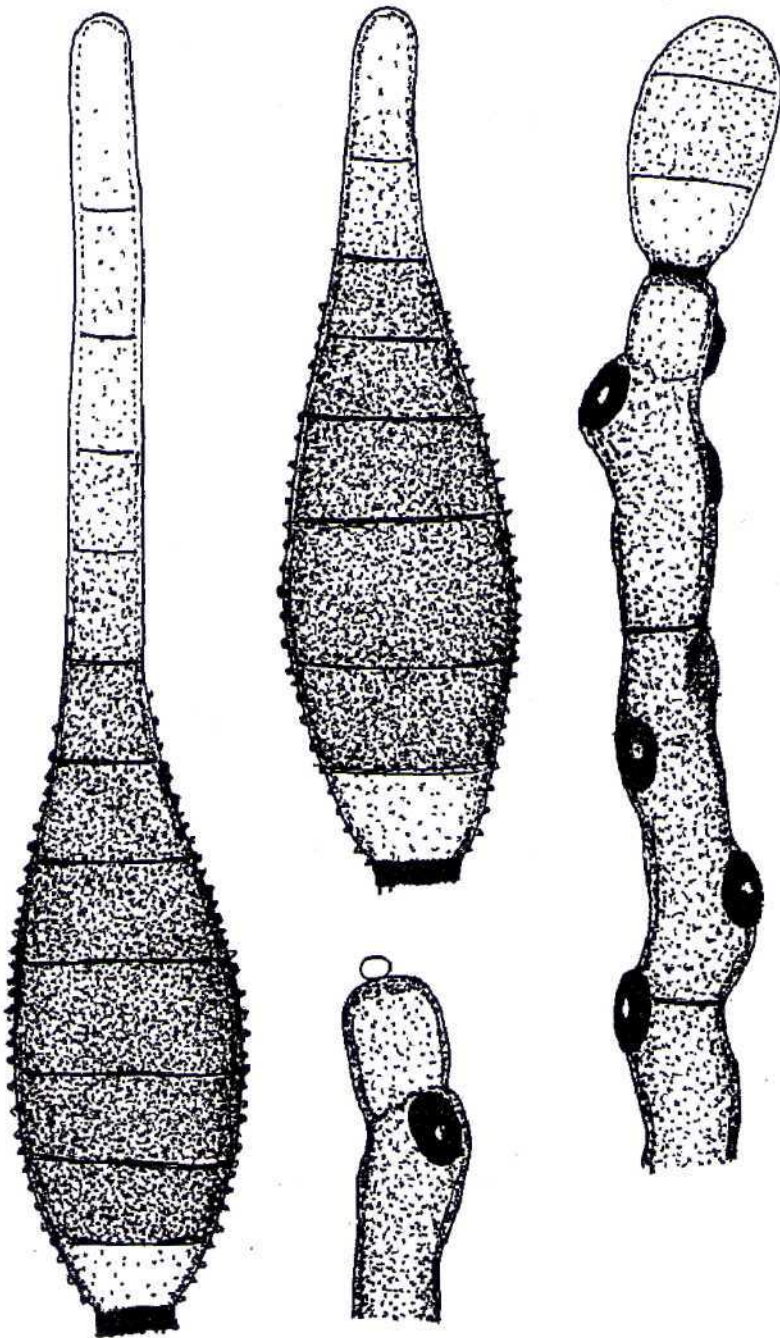




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THORNY PROBLEMS IN THE RUBIACEAE: BENKARA, FAGERLINDIA AND OXYCEROS

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ABSTRACT

RIDSDALE, C.E. 2008. Thorny problems in the *Rubiaceae*: *Benkara*, *Fagerlindia* and *Oxyceros*. *Reinwardtia* 12(4): 289 – 298. — The shoot architecture of *Fagerlindia* and *Oxyceros* is discussed. *Randia miquelii*, *Oxyceros rectispina* are transferred to – while *Fagerlindia* is reduced to a synonym of – *Benkara*. *O. hoaensis* are transferred to the genus *Benkara*. One new combination *Oxyceros drupacea* is made in the genus *Oxyceros*.

Keyword: *Benkara*, *Fagerlindia*, *Oxyceros*.

ABSTRAK

RIDSDALE, C.E. 2008. Berbagai masalah pada *Rubiaceae*: *Benkara*, *Fagerlindia* and *Oxyceros*. *Reinwardtia* 12(4): 289 – 298. — Arsitektur kuncup pada *Fagerlindia* dan *Oxyceros* didiskusikan. *Randia miquelii*, *Oxyceros rectispina* dipindah ke – sedangkan *Fagerlindia* direduksi menjadi sinonim – *Benkara*. *O. hoaensis* dipindahkan ke marga *Benkara*. Sebuah kombinasi baru *Oxyceros drupacea* dibuat dalam maerga *Oxyceros*.

Kata kunci: *Benkara*, *Fagerlindia*, *Oxyceros*.

INTRODUCTION

The genus *Fagerlindia* was segregated from *Randia s.l.* by Tirvengadam (1983) in his studies on the *Gardenieae* of S. E. Asia. The Philippine taxa were reviewed by Ridsdale (1985), in this paper some details of the shoot architecture of *F. emanuelssoniana* were given. The delimitation of the genera *Oxyceros*, *Fagerlindia* and *Benkara* is at present vague and generic position of many “*Randia*” species of mainland S. E. Asia difficult to ascertain. One of the major problems is that the majority of the herbarium collections consist only of small sections of the lateral, probably plagiotropic branches, sterile portions of the apex of the orthotropic shoot, or reiteration shoots are rarely collected. *Oxyceros* is predominantly Malesian in distribution .

Wong (1984) gives a good account of the two types of growth form of branches of the Malaysian taxa of *Oxyceros*.

ARCHITECTURE OF OXYCEROS

The architecture of the group of species with short recurved thorns (modified short shoots) is illustrated in fig 10a (Wong 1984) and Fig 1 c

(Robbrecht & Puff (1986) The orthotropic shoot shows sequential development of the plagiotropic shoots bearing the recurved spines. Sometimes the orthotropic shoot has a leaf bearing node where no plagiotropic shoot develops. Flowering is terminal on the plagiotropic shoot, and sympodial branching follows.

The taxa with fang-like thorns (modified short shoots) have a comparable architecture see Wong (1984) fig.10b) and Fig 1 d (Robbrecht & Puff (1986). Here the orthotropic branch has nodes which only bear stipules and bract-like leaves situated between the nodes bearing plagiotropic branches. The apical bud of the plagiotropic shoot on some branches becomes vegetatively inactive (it could later abort or produce an inflorescence) and the two axillary buds continue growth by sympodial branching.

No collections of an orthotropic apex of any non-armed species have been seen.

In all of the climbing species of *Oxyceros* in Malesia, where thorns are developed, there is no development of short shoots from a serial bud below the thorns.

Yamazaki (1970) was the first to attempt to transfer a straight-thorned taxa, *Randia rectispina*, into the genus *Oxyceros*. This is a shrub or tree

species. The limited collections of *Oxyceros rectispina* that I have examined all show the development of a short shoot from the serial bud below the spine. Tirvengadam followed Yamazaki in placing this species in the genus and also transferred *Randia hoaensis* Pierre ex Pitard to *Oxyceros*. These two species clearly deviate from most Malesian taxa, except *Randia miquelii*. On herbarium labels Tirvengadam considers this to be an *Oxyceros* species related to *O. rectispina*.

ARCHITECTURE OF FAGERLINDIA

The architecture of *F. emanuelssoniana* is described and illustrated by Ridsdale (1985).

One collection of *F. microcarpa*, *ISU (Ridsdale, Dejan & Baquiran) 284* includes an orthotropic apex and a reiteration shoot. Here, again, the orthotropic axis has two nodes between those bearing the plagiotropic shoots which have two normal leaves. In this collection spines are not developed on the plagiotropic shoots and there is no visible short shoot development. In other collections of this species, e.g. *BS (Edano) 78226* spines and short shoots are present. The situation is comparable to that found in *F. emmanuelsonii*, although in this species the short shoots are infrequent on the material.

Plagiotropic shoots on herbarium material of *Fagerlindia fasciculata*, the type species of the genus, generally show spines below which a short shoot develops. It is considered that the collection *Geesink, Hattink & Phengkklai 6615* represents a portion of the orthotropic shoot, or a reiteration shoot, here a serial bud below rapidly develops into a short shoot, or it may develop into a normal plagiotropic branch, as illustrated by Wong (1984)

It would appear that *Levine 473 (GH)* may represent an orthotropic shoot of *Fagerlindia sinensis*. Here growth is intermittent; two leaf-bearing nodes occur on the orthotropic shoot, two plagiotropic shoot nodes follow. On other collections of the same species, a serial bud below the spine develops either into a short shoot, or repeats the plagiotropic branching system. All of the examined taxa of *Fagerlindia* have straight spines, below which is a bud, which may develop into a shoot, or an inflorescence. On the upper nodes of the plagiotropic shoot the upper serial bud does not develop directly into a spine but into an inflorescence. The inflorescences are also terminal on the plagiotropic branches – sympodial branching then follows.

There is an excellent picture of *Fagerlindia depauperata*, taken by Mr. Antonie van den Bos (see <http://www.botanypictures.com>) in the Xishuanbanna tropical botanical garden, which clearly shows the architecture of a young plant.

ARCHITECTURE OF “RANDIA” MIQUELII

Two specimens of this species have been seen which bear orthotropic shoots, *Kuswata 254* and *Kostermans & Wirawan 77*. The main orthotropic axis has 2(—4) leaf-bearing nodes between each node bearing a pair of plagiotropic shoots. Initially there is no development of the serial bud below the spines on the plagiotropic shoots, however these are present on portions of older plagiotropic branches of the collection *Kuswata 254*.

Flowering is terminal on the plagiotropic shoot, or terminal on the short shoots. The habit of this species has long been unknown but Kuswata records it as a small shrub. The habit is comparable to *Oxyceros rectispinus*.

ARCHITECTURE OF BENKARA

The collection *Ridsdale 2116* is one of the few specimens seen where the shoot orientation is obvious. The orthotropic axis bears plagiotropic branches in 2's or 3's and is devoid of all thorns. Between each level of origin of the plagiotropic axis the orthotropic axis has 2 leaf-bearing nodes. The plagiotropic axis bears pairs of leaves with thorns above, pairs of leaves with short shoots, or when the apex ceases growth, a pair of leaves and two lateral branches. There seems to be no development of a short shoot below the pairs of thorns.

Basically the bud in the leaf axil either develops directly into a thorn, a short shoot or an inflorescence, or a branch shoot. This situation seems to apply to all of the herbarium material of *B. malabarica* deposited in the National Herbarium Netherlands, Leiden Branch. The inflorescence is, therefore never terminal on the plagiotropic shoot. This may always be the case but better collections are required from the apex of the orthotropic shoot and including a range of plagiotropic shoots.

At present *Benkara* is very difficult to distinguish and delimit against the species of *Fagerlindia* with a short corolla tube, viz. *F. depauperata* (Drake) Tirveng. and *F. esculenta* (Lour.) Tirveng. and from some, as yet, unplaced

species of *Randia* such as *R. forrestii* Anth. and *R. hainanensis* Merr. At least the latter two species have short straight thorns below which a short shoot develops. Tirvengadam, Taxon 32 (1983) 441 suggests three species of "*Randia s. l.*" viz. *R. elliptica* Geddes, *R. evanosa* Hutch. and *R. ovoidea* Pierre ex Pitard which after further investigation may prove to belong to *Benkara*. The type specimen of *R. evanosa* Hutch. has well-developed short shoots below the thorns comparable to that typical for *Fagerlindia*.

DISCUSSION

As far as can be judged there is no difference in the basic organisation of the orthotropic shoots in the genera and species discussed above. The plagiotropic branches develop from the orthotropic axis and may be separated from each other by 0—2(—4) nodes which bear bracts or normal leaves.

Benkara is the odd genus as here there appears to be one bud at each of the leaf axils, which variously develops into thorns, short shoots or inflorescences, or lateral plagiotropic branches. At present it is monotypic. Tirvengadam (1983) has noted some other Asiatic species of "*Randia*" that, after further study, may belong to *Benkara*. Of these *Randia evanosa* Hutch. would seem to have more affinity to *Fagerlindia* having the thorns and short shoot structure of this genus.

The genera *Oxyceros* and *Fagerlindia* are closely related, the latter genus has the potential to develop a short shoot from a serial bud below the thorn this is often present in herbarium material of older branches when the thorns are well-developed. *Oxyceros* in Malesia never develops short shoots from a serial bud below the thorns, nor from any other bud on the plagiotropic axis, where thorns occur in *Oxyceros* they are recurved or fang-like. "*Fagerlindia*" generally has straight thorns sometimes these are slightly curved. This is particularly obvious in some collections of *F. sinensis*. Thus, there are very few characters to separate *Oxyceros* from *Fagerlindia* as currently defined. At present it would appear that two species with straight thorns, *O. rectispinus* (Merr.) Yamazaki and *O. hoensis* (Pierre ex Pitard) Tirveng. (no material seen) should be transferred to "*Fagerlindia*." *Randia miquelii*, also a small shrub or tree, belongs to this alliance. The core species at present placed in "*Fagerlindia*" then have long corolla tubes, the exceptions are *F. depauperata* and *F. esculenta*.

Unfortunately Tirvengadam has not treated all of the S. E. Asian taxa of "*Randia*", some remaining as insufficiently known taxa. Based on the character of a short shoot below the thorns then *R. forestii* Anth., *R. hainanensis* Merr., and *Oxyceros evanosa* (Hutch) Yamazaki, all with short corolla tubes would appear to belong to the genus "*Fagerlindia*." However, apparently only the presence of the short shoots below the spines separates these taxa from *Benkara*. Clearly the corolla tube length cannot be significant as in *Oxyceros* the type species, *O. horridus* has a corolla tube shorter than the corolla lobes as is the case in *O. rugulosa* and *O. vidalii*, all of the remaining Malesian species have long corolla tubes. As noted above the same situation occurs in the taxa presently placed in "*Fagerlindia*." The character of the connate bracts of the inflorescence is present in all taxa under consideration, only being obvious in *Benkara* where the bract detaches in a circumscissile manner and remains around the fruit peduncle. Such a character also occurs in *R. miquelii*. The degree of development of hairs in the throat of the corolla, is difficult to evaluate as *Benkara* currently is monotypic. Compared to larger genera within the *Gardenieae* it is unlikely to be a character that can be used at generic level

Clearly one can ask the simple question can *Fagerlindia* be retained as distinct from *Benkara* on account of apparently different shoot architecture? Further studies on the lesser known Asiatic taxa are required to answer this question. For this, more material and better quality collections are required, particularly of some of the rarer species. These taxa have not been treated by Tirvengadam, understandably due to the scant material available. The present work was orientated towards solving the taxonomy of some Malesian taxa but it is clear that after some 15 years since the publication of *Fagerlindia* there are numerous problems in generic delimitation. It seems logical to include *Fagerlindia* in the synonymy of *Benkara*.

The relationships of the thorny species of "*Randia*" from Australia to *Fagerlindia* also need to be evaluated. Puttock Thesis (1992) has proposed a new genus to accommodate these taxa. In my opinion some of these are more closely related to a group of New Guinea taxa which includes "*Randia*" *ixoraeflora* Wernh. and "*Randia*" *debruynii* Val., an isotype of the latter has a pair of spines. This group seems to be different from the Malesian species (incl. *F. emanuelssoniana*) of *Fagerlindia*, particularly as the spines are commonly present only on juvenile material and

are rarely seen in the herbarium.

OXYCEROS

OXYCEROS Lour.

Fl. Cochinch. 151. 1790. Type species: *O. horridus* Lour.

Scandent climbers. Lateral, plagiotropic, branches armed with paired recurved or retrorse thorns or unarmed. Stipules broadly triangular to ovate. Leaves opposite. Inflorescence pseudo-axillary or subterminal appearing unilaterally on alternate nodes. Flowers bisexual. Calyx infundibular, shortly lobed. Corolla salverform, tube longer or shorter than the lobes. Anthers exerted. Style exerted, stigmatic lobes adherent. Ovary 2-locular, ovules numerous. Fruit globose to ellipsoidal, wall thin. Seeds immersed in a pulpy matrix.

DISTRIBUTION. S. E. Asia and Malesia

Key to the species

- 1.a. Plagiotropic branches devoid of any kinds of hooks.....2
- b. Plagiotropic branches with hooks, these paired along the branch, or fang-like.....4
- 2.a. Corolla tubes 10 mm or more long. Lamina hairy below. Borneo.....1. *O. kessleriana*
- b. Corolla tubes up to 5 mm long. Lamina glabrous below. Continental S.E. Asia.....3
- 3.a. Calyx tube broadly campanulate 2 mm long. Sri Lanka.....2. *O. rugulosus*
- b. Calyx narrowly tubular, 3 mm long. Vietnam.....3. *O. vidalii*
4. a. Plagiotropic branches with recurved spines arranged in pairs along the axis.5
- b. Plagiotropic branches with a basal pair of - recurved, fang - like hooks and sometimes with 1—2 pairs of recurved hooks above these.....11
- 5.a. Corolla tube short, up to 5 mm long, equalling or shorter than the corolla lobes.....4. *O. horridus*
- b. Corolla tube more than 5 mm, longer than the corolla lobes.....6
- 6.a. Leaves densely hairy below. Sumatra.....9. *O. jasminiflorus*
- b. Leaves glabrous to sparsely pubescent below.....7
7. a. Tertiary venation distinct and clearly visible below. Malay peninsula.....5. *O. penangianus*
- b. Tertiary venation indistinct, sunk in the lamina.....8
8. a. Calyx and hypanthium densely yellowish tomentose. Secondary veins impressed on the upper surface of the leaf12. *O. pubicalyx*
- b. Calyx and hypanthium glabrous or pallidly shortly pubescent. Secondary veins flat or slightly raised on the upper surface of the leaf.....9
- 9.a. Calyx lobes shortly triangular to obtuse or repand. Corolla lobes 4—6 mm wide. Leaves generally 9—17 x 4—7 cm. Predominantly inland forest of N. E. India and Andaman Is, Myanmar, Thailand.....6. *O. kunstleri*
- b. Calyx lobes distinctly narrowly triangular. Corolla lobes 2—3 (-5) mm wide. Leaves generally 3—8(-12) x 2.5—4 (-5.5) cm. Predominantly mangrove and swamp forest or inland in Java, Bali, Sumba.....10
- 10.a. Leaves below with glabrous domatia. Cymes 5—20 flowered, hypanthium and calyx glabrous. Common in mangrove and swamp forest.....7. *O. longiflorus*
- b. Leaves below with densely pubescent domatia. Cymes 3—10 flowered, hypanthium and calyx conspicuously sparsely pubescent. Lowland inland forest in Java, Bali, Sumba.....8. *O. patulus*
- 11.a. Calyx tube 7—12 mm long. Corolla lobes 7—13 mm broad. Fruit 20—35 mm diam. Malay Peninsula, Sumatra, Java, S. Borneo.....10. *O. drupacea*
- b. Calyx tube 4—5 mm long. Corolla lobes 4—5 mm broad. Fruit less than 15 mm diam. Throughout Malesia.....11. *O. bispinosa*

1. *Oxyceros kessleriana* Ridsdale, *spec. nov.*

Liana grandis inermis. Folia ovata ad elliptica 10—20 cm longa 4—9 cm lata infra pubescentia. Inflorescentia condensata 1—1.5 cm longa. Corollae tubus 10—12 mm longus. Fructus ad 8 mm diam. Typus: *Van Balgooy 6137 (L, holo; Wanariset iso)*

Large unarmed climber to 18 m., stem to 4 cm diameter. Stipules not seen. Leaves ovate to elliptic, (10—)14—18 (—20) x (4—) 6—8(-9) cm, subcoriaceous, above glabrous, below pubescent over whole lamina, apex acute to acuminate, base acute to cuneate, lateral nerves 6—8 pairs, petiole 1—2 cm long. Inflorescence compact, 1—1.5 cm long. Flowers mostly still in bud. Calyx and hypanthium 5—6 mm, sparsely hairy, calyx tubular 3—4 mm, minutely denticulate, corolla tube 10—12 mm, lobes oblong 5 mm, very slightly hairy outside at the base. Filaments up to 3.5 mm, anthers elliptic-oblong 6—7 mm. Style up to 10 mm long, stigma clavate to fusiform 3 mm. Fruits globular up to 8 mm diameter.

DISTRIBUTION. Borneo, Kalimantan

REPRESENTATIVE MATERIAL. *Ambri & Arifin W383*, *Van Balgooy 6137*.

2. OXYCEROS RUGULOSUS (Thw.) Tirveng.

Griffithia rugulosa Thw., Enum. Pl. Zeyl. (1859) 159.—*Randia rugulosa* (Thw.) Bedd., For. Man. Bot. (1871) 133.; Hook. f., Fl. Brit. Ind. 3 (1880) 113; Trimen, Handb. Fl. Ceyl. 2 (1894) 331.—*Aidia rugulosa* (Thw) Tirveng., Ceylon Journ. Sci. 14: 3. 1981.—*Oxyceros rugulosus* (Thw.) Tirveng. Nordic Journ. Bot. 3 (1983) 466.; Ridsd., Rev. Handb. Fl. Ceylon 12 (1998) 184.—Type: Sri Lanka, *Thwaites C.P. 245*.

Large unarmed climber. Stipules triangular 2—4 mm long. Leaves elliptic, 6—12 x 3—5 cm, coriaceous, above and below glabrous, apex acute, base acute, lateral nerves 5—7 pairs, petiole up to 1.5 cm. Inflorescence up to 6 cm long. Calyx and hypanthium 5 mm, covered with adpressed brown hairs, calyx campanulate 2 mm, minutely denticulate, corolla tube 5 mm, lobes oblong 8 mm, glabrous, reflexed. Filaments short 0.5 mm, anthers linear 5 mm, reflexed. Style 7 mm, stigma clavate 4 mm. Fruit not seen.

DISTRIBUTION. Endemic to Sri Lanka

3. OXYCEROS VIDALII Tirveng.

Oxyceros vidalii Tirveng., Nordic. J. Bot 3 (1983) 464, Fig 3 nos 6—13. Type : *Poilane 29400* (P. - n.v.)

Large unarmed climber to 25 m. Stipules broadly triangular up to 3 mm long. Leaves ovate, elliptic to broadly lanceolate 8—14(—18) x 4—6.5 (—7.5) cm, subcoriaceous, above and below glabrous, apex acute to acuminate, base acute to cuneate, lateral nerves 5—7 pairs, petiole 1—2 cm long. Inflorescence 5—7 cm long. Calyx and hypanthium 4—5 mm, sparsely hairy, calyx tubular 3 mm, minutely denticulate, corolla tube 5 mm, lobes oblong 9 mm, glabrous, reflexed. Filaments up to 3.5 mm, anthers elliptic-oblong, 6 mm, reflexed. Style up to 10 mm long, stigma clavate to fusiform 5 mm. Fruits globular up to 1 cm diameter.

DISTRIBUTION. Endemic to Vietnam

4. OXYCEROS HORRIDUS Lour.

Oxyceros horridus Lour., Fl. Cochinch (1790) 151.—*Randia horrida* (Lour.) Schultes in Roem. & Schultes, Syst 5 (1819) 248.—*Randia longiflora* Lam. var. *horrida*

Pierre ex Pitard, Fl. Gén. Indo-Chine 3 (1923) 243.—Type: *Loureiro s.n.* (B.M. -n.v.).

Griffithia siamensis Miq., Ann. Mus. Bot. Lugd. Bat. 4 (1869) 130.—*Webera siamensis* (Miq.) Kurz, For. Fl. Burma 2 (1877) 48.—*Randia siamensis* (Miq.) Craib, Kew Bull. (1911) 390—Type: *Teysmann s.n.*, Kanburi (n.v.).

Randia uncata Ridl., Journ. Str. Br. Roy. As. Soc. 59 (1911) 113.—Type: *Keith 101* (n.v.)

Climber, with recurved hooks on the plagiotropic shoots. Stipules triangular 3—5 mm long. Leaves (narrowly-) elliptic, 6—12 x 2—6 cm, above and below glabrous, apex acute, base rounded to acute, lateral nerves 5—7 pairs, petiole up to 2 cm. Inflorescence up to 4.5 cm long. Calyx and hypanthium 6 mm, calyx 4 mm, outside glabrous, lobes obovate, minutely toothed from the keel, hypanthium 2 mm, glabrous, corolla tube 4—5 mm, lobes elliptic 5—6 x 1.5—2 mm. Filaments short, anthers linear 4—5 mm Style exerted 5—8 mm, stigma clavate 4—5 mm. Fruit globose, 5—8 mm diam.

DISTRIBUTION. Myanmar, Thailand, Laos, Cambodia, Vietnam.

REPRESENTATIVE MATERIAL. *Pierre 3211, 3811, Larsen & Larsen 34324, Niyomatham et al. 1061, Phengnaren 32088*.

5. OXYCEROS PENANGIANUS (King & Gamble) Tirveng.

Randia penangiana King & Gamble., J. As. Soc. Beng. 72 (1903) 213; Ridley, Fl. Malay Pen. 2 (1923) 72.—*Oxyceros penangianus* (King & Gamble) Tirveng., Nord. J. Bot. 3 (1983) 466; Wong, Malay Nat. J. 38 (1984) 39—Lectotype (Wong 1984), *Curtis 927* (Sing.,-holo barcode SING 0001137, K-iso).

Large climber, with recurved hooks on the plagiotropic shoots. Stipules narrowly triangular, apex acuminate 2.5—3.5 mm long. Leaves broadly elliptic (4—) 5—9 (—12) x (2—) 4—6(—7) cm, above glabrous, below glabrous to sparsely pubescent, particularly on the lateral nerves, apex acute, base acute to obtuse, sometimes unequal, lateral nerves 4—7 pairs, tertiary venation clearly visible, domatia hairy, petiole up to 1 cm. Inflorescence up to 1 cm long. Calyx and hypanthium 6—9 mm, glabrous, calyx 3.5—4.5 mm, lobes shortly triangular, 0.7—1 mm long,

hypanthium 3—5 mm, corolla tube 20—30 mm, lobes broadly ovate, 10—14 x 8—10 mm, margins ciliate. Filaments short, anthers linear 4—6 mm. Style exerted 2-4 mm, stigma clavate, bilobed. Fruit 10—15 mm diameter.

DISTRIBUTION. Malay Peninsula

REPRESENTATIVE MATERIALS. *see Wong 1984 + FRI 16080 (Kochummen); King 10171; Scortechini 1538 ; SFN 2528 (Achmed , 29333 (Corner)(K).*

6. OXYCEROS KUNSTLERI (King & Gamble) Tirveng.

Randia kunstleri King & Gamble., J. As. Soc. Beng. 72 (1903) 216; Ridley, Fl. Malay Pen. 2 (1923) 74.—*Oxyceros kunstleri* (King & Gamble) Tirveng., Nord. J. Bot. 3 (1983) 466; — Lectotype (mihi), *Wallich 8284 C* (K.-Wall.)

Posoqueria longiflora Roxb., Fl. Ind. 2 (1824) 568; ed. 2, 1 (1832) 718 [non *R. longiflora* Lam.]

Randia longiflora Lam. var. *major* King & Gamble., J. As. Soc. Beng. 72 (1903) 213. — *Randia pauciflora* Ridl. Journ. Str. Br. Roy. As. Soc. 59 (1911) 112. — Type: *Curtis s.n.*, 6/1893 Pungah { *Pang-ngā Pûket Thailand* } , *Herb Sing Sheet 061816 (SING-holo.bar coode SING 0001136)*

Randia klossii Ridl., J. Fed. Malay Str. Mus. 10 (1920) 94.— Type: *Kloss & Robinson 6872. (SING -holo, barcode SING 0001135, iso-K).*

Oxyceros 'horrida' auct.: Wong, Malay Nat. J. 38 (1984) 39 pro parte

Climber, with recurved hooks on the plagiotropic shoots. Stipules triangular, 4 —5 mm long, keel slightly acicular. Leaves elliptic, (6—) 9 —14 (—18) x (3—) 4 —7(—11) cm, above and below glabrous, apex acute to slightly acuminate, base acute to obtuse, lateral nerves 4 —6 pairs, tertiary nervation indistinct, domatia glabrous, petiole up to 1.5 cm. Inflorescence up to 2 cm long. Calyx and hypanthium 5—8 mm long, calyx somewhat campanulate, 3—4 mm long, glabrous, lobes shortly triangular, 0.8—1 mm long, hypanthium 2 mm, glabrous, corolla tube (23—)25—32 mm long, lobes 9—12(—15) x 4—6 mm, glabrous. Filaments short, anthers linear 4 mm, included. Style slightly protruding from corolla tube, stigma clavate, 3—4 mm. Fruit globose, (8—)10—15(—20) mm diameter.

DISTRIBUTION. India, Andaman Is; Myanmar; Thailand; Malay Peninsula, Lankawi Is.

REPRESENTATIVE MATERIAL. Andaman Is.: *Balakrishnan, N. P. 393, Bhargave, N. 2425, 2442, 4139, 4224, 4388, Nair, N. G. 871, 1049, 3671, Prain's collector 21.* Continental India: *Bor, N.L. 18543 Falconer, H. s.n., Griffith KD 2804, Hook.f. & Thomson s.n., Jenkins s.n., Koelz, W.N. 24897, Simons s.n.* Thailand: *Geesink & Santisuk 5016, Geesink et al 7319, 7598, Kerr, A.F.G. 17851, Larsen & Larsen 30647.*

7. OXYCEROS LONGIFLORUS (Lam.) Yamazaki

Randia longiflora Lam., Encycl 3 (1789) 26; King & Gamble, J. As. Soc. Beng. 72 (1903) 212; Ridley, Fl. Mal. Pen. 2 (1923) 73. — *Gardenia multiflora* Willd., Sp. Pl. 1 (1798) 1231 nom. illeg. (includes type of *R. longiflora* Lam.)—*Posoqueria multiflora* (Willd.) Bl., Bijdr. Fl. Ned. Ind. (1826) 980.—*Randia multiflora* (Willd.) Koord. & Val., Bijdr. Boom. Java 8 (1902) 88 — *Oxyceros longiflorus* (Lam.) Yamazaki, J. Jap. Bot. 45 (1970) 339.— Type: *Sonnerat s.n., Java (P-LA -n.v.).* [Lectotypification of Wong 1984 rejected, irrelevant to Lamarck's protologue and incorrect type].

Griffithia palembanica Miq., Fl. Ind. Bat. Suppl. Sum. (1862) 541. — Type: *Junghuhn s.n., Palembang, Merangat* (U, L-fragment).

Randia longiflora Lamk. var. *ovoidea* Pitard Fl. Gén. Indo-Chine 3 (1923) 235.— Syntypes: 9 cited.

Large climber, with recurved hooks on the plagiotropic shoots. Stipules triangular 2.5—5 mm long. Leaves ovate to elliptic (3—) 5—8 (—14) x (2—) 2.5—4 (—6) above and below glabrous, apex acute, base acute to obtuse, sometimes unequal, lateral nerves 4—6 pairs, petiole up to 1 cm. Inflorescence up to 1.5 cm long. Calyx and hypanthium 5—7 mm, calyx somewhat campanulate, 3—4 mm long, usually glabrous, sometimes with a few scattered hairs, lobes (narrowly—)triangular, 0.5—1 mm long, hypanthium 2—3 mm, glabrous, corolla tube (15—) 20—25 mm, outside glabrous, lobes ovate to elliptic, 6—10 (—12) x 3—5 mm, glabrous. Filaments short, anthers linear, 3—4 mm. Style exerted 2—5 mm, stigma clavate, 2—3 mm, bifid at the apex. Fruit ellipsoidal to globose, 8—12 mm diam.

NOTE. There is one unusual collection *SAN 19140 (D.I. Nicholson, 11.2.1960)* from disturbed forest of the inner fringe of mangroves at Cpt 13 near the landing Sepilok Forest Reserve. The loose fruits with the specimen are ellipsoidal, 40 x 20 mm.! (such dimensions only known in *O. drupacea*), the vegetative characters correspond in all other respects to *O. longiflora* which is recorded from the area.

HABITAT. Nearly all recent collections have come from mangrove or swamp forest, sometimes also riverine forest.

DISTRIBUTION. ? Vietnam & Cambodia (exact distribution unknown due to confusion with *O. horridus*), Peninsular Thailand, Malay Peninsula, Sumatra, Java, Lesser Sunda Is., Borneo.

REPRESENTATIVE MATERIAL. (*Malay Peninsula see Wong 1984*). *Ambri & Arifin* AA 402; *Arbainsyah* AA 1845; *BRUN* 950 (*Ashton*), *BRUN* 5148 (*Ashton*); *Bunnemeijer* 1365, 6452; *Buwalda* 6616, 6818; *Clemens, M.S.* 11265; *Cult. Hort. Bog X.G.127, XVII.C.87, XVII.C.75, X.G.91*; *De Voogd* 138; *Dransfield*, 4340; *Elmer* 20059; *Gianno* 307; *Hallier* 633, 1023; *Kessler et al* 1396; *Kostermans & Anta* 373; *Larsen* 33068; *Lesger* 247; *Lorzing* 13166; *Maxwell* 77 386, 78 8; *Md Shah & Nur*, *MS* 767; *Ogara* 10698; *PBU* 382 (*Ridsdale*); *Polak* 716; *Phyto.survey Malaya KL* 3569; *Puff et al* 900827 2/2; *Salleh KMS* 2423 B; *SAN* 19140 (*Nicholson*), *SAN* 19175 (*Meijer*), *SAN* 31721 (*Muin Chai*), *SAN* 62885 (*Zain*), *SAN* 78670 (*Mandani*), *SAN* 84365 (*Bidin*), *SAN* 87084 (*BSC et al*), *SAN* 90300 (*Aban & Patrick*), *SAN* 107876 (*Amin Gambating*), *SAN* 111358 (*Madani & Ismail*), *SAN* 130299 (*Meijer & Good*); *SAN Nbfd* 3354 (*Melegrito*), *SAN Nbfd* 3716 (*Balajadia*), *SAN Nbfd* 7344 (*Enggoh*), *SAN Nbfd* 10208 (*Enggoh*), *SAN Nbfd* A 2174 (*Kadir*), *SAN Nbfd* A 2729 (*Kadir*); *S.(arawak)* 24539 (*Sibat ak Luang*), *S.* 26738 (*Chai et al*), *S.* 40095 (*Jugah ak Kudi*), *S.* 42282 (*Yii Puan Ching*); *Schmutz* 1884; *Simpson* 2014, 2581; *Sugau JBS* 172; *Van Niel* 3977, 4261; *Verheijen* 1176-8, 3094, 3322, 3334.

8. *Oxyceros patulus* (Horsf. ex R. & S) Ridsdale, *comb. nov.*

Gardenia patula Horsf. ex Roemer & Schultes, *Syst. Veg.* 5 (1819) 244—*Randia patula* (Horsf. ex R. & S.) *Miq.*, *Ann. Mus. Lugd. Bat.* 4 (1869) 235—Type: *Horsfield s.n.* (K).

Large climber, with recurved hooks on the plagiotropic shoots. Stipules triangular, 2—4 mm long. Leaves ovate to elliptic, (2—)3—6.5 (—9) x (—1.5) 2.5—3.5(—5) cm, above glabrous, below sparsely to pubescent, particularly on the nerves, apex acute to acuminate, base acute to obtuse, sometimes unequal, lateral nerves 4—5 pairs, tertiary venation visible, domatia hairy, petiole 0.5—1 cm. Inflorescence up to 1.5 cm long. Calyx and

hypanthium 6 mm, conspicuously pubescent, calyx somewhat campanulate, 4 mm, sparsely to densely pallidly pubescent, hypanthium 2 mm densely pubescent, corolla tube 20—30 mm, lobes narrowly elliptic, 10—14(—20) x 2—3(—5) mm, glabrous. Filaments short, anthers linear 3—4 mm. Style exerted 2—4 mm, stigma clavate, bifid at apex.. Fruit ellipsoidal to globose, 6—10 (—12) x 6—8 (—14) mm.

NOTE. Very closely related to *O. longiflorus*, differing particularly in the vegetative characters. Apparently growing at inland localities, once recorded on calcareous rocks.

DISTRIBUTION. Java, Bali, Sumba.

REPRESENTATIVE MATERIALS. *Ake* 200; *Altmans* 581; *Backer* 17344; *Backh.v.d.Brink* 5734, 7535; *Cult.Hort.Bog. X.G.124, XVII.C.75*; *De Voogd* 2239; *Hallier* 360, 463, 713, 1039; *Hochreutiner* 1869; *Lütjeharms* 5022; *Van Steenis* 10491; *Widjaja* 103.

9. *Oxyceros jasminiflorus* (S.Moore) Ridsdale, *comb. nov.*

Randia jasminiflora S. Moore, *J. Bot. (Suppl.)* 63:50. —Type: *Forbes, Sumatra* 1371. (BM).

Climber, with recurved hooks on the plagiotropic shoots. Stipules triangular 2—3 mm long, outside densely pubescent, slightly keeled. Leaves elliptic to ovate-oblong, (6—) 8—10 x (2.5—) 4.5—5 cm, above glabrous, below densely pubescent, apex acute to shortly acuminate, base obtuse, lateral nerves 5—6 pairs, domatia absent, petiole up to 7 mm. Inflorescence axis up to 1 cm long. Calyx and hypanthium 6 mm, narrowly tubular, calyx 4.5—5 mm, outside densely pubescent, lobes narrowly triangular, 0.7—1 mm, hypanthium 2 mm, densely pubescent, corolla tube 27—30 mm long, outside sparsely to mediumly pubescent, particularly in upper 2/3, lobes 10 x 2 mm, glabrous. Filaments short, anthers linear 5 mm. Style slightly exerted from throat, 32 mm, stigma clavate, bilobed 4 mm long. Fruit not seen.

DISTRIBUTION. Sumatra (only known from the type).

REPRESENTATIVE MATERIALS. *Forbes, Sumatra 1371*. (BM).

10. *Oxyceros drupacea* (Gaertn.) Ridsdale
comb. nov.

Posoqueria drupacea Gaertn.f. Fruct. Sem. Pl. 3 (1791) 77 tab.195 fig.1. — *Randia drupacea* DC., Prodr. 4 (1830) 389. Type: Unknown collector (L) Barcode L 0001756

Tocoyena scandens Blume, Bijdr. Fl. Ned. Ind. (1826) 980. — *Randia scandens* (Bl.) DC. Prodr. 4 (1830) 387. non (Thunb.) Lam.—*Oxyceros scandens* (Bl.) Tirveng., Nord. J. Bot. 3 (1983) 466; Wong, Malay Nat. J. 38 (1984) 42. — Type: *Blume, s.n.* (L).

Gardenia curvata Teijsm. & Binn., Kruidk. Arch. 3 (1855) 403.—*Griffithia curvata* (Teijsm. & Binn.) Kurz, J. Bot. 4 (1875) 326—*Randia curvata* (Teism. & Binn.) Val., Icon. Bogor. 2 (1904) t.146; Backer & Bakh.f., Fl. Java 2 (1965) 311. — Type: not indicated

Randia clarkei King & Gamble, J. As. Soc. Beng. 72 (1903) 1 213; Ridley Fl. Malay Pen. 2 (1923) 72. — Lectotype (Wong 1984) *Wallich Cat 8284D, parte "1849" -viz sheet 2.* (K-Wall).

Large climber, with 1—2(—3) fang-like hooks on the plagiotropic shoots. Stipules triangular (2—) 3—5 mm long. Leaves ovate to elliptic, (8—) 10—15 (—18) x (4—) 6—8.5 (—10) cm, above and below glabrous, apex acute, base obtuse, rarely acute, sometimes unequal, lateral nerves 4—6 pairs, tertiary nerves indistinct, domatia glabrous, petiole up to 2 cm. Inflorescence up to 1.5 cm long. Calyx and hypanthium 8—10(—12) mm, glabrous, calyx tubular 6—12 mm, undulate to minutely denticulate, margins hairy, hypanthium 4—6 mm, corolla tube (30—) 35—35 (—50) mm, glabrous, lobes elliptic (12—) 15—25 (—30) x (4—) 8—10 (—12) mm, glabrous. Filaments short, anthers linear 4—6 mm. Style exerted 5 mm, stigma clavate, bilobed. Fruit ellipsoidal to ovoidal, 25—40 x 20—35 mm.

DISTRIBUTION. Andaman Is., Nicobar Is. Malay Peninsula, Sumatra, Java, S. Borneo.

REPRESENTATIVE MATERIAL. (*Malay Peninsula see Wong 1984*). *Ambri & Arifin W258A; Amdjah 889; Backer 10596; Bhangara, N. 1928; Chakraborty, P. 2187, 2221, Cult. Hort. Bog. X.G.65, XVII.C.93; Endert 2655; Hochreutiner 2559; Jacobs 8473; Koorders 33417b; Kostermans 4124, 9780; Kostermans & Anta 866; Leeuwenberg 13150; Mochtar 114A; Sangkhachand 1966; Schiffner 2703; Soegandiredja 300.*

11. *Oxyceros bispinosa* (Griff.) Tirveng.

Stylocoryne bispinosa Griff., Not. 4 (1854) 260.—*Randia bispinosa* (Griff.) Craib, Fl. Siam Enum. 2 (1932) 99.—*Oxyceros bispinosa* (Griff.) Tirveng., Nord. J. Bot. 3 (1983) 466.—Type: *Griffith 869* (not traced. Note: There seems to be no type specimen of *Griffith 869* at Kew, only *Griffith 856*.)

Stylocoryne junghuhniana Miq., Ann. Mus. Lugd. Bat. 4 (1869) 237.—*Randia junghuhniana* (Miq.) Bakh.f., Fl. Java 2 (1965) 311.— Type *Junghuhn s.n.* (L. — barcodeL 0057617).

Randia longiflora var. *harmandiana* Pierre ex Pitard, Fl. Gén. Indo-Chine 3 (1923) 235. Syntypes: *Balansa, Batbac, Tonkin; Chevalier, Phu-tho prov., Tonkin; Chevalier, Nghé-an, Annam; Pierre, Bien-Ho, Cochin* (all P. n.v.).

Randia curtisii King & Gamble, J. As. Soc. Beng. 72 (1903) 208; Ridley, Fl. Malay Pen. 2 (1923) 74; Wong, Malay Nat. J. 38 (1984) 43. — Lectotype (Wong 1984) Curtis 3590 (Sing-Holo barcode SING 0001132).

Randia uncaria Elm., Leaflet. Philip. Bot. 1 (1906) 30; Merr. Enum. Philip. Pl. 2 (1923) 529; Merr. & Perry, J. Arn. Arb. 25 (1944) 202.— Type: *Elmer 7001* (n.v.).

Randia fragrantissima Ridl., J. Str. Br. As. Soc. 50 (1908) 115, Ridley Fl. Malay Pen. 2 (1923) 75.— *Oxyceros fragrantissima* (Ridl.) Wong, Malay Nat. J. 38 (1984) 43. — Lectotype (Wong 1984) *Ridley 5664* (Sing-Holo barcode SING 0001133.).

Randia williamsii Elm., Leaflet. Philip. Bot. 3 (1911) 1004. — Type *Elmer 12474* (n.v.)

Randia incurva Ridl., J. Str. Br. As. Soc. 79 (1918) 79; Ridley, Fl. Malay Pen. 2 (1923) 76.— Type: *Curtis 818* (SING-holo barcode SING 0001134).

Large climber, with 1—2(—3) fang-like hooks on the plagiotropic shoots. Stipules broadly triangular 2—3 mm long, usually with a 1—2 mm long acumen. Leaves ovate to elliptic, (6—) 9—14 (—24) x (3—) 4—7 (—15) cm, above and below glabrous, apex acute to acuminate, base obtuse to acute, sometimes unequal, lateral nerves (4—) 5—8 pairs, tertiary nerves usually distinct, domatia glabrous, petiole up to 2 cm. Inflorescence up to 3 cm long. Calyx and hypanthium 5—8 mm, usually with sparse distinct hairs, calyx somewhat campanulate 3—4 mm, lobes shortly triangular up to 0.3 mm, rarely lanceolate up to 3 mm long, hypanthium 1.5—2.5 mm, corolla tube variable (4—) 15—32 mm, glabrous, lobes elliptic (4—) 9—12 (—17) x (2—) 3—6 mm, glabrous. Filaments short, anthers linear 4—6 mm. Style exerted c. 5 mm, stigma clavate, bilobed. Fruit ellipsoidal to ovoidal, (8—) 10—15 (—20) mm diam.

NOTE. In this treatment the taxon is treated as being vary variable in terms of the length of the corolla tube and lobes. In some geographical areas there are limited flowering collections. Wong (1984) notes that in specimens of "*R. curtisii*" cited by King & Gamble the length of the corolla tubes varies from 4—11 mm. Similarly the Philippine specimens of "*R. uncarii*" have corolla tubes which vary from 10—32 mm. Throughout the range of the taxon there are plant collections with short compacted inflorescence axis. In some Javanese collections e.g. UNESCO (*Kostermans*)198 and *Hallier s.n.* 1.11.1896 the calyx lobes are conspicuously elongate-lanceolate. In my opinion these collections only represent extremes of variation of one taxon.

DISTRIBUTION. India, Myamar, Vietnam, Cambodia, Laos, Thailand, Malay Peninsular, Sumatra, Java, Borneo, Philippines, Celebes, New Guinea & Aru Islands

SPECIMENS EXAMINED. Thailand: *Beusekom & Phengkhlai* 433, 1006; *Chanthamuk, A.* 140; *Kerr, A.F.G.*, 16534; *Maxwell, J.F.* 74-557, 75-703; 76-127; *Phengaren, S.* 473; Malay Peninsular: see Wong 1984 sub. *O. curtisii* & *O. fragrantissima* + *FRI* 7134 (*Cockburn*), 28925 (Wong), *Maxwell, J.F.* 82-219, *Phytochemical survey of Malaya* 3496, 3556; *SFN (Henderson)*29638. Sumatra: *de Vogel* 2923; *De Wilde & de Wilde-Duyffes* 20413, 20440, 20796. Java: *Backer, C.J.* 23957; *Bakhuizen v.d.Brink* 7694. *Bueck, J.J. & de Monchy s.n.*; *De Voogd s.n.*, *De Wilde & de Wilde-Duyffes* 21812, *Hallier s.n.*, 198, 382, *Junghuhn s.n.*, *Kostermans* 21871, UNESCO(*Kostermans*) 198; Borneo: *Ambri & Arbainsyah AA* 1725; *Beaman, J.H.* 7085, 10117, *Clemens J. & J.S.* 30494, *Coode, M.J.E.* 6735, *Forman, L.L.* 1049, 1133, *Kessler et al* 1396; *Kostermans* 4211, 5769, *Niga Nanghat NN* 203, *SAN A* 3951 (Wood); *SAN (Singh,J)*24224, (*Aban,F.G.*)31198, (*Aham Talip*) 53062, (*Tangkilip,L.*) 80960, (*Krispinus,F.*) 86684, (*Madani,L.*) 90128, (*Madani,L.*) 90860, (*Lassan,P.*) 93555, (*Mantor,A.*) 122007, *S[arawak](Anderson, J.A.R.* 13278, (*Paie, I*) 31526, (*Chai, P.*) 39659, (*Awa & Paie*)47415, (*Mohtar, A.*)58907 (*Rena, Runi Rantai et al*) 63010 (*Runi, Yii et al*) Philippines: *Avellano, J.* 18, BS [Bureau of Science] (*Ramos, M.*) 1123, (*McGregor*) 12410, (*Ramos, M.*) 20550, (*Ramos,M.*) 24561, (*Ramos & Edano*) 33581, (*Ramos & Passasio*) 34795, (*Ramos, M.*) 41069, (*Ramos & Edano*) 44219, *Ebalo, L.E.* 565, *Elmer, A.D.E.* 7051, 12661, 17365, 17885, FB [Forestry Bureau] (*Alvarez*) 23719, (*Mabesa*) 26835, PNH [Philippines National Herbarium] (*Fox*) 9229, (*Abiguela*) 9590, (*Sulit*) 14453, (*Sulit*) 21671, (*Madulid*) 117965. *Foxworthy, F. W. s.n.*, *Hallier, H.* 4259, 4567, *Merrill, E.D.* 3943, 9301,

Soejarto et al 8587, SMHI (Swedish Match Hilleshög Incorporated] (*Podzorski A.C.*) 792, 823, (*Ridsdale, C. E.*) 177, 189, 320, 381, 1653, *Wenzel, C.A.* 2920, *Williams R.S.* 732. Celebes: *Amir, m.* 102, *Elbert, J.* 3407, *Lam, H.J.* 2698, *Prawiroatmodjo & Maskuri s.n.*, 1358. Moluccas: *Atje* 312, *Rutten* 1713, *de Vogel, E.F.* 3780, 3922. New Guinea: *Brass, L.J.* 7988, *Carr, C.E.* 12631, *van Royen & Sleumer* 7034. Aru Is.: *van Balgooy* 6665, 6784, *Nooteboom, 5951, 5961, 6050, 6665.*

12. OXYCEROS PUBICALYX Wong

Oxyceros pubicalyx Wong, Malay Nat J. 38 (1984) 40 —Type: *Alvins, s.n.*, 3/1885 [*Herb. Hort. Bot. Sing. Sheet no 061829/ barcode SING 0001138*] (SING)

Climber, with recurved hooks on the plagiotropic shoots. Stipules triangular 3—4 mm long. Leaves elliptic to slightly obovate (6—) 8—12 x (3—) 4—4.5 above glabrous, below glabrous to very sparsely hairy on the midrib, apex acute, base acute to obtuse, sometimes unequal, lateral nerves 8—10 pairs, looped at the margin, prominent below, tertiary venation indistinct, petiole 6—9 mm. Inflorescence short, up to 3 cm long. Calyx and hypanthium 9 mm, outside densely yellowish tomentose, hypanthium 2 mm, calyx tube 5—6 mm, lobes subulate 2.5—3 mm long, corolla tube 8—9.5 mm, outside glabrous, inside densely hairy in the upper half, lobes elliptic, 7—8.5 x 1.2—1.8 mm, glabrous. Filaments short, anthers linear, 2—2.5 mm. Style exerted 4—6 mm, stigma clavate, 3 mm, coherent at the apex. Fruit unknown.

DISTRIBUTION. Malay Peninsula (only known from the type).

EXCLUDED SPECIES

1. *Oxyceros rectispinus* (Merr.) Yamazaki = *Benkara rectispina*
2. *Oxyceros hoaensis* (Pierre ex Pitard) Tirveng. = *Benkara hoaensis*
3. *Oxyceros evanosa* (Hutch.) Yamazaki = *Benkara evanosa*
4. *Oxyceros parvula* (Ridl.) Yamazaki = *Benkara armigera*

BENKARA

BENKARA Adans.

Fam 2: 85. 1763.

Fagerlindia Tirveng., Nord. J. Bot. 3 (1983) 58 — Type species: *F. fasciculata* (Roxb.) Tirveng.

Griffithia Wight & Arn., Prodr. Pl. Ind. Or. 399—400. 1834; Tirveng. & Sastra, Bull. Mauritius Inst. 8: 86. 1979. Type species: *G. fragrans* (Roxb.) Wight & Arn.

Shrubs or small trees. Lateral, plagiotropic, branches usually armed with straight spines, when developed the older branches develop a short shoot below. Stipules broadly triangular to ovate. Leaves opposite. Inflorescence borne terminally on the lateral shoots or terminally on the short shoots. Flowers bisexual. Calyx infundibular, shortly lobed. Corolla salverform, tube longer or shorter than the lobes. Anthers partially exerted. Style exerted, stigmatic lobes clavate. Ovary 2-locular, ovules numerous. Fruit globose to ellipsoidal, wall thin. Seeds immersed in a pulpy matrix.

A genus of 19 species in S.E. Asia and Malasia extending to the Philippines (Palawan)

CONSPECTUS OF BENKARA

1. **Benkara armigera** (K.Schum) Ridsdale, *comb.nov.*

Randia armigera K. Schum. in Schmidt, Fl. Koh Chang (1902) 182.—*Fagerlindia armigera* (K.Schum.) Tirveng., Nord. J. Bot. 3 (1983) 456. — Type: *Schmidt 616* (C, n.v.)

Randia parvula Ridl., Journ. F.M.S. Mus. 10 (1920) 94;—*Oxyceros parvula* (Ridl.) Yamazaki, J. Jap. Bot. 45 (1970) 339.— Type: *Kloss 6608* (K).

Randia hirsuta Ridl., Journ. F. M. S. Mus. 10 (1920) 140; Fl. Malay Pen. 2 (1923) 73. Type: *Ridley s.n.*, 2/1917, *Channing Woods, Kelantan* (holo SING- n.v., iso K)

Randia fasciculata var. *velutina* Pierre ex Pitard, Fl. Gén. Indo-Chine 3 (1923) 226.— Syntypes: *Geoffray, Kep, Cambodia; Harmand, Condor, Cochinchine; Hayata, Tin-hoa, Ninh-hoa, Annam; Pierre, Mt. Chuing-diung, prov Tran, Cambodia; Pierre, Song-bé, Cochinchine; Robinson, Nha-trang, Annam; Spire, Keng-trap, Lao; Thorel, Cai-Cong, Cochinchine.* (all P-n.v.).

DISTRIBUTION. Thailand, Cambodia, Lao, Vietnam, Malay Peninsula.

2. **Benkara canthioides** (Champ. ex Benth) Ridsdale, *comb. nov*

Randia canthioides Champ ex Benth. in Kew J. 4 (1852) 94.—*Aidia canthioides* (Champ. ex Benth.) Masam., Trans. Nat. Hist. Formosa 28 (1938) 118.— *Fagerlindia canthioides* (Champ. ex Benth.) Tirveng. ex Ridsd., Blumea 41 (1996) 176. — Type: *Champion s.n.* (K), Hong Kong.

Aidia canthioides var. *lanceolata* Masam., Trans. Nat. Hist. Formosa 29 (1939) 218. — Type: *Masamune s.n.* (n.v.), Taiwan.

3. **Benkara depauperata** (Drake) Ridsdale, *comb. nov.*

Randia depauperata Drake, Journ. de Bot. (Morot) 9 (1895) 217. Tirveng., Nord. J. Bot. 3 (1983) 458— Syntypes: *Balansa 2667, 2668* (K, P-nv); *Balansa 4685; Eberhardt 2618, 2832* (All P-n.v.).

4. **Benkara emmanuelsoniana** (Ridsdale) Ridsdale, *comb. nov.*

Fagerlindia emmanuelsoniana Ridsd., Blumea 31 (1985) 243, fig.2. — Type: *SMHI 1238* (L.).

5. **Benkara esculenta** (Lour.) Ridsdale, *comb. nov.*

Genipa esculenta Lour., Fl. Cochinch. (1790) 149.— *Randia esculenta* (Lour.) Merr., Trans. Amer. Phil. Soc. N.S. 24 (1935) 336—*Fagerlindia esculenta* (Lour.) Tirveng., Nord. J. Bot. 3 (1983) 458. — Type: *Loureiro s.n.* (not traced)

6. **Benkara evanosa** (Hutch.) Ridsdale, *comb. nov.*

Randia evanosa Hutch. in Sargent, Fl. Wilson. 3 (1917) 400.—*Oxyceros evanosa* (Hutch.) Yamazaki, J. Jap. Bot. 45 (1970) 339. — Type: *Henry 10363* (A).

7. **Benkara fasciculata** (Roxb) Ridsdale, *comb. nov.*

Posoqueria fasciculata Roxb., Fl. Ind. 2 (1824) 568 — *Randia fasciculata* (Roxb.) DC., Prod. Syst. Nat. Veg. 4 (1830) 386.—*Fagerlindia fasciculata* (Roxb.) Tirveng., Nord. J. Bot. 3 (1983) 458. — Type *Wallich 8283* (Tirveng. 1982).

8. **Benkara forrestii** (Anth.) Ridsdale, *comb. nov.*

Randia forrestii Anth., Notes Bot. Gard. Edinb. 18 (1934) 204.—Type: *G. Forrest 19367* (iso A)

Randia plumbea Craib, Fl. Siam. Enum. 2 (1932) 111, Kew Bull. (1932) 287.—Type: *Kerr 3141* (K).

Randia hainanensis Merr., Lignan Sci. Journ. 2 (1932) 58.—Type: *Tsang & Fung 45* (iso-A)

9. **Benkara griffithii** (Hook.f.) Ridsdale, *comb. nov.*

Randia griffithii Hook.f., Fl. Brit. Ind. 3 (1880) 112.—Lectotype: *Griffith in Kew. Distr. 2800* (holo-K, L.).

Tarenna borii C.E.C. Fischer, Kew Bull. (1940) 34.—Type: *Bor 2653* (K).

10. **Benkara hoensis** (Pierre ex Pitard) Ridsdale, *comb. nov.*

Randia hoensis Pierre ex Pitard, Fl. Gén. Indo-Chine 3 (1923) 235.—*Oxyceros hoensis* (Pierre ex Pitard) Tirveng., Nord. J. Bot. 3 (1983) 466.—Syntypes: *Harmand s.n.*, *Mekong* (P); *Thorel s.n.*, *Ile de Khon*; *Pierre s.n.*, *Bien-hoa* (all P.-n.v.).

11. **BENKARA MALABARICA** (Lam.) Tirveng. Taxon 32: 440. 1983

Randia malabarica Lam., Encycl. Meth. 3: 25. 1789.—*Stylocoryne pandaki* Vahl ex DC., Prodr. 4: 377. 1830, nom. superfl. (incl. type *R. malabarica* Lam.). *Benkara galia* Raf., Sylva Tellur. 98. 1838 nom. superfl. (incl. type *R. malabarica* Lam.).—*Xeromphis malabarica* (Lam.) Raju, Excurs. Fl. Simachalam Hills, 13. 1966.—*Griffithia malabarica* (Lam.) Tirveng. & Sastra, Bull. Mauritius Inst. 8: 86. 1979, comb. illeg.—*Oxyceros malabarica* (Lam.) Tirveng., Ceylon J. Sci. 14: 4. 1981.—Type: *Benkara*, Rheede, Hort. Malabar. 5: 69, t. 35. 1685.

Gardenia fragrans Roxb., Pl. Corom. 2: t. 137. 1800.—*Posoqueria fragrans* (Roxb.) Roxb., Fl. Ind. 2: 567. 1824.—*Stylocoryna malabarica* DC., Prodr. 4: 377. 1830 nom. superfl. (incl. type *G. fragrans* Roxb.). *Griffithia fragrans* (Roxb.) Wight & Arn., Prodr. Pl. Ind. Or. 399. 1834; Wight, Icon. 1: pl. 310. 1840; Thwaites, Enum. Pl. Zeyl. 158. 1864.—*Randia fragrans* (Roxb.) Bedd., For. Man. Bot. S. Ind. 132. 1871.—Type: based on Roxb., Pl. Corom. 2: t. 137.

12. **Benkara microcarpa** (Bartl. ex DC) Ridsdale, *comb. nov.*

Gardenia microcarpa Bartl. Ex DC., Prodr. 4 (1830)

384.—*Randia microcarpa* Merr., En. Philip. Flow. Pl. 3 (1923) 527, comb. illeg., non *R. microcarpa* Sessé & Mociò 1888.—*Fagerlindia microcarpa* (Bartl. ex DC) Ridsd. Blumea 31 (1985) 243.—Type: *Haenke s.n.* (G-DC).

Randia cumingiana Vidal, Phan. Cuming. Philip. (1885) 179.—Lectotype (Ridsdale 1985): *Cuming 1366* (L.); syntypes: *Vidal 388* (L) *Herb propr. 39* (N.V.).

13. **Benkara miquelii** (Koord. & Val.) Ridsdale, *comb. nov.*

Randia miquelii Koord. & Val., Bijd. Boomsorten Java 8 (1902) 88, 89 in clavis; Koord., Exk. Fl. Java 3 (1912) 256; Koord.-Schum., Syst. Verz. (1913) Fam. 270, 85; Backer & Backh.f., Fl. Java 2 (1965) 162.—Type: *not indicated.*

14. **BENKARA OVOIDEA** (Pierre ex Pitard) Ridsdale

Randia ovoidea Pierre ex Pitard, Fl. Gén. Indo-Chine 3 (1923) 236.—Syntypes: *Thorel, [264] Compong-luong, Oudon, Cambodia* (P. n.v.). *Cambodia* (P. n.v., K); *Harmand [177], Khong*, (P. n.v.).

Randia ovoidea var. *parvifolia* Pitard, Fl. Gén. Indo-Chine 3 (1923) 237. Type: *Thorel, Akhóné, Utheu, Lao. Randia elliptica* Geddes, Fl. Siam. Enum. 2 (1932) 100, Craib, Kew Bull. (1932) 283.—Type: *Kerr 8422* (ABD-holo, n.v., K)

Randia ligustrifolia Geddes, Fl. Siam. Enum. 2 (1932) 102, Craib, Kew Bull. (1932) 284.—Type: *Kerr 5986* (ABD-holo, n.v., K)

15. **Benkara parviflora** (King & Gamble) Ridsdale, *comb. nov.*

Randia fasciculata var. *parviflora* King & Gamble, J. As. Soc. Beng. 72 (1903) 212.—*Fagerlindia fasciculata* var. *parviflora* (K. & G.) Wong, Malay Nat. J 38 (1984) 31.—Type: *Curtis 3383* (SING-holo, K).

16. **Benkara pierrei** (Pitard) Ridsdale, *comb. nov.*

Randia pierrei Pitard, Fl. Gén. Indo-Chine 3 (1923) 237.—Syntypes: *Pierre, s.n.*, *Bao-chiang, prov. Bien-hoa*; *Pierre s.n.*, *Mt Dinh, prov. Baria* (both P.-n.v.).

Randia celastroidea Craib, Fl. Siam. Enum. 2 (1932) 99, Kew Bull. (1932) 282.—Type: *Kerr 6051* (K).

17. **Benkara rectispina** (Merr.) Ridsdale, *comb. nov.*

Randia rectispina Merr., Lignan J. Sci. 14 (1935) 60.

— *Oxyceros rectispina* (Merr.) Yamazaki, *J. Jap. Bot.* 45 (1970) 340. — Type: *S.K. Lau 289* (A).

18. **Benkara scandens** (Thunb.) Ridsdale, *comb. nov.*

Gardenia scandens Thunb., *Diss. Bot. Gard* (1780) 17, pl.2 f.5.— *Fagerlindia scandens* (Thunb.) Tirveng., *Nord. J. Bot.* 3 (1983) 458.— Type: *Bladh 20* (LD-n.v., iso BM)

Randia accedens Hance *Advers. in Stirp. Crit. in Ann. Soc. Bot.* 5 (1886) 218 non Lam.

Plectronia levinei Merr., *Philip. J. Sci.* 15 (1919) 257. — Type: *Levine 3487* (n.v.)

19. **BENKARA SINENSIS** (Lour.) Ridsdale

Oxyceros sinensis Lour., *Fl. Cochinch.* (1790) 187.— *Randia sinensis* (Lour.) Reom. & Schult., *Syst. Veg.* 5 (1819) 248.— *Fagerlindia sinensis* (Lour.) Tirveng., *Nord. J. Bot.* 3 (1983) 458. — Type *Loureiro s.n.* (not traced).

Randia stenantha Drake in *Morot, Joorn. de Bot.* 9 (1895) 219.— Type: *Balansa 2660, Haiphong, Vietnam.* (? P. n.v.)

Randia stenantha Drake var. *tomentosa* Pitard, *Fl. Gén. Indo-Chine* 3 (1923) 238.— Syntypes: *Balansa Cut, Than-moi, Tonkin; Bon, Ninh-binh, Tonkin; Chevalier, Nghia-hung, Nghé-an, Annam; d.Alleizette, Quang-yen, Tonkin; Massie, Lao; Poilane, Lang-Khoai, prov. Quang-tri, Annam; Thorel, Lakhone, Penam, Lao.*

Randia fasciculata (Roxb.) DC. var. *multiflora* Pitard, *Fl. Gén. Indo-Chine* 3 (1923) 226.— Type: *Harmand, between Mékong & Hue, Lao* (P. n.v.).

Randia crassispina Geddes, *Fl. Siam. Enum.* 2 (1932) 100, *Craib, Kew Bull.* (1932) 283. — Type: *Kerr 8537* (ABD holo n.v., K)

Randia parvula Ridl. var. *mollis* Craib, *Fl. Siam. Enum.* 2 (1932) 109. — Type: Syntypes: *Kiah 24331, Marchan 1566, Put 1078, Put s.n. Hin Dat, Kanburi, Winit 665, (all K).*

Shrub 0—3(—6) m, usually armed with short

spines. Stipules narrowly triangular, 2—4 mm long. Leaves elliptic to obovate or oblanceolate, (2—)4—8 x (1.5—)2—4 cm, coriaceous, above and below glabrous, apex obtuse, usually slightly apiculate, base cuneate, lateral nerves 5—7 pairs, petiole up to 0.8 mm. Flowers 5-merous, calyx short, 0.8—1.5 mm, glabrous, lobes shortly triangular, 0.5 mm long. Corolla white, hypocrateriform, tube 4—5 mm, outside glabrous, inside with a ring of hairs in the throat, lobes oblong, 6—8 mm long, glabrous, recurved, Stamens exerted, recurved, anthers linear 4—7 mm long. Style 4—5 mm, stigma 5—7 mm, fusiform. Fruits globose, 0.7—1 cm diam. ripening red.

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