

## SUMMARY.

In all, 1,550 flowers of *Quisqualis indica* Linn. were examined to study variation in the floral parts. 29 flowers, i. e., 1.87% showed variation in the number of calyx-teeth, petals and stamens. Ovary was normal in all cases except in the case of a fasciated flower, in which it was bitocular. These 29 flowers showed 15 different types of abnormalities. Only those not recorded heretofore are recorded in this note.

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## NOTES ON THE CONVULVULACEAE OF BOMBAY

BY

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Whilst checking the *Convolvulaceae* of my Khandala collections with the types at Kew Herbarium, and going through the pertinent literature on the family, I gathered a fair number of notes that may very well serve towards the revision of the family at least as far as Bombay Province is concerned; this I consider the more necessary as Blatter on account of his untimely death in 1934 could not carry out his plans of a complete revision of the plants of Bombay. In the hope that these notes may prove of interest to other botanists in India, I hasten their publication.

One of the most striking features of the family *Convolvulaceae* is the very "fluid" state of the boundaries or limits separating adjoining genera. This is particularly the case with the genera *Merremia* Dennst., *Convolvulus* Linn., *Ipomoea* Linn., *Argyreia* Lour., *Leptostoma* Roxb., *Calonyction* Choisy, etc. In point of fact, the arrangement of many of these genera in Kew Herbarium obviates the difficulty by grouping together such genera as *Ipomoea*, *Operculina*, *Calonyction*, *Aniseia*, etc. under the genus *Ipomoea*. The difficulties in separating the genera are such that some of the Kew botanists, seriously or otherwise, have suggested as a practical working idea the grouping together of most of the *Convolvulaceae* under *Ipomoea* and *Convolvulus*, as Linn. did in his *Species Plantarum*. It is interesting to note that Bentham and Hooker in Gen. Plant. have fused *Calonyction*, *Quamoclit*, *Operculina*, *Aniseia*, *Batatax* and *Ipomoea* proper under the genus *Ipomoea*.

From the point of view of the practical systematist, the result of this confusion is that there is scarcely a genus of the Indian *Convolvulaceae*

that has not been placed at one time or another under a number of different genera. Such a procedure naturally complicates the problems of nomenclature almost to the limit of endurance for the poor systematist who attempts to work at the *Convolvulaceae*. In the following pages, I have followed the treatment of van Oostroom, who in recent years has produced an up-to-date monograph of the family, at least as far as India and South-East Asia are concerned. For a comprehensive list of the most important references, the reader is referred to the bibliography at the end of this paper. For purposes of ready reference and comparison, I have attempted to follow the same order of genera and species as Cooke in his *Flora*; it is not my intention nor my claim to have produced a complete revision of the family, as I have left out almost entirely such plants as are found to occur exclusively in Sind, since both politically and ecologically Sind can scarcely be called a part of the Province of Bombay.

To give a complete list of synonyms is beyond the scope of this paper, and would take too much unnecessary space; all those synonyms, however, are given which in any way affect the present name of the plant. References are also given to the most important books or papers on each subject, and among such important books, I include those especially written on the plants of Bombay. As far as possible I have also tried to give a reference to Gamble's *Flora of the Presidency of Madras*, for although this is not the latest, in my opinion it is the most critical of Indian Floras; as a proof of the careful study with which Gamble prepared his *Flora* one has but to examine the Madras sheets in Kew Herbarium, many of which show detailed dissections or diagrams or both made by Gamble whilst preparing his book. Merrill's *Enumeration of Philippine Flowering Plants* and other works by the same author are also quoted on numerous occasions, on account of the importance of Merrill's critical studies on the subject of plant nomenclature. In every case I have checked the references given and have satisfied myself of their accuracy. Finally I have tried to give a reference to a good illustration of the plant in question, those books being preferably quoted which are more easily available to Indian students.

It will not be out of place in conclusion to insert here a few sentences with which Choisy concludes the introduction to the *Convolvulaceae* in DC. Prodr. 9: 324, 1845: "A most unhappily intricate order as regards the distinction of genera and the synonymy of the species . . . In consequence we exhort and pray the diligent reader not to give up the work of revising his *Convolvulaceae*, and in particular not to cut the Gordian knot easily by creating new species and proposing new names which may render the already obscure synonymy even more obscure; moreover, if he does not find his plant among the *Iponoeae*, to look for it among the *Argyreiæ* or *Jacquemontias*; perhaps he will be luckier than ourselves, and may even correct our mistakes."

## 2. CUSCUTA Linn.

Corolla twice as long as the calyx or longer . . . . .	<i>C. reflexa.</i>
Corolla less than twice as long as the calyx:	
Scales at the base of corolla tube 0 . . . . .	<i>C. hyalina.</i>
Scales at base of corolla tube present and fimbriate . . . . .	<i>C. chinensis.</i>

*Cuscuta reflexa* Roxb., Pl. Cor. 2: 3, t. 104, 1798; Fl. Ind. 1: 446, 1832; Clarke, 225; Graham, 134; Choisy, in Mem. Soc. Phys. Hist. Nat. Geneve, 9: 273, 1841; Englemann, 518; Bot. Mag. 37: t. 6566, 1881; Cooke, 224; Hall. f. in Engler, Bot. Jahrb. 49: 375, 1813; Yuncker, 259, f. 130, A-F; van Ooststroom, in Blumea 3: 70-72, 1938 (non Decaisne).

The main difference between this *Cuscuta* and the following species, according to Yuncker, is in the length of the corolla tube, which in *C. reflexa* is about three times as long as the calyx, whilst in the other two species it is scarcely longer than the calyx.

*Cuscuta hyalina* Roth, Nov. Pl. Sp. 100, 1821; Clarke, 226; Choisy, 286; Englemann, 490; Cooke, 225; Yuncker, 235, f. 107 A-D. (non Wight, nec Boiss.).

*Cuscuta arabica* Wight, Icon. t. 1371, 1850 (non Fresen.).

*Cuscuta Boissieri* Stocks, in Hook. Journ. Bot. 4: 173, 1852.

*Cuscuta chinensis* Lamk. in Encycl. Meth. 2: 229, 1786; Clarke, 226; Choisy, 279; Wight, Icon. t. 1373; Englemann, 479; Cooke, 225; Yuncker, 209, f. 80 A-G.

*Cuscuta sulcata* Roxb., Hort. Beng. 12, 1814; Fl. Ind. 1: 477, 1820 (non Wall.).

*Cuscuta hyalina* Wight, Icon. t. 1372; Illustr. 2: t. 168, f. 12, 1850 (non Roth).

## 2. ERYCIBE Roxb.

Following Gamble, I have separated the variety *wightiana* Clarke and restored it to specific rank. The differences between the two species are given in the following key adapted from Gamble, *Flor. Pres., Madr.* p. 930:

Corolla yellowish, leaves elliptic-oblong or obovate, abruptly and sharply acuminate; base attenuate, up to 12.5 cms. long, 5 cms. broad, the petiole 8-13 mm. long; cymes axillary or in terminal panicles; berry 13 mm. long, ellipsoid.....

1. *E. paniculata*.

Corolla white; leaves elliptic or obovate, sometimes almost orbicular, sometimes even lanceolate, abruptly and usually obtusely acuminate, base cuneate or rounded, up to 10.2 cms. long, 5 cms. broad, the petioles 6.5 mm. long, cymes axillary and elongate or in terminal panicles; berry 13 mm. long, ovoid.....

2. *E. wightiana*.

*Erycibe paniculata* Roxb., Pl. Cor. 2: 31, t. 159, 1798; Clarke, 180; Graham, 137; Dalz. and Gilts. 169; Wight, Illustr. t. 180; Peter, 21, f. 10 E-F; Cooke, 225.

*Erycibe wightiana* Graham, 137; Hall. f. in Bull. Herb. Boiss. 5: 737, 1897; Gamble, 930.

*Erycibe paniculata* var. *wightiana* Clarke, in Hook. f. Fl. Brit. Ind. 4: 181, 1883; Cooke, 226.

## 3. PORANA Burm.

Merrill in his Enum. Phil. Fl. Pl. 3: 358, 1923 and elsewhere, spells the generic name as *Porania*; van Ooststroom in his monograph and all

other authors consulted spell it as *Porana*; Burmann in his *Flora Indica* 51, t. 21, f. 1, spells it also as *Porana*. I have failed to find the reason for Merrill's departure from the accepted spelling.

Calyx much enlarged in fruit, . . . . . *P. malabarica*.  
Calyx not or scarcely enlarged in fruit, . . . . . *P. paniculata*.

**Porana malabarica** Clarke in Hook. f. Fl. Brit. Ind. 4 : 223, 1883 ;  
Peter, 24, f. 11C ; Cooke, 227 ;

*Porana racemosa* Graham, 133 ; Dalz. and Gibs. 162 (non Roxb.).

**Porana paniculata** Roxb., Pl. Cor. 3 : 31, t. 235, 1819 ; Clarke, 222 ;  
Choisy, 6 : 189, 1833 ; Cooke, 227 ; van Oostroom in Blumea  
3 : 93, 1938.

#### 4. NEUROPELTSIS Wall.

Van Oostroom in Blumea, 5 : 268-73, 1942, has placed the plants of Western India under a new specific name, the plants being quite distinct from *N. racemosa* Wall. The following key is based on that of van Oostroom and is given here as a help to distinguish the two species of *Neuropeltis*; *N. racemosa* Wall. does not occur in the western parts of India.

Corolla tube inside hairy at the base of the filaments.  
Styles as long as or shorter than the breadth of the  
stigma. Tenasserim, N. W. part of the Malay  
Peninsula, . . . . . *N. racemosa* Wall.

Corolla tube inside glabrous at the base of the filaments.  
Styles much longer than the breadth of  
the stigma. British India (Deccan Peninsula) . . . *N. malabarica* Oostst.

**Neuropeltis malabarica** van Oostroom in Blumea loc. cit.

*Neuropeltis racemosa* auct. plur. (non Wall.)

For a description of the plant, see van Oostroom, loc. cit. This new species is quite clearly different from *N. racemosa* Wall.; the styles are only about as long as or even shorter than the width of the stigma, the whole of style and stigma being very short and included in the lower part of the corolla, the filaments are hairy at the base with a conspicuous tuft of hairs; whilst in *N. racemosa* Wall. the long style makes the stigma almost exerted, or at least forces it up to nearly the top of the corolla, the filaments being quite glabrous at the base.

#### 5. CRESSA Linn.

A common and widely distributed plant; specimens found on either side of the Mediterranean shores are remarkably similar to the Indian specimens. Prostrate, erect or suberect shrubby plant. For the nomenclature of this species, see Cooke, 228.

#### 6. EVOLVULUS Linn.

Erect or suberect, but not rooting at the nodes, . . . . . *E. alsinoides*.  
Prostrate and rooting at the nodes, . . . . . *E. nummularius*.

**Evolvulus alsinoides** Linn., Sp. Pl. 392, 1762 ; Clarke, 220 ; Wight,  
Illustr. t. 168 bis ; Hall, f. in Engler, Bot. Jahrb. 18 : 85, 1894 ;

Cooke, 229; Gamble, 923; van Ooststroom in Mon. Gen. Evol. 26, 1934.

*Convolvulus alsinoides* Linn., Sp. Pl. 157, 1753.

*Evolvulus hirsutus* Graham, 133; Dalz. and Gibs. 162.

"The forma on which Linnæus based this species is the common British India form spread throughout S.E. Asia." van Ooststroom, loc. cit.

*Evolvulus nummularius* Linn., Sp. Pl. 391, 1762; Jacq., Sel. Stirp.

Amer. t. 260, f. 23, 1780; Choisy, 8: 72, 1838; Hall. f. in

Engler, Bot. Jahrb. 18: 85, 1894; van Ooststroom in Mon.

Gen. Evol. 114, 1934.

*Convolvulus nummularius* Linn., Sp. Pl. 157, 1753.

*Evolvulus alsinoides* Jackson, in Ind. Kew. 1: 940, 1893 (non Linn.).

This is a new record for the Province of Bombay, and is not mentioned by Cooke. In the city of Bombay it is common in lawns (Santapau 8042-8046 l); Thirumalachar sent me some specimens collected by him in Bangalore; Mayuranathan reports its presence in Madras city; van Ooststroom gives the following localities from which the plant has been collected: Calcutta, Howrah, Sibpur Botanic Gardens, Hughly District, Bardwan, Motahari in Beliar, Benares Hindu University, etc.

*E. nummularius* is an American plant, native of from Mexico to N. Argentine, and the West Indies; it is also found in tropical Africa and Madagascar, and seems to be gradually spreading in India. The following description is taken from van Ooststroom loc. cit. pp. 115-116:

"A perennial herb. Stems several prostrate, rooting at the nodes, simple or slightly branched, slender, terete, pilose with short, patent, curved hairs, glabrescent, often lignescent at the base, variable in length, 10-40 cms. long; internodes 5-12 mm. sometimes to 20 mm. long. Leaves distichous, shortly petioled; petiole grooved above, pilose or glabrous, 1-5 mm. long, occasionally to 12 mm.; limb broad-ovate, elliptic or orbicular, sometimes obovate or oblong, rounded or emarginate at the apex, rounded, truncate or subcordate, sometimes slightly oblique at the base, variable in size, middle-sized leaves 4-15 mm. long, 3-15 mm. broad, larger ones up to 25 mm. long and 18 mm. broad, glabrous on both sides or sparsely appressed-pilose beneath especially on the nerves, sometimes also above, the margins sometimes ciliate, especially near the base, midrib and 2-5 pairs of lateral nerves more or less distinct beneath. Flowers 1 or 2 in the leaf-axils, on the main stems or on short lateral branches peduncles none or very short, rarely longer, up to 10 mm. long (f. pedunculatus); pedicels 2-6 mm. long, occasionally longer, recurved in fruit; bracteoles linear or lanceolate, acute, 0.5-1.5 mm. long. Sepals equal, 2.5-4 mm. long, ovate-oblong, obtuse or acutish, minutely mucronate with microscopic pellucid dots, sparsely pilose or glabrous, but with ciliate margin; with distinct midrib and reticulate nervation; often reflexed in fruit. Corolla white, rarely pale blue, rotate to broadly funnel-shaped, 5-7 mm. long, the tube short, the limb about 8 mm. in diam., 5-lobed, the lobes distinct, sparsely pilose bands. Filaments inserted about 2 mm. above the corolla base, 2-3 times as long as the oblong anthers. Ovary globular, glabrous. Capsule globular, as long as or a little longer than the sepals, 2-celled, 4-valved, 4- or less-seeded."

7. **BONAMIA** Thouars.

Asa Gray in the Proc. Amer. Acad. 5 : 337, 1862, suggested the fusion of the genus *Breweria* with *Bonamia*, the older name *Bonamia* being retained for the combined genus. Benth. and Hook. in Gen. Plant. 2 : 877, did not accept the fusion; Peter in Engl. and Prantl, Pflanzenfamilien, Jackson in Index Kew., Cooke in his Flora follow Benth. and Hooker in keeping the two genera separate. Hallier f., Merrill and van Ooststroom follow Asa Gray in fusing the two genera. On the other hand Benth. and Hooker make *Seddera* Hochst. a section of *Breweria*, whilst O. Kuntze in Rev. Gen. Pl. places all the species of *Seddera* under *Convolvulus*. I have followed van Ooststroom in uniting *Breweria* and *Seddera* under *Bonamia* Thouars.

**Bonamia semidigyna** (Roxb.) Hall. f. in Engler, Bot. Jahrb. 16 : 528, 1893, et 18 : 9, 1894 excl. syn. *Breweria abscissa* Choisy ; id. in Bull. Herb. Boiss. 5 : 382, 814, t. 15, 1897 ; Merrill, 357 ; van Ooststroom in Blumea 3 : 76, 1938.

*Convolvulus semidigynus* Roxb. Hort. Beng. 13, 1814 ; Fl. Ind. 2 : 47, 1824 et 1 : 468, 1832.

*Breweria cordata* Blum., Bijdr. 722, 1825 ; Choisy, 6 : 493, 1844 ; Clarke, 223 ; Cooke, 230.

*Breweria semidigyna* O. Kuntze, Rev. Gen. Pl. 440, 1891 (*Breweria*)

*Breweria Roxburghii* Choisy, 493 ; Wight, Icon. 1370.

**Bonamia latifolia** (Hochst. et Steud.) Santapau, comb. nov.

*Seddera latifolia* Hochst. et Steud. in Flora 27, Bes. Beibl. 8, t. 5 B-C, 1844.

*Breweria latifolia* Benth. ex C. B. Clarke, in Hook. f. Fl. Brit. Ind. 4 : 224, 1883 ; Cooke, 230.

8. **SHUTERIA** Choisy.

Van Ooststroom in Blumea 3 : 287, 1939, writes that in recent literature one finds generally the name *Hewittia* Wight et Arn. (1837) for this genus ; there is however an older name, *Shuterea* Choisy (1833) and in consequence the older name has been adopted by van Ooststroom ; this has necessitated the altering of *Shuteria* Wight et Arn. a name of a genus in the *Leguminosae*. This procedure is in accordance with the latest edition of the International Rules of Botanical Nomenclature, Art. 16, but the fact that the name *Hewittia* has been generally used up to the present and the necessary change in the *Leguminosae*, if Choisy's name be adopted, are reasons for the inclusion of *Hewittia* among the *Nomina Conservanda* ; until this is done, however, the name for the genus must be *Shuterea* Choisy.

**Shuterea sublobata** (Linn. f.) House in Bull. Torr. Bot. Club, 33 : 318, 1906 ; van Ooststroom in Blumea 3 : 287, 1939.

*Convolvulus sublobatus* Linn. f., Suppl. 135, 1781.

*Convolvulus bicolor* Vahl, Symb. 3 : 25, 1794 ; Bot. Mag. t. 2205.

*Shuterea bicolor* Choisy, 6 : 486, t. 2, f. 11, 1833.

*Hewittia bicolor* Wight et Arn. in Madr. Journ. Lit. and Sci. 5 : 22, 1837 ; Clarke, 216 ; Wight, Icon. t. 835 ; Peter, 25, f. 12 B ; Hall. f. in Bull. Herb. Boiss. 5 : 379-380, 1897 ; Cooke, 231 ; Merrill, in Phil. Journ. Sci., 1 (Suppl.) : 120, 1906 ; Gamble, 924.

*Hewittia sublobata* O. Kuntze, Rev. Gen. Pl. 441, 1891; Merrill, 359.

### 9. ANISEIA Choisy.

*Aniseia martinicensis* (Jacq.) Choisy, 8: 66, 1838; Hall. f. in Engler, Bot. Jahrb. 18: 96, 1894, et in Bull. Herb. Boiss. (ser. 2, 1: 674, 1901; Merrill, 359; van Oostroom in Blumea 3: 280, 1939.

*Convolvulus martinicensis* Jacq., Select. Stirp. Amer. 26, t. 17, 1763.  
*Convolvulus uniflorus* Burm., Fl. Ind., 47, t. 21, f. 2, 1768.

*Aniseia uniflora* Choisy, 6: 483, t. 2, f. 9, 1833; Wight, Icon. t. 850; Graham, 133; Dalz. and Gibs., 163; Peter, 25, f. 12 A., 1897; Cooke, 231.

*Ipomoea uniflora* R. et Schult., Syst. Veg., 4: 247, 1819; Clarke, 201 (non Blume).

### 10. CONVULVULUS Linn.

Erect, shrubby plant; corolla small, blue..... *C. Rottleriana*.  
Prostrate or twining herb; corolla about 2.5 cms. long,  
and about as much in diam., pink or white with  
pink stripes..... *C. arvensis*.

*Convolvulus arvensis* Linn., Sp. Pl. 153, 1753; Clarke, 219; Choisy, 479; Graham, 132; Dalz. and Gibs., 163; Hall. f. in Engler, Bot. Jahrb. 18: 108, 1894; Cooke, 234; Gamble, 925; van Oostroom in Blumea 3: 283, 1939.

*Convolvulus Rottlerianus* Choisy, 6: 477, 1833; Clarke, 219; Dalz. and Gibs. 164; Cooke, 233.

### 11. JACQUEMONTIA Choisy.

*Jacquemontia paniculata* (Burm. f.) Hall. f. in Engler Bot. Jahrb. 16: 541, 1893; Cooke, 235; Merrill, 359; Gamble, 926; van Oostroom in Blumea 3: 269, 1939.

*Ipomoea paniculata* Burm. f., Fl. Ind. 50, t. 21, f. 3, 1768.

*Convolvulus parviflorus* Vahl, Symb. 3: 29, 1794; Clarke, 220 (non Dalz., nec Dear.).

### 12. MERREMIA Dennst.

Leaves entire:

Leaves reniform, usually broader than long,  
12-25 mm. broad..... *M. enarginata*.

Leaves not reniform, longer than broad:

Seeds pubescent or hairy: *M. umbellata*.

Seeds hairy with long hairs..... *M. hederacea*.

Seeds with fulvous velvety pubescence..

Seeds glabrous:

Many or all the leaves 3-lobed or 3-  
toothed at the apex..... *M. tridentata*.

Leaves not 3-toothed at the apex; base  
auriculate dentate..... *M. hastata*.

Leaves 5-7-partite or lobed :

Corolla yellow; leaves palmately divided :

Stems glabrous; leaves palmately cut nearly to the base.....

*M. rhynchorhiza.*

Stems with long spreading deciduous hairs; leaves divided to less than half of the way down.....

*M. vitifolia.*

Corolla white; leaves digitately divided; stems with long deciduous hairs from bulbous bases.....

*M. aegyptia.*

**Merremia emarginata** (Burm. f.) Hall. f. in Engler, Bot. Jahrb. 16 : 552, 1893; Cooke, 236; Gamble, 928; Merrill, 360; van Ooststroom in Blumea, 3 : 312, 1939.

*Evolvulus emarginatus* Burm. f., Fl. Ind. 77, t. 30, f. 1, 1768.

*Convolvulus reniformis* Roxb., Fl. Ind. 2 : 67, 1824; et 1 : 481, 1832.

*Ipomoea reniformis* Choisy, 6 : 446, 1833; Clarke, 206; Graham, 131; Dalz. and Gibs., 164.

*Ipomoea emarginata* O. Kuntze, Rev. Gen. Pl., 444, 1891.

**Merremia umbellata** (Linn.) Hall. f. in Engler, Bot. Jahrb. 16 : 552, 1893; Cooke, 237; Gamble, 928; Merrill, 362; van Ooststroom in Blumea 3 : 333, 1939.

*Convolvulus umbellatus* Linn., Sp. Pl. 155, 1753; Wall., Cat. 2329.

*Convolvulus cymosus* Desr. in Lamk. Encycl. Meth. 3 : 556, 1791.

*Ipomoea cymosa* R. et Schult., Syst. 4 : 241, 1819; Choisy, 6 : 461, 1833; Clarke, 211.

*Merremia cymosa* Baker et Rendle, in This.-Dyer, Fl. Trop. Afr. 4(2) : 106, 1905.

Examination of large numbers of specimens both in the field and in Herb. Kew. has convinced me of the correctness of Cooke's remark that the corolla is linear, against the statement of Hallier f. in Engler, Bot. Jahrb. 18 : 133, that the corolla is never or very rarely linear.

**Merremia tridentata** (Linn.) Hall. f. in Engler, Bot. Jahrb. 16 : 552, 1893; Cooke, 237; Gamble, 928; van Ooststroom in Blumea 3 : 315, 1939.

*Convolvulus tridentatus* Linn., Sp. Pl. 157, 1753.

*Evolvulus tridentatus* Linn., Sp. Pl. 392, 1762.

*Ipomoea tridentata* Roth in R. et Schult., Arch. Bot. 1(3) : 38, 1798; Clarke, 205; Choisy, 447; Graham, 131; Dalz. and Gibs. 165.

**Merremia hastata** (Desr.) Hall. f. in Engler, Bot. Jahrb. 16 : 552, 1893; Cooke, 238; Gamble, 929; Merrill, 361.

*Convolvulus hastatus* Desr. in Lamk. Encycl. Meth. 3 : 542, 1789 (non Sieb., nec Thunb., nec Forsk.).

*Convolvulus simplex* Pers., Syn. 1 : 178, 1805 (non Spreng.).

*Ipomoea denticulata* R. Br., Prodr., 485, 1810; Bot. Reg. t. 317, 1818; (non Choisy).

*Convolvulus denticulatus* Spreng., Syst. 1 : 603, 1825.

*Merremia tridentata* subs. *hastata* van Oostst. in Blumea 3 : 317, 1939.

*Merremia hastata* Hall. f. has leaves which differ from those of *M. tridentata* in size and shape; the peduncles in *M. hastata* are much longer, the sepals and corolla much larger, the capsules much bigger.



For these reasons I am inclined to retain *M. hastata* as a separate species, against van Ooststroom, who makes of *M. hastata* but a subspecies of *M. tridentata*.

- Merremia hederacea** (Burm. f.) Hall. f. in Engler, Bot. Jahrb. 18: 118, 1894; Merrill, 361; van Ooststroom in Blumea 3: 302, 1939.  
*Evolvulus hederaceus* Burm. f., Fl. Ind. 77, t. 30, f. 2, 1768.  
*Ipomoea chryseides* Ker-Gawl. in Bot. t. 270, 1818; Choisy, 469; Clarke, 206; Wight, Icon. t. 157; Dalz. and Gibs., 166.  
*Merremia chryseides* Hall. f. in Engler, Bot. Jahrb. 16: 552, 1893; Cooke, 238; Gamble, 929.
- Merremia rhyncorhiza** Dalz. in Kew Journ. Bot. 3: 179, 1851;  
*Ipomoea rhyncorhiza* Dalz. in Kew Journ. Bot. 3: 179, 1851; Clarke, 214; Dalz. and Gibs., 167.
- Merremia vitifolia** (Burm. f.) Hall. f. in Engler, Bot. Jahrb. 16: 552, 1893; Cooke, 239; Gamble, 928; Merrill, 362; van Ooststroom in Blumea 3: 329, 1939.  
*Convolvulus vitifolius* Burm. f., Fl. Ind., 45, t. 18, f. 1, 1766.  
*Ipomoea vitifolia* Blume, Bijdr. 709, 1825; Choisy, 454; Clarke, 213; Graham, 132; Dalz. and Gibs., 165.
- Merremia aegyptia** (Linn.) Urb., Symb. Antill. 4: 505, 1910  
 Gamble, 928; van Ooststroom in Blumea 3: 327, 1939.  
*Ipomoea aegyptia* Linn., Sp. Pl. 162.  
*Convolvulus pentaphyllus* Linn., Sp. Pl. 223, 1762.  
*Ipomoea pentaphylla* Jacq., Collect. 2: 287, 1788; Clarke, 202.  
*Merremia pentaphylla* Hall. f. in Engler, Bot. Jahrb. 16: 552, 1893; Cooke, 239.  
*Batatas pentaphylla* Choisy, 6: 436, 1833; Graham, 129; Dalz. and Gibs., 167.
- Merremia dissecta** (Jacq.) Hall. f. in Engler, Bot. Jahrb. 16: 552, 1893; Cooke, 240; Gamble, 928.  
*Convolvulus dissectus* Jacq., Obs. 2: 4, 1761.  
*Ipomoea dissecta* Pers. in Linn. Syst. (ed. 15), in nota, 1795 (non Linn.).  
*Ipomoea sinuata* Ortega, Hort. Matr. Decad. 7: 74, 1798; Clarke 214; Graham, 132; Dalz. and Gibs., Suppl. 59.
- Merremia tuberosa** (Linn.) Rendle, in This.-Dyer, Fl. Trop. Afr. 4(2): 104, 1905; van Ooststroom, in Blumea 3: 325, 1939.  
*Ipomoea tuberosa* Linn., Sp. Pl. 160; Choisy, 452; Cooke, 251 (non Lour.).  
*Convolvulus tuberosus* Spreng., Syst. 1: 591, 1825 (non Willd.)  
*Operculina tuberosa* Meissn. in Mart. Fl. Bras. 7: 212, 1869; Hall. f. in Engler, Bot. Jahrb. 16: 476, 549, 1893; Merrill, 363.  
*Ipomoea nuda* Peter, 31.

### 13. OPERCULINA Silva Manso.

- Operculina Turpethum** (Linn.) Silva Manso, Enum. Subs. Bras. 16 et 49, 1836; Hall. f. in Engler, Bot. Jahrb. 18: 120, 1894; Cooke, 240; Gamble, 929; Merrill, 363; van Ooststroom in Blumea 3: 362, 1939.

*Batatas paniculata* Choisy, 6: 436, 1833; Graham, 129; Dalz. and Gibs., 167.

*Ipomoea diversifolia* R. Br., Prodr. 487, 1810; Merrill, 365; van Ooststroom in Blumea 3: 545, 1940.

*Pharbitis laciniata* Dalz. in Hook. Kew Journ. Bot., 3: 178, 1851; Dalz. and Gibs., 167.

*Ipomoea laciniata* Clarke, 200; Cooke, 250.

*Ipomoea cairica* (Linn.) Sweet, Hort. Brit. 287, 1827; Hall. f. in Engler, Bot. Jahrb. 18: 148, 1893; Gamble, 918 (excl. var. *I. pulchella* Roth); Merrill, 364; van Ooststroom in Blumea 3: 542, 1940.

*Convolvulus caricicus* Linn., Syst. (ed. 10), 922, 1759.

*Ipomoea palmata* Forsk., Fl. Aeg.-arab. 43, 1775; Clarke, 214; Cooke, 250.

*Ipomoea pulchella* Wight, Icon. t. 156, (non Roth).

*Ipomoea pes-tigridis* Linn., Sp. Pl. 162; Clarke, 204; Graham, 132; Wight, Icon., t. 836; Dalz. and Gibs., 165; Hall. f. in Engler, Bot. Jahrb. 18: 134, 1893; Cooke, 250; Gamble, 918; Merrill, 367; van Ooststroom in Blumea, 3: 504, 1940.

*Ipomoea hepaticifolia* Linn., Sp. Pl. 161.

*Ipomoea pes-tigridis* Linn. var. *hepaticifolia* Clarke, 204.

*Ipomoea Batatas* (Linn.) Lamk., Tabl. Encycl. 1: 465, 1791; Clarke, 202; Hall. f. in Engler, Bot. Jahrb. 18: 138, 1893; Cooke, 251; Merrill, 364; van Ooststroom in Blumea 3: 512, 1940.

*Convolvulus Batatas* Linn., Sp. Pl. 154.

*Convolvulus edulis* Choisy, 6: 435, 1833.

*Ipomoea Leari* Paxt., Mag. Bot. 6: 267, 1839; Cooke, 251; van Ooststroom in Blumea 3: 502, 1940.

*Pharbitis Leari* Dalz. and Gibs., Suppl. 58.

"*I. Leari* Paxt. . . which is sometimes found in culture for ornamental purposes seems to be not or scarcely different from *I. congesta* R. Br." (van Ooststroom, loc. cit.). Examination of the specimens in Herb. Kew. shows that *I. Leari* Paxt. is also very similar to *I. hederacea* Jacq. and *I. Nil* Roth, from both of which it differs mainly on account of a more or less glabrous and slightly smaller calyx.

*Ipomoea Nil* (Linn.) Roth, Cat. Bot. 1: 36, 1797; Hall. f. in Engler, Bot. Jahrb. 18: 136, 1893; van Ooststroom in Blumea 3: 497, 1940.

*Convolvulus Nil* Linn. Sp. Pl. (ed. 2) 219, 1762.

*Ipomoea scabra* Forsk., Fl. Aeg.-arab. 44, 1775.

*Ipomoea hederacea* auct. plur. (non Jacq.)

"Several authors have interpreted this species as being identical with the North American *Ipomoea hederacea* (Linn.) Jacq. (*Convolvulus hederaceus* Linn. Sp. Pl. ed. 1 (1753), p. 154, p. p.; id. ed. 2 (1762), p. 219, p. p.) and have mentioned it under that name. . . The true *I. hederacea* is probably now and then cultivated in gardens. I did not see any specimens from Malaysia." (van Ooststroom, loc. cit.)

This is a common plant in Khandala, and from the range of its distribution in the district, I find it very difficult to accept the plant as an

introduction and not a native in the western parts of India. I have always found, as regards Khandala, that introduced plants grew almost exclusively along the main road, or along the railway line, or if in the ravines, along the streams passing through the bottom of the ravines; no introduced plant has been found on top of the highest hills in the district; and yet this plant is abundant on the very highest parts of Bhoma hill, the highest spot about Khandala.

*Ipomoea alba* Linn., Sp. Pl. 161; Hall. f. in Meded. Rijks. Herb. Leiden, 1: 25, 1911; et 46: 19, 1922; van Oostroom, in Blumea, 3: 547, 1940.

*Convolvulus aculeatus* Linn., Sp. Pl. 155.

*Ipomoea bona-nox* Linn., Sp. Pl. 228, 1762; Bot. Mag. t. 752; Clarke, 197.

*Calonyction speciosum* Choisy, 6: 441, t. 1, f. 4, 1833 (excl. var. 6); Cooke, 252;

*Calonyction aculeatum* House, in Bull. Torr. Bot. Club, 31: 590, 1904; Merrill, 369;

*Calonyction Roxburghii* G. Don, Gen. Syst. 4: 263, 1837; Graham, 130.

*Ipomoea muricata* (Linn.) Jacq., Hort. Schoenbr. 3: 40, t. 323, 1794 (non Cav.); Clarke, 197; van Oostroom in Blumea, 3: 551, 1940.

*Convolvulus muricatus* Linn., Mant. 44, 1767.

*Calonyction muricatum* Don, Gen. Syst. 4: 264, 1838; Graham, 130; Hall. f. in Engler, Bot. Jahrb. 18: 154, 1893; et in Bull. Herb. Boiss. 5: 1044, 1897; Cooke, 253; Gamble, 920; Merrill, 370.

*Ipomoea purpurea* (Linn.) Roth, Bot. Abh. 27, 1787; Clarke, 200; Hall. f. in Engler, Bot. Jahrb. 18: 137, 1893; Cooke, 252; Merrill, 367; van Oostroom in Blumea 3: 496, 1940.

*Convolvulus purpureus* Linn., Sp. Pl. 1: 219, 1762; Bot. Mag. t. 113.

*Pharbitis hispida* Choisy, 6: 438, 1833.

*Pharbitis purpurea* Voigt, Hort. Sub. Calcut. 354, 1845.

*Ipomoea angulata* Lamk. in Tabl. Encycl. 1: 464, 1791; van Oostroom in Blumea 3: 553, 1940.

*Ipomoea phoenicea* Roxb., Pl. Ind. 2: 92, 1824, et 1: 502, 1832.

*Quamoclit phoenicea* Choisy, 6: 433, 1833; Gamble, 919; Merrill, 379.

*Quamoclit coccinea* Clarke, 199, et alior. plur. auct. (non Linn.).

Van Oostroom, loc. cit., p. 555, following Hallier f. holds the view that the Indian plant is quite different from the North American *Ipomoea coccinea* Linn. Sp. Pl. 160 (*Quamoclit coccinea* Moench.). The differences between the two species can be seen in a note by Hall. f. in Bull. Herb. Boiss. 7: 415, 1899.

*Ipomoea Quamoclit* Linn. Sp. Pl. 159; Clarke, 199; Bot. Mag. t. 244; van Oostroom in Blumea 3: 555, 1940.

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THE SYSTEMATIC POSITION OF THE FAMILY MORINGACEAE  
 BASED ON THE STUDY OF MORINGA PTERYGOSPERMA  
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(With 2 plates)

The family *Moringaceae* has long been known to be of uncertain affinity. Following *Genera Plantarum* (1), Hooker (5) places it at the end of *Polyptelae* and remarks, 'A natural order of very doubtful affinity which has been referred to near *Resedaceae*, *Capparidaceae*, *Melastomaceae*, *Violariaceae*, *Polygalaceae*, *Leguminosae*, *Bignoniaceae* (sic.) and others.'

Wetstein (10) as well as Engler and Diels (2) have placed it in the series *Rhoadales* after the family *Resedaceae*. The former, however, admits that the family is of uncertain and doubtful affinity and says, 'Die Stellung der Familie, die jetzt zum meist hier angeschlossen wird, ist eine germaßen unsicher. Morphologisch steht sie den Vorhergehenden nicht nahe. Das vorkommen kurzer Gynophor, von Myrosin sowie das sero-diagnostische Verhalten (positive Reaktion mit *Resedaceae* und *Capparidaceae*, negative mit *Cruciferae* u. s. T. mit *Papaveraceae*) spricht etwas für eine Verwandtschaft.'

Haines (4) places the family by itself in suborder 5. *Moringineae* of the Order *Parietales* of the Series *Choripetalae* between the suborder 3. *Flacourtiaceae* (including the families *Flacourtiaceae*, *Violaceae*, *Turneraceae* and *Ptilosporaceae*) and suborder 4. *Tamariscineae* (including the family *Tamaricaceae*) on the one hand and suborder 6. *Passiflorineae* (including the families *Caricaceae*, *Passifloraceae*, *Cucurbitaceae* and *Begoniaceae*) on the other. This position, however, has been regarded as doubtful and he further states that these suborders in question have little in common with one another.

Hutchinson (6) places this family under Order No. 10 *Capparidales* after the family *Capparidaceae* and before the family *Tovariaceae*. The next Order No. 11 *Cruciales* contains the family *Cruciferae* followed by the Order No. 12 *Violales* containing the families *Violaceae* and *Resedaceae*.

Schnarf (9) after examination of the families in the Series No. 19 *Rhoadales* states that the families *Papaveraceae*, *Tovariaceae*, *Cruciferae* and *Resedaceae* have common characters. No periplasmodium is formed in the anther-tapeum. The mature pollen grain is 2- or 3-nucleated and the ovule has thick nucellus and 2 integuments. The development of the embryo-sac is of the normal type. There may be differences in the formation of the archesporial cell, which cuts off wall cells while in *Resedaceae* and *Cruciferae* the tendency of the formation of wall cells is suppressed in course of the formation of the embryo-sac. With regard to the family *Moringaceae* he based his conclusions on the work of Rutgers (8)