mistake: the species occurs only in Ceylon. The specimens of Bourdillon quoted by Gamble are *I. perrottetiana* DC., Mon. Nr. 154, 155, 160. Gamble refers his new species to *I. Wightiana* DC., var. *montana* Thwaites. This is a Ceylon plant (C. P. 3092).

7. Isonandra alloneura Jeuken, species nova — *I. wightiana* DC., in schedulis.

Descriptio speciei. — *Ramuli* teretes, glabri, in imis apicibus ferrugineo-pubescentes; *folia* minus coriacea, utrinque glabra, ovali-oblonga vel spathulata, apice brevissime obtuse acuminata, basi acuta, supra atrolivida, subtus fusca, circiter 6—8 cm longa, 2.5—4 cm lata, petiolo sulcato 0.5—0.8 cm longo; costa media subtus prominens; nervi secundarii 6—7, subtus leviter prominentes, supra inconspicui, angulo circiter 55°—60° de costa adscendentes, prope marginem apicem folii versus deflectentes; nervi tertiarii longitudinaliter reticulati; *inflorescentiae* 6—7-florae in axillis foliorum insertae, flores sessiles vel subsessiles, pedicello florum circiter 0.07 cm, in fructu 0.13 cm longo; *calyx* 0.2 cm longus; sepala 4, intus glabra, obtuse deltoideo-oblonga; *corolla* 4-loba, 0.2 cm alta, lobis apice truncatis, in alabastro extus paulo pubescentibus, apice pilosis; *stamina* 8 non exserta; antherae apice pilosae vel glabrae; *ovarium* 4-loculatum, in alabastro 0.04 cm altum, in flore circiter 0.1 cm; stylus in alabastro 0.06 cm longus, in flore circiter 0.1 cm; *fructus* 0.7—1.8 cm longus, 0.4—0.6 cm latus, oblongus, basi angustus; testa fusca. — Ceylon. — *Fig. 3.*

Descriptio typi, Ceylon, *Mon. Nr. 222* (G). — Congruit cum descriptione speciei modo data.

CEYLON: *Thwaites*, buds and old fl., *Mon. Nr. 222, type-specimen*, (G); *Thwaites*, fl., *Mon. Nr. 223* (G); *Thwaites 1853*, fr., *Mon. Nr. 224* (K); *Thwaites*, Herb. Bog. 23710, *Mon. Nr. 225* (BO); (old fl. and fr., *Mon. Nr. 226, I. lanceolata* Wight), and on same sheet: old. fl., *Mon. Nr. 227, I. alloneura* Jeuken × *I. compta* Dubard?, and

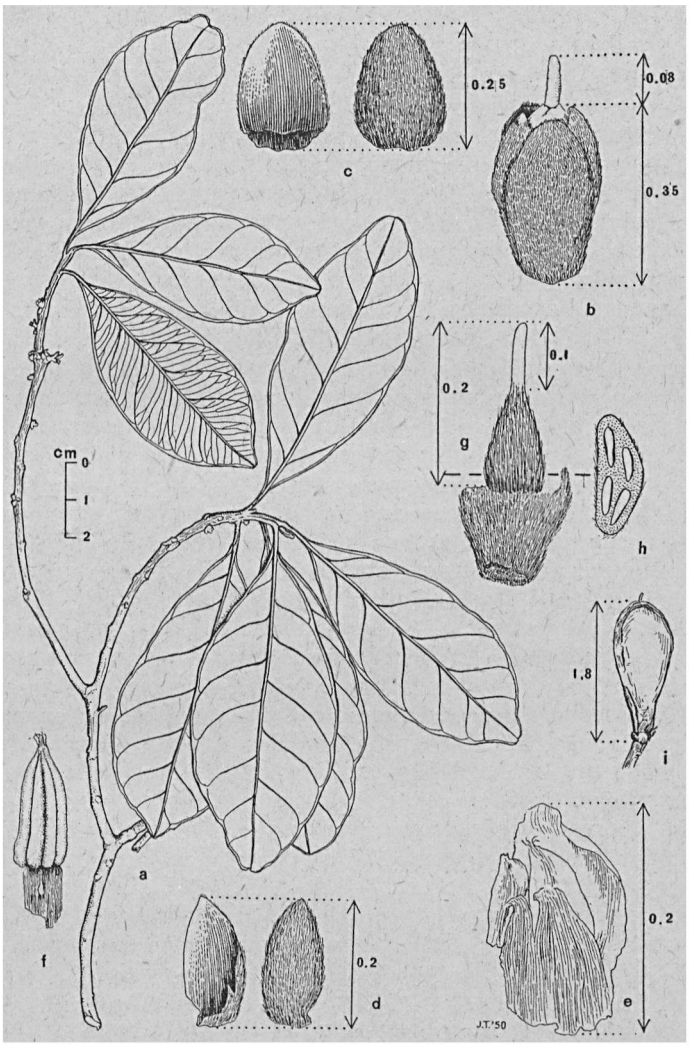


Fig. 3. *I. alloneura* — a. branchlet with leaves, buds and old flowers; b. flower; c. outer sepal, inside and outside; d. inner sepal, idem; e. part of corolla with stamens; f. stamen; g. ovary; h. id., cross-section; i. fruit. a. from type-specimen, Mon. Nr. 222; b—h. from Mon. Nr. 223; i. from Mon. Nr. 224.

also on same sheet: buds and fr., *Mon. Nr. 228* (G); (*Mon. Nr. 229, I. lanceolata* Wight), and on same sheet: fl., *Mon. Nr. 230, I. alloneura* Jeuken × *I. compta* Dubard ? (P); Herb. Bog. 23712, fl., *Mon. Nr. 231, I. alloneura* Jeuken × *I. montana* Gamble ? (BO); old fl., *Mon. Nr. 194* (G).

Discussion.

1. The longitudinally reticulate tertiary nervation is only found in this species and in some way in *I. compta* Dubard. The latter species has the leaves tomentose beneath and can be easy distinguished from *I. alloneura* Jeuken.

2. In the figure of the present species, the flowers are taken from the specimen *Mon. Nr. 223,* the only one with flowers. However, this specimen has the leaves more coriaceous than the type-specimen, and the identification of *Mon. Nr. 223* with the present species could therefore, seem doubtful. There is some resemblance with *Mon. Nr. 227* and also with *Mon. Nr. 231.* In general, the species seems not very constant, and so, until more material will be collected, I have inserted the specimens with glabrous leaves and longitudinally reticulate tertiary nervation into this new species *I. alloneura.*

8. Isonandra borneensis H. J. Lam, Bull. Jard. Bot. Buit., Sér. III, Vol. VII, 1—2, 1925, 108 and 109, fig. 31 and Vol. VIII, 4, 1927, 418.

Descriptio speciei. — *Ramuli* teretes, glabri, innovationibus tantum puberuli; stipulae minimae, deltoideae, pubescentes, mox deciduae; *folia* ad ramulorum apices dense conferta, obovata, basi acuta vel cuneata, apice rotundata vel interdum latissime acuta, supra glabra, subtus cum petiolo dense adpresse ferrugineo-pubescentia, 2—5.8 cm longa, 1.2—3.2 cm lata, petiolo 0.4—0.8 cm longo; costa media subtus prominens; nervi secundarii subtus minus prominentes, conspicui, recti vel paulo curvati, utrinque circiter 11, angulo 50°—55° de costa adscendentes, prope marginem diminuentes; nervi tertiarii transversaliter paralleli, angulo 90°—100° de costa descendentes; *inflorescentiae* 2—3-florae in axillis foliorum positae; flores minutissimi, pedicellis 0.1—0.15 cm longis; *sepala* 4 vel interdum 5, 0.15 cm longa, exteriora 2 late ovata, interiora 2 vel 3 angustoria, pubescentia marginibus scariosis ciliatis exceptis, omnia intus glabra; *corolla* exserta, 0.2 cm longa, glabra, tubus 0.1 cm longus, cylindricus, petala 4 ovata, rotundata; *stamina* 8, filamenta 0.1 cm longa, antherae plus minus deltoideae, 0.05 cm longae, vix pilosae; *ovarium* cum stylo minuto conoideo vel punctiforme fere 0.2 cm longum, 4-loculatum; *fructus* (immaturus?) dense adpresse pubescens, angustissime ovoideus, 1.2 cm longus, 0.3 cm diam., apice obtusus; *semen* ignotum. — Borneo. — *Fig. 4e.*

Descriptio typi, Borneo, Boekit Mili, *Amdjah,* exp. *Nieuwenhuis, 162, Mon. Nr. 232,* (BO). — Congruit cum descriptione speciei supra data.

Borneo: Boekit Mili, *Amdjah,* Exp. *Nieuwenhuis, 162,* fl. and fr. 14 Nov. 1898, *Mon. Nr. 232* (BO), *type-specimen*; idem, *Mon. Nr. 233* (BO), *co-type.*

Discussion.

This species is related to *I. perakensis* King and Gamble and to *I. compta* Dubard by the leaves tomentose beneath. It differs from *I. perakensis* by the smaller leaves and flowers and by the strictly transversally parallel tertiary nerves. *I. compta* Dubard has the leaves more shining, fewer secondary nerves, a more or less longitudinally reticulate tertiary nervation and larger flowers.

9. Isonandra compta Dubard, Bull. Mus. Hist. Nat. XV, 1909, 28;

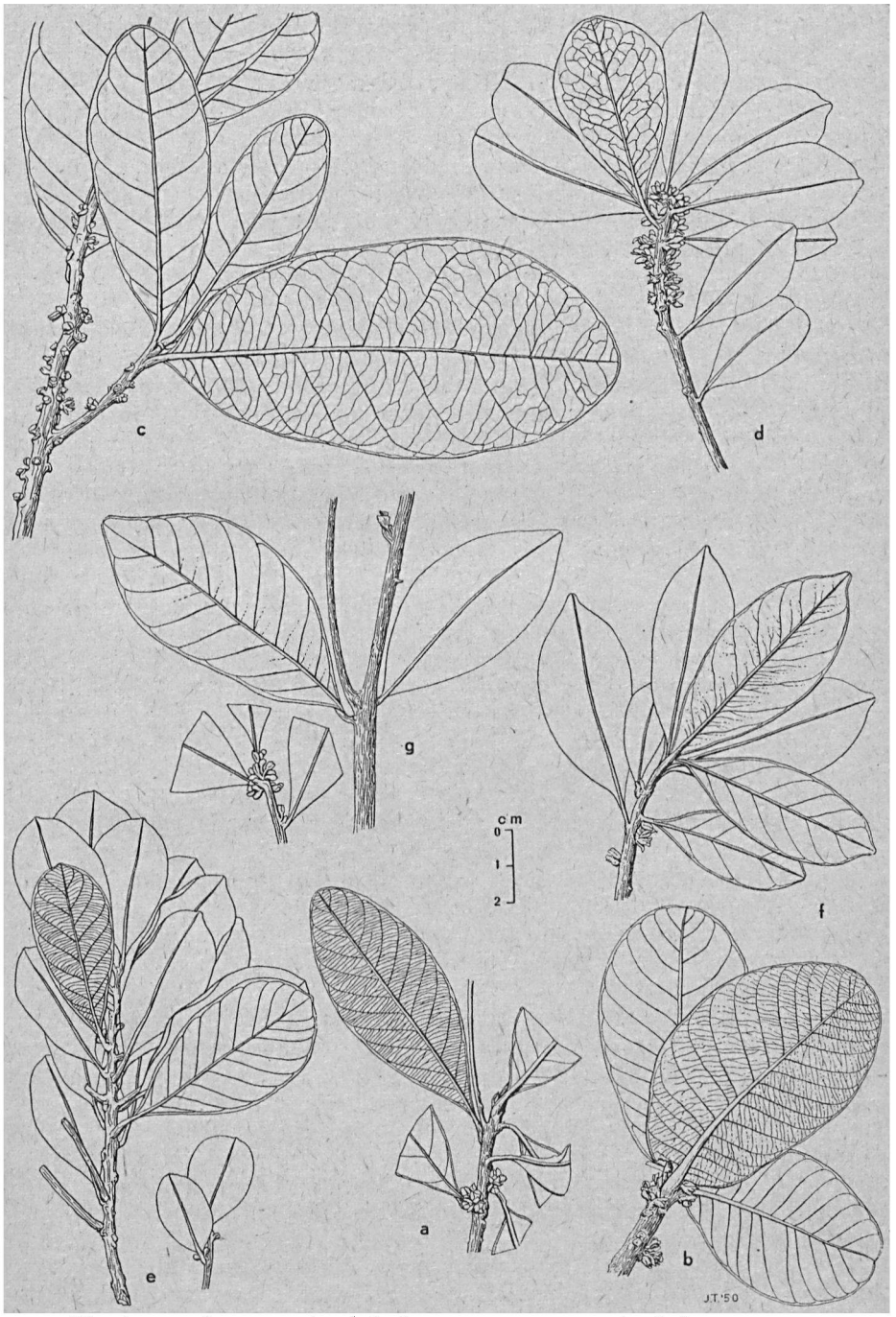


Fig. 4. — a. *I. perrottetiana*; b. *I. villosa*; c. *I. stocksii*; d. *I. montana*; e. *I. borneensis*; f. *compta*; g. *I. perakensis*. All figures taken from the type-specimens.

Rev. Gén. Bot. 21, 1909, 393; Lam, Bull. Jard. Bot. Buit., Sér. III, Vol. VII, 1—2, 1925, 259 and Vol. VIII, 4, 1927, 421 — *I. wightiana* DC. var. *compta* Thwaites ex Clarke in Hooker, Fl. Brit. Ind. III, 1882, 540 — *I. lanceolata* Wight var. *compta* Thw. in Trimen, Fl. Ceyl. III, 1895, 78 — *Bassia (Isonandra) compta* Thwaites mss., in schedulis.

Descriptio speciei emendata. — *Ramuli* teretes, glabri, imis apicibus ferrugineo-pubescentibus; *folia* supra glabra, nitida, fulvo-ferruginea, subtus dense nitideque ferrugineo-pubescentia, ovali-oblonga vel spathulata, apice paulo, circiter 0,2 cm, acuminata, basi acuta, 4.5—8.5 cm longa, 2—3.5 cm lata, petiolo sulcato 0.5—0.9 cm longo; costa media subtus prominens; nervi secundarii 7—8, subtus prominentes, angulo circiter 55° de costa adscendentes, prope marginem cohaerentes flectione juxta marginem nervum superiorem versus, deinde margine discedentes; nervi tertiarii plus minusve longitudinaliter reticulati; *inflorescentiae* 7—8-florae in axillis foliorum positae, floribus sessilibus vel subsessilibus; *calyx* 0.3 cm longus, sepala 4, oblonga, obtusa, intus glabra, exteriora interioribus paulo altiora; *corolla* 4-loba, lobis obtusis, cum tubo 0.3 cm longis; *stamina* 8, 4 epipetalia paulo longiora 4 episepalibus, epipetalia corollae fere aequantia; antherae ad apicem et ad basin pilosae; *ovarium* 4—5-loculatum, 0.1 cm altum, stylus 0.25 cm longus; *fructus* et *semen* ignoti. — Ceylon. — *Fig. 4f.*

Descriptio lecto-typi, Ceylon, Centr. Prov., *Thwaites, C. P. 3912,* March 1866 (K), *Mon. Nr. 234.* — Congruit cum descriptione speciei modo data.

CEYLON: Centr. Prov., *Thwaites (C. P. 3912)*, fl., Mar. 1866, *Mon. Nr. 234, lecto-type* of *I. wightiana* DC. var. *compta* Thw. = *lecto-type* of *I. compta* Dubard (K); *Thwaites,* 1868, fl., *Mon. Nr. 235* (P); buds, *Mon. Nr. 236* (CAL); *Thwaites,* 1867, fl.; *Mon. Nr. 238* (G); Adams Peak, *Thwaites,* fl., May 1866, leaves 9 × 5 cm, *Mon. Nr. 239* (K).

Discussion.

1. This species is related to *I. perakensis* King and Gamble and to *I. borneensis* H. J. Lam by the tomentose leaves, but it differs from the former by the spathulate, shining leaves with shortly acuminate tip, the more conspicuous and longitudinally reticulate tertiary nerves and the sessile flowers. *I. perakensis* has the leaves dull and elliptical, with rounded tip, the tertiary nerves are inconspicuous and transversally reticulate, and the flowers are pedicelled.

The present species differs from *I. borneensis* by its larger shining leaves, the fewer secondary nerves, the longitudinally reticulate tertiary nerves and by the larger flowers.

2. Beddome remarks that he has observed a form with the leaves fulvo-tomentose beneath on the Tinnevelly mountains (cf. For. Man. Bot., 1869, 141, and the present paper p. 551, 552). It is not clear which form he means. *I. compta* has the leaves fulvo-tomentose beneath, but I have only seen specimens from Ceylon, not from Deccan. Probably the form of Beddome is not an *Isonandra.*

3. The specimen used by Dubard for his description, Bull., 1909, 28, is *Mon. Nr. 235.* In his analysed flowers he found the ovary 5-celled. In *Mon. Nr. 234* I found a 4-celled ovary. In his description Dubard says: "8 étamines unisériées, les épipétales un peu plus courtes et moins déve-

loppées que les épisépales". The contrary is meant. The figure (by Dubard?) on the sheet *Mon. Nr. 235* shows the right situation.

10. Isonandra perakensis King and Gamble, Journ. As. Soc. Beng. 74, II, extr. nr. 17, 1906, 166; Ridley, Fl. Mal. Pen. II, 1923, 261; Lam, Bull. Jard. Bot. Buit., Sér. III, Vol. VII, 1—2, 1925, 108 and Vol. VIII, 4, 1927, 418.

Descriptio speciei. — *Arbor* parva, circiter 10 m alta; *ramuli* teretes, glabri, in imis apicibus ferrugineo-pubescentes; *folia* supra glabra, opaca, fulvo-ferruginea, subtus dense ferrugineo-pubescentia, elliptico-oblonga, apice obtusa, basi acuta, circiter 5—9 cm longa, 2.5—4 cm lata, petiolo 0.5—0.75 cm longo; costa media subtus prominens; nervi secundarii 8—10 subtus prominentes, angulo circiter 50°—60° de costa adscendentes, prope marginem apicem folii versus deflectentes; nervi tertiarii inconspicui, transversaliter reticulati; *inflorescentiae* 8—10-florae in axillis foliorum superiorum positae, pedicellis 0.2—0.25 cm longis, angularibus; *calyx* 0.25—0.3 cm longus, sepala 4—5, obtusa, intus glabra; *corolla* 4-loba, cum tubo 0.5 cm longa, lobis obtusis, tubo fere aequilongis; *stamina* 8 (in uno flore 9) corollae aequilonga; antherae sagittatae 0.08 cm longae, sparse pilosae pilis longis; *ovarium* 4-loculatum 0.1 cm altum; stylus circa 0.2 cm longus; *fructus* oblongus, acutus, 1—1.3 cm longus, fuscus; *semen* ellipsoideum, apice acutum, 0.8 cm longum. — Malay Peninsula. — *Fig. 4g.*

Descriptio typi, *King's collector 7138, Mon. Nr. 240,* est identica.

MALAY PENINSULA: Kuila Perak, Open Jungle, top of limestone mounts near G. M., 1000—1500 ft, *King's Collector 7138* ("a tree 30 to 40 ft high, stem 6 to 10 in. in D. Leaves dull, middle green, glossy brown underneath. Flower white, calex brown. Fruit light green."), buds, fl. and fr., January 1885, *Mon. Nr. 240* (CAL), *lecto-type; Co-types: Mon. Nr. 241, 242, 243* (CAL); *Mon. Nr. 244, 245* (K); *Mon. Nr. 246* (NY); *Mon. Nr. 247* (E); *Mon. Nr. 248* (with the name of King's Collector: *H. Kunstler*) (P).

Discussion.

1. The species is related to *I. compta* Dubard, but differs from it by the rounded leaf-tip and the elliptical form of the dull leaves. *I. compta* has shining, spathulate, acuminate leaves.

2. The species seems also related to *I. borneensis* H. J. Lam, but the latter has smaller leaves and flowers, the secondary nerves are more numerous, and the tertiary ones are transversally parallel.

3. There may be a relation to *I. montana* Gamble, but this species has the leaves not tomentose beneath, and the tertiary nerves are conspicuous. Moreover, in *I. montana* the secondary nerves are less numerous and the leaves are obovate and shortly acuminate. The inflorescences are inserted along the branchlets and the flowers are sessile.

Discussion about some excluded species.

1. *I. diplostemon* Clarke in Hooker, Fl. Brit. Ind. III, 1882, 540. — Deccan — This species is the same as *Diospyros obovata* Wight, Ic. Pl. 1226. However, it is not ebenaceous, but certainly belongs to the *Sapotaceae.* Only male flowers are known. The calyx has 2 whorls of 2 sepals, the corolla is deeply 6-cleft, the not extruding stamens are high in number, about 16, inserted on the corolla-tube; the rudiment of the ovary is a glabrous cone without cavity.

According to Lam, ms, it may represent a new genus of the *Sapotaceae*. (*Mon. Nr. 251, 252, 253* and *254*.)

2. *I. emarginata* H. J. Lam, Bull. Jard. Bot. Buit., Sér. III, VIII, 1927, 420, fig. 8. — Borneo — This species most probably is a synonym of *Palaquium multiflorum* (Pierre) Dubard. The last word about this synonymy cannot be spoken, since I have not seen the type-specimen of *I. emarginata*, only a specimen in the Rijksherbarium (Borneo, near Kuching, Haviland, *H. L. B. 908.167—687*, fl., Oct. 1892), which is certainly conspecific with the type-specimen of *Palaquium multiflorum* (*Beccari 1439*), but differs in a few points from the description given by Lam l. c.

The number of the flower-parts is mostly 6, as Pierre remarks. Pierre, giving a list of several flowers, concludes: "Dans cet éch., le nombre des sépales est presque toujours 6 en 2 séries de Palaquium. La corolle est de 5 à 6, le plus souvent de 6. Le nombre des étamines est le double de la corolle, et quelquefois d'avantage. L'ovaire est de 6 loges." cf. Pierre, ms, in *Beccari 1439* (P). The long-pedicelled flowers and the frequent occurrence of 6 sepals make the inclusion of *I. emarginata* H. J. Lam in *Isonandra* doubtful. Therefore, it seems better to consider this species a *Palaquium*, with a tendency towards *Isonandra*. (*Mon. Nr. 259, 260, 261* and *262*.)

3. *I. rufa* King and Gamble, Journ. As. Soc. Beng. LXXIV, 2, Extra Nr. 17, 1906, 166. — Malay Peninsula — Very imperfectly known. However, the glabrous ovary, the villous filaments, the 6 (?) corolla-lobes, the longer pedicels, and the type of nervation make it improbable that this is an *Isonandra*. The nervation recalls *Ganua*, as does the glabrous ovary, but probably the partitions of the ovary are perfect above the ovules, which is no *Ganua*-character. It had better be provisionally considered a new species of *Madhuca*. (*Mon. Nr. 249 and 250*).

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of species which have some time been described under Isonandra.

(Accepted species in roman, synonyms in italics.)

Abbreviations:

Lam, Bull. Jard. Bot. Buit., Sér. III, Vol. VII, 1—2, 1925 = Lam 1925
Lam, idem, Vol. VIII, 4, 1927 = Lam 1927
Index Kewensis = I. K.

I. acuminata Drury = Palaquium ellipticum (Engl.) Baill., cf. Lam 1927, 414.
I. acuminata Miquel = Palaquium gutta (Hook.) Baill., cf. Lam 1927, 387.
I. alloneura Jeuken, p. 572.
I. alphonseana Dubard = I. perrottetiana DC., p. 565.
I. argentata Teysmann & Binnendijk = Palaquium quercifolium (de Vr.) Burck, cf. Lam 1925, 53.
I. benjamina de Vriese = Payena leerii (T. & B.) Kurz, cf. Lam 1925, 137.
I. binnendijkii auct. ign. = Palaquium quercifolium (de Vr.) Burck (?). Fide Lam in annot. ad Icon. 86 A ex Herb. Par. Cf. Lam 1925, 53 and 1927, 399.
I. borneensis H. J. Lam, p. 574.
I. caloneura Kurz = Madhuca caloneura (Kurz) H. J. Lam, cf. Lam 1925, 265.
I. calophylla Kurz = Madhuca caloneura (Kurz) H. J. Lam, cf. Lam 1925, 265.

I. calophylla Teysmann & Binnendijk = Palaquium calophyllum (T. & B.) Pierre, cf. Lam 1925, 52.
I. canaliculata Thwaites = Palaquium canaliculatum (Thw.), Engler, cf. Lam 1925, 107.
I. candolleana Wight = I. perrottetiana DC., p. 566.
I. compta Dubard, p. 574.
I. dasyphylla Miquel = Payena dasyphylla (Miq.) Pierre, cf. Lam 1925, 143 and 1927, 431.
I. dasyphylla de Vriese = Palaquium dasyphyllum (de Vr.) Pierre, cf. Lam 1925, 73 and 1927, 431.
I. diepenhorstii Teysmann & de Vriese = Ganua motleyana (de Vr.) Pierre, cf. Lam 1925, 122.
I. diplostemon Clarke (= *Diospyros obovata* Wight); may be a new genus of the Sapotaceae, p. 577.
I. emarginata H. J. Lam = Palaquium multiflorum (Pierre) Dubard, p. 578.
I. gracilis H. J. Lam = I. lanceolata Wight var. gracilis (H. J. Lam) Jeuken, p. 561.
I. grandis Thwaites = Palaquium grande (Thw.) Engler, cf. Lam 1925, 107.
I. gutta Hooker = Palaquium gutta (Hook.) Baill., cf. Lam 1925, 28 and 1927, 387.
I. hexandra Griffith = Palaquium hexandrum (Griff.) Engler, cf. Lam 1925, 85.
I. krantziana Pierre = Palaquium obovatum (Griff.) Engler, cf. Lam 1925, 83.
I. laevifolia Thwaites = Palaquium laevifolium (Thw.) Engler, cf. Lam 1925, 107.
I. lamponga Miquel = Payena leerii (T. & B.) Kurz, cf. Lam 1925, 137 and 1927, 437.
I. lanceolaria Wight = I. lanceolata Wight f. anfractuosa, p. 557.
I. lanceolata Thwaites = Palaquium engleri H. J. Lam, cf. Lam 1925, 107.
I. lanceolata Wight, p. 557.
I. macrophylla de Vriese = Palaquium macrophyllum (de Vr.) Pierre, cf. Lam 1925, 106.
I. microphylla de Vriese = Payena microphylla (de Vr.) Pierre, cf. Lam 1925, 136 and 137.
I. montana Gamble, p. 571.
I. motleyana de Vriese = Ganua motleyana (de Vr.) Pierre, cf. Lam 1925, 122.
I. obovata Griffith = Palaquium obovatum (Griff.) Engler, cf. Lam 1925, 83.
I. pauciflora Thwaites = Palaquium pauciflorum (Thw.) Engler, cf. Lam 1925, 107.
I. perakensis King and Gamble, p. 577.
I. percha Hooker = Palaquium gutta (Hook.) Baill., cf. Lam 1925, 253 and 1927, 387.
I. perrottetiana DC., p. 563.
I. perrottetiana Wight = I. perrottetiana DC., p. 566.
I. polyandra Wight = Payena lucida (Wall.) DC., cf. Lam 1925, 145 and 146.
I. polyantha Kurz = Palaquium polyanthum (Wall.) Engler, cf. Lam 1925, 258.
I. polynesica Bentham and Hooker (= *Chrysophyllum polynesicum* Hillebrand) = Nesoluma polynesicum (Hillebr.) Baillon, p. 555.
I. puberula Miquel = Payena lucida (Wall.) DC., cf. Lam 1927, 431.
I. pulchra Burck = Payena acuminata (Bl.) Pierre ex Dubard, Rev. Gén. Bot. 20, 1908, 204, cf. Lam 1925, 140 and 142.
I. quercifolia de Vriese = Palaquium quercifolium (de Vr.) Burck, cf. Lam 1925, 53.
I. richii A. Gray = Burckella richii (A. Gray) H. J. Lam, cf. Lam in Blumea VI, 559.
I. rostrata Miquel = Palaquium rostratum (Miq.) Burck, cf. Lam 1925, 40.
I. rubiginosa Thwaites = Palaquium rubiginosum (Thw.) Engler, cf. Lam 1925, 107.
I. rufa King & Gamble = Madhuca sp.?, p. 578.
I. stocksii Clarke, p. 570.
I. sumatrana Burck = Payena acuminata (Bl.) Pierre ex Dubard, Rev. Gén. Bot. 20, 1908, 204, cf. Lam 1925, 140 and 142.
I. villosa Wight, p. 568.
I. wightiana DC. = I. lanceolata Wight, p. 562.
I. xanthochyma de Vriese = Palaquium xanthochymum (de Vr.) Pierre, cf. Lam 1925, 73.
I. zeylanica Jeuken, p. 567.