A REVISED HANDBOOK

TO THE

# FLORA OF CEYLON

Sponsored jointly by the
University of Ceylon, Peradeniya,
Department of Agriculture, Peradeniya,
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# FOREWORD

The Handbook to the Flora of Ceylon, by Henry Trimen, published in 1893-1900, was, in its time, one of the most comprehensive and outstanding floras available for any comparable tropical area. In 1931 A. H. G. Alston added a volume of additions, updating, and corrections to the original five volumes. These six volumes for many years served their purpose very well.

However, the original Handbook was published in a very small edition, and the paper on which it was printed, as was usually the case at the time, was very poor and has deteriorated very badly. Hence the Handbook has for years been absolutely unobtainable, and there are very few copies available even in libraries in Ceylon. Furthermore, botanical science has made substantial progress since the Handbook appeared, and many of Trimen's taxonomic and nomenclatural conclusions are now outdated. Also, with more thorough botanical exploration, new plants have been found to be members of the Ceylon flora. Hence, a new edition of this magnificent work is long overdue.

For quite a number of years Professor B. A. Abeywickrama had in mind a revision of Trimen's Handbook. But heavier and heavier administrative duties consumed his time and there was little opportunity for work on the Ceylon flora, though he did produce, in 1959, an updated Checklist of the Ceylon Flora, which has been most useful to botanists.

Fortuitously, in 1967, the Smithsonian Institution initiated a number of research projects in Ceylon, in cooperation with Ceylonese institutions and scientists. These included an investigation of several problems in plant ecology, with which Prof. Abeywickrama was associated as Co-Principal Investigator. These projects were financed by the Smithsonian using US excess foreign currency under the provisions of Public Law 480.

While we were discussing the ecological investigations, Prof. Abeywickrama wondered if it might not be possible to initiate, using PL-480 support, a project for the revision of Trimen's Handbook to the Flora of Ceylon. I offered to work up a cooperative proposal and submit it to the Smithsonian Excess Foreign Currency Program.

This was duly done, approved, and a year's tentative budget authorized. The project was started under the joint auspices of the Smithsonian Institution, the Ceylon Department of Agriculture and the University of Ceylon. I was appointed Principal Investigator. Co-Principal Investigators are Prof. B. A. Abeywickrama, Dr. J. W. L. Peiris, Mr. D. M. A. Jayaweera, Prof. M. D. Dassanayake and Mr. K. L. D. Amaratunga. The plan was to enlist the cooperation of botanists, from wherever available who were preferably experts in

particular families represented in the Ceylon flora. These monographers would be given a period of field work in Ceylon, an opportunity to study the specimens in the Ceylon National Herbarium, in the Royal Botanic Gardens, Peradeniya, with expenses met by the Smithsonian Institution. In return, they would provide updated manuscripts of their families for the revised Handbook, which would then be published by the University of Ceylon, with Smithsonian financing.

This enterprise was initiated in February, 1968, and has been continued without interruption since that date. Quarters for the work, herbarium and library, and other facilities have been furnished by the Division of Systematic Botany of the Department of Agriculture, Peradeniya and by the Botany Department, Faculty of Science, University of Ceylon, Peradeniya. We have enjoyed the cooperation of the US Embassy, Colombo, various Ceylon government departments and agencies, especially the Wildlife Department and the Forest Department, and of many plantations and individuals in all parts of Ceylon, too numerous to enumerate.

Special thanks must be offered to Professor Dieter Mueller-Dombois, of the Botany Department, University of Hawaii, who was for two years Principal Field Investigator for the plant ecology project, and who, on top of his duties in that capacity, supervised the activities of the flora project staff, facilitated the work of the visiting botanists, and acted as finance officer of the project. Without his help, the flora project could not have got started.

Special thanks are also offered to Dr. Marie-Helene Sachet, Research Botanist, Smithsonian Institution, who, though in no official capacity in the Project, has carried much of the administrative burden, at a sacrifice of her own work. The members of the Flora Project staff at Peradeniya also deserve great credit for their willing and enthusiastic assistance to the visitors, handling and processing of specimens, typing of labels and manuscripts, and keeping the Project's work going.

The materials on which the flora revisions are based are the visiting botanists' own collections, the herbarium at Peradeniya, personal collections of Mr. K. L. D. Amaratunga and the late Mr. Thomas B. Worthington, of Kandy, and materials housed in various foreign herbaria, especially those of Kew, British Museum, and the Indian National Herbarium, Calcutta for the use of which we are grateful to those in charge. A large amount of valuable material was amassed as vouchers for the ecological observations mentioned above and has been utilised by the flora project botanists. Sets of the specimens collected under the auspices of the Smithsonian projects are deposited and permanently available in the US National Herbarium and the Ceylon National Herbarium, Peradeniya. Partial sets are also being deposited in several other Ceylon institutions and in a number of herbaria with tropical interests in other parts of the world.

The resulting revised treatments of families are to be published, as they are prepared, in fascicles of about 100 pages, starting with the present one.

An editorial format has been suggested by us, but the content of each revision and the taxonomic conclusions are those of the various authors. An attempt has been made to have the nomenclature in accord with the International Code of Botanical Nomenclature, but the application of the Code is, again, the final responsibility of the authors.

It is hoped that, after the Handbook treatments are published, simplified versions can be prepared, suitable for lower school use and for the use of non-botanists.

We also have the hope that the new Handbook will stimulate active interest in the plant resources of Ceylon. Above all, it is hoped that this interest will bring about the establishment of more national parks and nature reserves in all parts of Ceylon, in order that the remarkable Ceylon flora may still have a suitable range of habitats in which to live. By this means, only, the species will be able to survive for the use and pleasure of many future generations of Ceylonese and of visitors from other parts of the world. Without a great increase in such reserves, at the present rate of deforestation and bringing land under agriculture, very many species will surely become extinct in the near future, as some probably already have.

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# APOCYNACEAE

[Herbert Hüber, Botanisches Institute II, Würzburg, Germany]

Type Genus: *Apocynum* L.

Trees, erect or climbing shrubs or perennial, very rarely annual herbs; with internal phloem and milky* latex, sometimes in small quantities. Leaves opposite or whorled or occasionally alternate; simple, entire, pinnately veined, without definite stipules. Flowers with calyx and corolla, actinomorphic, usually 5-merous (exceptionally some flowers 6-merous), bisexual, in terminal or axillary inflorescences or inflorescences arising laterally from between two petioles; sometimes the inflorescences reduced to one or two axillary flowers. Sepals shortly connate or almost free, imbricate. Corolla gamopetalous, frequently salver-shaped, the lobes contorted or rarely imbricate, overlapping in bud to the right or to the left. Stamens as many as corolla-lobes and alternating with them, inserted in the corolla-tube; anthers distinct, rarely connate by their points, free or adnate to the style-apex, longitudinally dehiscent along their inner side. Pollen granular (grains distinct, not united in tetrads). Corona absent or consisting of one or several series of scales inserted in the mouth of the corolla-tube. Disk annular when present. Carpels two, superior or semi-inferior, 2- to multi-ovulate, free or joined by their common style only, or united into a one- or two-locular ovary; style simple, often much thickened at the apex. Fruit consisting of two connate or more frequently distinct carpels, baccate, drupaceous or capsular, with one to many seeds in each carpel; merocarps paired or solitary by abortion, indehiscent or dehiscent along the ventral suture. Seeds with or without endosperm, with or without a tuft of hairs at one end or at both ends, rarely winged, without an aril but sometimes with a pulpy envelope derived from the pericarp.

A large family of about 300 genera with more than 1,400 species, predominantly in the tropics and subtropics, represented in Ceylon with 20 genera and a total of 24 truly native species, nine of which are endemic.

Apocynaceae are related with Loganiaceae (particularly with the tribe Potalieae) Periplocaceae and Asclepiadaceae. From the first family they readily can be distinguished by the occurrence of lactiferous tubes in the vegetative organs, whereas the latter families deviate in their highly specialised pollen-carriers and pollination mechanism. The subdivision of the Apocynaceae is much more problematic than their delimitation. Here the arrangement of M. Pichon is followed, but one should keep in mind that the Plumerioideae are a rather heterogenous assemblage of well-marked tribes, whereas the Apocynoideae form a thoroughly natural subfamily which hardly can be divided into distinct tribes. The genera native or naturalized in Ceylon can be arranged as follows:

Subfamily Plumerioideae.

Tribe **Carisseae:** *Willughbeia, Carissa, Hunteria.*

Tribe **Tabernaemontaneae:** *Pagiantha,* (*Ervatamia, Stemmadenia*).

Tribe **Plumerieae:** *Alstonia, Catharanthus, Holarrhena,* (*Plumeria*).

Tribe **Rauvolfieae:** *Rauvolfia, Petchia, Ochrosia.*

Tribe **Allamandeae:** (*Allamanda*).

Subfamily Cerberoideae.

Tribe **Cerbereae:** *Cerbera,* (*Thevetia*).

Subfamily Apocynoideae (Echitoideae).

Tribe **Parsonsieae:** *Aganosma, Chonemorpha, Parsonsia.*

Tribe **Nerieae:** *Vallaris, Walidda, Wrightia,* (*Nerium*).

Tribe **Apocyneae** (Ecdysanthereae): *Cleghornia, Anodendron.*

Tribe **Ichnocarpeae:** *Ichnocarpus.*

The economic importance of this family is limited to a few genera. In Ceylon the introduced *Alstonia macrophylla* Wallich ex G. Don is an important source of timber and *Rauvolfia serpentina* (L.) Benth. ex Kurz is collected and exported for pharmaceutical purposes. A ruthless exploitation made the latter disappear in many places where it used to be common few decades ago.

*Latex absent in *Nerium*.

The family is of considerable phytochemical interest and there is some correlation between morphological and chemical characters insofar as indolic alkaloids are widely distributed among the Plumerioideae but apparently absent from the rest. On the other hand, Cerberoideae and Apocynoideae are distinguished by the frequent presence of Cardiotoxic glycosides, which indicate a strong affinity of these two subfamilies with Periplocaceae and the tribe Asclepiadeae of Asclepiadaceae.

Most Ceylonese Apocynaceae are confined to the tropical lowland, particularly of the moist region, but a few species extend into the drier parts of the island or are restricted to them (e.g. *Wrightia angustifolia* Thwaites). Apart from *Carissa spinarum* L., commonly forming dense scrubs in the dry zone, and *Alstonia macrophylla* Wallich ex G. Don, which became naturalized and well established in secondary forests of the moist region, Apocynaceae in general do not play an important role in the vegetation of the island.

Due to the rapid destruction of the spontaneous vegetation, especially in the moist zone, some species are threatened by extinction, one of them being the monotypic *Petchia ceylanica* (Wight) Livera. On the other hand, a few alien species have become naturalized. These are treated like indigenous plants in this paper. Alien species frequently grown as ornamentals but not or rarely escaping from cultivation are included in the keys. A short description of these species is given below.

*Allamanda cathartica* L., Mantissa Plant. altera :214, 1771.

A straggling and climbing, sparsely puberulous or almost glabrous shrub. Leaves mostly in whorls of four or occasionally of three or leaves opposite; lanceolate, oblong or elliptic, acuminate, herbaceous to slightly coriaceous, with distant lateral veins including with the midrib an angle of 45 to 60°. Cymes short-peduncled, terminal but frequently overtopped by axillary branches. Calyx-lobes ovate-oblong, acute. Corolla large, yellow; Tube 4 to 8 cm long, cylindrical in the lower half*, campanulate above; lobes much shorter than the tube, orbicular to obovate-truncate, in bud overlapping to the left. Fruit a spiny, almost globose, unilocular capsule 3 to 7 cm long and 3 to 5 cm in diameter; spines up to 1 cm long. Seeds numerous, with a circular wing, without a tuft of hairs; very rarely produced in Ceylon.

A native of tropical America, largely grown for ornament and sometimes naturalized in the moist zone. Apart from the typical form with flowers 5 to 6 cm in diameter, there is a large-flowered plant with flowers 10 cm or more in diameter; this has been named var. *hendersonii* (Bull) Rafill.

*Ervatamia divaricata* (L.) Alston in Trimen, Handb.Flora Ceylon, 6, Suppl.: 191, 1931.

Syn.: *Nerium divaricatum* L., Spec. Plant.: 209, 1753. *Nerium coronarium* Jacq., Collectanea 1: 138, 1786.

*Tabernaemontana coronaria* (Jacq.) Willd., Enum. Hort. Berol.: 275, 1809.

*Tabernaemontana divaricata* (L.) R. Brown ex Roemer et Schultes, Syst. Veg. 4: 127, 1819.

*Ervatamia coronaria* (Jacq.) Stapf in Dyer, Flora Trop. Afr. 4(1): 127, 1902.

A slender, glabrous shrub. Leaves opposite, elliptic, acuminate, herbaceous, with distant lateral veins including with the midrib an angle of 45 to 60°. Cymes peduncled, dichasially branched, terminal but often overtopped by axillary branches. Calyx-lobes ovate-oblong, obtuse. Corolla white; tube about 2 cm long, narrowly cylindrical; lobes longer than the tube, obliquely ovate, with the covering side convex and the covered side straight, in bud overlapping to the left. Merocarps distinct, divaricate, spindle-shaped, produced into an acute beak, fleshy, dehiscent along the ventral suture when ripe, 3 to 4 cm long and about 1 cm in diameter, with orange inside. Seeds rather numerous, without a tuft of hairs.

This is the well-known Grape Jasmine, frequently grown in tropical gardens, both with single and double flowers. The flowers are heterostylous. A native of the southern Himalayas, but cultivated since ancient times.

*Nerium oleander* L., Spec. Plant.: 209, 1753.

A rigid shrub with watery juice. Young branches and inflorescences puberulous. Leaves mostly in whorls of three, lanceolate, coriaceous, glabrous; lateral veins numerous, including with the midrib an almost right angle. Cymes peduncled, with monochasial branches, terminal or lateral from between the petioles. Calyx-lobes lanceolate, acute. Corolla purple, pink or white, rarely yellowish; tube about 2 cm long, cylindrical in the lower, funnel-shaped in the upper half, with five laciniate scales in the throat; corolla-lobes slightly longer than the tube, obliquely obovate, in bud overlapping to the right. Merocarps cylindrical, 12 to 18 cm long, 0.6 to 1 cm in diameter, at first coherent by their tips, finally splitting and dehiscent along the ventral suture. Seeds numerous, densely pilose, with a tuft of hairs at one end.

Introduced from the Mediterranean and occasionally grown as an ornamental.

*Tube cylindrical in the lower third or quarter: *Allamanda schottii* Pohl.

*PLUMERIA* L., Spec. Plant.: 209, 1753.

Thick-branched, glabrous or puberulous shrubs or small trees with spirally arranged, large, lanceolate, oblong or obovate leaves, crowded at the top of the branches. Lateral veins numerous, including with the midrib an angle of 60 to almost 90°. Cymes long-peduncled, monochasially branched, terminal but sometimes overtopped by axillary branches. Calyx-lobes minute, truncate or very broadly triangular. Corolla rather large, white, purple or yellow, fleshy; tube 2 to 3 cm long, cylindrical, gradually and slightly funnel-shaped towards the mouth; lobes longer than the tube, elliptic to oblong, in bud overlapping to the left. Merocarps distinct, divaricate, cylindrical, up to 25 cm long and up to 3 cm in diameter, dehiscent along the ventral suture. Seeds numerous, winged, without a tuft of hairs.

Two species are frequently grown in Ceylon. According to Woodson, they can be distinguished as follows:

1. Leaves lanceolate to lanceolate-oblong, acute or acuminate at apex, rather pale green and opaque above, with tertiary venation hardly prominent beneath. Petiole glabrous. Corolla about 5 to 6 cm in diameter, tinged with pink or purple at least on the outside of the tube; lobes obliquely patent, pink, yellow or white with a yellow base. Merocarps up to 25 cm long and 2 to 3 cm wide.

   *P. rubra*

1. Leaves obovate to obovate-oblong, rounded at the apex, dark green and shining above, with tertiary venation strongly prominent beneath. Petiole more or less puberulous. Corolla about 10 cm in diameter, white with a yellow throat, not at all tinged with red; lobes spreading and slightly recurved, Merocarps up to 15 cm long and about 1.5 cm wide.

   *P. obtusa*

*Plumeria rubra* L., Spec. Plant.: 209, 1753.

Syn.: *Plumeria acuminata* Aiton, Hort. Kew. 2: 70, 1789.

*Plumeria acutifolia* Poir., Encycl. Suppl. 2: 667, 1812.

A native of Central America from Mexico to Panama. Commonly grown for ornament in Ceylon and throughout the tropics, sometimes found in a semi-wild state as a relict of cultivation.

*Plumeria obtusa* L., Spec. Plant.: 210, 1753.

A native of the Bahama Islands, Cuba, Jamaica, Hispaniola and Puerto Rico. In Ceylon frequently grown in gardens but hardly ever found as an escape.

*Stemmadenia bella* Miers, Apocyn. South. Amer.: 77, 1878.

A glabrous tree or tall shrub with slender branches. Leaves opposite, elliptic to obovate, acuminate, cuneate at the base, herbaceous; lateral veins distant, including with the midrib an angle of about 60°. Cymes short-peduncled, dichasially branched, terminal but frequently overtopped by axillary branches. Calyx-lobes ovate-oblong, obtuse. Corolla large, white; tube 5 to 6 cm long, cylindrical in the lower fifth, funnel-shaped above; lobes half to two third as long as the tube, broadly obovate, in bud overlapping to the left. Merocarps distinct, reflexed, obliquely ovoid, blunt, fleshy, dehiscent along the ventral suture, about 10 cm long and 7 cm in diameter. Seeds numerous, oblong, not compressed, without a tuft of hairs.

A native of southern Mexico and Guatemala, occasionally grown as an ornamental.

*Thevetia peruviana* (Pers.) Merrill, Philipp. Journ. Sci., Bot. 9: 130, 1914.

Syn.: *Cerbera thevetia* L., Spec. Plant.: 209, 1753.

*Cerbera peruviana* Pers., Syn. Plant. 1: 267, 1809.

*Thevetia neriifolia* Jussieu ex Steudel, Nomencl. Bot. ed. 2, 2: 680, 1841 as "*nereifolia*".

A tall, glabrous shrub or small tree with linear or linear-lanceolate, slightly coriaceous leaves; lateral veins rather distant, including with the midrib an angle of 45 to 60°. Cymes short-peduncled, monochasially branched, terminal but often overtopped by axillary branches. Calyx-lobes triangular-lanceolate, acute. Corolla rather large, yellow; tube 4 to 5 cm long, cylindrical in the lower third, funnel-shaped above; lobes obovate-truncate, much shorter than the tube, in bud overlapping to the left. Carpels united into a broadly turbinate drupe, slightly compressed laterally, about 3 cm long and wide, with few, strongly flattened seeds.

A native of Central and South America, now frequently grown throughout the tropics.

## KEY TO THE GENERA.

[Key to Flowering Specimens.]

1. Corolla-lobes (viewed from outside) overlapping to the right. Erect or twining woody plants.
   2. With paired spines in the axils of leaves at alternate nodes. Ovary simple, ovoid. **2. Carissa**
   2. Spines absent. Ovary of two distinct carpels.
      3. Erect shrubs or trees with leaves whorled or alternate.
         4. Flowers large, funnel-shaped, mostly purple or white. Calyx-lobes about 5 mm long, very acute. Anthers adnate to the style-apex. Introduced ornamental. **Nerium**
         4. Flowers rather small, salver-shaped, white or greenish-white. Calyx-lobes not exceeding 1.5 mm, obtuse. Anthers free.
            5. Pedicels several times longer than the calyx, minutely puberulous, rarely glabrescent. Leaves pubescent on the under surface at least when young. **5. Alstonia** (*macrophylla*)
            5. Pedicels about as long as the calyx, glabrous. Leaves glabrous even when young. **10. Ochrosia**
      3. Twining or semi-scandent shrubs with opposite leaves. Anthers adnate to the style-apex.
         6. Anthers exserted from the corolla-tube.
            7. Stamens inserted near the base of the corolla-tube. Filaments long, spirally twisted. Young stems glabrous. **14. Parsonsia**
            7. Stamens inserted near the mouth of the corolla-tube. Filaments short and straight. Young stems pubescent. **15. Vallaris**
         6. Anthers included in the corolla-tube.
            8. Young stem and inflorescence glabrous.
               9. Corolla-lobes ovate, half as long as the tube. **18. Cleghornia**
               9. Corolla-lobes linear, almost twice as long as the tube. **19. Anodendron**
            8. Young stem and inflorescence densely pubescent or tomentose.
               10. Corolla very large, 7 to 10 cm in diameter when expanded. Leaves 8 to 18 cm wide, cordate at the base. **13. Chonemorpha**
               10. Corolla not exceeding 2 cm in diameter. Leaves rounded or acute at base.
                  11. Calyx-lobes linear-lanceolate, 7 to 10 mm long, longer than the corolla-tube. **12. Aganosma**
                  11. Calyx-lobes minute, not exceeding 1 mm, shorter than the corolla-tube. **20. Ichnocarpus**

1. Corolla-lobes (viewed from outside) overlapping to the left. Plants woody or herbaceous, erect or climbing with tendrils.
   12. Anthers exserted from the corolla-tube, adnate to the style-apex. Mouth of corolla-tube with one or several series of erect scales. Calyx-lobes obtuse or almost obtuse.
      13. Corolla-tube 1.7 to 2.8 cm long; the lobes little shorter than the tube. Slender shrub. **16. Walidda**
      13. Corolla-tube not exceeding 0.5 cm in length; the lobes much longer. Trees. **17. Wrightia**
   12. Anthers included in the corolla-tube, not adnate to the style-apex. Scales in the mouth of the corolla-tube absent.
      14. Calyx-lobes obtuse.
         15. Leaves whorled or alternate.
            16. Flowers large. Stamens inserted near the base of the corolla-tube. Calyx glabrous. Introduced ornamental. **Plumeria**
            16. Flowers rather small. Stamens inserted in the upper part of the corolla-tube. Calyx densely puberulous. **5. Alstonia** (*scholaris*)

15. Leaves opposite.

17. Flowers small, yellow, in sessile or short-peduncled cymes. Climbing shrub with long, whip-like tendrils. **1. Willughbeia**

17. Flowers large, white. Erect shrubs or trees. Tendrils absent.

18. Corolla fleshy. Leaves firmly coriaceous, with lateral veins horizontally patent. **4. Paglantha**

18. Corolla membranous. Leaves herbaceous; lateral veins including with the midrib an angle of 45 to 60°. Introduced ornamentals.

19. Calyx-lobes connate at their very base only. Corolla-tube cylindrical in the lower fifth, funnel-shaped above. Corolla-lobes shorter than the tube. **Stemmadenia**

19. Calyx-lobes connate for at least half of their length. Corolla-tube narrowly cylindrical throughout. Corolla-lobes longer than the tube. **Ervatamia**

14. Calyx-lobes acute.

20. Corolla rather large, 4 cm in diameter or more; tube funnel-shaped towards the mouth. Calyx-lobes 7 to 20 mm long.

21. Flowers pure white, turning black when dried. Calyx deciduous. Ovary of two distinct carpels. **11. Cerbera**

21. Flowers yellow. Ovary ovoid, simple. Introduced ornamentals.

22. Leaves alternate, linear, up to 1 cm wide. Corolla-tube cylindric in the lower third. Ovary bilocular, with two ovules in each loculus. Trees. **Thevetia**

22. Leaves mostly whorled or opposite, lanceolate, 2 to 4 cm wide. Corolla-tube most frequently cylindric in the lower half. Ovary unilocular with numerous ovules. Scrambling or erect shrubs. **Allamanda**

20. Corolla medium-sized or small; tube not widened towards the mouth. Calyx-lobes not exceeding 5 mm in length.

23. Flowers solitary or paired in the axils of the leaves. Low subshrubs or herbs. **6. Catharanthus**

23. Inflorescence of more than two flowers, peduncled.

24. Corolla puberulous without; lobes longer than the tube. Stamens inserted near the base of the corolla-tube. **7. Holarrhena**

24. Corolla glabrous without; lobes shorter than the tube. Stamens inserted near the mouth of the corolla-tube.

25. Leaves at the branching usually in whorls of three, otherwise opposite. Corolla-lobes narrowly oblong; the tube pubescent in the mouth. **9. Petchia**

25. Leaves either opposite or whorled throughout. Corolla-lobes ovate or orbicular; tube glabrous in the mouth.

26. Leaves opposite, coriaceous. Small trees. **3. Hunteria**

26. Leaves in whorls of three, thin, membranous. Low shrubs. **8. Rauvolfia**

[Key to Fruiting Specimens.]

1. Seeds with a tuft of hairs at one end or at both ends. Erect or twining woody plants.

2. Leaves whorled. Trees or erect shrubs.

3. Tall trees with slender merocarps of 2.5 to 3.5 mm in diameter. Seeds with a tuft of hairs at both ends. **5. Alstonia**

3. Shrubs with rather stout merocarps of 0.6 to 1 cm in diameter. Seeds with a tuft of hairs at one end only. Introduced ornamental. **Nerium**

2. Leaves opposite.
   4. Young stems glabrous.
      5. Trees or erect shrubs.
         6. Slender shrubs. Merocarps acuminate, 9 to 15 cm long.
            **16. Walidda**
         6. Trees. Merocarps obtuse or acute but not acuminate, 17 to 45 cm long.
            7. Seeds dark brown. Branchlets dark purplish-brown; lenticels not conspicuous. Merocarps 30 to 45 cm long, obtuse.
               **7. Holarrhena**
            7. Seeds yellowish-grey or pale greyish-brown. Branchlets greyish-brown; lenticels whitish, very conspicuous. Merocarps 17 to 30 cm long, acute.
               **17. Wrightia** (*angustifolia*),
      5. Twining of semiscandent shrubs.
         8. Fruit a bilocular, septicidally dehiscent capsule 11 to 18 cm long. Seeds linear, 1.2 to 1.8 cm long.
            **14. Parsonsia**
         8. Fruit soon splitting into two distinct merocarps dehiscent along the ventral suture. Seeds 2 to almost 5 cm long.
            9. Merocarps slender, about 25 to 30 cm long and 0.5 cm in diameter, many-seeded. Seeds narrowly lanceolate.
               **18. Cleghornia**
            9. Merocarps stout, about 10 to 15 cm long and 1 to 1.5 cm in diameter, few-seeded. Seeds ovate-oblong.
               **19. Anodendron**
   4. Young stems pubescent or tomentose.
      10. Seeds linear, 1 to scarcely 2 mm wide. Trees or twining shrubs.
         11. Seeds yellowish-grey or pale brown. Trees.
            **17. Wrightia**
         11. Seeds blackish-brown. Twining shrubs.
            **20. Ichnocarpus**
      10. Seeds lanceolate or ovate, 3 mm wide or wider. Twining shrubs.
         12. Fruit tardily splitting into two rather fleshy merocarps 10 to 15 cm long. Seeds 1 to 1.2 cm long, pale yellowish-grey.
            **15. Vallaris**
         12. Merocarps soon distinct, 15 to 32 cm long. Seeds about 1.5 to 2 cm long, dark brown or black.
            13. Leaves glabrous, tapering to the base. Merocarps 0.5 to 0.7 cm in diameter.
               **12. Aganosma**
            13. Leaves pubescent above, tomentose beneath, cordate at the base. Mero-carps about 1 cm in diameter.
               **13. Chonemorpha**

1. Seeds without a tuft of hairs. Woody or herbaceous plants, erect or climbing with tendrils.
   14. Fruit simple, globose, ovoid or turbinate, formed by two united carpels, unilocular with two parietal placentas or bilocular.
      15. Fruit a spiny, unilocular capsule. Leaves whorled or opposite. Introduced ornamental.
         **Allamanda**
      15. Fruit not spiny, indehiscent.
         16. Leaves alternate, linear, up to 1 cm wide. Fruit a turbinate drupe, slightly compressed laterally. Introduced ornamental.
            **Thevetia**
         16. Leaves opposite. Fruit a globose or ovoid berry, not compressed laterally.
            17. Berry large, many-seeded. Climbing shrubs with long, whip-like tendrils.
               **1. Willughbeia**
            17. Berry rather small, few-seeded. Rigid shrubs or small trees with paired spines in the axils of the leaves at alternate nodes.
               **2. Carissa**

14. Fruit consisting of two merocarps (sometimes solitary by abortion), distinct or connate in the lower half only.

18. Merocarps many-seeded, dehiscent along the ventral suture.

19. Leaves spirally arranged. Seeds winged. Introduced ornamental.
**Plumeria**

19. Leaves opposite. Seeds not winged.

20. Merocarps narrowly cylindrical, dry, 1 to 3 mm in diameter. Low subshrubs or annual or perennial herbs.
**6. Catharanthus**

20. Merocarps fleshy, spindle-shaped or ovoid, much thicker than above. Trees or shrubs.

21. Merocarps spindle-shaped, about 1 cm in diameter, produced into an acute beak. Introduced ornamental.
**Ervatamia**

21. Merocarps obliquely ovoid, 3 to 7 cm in diameter, blunt.

22. Leaves coriaceous; lateral veins horizontally patent.
**4. Pagiantha**

22. Leaves herbaceous; lateral veins including with the midrib an angle of about 60°. Introduced ornamental.
**Stemmadenia**

18. Merocarps one-to four-seeded, indehiscent.

23. Merocarps fleshy, not exceeding 1.5 cm in diameter. Herbs, shrubs or slender-branched trees.

24. Leaves in whorls of three throughout. Merocarps sessile, 0.5 to 1.2 cm long, one-seeded.
**8. Rauvolfia**

24. Leaves mostly or entirely opposite. Merocarps 1.2 to 5 cm long, usually two-or several-seeded, stipitate.

25. Leaves opposite throughout. Merocarps with two collateral seeds, not constricted between the seeds; blunt.
**3. Hunteria**

25. Leaves at the branching usually in whorls of three, otherwise opposite. Merocarps normally two-to four-seeded, constricted between the seeds; produced into a slender beak.
**9. Petchia**

23. Merocarps woody-fibrous, 3 to 9 cm in diameter. Large shrubs or trees with rather stout branches.

26. Leaves rounded or very short-acuminate at the apex, not turning black when dried. Merocarps obliquely ovoid, distinctly longer than wide, usually both developed.
**10. Ochrosia**

26. Leaves acuminate, turning black when dried. Merocarps almost globose, mostly solitary.
**11. Cerbera**

## 1. WILLUGHBEIA Roxb.

Roxb., Plants Coast Corom. 3:77, t. 280, 1820 nomen conservandum.

Type Species: *Willughbeia edulis* Roxb.

Large, glabrous shrubs, twining when young, climbing when fully developed by long, whip-like tendrils which are leaf-less or bear one or two pairs of leaves at their base, with short, reflexed branchlets at the apex, ending in two hooks. Leaves opposite, elliptic, with numerous lateral veins including with the midrib an angle of 80 to 90°. Flowers in small, sessile or short-peduncled panicles, solitary or paired from the axils of the leaves. Calyx eglandular, with broadly rounded lobes. Corolla yellow, glabrous without; the tube very shortly cylindrical, slightly constricted at the mouth; the lobes about as long as the tube, linear-oblong, acute, in bud somewhat overlapping to the left. Stamens inserted near the base of the tube; anthers distinct, ovate-lanceolate. Disk absent. Ovary paracarpous, with two parietal placentas. Fruit a large, globose, many-seeded berry. Seeds ovoid, compressed, without endosperm and without a tuft of hairs, surrounded by a fleshy envelope.

A mainly Malesian genus with one species endemic in Ceylon.

**Willughbeia cirrhifera** Abeywickrama in Ceylon Journ. Sci. (Biol. Sci.) 2:84, 1959.

Nomenclatural type: Gardner in Herb. Wight 550 (K, lectotype).

Syn.: *Chilocarpus ceylanicus* Wight, Icon. Plant. Ind. Or. 4 (2):1, t. 1288, 1848.

*Willughbeia ceylanica* (Wight) Thwaites, Enum. Plant. Zeylan.:191, 1860, not *W. ceilanica* (Thunb.) Sprengel, 1825. Hooker f., Flora Brit. India 3:624, 1882. Trimen, Handb. Flora Ceylon 3:123, 1895 as "*zeylanica*".

Petiole 0.5 to 1.8 cm long. Leaf-blade 5 to 13 cm long, 2.5 to 7 cm wide, widest about in the middle, cuneate at the base, markedly or obsoletely acuminate and obtuse at the apex, coriaceous. Pedicels as long as the calyx or slightly longer. Calyx-lobes 1.5 to 2 mm long, glabrous. Corolla-tube little longer than the calyx. Fruit 8 to 15 cm in diameter, yellow, tinged with red, entirely filled with pulp in which are embedded the seeds, each of them 1.8 to 2.5 cm long.

Geographic distribution: Endemic in the rain-forest area of Ceylon. According to Thwaites not uncommon in the low country and up to an elevation of 1300 m. Nowadays becoming rare by the destruction of the forests.

Specimens examined: WESTERN PROVINCE: Kalutara District: Kalutara, . collector unknown (PDA). CENTRAL PROVINCE: Kandy District: Hantane near Kandy, 2300 ft, Gardner in Herb. Wight 550 (BM,K). Nuwara Eliya District: Rassawa, collector unknown (PDA). SABARAGAMUWA PROVINCE: Ratnapura District: Eratnagoda near Kuruwita, Huber 17 (US). SOUTHERN PROVINCE: Galle District: Kanneliya Forest between Hiniduma and Udugama, Compartment 19, Huber 62 (US); southern slope of Haycock (=Hiniduma Kande), Huber 64 (US). Locality unknown: Thwaites C.P. 1829. (BM,K,PDA).

Vernacular names: **Kiri-wel** (*S.*).

The handsome fruit, like a very large, pink-cheeked apple, is a favourite food of monkeys (Trimen).

## 2. CARISSA L.

L., Mantissa Plant. :7, 1767 nomen conservandum.

Type Species: *Carissa carandas* L.

Syn.: *Arduina* Miller, Figures :499, 1759.

Shrubs or small trees with rigid, minutely puberulous or glabrescent branches and paired, divaricate, simple or forked spines in the axils of the leaves at alternate nodes. Leaves opposite, orbicular, ovate, obovate or oblong, glabrous on both sides, with few, lateral veins including with the midrib an angle of 30 to 60°. Flowers in poor, sessile or peduncled cymes from the axils of the leaves* at alternate nodes. Calyx eglan-

* Cymes apparently but not truly terminal when arising from the axils of the uppermost leaves.

dular, with ovate-lanceolate, sharply pointed lobes. Corolla white or pink, glabrous or slightly puberulous without; the tube narrowly cylindrical, slightly widened in or above the middle; the lobes shorter than the tube, linear to lanceolate, acute, in bud overlapping to the right. Stamens attached to the tube in or little above the middle, not exserted; anthers distinct, linear-oblong, apiculate. Disk absent. Ovary bilocular. Fruit an ovoid, two-to four-seeded berry. Seeds obliquely ovate, strongly compressed, scutellate, with fleshy endosperm, without a tuft of hairs.

A genus of about 30 species widely distributed through the drier parts of southern and tropical Africa, tropical Asia and Australia.

KEY TO THE SPECIES

1. Leaves widest in or below the middle, acute at the apex, very rigid. Peduncles obsolete or short, not exceeding 1.5 cm in length. Berry up to 1 cm in diameter.

**1. C. spinarum**

1. Leaves widest in or above the middle, obtuse, rather thin. Peduncle well developed, 1.2 to 2.5 cm long. Berries almost 2 cm in diameter.

**2. C. carandas**

**1. Carissa spinarum** L., Mantissa Plant. Altera:559, 1771 excl. syn. Rumph. Hooker f., Flora Brit. India 3:631, 1882. Trimen, Handb. Flora Ceylon 3:125, 1895.

Nomenclatural type: Koenig in the Linnaean Herb. 295/2 (LINN).

Syn.: *Carissa diffusa* Roxb. [Hort. Bengal.: 19, 1814 nomon nudum] Flora Indica ed Carey 2:524, 1824. Thwaites, Enum. Plant. Zeylan.:191, 1860.

An intricately branched, erect or occasionally subscandent shrub. Spines simple or forked, 1.2 to 6 cm long. Leaves short-petioled; the blade 1.5 to 5 cm long and 1.2 to 4 cm wide, broadly ovate or rhomboid, widest in or below the middle, as long as wide to twice as long as wide, acute or rounded at the base, acute and apiculate at the apex, firmly coriaceous. Peduncle obsolete or up to 1.2 (rarely up to 1.5) cm long. Pedicels shorter to slightly longer than the calyx. Calyx-lobes 0.2 to 0.25 cm long, glabrous or puberulous without. Flowers scentless. Corolla-tube 1.2 to 2 cm long. Fruit 0.7 to 1.2 cm long, shining, black.

Chromosome number: 2n=28.

Geographic distribution: From the Punjab through India to Ceylon and Burma.

In Ceylon common throughout the dry zone, especially in overgrazed and otherwise disturbed vegetation, along roads and at the edge of forests. Absent from the hill country and from the moist region. Flowering all the year.

Specimens examined: NORTH WESTERN PROVINCE: Puttalam District: mile 15 of Puttalam-Anuradhapura Road, Huber 49 (US). NORTH CENTRAL PROVINCE: Anuradhapura District: between Anuradhapura and Nochchiyagama, Huber 7 (US). UVA PROVINCE: Badulla District: Ekiriyankumbura, Huber 39 (US). Monaragala District: Bibile, collector unknown (PDA). SOUTHERN PROVINCE: Hambantota District: Tissamaharama, Huber 35 (US). Locality unknown: Macrae 332 (BM): Thwaites C.P. 1822 (K, PDA).

Vernacular names: **Hin-karamba** (*S.*); **Chirukila, Kilatti** (T).

**2. Carissa carandas** L., Mantissa Plant.: 52, 1767. Thwaites, Enum. Plant. Zeylan.: 191, 1860. Hooker f., Flora Brit. India 3:630, 1882. Trimen, Handb. Flora Ceylon 3:124, 1895.

Nomenclatural type: Rumphius, Herb. Amb. 7, t. 25, 1755.

A large shrub or small tree. Spines usually simple, 1 to 3 cm long. Leaves shortly petioled; the blade 3 to 7 cm long and 1.5 to 4 cm wide, obovate, elliptic or oblong, mostly widest above the middle, slightly longer than wide to three times as long as wide; cuneate at the base, obtuse at the apex, rather thin. Peduncle 1.5 to 2.5 cm long. Pedicels about as long as the calyx or slightly longer. Calyx-lobes 0.25 to 0.3 mm long, puberulous without. Flowers as in *C. spinarum*. Fruit almost 2 cm long, reddish-purple.

Geographic distribution: From the Punjab through India to Ceylon, the Malay Peninsula and Malesia. Widespread by cultivation and doubtfully native outside of the Deccan Peninsula.

In Ceylon grown as a fruit tree, probably not native.

Specimens examined: NORTHERN PROVINCE: Jaffna District: Jaffna, Thwaites C.P. 1823 (BM, K, PDA).

Vernacular names: **Maha-karamba** (*S.*); **Perunkila** (*T.*).

*Carissa carandas* is appreciated for its palatable berries.

## 3. HUNTERIA Roxb.

Roxb., [Hort. Bengal. :84, 1814 nomen nudum] Flora Indica ed. Carey 1:695, 1832.

Type Species: *Hunteria corymbosa* Roxb.

A small, glabrous tree. Leaves opposite, oblong-elliptic or lanceolate, with rather numerous lateral veins including with the midrib an angle of about 60°. Flowers in short-stalked, terminal cymes, sometimes apparently axillary by overtopping. Calyx eglandular, with triangular-ovate, acute lobes. Corolla yellow to white, glabrous without; the tube cylindrical, inflated in the upper half; the lobes shorter than the tube, narrowly to broadly ovate, obtuse, in bud strongly overlapping to the left. Stamens attached to the corolla-tube within the inflated portion, not exerted; the anthers distinct, ovate-lanceolate, apiculate. Disk absent. Merocarps distinct, ovoid, short-stipitate, slightly apiculate or almost obtuse at the apex, fleshy, indehiscent, mostly two-seeded. Seeds ovoid, with fleshy endosperm, without a tuft of hairs.

A genus of six species, centered in tropical Africa, with one species extending to India, Ceylon and Malesia. Apart from this another species has been described from Ceylon. This is *Hunteria legocii* Livera in Ann. Roy. Bot. Garden Peradeniya 10: 140, 1926. This name is based on an inaccurate drawing at PDA.

**Hunteria zeylanica** (Retzius) Gardner ex Thwaites, Enum. Plant. Zeylan.: 191, 1860. Alston in Trimen, Handb. Flora Ceylon 6, Suppl.: 190, 1931. M. Pichon in Bot. Soc. Brot. 27:104, 1953.

Nomenclatural type: Koenig s.n. (LD holotype not seen, BM isotype).

Syn.: *Cameraria zeylanica* Retzius, Obs. Bot. 4:24, 1786.

*Hunteria corymbosa* Roxb., [Hort. Bengal.:84, 1814 nomen nudum] Flora Indica ed. Carey 1:695, 1832. Hooker f., Flora Brit. India 3:637, 1882. Trimen, Handb. Flora Ceylon 3:128, 1895.

Petiole 0.6 to 1.6 cm long. Leaf-blade 5 to 16 cm long, 1 to 6 cm wide, broadest in or below the middle, cuneate at the base, long- to short-acuminate or not at all acuminate and obtuse at the apex, coriaceous. Pedicels usually longer than the calyx. Calyx-lobes 1 to 2 mm long, glabrous. Flowers strongly fragrant. Corolla-tube 0.5 to 0.9 cm long. Merocarps 1.1 to 2.7 cm long, yellow when ripe.

Geographic distribution: Southern part of the Deccan Peninsula, Ceylon, the Andaman Islands, the Malay Peninsula, Hainan and Sumatra. Another variety in tropical East Africa.

In Ceylon formerly not uncommon in the moist low country, but now disappearing rapidly by the destruction of the rain-forests.

*Hunteria zeylanica* is represented in Ceylon by the following varieties:

1. Leaf-blade oblong-elliptic, 2 to 6 cm wide. var. *zeylanica*
1. Leaf-blade lanceolate, 1 to 2.3 cm wide. var. *salicifolia*

**Hunteria zeylanica** (Retzius) Gardner ex Thwaites var. **zeylanica.**

Leaf-blade oblong-elliptic, 2 to 6 cm wide, two to four times as long as wide, more or less acuminate at the apex.

According to Thwaites common in the warmer parts of Ceylon.

Specimens examined: WESTERN PROVINCE: Colombo District: Colombo, Koenig s.n. (K). Locality unknown: Gardner 554 (K); Koenig s.n. (BM); Macrae 356 (BM); Thwaites C. P. 1827 (BM, K, PDA).

Vernacular names: **Médiya** (*S.*).

According to Trimen the leaves have been used externally for wounds and cuts.

**Hunteria zeylanica** (Retzius) Gardner ex Thwaites var. **salicifolia** (Wallich ex A. DC.) M. Pichon in Bol. Soc. Brot. 27:111, Brot. 27:111, 1953.

Nomenclatural type: Hapie in Herb. Wallich 1540 (K-W).

Syn.: *Tabernaemontana salicifolia* Wallich ex A. DC. in DC., Prodr. 8:376, 1844.

*Hunteria lanceolata* A. DC. in DC., Prodr. 8:350, 1844.

*Hunteria roxburghiana* Wight, Icon. Plant. Ind. Or. 4 (2):2, t. 1294, 1850.

*Hunteria corymbosa* Roxb. var. *salicifolia* (Wallich ex A. DC.) Hallier f. in Jahrb. Hamb. Wiss. Anst. 17, 3. Beih.: 195, 1900.

*Hunteria Zeylanica* (Retzius) Gardner ex Thwaites var. *lanceolata* (Wallich ex A. DC.) Alston in Trimen, Handb. Flora Ceylon 6, Suppl.:190, 1931.

Leaf-blade lanceolate, 1 to 2.3 cm wide, five to about seven times as long as wide, not or not distinctly acuminate at the apex.

Specimens examined: SOUTHERN PROVINCE: Galle District: Galle, Gardner 554 (BM). Locality unknown: Thwaites C. P. 2518 (K).

## 4. PAGIANTHA Markgraf

Markgraf in Notizbl. Bot. Garten Berlin 12:546, 1935.

Type Species: *Pagiantha dichotoma* (Roxb.) Markgraf.

A tall, glabrous shrub or a small tree. Leaves opposite, oblong-elliptic, with rather numerous lateral veins including with the midrib a right angle. Flowers five- or six-merous, in long-peduncled, dichasially branched cymes arising from the axils of the terminal pair of leaves. Calyx glandular within; the lobes broadly ovate, obtuse. Corolla white with the throat and tube yellow within; glabrous without, the tube cylindrical, fleshy; the lobes longer than the tube, oblong, obliquely truncate and almost obtuse at the apex, in bud strongly overlapping to the left. The stamens inserted below the middle of the tube; anthers distinct, sagittate with the auricles appressed to the filament, acute, filled with pollen to the base. Disk absent. Merocarps distinct, obliquely ovoid, strongly convex on the ventral side, slightly so on the back, blunt, fleshy but dehiscent along the ventral suture, many-seeded. Seeds ovoid-oblong, not compressed, with endosperm, without a tuft of hairs, surrounded by a pulpy envelope.

Eleven species ranging from India and Ceylon through Malesia to the Fiji Islands.

**Pagiantha dichotoma** (Roxb.) Markgraf in Notizbl. Bot. Garten Berlin 12:546, 1935.

Nomenclatural type: Coloured drawing nr. 1811 of *Tabernaemontana dichotoma* by Roxburgh at K.

Syn.: *Tabernaemontana dichotoma* Roxb. [Hort. Bengal.: 20, 1814 nomen nudum] Flora Indica ed. Carey 2:21, 1832. Thwaites, Enum. Plant. Zeylan.:192, 1860. Hooker f., Flora Brit. India 3:645, 1882. Trimen, Handb. Flora Ceylon 3:132, 1895.

*Rejoua dichotoma* (Roxb.) Gamble, Flora Madras :812, 1923. Alston in Trimen, Handb. Flora Ceylon 6, Suppl.: 191, 1931.

Young parts covered with a shining, resinous coat. Petiole 2 to 4 cm long, bearing at the base on the upper side a semicircular rim of rudimentary, coalescent stipules. Leaf-blade 8 to 21 cm long and 2.5 to 9 cm wide, broadest in or above the middle, tapering to the base, rounded or very short-acuminate at the apex, coriaceous. Pedicels much longer than the calyx. Calyx-lobes 3 to 4 mm long, glabrous. Corolla-tube 1.8 to 2.5 cm long. Merocarps pendulous, paired or solitary by abortion, 3.5 to 7 cm long and 3 to 5 cm in diameter, glabrous, orange when ripe. Seeds with a coat of crimson pulp.

Geographic distribution: Western and Southern Deccan Peninsula, Ceylon.

A common member of the secondary forest of the moist part of Ceylon, mostly at low altitudes but occasionally ascending to about 1200 m.

Specimens examined: CENTRAL PROVINCE Kandy District: Hantane near Kandy, Huber 3 (US); Kandy, Udawattakele Sanctuary, Huber 5 (US); Kandy, Hillcrest 2130 ft, Worthington 7133 (private herbarium). Nuwara Eliya District: Rikilligaskada, Huber 57 (US). Locality unknown: Burmans. n. (BM); Gardner s. n. (K) Macrae 353 (BM); Thwaites C. P. 2834 (PDA).

Vernacular name: **Divi-kaduru** (*S.*).

The white latex of the plant can cause a two week inflammation of the eye (Worthington).

## 5. ALSTONIA R. Br.

R. Brown in Mem. Wern. Soc. 1:75, 1811, prepr. 1810, nomen conservandum.

Type Species: *Echites scholaris* L.

Tall trees with the young branches and leaves glabrous or pubescent. Leaves whorled, obovate, oblong or lanceolate, with rather numerous lateral veins including with the midrib an angle of 60 to 80°. Flowers in long-peduncled cymes arranged in a sessile, terminal umbel or sometimes in two superposed umbels. Calyx eglandular, with broadly ovate, obtuse or truncate lobes. Corolla white or greenish-white, glabrous or puberulous without; the tube cylindrical, slightly inflated below the mouth; the lobes shorter than or as long as the tube, obovate to oblong, obtuse to almost acute to the apex, overlapping in bud to the left or to the right. Stamens attached at the corolla-tube in the inflated portion near the mouth but not exserted; the anthers distinct, ovate, acute. Disk absent. Merocarps distinct, very long and slender, cylindrical, acute, dry and dehiscent along the ventral suture when ripe, many-seeded. Seeds oblong, flat, with scanty endosperm, with a tuft of hairs at both ends, brown.

A genus of 34 species distributed throughout the Old World Tropics, most numerous in the West Pacific Region. Primarily *Alstonia* was represented in Ceylon by *A. scholaris* (L.) R. Brown

only but since the beginning of this century the Malayan *A. macrophylla* Wallich ex G. Don has largely been naturalized.

KEY TO THE SPECIES

1. Leaves in whorls of three or four; the blade membranous, densely pubescent beneath when young, with rather distant lateral veins. Pedicels much longer than the calyx. Corolla-lobes almost as long as the tube, in bud overlapping to the right. Seeds acute at one end, obtuse at the other. **1. A. macrophylla**

1. Leaves in whorls of five to ten; the blade coriaceous, glabrous on both sides, with close and numerous lateral veins. Pedicels as long as or shorter than the calyx. Corolla-lobes one third or one quarter as long as the tube, in bud overlapping to the left. Seeds obtuse at both ends. **2. A. scholaris**

**1. Alstonia macrophylla** Wallich [Num. List nr. 1648, 1829 nomen nudum] ex G. Don, Gen. Hist. 4:87, 1837. Hooker f., Flora Brit. India 3:643, 1882. Alston in Trimen, Handb. Flora Ceylon 6, Suppl.: 192, 1931. Monachino in Pacific Sc. 5:164, 1949.

Nomenclatural type: Herb. Wallich nr.1648 (K-W).

Leaves in whorls of three or mostly of four. Petiole 1 to 3 cm long. Leaf-blade 10 to 50 cm long, 4 to 14 cm wide, widest in or above the middle, cuneate at the base, abruptly short-acuminate or more rarely obtuse at the apex, membranous, glabrous above, densely pubescent beneath at least when young, with rather distant lateral veins 0.6 to 2 cm apart from each other, including with the midrib an angle of 60 to 70.° Cymes rather lax, arranged in a sessile umbel. Pedicels much longer than the calyx. Calyx-lobes up to 1 mm long, semicircular, puberulous to almost glabrous without. Corolla glabrous without except for the ciliolate lobes; the tube 0.5 to 0.6 cm long, the lobes about as long as the tube, oblong, in bud overlapping to the right. Merocarps pendulous, 30 to 45 cm long, 0.25 to 0.35 cm in diameter, glabrous when ripe. Seeds acute but not acuminate at one end, obtuse at the other.

Geographic distribution: Malay Peninsula, Thailand, Indo-china, the Philippines, Celebes and Borneo. Naturalized in Ceylon.

Introduced as a forest tree to Ceylon, *Alstonia macrophylla* rapidly became naturalized in the moist region up to an elevation of 1200 to 1500 m. Now it is one of the most prominent species of the secondary rain forest in the island.

Specimens examined: WESTERN PROVINCE: Colombo District: Colombo, 15 ft. Worthington 4205 (BM). CENTRAL PROVINCE: Kandy District: Dekkanda Kadugannawa, 2000 ft, Worthington 333 (private herbarium); Hantana near Kandy, Huber 1 (US); Kandy, Hillcrest, 2100 ft, Worthington 4312 (BM); the same 4411 (BM); Kandy, Udawattakele Sanctuary, Huber 4 (US); Peradeniya, Mueller-Dombois 67110925 (BISH). SABARAGAMUWA PROVINCE: Ratnapura District: Bambara Botuwa Rain Forest, 1000 ft. Worthington 3203 (private herbarium).

Vernacular names: **Havarinuga** (*S.*).

The timber of *Alstonia macrophylla* is of superior quality to that of *A. scholaris* and less liable to attacks of boring insects. In reforestation the tree is the best pioneer for poor grass land (Worthington).

**2. Alstonia scholaris** (*L.*) R. Brown in Mem. Wern. Soc. 1:76, 1811, prepr. 1810. Thwaites, Enum. Plant. Zeylan.:193, 1860. Hooker f., Flora Brit. India 3:642, 1882. Trimen, Handb. Flora Ceylon 3:133, 1895. Monachino in Pacific Sc. 3:146, 1949.

Nomenclatural type: Linnaean Herb. 302/2 (LINN).

Syn.: *Echites scholaris* L., Mantissa 1:53, 1767.

Leaves in whorls of five to ten. Petiole 0.5 to 3 cm long. Leaf-blade 5 to 28 cm long and 2.5 to 11 cm wide, widest in or above the middle, cuneate at the base, usually rounded at the apex, coriaceous, glabrous on both sides, with close, numerous lateral veins 0.2 to 0.4 cm apart from each other, including with the midrib an angle of 80 to 90°. Cymes dense, almost glomerate, arranged in a sessile umbel or in two superposed umbels. Pedicel usually as long as or shorter than the calyx. Calyx-lobes 1 to 3 mm long, ovate, densely puberulous. Corolla puberulous without, at least on the lobes; the tube 0.6 to 0.8 cm long, the lobes one quarter to one third as long as the tube, broadly obovate, in bud overlapping to the left. Merocarps as in *A. macrophylla*. Seeds obtuse at both ends.

Geographic distribution: India and Ceylon, South East Asia from Burma and South China through Malesia to New Guinea and Queensland.

Common throughout Ceylon up to an elevation of 1000 m, both in the moist and the dry zone; in the latter along the banks of streams and other temporarily inundated places.

Specimens examined: NORTH CENTRAL PROVINCE: Polonnaruwa District: mile 49 of Polonnaruwa Valaichchenai Road, Huber 44 (US). CENTRAL PROVINCE: Kandy District: Kadugannawa, collector unknown (PDA). Matale District: Madipola, 1300 ft, Worthington 4445 (private herbarium); Sigiriya Gala, 654 ft, Worthington 4345 (private herbarium). EASTERN PROVINCE: Batticaloa District: Batticaloa, Huber 25 (US). UVA PROVINCE: Badulla District: Lunugala, 500 ft, Worthington 6317 (private herbarium). SABARAGAMUWA PROVINCE: Kegalle District: Ambepussa, Worthington 2478 (BM, private herbarium). Locality unknown: Gardner 558 (BM, K); Thwaites C. P. 1840 (BM, K, PDA).

Vernacular names: **Ruk-attana** (*S.*); **Elilai-ppalai, Mukampelai** (*T.*).

According to Trimen, the bark is a valuable astringent tonic, much used in fevers and the light and soft wood is largely used for coffins.

## 6. CATHARANTHUS G. Don

G. Don, Gen. Hist. 4:71, 1837.

Type Species: *Catharanthus roseus* (L.) G. Don.

Syn.: *Lochnera* Reichenb., Consp. Regni Veg.: 134, 1828.

Erect, perennial subshrubs or annual herbs with glabrous or puberulous stems and leaves. Leaves opposite, obovate or narrowly lanceolate, with rather few lateral veins including with the midrib an angle of 30 to 45°. Flowers solitary or paired from the axils of the leaves. Calyx eglandular, with sharp-pointed, narrowly lanceolate to subulate lobes. Corolla crimson or white, glabrous or puberulous without; the tube cylindrical, inflated below the mouth; the lobes shorter than the tube, obovate, obtuse or apiculate, in bud much overlapping to the left. Stamens attached to the corolla-tube in the inflated portion near the mouth but not exserted; the anthers distinct, narrowly ovate-lanceolate, acute. Disk absent. Ovary with two oblong glands alternating with the carpels. Merocarps distinct, narrowly cylindrical, obtuse to acuminate, dry, dehiscent along the ventral suture, with about eight seeds. The latter oblong, not compressed, with muricate longitudinal ridges, with fleshy endosperm, without a tuft of hairs.

A small genus of six species, all except one natives of Madagascar.

KEY TO THE SPECIES

1. Perennial herbs or subshrubs. Leaves obovate or obovate-oblong, usually rounded at the apex. Corolle 3 to 5 cm in diameter when expanded. Merocarps 0.2 to 0.3 cm wide, puberulous. **1. C. roseus**

1. Annual herbs. Leaves narrowly lanceolate, very acute. Corolla 0.5 to 0.6 cm in diameter. Merocarps about 0.1 cm wide, glabrous. **2. C. pusillus**

**1. Catharanthus roseus** (L.) G. Don, Gen. Hist. 4:95, 1837. Stearn in Lloydia 29:196, 1966.

Nomenclatural type: Linnaean Herb. 299/4 (LINN).

Syn.: *Vinca rosea* L., Syst. Nat. ed. 10, 2:944, 1759. Hooker f., Flora Brit. India 3:640, 1882. Trimen, Handb. Flora Ceylon 3:130, 1895.

*Lochnera rosea* (L.) Reichenb., Consp. Regni Veg.:134, 1828. Alston in Trimen, Handb. Flora Ceylon 6, Suppl.:191, 1931.

A perennial herb or subshrub with the young stems, leaves and calyx puberulous. Petiole 0.2 to about 1 cm long. Leaf-blade 2.5 to 6 cm long and 1 to 3 cm wide, widest above the middle, cuneate at the base, rounded but frequently with a minute apiculous at the apex, rarely subacute. Pedicels shorter than the calyx. Calyx-lobes 3 to 5 mm long, subulate. Corolla crimson, pink or white; the tube 2 to 3 cm long, pubescent without; the lobes 1.5 to 2.5 cm long, obtuse. Merocarps 1.2 to 2.5 cm long, 0.2 to 0.3 cm in diameter, obtuse or acute but not acuminate at the apex, puberulous.

Chromosome number: 2n = 16.

Geographic distribution: Endemic in Madagascar. Brought into cultivation in the eighteenth century and soon naturalized in many tropical countries.

Recorded from Ceylon since 1804 and now widely distributed in disturbed vegetation, both in the dry and in the moist zone at low elevations, particularly on sandy soil near the coast in the South West of the island. Also on the Maldive Islands.

Specimens examined: EASTERN PROVINCE: Amparai District: Pottuvil, Mueller-Dombois and Comanor 67072604 (BISH); the same 67072605 (BISH). SOUTHERN PROVINCE: Galle District: near Koggala Rail Motor Halt, Huber 61 (US). Locality unknown: Fraser 175 (BM).

*Catharanthus roseus*, commonly known as Madagascar Periwinkle, is rich in various alkaloids and may become an important drug because of its cytostatic properties.

**2. Catharanthus pusillus** (Murray) G. Don, Gen. Hist. 4:95, 1837.

Nomenclatural type: Murray, Comm. Gotting. 3, t. 1, t. 2, 1773.

Syn., *Vinca pusilla* Murray, Comm. Gotting. 3:66, 1773. Hooker f., Flora Brit. India 3:640, 1882. Trimen, Handb. Flora Ceylon 3:130, 1895.

*Lochnera pusilla* (Murray) K. Schumann in Engl. und Prantl, Natürl. Pflanzenfam. 4 (2):145, 1895. Alston in Trimen, Handb. Flora Ceylon 6, Suppl.:190, 1931.

A glabrous, annual herb. Petiole 0.15 to 0.5 cm long. Leaf-blade 2 to 7 cm long, 0.5 to 2 cm wide, widest in or below the middle, tapering to both ends, very sharp-pointed at the apex. Pedicels shorter than the calyx. Calyx-lobes 3 to 4 mm long, almost filiform. Corolla white, glabrous without; the tube 0.5 to about 1 cm long; the lobes shorter than one half of the tube, abruptly apiculate at the apex. Merocarps 2.5 to 5 cm long and about 0.1 cm wide, acuminate at the apex, glabrous.

Geographic distribution: India from the western Himalayas through the Gangetic Plain and the Deccan Peninsula to Ceylon.

In Ceylon a rather rare weed of cultivated land in the dry zone, known from a few places only (Batticaloa, Jaffna).

Specimens examined: NORTHERN PROVINCE: Jaffna District: on the way from Jaffna to Kankesanturai, Cooke s. n. (PDA).

## 7. HOLARRHENA R. Br.

R. Brown in Mem. Wern. Soc. 1:62, 1811, prepr. 1810.

Type Species: *Carissa mitis* Vahl.

A small tree up to 10 m tall with young branches and leaves glabrous. Leaves opposite, but on the flowering nodes sometimes slightly displaced; ovate-lanceolate to lanceolate, with rather few, strongly arched lateral veins including with the midrib an angle of about 60°. Flowers in short-peduncled, puberulous cymes which are terminal or terminal and axillary at alternate nodes. Calyx with glandular scales within; the scales alternating with the linear, acute lobes. Corolla white, puberulous without; the tube cylindrical, slightly inflated at the base; the lobes little longer than the tube, linear, obtuse, in bud overlapping to the left. Stamens inserted near the base of the tube; anthers distinct, ovoid-oblong, apiculate. Merocarps distinct, very long, slender, cylindrical, obtuse, dry and dehiscent along the ventral suture when ripe. Seeds numerous, linear, compressed, with scanty endosperm and a tuft of hairs at one end, dark brown.

A few species in tropical Africa and India from the Himalayas to Ceylon and Malacca.

**Holarrhena mitis** (Vahl) Roemer et Schultes, Syst. Veg. 4:400, 1819. Thwaites, Enum. Plant. Zeylan.:194, 1860. Hooker f., Flora Brit. India 3:645, 1882. Trimen, Handb. Flora Ceylon 3:131, 1895.

Nomenclatural type: Koenig s. n. (LD holotype not seen, BM isotype).

Syn., *Carissa mitis* Vahl, Symb. Bot. 3:44, t. 59. 1794. *Echites lanceolata* Moon, Cat. Plants Ceylon:20, 1824 nomen nudum.

Bark of the trunk whitish, smooth. Branchlets slender, drooping, dark purplish-brown; the lenticels inconspicuous. Petiole 0.4 to 0.6 cm long. Leaf-blade 5 to 12 cm long and 1 to 3 cm wide, widest in or below the middle, rather abruptly tapering to almost rounded at the base, acuminate but obtuse at the apex. Pedicels much longer than the calyx. Calyx-lobes about 2 mm long, puberulous. Flowers fragrant. Corolla-tube 0.8 to 1.2 cm long. Merocarps 30 to 45 cm long, 0.3 to 0.4 cm in diameter, glabrous.

Geographic distribution: Endemic in Ceylon.

Rather rare in Ceylon in the lowland and the hill country up to an elevation of 800 m, both in the moist and in the dry zone.

Specimens examined: NORTH CENTRAL PROVINCE: Polonnaruwa District: Gunner's Quoin, Neville 493 (PDA). CENTRAL PROVINCE: Kandy District: Kandy, Hillcrest, 2100 ft, Worthington 4625 (BM); the same 5565 (private herbarium); Tembillyalla, 2050 ft, Worthington 4539 (BM). WESTERN PROVINCE: Colombo District: Indikade Reserve, Holmes 393 (herbarium of Dept. of Forestry, Colombo). UVA PROVINCE: Monaragala District: Kataragama Peak, 350 m Huber 34 (US). SOUTHERN PROVINCE: Galle District: Nagoda, Udugama, 100 ft. Worthington 4130 (private herbarium). Kalutara District: Kalutara, Macrae 52 (BM, K). Locality unknown: Champion s. n. (K); Koenig s. n. (BM); Thwaites C. P. 757 (BM, K, PDA); Walker 1039 (K).

Vernacular names: **Kiri-walla, Kiri-mawara** (*S.*).

Both wood and bark are used as a remedy in fevers and dysentery; the bark is sold under the name "Kalinda" and is valued as an antiperiodic (Trimen).

## 8. RAUVOLFIA L.

L., Spec. Plant.: 208, 1753.

Type Species: *Rauvolfia tetraphylla* L.

Erect, glabrous shrubs or subshrubs with little latex. Leaves in whorls of three, obovate-lanceolate to broadly lanceolate, with few, strongly arched lateral veins including with the midrib an angle of 45 to 60°. Flowers in mostly long-peduncled cymes, terminal or terminal and lateral from between two petioles. Calyx eglandular; the lobes lanceolate, acute. Corolla pure white or white tinged with violet, glabrous without; the tube cylindrical, slightly inflated above the middle; the lobes shorter than the tube, ovate, obtuse, in bud overlapping to the left. Stamens inserted in the inflated portion of the tube; the anthers distinct, ovate to oblong, apiculate. Disk annular. Merocarps distinct or connate for one half of their length, ovoid, sessile, short-apiculate to almost obtuse, fleshy, indehiscent, each with one seed. Seeds ovoid, with fleshy endosperm, without a tuft of hairs.

A rather large, pantropical genus, represented in Ceylon by two species only.

### KEY TO THE SPECIES

1. Cymes laxly branched. Corolla-tube 0.5 to 1 cm long and 1 to 1.5 mm wide when pressed; the lobes longer than one half of the tube. Merocarps free. **1. R. densiflora**

1. Cymes dense, almost capitate. Corolla-tube 1 to 1.8 cm long, less than 1 mm wide whe pressed; the lobes shorter than one half of the tube. Merocarps connate for about half of their length. **2. R. serpentina**

**1. Rauvolfia densiflora** (Wallich) Bentham ex Hooker f., Flora Brit. India 3:633, 1882. Trimen, Handb. Flora Ceylon 3:126, 1895.

Nomenclatural type: Wallich in Edwards, Bot. Reg. 15, t. 1273, 1829. Described from a living specimen cultivated at Chiswick in 1827.

Syn.: *Tabernaemontana densiflora* Wallich in Edwards, Bot. Reg. 15, t. 1273, 1829.

*Ophioxylon ceylanicum* Wight, Icon. Plant. Ind. Or. 4 (2):1, t. 1291, 1848.

*Ophioxylon densiflorum* (Wallich) Thwaites, Enum. Plant. Zeylan.:191, 1860.

A shrub 0.7 to 2 m tall. Petiole 0.7 to 2.5 cm long. Leaf-blade 6 to 17 cm long and 2.5 to 6 cm wide, broadly lanceolate to obovate-lanceolate, widest in or above the middle, tapering to the base, markedly acuminate at the apex, thinly membranous. Cymes (in spite of the misleading specific epithet) laxly branched. Pedicels much longer than the calyx. Calyx-lobes 2 to 3 mm long, glabrous. Corolla-tube 0.5 to 1 cm long, rather stout, 1 to 1.5 mm wide when pressed; the lobes longer than one half of the tube. Merocarps 0.8 to 1.2 cm long, almost distinct, very slightly pointed, glabrous, bluish-grey pruinose when ripe.

Geographic distribution: Deccan Peninsula southwards from the Western Ghats; Ceylon; Assam.

In Ceylon not uncommon in the mountain zone at an elevation of 700 to 2000 m.

Specimens examined: UVA PROVINCE: Badulla District: Jungle at back of Hakgala, collector unknown (PDA); near Passara, collector unknown (PDA). CENTRAL PROVINCE: Kandy District: Hantane near Kandy, 2300 ft, Gardner 552 (BM, K); the same 555 (BM); 4000 ft, Worthington 261 (private herbarium); Hunnasgiriya, collector unknown (PDA). Nuwara Eliya District: Ferndale near Rangalla, Simpson 8734 (BM); Rikiligaskada, Huber 56 (US). Locality unknown: Fraser 125 (BM); Mackenzie s. n. (K); Thwaites C. P. 1834 (BM, K, PDA).

**2. Rauvolfia serpentina** (L.) Bentham ex Kurz, Forest Flora Brit. Burma 2:171, 1877. Hooker f., Flora Brit. India 3:632, 1882. Trimen, Handb. Flora Ceylon 3:126, 1895.

Nomenclatural type: Herbarium Hermann (BM).

Syn.: *Ophioxylon serpentinum* L., Spec. Plant.: 1043, 1753. Thwaites, Enum. Plant. Zeylan.: 191, 1860.

*Ophioxylon trifoliatum* Gaertner, Fruct. Sem. Plant. 2:123, 1791.

Petiole 0.6 to 1.4 cm long. Leaf blade 5 to 16 cm long and 1.5 to 6 cm wide, broadly lanceolate, widest in the middle, tapering to both ends, acute at the apex but not markedly acuminate, thinly membranous. Cymes dense. Pedicels up to twice as long as the calyx, sometimes shorter than the calyx. Calyx-lobes 1.5 to 2 mm long, glabrous. Corolla-tube 1 to 1.8 cm long, very slender, less than 1 mm wide when pressed; the lobes about one fifth to one quarter of the length of the tube. Merocarps 0.5 to 0.7 cm long, connate with their lower half or a little beyond, minutely apiculate, glabrous, shining blackish-purple when ripe.

Geographic distribution: Tropical Himalayas, Assam, Burma, Deccan Peninsula, Ceylon.

A plant of secondary scrub and grassy places of the moist zone, in Ceylon from the lowland ascending up to 700 m.

Specimens examined: NORTH WESTERN PROVINCE: Kurunegala District: Halpankande, collector unknown (herbarium of Dept. of Forestry, Colombo). CENTRAL PROVINCE: Kandy District: Uma Oya, collector unknown (PDA). SABARAGAMUWA PROVINCE: Kegalle District: Ambepussa Farm (cultivated?), Simpson 7928 (BM). SOUTHERN PROVINCE: Galle District: Galle, Gardner 551 (BM, K). Locality unknown: Fraser 44 (BM); Macrae 33 (BM); Thwaites C. P. 1836 (K, PDA); Walker s. n. (K).

Vernacular names: **Eka-weriya, Rat-eka-weriya** (*S.*).

Containing reserpine, an alkaloid with hypotensive properties, *Rauvolfia serpentina* has become an important medicinal plant.

## 9. PETCHIA Livera

Livera in Ann. Roy. Bot. Garden Peradeniya 10:140, 1926.

Type Species: *Petchia ceylanica* (Wight) Livera.

A small, glabrous shrub. Leaves usually in whorls of three at the branching, otherwise opposite; ovate or broadly lanceolate; lateral veins rather few, including with the midrib an angle of about 60°. Flowers in poor, short- to long-peduncled cymes, terminal or terminal and lateral from between two petioles. Calyx glandular between the lobes; the latter lanceolate, acute. Corolla creamy-white, glabrous without; the tube cylindrical, inflated near the mouth and pilose within the mouth; the lobes slightly shorter than the tube, narrowly oblong, acute, in bud overlapping to the left. Stamens attached to the tube in the inflated part below the mouth, not or scarcely exserted; anthers distinct, ovate-oblong, acute. Disk absent. Merocarps distinct, long-stipitate at the base, produced into a slender beak at the apex; mostly moniliform, two- to four-seeded, constricted between the seeds and thus consisting of two to four one-seeded, fleshy, obliquely ovoid joints, rarely the merocarps one-seeded by abortion and ovoid. Seeds ovoid, not compressed, with fleshy endosperm, without a tuft of hairs.

A monotypic genus endemic in Ceylon.

**Petchia ceylanica** (Wight) Livera in Ann. Roy. Bot. Garden Peradeniya 10:140, 1926 as "*zeylanica*". Alston in Trimen, Handb. Flora Ceylon 6, Suppl.:190, 1931 as "*zeylanica*".

Nomenclatural type: Walker in herb. Wight s. n. (K).

Syn.: *Alyxia ceylanica* Wight, Icon. Plant. Ind. Or. 4 (2):2, t. 1293, 1848 as "*Alexia*". Thwaites, Enum. Plant. Zeylan.: 191, 1860 as "*zeylanica*". Hooker f., Flora Brit. India 3:636, 1882. Trimen, Handb. Flora Ceylon 3:127, 1895 as "*zeylanica*".

*Gynopogon zeylanicus* (Wight) K. Schumann in Engl. und Prantl, Natürl. Pflanzenfam. 4 (2):151, 1895.

Petiole 0.3 to 0.5 cm long. Leaf-blade 4 to 7 cm long and 2 to 3.5 cm wide, widest in or below the middle, acute at the base, caudate-acuminate but obtuse at the apex. Pedicels much longer than the calyx. Calyx-lobes 2 mm long, glabrous. Corolla-tube 0.8 to 1.3 cm long. Merocarps 1.2 to 1.8 cm long when one-seeded or each joint about 1.2 cm long when moniliform; glabrous, scarlet when ripe.

Geographic distribution: Endemic in Ceylon.

A rare undershrub of the dense rain-forest at low elevations, ascending up to an elevation of 700 m according to Thwaites. Due to the rapid destruction of the rain forests in Ceylon, this species is much in danger of extinction. Flowering all the year.

Specimens examined: WESTERN PROVINCE: Colombo District: Kalatuwawa near Colombo, water reservoir, 600 ft., Worthington 3520 (private herbarium); Heneratgoda, collector unknown (PDA). SOUTHERN PROVINCE: Galle District: Kottawa Forest Reserve, collector unknown (PDA). Matara District: Mahaiynya Forest, Masmulla, 100 ft, Worthington 4163 (private herbarium). Locality unknown: Champion s. n. (K); Mackenzie s. n. (K); Thwaites C. P. 1935 (BM, K, PDA); Walker in herb. Wight s. n. (K).

Vernacular name: **Wal-kaduru** (*S.*).

**The plant is considered to be poisonous.**

## 10. OCHROSIA A. L. Juss.

A. L. Jussieu, Gen. Plant.:144, 1789.

Type Species: *Ochrosia maculata* Jacq.

A small, glabrous tree with stout branches. Leaves irregularly alternate or in whorls of three or four, oblong to obovate, with rather numerous lateral veins including with the midrib an angle of about 80°. Flowers in monochasial cymes which are arranged in a long-peduncled, terminal or lateral (by overtopping) umbel or in two superposed umbels. Calyx eglandular, with broadly ovate, obtuse lobes. Corolla greenish-white, glabrous without; the tube cylindrical, the lobes longer than the tube, oblong, obtuse, in bud overlapping to the right. Stamens attached to the corolla-tube near the mouth but not exserted; the anthers distinct, oblong-lanceolate, sagittate, acute, filled with pollen to the very base. Disk absent. Merocarps distinct, usually both developed, obliquely ovoid, bluntly pointed, spongy-woody, indehiscent, one-seeded. Seeds ovate, strongly flattened, with scanty endosperm, without a tuft of hairs.

A genus of about 30 species, centered in Malesia and the West Pacific Islands.

**Ochrosia oppositifolia** (Lamarck) K. Schumann in Engl. und Prantl, Natürl. Pflanzenfam. 4 (2):156, 1895.

Nomenclatural type: Rumphius, Herb. Amb. 2, t. 85, 1741.

Syn., *Cerbera oppositifolia* Lamarck, Encycl. 1:62, 1783. *Cerbera parviflora* Forster, Flor. Ins. Austr. Prodr.:19, 1786. Moon, Cat. Plants Ceylon:19, 1824.

*Ochrosia borbonica* Thwaites, Enum. Plant. Zeylan.:192, 1860. Hooker f., Flora Brit. India 3:638, 1882. Trimen, Handb. Flora Ceylon 3:129, 1895. Not *Ochrosia borbonica* J. F. Gmelin.

Branches glaucous green with the leaves often crowded at the end of a year's growth. Petiole 2 to 3.5 cm long. Leaf-blade 14 to 20 cm long and 4 to 10 cm wide, widest in or frequently above the middle, tapering to the base, rounded or faintly acuminate and obtuse at the apex, coriaceous, shining, not turning black when dried. Pedicels as long as or shorter than the calyx. Calyx-lobes 1 to 1.5 mm long, glabrous. Corolla-tube about 0.5 cm long. Merocarps about 6 cm long and 4 cm in diameter, glabrous, bright yellow when ripe.

Geographic distribution: Maldive Islands, Ceylon, Andaman Islands, Malay Peninsula, Thailand, Malesia and West Pacific Islands (New Caledonia, Fiji, Ellice Island). Absent from the Deccan Peninsula.

In Ceylon, a tree of the moist region, always growing near the seashore and slightly halophilous but not a true member of the mangrove formation.

Specimens examined: WESTERN PROVINCE: Kalutara District: Kalutara, Gardner 551 (BM). SOUTHERN PROVINCE: Galle District: Galle, Huber 58(US); mile 48 of Colombo-Galle Road, Worthington 2519 (BM); the same 4105 (private Herbarium). Locality unknown: Gardner 556 (K); Thwaites C. P. 1833 (K, PDA).

Vernacular names: **Mudu-kaduru** (*S.*).

## 11. CERBERA L.

L., Spec. Plant. :208, 1753.

Type Species: *Cerbera manghas* L.

A large, glabrous shrub or a small tree with stout branches. Leaves alternate, lanceolate-oblong, with rather numerous lateral veins diverging almost horizontally from the midrib. Flowers in lax, monochasially branched, peduncled, terminal inflorescences. Calyx eglandular; the lobes lanceolate, narrowed to the base, acute, deciduous. Corolla pure white, glabrous without; the tube funnel-shaped towards the mouth which is almost closed by five projecting wings; the funnel-shaped portion of the tube shorter than to as long as the cylindrical base; the lobes longer than the tube, obliquely elliptic, obtuse, in bud overlapping to the left. Stamens inserted in the middle of the corolla-tube; anthers oblong-lanceolate, acute, connate with their tips but not adnate to the style-apex, not exserted from the tube. Disk absent. Merocarps distinct, mostly solitary by abortion, globose, woody-fibrous, indehiscent, one- or two-seeded. Seeds ovoid, somewhat compressed, without endosperm and without a tuft of hairs.



11361—2

A genus of seven to eight species ranging from the Deccan Peninsula and Ceylon through Malesia eastwards to New Caledonia; if *Tanghinia* is included, one species in Madagascar.

**Cerbera manghas** L., Spec. Plant.: 208, 1753 pro parte. Moon Cat. Plants Ceylon:19, 1824. Alston in Trimen, Handb. Flora Ceylon 6, Suppl.:190, 1931. M. Pichon in Not. Syst. (Paris) 13:223, 1948. This is not *C. manghas* of Gaertner (1791) and some other authors.

Nomenclatural type: A drawing in the Herbarium Hermann (BM).

Syn.: *Cerbera odollam* Gaertner, Fruct. Sem. Plant. 2:193, t. 124, fig. 1, 1791. Thwaites, Enum. Plant. Zeylan. :192, 1860. Hooker f., Flora Brit. India 3:638, 1882. Trimen, Handb. Flora Ceylon 3:128, 1895. Corner, Wayside Trees Malaya 1:143, 1940.

Branchlets whorled, with the leaves crowded at the end of a year's growth. Petiole 2 to 5 cm long. Leaf-blade 12 to 30 cm long and 3 to 7 cm wide, widest above the middle, much tapering to the base, rather suddenly acuminate and almost acute at the apex, coriaceous, turning black when dried. Pedicels as long as or longer than the calyx. Calyx-lobes 1 to 2 cm long, glabrous. Corolla-tube 1.8 to 2 cm long. Merocarps 7 to 9 cm in diameter, glabrous, green, often tinged with pink when ripe.

Geographic distribution: Coasts of the Deccan Peninsula, Ceylon, Malay Peninsula and Malesia.

Common near the sea, both in the moist and in the dry zone of Ceylon. A plant of tidal river banks and of the back of the mangrove vegetation, less halophilous than *Ochrosia oppositifolia* (Lamarck) K. Schum. It is frequently planted between paddy fields and along roads, sometimes far from the coast, often together with *Barringtonia racemosa* (L.) Blume ex DC.

Specimens examined: NORTHERN PROVINCE: Jaffna District: Jaffna, Roettler s. n. (K.) NORTH WESTERN PROVINCE: Puttalam District: mile 41 of Colombo-Puttalam Road, between Madampe and Mahawewa, Huber 52 (US). WESTERN PROVINCE: Kalutara District: Alutgama, Huber 13 (US). EASTERN PROVINCE: Batticaloa District: Kalkudah Bay, collector unknown (PDA). Trincomalee District: Mutur, Worthington 1310 (private herbarium); Mouth of Mahaweli Ganga, Worthington 4883 (BM). SABARAGAMUWA PROVINCE: Kegalle District: between Mawanella and Udumulla, cultivated, Huber 2 (US). SOUTHERN PROVINCE: Galle District: Balapitiya, Worthington 4106 (BM). Locality unknown: Thwaites C. P. 1832. (PDA).

Vernacular names: **Gon-kaduru** (*S.*).

*Cerbera manghas* is a poisonous plant full of acrid latex.

The nomenclature of this plant is controversial. *Cerbera manghas* L., both in the Linnaean herbarium and in Hermann's herbarium, which alone is relevant for the typification of the species, includes two species at least. The one component, now *Pagiantha dichotoma* (Roxb.) Markgraf is represented in Hermann's herbarium by two dried specimens, whereas the other, *Cerbera manghas* L. as understood here, was known to Linnaeus by a drawing in Hermann's herbarium only. This drawing must be considered the nomenclatural type of *Cerbera manghas* L., as it does not appear ever to have been emended in a way which made it include Hermann's dried specimens.

## 12. AGANOSMA G. Don.

G. Don, Gen. Hist. 4:77, 1837.

Type Species: *Aganosma caryophyllata* G. Don.

A large, climbing and twining shrub with the young branches adpressedly pubescent. Leaves opposite, elliptic, elliptic-lanceolate or obovate-lanceolate, glabrous on both sides, with very few, arched, lateral veins including with the midrib an angle of about 45°. Flowers in dense, rounded, short-peduncled, terminal, tomentose cymes. Calyx with five glandular scales alternating with the lobes; the latter linear-lanceolate, very acute. Corolla yellowish-white, tomentose without; the tube constricted in the lower quarter, broadly cylindrical above; the lobes about twice as long as the tube, oblong, obtuse, in bud slightly overlapping to the right. Stamens inserted in the lower third of the tube; the anthers lanceolate-sagittate, acute, adnate to the style apex, enclosed in the corolla-tube, produced at the base into two tails deprived of pollen. Disk tubular, five-lobed, including the ovary. Merocarps distinct, long, cylindrical,

tapering to the apex, dry, dehiscent along the ventral suture, many-seeded. Seeds lanceolate, compressed, scarcely beaked, with scanty endosperm, with a tuft of hairs at one end, black.

About a dozen species, ranging from the Himalayas to Ceylon and eastwards to the Philippines.

**Aganosma cymosum** (Roxb.) G. Don, Gen. Hist. 4:77, 1837. Hooker f., Flora Brit. India 3:665, 1882. Trimen, Handb. Flora Ceylon 3:139, 1895.

Nomenclatural type: Coloured drawing nr. 2463 of *Echites cymosa* by Roxburgh at K.

Syn.: *Echites cymosa* Roxb. [Hort. Bengal.:84, 1814 nomen nudum] Flora Indica ed. Carey 2:16, 1832.

Petioles 0.7 to 1.5 cm long. Leaf-blade 5 to 11 cm long and 2 to 5 cm wide, widest in or above the middle, tapering to both ends, very acute and frequently acuminate at the apex. Pedicels much shorter than the calyx. Calyx-lobes 7 to 10 mm long, tomentose on both sides. Corolla-tube about 0.5 cm long. Merocarps 15 to more than 30 cm long, 0.5 to 0.7 cm wide, tomentose when young, glabrescent when ripe.

Geographic distribution: Deccan Peninsula, Ceylon, Sylhet.

In Ceylon not rare in the dry and intermediate zone at low elevations.

The Ceylon plant differs from the typical form, described from the Sylhet, by smaller and glabrous leaves with fewer pairs of lateral veins. It can be distinguished as

*Aganosma cymosum* (Roxb.) G. Don var. *elegans* (G. Don) Hooker f., Flora Brit. India 3:665, 1882.

Nomenclatural type: Heyn in Herb. Wallich nr. 1656 (K-W).

Syn.: *Echites elegans* Wallich, Num. List nr. 1656, 1829 nomen nudum.

*Aganosma elegans* G. Don, Gen. Hist. 4:77, 1837. Thwaites, Enum. Plant. Zeylan.:194, 1860.

Specimens examined: NORTH CENTRAL PROVINCE: Anuradhapura District: Maha-Illuppallama, collector unknown (PDA). UVA PROVINCE: Moneragala District: 6 km north of Bibile, Huber 37 (US); northern slope of Kataragama Peak, 200 m, Huber 65 (US). Locality unknown: Thwaites C. P. 1850. (BM, K, PDA).

## 13. CHONEMORPHA G. Don.

G. Don, Gen. Hist. 4:76, 1837 nomen conservandum.

Type Species: *Chonemorpha macrophylla* (Roxb.) G. Don.

A large, twining shrub with pubescent branches, leaves and inflorescences. Leaves opposite, broadly elliptic, short-pubescent above, tomentose beneath, with few lateral veins including with the midrib an angle of 45 to 60°. Flowers in poor, long-peduncled, terminal cymes. Calyx glandular within; the lobes ovate-deltoid, subacute. Corolla white, tinged with yellow, glabrous without; the tube cylindric, slightly inflated in the lower third, narrowly tubular below, wider above the inflated portion; the lobes up to twice as long as the tube, obliquely obovate, truncate, in bud strongly overlapping to the right. Stamens inserted in the inflated portion of the tube; anthers lanceolate-sagittate, acute, adnate to the style-apex, enclosed in the corolla-tube, produced at the base into two tails deprived of pollen. Disk cupular. Merocarps distinct, long, triquetrous, tapering to the apex, dry and dehiscent along the ventral suture when ripe, many-seeded. Seeds ovate, compressed, with scanty endosperm, with a tuft of hairs at one end, dark brown.

A genus of twelve species ranging from India and Ceylon to South China and the Philippines.

**Chonemorpha fragrans** (Moon) Alston in Ann. Roy. Bot. Garden Peradeniya 11:203. 1929. Alston in Trimen, Handb. Flora Ceylon 6, Suppl.:192, 1931. Chatterjee in Kew Bull. 1947:52, 1947.

Nomenclatural type: Rheede van Draakenstein, Hort. Ind. Malabar. 9, t. 5 et t. 6, 1689.

Syn.: *Echites fragrans* Moon, Cat. Plants Ceylon: 20, 1824.

*Echites macrophylla* Roxb. [Hort. Bengal.:20, 1814 nomen nudum] Flora Indica ed. Carey 2:13, 1832.

*Chonemorpha macrophylla* (Roxb.) G. Don, Gen. Hist. 4:76, 1837. Thwaites, Enum. Plant. Zeylan.:194, 1860. Hooker f., Flora Brit. India 3:661, 1882. Trimen, Handb. Flora Ceylon 3:138, 1895.

*Chonemorpha rheedei* Ridley in Agric. Bull. Straits and Fed. Mal. States 10:146, 1911.

A huge climber 10 to 20 m long. Petiole 0.7 to about 2 cm long. Leaf-blade 10 to 30 cm long and 8 to 20 cm wide, widest in or slightly below or above the middle, rounded or slightly cordate at the base, obtuse or mostly short-acuminate at

the apex. Pedicels several times longer than the calyx. Calyx-lobes 3 to 5 mm long, glabrescent. Corolla-tube 3.5 to 4.5 cm long, the lobes often undulate-crispate at the margin. Merocarps 20 to 30 cm long, 1 to almost 2 cm in diameter, glabrous when ripe.

Geographic distribution: Tropical Himalayas, India, Ceylon, Burma, Andaman Islands.

In Ceylon rather rare in the moist zone up to an elevation of 800 m. Flowering from March to May.

Specimens examined: CENTRAL PROVINCE: Kandy District: Kandy, Udawattakele Sanctuary, Huber 6 (US). SABARAGAMUWA PROVINCE: Kegalle District: mile 43/2 of Colombo Kandy Road, 400 ft, Worthington 4207 (BM). Locality unknown: Mackenzie s. n. (K); Thwaites C. P. 2467 (BM, PDA); Walker s. n. (K).

Vernacular name: **Bu-kiri-vel** (*S.*).

## 14. PARSONSIA R. Br.

R. Brown in Mem. Wern. Soc. 1:64, 1811, prepr. 1810 nomen conservandum.

Type Species: *Periploca capsularis* Forster.

A twining, glabrous shrub with opposite, elliptic, ovate or ovate-lanceolate leaves. Lateral veins few, including with the midrib an angle of about 60° (rarely and in extremely large leaves only, lateral veins diverging almost rectangularly). Flowers in rich, long-peduncled cymes, arising from between the petioles. Calyx eglandular, with triangular, acute lobes. Corolla green or green suffused with purple, glabrous without; the tube short-cylindrical, the lobes one and a half to twice as long as the tube, oblong, obtuse, in bud overlapping to the right. Stamens inserted at the base of the corolla-tube, with long, spirally twisted filaments; anthers lanceolate-sagittate, acute, adnate to the style-apex, exserted from the corolla-tube, produced at the base into two tails deprived of pollen. Disk consisting of five triangular lobes. Fruit a bilocular, narrowly lanceolate capsule with two longitudinal grooves, tapering to the apex, dry and septicidally dehiscent when ripe, many-seeded. Seeds narrowly linear, compressed, with scanty endosperm, with a tuft of hairs at one end, brown.

A genus of eighty species native in India, Ceylon, South East Asia and Oceania.

**Parsonsia laevigata** (Moon) Alston in Ann. Roy. Bot. Garden Peradeniya 11:203, 1927. Alston in Trimen, Handb. Flora Ceylon 6, Suppl.: 192, 1931. M. Pichon in Not. Syst. (Paris) 14:16, 1950.

Nomenclatural type: Rheede van Draakenstein, Hort. Ind. Malabar. 9, t. 9, 1689.

Syn.: *Echites laevigata* Moon, Cat. Plants Ceylon:20, 1824.

*Parsonsia spiralis* Wallich [Num. List nr. 1631, 1829 nomen nudum] ex G. Don, Gen. Hist. 4:80, 1837. Hooker f., Flora Brit. India 3:650, 1882. Trimen, Handb. Flora Ceylon 3:134, 1895.

*Heligme spiralis* (Wallich ex G. Don) Thwaites, Enum. Plant. Zeylan.:193, 1860.

Petiole 0.7 to 3.5 cm long. Leaf-blade 6 to 17 cm long, 2.5 to 10 cm wide, widest in or below the middle, rounded or very short-cuneate or shallowly cordate at the base, acute and acuminate at the apex. Pedicels several times longer than the calyx. Calyx-lobes 2 mm long, glabrous. Corolla-tube about 3 mm long. Capsule 10 to 18 cm long, each loculus 0.5 to 0.7 cm in diameter, glabrous.

Geographic distribution: Deccan Peninsula and Ceylon, South East Asia from Assam and Burma to South China and Malesia.

In Ceylon common in the moist and intermediate zone up to an elevation of 1000 m, less frequent in the dry country. Often in disturbed vegetation, e. g. in forest clearings and near human settlements twining in fences and hedges. Flowering throughout the year.

Specimens examined: NORTH WESTERN PROVINCE: Puttalam District: mile 43 of Colombo Puttalam Road, near Madampe, Huber 51 (US). NORTH CENTRAL PROVINCE: Anuradhapura District: Maha-Illuppallama, collector unknown (PDA); north eastern slope of Ritigala Kande, c. 400 m, Huber 42 (US). CENTRAL PROVINCE: Kandy District: Hantane near Kandy, 2300 ft, Gardner 559 (BM, K); Talatuoya, collector unknown (PDA). EASTERN PROVINCE: Trincomalee District: Trincomalee, Roettler s. n. (K). SOUTHERN PROVINCE: Galle District: Bentota, Huber 14 (US). Locality unknown: Macrae 225 (BM); Thwaites C. P. 1862 (BM, K, PDA); Walker s. n. (K).

## 15. VALLARIS Burm. f.

Burman f., Flora Ind.:51, 1768.

Type Species: *Vallaris pergulana* Burman f.

A large, twining shrub with puberulous young branches, petioles and inflorescences. Leaves opposite, oblong-lanceolate, glabrous on both sides, with few, distant, lateral veins including with the midrib an angle of 45 to 60°. Flowers in rich, peduncled cymes arising from between the petioles. Calyx with glandular scales alternating with the lobes; the lobes ovate-lanceolate, acute. Corolla greenish-white, minutely puberulous without; the tube cylindrical; the lobes twice as long as the tube, broadly obovate to almost orbicular, rounded at the apex, in bud strongly overlapping to the right. Stamens inserted at the mouth of the corolla-tube; filaments short; anthers lanceolate-sagittate, acute, adnate to the style-apex, exserted from the corolla-tube, produced at the base into two tails deprived of pollen. Disk a five-lobed ring. Fruit at first bilocular, tardily splitting from below into two distinct, narrowly oblong, acute, fibrous but rather fleshy merocarps dehiscent along the ventral suture when ripe. Seeds very numerous, ovate-oblong, compressed, tapering at one end and there bearing a tuft of hairs, with scanty endosperm, pale yellowish-gray.

Three or four species in India, Ceylon, South East Asia and Malesia.

*Vallaris glabra* (L.) Kuntze, Syn.: *V. pergulana* Burman f., a native of Bengal, the Malay Peninsula and Malesia, is occasionally grown as an ornamental. It may be distinguished from *V. solanacea* by its broadly elliptic to obovate leaves 7 to 10 cm wide.

**Vallaris solanacea** (Roth) Kuntze, Rev. Gen.:147, 1891. Alston in Trimen, Handb. Flora Ceylon 6, Suppl.:192, 1931.

Nomenclatural type: **Heyne**, not seen.

Syn.: *Peltanthera solanacea* Roth, Nov. Plant. Spec. Praes. Ind. Or.:132, 1821.

*Vallaris heynii* Sprengel, Syst. Veg. 1:635, 1825.Hooker f., Flora Brit. India 3:650, 1882. Trimen, Handb. Flora Ceylon 3:135, 1895.

*Echites dichotoma* Roxb., Flora Indica ed. Carey 2:19, 1832.

*Vallaris dichotoma* (Roxb.) Wallich, Num. List nr. 1621, 1829. Thwaites, Enum. Plant. Zeylan.:192, 1860.

Petiole 0.6 to 1.5 cm long. Leaf-blade 5 to 10 cm long and 2 to 3.5 cm wide, widest in or slightly above the middle, cuneate, rarely almost rounded at the base, acute or acuminate at the apex, shining on both sides. Pedicels much longer than the calyx. Calyx-lobes 4 mm long, puberulous. Corolla-tube twice as long as the calyx. Merocarps 10 to 15 cm long, about 1 cm in diameter, glabrous.

Chromosome number: 2n = 20.

Geographic distribution: Tropical Himalayas, Deccan Peninsula, Ceylon, Sylhet and Burma.

A rare plant in Ceylon, known from a few localities in the intermediate region only.

Specimens examined: CENTRAL PROVINCE: Nuwara Eliya District: Hangurankota, collector unknown (PDA). District unknown: Muppane (cultivated?), Alston 2462 (K, PDA). Locality unknown: Thwaites C. P. 2519 (K, PDA); Walker s. n. (K).

The flowers have the scent of almonds.

## 16. WALIDDA (A.DC.) M. Pichon

(A. DC.) M. Pichon in Not. Syst. (Paris) 14:87, 1951.

Type Species: *Walidda antidysenterica* (L.) M. Pichon.

Syn.: *Wrightia* sectio *Walidda* A. DC. in DC., Prodr. 8:404, 1844.

A slender, erect, glabrous shrub with opposite, ovate, elliptic or lanceolate leaves. Leaf-blade with rather few lateral veins including with the midrib an angle of 45 to 70°. Flowers in poor, short-peduncled, monochasially branched, terminal but sometimes overtopped cymes. Calyx with glandular scales alternating with the lobes; the latter ovate, obtuse. Corolla pure white, minutely papillose-puberulous on the lobes, otherwise glabrous without; the tube narrowly cylindrical, without a fleshy annulus in the mouth;

the lobes slightly shorter than the tube, obovate, obtuse, in bud overlapping to the left. Corona consisting of three series of segments, the multifid alternipetalous, the multifid but longer antepetalous and the geminate, simple or compound alternating supplementary segments. Stamens inserted in the mouth of the corolla-tube, with very short filaments; anthers lanceolate-sagittate, acute at the apex and produced into a glabrous acumen, adnate to the style-apex, exserted from the corolla-tube, produced at the base into two tails longer than the filaments and deprived of pollen. Disk absent. Fruit soon splitting into two distinct, cylindrical, acuminate merocarps, dry and dehiscent along the ventral suture when ripe. Seeds numerous, linear, compressed, with scanty, salmon-pink endosperm and a tuft of hairs at one end, pale grayish-brown.

A monotypic genus endemic in Ceylon. In his revision of the genus *Wrightia*, Ngan (1965) considered *Walidda* a section of *Wrightia*, as it seems, mostly with respect to the limited distribution of *Walidda*.

**Walidda antidysenterica** (L.) M. Pichon in Mem. Mus. Hist. Nat. Paris ser. b, Bot. 1:74, 1951; and in Not. Syst. (Paris) 14:88, 1951.

Nomenclatural type: Herbarium Hermann, vol. 4, page 76 (BM).

Syn: *Nerium antidysentericum* L., Spec. Plant. 209, 1753.

*Nerium zeylanicum* L., Cent. Plant. 2:12, 1756.

*Wrightia antidysenterica* (L.) R. Brown in Mem. Wern. Soc. 1:74, 1811, prepr. 1810. Phung Trung Ngan in Ann. Missouri Bot. Garden 52:166, 1965.

*Wrightia zeylanica* (L.) R. Brown in Mem. Wern. Soc. 1:74, 1811, prepr. 1810. Thwaites, Enum. Plant. Zeylan.:193, 1860. Hooker f., Flora Brit. India 3:654, 1882. Trimen, Handb. Flora Ceylon 3: 137, 1895.

A slender shrub 0.7 to 2 m tall. Petiole 0.1 to 0.6 cm long. Leaf-blade 4 to 11 cm long and 1 to 4 cm wide, widest in or slightly below or above the middle, cuneate or rarely almost rounded at the base, slightly to markedly acuminate at the apex. Pedicels much longer than the calyx. Calyx-lobes 1.5 to 3 mm long, glabrous. Corolla-tube 1.7 to 2.8 cm long. Corona minutely puberulous throughout. Merocarps 9 to 15 cm long, about 0.5 cm in diameter, glabrous.

Geographic distribution: Endemic in Ceylon,

A plant of the moist region at low elevations, up to 600 m, not uncommon in secondary scrub and forest clearings.

Specimens examined: NORTH WESTERN PROVINCE: Kurunegala District: Yakdessagala Kanda, 500 ft, Worthington 4005 (private herbarium). WESTERN PROVINCE: Colombo District: Colombo, collector unknown (BM). Kalutara District: Kalutara, Macrae 125 (BM, K); near Kalutara, Schiffner 2421 (BM). CENTRAL PROVINCE: Kandy District: Kadugannawa, 1800 ft, Worthington 2872 (private herbarium). SOUTHERN PROVINCE Galle District: Galle, Gardner 557 (BM, K); Hiniduma, on way to Haycock, 100-170 m, Huber 63 (US); Yakkatuwa, Koelmeyer 1391 (herbarium of Dept. of Forestry, Colombo); Hulandawa Ganga, 200 ft, Worthington 2235 (private herbarium); Tannahena, Hulandawa Oya, 200 ft, Worthington 3662 (BM, private herbarium). Locality unknown: Moon s. n. (BM); Roettler s. n. (K); Thwaites C.P. 1825 (BM, K, PDA); Walker s. n. (K).

Vernacular names: **Wal-idda, Sudu-idda** (*S*)

According to Trimen, bark and wood are used for external application.

## 17. WRIGHTIA R.Br.

R. Brown in Mem. Wern. Soc. 1:73, 1811, prepr. 1810.

Type Species: *Wrightia tinctoria* R. Brown.

Tall shrubs or small to rather tall trees with young branches, leaves and inflorescence glabrous, pubescent or tomentose. Leaves opposite, narrowly lanceolate, elliptic, ovate or obovate; lateral veins rather few, including with the midrib an angle of 45 to 60°. Flowers in poor to fairly rich, dichasially branched, peduncled cymes, terminal but sometimes overtopped by axillary branches. Calyx with glandular scales alternating with the lobes within, the lobes narrowly to broadly ovate, obtuse to acute. Corolla creamy white or yellow, sometimes turning orange or purple towards the end of the anthesis, puberulous without at least on the lobes; the tube short and stout, with a fleshy ring in the mouth; the lobes much longer than the tube, obovate to narrowly oblong, obtuse, in bud overlapping to the left. Corona consisting of one series of segments, the segments alternipetalous in this case, or of two series, then the segments

alternipetalous and antepetalous, rarely with a third series of segments alternating with the alternipetalous and antepetalous segments. Stamens inserted in the mouth of the corolla-tube; filaments very short; anthers lanceolate-sagittate, acute, produced into a barbate acumen at the apex, adnate to the style-apex, totally exserted from the corolla-tube, produced at the base into two tails as long as or shorter than the filaments and deprived of pollen. Disk absent. Fruit a bilocular, cylindrical capsule with two longitudinal grooves, blunt, septicidally dehiscent when dry, or soon splitting into two distinct, cylindrical, acute or acuminate merocarps dry and dehiscent along the ventral suture when ripe. Seeds numerous, linear, compressed, with scanty, pink or mauve endosperm and a tuft of hairs at one end, yellowish-gray or pale grayish-brown without.

About twenty species in India, South East Asia, Malesia and northern Australia.

KEY TO THE SPECIES

1. Young branches and inflorescence glabrous. Leaves narrowly lanceolate, 1 to 2 cm wide. Pedicels very slender, 0.2 to 0.3 mm thick when dried. Corolla 1 to 1.4 cm in diameter when expanded. Corona consisting of five alternipetalous segments only, exceeding the anther-cone. Merocarps soon distinct, about 0.5 cm thick when ripe.
**1. W. angustifolia**

1. Young branches and inflorescence pubescent or tomentose. Leaf-blade 2 to 8 cm wide. Pedicels 0.5 to almost 1 mm thick when dried. Corolla 2 to almost 4 cm in diameter when expanded. Corona consisting at least of five alternipetalous and five antepetalous segments; shorter than the anther-cone. Merocarps thicker or carpels connate into a stout capsule.
   2. Leaves densely pubescent or tomentose beneath. Cymes rather dense. Pedicels stout, about 0.8 mm thick when dried, mostly shorter than the flower. Fruit a blunt, bilocular capsule, warty with prominent lenticels.
**2. W. tomentosa**
   2. Leaves sparsely pubescent beneath. Cymes lax. Pedicels rather slender, about 0.5 mm thick when dried, as long as or slightly longer than the flowers. Fruit (unknown in *W. puberula*) consisting of two smooth and rather slender merocarps distinct except for their points.
      3. Corona consisting of five alternipetalous and five antepetalous segments. Carpels glabrous in flower.
**3. W. puberula**
      3. Corona consisting of five alternipetalous, five antepetalous and five supplementary segments alternating with the latter. Carpels in flower densely pubescent at the tip.
**4. W. flavido-rosea**

**1. Wrightia angustifolia** Thwaites, Enum. Plant. Zeylan.: 193, 1860. Hooker f., Flora Brit. India 3:653, 1882. Trimen, Handb. Flora Ceylon 3: 136, 1895. Ngan in Ann. Missouri Bot. Garden 52:158, 1965.

Nomenclatural type: Thwaites C.P. 1839 (PDA).

A tree up to 15 m high with branches and inflorescence glabrous even when young. Petiole 0.15 to 0.6 cm long. Leaf-blade 4 to 14 cm long, 1 to 2 cm wide, narrowly lanceolate, widest in or below the middle, very gradually tapering to the base, long-acuminate but obtuse at the apex, glabrous on both sides, very rarely puberulous. Cymes lax. Pedicels very slender, 0.2 to 0.3 mm thick when dried, much longer than the flowers. Calyx-lobes 0.7 to 1.2 mm long, narrowly ovate, ciliolate at the margin, glabrous on the back; the glandular scales alternating with the lobes narrowly lanceolate. Corolla creamy-white, malodorous; the tube 0.2 cm long, the lobes about 0.6 cm long, narrowly oblong. Corona of one series, consisting of five alternipetalous segments, glabrous, bifid or laciniate at the tip, about 0.5 cm long and 1 mm wide, slightly exceeding the anthers. Anthers rather slender, about 4 mm long. Carpels pubescent at the apex. Ripe merocarps distinct, 17 to 30 cm long and about 0.5 cm wide, acute at the apex, black, smooth and glabrous.

Geographic distribution: Endemic in Ceylon.

A tree of deciduous forest of the dry zone at low elevation. Not uncommon in North Central Province, otherwise rare.

Specimens examined: NORTH WESTERN PROVINCE: Kurunegala District: Badegama, by the Kumbukgala Ridge, 600 ft, Worthington 4014 (private herbarium). NORTH CENTRAL PROVINCE: Anuradhapura District: mile 71 of Anuradhapura Trincomalee Road, 300 ft, Worthington 55(BM, private herbarium), Huber 41 (US); Summit of Ritigala Kande, Willis 104 (PDA). Polonnaruwa District: Giritale, Worthington 1243 (private herbarium). CENTRAL PROVINCE: Matale District: Dambulla, collector unknown (PDA). EASTERN PROVINCE: Amparai District: Lahugala Tank, Mueller-Dombois and Comanor 67072525 (BISH). Trincomalee District: Nilaveli Road, 6 mile post, Worthington 72 (BM, private herbarium); mile 99 of Anuradhapura

Trincomalee Road, Worthington 971 (BM, private herbarium); Andankulam, Trincomalee, 20 ft, Worthington 1005 (BM); Trincomalee Town, 10 ft, Worthington 1006 (private herbarium). Locality unknown: Thwaites C.P. 1839 (BM, K, PDA).

*Wrightia angustifolia* Thwaites is easily recognized from distance by its drooping branchlets giving the tree a willow-like appearance, and the yellowish-green foliage.

**2. Wrightia tomentosa** Roemer et Schultes, Syst. Veg. 4: 414, 1819. Thwaites, Enum. Plant. Zeylan.: 193, 1860. Hooker f., Flora Brit. India 3: 653, 1882. Trimen, Handb. Flora Ceylon 3: 137, 1895. Ngan in Ann. Missouri Bot. Garden 52: 147, 1965.

Nomenclatural type: Roxburgh in herb. BR (according to an unpublished list of Roxburgh's specimens by Merrill, 1952 at K.)

Syn: *Nerium tomentosum* Roxb., [Hort. Bengal.: 84, 1814 nomen nudum] Flora Indica ed. Carey 2: 6, 1837.

*Wrightia pubescens* Roth, Nov. Plant. Spec. Praes. Ind. Or.: 120, 1821, not *W. pubescens* R. Brown, 1810.

A small or medium-sized tree with young branches and inflorescence pubescent to tomentose. Petiole 0.3 to 0.8 cm long. Leaf-blade 5 to 18 cm long, 2 to 8 cm wide, elliptic-lanceolate, elliptic or obovate, widest in or slightly above the middle, tapering to the base, obtuse and more or less acuminate at the apex, pubescent or glabrescent above, densely pubescent or tomentose beneath. Cymes dense, few-flowered. Pedicels stout, about 0.8 mm thick when dried, mostly somewhat shorter than the flowers. Calyx-lobes 1 to 3 mm long, broadly ovate, densely pubescent without; the glandular scales alternating with the lobes, ovate or orbicular, acute or serrulate. Corolla yellowish when young, turning dull inky-purple with age; the tube 0.3 to (exceptionally) 0.7 cm long, the lobes 0.8 to 1.6 cm long, narrowly elliptic to obovate. Corona of two series, usually shorter than the stamens, glabrous within; the alternipetalous segments bifid, rather broad, the antepetalous dentate, crenulate or subentire, adnate to the corolla-lobes, about as long as the alternipetalous ones; alternating supplementary segments absent. Anthers rather stout, about 7 mm long. Carpels glabrous, connate into a cylindrical capsule with two longitudinal grooves, septicidally dehiscent when ripe, 17 to 35 cm long and 2 or 3 cm wide, stoutly apiculate, warty by prominent lenticels.

Geographic distribution: India, Ceylon, Burma, Malay Peninsula.

In Ceylon widely distributed but always rare, mostly in deciduous forest of the dry zone and at low elevations. One locality in the moist region requires confirmation.

According to Ngan, *Wrightia tomentosa* Roemer et Schultes is represented in Ceylon by an endemic subspecies. This is subsp. *pauciflora* Ngan in Ann. Missouri Bot. Garden 52: 149, 1965, based on Thwaites C.P. 2619 (K, holotype) and distinguished from the continental plant by its relatively few-flowered inflorescences and the coherent corona-segments. The material seen does not allow to decide, if all Ceylon specimens belong to subsp. *pauciflora* Ngan.

Specimens examined: NORTH CENTRAL PROVINCE: Anuradhapura District: mile 75 of Anuradhapura Trincomalee Road, 300 ft, Worthington 1343 (private herbarium); Habarane, 600 ft, Worthington 683 (BM) and Worthington 1214 (BM). Polonnaruwa District: Alut Oya, 76½ mile post and 40 yards, 300 ft, Worthington 715 (BM) and Worthington 2704 (private herbarium). CENTRAL PROVINCE: Kandy District: Kadugannawa, collector unknown (PDA). EASTERN PROVINCE: Batticaloa District: Batticaloa, collector unknown (PDA). Trincomalee District: Andankulam, Worthington 2667 (BM). SOUTHERN PROVINCE: Hambantota District: Ruhuna National Park, plot 24 area, Comanor 1044 (BISH). Locality unknown: Thwaites C.P. 2619 (BM, K, PDA); Walker 156 (K); the same s. n. (K).

Vernacular name: **Palmadankai** (*T.*).

**3. Wrightia puberula** (Thwaites) Ngan in Ann. Missouri Bot. Garden 52: 145, 1965.

Nomenclatural type: Thwaites C.P. 1837 (K).

Syn.: *Wrightia rothii* G. Don var. *puberula* Thwaites, Enum. Plant. Zeylan.: 193, 1860.

A tall shrub or small tree with young branches and inflorescence pubescent. Petiole about 0.7 cm long. Leaf-blade 8 to 12 cm long and 2.5 to 3.5 cm wide, narrowly elliptic to ovate, widest in or slightly above the middle, tapering to the base, obtuse and acuminate at the apex, sparsely pubescent on both sides. Cymes lax and rather few-flowered. Pedicels about 0.5 mm thick when dried, as long as or little longer than the flowers. Calyx-lobes 2 to 3.5 mm long, ovate to broadly ovate, puberulous without; the glandular scales alternating with the lobes ovate, acute. Colour of the corolla not known; corolla-tube 0.35 cm long, the lobes about 1.3 cm long, narrowly oblong-elliptic. Corona of two series, shorter than the stamens, glabrous within; the alternipetalous segments bifid or laciniate, rather broad, the antepetalous laciniate, adnate to the corolla-lobes, about as long as the alternipetalous ones; alternating supplementary segments absent. Anthers rather stout, about 6 mm long. Carpels glabrous. Fruit unknown.

Geographic distribution: Endemic in Ceylon.

A tree of the dry zone, known from a single locality only.

Specimens examined: CENTRAL PROVINCE: Matale District: Dambulla, Gardner s. n. (K), Thwaites C.P. 1837 (BM, K, PDA).

Trimen in Journ. Bot. (London) 23: 238, 1885 and in Handb. Flora Ceylon 3: 136, 1895 incorrectly identified this plant with his *Wrightia flavido-rosea*.

**4. Wrightia flavido-rosea** Trimen in Journ. Bot. (London) 23: 238, 1885. Trimen, Handb. Flora Ceylon 3: 136, 1895 partly. Ngan in Ann. Missouri Bot. Garden 52: 166, 1965.

Nomenclatural Type: Trimen s. n. (K).

A small tree with young branches and inflorescence pubescent. Petiole about 0.5 cm long. Leaf-blade 10 to 15 cm long and 2.5 to 3.5 cm wide, narrowly elliptic, widest in or slightly above the middle, tapering to the base, obtuse and acuminate at the apex, sparsely and minutely pubescent along the veins beneath, almost glabrous otherwise. Cymes lax. Pedicels about 0.5 mm thick when dried, as long as or slightly longer than the flowers. Calyx-lobes about 1.5 mm long, broadly ovate, puberulous without; the glandular scales alternating with the lobes triangular, about half as long as the lobes. Corolla at first pale yellow, afterwards orange-pink, finally purplish-gray; the tube 0.3 cm long, the lobes 1 to 1.2 cm long, oblong. Corona of three series, shorter than the stamens, glabrous within; the alternipetalous segments bifid, the antepetalous rather narrow and adnate to the corolla-lobes, the alternating supplementary segments solitary, simple, as long as the others. Anthers rather stout, about 7 mm long. Carpels densely pubescent at the tips, connate into a cylindrical, longitudinally grooved fruit when young, distinct except for the points and dehiscent along the ventral suture of the merocarps when ripe, 18 to 22 cm long and 0.7 to 0.9 cm in diameter, produced at the apex into a slender, acute beak, smooth and finally glabrous.

Geographic distribution: Endemic in Ceylon.

Known from a single station in the intermediate zone only: Doluwa Kande, a hill about 8 miles north of Kurunegala. Flowering in May, fruiting in September.

Specimens examined: NORTH WESTERN PROVINCE: Kurunegala District: Doluwa Kande, Trimen s. n. (K), Trimen 36 (PDA), Trimen 37 (PDA).

## 18. CLEGHORNIA Wight

Wight, Icon. Plant. Ind. Or. 4 (2):5, t. 1310, 1848.

Type Species: *Cleghornia acuminata* Wight.

A diffuse, semiscandent, glabrous shrub with opposite, elliptic, obovate or oblong-lanceolate leaves. Lateral veins fairly numerous, diverging almost horizontally from the midrib. Flowers in rich, peduncled cymes, terminal or lateral from between the petioles. Calyx with five glandular scales within; the lobes oblong, obtuse, with a narrow, scariose margin. Corolla orange-yellow, glabrous without; the tube short-cylindrical, the lobes half as long as the tube, obliquely ovate-oblong, obtuse to almost acute, in bud overlapping to the right. Stamens inserted near the base of the corolla-tube, with very short filaments; anthers lanceolate-sagittate, acute, adnate to the style-apex, included in the corolla-tube, produced at the base into two tails deprived of pollen. Disk large, fleshy, annular. Merocarps distinct, long and slender, tapering to the apex, obtuse, dry and dehiscent along the ventral suture. Seeds numerous, narrowly lanceolate, compressed, short-beaked, with scanty endosperm and with a tuft of hairs at one end, brown.

Two or three species in Ceylon and Malesia.

**Cleghornia acuminata** Wight, Icon. Plant. Ind. Or. 4 (2): 5, t. 1310, 1848. Thwaites, Enum. Plant. Zeylan.: 194, 1860.

Nomenclatural type: Herb. Wight propr. s. n. (K).

Syn: *Cleghornia cymosa* Wight, Icon. Plant. Ind. Or. 4 (2): 5, 1848.

*Baissea acuminata* (Wight) Hooker f., Flora Brit. India 3: 663, 1882. Trimen, Handb. Flora Ceylon 3: 140, 1895.

Petiole 0.7 to 2 cm long. Leaf-blade 5 to 13 cm long and 2 to 5 cm wide, widest in or above the middle, cuneate at the base, suddenly contracted at the apex into a narrowly linear acumen. Pedicels up to three times as long as the calyx. Calyx-lobes about 1 mm long. Corolla-tube 0.2 to 0.3 cm long. Merocarps 25 to 30 cm long, about 0.5 cm in diameter, glabrous.

Geographic distribution: Endemic in the hill country of Ceylon.

According to Thwaites common at an elevation of 2,000 to 5,000 ft, but apparently having become rare within this century.

Specimens examined: CENTRAL PROVINCE: Kandy District: Kadugannawa, collector unknown (PDA). Uva Province: Badulla District: Jungle below Hakgala on way to Fort Macdonald, collector unknown (PDA). Locality unknown: Champion s. n. (K); Gardner 555 (K); Macrae 103 (BM); Macrae 545 (BM); Moon 113 (BM); Thwaites C.P. 1861 (BM, K, PDA); Walker s. n. (K).

## 19. ANODENDRON A. DC.

A. DC. in DC., Prodr. 8:443, 1844.

Type Species: *Anodendron paniculatum* (Roxb.) A. DC.

Long-twining, glabrous shrubs with opposite, elliptic, ovate-oblong or oblong-lanceolate leaves. Lateral veins rather numerous, including with the midrib an angle of about 60°. Flowers in diffuse, peduncled cymes, terminal or lateral from between the petioles. Calyx glandular within, the lobes ovate to triangular-ovate, with a whitish, scarious margin, obtuse to acute. Corolla dull orange, glabrous without; the tube shortly cylindrical, the lobes almost twice as long as the tube, narrowly linear, falcate, in bud overlapping to the right. Stamens inserted near the base of the corolla-tube, with very short filaments; anthers lanceolate-sagittate, acute, adnate to the style-apex, included in the tube, produced at the base into two tails deprived of pollen. Disk cupular. Merocarps distinct, stout, broadest near the base, tapering to the apex, obtuse, dry and dehiscent along the ventral suture when ripe. Seeds few, ovate-oblong, compressed, beaked, with endosperm and with a tuft of hairs at one end, very dark brown to black.

At least 17 species in India, Ceylon and the Malay Peninsula and Malesia.

### KEY TO THE SPECIES

1. Leaf-blade rather abruptly contracted into the petiole; lateral veins strongly prominent beneath. Pedicels mostly one to three times as long as the calyx. Beak of the seed not exceeding 1 cm. **1. A. manubriatum**

1. Leaf-blade gradually tapering towards the base; lateral veins scarcely prominent beneath. Pedicels usually three to several times as long as the calyx. Beak of the seed 1.5 to 2.5 cm long. **2. A. rhinosporum**

**1. Anodendron manubriatum** Merrill in Philipp. Journ. Sci., Bot. 7: 333, 1912.

Nomenclatural type: Francis de Silva in Herb. Wallich nr. 1663 (K-W).

Syn.: *Echites manubriata* Wallich, Num. List nr. 1663, 1829 nomen nudum.

*Echites paniculata* Roxb., [Hort. Bengal.: 20. 1814 nomen nudum] Flora Indica ed, Carey 2: 17, 1832, not *Echites paniculata* Poiret 1812.

*Ichnocarpus paniculatus* Moon, Cat. Plants Ceylon: 20, 1824 nomen nudum.

*Anodendron paniculatum* (Roxb.) A. DC. in DC., Prodr. 8: 444, 1844. Thwaites, Enum. Plant. Zeylan.: 194, 1860. Hooker f., Flora Brit. India 3: 668, 1882. Trimen, Handb. Flora Ceylon 3: 141, 1895.

Petiole 0.7 to 1.5 cm long. Leaf-blade 8 to 14 cm long and 3.5 to 6.5 cm wide, widest in or below the middle, abruptly contracted into the petiole and frequently almost rounded at the base, shortly and suddenly acuminate but obtuse at the apex, with the lateral venation prominent beneath. Pedicels one to three times as long as the calyx with a few pedicels somewhat longer. Calyx-lobes 0.6 to 1 mm long, glabrous. Corolla-tube 0.15 to 0.2 cm long; the lobes slightly falcate. Merocarps 10 to 14 cm long, about 2 cm in diameter, above the base glabrous. Seeds (including the beak but not the coma) 2 to 3 cm long, the beak not exceeding 1 cm in length.

Geographic distribution: Deccan Peninsula, Ceylon and from the Sylhet southwards through the Malay Peninsula to the Philippines.

In Ceylon according to Thwaites common in the moist zone up to an elevation of 700 m. The plant has not been seen by any recent collector.

Specimens examined: Locality unknown: Macrae 687 (BM); Moon 596 (BM); Thwaites C.P. 1843 (BM, K, PDA).

**2. Anodendron rhinosporum** Thwaites, Enum. Plant. Zeylan.: 194, 1860. Hooker f., Flora Brit. India 3: 669, 1882. Trimen, Handb. Flora Ceylon 3: 141, 1895.

Nomenclatural type: Thwaites C.P. 2579 (K)

Petiole 0.7 to 1.4 cm long. Leaf-blade 6 to 12 cm long and 1.8 to 4 cm wide, widest in or above the middle, cuneate at the base, short-acuminate and obtuse at the apex, with the lateral venation inconspicuous. Pedicels usually three to several times as long as the calyx. Calyx-lobes 0.5 to 0.8 mm long, glabrous. Corolla-tube 0.12 to 0.15 cm long; the lobes strongly falcate. Merocarps 7 to 12 cm long, slightly narrower than in *A. manubriatum*, glabrous. Seeds (including the beak but not the coma) 2.5 to 4.5 cm long, the beak 1.5 to 2.5 cm long.

Geographic distribution: Endemic in Ceylon.

A rare plant of the hill country with an outlying station on Ritigala Kande.

Specimens examined: NORTH CENTRAL PROVINCE: Anuradhapura District: Summit of Ritigala Kande, collector unknown (PDA). CENTRAL PROVINCE: Nuwara Eliya District: Maturata, Thwaites C.P. 2579 (BM, K, PDA).

## 20. ICHNOCARPUS R. Br.

R. Brown in Mem. Wern. Soc. 1:61, 1811, prepr. 1810.

Type Species: *Apocynum frutescens* L.

A twining shrub with finely fulvous-tomentose branches, petioles and inflorescences. Leaves opposite, ovate-elliptic or obovate, with very few lateral veins including with the midrib an angle of 45 to 60°; glabrous above, pubescent beneath, especially on the veins. Flowers in elongate, rusty pubescent panicles composed of small, dichasially branched, sessile or peduncled cymes. Calyx with five glandular scales within or scales absent; the lobes oblong-ovate, subacute. Corolla yellow, puberulous without on the tube, at least towards the base; the tube shortly cylindrical, slightly widened in or little below the middle; the lobes a little longer than the tube, oblong, minutely apiculate, in bud overlapping to the right. Stamens inserted in the widened portion of the tube; with very short filaments; anthers lanceolate-sagittate, acute, adnate to the style-apex, included in the corolla-tube, produced at the base into two tails deprived of pollen. Disk five-lobed. Merocarps distinct, long and very slender, cylindrical, tapering to the apex, dry and dehiscent along the ventral suture when ripe. Seeds numerous, linear, compressed, with endosperm and with a tuft of hairs at one end, blackish-brown.

A genus of ten species ranging from the western Himalayas to Ceylon, South China, the Philippines and Queensland.

**Ichnocarpus frutescens** (L.) R. Brown in Aiton f., Hort. Kew. ed. 2, 2: 69, 1811. Thwaites, Enum. Plant. Zeylan.: 194, 1860. Hooker f., Flora Brit. India 3: 669, 1882. Trimen, Handb. Flora Ceylon 3: 142, 1895.

Nomenclatural type: Herbarium Hermann vol. 3, page 29 (BM).

Syn.: *Apocynum frutescens* L., Spec. Plant.: 213, 1753.

*Echites frutescens* (L.) Roxb., Hort. Bengal: 20, 1814.

A much-branched, twining shrub with whip-like branches. Petiole 0.3 to 0.7 cm long. Leaf-blade 3 to 6 cm long, 1.5 to 3.5 cm wide, widest in or slightly above the middle, shortly cuneate or rounded at the base, acute or slightly acuminate at the apex. Pedicels one to three times as long as the calyx. Calyx-lobes about 0.7 mm long, tomentose. Corolla-tube 0.2 to 0.3 cm long, the lobes undulate at the margin, glabrous without, hairy within. Merocarps 12 to 22 cm long, about 0.2 cm in diameter, rusty pubescent when young, more or less glabrescent when ripe.

Geographic distribution: From the western Himalayas to Ceylon and through South East Asia to Australia.

In Ceylon common throughout the dry region, especially in secondary scrub, along the edges of forests; up to an elevation of about 1,000 m. Rather sporadic and probably in secondary vegetation only in the moist zone.

Specimens examined: NORTH WESTERN PROVINCE: Kurunegala District: Kurunegala, collector unknown (PDA). WESTERN PROVINCE: Colombo District: Colombo, collector unknown (PDA). CENTRAL PROVINCE: Kandy District: Hantane near Kandy, 2,500 ft, Gardner 561 (BM, K). Matale District: east of Dambulla, Simpson 9808 (BM). SOUTHERN PROVINCE: Hambantota District: Ranna, collector unknown (PDA). District unknown: near Maradakadawala, Simpson 9186 (BM). Locality unknown: Champion s. n. (K); Fraser 199 (BM); Macrae 102 (BM); Thwaites C.P. 1863 (BM, PDA).

Vernacular names: **Kiri-wel** (*S*).

# PERIPLOCACEAE

[Herbert Hüber, Botanisches Institut, II, Würzburg, Germany].

Type Genus: *Periploca*. L.

Prostrate or twining shrubs, subshrubs or perennial herbs with a woody rootstock; with internal phloem and milky latex. Leaves opposite, simple, entire, pinnately veined, without stipules. Flowers with calyx and corolla, actinomorphic, 5-merous, bisexual, in axillary* or occasionally terminal (*Cryptostegia*) cymes. Sepals almost free, imbricate. Corolla gamopetalous, deeply lobed in the indigenous genera (funnel-shaped in *Cryptostegia*), the lobes valvate or contorted, overlapping in bud to the right. Stamens five, alternating with the corolla-lobes and inserted near the base of the tube; anthers distinct, connivent above but not adnate to the style-apex, longitudinally dehiscent along their inner side. Pollen granular, the grains united in tetrads, discharged on five funnel- or spoon-shaped pollen-carriers, alternating with the stamens, derived from and attached to the style-apex. Corona of five fleshy scales alternating with the corolla-lobes, inserted in the mouth or near the base (*Cryptostegia*) of the corolla-tube. Disk absent. Carpels two, superior (semi-inferior in *Cryptostegia*), multi-ovulate, free and joined by their common style only. Fruit consisting of two distinct, many-seeded carpels, tapering towards the apex, dehiscent along the ventral suture. Seeds with endosperm, with a tuft of hairs at one end, without an aril.

A family of about 40 genera and almost 200 species in the tropics and the warm-temperate regions of the Old World, poorly represented in Ceylon.

Periplocaceae are incorporated in Asclepiadaceae by most authors. This, however, is not justified, as the pollination mechanism of the two families, although highly specialised in both, fundamentally differs in structure. Both, Periplocaceae and Asclepiadaceae, are derived from Apocynaceae. They are not more closely related to each other than to Apocynaceae-Apocynoideae.

The two Ceylonese species of Periplocaceae, most commonly *Hemidesmus indicus* (L). R. Brown in Aiton f., are used as medical plants.

The following plant is much grown as an ornamental and may be found in a semi-wild state:

*Cryptostegia grandiflora* R. Brown in Edwards, Bot. Reg. 5, t. 435, 1820.

A tall, twining, glabrous shrub. Leaves opposite, broadly ovate, obtuse, sometimes short-acuminate, acute at the base, with rather distant lateral veins including with the midrib almost a right angle. Cymes short-peduncled, dichasially branched, terminal, few-flowered. Calyx-lobes ovate-lanceolate, acute. Corolla large, purple; tube 2.5 to 4 cm long, funnel-shaped, attenuate in the lower half; lobes broadly obovate, shorter than the tube. Ovary semi-inferior. Merocarps ovoid-oblong, tapering to the apex, 8 to 12 cm long and 2 to 2.5 cm wide, sharply angled.

A native of Madagascar, now largely planted in tropical gardens. According to Trimen often naturalized in Ceylon near the shore.

## KEY TO THE GENERA

1. Inflorescence terminal. Corolla very large, the tube much longer than the calyx. Corona inserted near the base of the corolla-tube. Merocarps very stout, ovoid-oblong. Introduced ornamental. **Cryptostegia**

1. Inflorescence axillary. Corolla rather small, the tube about as long as the calyx-lobes. Corona inserted in the mouth of the corolla-tube.

   2. Leaves with numerous, close, lateral veins, shining, not variegated. Buds produced into a slender beak. Corolla yellowish white, the lobes contorted in bud. Corona-scales almost as long as the anthers. Merocarps rather stout. **1. Cryptolepis**

   2. Leaves with rather few, distant, lateral veins, not shining, often variegated with white along the veins on upper side. Buds ovoid, not beaked. Corolla dull purplish brown, the lobes valvate in bud. Corona scales much shorter than the anthers. Merocarps slender. **2. Hemidesmus**

* Cymes never arising laterally from between the petioles.

## 1. CRYPTOLEPIS R.Br.

R. Brown in Mem. Wern. Soc. 1:69, 1811, prepr. 1810.

Type Species: *Cryptolepis buchananii* Roemer et Schultes.

A twining, glabrous shrub. Leaves ovate to obovate, with numerous, straight lateral veins almost horizontally diverging. Flowers in rather lax, peduncled, axillary cymes. Calyx-lobes ovate-oblong, obtuse. Corolla yellowish-white, glabrous without; tube about as long as calyx; the lobes much longer than the tube, oblong-linear, contorted in bud and produced into a narrowly conical beak. Corona of five fleshy, oblong-spathulate scales notched at the apex, inserted in the mouth of the corolla-tube. Merocarps ovate-lanceolate, rather stout, slightly flattened dorsally.

A palaeotropical genus with several species ranging from tropical Africa through India to South China and Malesia. In Ceylon represented by one species only.

**Cryptolepis buchananii** Roemer et Schultes, Syst. Veg. 4: 409, 1819. Thwaites, Enum. Plant. Zeylan.: 195, 1860. Hooker f., Flora Brit. India 4: 5, 1883. Trimen, Handb. Flora Ceylon 3: 145, 1895.

Nomenclatural type: Buchanan-Hamilton s. n. (B.M).

Syn.: *Nerium reticulatum* Roxb. [Flora Ind.: 19, 1814 nomen nudum] Flora Ind. ed. Carey et Wallich 2: 8, 1821.

*Cryptolepis reticulata* (Roxb.) K. Schumann in Engl. und Prantl, Natürl. Pflanzenfam. 4(2): 219, 1895.

Petiole 0.5 to 1.2 cm long. Leaf-blade 5 to 18 cm long and 2.5 to 8 cm wide, rounded or short-cuneate at the base, suddenly narrowed into a short mucronate apex, shining above, not variegated. Inflorescence shorter than the leaves, the peduncle equalling or exceeding the petiole. Pedicels mostly longer than the calyx. Calyx-lobes 1.5 to 2 mm long, glabrous. Corolla 1.2 to 2 cm in diameter when expanded. Merocarps 6 to 10 cm long, 1.2 to 1.8 cm wide, tapering to the apex, glabrous.

Geographic distribution:From northern Pakistan, Nepal and Bhutan through India to Ceylon and Burma.

In Ceylon rather common in deciduous scrub and forests of the dry and intermediate zone, especially in the eastern part of North Central Province, northern and eastern part of Central Province and in Uva Province, up to an elevation of 1,000 m. Flowering from October to March.

Specimens examined: NORTH CENTRAL PROVINCE: Polonnaruwa District: between Alut Oya and Gal Oya, Huber 28 (US). CENTRAL PROVINCE: Kandy District: between Madugoda and Weragantota, Huber 38 (US). UVA PROVINCE: Badulla District Talabottawa near Passara, Huber 19 (US). Locality unknown: Thwaites C.P. 2548 (BM, K, PDA).

Vernacular names: **Wel-rukattana** (*S.*).

According to Trimen the wood is used in native medicine.

## 2. HEMIDESMUS R. Br.

R. Brown in Mem. Wern. Soc. 1:56, 1811, prepr. 1810.

Type Species: *Periploca indica* L.

Subshrubs or herbs with a woody rootstock and prostrate or slightly twining, puberulous or glabrescent stems. Leaves obovate, elliptic, oblong or linear, with distant lateral veins strongly arched towards the margin and including with the midrib an angle of 45 to 60°; glabrescent or slightly puberulous on the veins and at the margin. Flowers in small, dense, sessile, axillary cymes. Calyx-lobes broadly ovate, acute. Corolla purplish-brown within, glabrous and greenish without; the tube about as long as the calyx; the lobes two or three times as long as the tube, ovate, valvate in bud. Bud ovoid. Corona of five short, fleshy, broadly truncate scales inserted in the mouth of the corolla-tube. Merocarps slender, cylindrical.

Monotypic.

**Hemidesmus indicus** (L). R. Brown in Aiton f., Hort. Kew. ed. 2, 2 : 75, 1811. Thwaites, Enum. Plant. Zeylan.: 195, 1860. Hooker f., Flora Brit. India 4 : 5, 1883. Trimen, Handb. Flora Ceylon 3: 144, 1895.

Nomenclatural type: Herbarium Hermann, vol. 3, page 51 (BM).

Syn.: *Periploca indica* L., Spec. Plant.: 211, 1753.

Petiole 0.1 to 0.6 cm long. Leaf-blade extremely variable in shape, 3 to 7 cm long, 0.3 to 3 cm wide, acute, rounded or truncate at the base, acute, rounded or emarginate and apiculate at the apex, not shining, frequently variegated with white along the veins. Inflorescence shorter than the leaves. Pedicels about as long as or slightly longer than the calyx. Calyx-lobes 1 to 1.5 mm long, puberulous or glabrescent. Corolla 0.6 to 0.8 cm in diameter when expanded. Merocarps 10 to 12 cm long, 0.5 to 0.6 cm wide, slightly falcate, glabrous.

Geographic distribution: From northern India and Sikkim through the Deccan Peninsula to Ceylon.

In Ceylon abundant throughout, up to an elevation of 1,000 m, particularly in deciduous scrub and forests of the dry and arid regions, less common in secondary forests of the moist zone. Flowering in February.

Specimens examined: NORTHERN PROVINCE: Jaffna district: 3 miles south of Jaffna, Simpson 7984 (BM). CENTRAL PROVINCE: Kandy District: Kandy, Champion s. n. (K). SOUTHERN PROVINCE: Hambantota District: Ruhuna National Park, Block 1, Mueller-Dombois and Cooray 67121008 (BISH). Locality unknown: Thwaites C.P. 183 (BM, K, PDA); Walker s. n. (K).

Vernacular names: **Irramusa, Iramusu** (*S.*); **Nannari** (*T.*).

The roots are much used in native medicine as a tonic (Trimen).

# ASCLEPIADACEAE

[Herbert Hüber, Botanisches Institut II, Würzburg, Germany].

Type Genus: *Asclepias* L.

Erect, creeping, scrambling or most frequently twining herbs and shrubs, sometimes more or less succulent; with internal phloem and usually milky latex, sometimes in small quantities, or with a watery sap. Leaves opposite, simple, entire, pinnately veined, reduced or absent in some succulent genera; stipules absent. Flowers with calyx and corolla, actinomorphic (except *Ceropegia* with the corolla-tube mostly curved), 5-merous, bisexual, usually in lateral inflorescences arising from between the petioles (except *Caralluma*), rarely the inflorescence reduced to a single flower. Sepals shortly connate or almost free, imbricate. Corolla gamopetalous, rotate, campanulate or tubular, the lobes valvate or contorted in bud, rarely imbricate or reduplicate, when contorted overlapping to the right (except *Toxocarpus*). Stamens five, alternating with the corolla-lobes and inserted at the very base of the tube; anthers distinct or connate, adnate to the style-apex, longitudinally dehiscent or opening by terminal slits. Pollen united into waxy masses, corresponding with the content of an anther-sac; the pollen-masses of adjacent loculi of different anthers connected by caudicles to five pollen-carriers, derived from the angle of the style-apex and concealing the stigmatic tissue. Corona of one or two series, attached to the corolla or to the staminal column or the outer series to the corolla and the inner to the staminal column. Disk absent. Carpels two, superior, multi-ovulate, free but joined by their common style; the latter much thickened at the apex. Fruit consisting of two distinct, many-seeded merocarps; dry, dehiscent along the ventral suture, sometimes solitary by abortion. Seeds with scanty endosperm, with a tuft of hairs at one end, without an aril.

More than 250 genera with about 3000 species, mainly in the tropics and in warm-temperate regions, most abundant in Africa south of the equator. In Ceylon 21 genera indigenous with 37 species. Three species seem to be endemic: *Bidaria celsicola* H. Huber, *Ceropegia parviflora* Trimen and *Gymnema rotundatum* Thwaites.

The genera represented in the flora of Ceylon may be arranged as follows:

Tribe **Asclepiadeae:** *Calotropis, Cynanchum, Holostemma, Sarcostemma, Oxystelma, Pentatropis, Pergularia, (Asclepias, Gomphocarpus).*

Tribe **Secamoneae:** *Secamone, Toxocarpus.*

Tribe **Marsdenieae:** *Tylophora, Gymnema, Bidaria, Marsdenia, Cosmostigma, Heterostemma, Wattakaka, Hoya, Dischidia.*

Tribe **Ceropegieae:** *Leptadenia, Ceropegia, Caralluma.*

In the tribe Secamoneae according to Sawfat (1962) all four pollen-sacs are fertile, whereas otherwise in Asclepiadaceae only two pollen-sacs remain fertile, the two other pollen-sacs having become transformed into horny grooves leading the respective organs of visiting insects to the pollen-carrier. Based on this character, the family has been divided into two subfamilies, Secamonoideae and Asclepiadoideae. This division, however, is somewhat arbitrary, neglecting the even more fundamental differences between the tribe Asclepiadeae with their pollen-sacs embedded in the basal part of the anther, and the rest of the family with the pollen-sacs embedded in the apical portion of the anther.

Also phytochemical observations substantiate the distinction of the tribe Asclepiadeae from the other tribes and its primary position in this family. In Asclepiadeae, cardiotoxic glycosides are widely distributed (e.g. in *Asclepias curassavica* L., *Calotropis gigantea* (L.) R. Brown in Aiton f., *Gomphocarpus physocarpus* E. Meyer, *Pergularia daemia* (Forsk). Chiov. indicating a rather close affinity with Periplocaceae and Apocynaceae, particularly with the subfamily Apocynoideae. In the tribes Marsdenieae and Ceropegieae these cardiotoxic glycosides are gradually replaced by more specialized types of picric substances, related with Condurangine.

Most Asclepiadaceae are plants of a rather dry climate or at least of a climate with a pronounced dry season. In spite of the fact that the family is represented in Ceylon by only one truely geophytic species. (i.e. *Ceropegia candelabrum* L.) some Asclepiadaceae are frequently met with in areas, where the vegetation is repeatedly destroyed by fire. Very few species are restricted to the moist parts and to the hill country of Ceylon; some of them have not been collected since Thwaites and a part of them seems to have disappeared by colonisation and particularly by tea plantations.

The following two species have become naturalized:

*Asclepias curassavica* L., Spec. Plant.: 215, 1753.

An erect, herbaceous plant 0.5 to 1 m tall, with young stems and inflorescence minutely puberulous. Leaves lanceolate, tapering at both ends; with a short petiole. Flowers in long-peduncled, umbel-like cymes solitary at the nodes. Peduncle shorter than the leaves. Calyx-lobes lanceolate, acute. Corolla red, rotate, 1 to 1.5 cm in diameter when expanded, glabrous throughout; the lobes reflexed, ovate, much longer than the radius of the united portion, valvate in bud. Corona in one series, consisting of five erect segments attached to the staminal column, not adnate beyond the point of insertion; segments not compressed laterally, concave on the inner face and there bearing a conspicuous, erect tooth. Anthers with the connective produced into a membranous tip. Pollen-masses solitary in each anther-loculus, pendulous. Merocarps fusiform, 7 to 10 cm long, 1 to 1.2 cm in diameter, long-tapering and acute at apex, smooth and glabrous.

A native of the West Indies, commonly cultivated and occasionally found as an escape.

*Gomphocarpus physocarpus* E. Meyer, Comm. Plant. Afr. Austr.: 202, 1838.

A slender, erect shrub 1 to 2 m high, with young stems and inflorescence pubescent. Leaves narrowly lanceolate, tapering at both ends, short-petioled. Flowers in peduncled, umbel-like cymes solitary at the nodes. Peduncle shorter than the leaves. Calyx-lobes lanceolate, acute. Corolla white, rotate, 1.4 to 2 cm in diameter; the lobes reflexed, ovate, much longer than the radius of the united portion, densely bearded on the margin, valvate in the bud. Corona in one series, of five erect segments attached to the staminal column, not adnate beyond the point of insertion; the segments folded lengthwise and strongly compressed laterally, without a projection from the inner side but with two rhomboid teeth on the inner edges. Anthers with the connective produced into a membranous tip. Pollen-masses solitary in each anther-loculus, pendulous. Merocarps obliquely ovoid, strongly inflated, 4 to 7 cm long, 2.5 to 5 cm in diameter, blunt, covered with long, soft bristles, tomentellous when young, glabrescent when ripe.

A native of South and tropical Africa, escaped from cultivation and naturalized below Hakgala, Badulla District, on the way to the former Fort Macdonald.

## KEY TO THE GENERA

1. Leafless or almost leafless succulent plants.
   2. Stems jointed, cylindrical, scrambling and twining. Flowers pale yellowish green. Corolla-lobes glabrous. **4. Sarcostemma**
   2. Stems not jointed, quadrangular, erect or ascending. Flowers purplish-brown or yellow with purplish spots and streaks. Corolla-lobes ciliate on the margin or pubescent within. **21. Caralluma**
1. Leaves well developed.
   3. Cymes arising exactly from the leaf-axils. (see Periplocaceae)
   3. Cymes arising from the nodes between the petioles.
      4. Stem erect.
         5. Corolla small, 0.5 to 0.7 cm in diameter. Pollen-masses minute, almost orbicular. **10. Tylophora**
         5. Corolla 1 to 4.5 cm in diameter. Pollen-masses elongate, clavate or rather drop-shaped.
            6. Leaves glaucous, cordate at the base. Corolla 3 to 4.5 cm wide, pale violet, rarely white. **1. Calotropis**
            6. Leaves not glaucous, tapering to the base. Corolla 1 to 2 cm wide.
               7. Corolla red; lobes glabrous. Corona-segments not compressed laterally. Merocarps fusiform, smooth. **Asclepias**
               7. Corolla white; lobes bearded on the margin. Corona-segments strongly compressed laterally. Merocarps obliquely ovoid, echinate with long, soft bristles. **Gomphocarpus**

4. Stem twining, scrambling, **prostrate or** creeping.
   8. Leaves cordate throughout. **Petiole** 1 to 10 cm long.
      9. Cymes dichasially branched, sessile or short-peduncled, shorter than the petioles. Leaves tomentose beneath. **13. Marsdenia**
      9. Cymes not dichasially branched; umbel- or raceme-like, shorter or frequently longer than the petioles.
         10. Corolla salver-shaped; lobes densely pilose within. Merocarps echinate with long bristles. **7. Pergularia**
         10. Corolla rotate or shallowly campanulate; lobes glabrous. Merocarps smooth.
            11. Flowers small, not exceeding 1 cm when expanded. Frequently with a pair of small, roundish leaves in the leaf-axils. **2. Cynanchum**
            11. Flowers exceeding 1 cm in diameter. Leaves without roundish leaves in their axils.
               12. Peduncle shorter than the petiole. Corolla purplish-crimson. **3. Holostemma**
               12. Peduncle equalling or exceeding the petiole. Corolla green. **16. Wattakaka**
   8. Leaves not or very shallowly cordate or only the lower leaves cordate.
      13. Flowers in lax, dichasially branched cymes or in dense, umbel-like cymes but then paired at the nodes.
         14. Calyx-lobes acute, glabrous. Corolla mostly purple-brown. Cymes shorter to longer than the leaves. **10. Tylophora**
         14. Calyx-lobes obtuse, puberulous. Corolla mostly yellowish. Cymes shorter than the leaves.
            15. Cymes compact, often umbel-like. Corolla-lobes about as long as the tube, acute. Leaves broadly ovate to ovate-lanceolate. **11. Gymnema**
            15. Cymes rather laxly branched, not umbel-like. Corolla-lobes two to several times longer than the tube. Leaves ovate-lanceolate to linear-lanceolate.
               16. Stem and leaves glabrous. Corolla 0.3 to 0.5 cm in diameter; lobes ovate. **8. Secamone**
               16. Stem and under surface of leaves rusty pubescent. Corolla 0.7 to 1 cm in diameter; lobes linear-oblong. **9. Toxocarpus**
      13. Cymes umbel-or raceme-like, sessile or peduncled, always solitary at the nodes.
         17. Cymes sessile or almost sessile, umbel-like.
            18. Stems rooting at the nodes. Plants mostly epiphytic.
               19. Leaves narrowly ovate-lanceolate, 2 to 5 cm long, 0.5 to 1 cm wide, tapering to an obtuse apex, not apiculate nor mucronate. Corolla rotate. **17. Hoya** (*pauciflora*)
               19. Leaves orbicular, up to 1 cm long and wide, often minutely apiculate. Corolla urceolate. **18. Dischidia**
            18. Stems normally not rooting at the nodes. Leaves ovate to oblong, acute or obtuse but then apiculate or mucronate. Corolla rotate.
               20. Leaves rather small, 1 to 3.5 cm long. Corolla 0.5 to 0.8 cm in diameter, the lobes much longer than the united portion, minutely puberulous within. **6. Pentatropis**
               20. Leaf-blade 3.5 to about 10 cm long. Corolla 1 to 1.5 cm in diameter, the lobes as long as or slightly longer than the radius of the united portion, glabrous within.
                  21. Leaves slightly fleshy, glabrous or more frequently puberulous, especially beneath. Calyx-lobes lanceolate, very sharply pointed. **10. Tylophora** (*indica*)
                  21. Leaves thinly membranous, quite glabrous. Calyx-lobes ovate-oblong, almost obtuse. **15. Heterostemma**
         17. Cymes peduncled, umbel-or raceme-like
            22. Corolla-lobes connate with their tips, shorter than the tube, rarely almost as long as the tube; the latter ventricose at the base. **20. Ceropegia**

22. Corolla-lobes not coherent with their tips; tube not inflated at the base.
    23. Corolla-lobes pubescent at least on the margin.
        24. Glabrous herbs. Leaves ovate-lanceolate to linear-lanceolate. Cymes long-peduncled, laxly racemiform. Corolla 1.8 to 2.5 cm in diameter, glabrous without; lobes densely pubescent on the margin. **5. Oxystelma**
        24. Mealy puberulous shrubs. Leaves ovate or ovate-oblong. Cymes short-peduncled, umbel-like. Corolla 0.6 to 0.8 cm in diameter, minutely puberulous without; lobes villous outside. **19. Leptadenia**
    23. Corolla-lobes glabrous.
        25. Corolla salver-shaped; tube 0.2 to 0.5 cm long, slightly narrowed at the mouth; lobes shorter than or as long as the tube. Young branches puberulous. **12. Bidaria**
        25. Corolla rotate; lobes usually longer than the radius of the united portion.
            26. Corona cup-shaped, free from the staminal column. Leaves frequently with a pair of small, roundish leaves in the axils. Flowers 0.5 to 0.9 cm in diameter. **2. Cynanchum**
            26. Corona attached to the staminal column. Leaves without roundish leaves in the axils.
                27. Corona-segments near the apex with a fleshy tooth projecting horizontally inwards. Corolla 1 to 1.5 cm in diameter. Plant glabrous.
                    28. Stem not radicant. Leaves not succulent. Not epiphytic. **16. Wattakaka**
                    28. Stem rooting at the nodes. Leaves thick and fleshy. Mostly epiphytic. **17. Hoya** (*ovalifolia*)
                27. Corona-segments without a tooth projecting inwards. Plants glabrous or pubescent.
                    29. Cymes usually umbel-like. Calyx-lobe acute, hairy or glabrous. Merocarps produced into a slender, acute beak. **10. Tylophora**
                    29. Cymes becoming racemiform. Calyx-lobes obtuse, glabrous. Merocarps blunt. **14. Cosmostigma**

## 1. CALOTROPIS R.Br.

R. Brown, in Mem. Wern. Soc. 1:39, 1811, prepr. 1810.

Type Species: *Asclepias procera* Ait.

Erect shrubs with young stems and inflorescence cottony pubescent. Leaves oblong, obovate or panduriform, rather thick, cottony tomentose when young, frequently glabrescent when fully developed. Flowers in long-peduncled, umbel-like or furcate cymes solitary at the nodes. Calyx-lobes ovate, acute. Corolla pale violet or occasionally pure white, rotate, glabrous; the lobes much longer than the radius of the united portion, ovate, valvate in bud. Corona in one series, of five segments adnate to the staminal column for their total length, strongly compressed laterally, keeled on the back, with two small teeth just below the top and a spur curved upwards at the base. Anthers with the connective produced into a membranous tip; pollen-masses solitary in each anther-loculus, pendulous, elongate-dropshaped, without a pellucid margin. Merocarps half-ovoid, thick and fleshy, slightly corrugated.

Three species in northern Africa, Arabia and tropical Asia, mainly in arid regions.

**Calotropis gigantea** (L.) R. Brown in Aiton f., Hort. Kew. ed. 2, 2:78, 1811. Thwaites, Enum. Plant. Zeylan.:196, 1860. Hooker f., Flora Brit. India 4:17, 1883. Trimen, Handb. Flora Ceylon 3:148, 1895.

Nomenclatural type: Herbarium Hermann, vol. 2, pag. 74 (BM).

Syn.: *Asclepias gigantea* L., Spec. Plant.: 214, 1753.

Stems 1 to 5 m high. Petiole 0.3 to 2 cm long. Leaf-blade 6 to 18 cm long and 3 to 8 cm wide, cordate at the base, acute, rarely rounded at the apex, glaucous green. Peduncles shorter than to as long as the leaves. Calyx-lobes 3 to 4 mm long, puberulous. Corolla 3 to 4.5 cm in diameter. Merocarps 7 to 10 cm long and 2.5 to 4 cm broad, glabrous.

Geographic distribution: From Pakistan and Nepal through India to Ceylon, the Maldive Islands (Hulula), South China and Malesia.

Common in disturbed vegetation and on waste places throughout the dry and arid parts of Ceylon, less frequently as a weed in the humid zone. Absent from the higher elevations. Flowering all year long.

Specimens examined: NORTH CENTRAL PROVINCE: Anuradhapura District: between Maragahawewa and the Wilpattu National Park, Huber 9 (US). EASTERN PROVINCE: Amparai District: Padiyatalawa, Huber 40 (US). Trincomalee District: Trincomalee, Worthington 1102 (private herbarium); Sandy Cove, Worthington 2664 (private herbarium). SABARAGAMUWA PROVINCE: Ratnapura District: Ratnapura, collector unknown (PDA), SOUTHERN PROVINCE: Galle District: Galle. Champion s.n. (K); Fort of Galle, Huber 16 (US). Hambantota District: Ruhuna National Park, Block 1, Mueller-Dombois and Cooray 67121008 (BISH).

Vernacular names: **Wara** (*S.*); **Manakkovi, Errukalai, Urkkovi** (*T.*).

According to Trimen the bark of the root is used in medicine as a tonic and the milky juice is given as a remedy for leprosy. A fine fibre is obtained from the stem.

## 2. CYNANCHUM L.

L., Spec. Plant.:212, 1753.

Type Species: *Cynanchum acutum L.*

Twining, glabrous or puberulous herbs with triangular, ovate or lanceolate leaves. Flowers in rather short-peduncled, umbel-like cymes solitary at the nodes. Calyx-lobes ovate-lanceolate, acute. Corolla greenish or purple-brown, rotate, glabrous; the lobes much longer than the radius of the united portion, ovate-oblong, contorted in bud. Corona in one series, cup-shaped, shallowly five-lobed, arising from the very base of the corolla. Anthers with the connective produced into a membranous tip; pollen-masses solitary in each anther-loculus, pendulous, without a pellucid margin. Merocarps fusiform, long-tapering to the apex, smooth.

A large genus of more than hundred species falling into two sections which differ in their corona structure: in section *Cynanchum* the corona segments are highly connate, forming a cup-like structure, in section *Vincetoxicum* they are almost free or fused at the base only. These two sections are treated as distinct genera by several authors. The Ceylonese species both belong to section *Cynanchum*, which is widely distributed throughout the Old World including Australia.

KEY TO THE SPECIES

1. Stem puberulous at the nodes, with two longitudinal lines of pubescence at the internodes, at least when young. Peduncle with one line of pubescence. Pedicels puberulous. Leaves ovate-lanceolate. **1. C. alatum**

1. Stem, peduncle and pedicels quite glabrous. Leaves triangular-ovate. **2. C. tunicatum**

1. **Cynanchum alatum** Wight et Arnott ex Wight, Contrib. Bot. India:57, 1834. Hooker f., Flora Brit. India 4:23, 1883. Alston in Trimen, Handb. Flora Ceylon 6, Suppl.: 194, 1931.

Nomenclatural type: Herb. Wight propr. 1552 (K).

Syn.: *Cynoctonum alatum* (Wight) Decne. in DC., Prodr. 8:529, 1844.

Stem puberulous at the nodes and at the internodes, here the pubescence confined to two longitudinal lines, sometimes glabrescent with age. Leaves frequently with a pair of small, round leaves in their axil. Petiole 1 to 3 cm long, puberulous along their upper side. Leaf-blade 3 to 6 cm long, 0.7 to 2 cm wide, shallowly cordate with a rather narrow sinus or almost truncate at the base, acute and acuminate at the apex, glabrous or almost glabrous when fully developed. Peduncle mostly shorter than the petiole, with a longitudinal line of pubescence. Pedicels puberulous. Calyx-lobes about 1.5 mm long, slightly puberulous. Corolla purplish-brown, 0.5 to 0.6 cm in diameter. Merocarps as in *Cynanchum tunicatum*.

Geographic distribution: Mountains of the southern Deccan Peninsula and of Ceylon.

In Ceylon known only from two places, both on the eastern slope of the main block in the moist or intermediate region. Flowering from January to May.

Specimens examined: CENTRAL PROVINCE: Nuwara Eliya District: Maturata, collector unknown (PDA). UVA PROVINCE: Badulla District: Hakgala, Simpson 9075 (BM,PDA). Locality unknown: Gardner s.n. (K).

2. **Cynanchum tunicatum** (Retzius) Alston in Trimen, Handb. Flora Ceylon 6, Suppl.: 194, 1931.

Nomenclatural type: Koenig s.n. (LD holotype not seen, BM isotype).

Syn.: *Periploca tunicata* Retzius, Obs. Bot. 2:15, 1781.

*Cynanchum pauciflorum* R. Brown in Mem. Wern. Soc. 1:45, 1811, prepr 1810. Hooker f., Flora Brit. India 4:23, 1883. Trimen, Handb. Flora Ceylon 3:151, 1895.

*Cynoctonum pauciflorum* (R. Brown) Decne. in DC., Prodr. 8:528, 1844. Thwaites, Enum. Plant. Zeylan.:195, 1860.

Stem glabrous. Leaves mostly with a pair of roundish leaves of about 1 cm in diameter in their axils. Petiole 2 to 7 cm long, glabrous. Leaf-blade 5 to 10 cm long and 3 to 6 cm wide, cordate at the base with a widely open sinus, acuminate and very acute at the apex, glabrous. Peduncle shorter than the petioles, glabrous. Pedicels glabrous. Calyx-lobes 1.5 to 3 mm long, glabrous. Corolla greenish, 0.6 to 0.9 cm in diameter. Merocarps 4 to 7 cm long, about 1 cm in diameter, glabrous.

Geographic distribution: Deccan Peninsula southwards from the Konkan; Ceylon.

Twining in scrub and fences along temporarily inundated places of the dry zone of Ceylon. According to Thwaites very common in the Central Province but not recently found there and perhaps in part mistaken for *C. alatum*. Flowering from November to March.

Specimens examined: NORTH CENTRAL PROVINCE: Anuradhapura District: Maha-Illupalama, Huber 47 (US). CENTRAL PROVINCE: Kandy District: Deltota, collector unknown (PDA). Locality unknown: Thwaites C.P. 2466 (BM, PDA).

## 3. HOLOSTEMMA R.Br.

R. Brown in Mem. Wern. Soc. 1:42, 1811, prepr. 1810.

Type Species: *Holostemma annulare* (Roxb.) K. Schumann.

A large, twining subshrub with glabrous stems and inflorescences. Leaves rather thick, cordate, puberulous on the veins beneath. Flowers in poor, short-racemiform, peduncled cymes solitary at the nodes. Calyx-lobes ovate, obtuse. Corolla purplish-crimson, shallowly cup-shaped, glabrous; the lobes about twice as long as the radius of the united portion, ovate-elliptic, contorted in the bud. Corona in one series, cup-shaped, entire, arising from the very base of the corolla. Anthers very large, with the connective produced into a membranous tip, pollen-masses solitary in each anther-loculus, pendulous, without a pellucid margin. Merocarps stout, oblong-fusiform, slightly tapering to a very blunt apex.

Few species in India and China.

**Holostemma annulare** (Roxb.) K. Schumann in Engl. und Prantl, Natürl. Pflanzenfam. 4 (2):250, 1895.

Nomenclatural type: Rheede tot Draakestein, Hort. Ind. Malabar. 9, t. 7, 1689.

Syn.: *Asclepias annularia* Roxb., Hort. Bengal. :20, 1814, based on Rheede tot Draakestein.

*Holostemma ada-kodien* Schultes, Syst. Veget. 6:95, 1820.

*Sarcostemma annulare* Roth, Nov. Plant. Spec. praes. Ind. Or.:178, 1821.

*Holostemma rheedianum* Sprengal, Syst. Veget. 1:851, 1825.

*Holostemma rheedei* Wallich, [Num. List East Ind. Comp. Mus. nr. 4409, 1828 nomen nudum] Plant. Asiat. Rar. 2:51, 1831. Hooker f., Flora Brit. Ind. 4:21, 1883. Trimen, Handb. Flora Ceylon 3:150, 1895.

Petiole 2 to 6 cm long. Leaf-blade 6 to 12 cm long, 2 to 8 cm wide, short-acuminate and very acute at the apex. Peduncle shorter than the petioles. Calyx-lobes about 3 mm long. Corolla 2 to 3.5 cm wide. Merocarps 8 to 14 cm long and about 4 cm in diameter, deeply furrowed along each side, glabrous.

Geographic distribution: Tropical Himalayas, southern Deccan Peninsula, Ceylon, Burma.

In Ceylon known from a few places only, probably all in Uva Province. Flowering in January.

Specimens examined: UVA PROVINCE: Badulla District: Ekiriyankumbura, collector unknown (PDA). Badulla or Monaragala District: between Bibile and Ekiriyankumbura, collector unknown (PDA). District unknown: Nilgala, Thwaites C.P. 3582 (PDA).

## 4. SARCOSTEMMA R. Br.

R. Brown in Mem. Wern. Soc. 1:50, 1811, prepr. 1810.

Type Species: *Cynanchum viminale* L.

Scrambling and twining shrubs or subshrubs with glabrous, fleshy, cylindrical stems; leafless or the leaves reduced to minute, deciduous scales. Flowers in sessile, umbel-like, puberulous clusters solitary at the nodes. Calyx-lobes ovate, acute. Corolla pale or yellowish green, rotate or shallowly campanulate, glabrous; the lobes much longer than the radius of the united portion, ovate-oblong, slightly contorted in the bud. Corona in two series, the outer a glabrous, lobed annulus arising from the base of the staminal column, the inner of five ovoid segments attached to the staminal column. Anthers with the connective produced into a membranous tip; pollen-masses solitary in each anther-loculus, pendulous, without a pellucid margin. Merocarps narrowly fusiform, smooth.

If construed in a narrow sense, the genus *Sarcostemma* comprises about a dozen species native in Africa, tropical Asia and Australia. They all are succulent, almost leafless xerophytes. *Oxystelma*, included in *Sarcostemma* by Holm (1950), is maintained as a separate genus here.

**Sarcostemma brunonianum** Wight et Arnott ex Wight, Contrib. Bot. India :59, 1834. Thwaites, Enum. Plant. Zeylan.: 196, 1860. Hooker f., Flora Brit. India 4:27, 1883. Trimen, Handb. Flora Ceylon 3:152, 1895.

Nomenclatural type: Herb. Wight propr. 1557 (K).

Syn.: *Sarcostemma viminale* Moon, Cat. Plants Ceylon :20, 1824, not *S. viminale* (L.) R. Brown in Aiton f.

Stems jointed, dark green, with a watery juice. Peduncle absent. Calyx-lobes about 1.5 mm long, puberulous. Corolla 0.8 to 1.2 cm wide. Merocarps 8 to 9 cm long, up to 0.5 cm in diameter, glabrous.

Geographic distribution: Deccan Peninsula, Ceylon.

In Ceylon rather common in the dry and arid regions.

Specimens examined: NORTH WESTERN PROVINCE: Puttalam District: Chilaw, Simpson 8156 (BM). EASTERN PROVINCE: Batticaloa District: Batticaloa, collector unknown (PDA). Trincomalee District: Trincomalee, collector unknown (PDA). SOUTHERN PROVINCE: Hambantota District: Ruhuna National Park, Block 1, Comanor 374 (BISH).

Vernacular names: **Muwakiriya, Mowang kiri** (*S.*).

## 5. OXYSTELMA R. Br.

R. Brown in Mem. Wern. Soc. 1:40, 1811, prepr. 1810.

Type Species: *Periploca esculenta* L.f.

Twining, glabrous herbs with thin, ovate-lanceolate to linear-lanceolate leaves. Flowers in lax, few-flowered, long-peduncled, raceme-like cymes solitary at the nodes. Calyx-lobes lanceolate, acute. Corolla cream-coloured, tinged with purple; shallowly campanulate to almost rotate, glabrous without; the lobes about as long as the radius of the united portion, triangular, in bud valvate below, imbricate above. Corona in two series, the outer a densely pubescent, entire annulus at the base of the corolla-tube, the inner of five ovate-lanceolate segments attached to the staminal column and exceeding the anthers. Anthers with the connective produced into a membranous tip; pollen-masses solitary in each anther-loculus, pendulous, without a pellucid margin. Merocarps obliquely ovoid, paired or solitary by abortion.

A genus of two species, native in western tropical Africa, Egypt, India and Ceylon. Holm (1950) united *Oxystelma* with *Sarcostemma*, but this is not followed here; the shallowly lobed corolla, the pubescent outer corona, attached to the corolla and the lanceolate tips of the inner corona segments clearly allow to distinguish the two genera.

**Oxystelma esculentum** (L.f.) R. Brown ex Schultes, Syst. Vegot. 6:89, 1820. Thwaites, Enum. Plant. Zeylan.: 196, 1860. Hooker f., Flora Brit. India 4:17, 1883. Trimen, Handb. Flora Ceylon 3:147, 1895.

Nomenclatural type: Koenig in the Linnaean Herb. 307/7 (LINN).

Syn.: *Periploca esculenta* L. f., Suppl. Plant.: 168, 1781.

*Sarcostemma esculentum* (L. f.) Holm in Ann. Missouri Bot. Garden 37:482, 1950.

Petiole 0.4 to 1 cm long. Leaf-blade 3 to 10 cm long, 0.3 to 1.5 cm wide, rounded at the base, tapering to and very acute at the apex. Peduncle shorter than or almost as long as the leaves. Calyx-lobes 2 to 3.5 mm long, glabrous. Corolla 1.8 to 2.5 cm wide, the lobes densely pubescent on the margins. Merocarps about 6 cm long and 1 to 1.4 cm in diameter, glabrous.

Geographic distribution: Egypt, Pakistan, India, Ceylon, Burma.

In Ceylon rare in the drier parts of the island, usually near tanks. Flowering throughout the year.

Vernacular names: **Kulappalai** (*T.*).

Specimens examined: NORTHERN PROVINCE: Jaffna District: Jaffna, collector unknown (PDA). SOUTHERN PROVINCE: Hambantota District: Tissamaharama, Simpson 9919 (BM, PDA). Locality unknown: Thwaites C.P. 2837 (BM, K, PDA).

The plant is said by Trimen to be employed by the native doctors as a remedy in hydrophobia.

## 6. PENTATROPIS Wight

Wight, Contrib. Bot. India : 53, 1834.

Type Species: *Pentatropis microphylla* (Heyne ex Roth) Wight.

Twining, glabrous herbs or subshrubs with small, fleshy, broadly ovate to oblong leaves. Flowers in poor, sessile or almost sessile, umbel-like cymes solitary at the nodes. Calyx-lobes ovate-lanceolate, acute. Corolla green, suffused with purple on the inner side, rotate, glabrous without; the lobes much longer than the radius of the united portion, ovate-oblong, contorted in bud. Corona in one series, consisting of five segments attached to the staminal column above its base; segments laterally compressed, produced at the base into a short, radially divergent spur and at the apex into a slender tip appressed to the staminal column. Anthers with the connective ending in a membranous tip; pollen-masses solitary in each anther-loculus, pendulous, without a pellucid margin. Merocarps fusiform, produced into a slender beak, smooth.

A genus of about 6 species ranging from Africa through Arabia, India and Madagascar to Australia.

**Pentatropis capensis** (L.f.) Bullock in Kew Bull. 1955:284, 1955.

Nomenclatural type: Koenig in the Linnaean Herb. 308/8 (LINN).

Syn.: *Cynanchum capense* L.f. Suppl. Plant.: 168, 1781.

*Asclepias microphylla* Heyne ex Roth, Nov. Plant. Spec. praes. Ind. Or.:177, 1821.

*Cynanchum acuminatum* Thunb. (Alner), Obs. in Cynanchum :5, 1821.

*Asclepias microphylla* Roxb., [Hort. Bengal.: 85, 1814 nomen nudum] Flora Indica ed. Carey 2:35, 1832.

*Pentatropis microphylla* (Heyne ex Roth) Wight, Contrib. Botan. India :52, 1834. Thwaites, Enum. Plant. Zeylan.: 196, 1860. Hooker f., Flora Brit. India 4:20, 1883. Trimen, Handb. Flora Ceylon 3:149, 1895.

Stems twining up to 3 m. Petioles 0.2 to 0.7 cm long. Leafblade 1 to 3.5 cm long and 0.5 to 2.2 cm wide, rounded or subcordate at the base, obtuse or occasionally acute but always mucronate at the apex. Peduncle 0 to 2 mm long. Calyx-lobes about 1 mm long, glabrous. Corolla 0.7 to 1.2 cm in diameter, the lobes glabrous on the margin, minutely puberulous within. Merocarps 4 to 5 cm long, 0.7 to 1 cm in diameter, glabrous.

Geographic distribution: Northeastern and peninsular India, Ceylon. This species does not occur in South Africa as unfortunately suggested by the specific epithet.

In Ceylon a common twiner in the coastal scrub of the dry and arid region, never found far from the sea and well adapted to soil salinity as shown by the fleshy leaves. Absent from the humid zone. Flowering from September to April.

Specimens examined: NORTH WESTERN PROVINCE: Puttalam District: mile 73 of Colombo Puttalam Road, near Madurankuli, Huber 50 (US). EASTERN PROVINCE: Amparai District: Karativu, Huber 24 (US). Batticaloa District: Kannankudah Ferry, Huber 22 (US). Trincomalee District: Foul Point Trincomalee, Simpson 9692 (BM, K). SOUTHERN PROVINCE: Hambantota District: Ruhuna National Park, Block 1, Fosberg and Mueller-Dombois 50147 (US); Huber 29 (US); the same 32 (US); Mueller-Dombois, Comanor and Cooray 67093002 (BISH); Tissamaharama, Huber 36 (US). Locality unknown: Thwaites C.P. 1853 (BM, K).

Similar to *Tylophora tenuissima* (Roxb). Wight et Arnott ex Wight but easily distinguished by its sessile or very short-peduncled, umbel-like cymes.

*Pentatropis capensis* (L.f.) Bullock is appreciated in native medicine as a remedy against deseases of the excretive organs.

## 7. PERGULARIA, L.

L., Syst. Nat. ed. 12:191, 1767; Mantissa 8:53, 1767.

Type Species: *Pergularia tomentosa* L.

Twining herbs with pubescent, hispid or prickly stems. Leaves cordate, sparsely to densely tomentose on both sides. Flowers in long-peduncled, umbel-like to almost raceme-like, pubescent or hispid cymes solitary at the nodes. Calyx-lobes ovate-lanceolate, acute. Corolla yellowish- or greenish-white, salver-shaped, glabrous without; the lobes one and a half to twice as long as the tube, ovate, contorted in the bud. Corona in two series, the outer a glabrous, five-lobed, denticulate annulus at the base of the staminal column, the inner consisting of five long segments, attached to the staminal column above its base, produced at the base into a short, radially divergent spur and at the apex into an acute, lanceolate tooth exceeding the staminal column. Anthers with the connective ending in a membranous tip; pollen-masses solitary in each anther loculus, pendulous, with a narrow hyaline margin reaching from the insertion of the caudicles to the distal end. Merocarps half-ovoid, tapering to a long beak, echinate with long, soft bristles.

Four species in the drier parts of Africa and southern Asia.

**Pergularia daemia** (Forsk.) Chiov. in Result. Sc. Miss. Stefani-Paoli Somal. Ital. 1:115, 1916.

Nomenclatural type: Forskal, not seen (C?).

Syn.: *Asclepias daemia* Forsk., Descr. Plant. Fl. Aegypt.—Arab.:51, 1775.

*Cynanchum extensum* Jacq., Misc. 2:353, 1781-82.

*Daemia extensa* (Jacq.) R. Brown in Aiton f., Hort. Kew. ed. 2, 2:76, 1811, prepr. 1810. Thwaites, Enum. Plant. Zeylan.: 196, 1860. Hooker f., Flora Brit. India 4:20, 1883. Trimen, Handb. Flora Ceylon 3:150, 1895.

*Cynanchum echinatum* Thunb. (Alner), Obs. in Cynanchum :8, 1821.

*Gomphocarpus volubilis* Moon, Cat. Plants Ceylon :20, 1824 nomen nudum.

*Daemia cordifolia* (Retzius) K. Schumann in Engl. and Prantl, Natürl. Pflanzenfam. 4 (2) :258, 1895.

Petiole 2 to 9 cm long. Leaf-blade 3 to 9 cm long and about as wide, acute or short-acuminate at the apex. Peduncle often exceeding the leaves. Calyx-lobes about 2 mm long, glabrous or puberulous. Corolla 1.2 to 1.8 cm in diameter, the lobes densely hairy within. Merocarps 5 to 8 cm long, 1.5 to 2 cm wide, puberulous, also on the bristles.

Chromosome number: 2n = 24.

Geographic distribution: Ranging from South and tropical Africa through Arabia to Lower Bengal and Ceylon.

Common throughout the dry and arid parts of Ceylon in disturbed vegetation, particularly in hedges and fences near or within villages. Absent from the moist zone and from the hill country.

Specimens examined: NORTHERN PROVINCE: Jaffna District: Jaffna,collector unknown (PDA). NORTH CENTRAL PROVINCE: Anuradhapura District: between Anuradhapura and Galkulama, Huber 10 (US). EASTERN PROVINCE: Batticaloa District: Kannankudah Ferry, Huber 20 (US). Trincomalee District: Kuchchaveli Ferry, Huber 55 (US). SOUTHERN PROVINCE: Hambantota District: Ruhuna National Park, Block 1, Huber 33 (US). Locality unknown: Thwaites C.P. 1841 (BM, K).

Vernacular names: **Medahangu** (*S.*); **Uttamakam, Veliparatti** (*T.*).

The plant contains cardiotoxic glycosides and is said to have emetic properties.

## 8. SECAMONE, R.Br.

R. Brown in Mem. Wern. Soc. 1:55, 1811, prepr. 1810.

Type Species: *Periploca emetica* Retzius.

Scrambling and twining subshrubs with glabrous, wiry stems. Leaves ovate-lanceolate to linear-lanceolate, slightly coriaceous, glabrous. Flowers in sessile or peduncled, simple or compound, minutely puberulous, dichasial cymes. Calyx-lobes broadly ovate, obtuse. Corolla yellow, rotate, glabrous outside; the lobes much longer than the united portion, ovate, contorted in bud. Corona single, of five erect segments which are compressed laterally and produced at the apex into a triangular point, attached to the staminal column. Anthers with the connective produced into a membranous tip; pollen-masses two in each anther-loculus, ascending, minute, almost orbicular, without a pellucid margin. Style apex short, obtuse, not exceeding the staminal column. Merocarps spindle-shaped, flattened on the ventral side, convex on the back, long-tapering to an acute apex, smooth.

A genus of about 40 species ranging from South and tropical Africa through Madagascar and India to the Philippines and Australia. The structure of the flower of *Secamone* has recently been studied by Sawfat in Ann. Missouri Botan. Garden 49:95—119, 1962.

**Secamone emetica** (Retzius) R. Brown ex Schultes, Syst. Veget. 6:124, 1820. Thwaites, Enum. Plant. Zeylan.:195, 1860. Hooker f., Flora Brit. India 4:36, 1883. Trimen, Handb. Flora Ceylon 3:146, 1895.

Nomenclatural type: Koenig s. n. (LD holotype not seen, BM isotype).

Syn.: *Periploca emetica* Retzius, Obs. Bot. 2:14, 1781.

Petiole 0.1 to 0.5 cm long. Leaf-blade 3 to 7 cm long, 0.6 to 1.8 cm wide, acute at the base, tapering to and very acute at the apex. Inflorescence shorter than the leaves; the peduncle, so far developed, exceeding the petioles. Calyx-lobes 0.5 to 0.7 mm long, puberulous. Buds broadly ovoid. Corolla 0.3 to 0.5 cm in diameter. Merocarps 4 to 5.5 cm long, about 0.6 cm wide, glabrous.

Geographic distribution: Southern Deccan Peninsula, Ceylon. According to K. Schumann also in East Africa.

Not uncommon in Ceylon in coastal scrub of the dry and arid zone, usually near the sea. Reported from one locality inland (Kurunegala) but not observed there recently. Flowering throughout the year.

Specimens examined: NORTHERN PROVINCE: Jaffna District: Jaffna, collector unknown (PDA). NORTH WESTERN PROVINCE: Kurunegala District: Kurunegala, collector unknown (PDA). Puttalam District: Puttalam, collector unknown (PDA). SOUTHERN PROVINCE: Hambantota District:Ruhuna National Park, Block 1, Huber 30 (US); Mueller-Dombois and Cooray 67121029 (BISH); the same 67121051 (BISH). Locality unknown: Thwaites C.P. 1851 (BM, K, PDA).

## 9. TOXOCARPUS Wight

Wight et Arnott ex Wight, Contrib. Bot. India:61, 1834.

Type Species: *Toxocarpus kleinii* Wight et Arnott ex Wight.

Twining shrubs with stem and inflorescence rusty puberulous. Leaves lanceolate, slightly coriaceous, glabrous above, rusty pubescent beneath. Flowers in sessile or peduncled, compound dichasia. Calyx-lobes ovate, obtuse. Corolla yellowish-green, brown without, broadly campanulate, glabrous; the lobes about twice as long as the tube, linear-oblong, recurved, contorted in bud and overlapping to the left. Corona single, consisting of five erect, triangular-lanceolate, dorsally flattened segments attached to the staminal column and appressed to the base of the style-apex. Anthers with the connective produced into a membranous tip; pollen-masses two in each anther-loculus, ascending, minute, almost orbicular, without a pellucid margin. Style apex elongate, fusiform, exceeding the staminal column and slightly exserted from the corolla-tube. Merocarps elongate-fusiform, tapering to an acute apex, smooth.

About a dozen species in tropical Africa, India, Ceylon, Malesia and South China. Included in *Secamone* by Schumann, *Toxocarpus* differs markedly by its dorsally flattened corona segments and the long, narrowly conical or clavate style apex.

**Toxocarpus kleinii** Wight et Arnott ex Wight, Contrib. Bot. India :61, 1834. Thwaites, Enum. Plant. Zeylan.: 195, 1860. Hooker f., Flora Brit. India 4:14, 1883. Trimen, Handb. Flora Ceylon 3:146, 1895.

Nomenclatural type: Herb. Wight propr. 1560 (K).

Petiole 0.7 to 1.2 cm long. Leaf-blade 4 to 7 cm long, 1.2 to 2 cm wide, acute at the base, shortly acuminate at the apex. Inflorescence shorter than the leaves, the peduncle, so far developed, as long as or slightly longer than the petioles. Calyx-lobes 1 to 1.3 mm long, puberulous. Buds narrowly conical. Corolla 0.7 to 1 cm in diameter when expanded. Merocarps 12 to 15 cm long and about 1 cm wide.

Geographic distribution: Deccan Peninsula southwards from the Konkan; Ceylon.

In Ceylon very local in the lowland and the hill country up to an elevation of 1000 m, both in the dry and in the moist zone.

Specimens examined: CENTRAL PROVINCE: Nuwara Eliya District: Hanguranketa, Thwaites C. P. 2578 (BM, K, PDA). SOUTHERN PROVINCE: Galle District: Galle, Champion s. n. (K).

## 10. TYLOPHORA R. Br.

R. Brown in Mem. Wern. Soc. 1:28, 1811, prepr. 1810.

Type Species: *Tylophora flexuosa* R. Brown.

Twining, prostrate or rarely erect herbs or subshrubs with the stems, leaves and inflorescence glabrous, pubescent or hairy. Leaves thin or rather fleshy, ovate, oblong or ovate-lanceolate. Flowers in sessile or peduncled, umbel-like or laxly dichasially branched cymes, usually solitary at the nodes; occasionally the cyme reduced to a single flower. Calyx-lobes triangular, ovate or lanceolate, acute. Corolla greenish-yellow, often tinged with purple, or uniformly purple-brown, rotate, glabrous; the lobes little to much longer than the united portion of the tube, ovate, slightly contorted in the bud. Corona single, consisting of five erect, fleshy, triangular segments, adnate to but not exceeding the staminal column. Anthers with the connective produced into a membranous tip; pollen-masses solitary in each anther-loculus, ascending or the caudicles ascending and the pollen-masses pendulous; minute, almost orbicular, without a pellucid margin. Merocarps fusiform, tapering to the apex, smooth.

A difficult and little known genus of about 50 species, centered in tropical Asia, extending to West Africa, Japan and Australia. *Tylophora* is related to *Secamone*, from which it differs mainly by the presence of only one pollen-mass in each anther-loculus.

## KEY TO THE SPECIES

1. Cymes one or two-flowered. **2. T. cordifolia**
1. Cymes several to many-flowered.
   2. Flowers in laxly branched, not at all umbel-like cymes. Calyx-lobes ovate or broadly triangular. Stem quite glabrous.
      3. Leaves very thin. Calyx exceeding 1 mm. **5. T. membranifolia**
      3. Leaves slightly fleshy. Calyx-lobes not exceeding 1 mm.
         4. Stem stout. Leaves 6 to 10 cm wide. **6. T. zeylanica**
         4. Stem very slender. Leaves 0.4 to 3.2 cm wide. **7. T. tenuissima**
   2. Flowers in an umbel-like cyme or in two superposed, umbel-like clusters. Stem glabrous, pubescent or hairy.
      5. Calyx-lobes three times as long as wide or longer. Stem elongate, twining or prostrate. Corolla 1 to 1.5 cm in diameter. **1. T. indica**
         6. Stem, under surface of the leaves and cyme pubescent or hairy. *var.* **indica**
         6. Stem, leaves and cyme quite glabrous. *var.* **grabra**
      5. Calyx-lobes hardly up to twice as long as wide. Stem erect or slightly twining. Corolla less than 1 cm in diameter.
         7. Stem minutely puberulous when young. **3. T. fasciculata**
         7. Stem quite glabrous. **4. T. multiflora**

**1. Tylophora indica** (Burm. f.) Merrill in Philipp. Journ. Sc. 19:373, 1921.

Nomenclatural type: not seen.

Syn.: *Cynanchum indicum* Burm. f., Flora Indica :70, 1768.

*Asclepias asthmatica* L. f., Suppl. Plant.: 171, 1781.

*Cynanchum bracteatum* Thunb. (Alner), Obs. in Cynanchum :7, 1821.

*Hoya hirsuta* Moon, Cat. Plants Ceylon: 21, 1824 nomen nudum.

*Tylophora asthmatica* (L. f.) Wight et Arnott ex Wight, Contrib. Bot. India :51, 1834. Thwaites, Enum. Plant. Zeylan.:197, 1860. Hooker f., Flora Brit. India 4:44, 1883. Trimen, Handb. Flora Ceylon 3:153, 1895.

Stem elongate, twining or prostrate, hairy, pubescent or glabrous. Petiole 0.5 to 2 cm long. Leaf-blade 3.5 to about 10 cm long, 1.5 to 7 cm wide, broadly ovate to ovate-oblong, rounded, truncate or very shallowly cordate at the base, acute or obtuse but apiculate at the apex, slightly fleshy, puberulous or glabrescent above, densely puberulous beneath, or quite glabrous. Cymes mostly umbel-like, sometimes consisting of two superposed umbels, hairy, pubescent or glabrous, shorter than to as long as the leaves, sessile or with a peduncle shorter or longer than the petioles. Calyx-lobes 1.5 to 2.5 mm long, lanceolate, hairy or glabrous. Corolla greenish-yellow, frequently tinged with brown on the inside, 1 to 1.5 cm in diameter; the lobes slightly longer than the radius of the united portion. Merocarps 5 to 9 cm long, about 1 cm wide, produced into an acute, slender beak.

Geographic distribution: From the Seychelles through India and Ceylon to South East Asia including Malesia.

Common along the coasts of Ceylon on sandy soil, particularly on stabilised dunes [here often associated with *Ipomoea pes-caprae* (L.) R. Brown] and in sandy coconut-groves, in the dry part of the island as well as in the moist zone.

*Tylophora indica* is represented in Ceylon by two races, distinguishable both in their pubescence and distribution.

**Tylophora indica** (Burm. f.) Merrill var. **indica.**

Stem, leaves, the latter especially beneath, and cymes pubescent or hairy. Flowers greenish, tinged with brown on the inside, about 1 cm wide.

Geographic distribution: that of the species.

This is the common plant in Ceylon except of the Southwest, where it is rare.

Specimens examined: NORTHERN PROVINCE: Jaffna District: Chavakacheri, collector unknown (PDA). NORTH WESTERN PROVINCE: Puttalam District: mile 35 of Colombo Puttalam Road, between Katuneriya and Marawila, Huber 53 (US). WESTERN PROVINCE: Colombo District: Negombo, Simpson 7915 (PDA); this plant is intermediate between var. *indica* and var. *glabra*. EASTERN PROVINCE: Batticaloa District: Batticaloa, Huber 23 (US). Trincomalee District: Mutur Ferry, Huber 27 (US). SOUTHERN PROVINCE: Galle District: Galle, collector unknown (PDA). Hambantota District: Hambantota, Alston, 1293 (PDA); intermediate between var. *indica* and var. *glabra*; Ruhuna National Park, Block 1, Patanagala, Huber 31 (US), Mueller-Dombois and Cooray 67121056 (BISH). Locality unknown: Fraser 3 (BM); Gardner 575 (K); Thwaites C.P; 1857 (PDA); the same C. P. 1858 (BM, K); Walker 1130 (K).

According to Trimen the root of this plant is a valuable substitute for Ipecacuanha.

Vernacular names: **Bin-nuga** (*S.*); **Peypalai, Nancharapanchan** (*T.*).

**Tylophora indica** (Burm. f.) Merrill var. **glabra** (Decne.) H. Huber, comb. nov.

Nomenclatural type: not seen.

Syn.: *Cynanchum flavens* Thunb. (Aiuer), Obs. in Cynanchum :7, 1821.

*Tylophora asthmatica* (L. f.) Wight var. *glabra* Decne. in DC., Prodr.: 8:611, 1844 pro parte.

*Tylophora asthmatica* (L. f.) Wight var. *glabra* Decne. emend. Thwaites, Enum. Plant. Zeylan.: 197, 1860.

*Tylophora flava* Trimen in Journ. Bot. (London) 23:239, 1885. Trimen, Handb. Flora Ceylon 3:159, 1895.

Stem, leaves (except of the upper side of the petiole) and inflorescence glabrous. Flowers greenish yellow, not tinged with brown, slightly larger than in var. *indica*.

Geographic distribution: Seychelles, Ceylon, Deccan Peninsula (not seen from the latter). Given for Mauritius by Decaisne, but this species does not grow there. Decaisne's reference "India orientalis" may apply to Ceylon.

This plant largely replaces the typical variety in the Southwest of Ceylon.

Specimens examined: WESTERN PROVINCE: Colombo District: Colombo, collector unknown (PDA). SOUTHERN PROVINCE: Galle District: between Bentota and Induruwa, Huber 15 (US).

Intermediate forms have been collected at Negombo and Hambantota; they are enumerated under var. *indica*.

Vernacular names: **Mudubinnuga** (*S.*).

**2. Tylophora cordifolia** Thwaites, Enum. Plant. Zeylan. :196, 1860. Hooker f., Flora Brit. India 4:44, 1883. Trimen, Handb. Flora Ceylon 3:158, 1895.

Nomenclatural type: Thwaites C. P. 717 (K).

Syn.: *Tylophora thwaitesii* K. Schumann in Engl. und Prantl, Natürl. Pflanzenfam. 4 (2) :286, 1895.

Stem slender, long-twining, minutely puberulous when young, soon glabrescent. Petiole 0.2 to 0.6 cm long. Leaf-blade 1 to 3 cm long, 0.4 to 2 cm wide, triangular-ovate to ovate-oblong or ovate-lanceolate, rounded, truncate or very shallowly cordate at the base, acute or obtuse but apiculate at the apex, glabrous on both sides. Cymes one- or two-flowered, glabrous, shorter than or as long as the leaves, with a peduncle exceeding the petioles. Calyx-lobes about 0.8 mm long, triangular-ovate, glabrous. Corolla purplish-brown, about 0.6 cm wide; the lobes longer than the radius of the united portion. Merocarps 3.5 to 4 cm long, 0.5 to 0.7 cm in diameter, tapering to an acute apex.

Geographic distribution: Southern Deccan Peninsula, Ceylon.

According to Thwaites and Trimen common or rather common in the Central Province in the moist region at an elevation of 600 to 1200 m, with an outlying station on Ritigala Kande.

Specimens examined: NORTH CENTRAL PROVINCE: Anuradhapura District: Summit of Ritigala Kande, 730 m, Huber 43 (US), Willis 105 (PDA). District unknown: Ambagamuwa, Thwaites C. P. 717 (K, PDA).

**3. Tylophora fasciculata** Buch. -Ham. ex Wight, Contrib. Bot. India :50, 1834. Thwaites, Enum. Plant. Zeylan.: 424, 1864. Hooker f., Flora Brit. India 4:40, 1883. Trimen, Handb. Flora Ceylon 3:156, 1895.

Nomenclatural type: Buchanan-Hamilton 758 (K).

Stem erect or very slightly twining, minutely pubescent when young. Petiole 0.5 to 0.7 cm long. Leaf-blade 2 to 4 cm long, 0.8 to 1.5 cm wide, ovate, ovate-oblong, or ovate-lanceolate, acute or rounded at the base, acute or rarely obtuse at the apex, glabrous above, puberulous on the veins beneath. Cymes umbel-like, clusters or two superposed umbel-like clusters, pubescent, shorter than or about as long as the leaves, with the peduncle as long as or slightly longer than the petioles. Calyx-lobes 2 to 2.5 mm long, triangular-ovate, almost glabrous. Corolla about 0.6 cm in diameter, the lobes longer than the radius of the united portion. Merocarps not seen.

Geographic distribution: Nepal, Deccan Peninsula, Ceylon.

In Ceylon known only from one station in the hill country, where the plant grows at an elevation of 1300 to 2100 m. It has not been collected in Ceylon since Thwaites.

Specimens examined : SABARAGAMUWA PROVINCE: Ratnapura (District?): Mutetuwegama near Balangoda, Thwaites C.P. 3792 (PDA).

**4. Tylophora multiflora** (Wight et Arnott ex Wight) Alston in Trimen, Handb. Flora Ceylon 6, Suppl.: 195, 1931.

Nomenclatural type: Herb. Wight propr. 1544 (K).

Syn.: *Iphisia multiflora* Wight et Arnott ex Wight, Contrib. Bot. India :52, 1834.

*Tylophora iphisia* Decne. in DC., Prodr. 8:610, 1844. Thwaites, Enum. Plant. Zeylan.:197, 1860 as "*T. fasciculata*" and l. c. :424, 1864 as "*T. iphisia*". Hooker f., Flora Brit. India 4:40, 1883. Trimen, Handb. Flora Ceylon 3:157, 1895.

Stem suberect, flexuous, slightly twining, glabrous, Petiole 0.7 to 1.5 cm long. Leaf-blade 4 to 6 cm long, 2.5 to 3.5 cm wide, ovate or ovate-oblong, rounded or very shallowly cordate at the base, very acute and apiculate at the apex, glabrous on both sides. Cymes umbel-like or two superposed umbel-like clusters, glabrous, shorter

than or as long as the leaves, with the peduncle usually longer than the petioles. Calyx-lobes 1.2 to 1.7 mm long, triangular-ovate, glabrous. Corolla purple or yellow tinged with purple, about 0.6 cm in diameter, the lobes longer than the radius of the united portion. Merocarps 6 to 8 cm long, about 1 cm in diameter, gradually tapering to the apex.

Geographic distribution: Mountains of the southern Deccan Peninsula and of Ceylon.

According to Thwaites (1860) common in the more elevated parts of the Central Province of Ceylon, but already referred to as rather rare by Trimen (1895). In Ceylon this species does not seem to have been collected since the last century.

Specimens examined: Locality unknown: Gardner 568 (K); Maxwell s. n. (K); Thwaites C. P. 369 (BM, K, PDA); Walker s. n. (K).

**5. Tylophora pauciflora** Wight et Arnott—ex Wight, Contrib, Bot. India :49, 1834. Hooker f., Flora Brit. India 4:41, 1883 excl. syn. *Tylophora asthmatica* var. *glabra* Thwaites and *Cynanchum flavens* Thunb.

Nomenclatural type: Herb. Wight propr. 1539 (K).

Syn.: *Tylophora membranifolia* Thwaites, Enum. Plant. Zeylan. :424, 1864. Trimen, Handb. Flora Ceylon 3:157, 1895.

Stem long-twining, glabrous. Petiole 1 to 2.5 cm long. Leaf-blade 3.5 to 7 cm long, 2 to 4 cm wide, ovate, truncate or very shallowly cordate at the base, acute and apiculate at the apex, very thin, glabrous on both sides. Cymes laxly and dichasially branched, rather few-flowered, glabrous, shorter to longer than the leaves, with a peduncle usually exceeding the petioles. Calyx-lobes (1.2 to) 1.5 to 2 mm long, broadly ovate, glabrous. Corolla about 0.6 cm in diameter, the lobes longer than the radius of the united portion. Merocarps up to 6 cm long and up to 1 cm broad, produced into a slender beak.

Geographic distribution: Deccan Peninsula southwards from South Kanara; Ceylon.

A rare plant, growing at low elevations, particularly in the dry region but according to Thwaites also at Colombo.

Specimens examined: NORTH CENTRAL PROVINCE: Anuradhapura District: Anuradhapura, collector unknown (PDA). CENTRAL PROVINCE: Matale District :Nalanda, collector unknown (PDA). Locality unknown: Thwaites C. P. 1860 (K); the same s. n. (K).

The Ceylon plant has been considered a distinct species but the only difference I could discover, the slightly longer calyx-lobes of the Ceylonese plant, does not make an important character.

**6. Tylophora zeylanica** Decne. in DC., Prodr. 8:608, 1844. Hooker f., Flora Brit. India 4:42, 1883. Trimen, Handb. Flora Ceylon 3:157, 1895.

Nomenclatural type: Reynaud (P not seen).

Syn.: *Cynanchum micranthum* Thunb. (Alner), Obs. in Cynanchum :5, 1821.

*Tylophora micrantha* (Thunb.) Thwaites, Enum. Plant. Zeylan.:197, 1860. Not *Tylophora micrantha* Decne.

Stem stout, long-twining, glabrous. Petiole 1.4 to 2.5 cm long. Leaf-blade 6 to 15 cm long, 6 to 10 cm wide, broadly ovate, rounded or truncate at the base, shortly acuminate at the apex, slightly fleshy, glabrous on both sides. Cymes laxly and dichasially branched, many-flowered, glabrous, as long as or longer than the leaves, with a peduncle equalling or exceeding the petioles. Calyx-lobes about 0.6 mm long, ovate, glabrous. Corolla purplish, 0.3 to 0.4 cm in diameter, the lobes longer than the radius of the united portion. Merocarps about 12 cm long and 0.5 to 0.8 cm wide, tapering to a slender point.

Geographic distribution: Doubtfully endemic; a similar and perhaps conspecific plant in the southern Deccan Peninsula.

In Ceylon rare, if still existing at all, in the Central Province at an elevation of 700 to 1400 m.

Specimens examined: CENTRAL PROVINCE Kandy District: Hantane near Kandy, Thwaites C. P. 2517 (BM, K, PDA). Locality unknown Gardner 572 (K).

**7. Tylophora tenuissima** (Roxb.) Wight et Arnott ex Wight, Contrib. Bot. India: 49, 1834.

Nomenclatural type: Coloured drawing nr. 1383 of *Asclepias tenuissima* by Roxburgh at K.

Syn.: *Asclepias tenuissima* Roxb. [Hort. Bengal.: 20, 1814 nomen nudum] Flora Indica ed. Carey et Wallich 2: 41, 1821.

*Tylophora tenuis* Blume, Bijdr. Flora Ned. Ind.:1062, 1826-27. Hooker f., Flora Brit. India 4: 42, 1883. Trimen, Handb. Flora Ceylon 3: 158, 1895.

*Tylophora carnosa* Wallich ex Wight, Contrib. Bot. India: 49, 1834. Thwaites, Enum. Plant. Zeylan.: 196, 1860.

Stem very slender, long-twining, glabrous. Petiole 0.2 to 0.9 cm long. Leaf-blade 1.2 to 6.5 cm long and 0.4 to 3.2 cm wide, ovate, ovate-oblong to oblong-lanceolate, acute or rounded at the base, acute and apiculate at the apex, fleshy, glabrous on both sides. Cymes laxly and dichasially branched, rather few-flowered, glabrous, shorter or frequently longer than the leaves, with a peduncle exceeding the petioles. Calyx-lobes about 0.6 mm long, triangular, glabrous. Corolla purplish-brown, 0.3 to 0.4 cm in diameter, the lobes longer than the radius of the united portion. Merocarps 5 to 6.5 cm long, 0.7 to 1 cm in diameter, produced into a slender, acute beak.

Geographic distribution: Coasts of the Deccan Peninsula, of Ceylon, Bengal, Burma, the Malay Peninsula, Java and Borneo.

In Ceylon rather common in halophilous scrub near the coast, both in the moist and in the dry parts of the island, but more frequent in the latter. Reported from one inland locality (Anuradhapura).

Specimens examined: NORTHERN PROVINCE: Jaffna District: Jaffna, collector unknown (PDA). NORTH CENTRAL PROVINCE: Anuradhapura District: Anuradhapura, collector unknown (PDA). WESTERN PROVINCE: Colombo District: Southwest edge of Negombo Lagoon, Huber 12 (US). EASTERN PROVINCE: Batticaloa District: between Batticaloa and Chenkaladi, Huber 21 (US). Locality unknown: Gardner 573 (K); Mackenzie s. n. (K); Thwaites C.P. 1852 (BM, K, PDA); Walker s. n. (K).

## 11. GYMNEMA R.Br.

R. Brown in Mem. Wern. Soc. 1:33, 1811, prepr. 1810.

Type Species: *Asclepias lactifera* L.

Twining or straggling shrubs with the young branches and the inflorescence puberulous or tomentose. Leaves broadly ovate to ovate-lanceolate, glabrous or more or less pubescent, especially beneath. Flowers in short-stalked, umbel-like or bifid cymes normally paired at the nodes. Calyx-lobes ovate, obtuse. Corolla yellowish, campanulate, glabrous; the lobes about as long as the tube, triangular-ovate, slightly contorted in bud. Corona single, consisting of five fleshy, elongate scales adnate to the throat of the corolla-tube between the lobes, leading downwards as a villous, double ridge. Anthers with the connective produced into a membranous tip; pollen-masses solitary in each anther-loculus, ascending, without a pellucid margin. Merocarps ovoid-oblong to narrowly fusiform, tapering to the apex, acute or blunt, smooth.

A genus of about 20 species centered in India and continental South East Asia with one species extending to Africa.

KEY TO THE SPECIES

1. Leaf-blade acute at the base, mostly rather long-acuminate at the apex. Merocarps ovoid-oblong, 1.5 to 2 cm in diameter, blunt. **1. G. lactiferum**

   2. Leaves glabrous or puberulous only on the veins beneath. var. **lactiferum**

   2. Leaves densely velvety beneath. var. **thwaitesii**

1. Leaf-blade rounded or truncate at the base, short-acuminate or not at all acuminate at the apex. Merocarps narrowly spindle-shaped, 0.5 to 0.7 cm in diameter, tapering to an acute apex.

   3. Petiole 0.4 to 1.2 cm long. Leaf-blade normally up to 5 cm long and up to 3 cm wide. **2. G. sylvestre**

   3. Petiole 1.8 to 3 cm long. Leaf-blade 6 to 10 cm long and 5 to 9 cm wide. **3. G. rotundatum**

**1. Gymnema lactiferum** (L.) R. Brown ex Schultes, Syst. Veg. 6:57, 1820. Thwaites, Enum. Plant. Zeylan.:198, 1860. Hooker f., Flora Brit. India 4:30, 1883. Trimen, Handb. Flora Ceylon 3:154, 1895.

Nomenclatural type: Herbarium Hermann, vol. 2, pag. 11 (BM).

Syn.: *Asclepias lactifera* L., Spec. Plant.:216, 1753. *Gymnema zeylanicum* Decne. in DC., Prodr. 8:622, 1844.

Petiole 0.4 to 1 cm long. Leaf-blade 3 to 8 (to 10) cm long, 1.2 to 4 (to 5.5) cm wide, usually two or three times as long as broad, acute at the base and mostly rather long-acuminate at the apex, quite glabrous on both sides or puberulous on the veins beneath. Cymes umbel-like, much shorter than the leaves. Calyx-lobes 1.5 to 2 mm long, puberulous on the back. Corolla 0.4 to 0.5 cm in diameter. Merocarps not seen, according to Trimen about 6 cm long and 1.8 cm wide, ovoid-oblong, blunt.

Geographic distribution: Ceylon, Assam, Malayan Peninsula, Malesia.

In Ceylon not uncommon in the moister part, according to Thwaites up to an elevation of 1000 m, rare in the dry zone. Flowering from July to November.

Two varieties can be distinguished.

**Gymnema lactiferum** (L.) R. Brown ex Schultes var. **lactiferum.**

Leaf-blade up to 8 cm long and up to 4 cm wide, glabrous on both sides or puberulous only on the veins below.

Geographic distribution: Endemic in Ceylon.

Specimens examined: NORTH CENTRAL PROVINCE: Anuradhapura District: Maha-Illupalama, Huber 46 (US); Ritigala Kande, collector unknown (PDA). CENTRAL PROVINCE: Kandy District: Peradeniya, collector unknown (PDA). SOUTHERN PROVINCE: Galle District: Galle, collector unknown (PDA). Locality unknown: Gardner 571 (K); Thwaites C.P. 2580 (BM, K, PDA): Walker 61 (K).

Vernacular names: **Kurinnan** (*S.* and *T.*)

**Gymnema lactiferum** (L.) R. Brown ex Schultes var. **thwaitesii** Hooker f., Flora Brit. India 4:31, 1883. Trimen, Handb. Flora Ceylon 3:154, 1895.

Nomenclatural type: Thwaites C.P. 1847 (K).

Leaf-blade up to 10 cm long and up to 5.5 cm wide, densely velvely beneath.

Geographic distribution: Endemic in Ceylon.

Specimens examined: CENTRAL PROVINCE: Nuwara Eliya District: Maturata, Thwaites C.P. 1847 (BM, PDA). Locality unknown: Thwaites C.P. 2549 (K).

**2. Gymnema sylvestre** (Retzius) R. Brown ex Schultes, Syst. Veg. 6:57, 1820. Thwaites, Enum. Plant. Zeylan.:197, 1860. Hooker f., Flora Brit. India 4:29, 1883. Trimen, Handb. Flora Ceylon 3:153, 1895.

Nomenclatural type: Koenig s.n. (LD not seen).

Syn.: *Periploca sylvestris* Retzius, Obs. Bot. 2:15, 1781.

Petiole 0.4 to 1.2 cm long. Leaf-blade 2 to about 6 cm long, 1 to 3 cm wide, one and a half to three times as long as broad, usually rounded at the base, shortly or not at all acuminate at the apex, velvety tomentose on both sides or pubescent above, pubescent to tomentose beneath or glabrous except on the veins above and beneath. Cymes umbel-like, much shorter than the leaves. Calyx-lobes 0.7 to 1.2 mm long, pubescent. Corolla 0.3 cm in diameter. Merocarps 5 to 7 cm long, 0.5 to 0.7 cm in diameter, produced into an acute beak, glabrous.

Geographic distribution: Tropical Africa, Deccan Peninsula, Ceylon.

Rather frequent in the drier parts of Ceylon, twining and straggling in deciduous secondary scrub. Flowering from November to February.

Specimens examined: NORTH CENTRAL PROVINCE: Anuradhapura District: Anuradhapura, collector unknown (PDA); mile 18 of Eppawala Talawa Road, near Eppawala, Huber 45 (US). CENTRAL PROVINCE: Kandy District: Hantane near Kandy, Schlechter s.n. (K). UVA PROVINCE: Badulla District: Ekiriyankumbura, collector unknown (PDA). SOUTHERN PROVINCE: Hambantota District: Tissamaharama, collector unknown (PDA). Locality unknown: Thwaites C.P. 1844 (K, PDA); the same C.P. 2549 (PDA); Walker 1470 (K).

*Gymnema sylvestre* varies considerably in the pubescence of its leaves. In the Ceylon specimens the upper surface of the leaves is mostly more or less pubescent, the under side more densely so, or the leaves are glabrescent on both sides. Only in two specimens seen (Schlechter s.n. from Hantane near Kandy and Thwaites C.P. 1844, locality not known) the leaves, slightly larger than usual, are velvety tomentose on both sides. This plant is *Gymnema sylvestre* (Retzius) R. Brown ex Schultes var. *decaisneanum* Thwaites, Enum. Plant. Zeylan.: 197, 1860 excl. syn., of which *Gymnema sylvestre* (Retzius) R. Brown ex Schultes var. *ceylanicum* Hooker f., Flora Brit. India 4:29, 1883 is synonymous. Both these varieties are based on the same nomenclatural type, Thwaites C.P. 1844. This plant strongly resembles *Gymnema hirsutum* Wight et Arnott ex Wight from the Deccan Peninsula, which, however, differs from *Gymnema sylvestre* including var. *decaisneana* by its much larger flowers, 0.5 to 0.8 cm in diameter. Vern. **Masbedde** (*S.*)

**3. Gymnema rotundatum** Thwaites, Enum. Plant. Zeylan. :197, 1860. Hooker f., Flora Brit. India 4:30, 1883. Trimen, Handb. Flora Ceylon 3:153, 1895.

Nomenclatural type: Thwaites C.P. 3086 (PDA).

Petiole 1.8 to 3 cm long. Leaf-blade 6 to 10 cm long, 5.5 to 9 cm wide, one to one and a half times as long as wide, mostly truncate at the base, shortly or not at all acuminate at the apex, puberulous on both sides. Cymes usually divided dichasially into two short branches, much shorter than the leaves. Calyx-lobes 1 to 1.5 mm long, pubescent. Corolla 0.3 to 0.5 cm in diameter. Merocarps not seen, according to Trimen about 7 cm long, narrow, glabrous.

Geographic Distribution: Endemic in Ceylon.

A rare plant of the dry and intermediate zone. Flowering from November to February.

Specimens examined: NORTH CENTRAL PROVINCE: Anuradhapura District: Anuradhapura, collector unknown (PDA). CENTRAL PROVINCE: Matale District: Nalanda, collector unknown (PDA). Nuwara Eliya District: Hanguranketa, about 3000 ft., Thwaites C.P. 3086 (BM, PDA).

## 12. BIDARIA (Endl.) Decne.

(Endl.) Decne. in DC., Prodr. 8:623, 1844.

Type Species: *Asclepias tingens* Roxb.

Syn.: *Gymnema* sect. *Bidaria* Endl., Gen. Plant.:595, 1838.

Twining shrubs with the young branches and the inflorescence puberulous. Leaves ovate-lanceolate to elliptic-lanceolate, glabrous or slightly puberulous on both sides. Flowers in short-peduncled, umbel-like cymes arising solitary at the nodes. Calyx-lobes ovate to oblong, obtuse to acute. Corolla greenish-yellow or pink, campanulate with the tube somewhat narrowed at the mouth, glabrous outside; the lobes slightly shorter to longer than the tube, oblong, spreading or recurved, contorted in bud. Corona single, reduced to five narrow, double ridges, membranous at their edge, entirely adnate to the corolla-tube, villous or glabrous. Anthers with the connective produced into a membranous tip; pollen-masses solitary in each anther-loculous, ascending,without a pellucid margin. Merocarps narrowly spindle-shaped, long-tapering to an acute apex, smooth.

This genus, closely related to *Gymnema* and included in it by most authors, is formed by a few species ranging from India to Ceylon and Malesia. Apart from the different shape of the corolla and the corona, *Bidaria* most easily can be distinguished by the umbel-like cymes, solitary at the nodes and not paired, as in *Gymnema*.

KEY TO THE SPECIES

1. Calyx-lobes one third to scarcely half as long as the corolla-tube, the latter 0.35 to 0.45 cm long. Merocarps 12 to 15 cm long. **1. B. cuspidata**

2. Cyme 7- to 15-flowered. Pedicel not much longer than the calyx. Corolla-lobes as long as the tube or shorter. var. **cuspidata**

2. Cyme few-flowered. Pedicel three to five times longer than the calyx. Corolla-lobes as long as the tube or longer than the tube. var. **stenoloba**

1. Calyx-lobes two third to almost as long as the corolla-tube; the latter 0.2 to 0.3 cm long. Merocarps 5 to 7 cm long. **2. B. celsicola**

**1. Bidaria cuspidata** (Thunb.) H. Huber, **comb. nov.**

Nomenclatural type: Thunberg (UPS not seen).

Syn.: *Cynanchum cuspidatum* Thunb. (Alner), Obs. in Cynanchum :5, 1821.

*Bidaria pergularioides* Thwaites, Enum. Plant. Zeylan. :198, 1860.

*Gymnema pergularioides* (Thwaites) Hooker f., Flora Brit. India 4:32, 1883. Trimen, Handb. Flora Ceylon 3:154, 1895.

*Gymnema cuspidatum* (Thunb.) Kuntze, Rev. Gen.:420, 1891.

Petiole 0.7 to 2 cm long. Leaf-blade 5 to 15 cm long, 1.8 to 5 cm wide, rounded or shortly cuneate at the base, long-acuminate at the apex, thinly membranous. Inflorescence much shorter than the leaves; the peduncle shorter to longer than the petiole. Calyx-lobes ovate, 1.2 to 1.5 mm long, almost glabrous. Corolla-tube 0.35 to 0.45 cm long, the lobes slightly shorter to longer than the tube, narrowly oblong. Merocarps 12 to 15 cm long, about 0.5 cm in diameter, puberulous when young.

Geographic distribution: Endemic in Ceylon.

A rare plant of the hill country above 700 m. It has not been collected since the last century.

*Bidaria cuspidata* is a somewhat variable species.

**Bidaria cuspidata** (Thunb.) H. Huber var. **cuspidata.**

Cyme 7- to 15-flowered. Pedicel up to twice as long as the calyx. Corolla-lobes as long as the tube or mostly a little shorter.

Specimens examined: CENTRAL PROVINCE: Kandy District: Deltota, collector unknown (PDA). Locality unknown: Gardner 569 (PDA); Thwaites C.P. 1848 (K but not the specimen of the same number at PDA); the same C.P. 2671 (BM, K); Walker 97 (K).

**Bidaria cuspidata** (Thunb.) H. Huber var. **stenoloba** (Hooker f.) H. Huber, **comb. nov.**

Nomenclatural type: Walker s.n. (K).

Syn.: *Gymnema stenolobum* Hooker f., Flora Brit. India 4:32, 1883.

*Gymnema pergularioides* (Thwaites) Hooker f. var. *stenolobum* (Hooker f.) Trimen, Handb. Flora Ceylon 3:155, 1895.

Cyme few-flowered. Pedicel three to five times longer than the calyx. Corolla-lobes as long as or slightly longer than the tube.

Specimens examined: Locality unknown: Thwaites C.P. 2672 (K, PDA); Walker s.n. (K); the same 79 (K); the same 1713 (K).

**2. Bidaria celsicola** H. Huber, **nom. et stat. nov.**

Nomenclatural type: Gardner 567 (K).

Syn.: *Bidaria pergularioides* Thwaites var. β Thwaites, Enum. Plant. Zeylan.: 198, 1860.

*Gymnema pergularioides* (Thwaites) Hooker f. var. *gardneri* Thwaites ex Hooker f., Flora Brit. India 4:32, 1883. Trimen, Handb. Flora Ceylon 3:155, 1895.

Petiole 0.5 to 1 cm long. Leaf-blade 3 to 6 cm long, 1 to 2.5 cm wide, acute or rarely almost rounded at the base, mostly acuminate at the apex, rather firm in texture. Inflorescence much shorter than the leaves; the peduncle slightly shorter to longer than the leaves. Pedicels shorter to little longer than the calyx. Calyx-lobes oblong, 1.8 to 2.4 mm long, glabrous or sparsely puberulous at the base. Corolla-tube 0.2 to 0.3 cm long, the lobes about as long as the tube, ovate-oblong. Merocarps 5 to 7 cm long, 0.6 cm in diameter, glabrous.

Geographic distribution: Endemic in Ceylon.

Restricted to elevations above 1800 m.

Specimens examined: CENTRAL PROVINCE: Nuwara Eliya District: Nuwara Eliya, Gardner 567 (K); Adam's Peak, collector unknown (PDA). Locality unknown: Gardner 569 (K); Thwaites C.P. 1848 partly (PDA but not the specimen of the same number at K); Walker s.n. (K); the same 228 (K).

## 13. MARSDENIA R. Br.

R. Brown in Mem. Wern. Soc. 1:28, 1811, prepr. 1810.

Type Species: *Marsdenia tinctoria* R. Brown.

Large, twining shrubs with young branches, under surface of leaves and inflorescence tomentose. Leaves cordate. Flowers in sessile or short-peduncled, dichasially branched cymes solitary at the nodes. Calyx-lobes ovate-oblong, obtuse. Corolla purple, shallowly campanulate, puberulous without; the lobes about as long as the tube, ovate-oblong, contorted in bud. Corona single, consisting of five flat, erect segments, truncate, emarginate or shortly bifid at the apex, attached to the staminal column. Anthers with the connective produced into a membranous tip; pollen-masses solitary in each anther-loculus, ascending, without a pellucid margin. Merocarps ovoid-oblong, tapering to a blunt apex, smooth.

A large genus of almost a hundred species distributed throughout the tropics and extending into the warm-temperate zones.

**Marsdenia tenacissima** (Roxb.) Moon, Cat. Plants Ceylon :21, 1824. Thwaites, Enum. Plant. Zeylan. :197, 1860. Hooker f., Flora Brit. India 4:35, 1883. Trimen, Handb. Flora Ceylon 3:155, 1895.

Nomenclatural type: Roxburgh in Herb. Wallich 8176/a (K).

Syn.: *Asclepias tenacissima* Roxb., Plants Coast Coromand. 3:35, t.24, 1815.

Petiole 5 to 9 cm long. Leaf-blade 7 to 18 cm long, 6 to 16 cm wide, acute or shortly acuminate at the apex, velvety pubescent above, densely tomentose beneath. Cymes shorter than the petioles. Calyx-lobes about 2 mm long, densely hairy. Corolla 0.4 to 0.5 cm in diameter. Merocarps 7 to 17 cm long, up to 6 cm wide, velvety pubescent.

Geographic distribution: From the western Himalayas through Nepal and Bengal to Upper Burma; Ceylon.

In Ceylon rather rare in the dry and intermediate zone. Flowering in June and July.

Specimens examined: NORTH WESTERN PROVINCE: Kurunegala District: Kurunegala, collector unknown (PDA). UVA PROVINCE: Badulla District: Ekiriyankumbura, collector unknown (PDA). Locality unknown: Thwaites C.P. 2860 (BM, K, PDA).

Vern.: **Muruva-dul** (*S.*).

According to Trimen the stems afford a strong, silky fibre and the leaves are given as a remedy for flatulence.

## 14. COSMOSTIGMA Wight

Wight, Contrib. Bot. India :41, 1834.

Type Species: *Cosmostigma racemosum* (Roxb.) Wight.

Twining shrubs or subshrubs with stems and leaves glabrous. Leaves ovate, rather thin. Flowers in peduncled cymes; the latter at first umbel-like, soon elongating and raceme-like, slightly pubescent, solitary at the nodes. Calyx-lobes triangular-ovate, obtuse. Coralla greenish-yellow with red dots, rotate, glabrous; the lobes much longer than the radius of the united portion, ovate to ovate-oblong, contorted in bud. Corona single, consisting of five flat, erect segments, truncate or bifid at the apex, attached to the base of the staminal column but not exceeding it. Anthers with the connective produced into a membranous tip; pollen-masses obliquely ovate, solitary in each anther-loculus, ascending, without a pellucid margin. Merocarps ovoid-oblong, blunt, smooth.

This genus consists of only one species.

**Cosmostigma racemosum** (Roxb.) Wight. Contrib. Bot. India :42. 1834. Thwaites, Enum. Plant. Zeylan.:197. 1860. Hooker f., Flora Brit. India 4:46, 1883. Trimen, Handb. Flora Ceylon 3:160, 1895.

Nomenclatural type: Coloured drawing nr. 1813 of *Asclepias racemosa* by Roxburgh at K.

Syn.: *Asclepias racemosa* Roxb. [Hort. Bengal. :20, 1814 nomen nudum] Flora Indica ed. Carey 2:32, 1832.

Petiole 1 to 3.5 cm long, Leaf-blade 6 to 10 cm long, 3.5 to 7 cm wide, shortly cuneate, rounded, truncate or shallowly cordate at the base, acuminate at the apex. Inflorescence shorter than to about as long as the leaves; the peduncle shorter than or as long as the petioles. Calyx-lobes 1 to 1.7 mm long, glabrous. Corolla 0.7 to 1.2 cm in diameter. Merocarps not seen, according to Trimen 6 to 8 cm long.

Geographic distribution: Southern Deccan Peninsula, Ceylon, Assam, Burma.

A plant of the dry and intermediate regions of Ceylon, according to Thwaites rather common.

Specimens examined: NORTH WESTERN PROVINCE: Kurunegala District: Kurunegala, Thwaites C.P. 1854 (BM, PDA). EASTERN PROVINCE: Batticaloa District: Mankeni, Worthington 4897 (private herbarium).

## 15. HETEROSTEMMA Wight et Arn.

Wight et Arnott ex Wight, Contrib. Bot. India: 42, 1834.

Type Species: *Heterostemma tanjorense* Wight et Arnott ex Wight.

Twining, glabrous herbs or subshrubs with thin, ovate or ovate-oblong leaves. Flowers in sessile or very shortly peduncled, umbel-like cymes solitary from the nodes. Calyx-lobes ovate-oblong, almost obtuse. Corolla purplish-brown or green, tinged with brown, rotate, glabrous; the lobes as long as or slightly longer than the radius of the united portion, triangular-ovate, valvate in bud. Corona single, consisting of five large segments, laterally compressed, produced at the base into a short, horizontally spreading spur and at the apex into an erect, triangular tooth slightly exceeding the staminal column. Anthers with the connective produced into a membranous tip; Pollen-masses almost orbicular, solitary in each anther-loculus, ascending, with a narrow pellucid margin near the insertion of the caudicles half as long as the pollinium. Merocarps slender, cylindrical, smooth.

About a dozen species, ranging from India to China, the Philippines and Samoa.

**Heterostemma tanjorense** Wight et Arnott ex Wight, Contrib. Bot. India :42, 1834. Thwaites, Enum. Plant. Zeylan. :198, 1860. Hooker f., Flora Brit. India 4:47, 1883. Trimen, Handb. Flora Ceylon 3:163, 1895.

Nomenclatural type: Herb. Wight propr. 1527 (K).

Syn.: *Heterostemma tanjorense* Wight et Arnott ex Wight var. *zeylanicum* Hooker f., Flora Brit. India 4:48. 1883.

Petiole 1.4 to 3 cm long. Leaf-blade 6 to 12 cm long, 2.5 to 5 cm wide, rounded or truncate at the base, acute or sharply acuminate at the apex. Inflorescence shorter than the leaves. Peduncle up to 3 mm long. Calyx-lobes about 1.5 mm long, glabrous. Corolla 1.2 to 1.5 cm in diameter. Merocarps about 10 cm long and 0.5 cm wide, glabrous.

Geographic distribution: Western Deccan Peninsula, Ceylon.

A rare plant of the moist zone of Ceylon, found at an elevation of about 1300 m. Flowering in August.

Specimens examined: CENTRAL PROVINCE: Kandy District: Hantane near Kandy, Thwaites C. P. 1856 (PDA) Locality unknown: Thwaites C.P. 1859 (K, holotype of var. *zeylanicum* Hooker f.).

## 16. WATTAKAKA Hasskarl

Hasskarl in Flora 40:99, 1857.

Type Species: *Wattakaka viridiflora* (R. Brown) Hasskarl.

Twining, glabrous shrubs with ovate, rather firm but not fleshy leaves. Flowers in peduncled, umbel-like cymes solitary at the nodes. Calyx-lobes ovate or ovate-lanceolate, acute or glabrous. Corolla entirely green, rotate, glabrous; the lobes about twice as long as the radius of the united portion, ovate, contorted in bud. Corona single, consisting of five fleshy, top-shaped segments attached to the upper part of the staminal column, truncate above, with an apical tooth projecting horizontally inwards. Anthers with the connective produced into a membranous tip; pollen-masses ovate-oblong, solitary in each anther-loculus, ascending, without a distinct, pellucid margin. Merocarps ovoid-oblong, tapering to a blunt apex, grooved longitudinally.

Two species ranging from India and Ceylon to South China and Malesia.

**Wattakaka volubilis** (L. f.) Stapf in Curtis, Bot. Mag. sub t. 8976, 1923.

Nomenclatural type: Koenig in the Linnaean Herb. 310/6 (LINN).

Syn.: *Asclepias volubilis* L. f., Suppl. Plant.: 170, 1781. *Hoya viridiflora* R. Brown in Mem. Wern. Soc. 1:27, 1811, prepr. 1810. Thwaites, Enum. Plant. Zeylan. :199, 1860.

*Wattakaka viridiflora* (R. Brown) Hasskarl in Flora 40:99, 1857.

*Dregea volubilis* (L. f.) Benth. ex Hooker f., Flora Brit. India 4:46, 1883. Trimen, Handb. Flora Ceylon 3:161, 1895.

Petiole 1.2 to 5.5 cm long. Leaf-blade 5 to 13 cm long, 3 to 10 cm wide, short-cuneate or rounded, rarely cordate at the base, acute and acuminate at the apex. Inflorescence shorter than to as long as the leaves; peduncle as long as or longer than the petioles. Calyx-lobes 1.8 to 2.5 mm long, glabrous. Corolla about 1.5 cm in diameter. Merocarps 6 to 10 cm long, 2 to 3 cm wide, glabrous.

Geographic distribution: From Nepal through India to Ceylon and Malesia.

In Ceylon not uncommon in the dry zone from the lowlands up to an elevation of 1000 m. Flowering in March and April.

Specimens examined: NORTHERN PROVINCE: Jaffna District: Jaffna, collector unknown (PDA). Mannar District: Giant's Tank, Simpson 9358 (BM). CENTRAL PROVINCE: Kandy District: Hantane near Kandy, 2500 ft. Gardner 564 (BM, K). Matale District: Dambulla Hill, Simpson 9776 (BM); Nalanda Gorge, Worthington 6384 (private herbarium). Locality unknown: Fraser s.n. (BM); Walker s.n. (K); Thwaites C.P. 6384 (BM, PDA).

Vern.: **Kirianguna** (*S.*); **Kurincha** (*T.*).

The leaves are eaten in curries and also used in native medicine for fevers in children (Trimen).

## 17. HOYA R. Br.

R. Brown in Mem. Wern. Soc. 1:26, 1811, prepr. 1810.

Type Species: *Hoya carnosa* R. Brown.

Climbing and twining, glabrous, often epiphytic subshrubs with rooting stems and fleshy, elliptic, rhomboid or narrowly ovate-lanceolate leaves. Flowers two to numerous in sessile clusters or in peduncled, umbel-like cymes solitary at the nodes, becoming racemiform with age by producing flowers for several seasons. Calyx-lobes triangular or ovate-oblong, obtuse or subacute. Corolla green or pinkish white, rotate, glabrous without; the lobes slightly to markedly longer than the radius of the united portion, triangular to ovate, valvate in bud. Corona single, consisting of five large, fleshy, horizontally spreading segments attached to the staminal column, produced at the inner angle into a tooth projecting inwards. Anthers with the connective produced into a membranous tip; pollen-masses ovate-oblong, solitary in each anther-loculus, ascending, with a narrow pellucid margin almost as long as the pollinium. Merocarps linear, tapering to the apex, smooth.

About 80 species, mostly epiphytic and climbing with rooting stems, throughout the moister parts of the Eastern Tropics from Nepal and Ceylon to South China and northern Australia.

KEY TO THE SPECIES

1. Leaves narrowly ovate-lanceolate, 0.5 to 1 cm wide. Flowers in sessile or almost sessile clusters. **1. H. pauciflora**

1. Leaves elliptic or rhomboid, 2 to 4 cm wide. Flowers in long-peduncled cymes. **2. H. ovalifolia**

**1. Hoya pauciflora** Wight, Icon. Plant. Ind. Or. 4 (2):16, t. 1269, 1848 (page 16 as "*parviflora*"). Hooker f., Flora Brit. India 4:56, 1883. Trimen, Handb. Flora Ceylon 3:162, 1895.

Nomenclatural type: Wight 511 (K).

Syn.: *Hoya wightiana* Thwaites, Enum. Plant. Zeylan.:199, 1860.

Petiole 0.2 to 0.5 cm long. Leaf-blade 2 to 5 cm long, 0.5 to 1 cm wide, narrowly ovate-lanceolate, acute or rounded at the base, obtuse at the apex, frequently dotted with red beneath. Flowers 2 to 12 in sessile or almost sessile, umbel-like cymes, usually shorter than the leaves. Calyx-lobes about 1 mm long, ovate or ovate-oblong, glabrous. Corolla 1.2 to 1.8 cm in diameter, the lobes minutely puberulous and ciliolate within towards the margin. Merocarps not seen, according to Trimen about 10 cm long, very slender.

Geographic distribution: Southern Deccan Peninsula, Ceylon.

A plant of the moist region of Ceylon, rather uncommon in forests on tree trunks and on rocks in the lower montane zone at an elevation of 1000 to 1700 m. Flowering in March and September.

Specimens examined: CENTRAL PROVINCE: Kandy District: Hantane near Kandy, Champion s.n. (K), Nuwara Eliya District: Rambodа, collector unknown (PDA). Locality unknown: Gardner 563 (K holotype of *H. wightiana* Thwaites); Thwaites C.P. 2762 (BM, K, PDA).

**2. Hoya ovalifolia** Wight et Arnott ex Wight, Contrib. Bot. India :37, 1834. Thwaites, Enum. Plant. Zeylan.:198, 1860. Hooker f., Flora Brit. India 4:60, 1883. Trimen, Handb. Flora Ceylon 3:162, 1895.

Nomenclatural type: Herb. Wight propr. 1522 (K).

Petiole 0.4 to about 1 cm long. Leaf-blade 3.5 to 10 cm long, 2 to 5 cm wide, elliptic or rhomboid, tapering at both ends, or rarely rounded at the base, short-acuminate or almost acute at the apex. Flowers numerous in peduncled cymes, at first umbel-like, producing flowers for several seasons and thus becoming racemiform with age; the peduncle as long as or longer than the leaves. Calyx-lobes about 1 mm long, triangular, subacute. Corolla about 1 cm in diameter, the lobes glabrous within and not ciliolate. Merocarps not seen.

Geographic distribution: Southern Deccan Peninsula, Ceylon.

In Ceylon rare in forests of the moist zone at low altitudes; an outlying station on Ritigala Kande. Flowering in March.

Specimens examined: NORTH CENTRAL PROVINCE: Anuradhapura District: Summit of Ritigala Kande, collector unknown (PDA). CENTRAL PROVINCE: Kandy District: Ma Oya, 12 miles east of Kandy, Worthington 6574 (private herbarium). SOUTHERN PROVINCE: Galle District: on the summit of a hill 12 miles from Galle, Walker 1714 (K). District unknown: Kitulgala, Thwaites C.P. 2670 (BM, PDA). Locality unknown: Gardner s.n. (K); Walker s.n. (K).

## 18. DISCHIDIA R. Br.

R. Brown in Mem. Wern. Soc. 1:32, 1811, prepr. 1810.

Type Species: *Dischidia nummularia* R. Brown.

Syn.: *Collyris* Vahl, Skr. Nat. Selsk. Kiobenh.:110, 1810.

Small, glabrous, epiphytic herbs with the stem rooting at the nodes. Leaves fleshy, orbicular. Flowers one to three in sessile or almost sessile cymes solitary at the nodes. Calyx-lobes ovate, acute. Corolla white or purple, urceolate, glabrous without; the lobes shorter than the tube, triangular, valvate in bud. Corona single, consisting of five segments attached to the staminal column; the segments long and narrowly T-shaped, slightly incurved, the arms terminating in two pendulous, obliquely ovoid or cultriform appendages, thinly membranous. Anthers with the connective produced into a membranous tip; pollen-masses solitary in each anther-loculus, ascending, with a narrow, pellucid margin. Merocarps narrowly fusiform.

About 50 species, centered in South East Asia and Malesia from the East Himalayas to Formosa and New Guinea, with a few extending to Queensland. *Dischidia* is absent from the Deccan Peninsula.

**Dischidia nummularia** R. Brown, Prodr. Nov. Holl. 1:461, 1810. Thwaites, Enum. Plant. Zeylan.:198, 1860. Hooker f., Flora Brit. India 4:49, 1883. Trimen, Handb. Flora Ceylon 3:161, 1895.

Nomenclatural type: Rumphius, Herb. Amb. 5, t. 176, fig. 1, 1747.

Syn.: *Collyris minor* Vahl, Skr. Nat. Selsk. Kiobenh.:111, 1810. *Dischidia minor* (Vahl) Merrill in Lignan Sc. Journ. 13:67, 1934.

Stem filiform. Petiole about 0.2 cm long. Leaf-blade 0.7 to 1 cm long and wide, sometimes slightly wider than long, rounded at both ends or very short-cuneate at the base, mostly with a

minute apiculus at the apex. Calyx-lobes 0.5 to 0.7 mm long, glabrous. Corolla 2.3 mm long. Merocarps 2.5 to 3 cm long and about 0.3 cm wide, glabrous.

Geographic distribution: Ceylon, Malayan Peninsula, Malesia to Queensland and the Solomon Islands.

In Ceylon very rare in the Matale District on tree-trunks at an elevation of 700 to 1000 m in the moist to intermediate zone. It has not been found in Ceylon since Thwaites.

Specimens examined: CENTRAL PROVINCE: Matale District: Lagalla, Thwaites C.P. 3875 (PDA).

## 19. LEPTADENIA R. Br.

R. Brown in Mem. Wern. Soc. 1:34, 1811, prepr. 1810.

Type Species: *Leptadenia heterophylla* (Del.) Decne.

Twining shrubs with the young branches and the inflorescence mealy puberulous. Leaves ovate or ovate-oblong, glabrous above, puberulous or glabrescent beneath. Flowers in short-peduncled or rarely almost sessile, umbel-like cymes solitary at the nodes. Calyx-lobes ovate, subacute. Corolla greenish-yellow, almost rotate, very minutely puberulous outside; the lobes much longer than the tube, ovate-oblong, with the margins replicate, bearing on the inside a keel which is produced into a short tooth projecting inwards. Corona double but the inner series difficult to observe; the outer series consisting of five short, fleshy segments attached to the base of the corolla alternating with the lobes; the segments notched at the apex; The inner series reduced to an undulate annulus at the base of the staminal column. Anthers not produced into a membranous tip; pollen-masses solitary in each anther-loculus, ascending, with a prominent pellucid margin at the distal end. Merocarps ovate-oblong to oblong, tapering to the apex, smooth.

About ten species ranging through northern tropical Africa, Arabia eastwards to Burma and southwards to the Mascarene Islands.

**Leptadenia reticulata** (Retzius) Wight et Arnott ex Wight, Contrib. Bot. India :47, 1834. Thwaites, Enum. Plant. Zeylan. :198, 1860. Hooker f., Flora Brit. India 4:63, 1883. Trimen, Handb. Flora Ceylon 3:164, 1895. Bullock in Kew Bull. 1955:291, 1955.

Nomenclatural type: Koening s.n. (LD holotype not seen, BM isotype).

Syn.: *Cynanchum reticulatum* Retzius, Obs. Bot. 2:15, 1781.

*Cynanchum ovatum* Thunb. (Alner), Obs. in Cynanchum :6, 1821.

*Daemia reticulata* (Retzius) Moon, Cat. Plants Ceylon :20, 1824.

Petiole 0.8 to 2.5 cm long. Leaf-blade 3 to 8.5 cm long, 1.4 to almost 6 cm wide, truncate, rounded or very short-cuneate at the base, short-acuminate and acute at the apex. Cymes shorter than the leaves, the peduncle shorter to longer than the petioles. Calyx-lobes 1 to 1.7 mm long, minutely puberulous. Corolla 0.6 to 0.8 cm in diameter when expanded, the lobes villous within. Merocarps 6 to 8 cm long, 2 to 2.5 cm in diameter, glabrous when ripe.

Geographic distribution: India from Nepal and the Punjab southwards to Ceylon and eastwards to Burma; also in the Comoro Islands, Madagascar and Mauritius.

A plant of the dry zone. In Ceylon rather common in deciduous scrub and at the edge of forests. Flowering from July to October.

Specimens examined: NORTHERN PROVINCE: Mannar District: Jalai, collector unknown (PDA). NORTH CENTRAL PROVINCE: Anuradhapura District: near Hanuwilagama, Huber 8 (US); near Maragahawewa, Huber 48 (US). NORTH WESTERN PROVINCE: Kurunegala District: near Kolalegala, Wariyapola—Kurunegala Road, Simpson 8177 (BM). Puttalam District: Puttalam, collector unknown (PDA). EASTERN PROVINCE: Batticaloa District: Panchchankeni, Huber 26 (US). Trincomalee District: Trincomalee, collector unknown (PDA). Locality unknown: Thwaites C.P. 1846 (BM, K, PDA).

Vern. : **Pālai, Pāla** (*T.*).

## 20. CEROPEGIA L.

L., Spec. Plant. :211, 1753.

Type Species: *Ceropegia candelabrum* L.

Twining, glabrous or very rarely slightly pubescent herbs with ovate, elliptic, oblong or lanceolate leaves. Flowers in poor to fairly rich, peduncled, umbel-like cymes arising solitary at the nodes. Calyx-lobes linear to subulate, very acute. Corolla white or greenish, frequently striped or spotted with purple, narrowly tubular with the base inflated, glabrous without; the lobes shorter than to almost as long as the tube, triangular, semi-circular, ovate or oblong, rarely almost obsolete, often produced into a long, linear beak, always connate by their tips, valvate or reduplicate in bud. Corona double, attached to the staminal column, the outer series consisting of five bifid or truncate segments, the inner of five simple, erect, linear segments exceeding the staminal column. Anthers not produced into a membranous tip; pollen-masses solitary in each anther-loculus, ascending, with a pellucid margin. Merocarps linear, tapering to the apex, smooth.

A genus of about 160 species, widely distributed throughout the Old World Tropics, extending to South Africa, the Canary Islands, the Himalayas, West China and Queensland.

KEY TO THE SPECIES

1. Corolla-tube almost cylindrical except at the inflated base, not funnel-shaped at the mouth.
   2. Corolla (including the lobes) 2.4 to 5 cm long; the lobes pubescent within. Outer corona consisting of five truncate segments, much shorter than the staminal column. **1. C. candelabrum**
   2. Corolla (including the lobes) 1.4 to 2 cm long; the lobes quite glabrous. Outer corona consisting of five deeply bifid segments exceeding the staminal column. **5. C. parviflora**
1. Corolla-tube funnel-shaped at the mouth.
   3. Corolla-lobes 2 to 3.5 cm long, longer than one half of the tube, produced into a long, linear beak. **2. C. decaisneana**
   3. Corolla-lobes 0.5 to 1.8 cm long, shorter than one half of the tube, triangular, semicircular, ovate, oblong or almost truncate but not at all produced into a beak.
      4. Corolla-lobes ovate-oblong, slightly longer than wide. **3. C. thwaitesii**
      4. Corolla-lobes broadly triangular or broadly ovate, sometimes almost obsolete, as long as wide or wider than long. **4. C. elegans**
         5. Mouth of the corolla-tube 1 to 2 cm in diameter, not prominent in the sinuses between the lobes. var. **elegans**
         5. Mouth of the corolla-tube 2.5 to 3.5 cm in diameter, strongly prominent into five rounded pouches in the sinuses between the lobes. var. **gardneri**

**1. Ceropegia candelabrum** L., Spec. Plant. :211, 1753. Thwaites, Enum. Plant. Zeylan. :199, 1860. Hooker f., Flora Brit. India 4:70, 1883. Huber in Mem. Soc. Brot. 12:58, 1958.

Nomenclatural type: Rheede tot Draakestein, Hort. Ind. Malabar. 9, t. 16, 1689.

Syn.: *Ceropegia biflora* L., Spec. Plant. :211, 1753. Trimen, Handb. Flora Ceylon 3:167, 1895.

*Ceropegia tuberosa* Roxb., Plants Coast Coromand. 1:12, t. 9, 1795. Hooker f., Flora Brit. India 4:70, 1883.

*Ceropegia intermedia* Hooker f., Flora Brit. India 4:71, 1883 pro parte, as to the Ceylonese specimens, not *C. intermedia* Wight.

Rootstock a usually globose tuber. Plant glabrous. Petiole 0.5 to 1 cm long, Leaf-blade 3 to 6 cm long, 1 to 2 cm wide, variable in shape, ovate, elliptic, obovate, oblong or lanceolate, rounded or acute at the base, tapering to and often apiculate at the apex. Cymes few- to rather many-flowered; the peduncle much longer than the petioles. Calyx-lobes 2.5 to 5 mm long, glabrous. Corolla greenish-white, striped with purple within the tube, the lobes often suffused with purple-brown; 2.4 to 5 cm long; the tube curved, cylindric except at the inflated base, not funnel-shaped at the mouth; the lobes pubescent within, much shorter than to almost as long as the tube, 0.5 to 2 cm long, ovate-oblong or more frequently produced at the apex into a narrowly linear beak. Outer corona consisting of five truncate, pilose segments much shorter than the staminal column; the segments of the inner corona linear or almost spathulate, connivent with their tips, much exceeding the staminal column.

Geographic distribution: Southern and eastern part of the Deccan Peninsula; Ceylon.

Not common but widely distributed in Ceylon, mostly in the dry region but extending into the moist zone; in the latter limited to clear secondary vegetation, avoiding shade. Absent from the higher elevations and from the North of the island. Flowering from November to March.

Specimens examined: NORTH WESTERN PROVINCE: Kurunegala District: Kurunegala, collector unknown (PDA). WESTERN PROVINCE: Colombo District: Colombo, Thwaites C.P. 774 (PDA, W). UVA PROVINCE: Badulla District: Minivangoda near Passara, Simpson 8849 (BM). SOUTHERN PROVINCE: Hambantota District: Tissamaharama, collector unknown (PDA). Locality unknown: Walker s.n. (P).

As in some other species of this genus, the flowers of *Ceropegia candelabrum* L. are dimorphic: there are specimens with their corolla-lobes produced into a long, narrowly linear beak and specimens with the lobes erostrate. The more commonly distributed and, from a phylogenetic point of view, the original form is the one with beaked lobes; the figure of Rheede tot Draakestein, which is the nomenclatural type of the species, shows the erostrate plant, which is very rare in Ceylon, only one specimen seen (Passara) being referable to it.

Vern.: **Wel-mottu** (*S.*).

2. **Ceropegia decaisneana** Wight, Icon. Plant. Ind. Or. 4 (2):14, t. 1259, 1848. Hooker f., Flora Brit. India 4:73, 1883. Trimen, Handb. Flora Ceylon 3:166, 1895. Huber in Mem. Soc. Brot. 12:62, 1958.

Nomenclatural type: Wight s.n. (K).

Rootstock slender, with fasciculate, fleshy roots. Plant glabrous (Ceylonese specimen only). Petiole 1 to 3 cm long. Leaf-blade 3 to 16 cm long and 1 to 7 cm wide, variable in shape, ovate, elliptic, obovate or lanceolate, rounded or cuneate at the base, acute and acuminate at the apex. Cymes few- (1- to 8-) flowered; the peduncle much longer than the petioles. Calyx-lobes 6 to 7 mm long, glabrous. Corolla greenish-white, mottled with purple, 5 to 8 cm long; the tube curved, strongly inflated in the lower third or half, abruptly narrowed in the middle and gradually expanding towards the broadly funnel-shaped mouth; the lobes 2 to 3.5 cm long, nearly as long as the tube, linear from a triangular base, ciliate, purple towards the apex. Outer corona consisting of five prominent, bifid, hairy segments exceeding the staminal column; the segments of the inner corona narrowly linear, connivent-erect, about twice as long as those of the outer corona.

Geographic distribution: Mountains of the southern Deccan Peninsula, Ceylon.

An extremely rare plant of the hill country, collected in Ceylon but once.

Specimen examined: CENTRAL PROVINCE: Kandy District: Rangala, by the path to Nitre Cavo District, c. 3800 ft, collector unknown (PDA).

The Ceylonese specimen does not agree completely with the typical plant from the Nilgiris. Peninsular specimens normally show some pubescence, particularly on the young shoots and frequently also on the upper side of the leaves and the back of the calyx-lobes; besides that the peduncle bears a line of hairs and the plants from the Nilgiri Hills have their calyx-lobes elongated up to 1 or 1.5 cm, whereas the Rangala specimen, described above, is glabrous and has relatively short calyx-lobes.

3. **Ceropegia thwaitesii** Hooker, in Curtis Bot. Mag. t. 4758, 1854. Thwaites, Enum. Plant Zeylan.:199, 1860. Hooker f., Flora Brit. India 4:71, 1883. Trimen, Handb. Flora Ceylon 3:166, 1895. Huber in Mem., Soc. Brot. 12:71, 1958.

Nomenclatural type: A specimen grown at Kew Gardens (K).

Rootstock slender. Plant glabrous. Petiole 1 to 3 cm long. Leaf-blade 5 to 10 cm long and 2.5 to 5 cm wide, ovate or ovate-lanceolate, rounded or shallowly cordate at the base, acute and acuminate at the apex. Cymes one- to five-flowered; the peduncle shorter to slightly longer than the petioles, at most twice as long. Calyx-lobes 6 to 8 mm long, glabrous. Corolla greenish with purple blotches towards the mouth of the tube and a purple band across the lobes, 3.5 to 5 cm long; the tube curved, strongly inflated in the lower third or half, abruptly narrowed in the middle and gradually expanding towards the broadly funnel-shaped mouth; the lobes 1 to 1.8 cm long, about half as long as the tube, ovate-oblong, slightly longer than wide at the base when expanded, glabrous. Outer corona consisting of five prominent, bifid, hairy segments exceeding the staminal column; segments of the inner corona linear, connivent-erect, twice as long as those of the outer corona.

Geographic distribution: Southern Deccan Peninsula, Ceylon.

A rare plant of the moist hill country. Not found by recent collectors. Flowering in December.

Specimen examined: CENTRAL PROVINCE: Kandy District: Peradeniya, Thwaites C.P. 1842 (GH, K, PDA).

4. **Ceropegia elegans** Wallich in Curtis, Bot. Mag. t. 3015, 1830. Thwaites, Enum. Plant. Zeylan.: 199, 1860. Hooker f., Flora Brit. India 4:68, 1883. Trimen, Handb. Flora Ceylon 3:165, 1895. Huber in Mem. Soc. Brot. 12:72, 1958.

Nomenclatural type: A specimen grown at Kew Gardens (K).

Syn.: *Ceropegia walkeriae* Wight, Icon. Plant. Ind. Or. 4 (2):15, t. 1266, 1848. Hooker f., Flora Brit. India 4:69, 1883.

*Ceropegia elegans* Wallich var. *walkeriae* (Wight) Trimen, Handb. Flora Ceylon 3:165, 1895.

Rootstock slender, with numerous, fibrous roots. Plant glabrous. Petiole 1 to 3 cm long. Leaf-blade 4 to 9 cm long and 1.5 to 5 cm wide, ovate, elliptic or ovate-lanceolate, rounded or truncate at the base, rounded and short-acuminate or acute and long-acuminate at the apex. Cymes normally few-flowered; the peduncle shorter or at most slightly longer than the petioles. Calyx-lobes 4 to 6 mm long, glabrous. Corolla greenish-white, white or cream-coloured, mottled and dotted with purple, 3 to 5 cm long; the tube strongly curved and inflated in the lower third, abruptly narrowed in the middle, gradually expanding into an extremely wide, funnel-shaped mouth; the lobes 0.5 to 1.2 cm long, about as long as the diameter of the mouth of the tube or shorter, semicircular or broadly triangular or occasionally almost obsolete, glabrous or ciliate with long, purple hairs. Outer corona consisting of five deeply bifid segments, glabrous or ciliate, exceeding the staminal column; the segments of the inner corona linear, connivent-erect, as long as the outer corona or slightly longer.

Geographic distribution: Southern Deccan Peninsula, Ceylon.

A plant of the intermediate and moist zone up to an elevation of 1200 m. According to Thwaites and Trimen rather common but now rare or has disappeared at most localities known.

*Ceropegia elegans* Wallich is an extremely variable plant with little correlation between the different characters. Therefore apart from the typical plant only one variety is recognized here.

**Ceropegia elegans** Wallich var. **elegans.**

Cymes one- or few-flowered, short-peduncled or the peduncles only little longer than the petioles; rarely the cymes almost sessile. Corolla pale green or greenish-white, spotted and stained with purple; the mouth of the tube 1 to 2 cm in diameter, not prominent in the sinuses between the lobes; the lobes glabrous or long-ciliate.

Specimens examined: CENTRAL PROVINCE: Kandy District: Hantane near Kandy, Thwaites C.P. 738 (K, P, PDA); Bolandavela Hill, Uma-Oya, Silva 231 (PDA); Nitre Cave area collector unknown (PDA). UVA PROVINCE: Badulla District: Ekiriyankumbura, Trimen's collector (PDA). District unknown: between Kumbukkan and Mappane, Silva s.n. (PDA). Locality unknown: Walker in herb. Gardner s.n. (K).

Mrs. Walker's collection includes several most strikingly aberrant specimens which differ by exceptionally long-peduncled and many-flowered cymes and partly by their rather small flowers. None of these features, however, seems to be constant enough to allow a clear distinction from var. *elegans*. These plants have nothing to do with *C. walkeriae* Wight. Unfortunately the place where they have been collected is not mentioned.

**Ceropegia elegans** Wallich var. **gardneri** (Thwaites ex Hooker) Huber in Mem. Soc. Brot. 12:73, 1958.

Nomenclatural type: Gardner 565 (K).

Syn.: *Ceropegia gardneri* Thwaites, Enum. Plant. Zeylan.:199, 1860. Hooker f., Flora Brit. India 4:69, 1883. Trimen, Handb. Flora Ceylon 3:165, 1895.

Cymes one- or few-flowered. Peduncle about as long as the petioles or but slightly longer. Corolla white, dotted with purple; the mouth of the tube 2.5 to 3.5 cm in diameter, strongly prominent into five rounded pouches in the sinuses between the lobes; the latter long-ciliate.

Geographic distribution: Endemic in Ceylon.

A plant of the moist hill country. Not found since the last century and perhaps extinct in the wild state. In Europe grown in greenhouses.

Specimens examined: CENTRAL PROVINCE: Nuwara Eliya District: Ramboda, 4000 to 5000 ft., Gardner 565 (K); Gardner 566 (K, L); Thwaites C.P. 2838 (PDA). Locality unknown: Walker in herb. Gardner s.n. (FI).

**5. Ceropegia parviflora** Trimen in Journ. Bot. (London) 27:164, 1889. Trimen, Handb. Flora Ceylon 3:167, 1895. Huber in Mem. Soc. Brot. 12:72, 1958.

Nomenclatural type: Trimen s.n. (K).

Rootstock slender, with fasciculated roots. Plant glabrous. Petiole 1 to 3.5 cm long. Leaf-blade 5 to 7 cm long and 3 to 5.5 cm wide, broadly ovate to ovate-oblong, rounded or very shallowly cordate at the base, acute and short-acuminate at the apex. Cymes rather few- (2- to 5-) flowered; the peduncle shorter than or about as long as the petioles. Calyx-lobes about 4 mm long, glabrous. Corolla pale greenish-yellow, 1.4 to 2 cm long; the tube slightly curved, inflated in the lower third or half, abruptly narrowed in the middle and narrowly cylindrical above, not funnel-shaped at the mouth; the lobes 0.2 to 0.6 cm long, oblong, glabrous. Outer corona consisting of five prominent, bifid segments, hairy at their base and exceeding the staminal column; The segments of the inner corona linear, connivent-erect, slightly longer than the outer corona.

Geographic distribution: Endemic in Ceylon.

A very local plant of the dry zone, known only from a few places near Anuradhapura. Flowering in February.

Specimens examined: NORTH CENTRAL PROVINCE: Anuradhapura District: near Anuradhapura, Trimen s.n. (K, PDA).

## 21. CARALLUMA R. Br.

R. Brown in Mem. Wern. Soc. 1:25, 1811, prepr. 1810.

Type Species: *Stapelia adscendens* Roxb.

Syn.: *Boucerosia* Wight et Arnott ex Wight, Contrib. Bot. India: 34, 1834.

Strongly succulent. Leaf-less or almost leaf-less plants. Stems ascending or erect, branched, quadrangular, glabrous, with or without prominent, conical, tooth-like leaf-bases on the ribs, with very deciduous, minute leaves reduced to sessile, lanceolate scales. Flowers solitary or in few-flowered, sessile cymes from the teeth of the stem or in a rather many-flowered inflorescence from the top of the stem. Calyx-lobes ovate-lanceolate to linear-lanceolate, very acute. Corolla uniformly purple-brown within or yellowish with purple streaks, rotate or very shallowly campanulate, glabrous without; the lobes about as long as to much longer than the radius of the united portion, valvate in bud. Corona double, attached to the staminal column, the outer series consisting of five deeply bifid segments, the inner series of five linear segments incumbent on the anthers. Anthers not produced into a membranous tip; pollen-masses solitary in each anther-loculus, ascending, with a pellucid margin. Merocarps slender, fusiform, smooth.

A markedly xerophytic genus of about a hundred species, often of a cactus like appearance, most numerous in southern and eastern Africa, extending towards North into the Mediterranean and towards East through Arabia and India to Burma.

KEY TO THE SPECIES

1. Stems obtusely angled. Flowers solitary or in very few-flowered clusters from distant leaf-scars. Corolla-lobes lanceolate, much longer than the radius of the united portion. **1. C. adscendens**

1. Stems sharply angled. Cymes several-flowered, crowded on the top of the stems and forming a globose inflorescence. Corolla-lobes broadly triangular, about as long as the radius of the united portion. **2. C. umbellata**

**1. Caralluma adscendens** (Roxb.)Haworth, Syn. Plant. Succ.:47, 1812. Gravely and Mayuranathan, Ind. Spec. Gen. Caralluma :12, 1931.

Nomenclatural type: Roxb., Plants Coast Coromand. 1, 30, 1795.

Syn.: *Stapelia adscendens* Roxb., Plants Coast Coromand. 1:28, 1795.

*Caralluma adscendens* (Roxb.) Haworth is represented in Ceylon with the following variety only:

**Caralluma adscendens** (Roxb.) Haworth var. **fimbriata** (Wallich) Gravely and Mayuranathan, Ind. Spec. Gen. Caralluma :13, 1931.

Nomenclatural type: Wallich, Plant. As. Rar. 1, t. 8, 1829.

Syn.: *Caralluma fimbriata* Wallich, Plant. As. Rar. 1:7, 1829. Trimen, Handb. Flora Ceylon 3:168, 1895.

*Caralluma attenuata* Thwaites, Enum. Plant. Zeylan. :200, 1860. Hooker f., Flora Brit. India 4:76, 1883. Not *C. attenuata* Wight.

Stems decumbent and rooting at the base, then upraised and often arched at the summit, 7 to 20 cm tall and 4 to 8 mm in diameter, not or slightly attenuate towards the apex; obtusely quadrangular, particularly at the base, without prominent teeth on the ribs. Cymes sessile and mostly reduced to a solitary flower arising from the leaf-scars of the upper half of the stem but not from the top of the stem. Peduncle slender, slightly nodding, 2 to 3 mm long. Calyx-lobes 1.2 to 1.8 mm long. Corolla 1 to 1.2 cm in diameter when expanded, slightly campanulate, uniformly purple-brown; the lobes lanceolate, much longer than the united portion, reduplicate, glabrous without and within but densely ciliate with long, purple bristles in the upper half of the margin.

Geographic distribution: Deccan Peninsula, Ceylon and Burma. *Caralluma adscendens* var. *fimbriata* is more widely distributed than the other varieties of the species, which are restricted to the Deccan Peninsula.

A rare plant of the dry region, growing in arid, stony places. Flowering from November to May.

Specimens examined: CENTRAL PROVINCE Kandy District: Uma Oya, Thwaites C.P. 3304 (PDA).

Vern.: **Mankalli** (*T.*).

**2. Caralluma umbellata** Haworth, Syn. Plant. Succ.:47, 1812. Gravely and Mayuranathan, Ind. Spec. Gen. Caralluma :23, 1931.

Nomenclatural type: not preserved.

Syn.: *Stapelia umbellata* (Haworth) Roxb., Plants Coast Coromand. 3:36, 1819.

*Boucerosia umbellata* (Haworth) Wight et Arnott ex Wight, Contrib. Bot. India : 34, 1834. Thwaites. Enum. Plant. Zeylan.: 200, 1860. Hooker f., Flora Brit. India 4:77, 1883.

*Boucerosia campanulata* Wight, Icon. Plant. Ind. Or. 4 (2):1, t. 1287, 1848.

*Caralluma campanulata* (Wight) N. E. Brown in Gard. Chron. 12:369, 1892. Trimen, Handb. Flora Ceylon 3:168, 1895.

Stems ascending or erect, much branched, 12 to 50 cm tall and 1 to 2 cm in diameter, not or scarcely attenuate towards the apex, sharply quadrangular, with the leaf-scars mostly produced into conical teeth. Cymes crowded at the top of the stems, forming a large, subumbellate inflorescence. Pedicels almost straight, (5-) 20 to 30 mm long. Calyx-lobes 2.5 to 3 mm long. Corolla 2 to 3 cm in diameter, rotate or very shallowly campanulate, uniformly purple-brown or yellow with concentric purplish streaks*), densely velvety within, not ciliate on the margin, with broadly triangular lobes about as long as the radius of the united portion. Merocarps 10 to 15 cm long, 0.5 to 1 cm in diameter, glabrous.

Geographic distribution: Nepal, central and southeastern Deccan Peninsula, Ceylon.

In Ceylon extremely rare in the intermediate zone on rocky outcrops.

Specimen examined: NORTH WESTERN PROVINCE: Kurunegala District: Thoragasyaya, Silva s.n. (PDA); Kurunegala, Thwaites C.P. 2861 (BM, PDA).

*In Ceylon apparently only the form with one-coloured, purplish-brown flowers.

# VISCACEAE

(Delbert Wiens, Utah, U.S.A.)

Plants shrubby or herbaceous, aerial parasites on other seed plants, pubescent or glabrous, monoecious or dioecious. Stems evergreen, usually forked, brittle and much branched with generally swollen and articulated nodes. Leaves opposite, simple, entire, evergreen or sometimes reduced to scales. Flowers minute (ca. 2 mm or less long), monochlamydeous, unisexual, solitary or clustered at the nodes, or in axillary spikes or cymes. Perianth segments 2-4, valvate. Staminate flowers with stamens opposite, adnate or free, and equal in number to the tepals, sometimes with a vestigial style. Pollen spherical. Pistillate flower with a simple style and terminal stigma. Ovary inferior, uniloculate and without ovules, the embryo sac originating from a short placental column. Fruit baccate, with a viscous layer and persistent tepals. Seeds with endosperm, several mm long, occurring singly in the fruit; eaten and distributed by birds.

A family of seven genera and perhaps 400 species found on all continents but with the greatest development in tropical, subtropical, and north temperate regions. Four genera are known in Ceylon.

All are called *Pilila*, (*S.*) and *Kuruvichchai* (*T.*).

KEY TO THE GENERA

1. Leaves brownish tomentose below. **1. Notothixos**
1. Leaves glabrous, or absent.
   2. Leaves linear-spathulate; anthers free from the perianth segments, internodes with cataphylls above each node. **2. Ginalloa**
   2. Leaves usually ovate, lanceolate-elliptical to obovate, or leafless; anthers adnate to the perianth segments; internodes acataphyllous.
      3. Mature plants usually about 5-8 cm high; internodes not twisted just above the nodes; inflorescence with pubescence between the flowers **3. Korthalsella**
      3. Mature plants usually over 20 cm high; internodes twisted 90 degrees just above the nodes; inflorescence glabrous. **4. Viscum**

## 1. NOTOTHIXOS Oliver

Plants monoecious, shrubby, relatively small (probably less than 1 m high), dichotomously or trichotomously branched. Internodes terete, slender, rarely over several mm wide, generally glabrous at maturity, tomentose when young; leaves curvinervous, usually with reticulated venation between the principal veins. Inflorescence originally of dichasia produced terminally or axillarily in spicate or paniculate arrangements, individual dichasia sometimes producing additional dichasial units laterally resulting in flabellate clusters. Staminate flowers with broadened anthers, several-loculate, the chambers opening by a terminal pore. Pistillate flowers with a sub-capitate stigma.

A genus of perhaps 8 species occurring from Ceylon, through the Malay Peninsula, Indonesia and Australia. A single species in Ceylon.

**Notothixos floccosus** (Thw.) Oliv., Jour. Linn. Soc. (Bot.) 7:104, 1864; Trim. Fl. Ceyl. 3:473.
*Viscum floccosum* Thw., Enum. Pl. Zeyl. 418, 1864.

Internodes at maturity ca. 2-4 cm long, ca. 1-2 mm wide; petiole ca. 5 mm long, sometimes expanded near the blade; mature blades orbicular-ovate, ca. 2-3 cm in diameter, with 3 distinct veins often depressed from above, tawny, floccous tomentose below, mostly glabrous above; inflorescence tawny, floccous tomentose with dichasia in spicately arranged whorls on an articulated rachis up to ca. 10 mm long; rachis with up to ca. 5 segments; individual segments up to ca. 2-3 mm long; fruit ca. 5 mm long at maturity (?), the persistent calyx tawny, floccous tomentose. Flowering in April and September, and probably throughout the year; occurring in the low Moist Zone of southwestern Ceylon; endemic.

Specimens examined: LOCALITY UNKNOWN: *C.P.* 3654 (K, PDA). DISTRICT UNKNOWN: "Palewate", *Trimen* in 1883 (PDA).

## 2. GINALLOA Korth

Plants monoecious, relatively small (probably less than 1 m high), usually dichotomously, or sometimes, trichotomously branched, glabrous. Internodes terete, bearing sheathing cataphylls above each node, slender, rarely over several mm in diameter. Leaves curvinervous, often elongated. Inflorescence of sessile, decussate dichasia, subtended by a sub-cupular involucre, the dichasia spicately arranged, axillary or terminal, the rachis articulated. The central flower of the dichasium pistillate, the lateral staminate. Flowers 3-merous. Staminate flower with bilocular anthers opening by longitudinal slits. Pistillate flowers with a short tube terminated by the perianth segments. A genus of perhaps 8 species occurring in southeast Asia. A single species in Ceylon.

**Ginalloa spathulifolia** (Thw.) Oliv., Jour. Linn. Soc. (Bot.) 7:103, 1864; Trim. Fl. Ceyl. 3:473.
*Viscum spathulifolium* Thw., Enum. Pl. Zeyl. 136, 1859.

Internodes at maturity ca. 5-7 cm long, ca. 1-2 mm wide; petiole sub-sessile; blades linear to linear-spathulate ca. 4-6 cm long, ca. 5-10 mm wide, often long attenuated at base, rounded or truncated apically. Inflorescences with up to ca. 8 segments, ca. 10 cm long, individual segments up to ca. 6-8 mm long; fruit sub-oblong at maturity; flowering in April and September and probably throughout the year; occurring in the low, Moist Zone of southwestern Ceylon; endemic.

Specimens examined: COLOMBO DIST.: btwn Hanwella and Labugama, *Trimen* in 1882 (PDA). KANDY DIST.: Adam's Peak, *C.P.* 336 (K, PDA).

## 3. KORTHALSELLA V. Tiegh

Plants monoecious, leafless, often less than 1 dm high, rarely over 2 dm high, glabrous except for the inflorescences. Internodes often flattened or sometimes rounded, if flattened, the compressions always in the same plane. Inflorescence apparently a dichasium originally, produced laterally at the nodes, ebractate but the flowers surrounded by trichomes. New flowers apparently added to the dichasial units collaterally or serially and forming dense clusters. Flowers 3-merous. Staminate flowers essentially afilamentous, the anthers ca. 6-loculate. Pistillate flowers with a short tube giving rise to the perianth segments. Fruit clavate or pyriform. A widespread Asian, African, and Pacific genus of perhaps 20 species. A single species in Ceylon.

**Korthalsella japonica** (Thunb.) Engler, Nat. Pflanzenf., Nachtr. 138, 1897.
*K. opuntia* (Thunb.) Merrill, Phillipine Jour. Sci. (Bot.) 4:152, 1909.
*Viscum japonicum* Thunb., Trans. Linn Soc. 2:329, 1794; Trim. Fl. Ceyl. 3:472.
*Viscum opuntia* Thunb., Fl. Jap. 64, 1784. (nom. illeg.)
*V. moniliforme* Blume, Bijdr. Ned. Ind. 13: 667, 1825.

Plants usually less than 1 dm tall, often densely flabellately branched by the occurrence of collateral branches arising from the nodes; basal internodes of the main stem ca. 5-10 mm long, often somewhat rounded and shorter than immediately succeeding ones, which are ca. 12-15 mm long, ca. 5 mm wide, flattened and broadened with a medially raised midrib, becoming gradually narrowed and shortened apically. Fruit sub-pyriform ca. 1-2 mm long; probably flowering throughout the year; scattered through the high Montane Zone; the species is widespread in continental Asia, but also reaches Africa and Indonesia. A widely distributed and variable species, composed of 5 varieties (Danser, Bull. Jard. Bot. Buitenz. Ser. III, Vol. XI; 453, 1929). The Ceylonese populations belong to the typical phase of the species.

Specimens examined: NUWARA ELIYA DISTRICT: Pidurutalagala, *C.P.* 295 (K. PDA); Horton Plains, *Trimen* in 1890 (PDA); Hakgala, *de Silva* in 1906 (PDA); Ambawela, *Alston* 1022 (PDA); top of Namunukula *de Silva* in 1909 (PDA); Sita Eliya, *Alwis* in 1922 (PDA).

## 4. VISCUM L.

Plants monoecious, glabrous (in Ceylon), relatively small shrubs usually less than 1 dm tall, forming orbicular masses, spread along branches, or sometimes pendulous, often densely di- or trichotomously branched or sometimes whorled. Internodes terete or flattened, with or without leaves. Inflorescences axillary or sometimes terminal, basically of dichasia, sometimes reduced to the single terminal flower or sometimes variously compounded. Flowers mostly 4-merous, bracteate. Staminate flowers with the

anthers adnate to the perianth segments, multiloculate, opening by lateral pores; pistillate flowers with sub-conical style and stigma or the stigma sometimes slightly enlarged; fruit with the perianth segments usually dehiscent. A genus of perhaps 75 species occurring throughout the tropical and sub-tropical areas of the Old World, but with the greatest development of species in Tropical Africa and the Malagasay Republic. Six species occur in Ceylon.

KEY TO THE SPECIES

1. Plants leafless.
   2. Internodes terete, usually less than 2 mm in diameter, often filiform. **1. V. ramosissimum**
   2. Internodes flattened, usually over 3 mm wide, never filiform. **2. V. articulatum**
1. Plants leafy, but older plants sometimes with only a few persistent leaves.
   3. Fruit warty during development. **3. V. heyneanum**
   3. Fruit sometimes glandular-dotted, but smooth during all phases of development.
      4. Leaves at maturity conduplicately folded, mostly (but rarely completely) deciduous with age; parasitic on Loranthaceae (*Dendrophthoe, Taxillus*) **4. V. capitellatum**
      4. Leaves at maturity never folded, persistent with age; parasitic on various and diverse trees, never on Loranthaceae.
         5. Leaves highly variable, but mostly ovate to oblong-elliptical, usually not lanceolate or falcate; fruit usually ovate to orbicular, not apically truncated; peduncle present, ca. 3 mm long. **5. V. orientale**
         5. Leaves usually elliptical-lanceolate and falcate; fruit oblong, apically truncated; peduncle absent, or sub-sessile, never more than 1 mm long. **6. V. monoicum**

**1. Viscum ramosissimum** Roxb., ex D.C. Prod. 4:278, 1830.

Plants slender, pendulous, yellowish-green; internodes terete, mostly ca. 1-2 cm long, ca. 1-2 mm wide; inflorescences of dichasia or modified dichasia, pistillate flowers sometimes solitary, and representing a reduced dichasium, sometimes the dichasia complete and bearing a terminal pistillate flower and 2 lateral staminate flowers, sometimes becoming complex, clustered and difficult to interpret; fruit, at maturity (?), sub-orbicular, ca. 3-4 mm in diameter, pale green; flowering in March and probably also in other months; apparently rare in the Montane Zone; also in southern India. This species is similar to *V. angulatum* Heyne ex D.C., an Indian species, and its status as a species distinct from *V. angulatum* should be investigated.

Specimens examined: NUWARA ELIYA DIST.: Maturata, *Trimen* in 1885 (PDA); Uda Pussolawa, *Trimen* in 1885 (PDA).

**2. Viscum articulatum** Burm., Fl. Ind. 211, 1768; Trim. Fl. Ceyl. 3:472.

*V. nepalense* Spreng., Syst. Veg. 47, 1827.

*V. compressum* Poir., in Lam., Encycl. Méth. Suppl. 2:861, 1811.

*V. attenuatum* DC., Prod. IV. 284, 1830.

*V. aphyllum* Griffith, Not. Pl. As. 4:634, 1845.

Plants usually becoming pendulous, sometimes clustered yellowish-green; basal internodes often rounded; succeeding internodes decussately flattened, although appearing in a single plane because of a 90 degree twist just above the nodes, ca. 3-4 cm long, ca. 3-5 mm wide, longitudinally striated; flowers subtended by two coalescent bracteoles, originating at the nodes; pistillate flowers often solitary, but common; staminate flowers smaller and less prevalent; fruit sub-orbicular ca. 4 mm in diameter, whitish; probably flowering throughout the year; scattered throughout the Dry Zone of northern Ceylon; widely distributed in southeastern Asia.

Because of the wide distribution and variability of this species there is an extensive synonomy not all of which is mentioned here. For a complete treatment of this species see Danser (Blumea 4:261-319, 1941) and Rao (Jour. Ind. Bot. Soc. 36:113-168, 1957). I am accepting Rao's treatment of this species, which considers *V. nepalense* as synonymous with *V. articulatum*. The former differs from *V. articulatum* only by having wider internodes and inasmuch as the two apparently occur in the same ecological situation, I do not believe this is adequate characterization for a species. *Viscum articulatum* var. *flexuosum* (Gamble) Danser, has been reported in Ceylon from Hakgala by Weeraratna (Ceyl. For. 4:365-375, 1960) and there is a specimen in the Peradeniya Herbarium, also from Hakgala (*Simpson* 9032 in 1932) labeled *V. ramosissimum* which is probably this taxon. It is distinguished from typical *V. articulatum* by narrow internodes; however, inasmuch as it occurs in a completely different ecological situation it may be a valid subspecific phase of *V. articulatum* if its morphology is consistent.

Specimens examined: ANURADHAPURA DIST.: Anuradhapura, *de Silva* in 1926 (PDA); hwy A14 btwn Medawachchiya and Mannar near mile marker 99/5, *Wiens* 4316 (AD, EPF, K, MO, PDA, RSA, US, UT). JAFFNA DIST.: part of *C.P.* 497 (PDA). KURUNEGALA DIST.: Kurunegala, part of *C.P.* 497 (PDA). MATALE DIST.: Dambulla, *Trimen* in 1887 (PDA); hwy A6 btwn Dambulla and Habarane near mile marker 46/1, *Wiens* 4296 (AD, K, MO, NY, PDA, US, UT). TRINCOMALEE DIST.: part of *C.P.* 497 (PDA). DISTRICT UNKNOWN: Galagama, part of *C.P.* 497 (PDA); Uma-Oya, *Trimen* in 1880 (PDA).

**3. Viscum heyneanum** DC., Prod. 4:278, 1830.

*V. verruculosum* W. & A., Prod. Fl. Penn. Ind. Or. 379, 1834.

Plants usually dark green, the branches dense and sometimes whorled apically, often decussately arranged basally; internodes generally terete, but the younger internodes often minutely ridged, ca. 1.5-2 cm long, ca. 2-3 mm wide; petioles sub-sessile tc ca. 2 mm long; leaves mostly obovate to oblong-elliptical ca. 2-3 cm long, ca. 1-1.5 cm wide, base mostly acute, but sometimes obtuse, apex mostly obtuse-rounded, curvinervous with ca. 3-5 distinct veins; inflorescences axillary, ca. 3-5 per node; dichasia subsessile to short (ca. 1 mm) pedunculate, bearing ca. 3-5 flowers subtended by 2 coalesced bracts forming a naviculate involucre ca. 2-3 mm long; fruit mostly elliptical-ovate, warty, elliptical during dovelopment, becoming ovate, or sometimes oblong, smooth at maturity, the minute style persistent, ca. 5 mm long, ca. 3 mm wide; flowering in March and July, and probably throughout the year; apparently in the Dry and Intermediate Zones of northern Ceylon; also occurring in southern India.

This species was considered conspecific with *V. orientale*, until Danser (Blumea 4:261-319, 1941) re-established *V. heyneanum* after examining type material of both species. *Viscum heyneanum* is morphologically similar to *V. orientale*, but differs from it primarily by the warty fruits, sub-sessile peduncles, and smaller obovate leaves; I am inclined to accept its validity.

Specimens examined: BADULLA DIST.: Uva, *Trimen* in 1881 (PDA). JAFFNA DIST.: part of *C.P.* 412 (PDA). KANDY DIST.: btwn Kandy and Hanguranketa near mile marker 11/10, *Wiens* 4248 (MO, PDA, RSA, US, UT). MANNAR DIST.: hwy A14 btwn Medawachchiya and Mannar near mile marker 123/0, *Wiens* 4319 (AD, K, MO, PDA, US, UT). NUWARA ELIYA DIST.: part of *C.P.* 412 (PDA); Ohiya, *Wiens* 4207 (AD, FPF, K, NY, PDA, US, UT), 4234, (AD, FPF, PDA, RSA, US, TU).

**4. Viscum capitellatum** Smith, in Rees Cyclopedia 37: (*Viscum*, no. 18), 1817; Trim. Fl. Ceyl. 3:471.

Plants usually pale green, densely branched, producing a whorl of stems from a shortened, swollen basal attachment; older branches generally also whorled at the nodes; internodes rounded or compressed, sometimes grooved, greatly variable in size, up to ca. 5-6 cm long, ca. 1-3 mm thick; leaves usually present on young plants, often largely (rarely completely) deciduous on older plants, sub-sessile, mostly obovate, ca. 2-2.5 cm long, ca. 5-10 mm wide, the base sometimes cuneate, apex-mostly rounded, generally conduplicately and vertically folded or rolled, inflorescences mostly axillary; dichasia borne on peduncles up to ca. 12 mm long and bearing up to ca. 5 dichasia subtended by 2 coalesced bracts forming a naviculate involucre ca. 2-3 mm long, the peduncles sometimes bearing two whorls of dichasia, the central flower of each dichasium staminate; fruit orbicular-elliptical, smooth, apparently light green (?) at maturity; flowering in December and July, and probably throughout the year; this species is a common parasite only on Loranthaceae, particularly *Dendrophthoe falcata* and *D. neelgherrensis*, and generally occurs wherever these plants are common, except in the high Montane Zone, where it has not been observed on *D. neelgherrensis*. I have also found this species on *Taxillus cuneatus* in the northern Dry Zone of Ceylon.

Specimens examined: ANURADHAPURA DIST.: hwy A12 btwn Trincomalee and Anuradhapura, 6 miles e of Horowapotana, *Wiens* 4308 (PDA, US, UT); hwy A12 btwn Trincomalee and Anuradhapura near mile marker 65/1, *Wiens* 4312 (PDA, US, UT); hwy A12 btwn Anuradhapura and Puttalam near mile marker 30/5, *Wiens* 4324, (PDA, US, UT), BADULLA DIST: btwn Beragalla and Haputale near mile marker 1/4, *Wiens* 4267 (AD, FPF, PDA, UC, US, UT). JAFFNA DIST.: part of *C.P.* 1638 (PDA). KANDY DIST.: Peradeniya, part of *C.P.* 1638 (PDA); hwy A5 btwn Gampola and Pussellawa near mile marker 20/4, *Wiens* 4201 (AD, PDA, US, UT); hillsides above U. of Ceylon, Peradeniya, *Wiens* 4218 (AD, K, PDA, US, UT). MATALE DIST.: Matale, *Wiens* 4337 (FPF, K, MO, PDA, US, UT).

**5. Viscum orientale** Willd., Sp. Pl., 4 ed., 737, 1805; Trim. Fl. Ceyl. 3:471.

Plants usually dark green, the branches dense and often whorled apically, usually decussately arranged basally; internodes generally terete, but the younger internodes often minutely ridged, ca. 2-3 cm long, ca. 2-3 mm wide; leaves subsessile, mostly ovate to oblong-elliptical, ca. 4-5 cm long, ca. 1-2.5 cm wide, base mostly acute-obtuse, apex acute to rounded, curvinervous, usually with 3 conspicuous veins; inflorescence axillary, ca. 3-5 per node; dichasia with a short but distinct peduncle ca. 3-4 mm long, usually bearing ca. 3-5 flowers, usually the central pistillate and the lateral staminate, subtended by 2 coalesced bracts forming a naviculate involucre ca. 2-3 mm long; fruit mostly ovate-orbicular, ca. 6 mm long, ca. 4 mm wide, always smooth, style deciduous; flowering in January, June and July and probably throughout the year; scattered through the Dry Zone of northern and southern Ceylon; also in southern India.

For a discussion of the relationship of this species to *V. heyneanum* and *V. monoicum*, see the discussion under *V. heyneanum*.

Specimens examined.: ANURADHAPURA DIST.: hwy A20 btwn Anuradhapura and Medawachchiya near milo marker 93/4, *Wiens* 4314 (AD, FPF, K, MO, PDA, US, UT). HAMBANTOTA DIST.: ca 1 mile n of Hungama on road to Middeniya, *Wiens* 4274 (NY, PDA, US, UT). JAFFNA DIST.: Jaffna, *Trimen* in 1890 (PDA); Vaddukoddai, *Koshy* 21 (PDA). MONERAGALA DIST.: btwn Wellawaya and Hambantota at milo marker 196/9, *Wiens* 4269 (GH, K, PDA, US, UT). PUTTALAM DIST.: hwy A10 btwn Puttalam and Kurunegala at town of Anamaduwa, *Wiens* 4330 (K, PDA, US, UT). TRINCOMALEE DIST.: 1 mile n of Trincomalee, *Simpson* 8512 (PDA); 3 miles n of Trincomalee, *Wiens* 4304 (K, MO, PDA, RSA, UC, US). LOCALITY UNKNOWN: part of *C.P.* 412 (K, PDA).

**6. Viscum monoicum** Roxb., ex DC. Prod. 4:278, 1830; Trim. Fl. Coyl. 3:471.

Plants pale green, densely and often decussately branched basally; internodes generally terete, ca. 3-5 cm long, ca. 2-3 mm wide; petioles subsessile ca. 2 mm long; leaves usually elliptical-lanceolate, often falcate, ca. 5-8 cm long, ca. 1-2.5 cm wide, base acuto-obtuse, apex usually acuto, often attenuated and occasionally sub-acuminate, curvinervous, with usually 3-5 distinct veins: inflorescences mostly axillary, up to ca. 6 per node; dichasia sub-sessile or short (ca. 1 mm) pedunculate, bearing ca. 3-5 flowers subtended by 2 coalesced bracts forming a naviculate involucre ca. 2-3 mm long; fruit mostly oblong, slightly rounded at the base, truncated at the apex, ca. 5 mm long, ca. 2-3 mm wide; flowering in May, July, and September and probably throughout the year; mostly in the Intermediate Zone, but also found in the low Moist Zone of southwestern Ceylon; widely distributed through India, Burma and adjoining countries of southeast Asia.

Specimens examined: BADULLA DIST.: Ella Uva, *Trimen* in 1890 (PDA). GALLE DIST.: 6 miles e of Neluwa on road to Morawaka, *Wiens* 4280 (AD, K, PDA, US, UT). MATALE DIST.: Lagalla, *Trimen* in 1890 (PDA).

# LORANTHACEAE

(Delbert Wiens, Utah, U.S.A.)

Plants usually shrubby (rarely herbaceous) aerial hemiparasites on other seed plants, or terrestrial root parasitic shrubs or small trees, glabrous or variously pubescent. Stems evergreen, usually forked, brittle and often much-branched, with swollen nodes. Leaves mostly opposite, but sometimes sub-opposite to alternate, simple, entire, evergreen, often coriaceous, or rarely absent. Flowers dichlamydeous, varying greatly in size, mostly bisexual, rarely unisexual and dioecious. Calyx reduced to an entire or lobed limb adnate to the ovary. Corolla choripetalous or sympetalous, actinomorphic or zygomorphic, valvate, usually 4 to 6-merous (rarely up to 9-merous). Stamens opposite, adnate and equal in number to the petals. Anthers mostly basifixed and immobile, but occasionally dorsifixed and versatile; 2-4 loculed, opening longitudinally. Pollen mostly trilobate. Ovary inferior, uni- or multiloculate, without true ovules, the embryo sacs originating from a central column or at the base of the ovary. Fruit drupaceous, but without an obviously indurated endocarp, or rarely dry. Seeds usually with endosperm (rarely without), several mm long, occurring singly in the fruit; eaten and distributed by birds.

A family of perhaps 60 genera and about 700 species, found on all continents, but with the greatest development in tropical, subtropical and south temperate regions. Seven genera, (largely with Malayan affinities) known from Ceylon.

The descriptions of the following species were drawn up from living plants: *Macrosolen barlowii; M. albicaulis; M. capitellatus; M. parasiticus; Dendrophthoe neelgherrensis; D. suborbiculatus; D. ligulata; D. falcata; Taxillus canescens; T. tomentosus; T. incanus; T. cuneatus; Scurrula parasitica; Helixanthera hookeriana.*

All species of the Loranthaceae are called *Pilila* (*S.*), and *Kuruvichchai* (*T.*).

KEY TO THE GENERA

1. Petals 6; flowers subtended by 3 bracts (1 bract, 2 bracteoles); inflorescence an apically crowded spike, the flowers occurring in decussate pairs. **1. Macrosolen**

1. Petals 5 or 4; individual flowers subtended by a single bract; inflorescence never a spike with flowers in decussate pairs.

2. Petals 5.

3. Inflorescence racemose, but sometimes superficially umbellate, with the flowers strongly crowded at the apex. **2. Dendrophthoe**

3. Inflorescence umbellate, or in sessile clusters surrounded by an involucre, or the flowers sometimes born singly in the leaf axils.
   4. Corolla actinomorphic, without a conspicuous split; inflorescence a cluster of sessile flowers surrounded by a conspicuous red involucre, often occurring on older parts of the stem. **3. Tolypanthus**
   4. Corolla zygomorphic by the presence of a single, long, conspicuous split and the petals all reflexed in the same direction opposite the split; inflorescence of few-flowered axillary umbels, or the flowers occurring singly, never surrounded by an involucre. **4. Taxillus**
2. Petals 4.
   5. Corolla sympetalous, zygomorphic; ovary and fruit clavate, and strongly attenuated toward the base. **5. Scurrula**
   5. Corolla choripetalous, actinomorphic; ovary and fruit usually rounded.
      6. Inflorescence racemose or spikate, usually over 3 cm long. **6. Helixanthera**
      6. Inflorescence a sessile head, occurring in dense, axillary clusters without an involucre. **7. Barathranthus**

## 1. MACROSOLEN (Blume) Reichenb.

Plants aerial parasites, often forming large shrubs up to 3 m, with or without haustorial bearing surface runners, bisexual, usually glabrous. Branches terete, rarely flattened or angled terminally. Nodes slightly swollen or rarely rounded and enlarged ca 2-3 times the diameter of the internodes. Petiole usually flattened, or sometimes grooved above, rounded below. Leaves opposite. Venation penninervous. Inflorescence racemose or spicate, rarely umbels or heads. Individual flowers subtended by 3 bracts (1 bract and 2 bracteoles). Corolla 6-merous, sympetalous, actinomorphic or sometimes zygomorphic by the presence of a single split. Mature floral buds gradually dilated ca $\frac{1}{2}$ to $\frac{3}{4}$ the length, then constricted abruptly to a neck and re-expanded to form a clavate tip, usually conspicuously keeled from the point of maximum dilation, or rarely without constriction or keels, in which case the buds are relatively smooth, acutely tipped and spurred. Corolla lobes reflexing at the constriction, if present, usually twisting with age. Anthers basifixed, 4-loculate, these locellate, about the diameter of the filament. Style generally articulated or obviously constricted at some point. Fruit orbicular-elliptical. A genus of perhaps 35-40 species throughout southeastern Asia and India. Four species occur in Ceylon.

### KEY TO THE SPECIES

1. Floral buds with a short, curved beak; corolla tube split about one third the length, with a conspicuously angled swelling at the base of the split; nodes usually markedly enlarged and rounded to three or more times the diameter of the internodes. **1. M. barlowii**
1. Floral buds clavate or rounded, never acute or beaked; corolla tube never split or with an angled swelling; nodes only slightly swollen, seldom enlarged more than twice the diameter of the internodes and never rounded.
   2. Corolla tube at anthesis about 40 mm long, pink at the base and white toward the top; leaves pale, light green; presently known only on *Ficus religiosa*. **2. M. albicaulis**
   2. Corolla tube at anthesis about 20 mm or less long, color pattern otherwise (see below); leaves dark green; on various and diverse hosts.
      3. Penduncles at anthesis about 3-5 mm long, usually terete or quadrangular; mature corolla tube about 5 mm long and about 8 mm wide at the top, flesh-colored at base, otherwise dark dull red. **3. M. capitellatus**
      3. Peduncles at anthesis about 7-9 mm long, usually flattened; mature corolla tube about 15 mm long and 5 mm wide at the top, uniformly bright pink to rose red. **4. M. parasiticus**

**1. Macrosolen barlowii** Wiens Ceyl. J.Sci. (Bio. Sc.) 9(2): 47, 1971.

Branches grayish brown, terete or slightly angled apically: internodes usually twisted 90 degrees, nodes often conspicuously enlarged and rounded; petiole 8-10 mm long; blades dark green with purplish veins, elliptical-oblong, ca 6-7 cm long, ca 3-4 cm wide, base usually obtuse, apex usually obtuse; peduncle subterete to slightly flattened, purplish, ca 4-7 mm long at anthesis; bracts usually acute, bracteoles coalescent, usually obtuse; calyx cylindrical, truncated but minutely laciniate, ca 2 mm long; mature floral bud with basal third red, middle third green and upper third red, strongly curved at the base, ca 38 mm long; corolla tube at anthesis red, ca 25 mm long, sinuses between the lobes ca 2 mm deep, tube with a single split ca 10 mm deep, with a conspicuous angular swelling at its base; corolla lobes red when reflexed, oblong, acute, slightly curved; filaments greenish yellow, slightly flattened, free from lobe ca 5 mm; anthers yellow, linear-acute, ca 3 mm long; style greenish yellow, 6-angled, articulated ca 5 mm below the stigma, ca 32 mm long; stigma bright red, oblique, irregularly lobed, ca 11 mm above the lobes, exserted ca 2 mm above the surrounding anthers; mature fruit unknown; flowering in July and August, perhaps also in other months; known only from the type locality at Horton Plains in the high Montane Zone.

The species is quite distinct from other Ceylonese species of *Macrosolen*, particularly with respect to corolla structure. It might, in fact, be considered generically distinct from *Macrosolen* as defined by Danser (Blumea 2: 36, 1936); however, such a treatment of the species must await a careful analysis of the range of variation in *Macrosolen* as a whole. The species is named for Dr. Bryan Barlow, contemporary Australian student of the Loranthaceae.

Specimens examined: NUWARA ELIYA DIST.: Horton Plains, 2.4 miles of Farr's Inn on road to Ohiya, *Wiens* 4231 (AD, FPF, GH, K, KLU, MO, PDA, NY, UC, US, UT-type collection).

**2. Macrosolen albicaulis** Wiens Ceyl. J.Sc. (Bio. Sc.) 9(2): 45, 1971.

Plants without haustoria bearing surface runners, usually forming large, pendulous masses up to ca 4 m long; branches light brown, terete or slightly angled apically, younger branches usually twisted 90 degrees, conspicuously lenticellate; petiole ca 10-15 mm long; blade distinctively pale, light green, lanceolate to ovate-lanceolate, ca 7-10 cm long, ca 3-4 cm wide; base usually obtuse, sometimes slightly oblique, apex usually acute and sometimes attenuated; inflorescence spicate, usually with 2-3 pairs of decussate apically crowded flowers, peduncle sub-terete or slightly angled, ca 10 mm long at anthesis; bracts and bracteoles usually rounded ca 2 mm long; calyx cylindrical, truncated, entire, ca 2 mm long; mature floral bud pink at base, becoming whitish pink at point of maximum dilation, constricted section green, upper clavate portion dull pink, ca 60 mm long, often strongly curved at the base; corolla tube at anthesis pink at the base and whitish-pink toward the throat, ca 45 mm long, sinuses between the lobes ca 4 mm deep; corolla lobes when reflexed silvery against a dark red background, linear-oblanceolate, acute, ca 14 mm long, usually twisting with age; filaments reddish pink, thickened and flattened, free from the lobes ca 8 mm; anthers bright yellow, linear, ca 5 mm long, surrounding the style; style pink, slender, terete, articulated ca 5 mm below the stigma, curved, ca 60 mm long; stigma bright red, globose, exserted ca 1 mm above the surrounding anthers; fruit at maturity (?) green, ovate-elliptical, ca 8 mm long, ca 4 mm wide, calyx persistent; flowering from June to September and probably longer: known only from the Intermediate and higher Dry Zones surrounding the central montane part of Ceylon; apparently endemic.

Specimens examined: BADULLA DIST.: ca 3 miles n of Badulla on road to Mahiyangana, *Wiens* 4242 (GH, K, MO, NY, PDA, RSA, UC, US, UT-type collection); ca. 14 miles n of Badulla at village of Migahakiula, *Wiens* 4244 (PDA, US, UT); ca. 1/2 mile s of Welimada on road to Bandarawela, *Wiens* 4262 (GH, PDA, UC, US, UT); observed but not collected between Haputale and Beragalla. MATALE DIST.: Matale, *Wiens* 4334 (K, PDA, UC, US, UT). NUWARA ELIYA DIST.: Hanguranketa, *Wiens* 4251 (GH, K, PDA, US, UT).

**3. Macrosolen capitellatus** (W. & A.) Danser, Blumea 2:36, 1936.

*Loranthus capitellatus* W. & A., Prod. Flora Penn. Ind. Orient. 382, 1834; Trim. Fl. Ceyl. 3:470.

*Elytranthe capitellatus* (W. & A.) Engler, in Engler & Prantl, Nat. Pflanzenfam. 3(1): 189, 1889.

Plants with haustoria bearing surface runners, glabrous; branches grayish to light brown, terete or slightly angled apically, the internodes usually twisted 90 degrees; petioles ca. 7-8 mm long; blades dark green, ovate-rounded, greatly variable in size from ca. 7-12 cm long, ca. 2.5-5 cm wide, base obtuse-rounded, apex acute and sometimes attenuated; inflorescence spicate, usually with two pairs of decussate apically crowded flowers, peduncle terete or somewhat quadrangular, ca. 5 mm long at anthesis; bracts and bracteoles

rounded to obtuse, ca. 2 mm long, the bracteoles coalescent at the base; calyx cylindrical, truncated, but minutely laciniate, ca. 2 mm long; mature floral bud reddish-yellow on the basal dilated portion, the constricted area green, the upper clavate portion dark red, ca. 2 cm long, strongly curved at the base; corolla tube at anthesis flesh colored within, dark red without, ca. 5 mm long; corolla lobes when reflexed dark red along the margin, creamy pink centrally, usually linear-oblanceolate, acute, ca. 8 mm long, often twisting with age; filaments sub-filiform, yellowish green below anther, free and erect above the lobes ca. 5 mm, spreading away from the style; anthers yellowish, oblong-linear, 4 mm long; style light green, minutely angled, curved, ca. 12 mm long, articulated ca. 5 mm below the stigma; stigma bright red, globose, minutely 4-lobed, exserted ca. 7 mm beyond the lobes, about equal to the anthers; fruit at maturity dark red, orbicular-oblong, ca. 8 mm long, ca. 6 mm wide; clayx persistent; flowering March to May, July, August, and probably throughout the year; scattered throughout the low Moist Zone of southwestern Ceylon; also in southern India.

Various workers, beginning with Thwaites, have questioned the distinctiveness of *M. capitellatus* from *M. parasiticus*. The observation of living material of both species, however, leaves no doubt of the specific distinctiveness of each on both morphological and ecological grounds.

Specimens examined.: GALLE DIST.: btwn Yakkalamulla and Udugama near mile marker 15/2, *Wiens* 4276 (AD, FPF, K, MO, PDA, RSA, US, UT). KALUTARA DIST.: Matugama, *Trimen* in 1887 (PDA). KANDY DIST.: w of Kandy (Moon), part of *C.P.* 2814 (PDA). MATARA DIST.: 3 miles into forest on timber access road, off hwy A17 at mile marker 48/15 near Kotapola, *Wiens* 4281 (K, MO, PDA, US, UT). RATNAPURA DIST.: Ratnapura, part of *C.P.* 2814 (PDA). DISTRICT UNKNOWN: Mapalagama, *Thwaites* in 1861, part of *C.P.* 3716 (K, PDA).

**4. Macrosolen parasiticus** (L.) Danser, Blumea 2:36, 1936.

*Lonicera parasitica* L. Sp. Pl., 175, 1753.

*Loranthus loniceroides* L., Sp. Pl., ed. 2, 473, 1762; Trim. Fl. Ceyl. 3:469.

*Elytranthe loniceroides* (L.) G. Don, Gen. Hist. III, 427, 1834.

*Elytranthe parasitica* (L.) Danser, Bull. Jard. Bot. Buitenz. Ser. III, Vol. X, 315, 1929.

Plants not usually with well developed haustoria bearing surface runners, glabrous, often occupying terminal positions on the host branch; branches grayish brown, terete or slightly angled, internodes usually twisted 90 degrees; petiole ca. 5-6 mm long; blade dark green, ovate-lanceolate, ca. 5-7 cm long, ca. 2-3.5 cm wide, base usually obtuse, apex acute and sometimes attenuated; inflorescence spicate, usually with 3-4 pairs of decussate, apically crowded flowers, peduncle strongly flattened, ca. 8 mm long at anthesis; bracts and bracteoles usually acute, slightly keeled, ca. 6 mm long; calyx truncated, but minutely laciniate, ca. 2-3 mm long; mature floral bud bright pink, strongly curved at base, ca. 3.5 cm long; corolla tube at anthesis bright pink, tube ca. 2 cm long, sinuses between the lobes ca. 3 mm deep; corolla lobes reflexed, green and pink, linear-oblanceolate, acute, ca. 1 cm long, usually twisting with age; filaments green, thickened and flattened, free from lobe ca. 6 mm, approssed against the style; anthers yellowish, oblong-linear, ca. 5 mm long; style green, minutely angled, articulated ca. 6 mm below the stigma, ca. 30 mm long; stigma bright red, globose, minutely 4-lobed, ca. 11 mm above the lobes, exserted ca. 1 mm above the surrounding anthers; fruit at maturity (?) green, ovate-oblong, ca. 11 mm long, ca. 7 mm wide, the calyx persistent; flowering in January and July to September, and probably throughout the year; common in the high Montane Zone, particularly around Nuwara Eliya; also in southern India.

This plant sometimes forms immense bushes many meters high and the bases of some of the branches must be as large as 10-15 cm in diameter. Danser (Bull. Jard. Bot. Buitenz. Ser. III, Vol. XI:306, 1929) mentions that the related Indonesian species, *Elytranthe albida*, also forms similarly large bushes. I have not been able to verify the presence of a possible new species mentioned by Trimen with "smaller flowers, smaller obtuse leaves and black fruits" from Hakgala.

Specimens examined: BADULLA DIST.: btwn Bandarawela and Welimada near mile marker 3/2, *Wiens* 4265 (PDA, UC, US, UT); Passara, *Trimen* in 1888 (PDA). MATALE DIST.: btwn Illukkumbura and Rattota, near mile marker 32/7, *Wiens* 4347 (AD, PDA, RSA, UC, US, UT). NUWARA ELIYA DIST., Hakgala, *de Silva* in 1906, 1926 (PDA); Maturata, *Thwaites* in 1851, 1857, part of *C.P.* 2551 (K, PDA); Nuwara Eliya, (Gardner) part of *C.P.* 575 (K, PDA); ca 3 miles sw of Nuwara Eliya, *Wiens* 4222 (AD, GH, NY, PDA, UC, US, UT); below Horton Plains on road to Diyagama, 2 1/2 miles nw of Farr's Inn, *Wiens* 4229 (MO, PDA, US, UT); Farr's Inn, Horton Plains, *Wiens* 4230 (MO, PDA, US, UT).

## 2. DENDROPHTHOE Mart

Aerial parasites, often forming large shrubs several m high, with haustorial bearing surface runners, bisexual, variously pubescent or glabrous. Branches usually terete, but often somewhat flattened terminally and sometimes at the nodes. Leaves alternate to sub-opposite. Petioles often flattened above, rounded beneath. Inflorescence racemose, spicate, or sub-umbellate, sometimes pubescent, individual flowers with single small

(ca. 1 mm long) bracts. Corolla 5-merous, sympetalous, often zygomorphic by the presence of a long single split of varying length. Mature floral buds basally dilated, then constricted to a neck and re-expanded to form a clavate tip. Corolla lobes spreading or reflexing at the constriction, often twisted with age. Anthers basifixed, 4-loculate, about the size of the filament. Style not articulated. A genus of perhaps 30-35 species centered in southeast Asia, but with representatives widespread in the tropical regions of Australia, India and Africa. Five species in Ceylon.

KEY TO THE SPECIES

1. Racemes at anthesis usually with 8 or less flowers, the axis generally 1.5 cm or less long; flowers congested at the apex of the rachis and appearing superficially umbellate.
   2. Floral buds preceding anthesis 3 cm or more long, strongly bilaterally symmetrical; leaf venation conspicuously depressed from above. **1. D. lonchiphyllus**
   2. Floral buds preceding anthesis less than 2 cm long, radially symmetrical; leaf venation not depressed from above. **2. D. neelgherrensis**
1. Racemes at anthesis usually with 12 or more flowers, the axis generally 3 cm or more long; flowers evenly distributed along the rachis.
   3. Calyx brownish tomentose and deeply lobed; mature leaves usually orbicular, seldom more than 1 1/2 times longer than wide; corolla tube split, hence irregular. **3. D. suborbicularis**
   3. Calyx glabrous and truncate; mature leaves lanceolate-ovate to oblong-linear, at least 3 times longer than wide; corolla tube not split, regular.
      4. Corolla tube light yellow at anthesis, ca. 3 cm long, lobes same color as the tube; mature leaves usually oblong to oblong-linear, pale green. **4. D. ligulata**
      4. Corolla tube white to red at anthesis, lobes green, usually over 3 cm long (often up to 5 cm long); mature leaves usually lanceolate-ovate, dark green. **5. D. falcata**

**1. Dendrophthoe lonchiphyllus** (Thw.) Danser, Bull. Jard. Bot. Buitenz. Ser. III, Vol. X:310, 1929.

*Loranthus lonchiphyllus* Thw., Enum. Pl. Zeyl. 418, 1864; Trim. Fl. Ceyl. 3:468.

Older branches apparently whitish, terete, young branches somewhat flattened terminally; petiole 3-4 mm long; leaves sub-opposite to alternate, mostly ovate-lanceolate, up to ca. 14 cm long and ca. 6 cm wide; base rounded, apex somewhat attenuated and acute, venation strongly depressed from above; inflorescence apparently racemose, in axillary clusters, the flowers strongly crowded at the apex and appearing superficially umbellate; bracts small, ca. 1 mm long; mature (?) floral bud apparently pink or crimson at the base, green at the constriction, clavate portion purplish; corolla tube at anthesis probably red, ca. 33 mm long, the lobes apparently all reflexing opposite the split in the corolla, which descends ca. 15 mm toward the base; fruit red, oblong, ca. 12 mm long, ca. 7 mm wide; flowering in November; endemic.

This species is known only from the type specimen, *C.P.* 3678 (K, PDA) from Ambagamuwa (?) in 1860. Another collection (*Weeraratna* 215) from Waga, Colombo Dist. is mentioned in the literature. The description is based on the type, information given in Thwaites and Trimen, and from a drawing in the Peradeniya Herbarium.

**2. Dendrophthoe neelgherrensis** (W. & A.) V. Tiegh. Bull. Soc. Bot. Fr. 42:252, 1895.

*Loranthus neelgherrensis* W. & A., Prod. Fl. Penn. Ind. Or. 382, 1834. Trim. Fl. Ceyl. 3:468.

Plants often with well-developed haustoria bearing surface runners, older plants sometimes covering large portions of trees and superficially resembling lianas; branches usually grayish, terete, sometimes terminal branching in whorls of 3; leaves usually opposite, sub-sessile; blades highly variable, mostly ovate-lanceolate to olliptical, up to ca. 12 cm long, and ca. 7 cm wide, venation usually inconspicuous except for the purplish prominent midrib; inflorescence racemose in crowded axillary clusters, flowers congested toward the apex and appearing superficially umbellate, usually with 8 or fewer flowers; peduncle ca. 10 mm long, rachis ca. 1-2 mm long; bracts acute, ca. 1 mm long; calyx truncated, entire, ca. 1 mm long; mature floral bud either all dark red or dull white on basal half and greenish on the upper portion, ca. 22 mm long, the lobes first separating slightly at the constriction, thereafter explosively reflexing upon contact and scattering pollen for several cm; corolla tube at anthesis dark red or dull white, ca. 15 mm long, straight, the sinuses between the lobes ca. 2 mm deep, tube split ca. 12 mm deep; corolla lobes all dark red or greenish-white, linear, ca. 6 mm long, less than 1 mm wide, usually reflexed and twisted with age; filaments all dark red, or

greenish-white, free portion above the lobes ca. 5 mm long; anthers reddish or yellowish, oblong acute, ca. 3 mm long, exserted above the corolla lobes ca. 4 mm; style reddish or pale yellow, terete or minutely angled: stigma capitate; exserted, ca. 10 mm long, obovate, reddish orange; some individuals flowering at least sporadically throughout much of the year; common throughout most of Ceylon, except in the Dry Zone; also occurring in India.

There are two color phases of the inflorescence and flowers in this species. Sometimes the flowers are greenish to yellowish white, and in other individuals the inflorescences and flowers are dark red. Otherwise the inflorescences and flowers appear similar. Although the two forms occur within the same population, individual plants appear to have either one form or the other, and I have seen no plants with the two color phases occurring on the same individual.

Specimens examined: BADULLA DIST.: Lunigalla (?); *Trimen* in 1888 (PDA); village of Pannalawela btwn Uda Pussellawa and Welimada, *Wiens* 4239 (GH, MO, PDA, RSA, UC, US, UT); btwn Borlanda and Haputale at mile marker 3/2, *Wiens* 4226 (PDA, US, UT). GALLE DIST.: 2 miles n of Galle on road to Yakkalamulla, *Wiens* 4275 (PDA; US). KANDY DIST.: hwy A5 btwn Gampola and Pussellawa near mile marker 20/4, *Wiens* 4200 (K, MO, PDA, US, UT); Hantane, hills of Kandy above Oodawella Tea Estate, *Wiens* 4211 (AD, MO, PDA, UC, US, UT); Kandy hills above s shore of lake, *Wiens* 4216 (AD, FPF, GH, PDA, US, UT); road to upper Hantane above U. of Ceylon, Peradeniya, *Wiens* 4217 (K, PDA, RSA, US, UT); hwy A5 btwn Gampola and Pussellawa near mile marker 17, *Wiens* 4220 (K, PDA, US, UT). MATALE DIST.: Matale, *Wiens* 4333 (PDA, US, UT); road btwn Matale and Rattota near mile marker 18/4, *Wiens* 4338 (K, PDA, US, UT); road btwn Rattota and Illukkumbura near mile marker 27/9, *Wiens* 4343 (PDA, US), mile marker 29/17, *Wiens* 4344 (PDA, US), near mile marker 37/5, *Wiens* 4352 (AD, MO PDA, US, UT). NUWARA ELIYA DIST.: Nuwara Eliya, golf course, *Wiens* 4210 (GH, K, MO, PDA, RSA, US, UT), 4224 (K, PDA, US, UT); hwy A5 btwn Pussellawa and Nuwara Eliya near mile marker 30, *Wiens* 4221 (PDA, US, UT); Horton Plains, *Wiens* 4227 (PDA, US, UT), 4232 (MO, PDA, UC, US, UT), *Trimen* in 1882 (PDA), *de Silva* in 1911 (PDA); btwn Kandy and Hanguranketa near mile marker 14/14, *Wiens* 4249 (MO, PDA, US, UT); btwn Rikiligaskada and Maturata near mile marker 24/13, *Wiens* 4253 (MO, PDA, US, UT); MahacoodagalaTea Estate, btwn Maturata and Kandapola, *Wiens* 4255 (PDA, US, UT); btwn Nuwara Eliya and Hakgala at mile marker 53/15, *Wiens* 4256 (MO, PDA, US, UT), near mile marker 54/9, *Wiens* 4259 (GH, MO, PDA, UC, US, UT); Pidurutalagala, part of *C.P.* 1647 (K, PDA); Maturata, part of *C.P.* 1647 (PDA); top of Namunakula (?), *de Silva* in 1910(PDA); vicinity of Hakgala (3 specimens), *de Silva* in 1906 (PDA). DISTRICT UNKNOWN: Ambagamuwa, part of *C.P.* 1647 (PDA); Maskeliya, *Trimen* in 1891 (PDA).

**3. Dendrophthoe suborbicularis** (Thw.) Danser, Bull. Jard. Bot. Buitenz. Ser. III, Vol. X. 311, 1929.

*Loranthus suborbicularis* Thw., Enum. Pl. Zeyl. 134, 1859; Trim. Fl. Ceyl. 3:467.

Branches gravish brown, roughened, lenticellate: leaves alternate; petiole ca. 8 mm long; blades glabrate, brownish tomentose when young; obovate-orbicular, ca. 5-7 cm in diameter, base and apex usually obtuse-rounded, often 5-veined: inflorescence straight, racemose, in axillary clusters, rachis ca. 3-4 cm long, ca. 1 mm wide, with up to ca. 20 flowers, peduncles ca. 4 mm long: bracts ovate-acute, ca. 1 mm long, entire inflorescence and flowers in bud brownish tomentose: calyx lobed, ca. 1 mm long, mature floral bud greenish yellow to constriction, dark brownish red at clavate portion, ca. 30 mm long, with 2 prominent lateral swellings at the constriction, slightly curved; corolla tube at anthesis yellow, ca. 25 mm long, filaments maroon where adnate to petals, producing 5 vivid longitudinal maroon strips against the yellow background of the petals, sinuses between the lobes ca. 3 mm deep, tube split ca. 14 mm deep; corolla lobes yellow, linear acute, ca. 7 mm long, ca. 1 mm wide, all spreading in the same direction and opposite the split: filaments maroon where adnate to the corolla, free portion of filament above the lobes, erect, bright red, ca. 3 mm long; anthers light yellow, oblong, ca. 4 mm long, less than 1 mm wide, exserted ca. 7 mm above the tube; style light green, but reddish orange just below stigma, terete but minutely angled, curved, ca. 30 mm long; stigma dark red, subglobose, exserted ca. 3 mm above the surrounding anthers; fruit at maturity (?), brownish, oblong, ca. 10 mm long; calyx persistent and puberulent, flowering from April to August and probably also in other months; endemic, known only from the high Montane Zone.

A distinctive species without obviously close relatives in Ceylon. A common species of the higher montane regions.

Specimens examined: KANDY DIST.: Adam's Peak, *Trimen* in 1891 (PDA). NUWARA ELIYA DIST.: Galagama (Gardner), part of *C.P.* 474 (PDA); Pidurutalagala, part of *C.P.* 474 (K, PDA), *de Silva* in 1906 (PDA); Nuwara Eliya, *Wiens* 4223 (AD, FPF, K, MO, PDA, US, UT); Horton Plains, *Trimen* in 1890 (PDA), *Wiens* 4208 (PDA, US, UT); Ambawela, *Wiens* 4226 (GH, MO, NY, PDA, UC, US, UT).

**4. Dendrophthoe ligulata** (Thw.) V. Tiegh. Bull. Soc. Bot. Fr. 252, 1895.

*Loranthus ligulatus* Thw., Enum. Pl. Zeyl. 135, 1859; Trim. Fl. Ceyl. 3:467.

Branches grayish, glabrous; leaves mostly alternate, glabrous; petiole ca. 9-10 mm long; mature blades mostly oblong-linear, up to 10 cm long, ca. 3 cm wide, base acute-obtuse, apex

mostly obtuse, pale green, slightly glaucous and succulent; inflorescence of solitary, glabrous, axillary racemes, up to ca. 7 cm long; bearing up to ca. 25 flowers; peduncles ca. 8-12 mm long; pedicels ca. 5-6 mm long; bracts ca. 1-2 mm long, sub-ovate; calyx cylindrical, truncated, sometimes irregularly and minutely toothed, ca. 1 mm long; mature floral buds yellow to constriction with a dark green band just below the constriction, the clavate portion light green; corolla tube at anthesis yellow, ca. 30 mm long, sinuses between the lobes ca. 2 mm deep, tube split ca. 4 mm, margins of split and sinuses tuberculate; corolla lobes light green, linear to linear-lanceolate, acute, ca. 11 mm long, ca. 2 mm wide, usually spreading and not twisting with age; filaments white where free from corolla lobes, erect for ca. 3 mm above the lobes; anthers bright red, linear-oblong, ca. 7 mm long; style light green, filiform, ca. 45 mm long; stigma light green, oblong, exserted ca. 9 mm above the lobes, and ca. 3 mm above the closely surrounding anthers; fruit bright green at maturity (?), oblong, ca. 15 mm long, ca. 7 mm wide, calyx persistent; flowering in January, February, and July, probably also in other months; endemic, known only from the northwest coastal areas of the Dry Zone.

A distinctive species, but showing affinities to *D. falcata*.

Specimens examined: JAFFNA DIST.: Pallavarayankaddu, *Trimen* in 1890 (PDA); Jaffna (Gardner), part of *C.P.* 1640 (PDA); without locality, *de Silva* in 1923 (PDA). MANNAR DIST.: without locality, *Lewis* in 1919 (PDA); Mannar Island, *Trimen* in 1890 (PDA); hwy A14 btwn Medawachchiya and Mannar near mile marker 130/1, *Wiens* 4320 (GH, K, KLU, MO, NY, PDA, UC, US, UT).

5. **Dendrophthoe falcata** (Linn. f.) Ethingsh., Denkschr. Akad. Wissensch., Math.-Natuwiss. Cl. 32:52, 1872.

*Loranthus falcatus* Linn. f., Suppl. Sp. Pl.:211, 1781; Trim. Fl. Ceyl. 6:250.

*L. longiflorus* Desr., in Lam. Encycl. Méth. Bot. (3):598, 1789; Trim. Fl. Ceyl. 3:468.

*L. amplexifolius* DC., Prod. IV: 305, 1830.

*L. longiflorus* var. *amplexifolius* (DC.) Thw., Enum. Pl. Zeyl. 214, 1859.

Branches often grayish-brown, glabrous; petioles short, 2-3 mm long or absent, the leaves sometimes amplexicaul; leaves sub-opposite, usually glabrous and highly variable (especially in size), but most often ovate-oblong, up to 20 cm long and up to 8 cm wide, but often half this size, base and apex usually obtuse; margin often minutely white, calloused, especially when dried; inflorescence stout, solitary, curved, axillary racemes, sometimes puberulent; racemes up to ca. 7 cm long, peduncle short (ca. 2-3 mm long) but thickened (up to 5 mm wide), bearing up to 50 flowers; pedicels ca. 3 mm long; bracts ca. 1 mm long, broadly rounded; calyx rudimentary, ca. 1 mm high, minutely lobed; mature floral buds white to pink or bright red to constriction, with a dark green band just below the constriction, the clavate portion bright green; corolla tube at anthesis colored as the buds, up to 50 mm long, but sometimes as little as half that length (the following description based on a 50 mm flower); sinuses between the lobes ca. 2 mm deep, tube split ca. 13 mm deep, margin of sinuses and split tuberculate; corolla lobes white to red, the margins green, sub-linear, acute, ca. 9 mm long, ca. 1 mm wide; filaments bright red, erect, free from the corolla lobes ca. 4 mm; anthers yellow, linear-oblong, ca. 5 mm long; style light reddish brown, exserted ca. 8 mm above the corolla lobes, ca. 60 mm long, the diameter slightly enlarged below the stigma for ca. 5 mm; stigma dark reddish brown, only slightly larger than the style; fruit bright pink, oblong, ca. 17 mm long, ca. 6 mm wide; probably flowering throughout the year, widespread throughout Ceylon, except in the high Montane Zone; particularly common in the Dry Zones.

*Dendrophthoe falcata* is a polymorphic species widely distributed from India to tropical Australia. Variety *amplexifolius*, apparently based on the clasping nature of the leaf petioles, appears to have no geographical consistency and the character is rather variable even within single populations. Consequently, I do not believe this proposed taxon warrants recognition.

Trimen reports that this species extends to 7000 ft, but I have seen no specimens and made no collections of *D. falcata* in the high montane areas. For further discussion and synonomy of this species see Danser (Bull. Jard. Bot. Buitenz. Ser. III, Vol. XI:403, 1929).

Specimens examined: ANURADHAPURA DIST.: hwy A12 btwn Trincomalee and Anuradhapura, 6 miles e of Horowupotana, *Wiens* 4307 (PDA, US, UT); hwy A12 btwn Trincomalee and Anuradhapura near mile marker 67, *Wiens* 4310 (PDA, US, UT); Wilpattu Nat. Park, ca. 5 miles n of park office, *Wiens* 4327 (PDA, US, UT). BADULLA DIST.: Pannalawela, btwn Uda Pussellawa and Welimada, *Wiens* 4240 (GH, MO, PDA, US, UT); 3 miles n of Badulla on road to Mahiyangana, *Wiens* 4243 (AD, FPF, GH, MO, NY, PDA, RSA, UC, US, UT); 21 miles n of Badulla on road to Mahiyangana, *Wiens* 4246 (PDA, RSA, US, UT); 3 miles s of Hakgala on road to Palugama, *Wiens* 4260 (MO, NY, PDA, US, UT); 3 miles se of Welimada on road to Bandarawela, *Wiens* 4264 (PDA, US); btwn Haputale and Beragalla near mile marker 1/4, *Wiens* 4268 (PDA, US). COLOMBO DIST.: btwn Labugama and Waga near mile marker 54/1, *Wiens* 4290 (PDA, US, UT). GALLE DIST.: btwn Yakkalamulla and Udugama near mile marker 15/2, *Wiens* 4277 (AD, PDA, US, UT); 5 miles e of Neluwa on road to Morawaka, *Wiens* 4279 (K, PDA, US, UT). HAMBANTOTA DIST.: 1 mile w of Tissamaharama on road to Hambantota, *Wiens* 4272 (PDA, US); 1 mile n of Hungama on road to Middeniya, *Wiens* 4273 (PDA, US, UT). JAFFNA DIST.: Jaffna (Gardner), part of *C.P.* 198 (PDA), *de Silva* in 1906 (PDA). KANDY DIST.: Deltota,

part of *C.P.* 2412 (PDA); Hantane, hills s of Kandy, Oodawella Tea Estate, *Wiens* 4213 (PDA, US, UT). MANNAR DIST.: without locality, *de Silva* in 1923 (PDA). MATALE DIST: btwn Rattota and Illukkumbura near mile marker 25/17, *Wiens* 4341 (AD, K, MO, PDA, UC, US, UT), near mile marker 27/9, *Wiens* 4342 (K, MO, PDA, US, UT). MONARAGALA DIST.: btwn Wellawaya and Hambantota near mile marker 196/9, *Wiens* 4270 (PDA, US, UT). NUWARA ELIYA DIST.: btwn Kandy and Hanguranketa near mile marker 15/5, *Wiens* 4250 (K, MO, PDA, US, UT). POLONNARUWA DIST.: hwy A11 8 miles w of Polonnaruwa on road to Habarane, *Wiens* 4299 (FPF, PDA, US, UT); hwy A11 btwn Polonnaruwa and Batticaloa near mile marker 57/3, *Theobald* 2318 (PDA, US). RATNAPURA DIST.: hwy A17 btwn Hayes and Rakwana near mile marker 69/18, *Wiens* 4285 (PDA, US, UT); 5 miles n of Ratnapura on hwy A4, *Wiens* 4289 (K, PDA, US, UT). TRINCOMALEE DIST.: 5 miles n of Trincomalee on coastal road, *Wiens* 4306 (PDA, US, UT). VAVUNIYA DIST.: hwy A14 btwn Medawachchiya and Mannar near mile marker 109/3, *Wiens* 4317 (PDA, US, UT). DISTRICT UNKNOWN: Ambagamuwa, part of *C.P.* 2414 (K, PDA); Matugama, *Trimen* in 1887 (PDA).

## 3. TOLYPANTHUS (Blume) Reichenb

Aerial parasites forming moderately large shrubs, glabrous, glabrate or pubescent, branches terete. Leaves alternate or opposite, penninervous. Inflorescence a sessile head, surrounded by a prominent involucre. Fl. bisexual. Corolla 5-merous, sympetalous, actinomorphic, with reflexing lobes. Anthers basifixed. Fruit baccate. A small primarily Malayan genus of perhaps 4 species. A single species in Ceylon.

**Tolypanthus gardneri** (Thw.) V. Tiegh., Bull. Soc. Bot. Fr. 42:249, 1895.

*Loranthus gardneri* Thw., Enum. Pl. Zeyl. 133, 1859; Trim. Fl. Ceyl. 3:469.

Branches reddish brown, older bark exfoliating, new growth apparently purplish, glabrous; leaves opposite to sub-opposite; blades usually ovate-elliptical to oblong, base rounded-obtuse, apex acute-obtuse, midrib prominently raised beneath, differently colored above and beneath; inflorescence usually with 6 or fewer flowers, involucre composed of ca. 5 basally connivent, dark pink, cuspidate bracts, ca. 1 cm long; individual flowers ebracteate; ovary brownish tomentose; calyx ca. 1 mm long, sub-glabrous; mature floral bud slightly dilated above, ca. 23 mm long, sparsely puberulent; corolla tube at anthesis red; corolla lobes apparently the same color as the tube, linear, acute, ca. 3 mm long, spreading or only slightly recurved; filaments free and erect above the corolla tube for ca. 3 mm; anthers exserted, linear, sub-dorsifixed; style filiform; stigma exserted, only slightly enlarged from the diameter of the style; fruit red, obovate-oblong, ca. 10 mm long; flowering in March to May and probably also in other months; endemic; occurring in the low moist regions of the south-western part of the island.

I have not collected this species, although it was reported by Weeraratna (Ceylon Forester 4:365-375, 1960). Most of the original localities have been destroyed by agricultural activities.

Specimens examined: KANDY DIST.:Deltota, part of *C.P.* 1644 (K, PDA). RATNAPURA DIST.: Kuruwita Kande, *de Silva* in 1919 (PDA). DISTRICT UNKNOWN: Ambagamuwa, *Trimen* in 1890 (PDA); Mandagala Forest, Hewesse, *Trimen* in 1887 (PDA).

## 4. TAXILLUS V. Tiegh

Aerial parasites, forming only moderately sized shrubs, usually less than 1 m high, generally having haustorial bearing surface runners, bisexual, variously pubescent or glabrous. Inflorescence of clustered, few-flowered, axillary umbels, or sometimes occurring singly. Leaves alternate. Corolla 5-merous, strongly zygomorphic by the presence of a single split in the corolla and the lobes all reflexing in the direction opposite the split. Mature floral buds usually basally dilated, then constricted to a neck and re-expanded to form a clavate tip. Corolla lobes reflexing at the constriction. Anthers basifixed, 4-loculate. Fruit mostly oblong.

A genus of perhaps 12 to 16 species occurring in southern Asia through the Malay Peninsula southward to Borneo and the Philippines.

### KEY TO THE SPECIES

1. Leaves, flowers and fruit tomentose or variously pubescent.
   2. Bracts 3-5 mm long, enveloping the ovary and calyx; corolla long shaggy tomentose. **1. T. tomentosus**
   2. Bracts about 1 mm long, never enveloping the ovary and calyx; corolla tomentose, but never shaggy.

3. Corolla tube preceding anthesis canescent-tomentose; base of tube not inflated or only obscurely inflated toward the top; mature leaves usually glabrous or only slightly puberulent, usually 5-10 mm wide, cuneate, only the midrib conspicuous. **2. T. courtallensis**

3. Corolla tube preceding anthesis grayish tomentose below the constriction, but rusty-brown tomentose above; base of tube conspicuously inflated; mature leaves usually glabrous above, brownish tomentose below, usually 2-2.5 cm wide, base rounded to obtuse, conspicuously penninervous. **3. T. incanus**

1. Leaves, flowers and fruit usually glabrous, or sometimes sparsely and minutely stellate pubescent.

4. Corolla orange-pink; leaves usually with a reddish margin, extremely coriaceous. **4. T. sclerophyllus**

4. Corolla yellowish-green; leaves never with a reddish margin or significantly coriaceous; **5. T. cuneatus**

**1. Taxillus tomentosus** (Roth) V. Tiegh., Bull. Soc. Bot. Fr. 42:265, 1895:

*Loranthus tomentosus* Roth ex Heyne, Nov. Pl. Sp. 191, 1821; Trim. Fl. Ceyl. 3:465.

Branches dark brown, terete, young growth rusty stellate tomentose; petiole ca. 5-7 cm long, rusty stellate tomentose; blades glabrous or sparsely stellate pubescent, light brown or buff tomentose beneath, ovate-oblong to elliptical, venation conspicuously penninervous; bracts clearly longer than the calyx, sub-ovate, obtuse, ca. 5 mm long, rusty tomentose; calyx lobed, rusty tomentose,ca.2 mm long; mature floral buds inflated at the base, constricted at the neck initiating the clavate portion, long, shaggy, tannish pubescent over the entire surface except the clavate tip, which is rusty brown pubescent, ca. 15 mm long; corolla tube at anthesis light green within, ca. 10 mm long, the split ca. 5 mm long, dilating at the top to nearly the diameter of the tube; corolla lobes light green, linear to sub-spathulate, acute, reflexed, ca. 4 mm long; filaments light green where adnate to corolla, but bright red for ca. 2 mm where free from petals and bent forward toward the split in the corolla; anthers yellow, oblong, ca. 1 mm long, exserted ca. 3 mm in nearly a horizontal plane from the top of the corolla, the anthers as a group forming a flattened triangle, the point of which terminates around the style just below the stigma; style light green, terete, curved toward the split; stigma bright red, orbicular, exserted ca. 4 mm in front of the lobes above the split in the tube, exceeding the anthers by ca. 1 mm; fruit at maturity unknown; immature fruit oblong, rusty tomentose, bearing a dense ring of hairs (formerly surrounding the style at its point of attachment) which is obscured by the persisting calyx; flowering apparently all year; common in the Uva Basin and occurring in several scattered areas of the Intermediate Zone; also known from India.

This species is easily distinguished from *T. incanus* by the large bracts and the long, shaggy pubescence on the corolla. Also they occur in completely different ecological situations. Thwaites and others have suggested the large bracts are abnormal developments, but field observations suggest they are consistent. For further discussion see *T. incanus*.

Specimens examined: BADULLA DIST.: Welimada, *de Silva* in 1906 (PDA); btwn Badulla and Mahakumbura, *de Silva* in 1929 (PDA); below Hakgala, *de Silva* in 1906 (PDA); ca. 2 miles e of Ohiya Station on road to Borlanda, *Wiens* 4236 (PDA, US); ca. 1 mile s of Palugama on road to Borlanda, *Wiens* 4237 (AD, GH, NY, PDA, RSA, US, UT); Pannalawela, btwn Uda Pussellawa and Welimada, *Wiens* 4238 (PDA, UC,US, UT); btwn Uda Pussellawa and Welimada, near milemarker 5/8, *Wiens* 4241 (K, MO, PDA, RSA, US, UT); Palugama, near mile marker 60/10, *Wiens* 4261 (MO, PDA, US, UT); 3 miles se of Welimada on road to Bandarawela, *Wiens* 4263 (PDA, US). MATALE DIST.: btwn Rattota and Illukkumbura near mile marker 38/4, *Wiens* 4353 (AD, FPF, PDA, US, UT). MONARAGALA DIST.: 4 miles s of Wellawaya on road to Hambantota, *Wiens* 4271 (K, MO, PDA, US, UT). NUWARA ELIYA DIST.: btwn Hanguranketa and Rikiligaskada near mile marker 20/8, *Wiens* 4252 (MO, PDA, US, UT). LOCALITY UNKNOWN: *C.P.* 2492 (K, PDA); *Alston* 475 (PDA).

**2. Taxillus courtallensis** (Gamble) Danser, Verhandelingen der Koninklijke Academie van Wetenschappen te Amsterdam Afdeeling Natuurkunde (Tweede Sectie) Deel XXIX, No. 6. 124, 1933.

*Loranthus courtellensis* Gamble, Fl. Madras 7: 1249, 1952, 1925.

*Taxillus canescens* Wiens, Ceyl, J. Sci. (Bio. Sci.) 9(2): 48, 1971.

Plants often forming relatively small (up to ca. 3-5 dm high), somewhat rounded clusters; branches grayish brown, terete, new growth usually reddish brown; petiole ca. 3-5 mm long to sub-sessile; leaves alternate and often fascicled in groups of 2-3; blades usually obovate, up to ca. 2.5 cm long and ca. 2 cm wide, base strongly cuneate, venation inconspicuous, sometimes sparsely scattered tomentose; inflorescences of clustered, 2-3 flowered, axillary umbels, or flowers occurring singly; bracts ca. 1 mm long, obtuse; calyx ca. 1 mm long, usually lobed; mature floral buds densely canescent-tomentose, with two constrictions, the first ca. 1/3 from the base, the second initiating the clavate apex, a single lateral swelling at the second constriction, ca. 25 mm long; corolla tube at anthesis

scattered canescent-tomentose, yellowish green for the terminal 1/3, but becoming orangish-yellow with age, the tube expanding slightly in the upper part only, ca. 18 mm long, the single split descending only ca. 8 mm from the top; corolla lobes reflexed, greenish, but becoming orange with age, linear, acute, ca. 5 mm long; filaments greenish where adnate to corolla, but becoming deep red for ca. 2 mm below the curved, free portion; anthers apparently reddish, linear, locellate, ca. 4 mm long, exserted ca. 5 mm above and in front of the tube; style green, but reddish just below the stigma, terete, but minutely angled; stigma dark red, sub-capitate, exserted ca. 1 mm beyond the closely surrounding anthers; fruit canescent-tomentose, oblong, calyx apparently persistent, size at maturity unknown; probably flowering throughout the year; known only from the northern area of the Dry Zone, where it is widely scattered.

This taxon was originally given varietal status under *T. cuneatus* by Thwaites and maintained as such by Trimen. Field observations, however, have shown that this species is sympatric with *T. cuneatus*, to which it is closely related.

Because there is presently no evidence of hybridization between the two species and inasmuch as they exhibit a number of consistent differences, I believe specific recognition is desirable.

Specimens examined: ANURADHAPURA DIST.: hwy A12 btwn Trincomalee and Anuradhapura near mile marker 67/0, *Wiens* 4309 (K, MO, PDA, RSA, US, UT). JAFFNA DIST.: Jaffna (Gardner), part of *C.P.* 1641 (PDA). KURUNEGALA DIST.: hwy A10 btwn Puttalam and Kurunegala near mile marker 61/2, *Wiens* 4331 (GH, K, UC, US, UT). MANNAR DIST.: hwy A14 btwn Medawachchiya and Mannar near mile marker 130/1, *Wiens* 4321 (GH, K, KLU, MO, PDA, UC, US, UT-type collection). MATALE DIST.: hwy A6 btwn Dambulla and Habarane near mile marker 46/1, *Wiens* 4297 (GH, K, MO, PDA, US, UT). DISTRICT UNKNOWN: Kokirawa, *Trimen* in 1887 (PDA).

**3. Taxillus incanus** (Trimen) Wiens *comb. nov.*

*Loranthus tomentosus* Roth var. *incanus* Trim Fl. Ceyl. 3:466, 1893.

*L. tomentosus* Roth var. *normalis* Thw., Enum. Pl. Zeyl. 135, 1859.

Branches reddish brown, terete, lenticellate; petiole up to ca. 10 mm long, tomentose to subglabrous below, glabrous to sparsely and highly stellate-pubescent above, the pubescence sometimes extending a short distance down the midrib; blades glabrous or sometimes lightly and sparsely stellate-pubescent above, light brown or buff beneath by the presence of a dense tomentum, oblong-orbicular, up to ca. 6 cm long and ca. 4 cm wide, but greatly variable in size; bracts ca. 1 mm long, obtuse; calyx margin slightly irregular, tomentose, ca. 1 mm long; mature floral buds dull pink on the basal half, then greenish, rusty tomentose at the tip, ca. 17 mm long; corolla tube at anthesis pinkish to the base of the split, dull white to flesh colored above, somewhat compressed laterally, the split ca. 5 mm long with a swelling at the base, dilated toward the top, the tube ca. 10 mm long; corolla lobes light green with a medial pinkish strip, reflexed; filaments greenish where adnate to corolla but bright red for ca. 2 mm where free from petals and bent forward toward the split in the corolla; anthers light yellow, oblong, locellate, ca. 1 mm long, exserted ca. 3 mm; style greenish, terete, curved, exserted ca. 1 mm beyond the stamens; stigma bright red, orbicular; fruit at maturity (?) green, sub-oblong, (slightly wider at the base), ca. 8 mm long, ca. 4 mm wide at the base, the calyx persistent; flowering apparently all year; common in the Moist Zone up to elevations of 7000 ft. Probably endemic, its relationship to several Indian species is not presently clear.

This species is similar but distinct from *T. tomentosus*, to which other workers have assigned it. Trimen indicated that intermediate forms linked this species to *T. tomentosus*, but my own field work showed that the two taxa were morphologically consistent. The probability of hybridization is essentially precluded because the two species are not sympatric and occupy distinct ecological niches. Inasmuch as a number of differences separate this taxon from *T. tomentosus*, and no intermediate forms are known, I believe both taxa are best treated as separate species.

Specimens examined: GALLE DIST.: ca. 3 miles s of Neluwa on road to Hiniduma, *Wiens* 4278 (AD, K, PDA, US, UT). KANDY DIST.: Peradeniya, part of *C.P.* 1642 (PDA); Hantane, hills s of Kandy, *Wiens* 4212 (AD, K, MO, NY, PDA, UC, US, UT), 4219 (AD, GH, K, MO, NY, PDA, US, UT); Delgoda (Deltota?), *de Silva* in 1919 (PDA). MATALE DIST.: btwn Rattota and Illukkumbura near mile marker 30/0, *Wiens* 4345 (PDA, US, UT), near mile marker 32/7, *Wiens* 4346 (NY, PDA, US, UT), near mile marker 32/9, *Wiens* 4348 (PDA, US). MATARA DIST.: ca. 3 miles off hwy A17 btwn Kotapola and Deniyaya, on access road originating at mile marker 48/15, *Wiens* 4282 (K, PDA, US, UT). NUWARA ELIYA DIST.: Rhamboda (Gardner), part of *C.P.* 1642 (PDA); Horton Plains, part of *C.P.* 1642 (PDA); hwy A5 37 miles se of Kandy, *Wiens* 4204 (AD, FPF, K, PDA, US, UT), Horton Plains, at New Farm on Pattipola road, *Wiens* 4209 (GH, K, MO, PDA, RSA, US, UT); nw of Nuwara Eliya on hwy A5 near mile marker 46, *Wiens* 4225 (NY, PDA, RSA, UC, US, UT); Horton Plains, 2 1/2 miles nw of Farr's Inn on road to Diyagama, *Wiens* 4228 (GH, MO, PDA, US, UT); btwn Maturata and Kandapola near mile marker 3/7, *Wiens* 4254 (GH, MO, PDA, US, UT); btwn Nuwara Eliya and Hakgala near mile marker 54/9, *Wiens* 4257 (MO, PDA, UC, US, UT). RATNAPURA DIST.: hwy A17 btwn Rakwana and Hayes near mile marker 77/8, *Wiens* 4286 (PDA, US).

**4. Taxillus sclerophyllus** (Thw.) Danser, Bull. Jard. Bot. Buitenz., Ser. III, Vol. X: 355, 1929.

*Loranthus sclerophyllus* Thw., Enum. Pl. Zeyl. 135, 1859; Trim. Fl. Ceyl. 3:466.

Branches grayish brown, lenticellate; petiole ca. 5 mm long to subsessile; blades dark green, highly coriaceous, mostly obovate, base sometimes cuneate, apex rounded, margin often orangish when living, usually with 3 conspicuous curvinervous veins, glabrous; inflorescence brownish tomentose, apparently becoming glabrous at fruiting time; bracts almost equaling the calyx, ca. 2 mm long, acute-obtuse; calyx and ovary brownish tomentose, calyx ca. 1 mm long, slightly toothed; mature floral buds sparsely rusty pubescent, ca. 23 mm long, slightly inflated and curved; corolla tube at anthesis bright orange-pink, ca. 15 mm long, split ca. 4 mm long; corolla lobes linear-oblanceolate, acute and attenuated at apex, spreading or reflexed, ca. 5 mm long; filaments free from corolla lobes ca. 2 mm, somewhat flattened; anthers oblong, but apically acute, ca. 2 mm long; style slightly curved, terete; stigma sub-capitate, ca. 6 mm above the lobes, ca. 2 mm above the anthers; fruit at maturity (?) oblong, glabrous, ca. 7 mm long, ca. 3 mm wide; flowering with definite periodicity, probably from about March to June; fruiting from July through September and possibly later; scattered in distribution in the High Montane Zone, from ca. 4000 to 7000 ft; endemic.

Specimens examined: BADULLA DIST.: Haputale, *Trimen* in 1890 (PDA). MATALE DIST.: Lagalla, *Trimen* in 1887 (PDA); btwn Rattota and Illukkumbura near mile marker 33/16, *Wiens* 4349 (AD, K, MO, PDA, US, UT). NUWARA ELIYA DIST.: Elk Plains, part of *C.P.* 2442 (K, PDA); Pidurutalagala, part of *C.P.* 2442 (PDA); btwn Nuwara Eliya and Hakgala, *de Silva* in 1906 (PDA), at mile marker 54/9, *Wiens* 4258 (GH, NY, PDA, UC, US); junction of Ohiya and Horton Plains road, *Wiens* 4233 (AD, FPF, K, PDA, US, UT). LOCALITY UNKNOWN: *de Silva* in 1906 (PDA), *de Silva* in 1907 (PDA).

**5. Taxillus cuneatus** (Roth) Danser, Bull. Jard. Bot. Buitenz. Ser. III, Vol. X:354, 1929.

*Loranthus cuneatus* Roth, Nov. Pl. Sp. 193, 1821; Trim, Fl. Ceyl. 3:466.

Plants often forming relatively small (up to ca. 3-5 dm high), somewhat rounded clusters; branches grayish-brown, terete, lenticellate; leaves sub-sessile to short petiolate; alternate, sometimes fascicled in groups of 2-3, blades mostly obovate, base strongly cuneate, apex mostly rounded, venation (except midrib) mostly inconspicuous, glabrous to sparsely and minutely stellate pubescent, up to ca. 4 cm long and ca. 1-2 cm wide; inflorescences of clustered, 2-3 flowered axillary umbels, or flowers occurring singly in the same position; bracts ca. 1 mm long, obtuse; calyx ca. 1 mm long, usually lobed; mature floral buds light green at base, dark green at constriction, the clavate portion light brown at the apex, ca. 34 mm long; corolla tube at anthesis yellowish green, but becoming yellowish orange with age, sub-cylindrical, the tube expanding directly at the base, the single split reaching within ca. 2-3 mm of the base and opening to ca. 2 mm at the top of the tube; corolla lobes green, becoming greenish-red with age, linear-acute, ca. 4 mm long; filaments greenish where adnate to corolla, but becoming deep red, ca. 2 mm below the curved free portion; anthers apparently reddish, linear, locellate, ca. 2 mm long, exserted ca. 3 mm; style green except slightly reddish below stigma, strongly curved toward the split in the corolla; stigma dark red, sub-capitate, exserted ca. 2 mm in front of the anthers; fruit pink at maturity, oblong, ca. 10 mm long, ca. 5 mm wide, glabrous to sparsely and minutely stellate pubescent, calyx essentially deciduous; apparently flowering throughout the year; common throughout the Dry and Intermediate Zones of northern Ceylon, where it sometimes becomes abundant locally; also occurring in the Ratnapura district, common also in southern India.

The plants occurring in the more humid regions tend to have leaves which are larger and darker green.

Specimens examined: ANURADHAPURA DIST.: hwy A12 btwn Anuradhapura and Trincomalee near mile marker 65/0, *Wiens* 4311 (AD, K, MO, PDA, US, UT); hwy A12 btwn Anuradhapura and Puttalam near mile marker 30/5, *Wiens* 4323 (PDA, US); hwy A14 btwn Medawachchiya and Mannar near mile marker 99/1, *Wiens* 4315 (AD, K, MO, PDA, RSA, US, UT); hwy A20 btwn Anuradhapura and Medawachchiya at mile marker 91/0, *Wiens* 4322 (PDA, US, UT); Wilpattu Nat. Park ca. 5 miles n of park office, *Wiens* 4328 (KLU, PDA, US, UT). JAFFNA DIST.: Jaffna (Gardner), part of *C.P.* 2554 (PDA). KANDY DIST.: Peradeniya, part of *C.P.* 2554 (K, PDA); Royal Botanic Gardens, Peradeniya, *de Silva* in 1910 (PDA). MATALE DIST.: hwy A9 btwn Matale and Dambulla near mile marker 39/2, *Wiens* 4294 (K, MO, PDA, UC, US, UT); vicinity of Matale, *Wiens* 4335 (FPF, PDA, UC, US, UT); btwn Matale and Rattota near mile marker 22/4, *Wiens* 4339 (PDA, US, UT), near mile marker 22/0, *Wiens* 4340 (AD, K, MO, PDA, RSA, US, UT); btwn Rattota and Illukkumbura near mile marker 37/5, *Wiens* 4351 (PDA, US, UT). MATARA DIST.: hwy A17 btwn Kotapola and Deniyaya near mile marker 48/15, *Wiens* 4283 (AD, GH, K, MO, PDA, US, UT). POLONNARUWA DIST.: 8 miles w of Polonnaruwa on road to Habarane, *Wiens* 4300 (K, MO, NY, PDA, US, UT), 10 miles w of Polonnaruwa, *Wiens* 4302 (PDA, US, UT), hwy A6 btwn Habarane and Trincomalee near mile marker 118/1, *Wiens* 4303 (GH, K, MO, PDA, UC, US, UT). PUTTALAM DIST.: hwy A12 btwn Anuradhapura and Puttalam near mile marker 5/1, *Wiens* 4329 (PDA, US, UT). TRINCOMALEE Dist.: 5 miles n of Trincomalee on coastal road, *Wiens* 4305 (FPF, K, MO, PDA, RSA, US, UT).

## 5. SCURRULA L.

Aerial hemi-parasites forming moderately large shrubs, pubescent or sometimes glabrate, with or without haustorial bearing surface runners. Branches terete, sometimes terminally angled, usually lenticellate. Leaves opposite or sub-opposite, venation penninervous, the midrib often conspicuous below. Inflorescence racemose in axillary fascicles, tomentose, the flowers arranged sub-decussately, each with a minute awl-shaped bract. Flowers bisexual. Corolla narrowly cylindrical and acutely clavate in bud, 4-merous, sympetalous, zygmorphic, the lobes all reflexing toward the side opposite the prominent split. Filaments adnate to the petals in the tube, free above the lobes. Anthers basifixed, exserted. Style filiformous, stigma only slightly enlarged and rounded, exserted. Fruit baccate, conspicuously clavate, and long attenuated toward the base. Seed in the enlarged portion.

A genus of perhaps 40-50 species, widely distributed in southeast Asia and India.

KEY TO THE SPECIES

1. Mature leaves usually glabrous or only sparsely brownish tomentose below, principal veins often purplish when fresh; fruit light green, with a pale red band near the summit, sometimes lightly puberulent. **1. S. parasitica**

1. Mature leaves densely whitish tomentose, at least below, venation inconspicuous; fruit whitish tomentose. **2. S. cordifolia**

**1. Scurrula parasitica** L., Sp. Pl. Ed. 1. 110, 1753.

*Loranthus scurrula* (L.) L., Sp. Pl., Ed. 2., 1: 472, 1762; Trim. Fl. Ceyl. 3:465.

*L. buddleioides* Desr., in Lam. Encycl. Méth. Bot. 600, 1789.

*S. buddleioides* (Desr.) G. Don, Gen. Syst. 422, 1834.

Older branches usually brown, runners often poorly developed or absent; leaves sub-opposite, petiole 5-8 mm long, scattered rusty tomentose; blades dark green, ovate-oblong to obovate, 3-6 cm long, ca. 2-3 cm wide, base acuto-obtuse, apex obtuse-rounded, principal veins often purplish beneath and sometimes also sparsely brownish tomentose beneath; inflorescence racemose, superficially umbellate, usually with 6 or less flowers; peduncle ca. 2 mm long, brownish tomentose; calyx rudimentary; mature floral bud pale green, approximately to constriction, medium green at constriction, the clavate tip brownish green, ca. 11-12 mm long, ca. 1 mm wide; corolla at anthesis yellowish green, tube ca. 8 mm long, lobes yellowish green, but lighter at the apex, linear sub-oblanceolate, ca. 2-3 mm long, ca. 1 mm wide, spreading or partially reflexed, often turning pale red with age; filaments maroon where united with corolla, giving the inside of the tube a deep red appearance, free from the corolla ca. 2 mm, sub-ligulate and bright red; style bright red; stigma deep maroon, similar to filaments where adnate to the petals; fruit pale green, sometimes lightly puberulent, with a light reddish band near the summit, ca. 8 mm long; flowering in July and probably also during other months; widespread in India and other Indo-Malayan countries; common in the Intermediate and Dry Regions.

This is a widespread and variable species, but it appears to be a single taxon in Ceylon.

Specimens examined: ANURADHAPURA DIST.: Habarane, *de Silva* in 1926 (PDA); btwn Dambulla and Kekirawa, *Trimen* in 1887 (PDA); Wilpattu Nat. Park, ca. 5 miles n of park office, *Wiens* 4325 (GH, K, KLU, PDA, US, UT); hwy A12 btwn Anuradhapura and Trincomalee near mile marker 56, *Wiens* 4313 (AD, K, MO, PDA, RSA, US, UT). BADULLA DIST.: 19 miles n of Badulla on road to Mahiyangana, *Wiens* 4245 (K, MO, PDA, US, UT); 17 miles se of Mahiyangana on road to Bibile, *Wiens* 4247 (K, MO, PDA, RSA, UC, US, UT). MATALE DIST.: 17 miles n of Matale on hwy A9 to Dambulla, *Wiens* 4291 (K, MO, NY, PDA, RSA, UC, US, UT); hwy A9 btwn Matale and Dambulla near mile marker 37/5, *Wiens* 4293 (AD, K, MO, NY, PDA, US, UT); vicinity of Illukkumbura, ne of Rattota, *Wiens* 4350 (AD, K, MO, PDA, RSA, US, UT). POLONNARUWA DIST.: ca 9 miles e of Habarane on road to Polonnaruwa, *Wiens* 4298 (GH, K, PDA, RSA, UC, US, UT). RATNAPURA DIST.: hwy A17 btwn Hayes and Rakwana near mile marker 80/9, *Wiens* 4287 (AD, FPF, K, MO, PDA, US, UT). LOCALITY UNKNOWN: *C.P.* 2391 (K, PDA).

**2. Scurrula cordifolia** (Wall.) G. Don, Syst. Gen. 421, 1834.

*Loranthus cordifolius* Wall. in Roxb., ed. Carey, Fl. Indica 2:222, 1824; Trim. Fl. Ceyl. 3:465.

*Dendrophthoe cordifolia* (Wall.) Mart., Flora 1: 110, 1830.

Older branches brown, haustorial bearing surface runners poorly developed or absent, young branches whitish-tomentose; leaves sub-opposite; petiole ca. 6-8 mm long; blades generally pale green above, often puberulent, whitish tomentose below, and sometimes also above, especially when young, orbicular to sub-cordate,

varying greatly in size, 3-6 cm broad, base sometimes sub-truncate, often slightly oblique; inflorescence racemose, superficially umbellate, whitish tomentose; peduncle ca. 3 mm long with usually 6 or less flowers; flowers according to Trimen similar to *S. parasitica;* fruit densely whitish tomentose, ca. 10 mm long; reported flowering in February and August, scattered in the Dry and Intermediate Zones.

Several workers have questioned the separation of this species from *S. parasitica;* however I have seen no obvious intermediate forms and inasmuch as these two taxa are apparently sympatric, I am retaining the specific status of *P. cordifolia.*

Specimens examined: ANURADHAPURA DIST.: Wilpattu Nat. Park, ca. 5 miles n of park office, *Wiens* 4326 (GH, K, PDA, UC, US, UT). MATALE DIST.: hwy A9 ca. 20 miles n of Matale, *Wiens* 4292 (AD, FPF, K, MO, PDA, US, UT); hwy A9 btwn Matale and Dambulla near mile marker 40/8, *Wiens* 4295 (AD, K, MO, PDA, US, UT); vicinity of Matale, *Wiens* 4332 (K, KLU, PDA, UC, US, UT). DISTRICT UNKNOWN: "Rikillagasgoda", *de Silva* in 1920 (PDA); Ugulduwa Valley, *Trimen* in 1882 (PDA); without locality, *C.P.* 2391 (PDA).

## 6. HELIXANTHERA Lour

Aerial or sometimes terrestrial root parasitic shrubs, usually glabrous; when aerial parasites, with or without haustorial bearing surface runners. Leaves opposite to subopposite or alternate. Inflorescence racemose or spicate, sometimes subtended by an involucre of small hard bracts. Individual flowers subtended by minute separate bracts. Flowers bisexual. Corolla 4- to 7-merous, choripetalous, actinomorphic. Anthers basifixed. Style filiform, stigma capitate. Fruit ovate to elliptical.

A genus of perhaps 25 species occurring throughout southeast Asia, but also with species in Africa.

KEY TO THE SPECIES

1. Inflorescence spicate, stout, rachis ca. 2 mm wide; leaves penninervous; young parts rusty tomentose. **1. H. hookeriana**
1. Inflorescence racemose, delicate, rachis ca. 1 mm or less wide, leaves strongly curvinervous; plants glabrous. **2. H. ensifolia**

**1. Helixanthera hookeriana** (W. & A.) Danser, Bull. Jard. Bot. Buitenz. Ser. III, Vol. X: 317, 1929.

*Loranthus hookerianus* W. & A., Prod. Fl. Penn. Ind. Or. 381, 1834; Trim. Fl. Ceyl. 3:464.

*Phoenicanthemum hookerianum* (W. & A.) V. Tiegh., Bull. Soc. Bot. Fr. 41:502, 1894.

Aerial parasites often forming densely branched shrubs, apparently without haustorial bearing surface runners; branches grayish-brown, roughened, terete or slightly angled terminally, lenticellate, young internodes rusty tomentose; leaves sub-opposite; petiole ca. 5 mm long; blades mostly ovate, glabrous at maturity, often rusty tomentose when young, base obtuse, apex obtuse-acute, ca. 6-8 cm long, ca. 3-4 cm wide; inflorescence an elongated axillary spike, up to 11 cm long, ca. 2 mm wide, with up to 30 flowers, rusty tomentose when young; bracts subtending only individual flowers, minute, ca. 1 mm long, sub-ovate; calyx minutely 4-lobed, ca. 1 mm long; mature floral buds rusty red, straight, sub-clavate ca. 1 cm long, ca. 1.5 mm wide, somewhat keeled toward the base; corolla at anthesis dark red, petals connivent about half their length, then spreading or reflexing; corolla lobes ca. 6 mm long, ca. 1 mm wide, dark red; filaments rusty red, free and erect above the lobes for ca. 1 mm, strongly introrse, where adnate to petal surrounded by two lateral ridges; anthers dark red, oblong, ca. 1 mm long and surrounding the style, exserted ca. 2 mm, style dark red, filiform, ca. 1 cm long, curved; persistent sometime after anthesis; stigma dark red, sub-capitate, exserted ca. 5 mm above the petals and ca. 1 mm above the anthers; fruit brownish purple, orbicular, ca. 5 mm in diameter; flowering in March, July, August, and September and perhaps the entire year; widely scattered, and relatively rare, mostly in the northern Dry and Intermediate Zones but also in the Moist Zone; occurring also in India.

I have not found this species in the High Montane area, as mentioned by Trimen, but it does occur at medium elevations in the Moist Zone.

Specimens examined: BADULLA DIST.: Uva, *Thwaites* in 1860, part of *C.P.* 1645 (PDA). BATTICALOA DIST.: without locality (Gardner), part of *C.P.* 1645 (PDA). KANDY DIST.: Peradeniya, *de Silva* in 1930 (PDA); Kandy Jungle, *de Silva* in 1928 (PDA); Hantane, *Thwaites* in 1857, part of *C.P.* 1645 (PDA). MATALE DIST.: Illukkumbura, ne of Rattota, *Wiens* 4355 (AD, FPF, PDA, US, UT). NUWARA ELIYA DIST.: Maturata, *Thwaites* in 1851, part of *C.P.* 1645 (PDA). POLONNARUWA DIST.: hwy A11 btwn Polonnaruwa and Batticaloa ca. 6 miles e of Mannapitiya, *Wiens* 4301 (AD, K, MO, PDA, US, UT). RATNAPURA DIST.: ca. 5 miles n of Hayes on road to Rakwana, *Wiens* 4284 (FPF, GH, K, MO, PDA, RSA, US, UT).

**2. Helixanthera ensifolia** (Thw.) Danser, Bull, Jard. Bot. Buitenz. Ser. III, Vol. X: 317, 1929.

*Loranthus ensifolius* Thw., Enum. Pl. Zeyl. 134, 1859; Trim. Fl. Ceyl. 3:464.

*Phoenicanthemum ensifolium* (Thw.) V. Tiegh, Bull. Soc. Bot. Fr. 41:503, 1894.

Aerial parasites rather loosely branched, the stems gravish, terete; leaves opposite; petiole 7-8 mm long; mature blades mostly olliptical falcate, ca. 1.5-2.5 cm wide, ca. 8-9 cm long, base obtuse-acute, apex acute, conspicuously basinervous, with 3-5 principal veins; inflorescence an elongated, somewhat secund, axillary raceme, up to ca. 7 cm long, with up to ca. 25 flowers; bracts subtending individual flowers minute, less than 1 mm long, ovate-deltoid; mature floral buds and flowers not known; immature floral buds slender, less than 1 mm wide; mature (?) fruit obovate, ca. 4 mm long, ca. 2 mm wide; flowering in April and probably also at other times; apparently rare, known only from the Ratnapura area in the low Moist Zone of southwestern Ceylon; endemic.

Specimens examined: RATNAPURA DIST.: Karawita Kande, *C.P.* 3453 (PDA), *Trimen* in 1881 (PDA).

## 7. BARATHRANTHUS (Korth.) Miq.

Aerial parasites forming moderately large shrubs; dioecious or flowers bi-sexual; glabrous or pubescent, with haustorial bearing surface runners. Branches terete or terminally angled, often roughened by the presence of lenticels. Leaves opposite or alternate, venation penninervous, with the midrib conspicuously evident below. Inflorescence an axillary, sessile head with usually 6 or less flowers, without an involucre. Individual flowers subtended by basally cupuliferous bracts. Corolla 4-merous, choripetalous, actinomorphic, the older buds cylindrical to sub-clavate. Filaments adnate with the petals. Anthers basifixed, bilocular, the same diameter as the filament. Style filamentous. Stigma the same diameter as the style or capitate. Fruit baccate, orbicular.

A genus of perhaps 4 species occurring in Indonesia, the Malayan Peninsula and Ceylon. Two species in Ceylon.

KEY TO THE SPECIES

1. Leaves ovate-elliptical, apex not especially attenuated, ca 1.5-4.0 cm long; petiole ca 2-3 mm long. **2. B. mabaeoides**

1. Leaves lanceolate-ovate, apex usually attenuated, ca 5-8 cm long; petiole ca 5-7 mm long. **1. B. nodiflorus**

**1. Barathranthus nodiflorus** (Thw.) V. Tiegh., Bull. Soc. Bot. Fr. 41:501, 1894.

*Loranthus nodiflorus* Thw., Enum. Pl. Zeyl. 134, 1859; Trim. Fl. Ceyl. 3:463.

Branches dark brown (in dried material); leaves alternate; petiole ca. 5-7 mm long; blades lanceolate-ovate, ca. 5-8 cm long and ca. 2-3 cm wide, base usually obtuse, apex attenuated, acute; calyx truncated, minute, less than 1 mm long; mature floral buds clavate, ca. 1 cm long; corolla at anthesis crimson, petals reflexed approximately at midpoint; anthers basifixed, oblong, ca. 1 mm long, the same diameter as the filament; style filiform, apparently included; fruit unknown; flowering in March and probably also during other months; endemic; rare, low Moist Regions.

I have not collected this species; it is known from the type collection from "Ambagamuwa", and from the Galle District at Udugama and Hiniduma (Weeraratna, G. Ceylon For. 4:365-375, 1960).

Specimens examined: DISTRICT UNKNOWN: "Ambagamuwa", *C.P.* 2589 (PDA); without locality, *Walker* (K, PDA).

**2. Barathranthus mabaeoides** (Trimen) Danser, Bull. Jard. Bot. Buitenz. Ser. III, Vol. X:302, 1929.

*Loranthus mabaeoides* Trimen, Jour. Bot. (London) 27:166, 1889; Trim. Fl. Ceyl. 3:463.

Branches dull brown (in dried material); leaves alternate; petioles ca. 2-3 mm long, but distinct; blades ovate-elliptical ca. 1.5-4.0 cm long and ca. 1.0-2.0 cm wide, apex and base acute-obtuse, stellate-canescent when young, glabrate with age; calyx tuncated, minute, less than 1 mm long, brownish tomentose; mature floral buds slightly clavate, ca. 3-4 mm long; corolla at anthesis probably ca. 4 mm long, petals erect, not spreading, oblong-linear; filaments ligulate, united to petals for approximately half the length of the petal; anthers, oblong, ca. 1 mm long; style filiform; stigma capitate; fruit brownish canescent, globose, ca. 2 mm in diameter; flowering in August and September and probably also in other months; endemic, rare.

I have collected this species with only two flowers and these after anthesis and before fruit maturation. Previous collection in bud only. The description compiled from the two specimens and partially abstracted from Trimen. The species is close to *B. nodiflorus*, but probably distinct.

Known only from the Intermediate Zone in the Matale District.

Specimens examined: MATALE DIST.: Kalupahane Valley, below Lagalla, *Trimen* (K, PDA); vicinity of Illukkumbura, ne of Rattota, *Wiens* 4354 (K, PDA, US, UT).

# BIGNONIACEAE

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Trees, shrubs, or lianas, very rarely herbs. Leaves usually opposite, rarely alternate, usually palmately or pinnately-compound, terminal leaflet sometimes tendril-like; stipules absent. Inflorescence usually a terminal raceme or panicle, sometimes axillary, solitary or dichasial, occasionally cauliflorous. Bracts and bractlets usually present. Flowers hermaphroditic, often zygomorphic, usually large and showy. Calyx 5-merous, usually campanulate or spathaceous, sometimes 5-lobed, toothed, or 2-lipped. Corolla 5-merous, gamopetalous, campanulate, funnelform, or tubular, often ventricose and oblique, usually 2-lipped; lobes imbricate. Stamens usually 4, rarely 2 or 5 (*Oroxylum*), inserted on corolla tube; anthers connivent in pairs or free, bilocular; locules often divergent; staminodium usually present. Disk usually present, usually annular or cupular, often enlarged and conspicuous. Ovary superior, bilocular with axile placentation, occasionally with false septa, and then appearing 4-locular, rarely unilocular with 2 parietal placentae; style simple; stigma 2-lipped. Fruit usually a capsule, septicidally or loculicidally dehiscent, rarely fleshy and indehiscent. Seeds numerous, large, usually winged; wings membranous or corky.

**Distribution and Ecology:** A family of 120 genera and 650 species with a large number of small or monotypic genera. It is primarily tropical and especially abundant in northern South America where many are climbers and an important feature of the forests. Only two genera (*Campsis* and *Catalpa*) occur both in the New and Old World. Ceylon representatives of the family include one species each of *Oroxylum*, *Dolichandrone*, *Stereospermum*, and *Spathodea*. The first three are apparently native, while *Spathodea campanulata*, a native of Africa, has become widely naturalized on the island. All are known from the moist lowlands of the Southeast, especially near the coast. However, *Oroxylum* and *Stereospermum* are also reported from areas surrounding Kandy in the Central Province. *Spathodea* is widespread along the coast and in the montane regions of Wet Zone up to elevations of approximately 1200 meters.

Numerous members of the family are cultivated in the island including: e.g., *Bignonia*, *Tecomaria*, *Jacaranda*, and *Tabebuia*. *Millingtonia hortensis* L.f. and *Stereospermum suaveolens* DC, have been reported by Thwaites and Trimen as being commonly planted on the island, with the latter often seen near Buddhist Temples. Worthington (1959. —Ceylon Trees, p. 340) has noted *Markhamia platycalyx* as introduced by himself in 1928 and now naturalized.

**Discussion:** None of the taxa are endemic and all are widespread in adjacent regions, including India, Southeast Asia, and Indonesia. For an excellent discussion of the taxonomy, geographic distribution and possible origins of these and other taxa, see C.G.G.J. van Steenis (1927)—Malayan Bignoniaceae, their taxonomy, origin and geographic distribution. *Rec. Trav. Bot. Neerl.* 24:787-1049. See also D. Chatterjee (1948)—A review of Bignoniaceae of India and Burma. Bull. Bot. Soc. Bengal 2: 62-79; and C.G.G.J. van Steenis (1928)—The Bignoniaceae of the Netherlands Indies. Bull. Jard. Bot. Buitenzorg 10: 173-290.

## KEY TO THE GENERA

1. Leaves 2-3 pinnate; stamens 5; capsule broadly-linear, greater than 7 cm broad, septicidally 2-valved **1. Oroxylum**

1. Leaves simply pinnate; stamens 4; capsule oblong or narrowly-linear, less than 3 cm broad, loculicidally 2-valved.

   2. Calyx spathaceous; corolla white or orange-red, greater than 7 cm long; capsule oblong or narrowly-linear, greater than 1.7 cm broad; seeds flattened, membranous or corky-winged.

      3. Corolla white, opening at night, tubular portion greatly exceeding the calyx, capsule linear, seeds corky-winged. **2. Dolichandrone**

      3. Corolla orange-red, open during day, tubular portion included within calyx; capsule oblong, seeds membranous winged. **3. Spathodea**

   2. Calyx campanulate; corolla pinkish or yellowish, flecked and striped reddish-purple, less than 3 cm long; capsule narrowly-linear, less than 6 mm broad, seeds 3-angled, membranous-winged. **4. Stereospermum**

## 1. OROXYLUM Vent.

Dec. Gen. Nov. 8. 1808.

*Calosanthes* Blume, Bidjr. 760. 1826.

Trees. Leaves opposite, large, 2-3 pinnate. Inflorescence a large, compact, terminal raceme on an elongated peduncle, usually extending obliquely well above the foliage; bracts present; flowers large, longer than 9 cm (in ours). Calyx large, coriaceous, oblong-campanulate, truncated or shallowly lobed. Corolla thick and fleshy, campanulate-ventricose; lobes 5, crisped and crumpled, upper 3 lobes subequal, lower 2 slightly smaller, partially fused at base. Stamens 5, equally inserted near base of tube, not or only slightly exserted at throat; filaments in 2 unequal pairs and 5th shorter; anthers glabrous, bilocular; locules oblong, parallel or slightly divergent. Disk large, cushion-like, not surrounding the base of the ovary. Ovary linear-oblong, bilocular; style slender; stigma 2-lipped, lips flattened. Fruit a large capsule, broadly linear, over 50 cm long, greater than 7 cm broad, tapering at both ends, septicidally 2-valved; valves woody, compressed parallel to the septum; septum flat. Seeds numerous, thin, discoid, surrounded by a broad, membranous wing, except at base.

*Distribution:* A genus of one or two species known from Southern China and India south-eastward to the Philippines and parts of Indonesia.

**Oroxylum indicum** (L.) Vent., Dec. Gen. Nov. 8. 1808. **Fig. 1:A1-A3**; Trim. Fl. Ceyl. 3:281.

*Bignonia indica* L., Sp. Pl. 625. 1753.

*Spathodea indica* Pers., Syn. Pl. 2:173. 1806.

*Calosanthes indica* Blume, Bijdr. 761. 1826.

Usually small trees, often irregularly branched near top, 5-8 m high, sometimes up to 13 m; bark thick, yellowish-gray with numerous, large, corky lenticels. Leaves deltoid-ovate in outline, 9-13 dm long, 5-8 dm broad; ultimate divisions ovate-elliptical, 4-16 cm long, 3-9 cm broad, base variable, obtuse to cordate or oblique, margin entire, apex caudate-acuminate, minutely lepidote, appearing glabrous, sometimes pubescent along veins, paler beneath; petiole and rachis stout, cylindrical, base and joints of rachis distinctly swollen, articulate, corky lenticels prominent. Inflorescence on very stout, branch-like peduncle, persistent, 35 cm or more long; pedicels stout, 3-7 cm long, articulate at base, glabrous; bracts fused to pedicel at base. Calyx blackish-purple, glabrous, 3-4.5 cm long, 1.5-2.5 cm broad. Corolla opening in evening; tube 5-7 cm long, ca. 3 cm broad at throat, deep maroon to reddish-purple without, creamy-yellow with a diffuse dull pink within; glandular within; lobes much crumpled in bud, obovate in outline, 4-6 cm long, 3-4.5 cm broad, usually with 2 deep longitudinal grooves without, crisped and sparsely toothed at margins, color similar to tube but usually paler, surface papillose, glandular, and minutely pubescent. Filaments glandular, densely tomentose at point of insertion, longest pair ca. 5 cm long, 2nd pair ca. 4 cm long, solitary stamen ca. 3 cm long; anthers 8-10 mm long, locules parallel or slightly divergent. Disk shallowly 5-lobed, 12-15 mm in diameter, 4-5 mm high. Ovary ca. 17 mm long, style ca. 5 cm long; stigma ca. 7 mm long, ca. 5 mm broad. Capsule flat, 50-75 cm long, 7-9 cm broad, tapering at both ends, acute; valves semi-woody, thin, median and 2 larger marginal ridges evident externally. Seeds ca. 2 cm in diameter, winged margin 1.5-2 cm broad. Flowering June-September.

**Distribution.** In the moist low country below 700 meters and inland to Weragamtota along the Mahaweli Ganga. It is a conspicuous tree due to the very large leaves, the persistent, long, broad capsules, and the long inflorescence extending well above the foliage. It is probably more widespread than indicated by known collections, and Trimen has reported it as common. Also found from India east to southeastern Asia, Indonesia, and the Phillipines.

**Ecology:** Trimen has noted it to be a weedy little tree, and those observed in the present study do appear to be growing readily in disturbed areas along roadsides. The flowers open at night and give off a somewhat fetid odor. This combined with the thick, fleshy petals, and an inflorescence that extends well beyond the leaves point to possible bat-pollination.

*Notes:* Van Steenis (1927—Rec. Trav. Bot. Neerl. 24:819) has noted that Miquel described a new araliaceous taxon from Ceylon, *Arthrophyllum zeylanicum n. sp.?*, which he based on sterile material and which is in all probability, *Oroxylum indicum*. The same is also true for *A. reticulatum* Blume ex Miq. from Java.

*Illustrations:* Wight, Ic. Pl. Ind. Or. 4:t. 1337-38. 1848. (*Calosanthes indica*).

Specimens Examined: COLOMBO DIST.: south edge of rd. near small bridge, Tarakuliya, on rd. around southern edge of Negombo Lagoon, *Theobald & Grupe* 2376 (A, K, L, NY, PDA, UC, US); KANDY DIST.: river bank in jungle Mahaweli Ganga near Weragamtota, *Simpson* 8463 (BM); growing in Royal Botanic Garden, Peradeniya, *Theobald & Grupe* 2390 (A, BO, E, K, L, LE, PDA, SING, UC, US); Royal Botanic Garden, Peradeniya, *Trimen s.n.*, in 1882 (PDA). DISTRICT UNKNOWN: *Gardner s.n.* (K).

Vern. **Totila,** (*S.*)

## 2. DOLICHANDRONE (Fenzl.) Seem.

Ann. Mag. Nat. Hist. Ser. 3, 10:31. 1862. Nomen Conservandum

*Pongelia* Raf., Sylva Tell. 78. 1838 trim. 4.

*Dolichandra* sect. B. *Dolichandrone* Fenzl. Denkschr. Baier. Bot. Ges. Regensb. 3:113, 265, 1841.

Trees. Leaves opposite (in ours) simply pinnate. Inflorescence a terminal, few-flowered raceme or panicle; flowers large, longer than 10 cm (in ours). Calyx spathaceous, curved, caducous. Corolla opening towards evening, lower portion of corolla tube very long, cylindrical, much exceeding the calyx, upper portion inflated and funnel-shaped; lobes 5, subequal, rounded, crisped. Stamens 4, didynamous, equally inserted at base of swollen portion of tube; anthers very large, bilocular, locules divergent, glabrous; staminodium small. Disk large, annular, cushion-like. Ovary linear-oblong, bilocular with 2 false septa, appearing 4-locular; style slender; stigma 2-lipped, lips flattened. Fruit a capsule, linear, curved, sub-cylindrical or compressed contrary to the septum in transection, loculicidally 2-valved; valves perpendicular to the septum, flat or convex, septum flat. Seeds numerous, corky or membranous winged.

*Distribution:* A genus of about 9 species known from tropical East Africa and Madagascar east through India and Southeast Asia to Indonesia, northern Australia, and New Caledonia.

**Dolichandrone spathacea** (L.f.) K. Sch., Fl. Kais. Wilh. Land. 123. 1889. **Fig. 1:B1-B3.**

*Bignonia spathacea* L.f., Suppl. Pl. 283. 1781.

*Spathodea longiflora* Vent., Choix. 40. 1807.

*Spathodea rheedii* Wall, Cat. no. 6516. 1832.

*Dolichandrone rheedii* Seem., Journ. Bot. 8:380. 1870; Trim. Fl. Ceyl. 3:282.

Trees, often branching from near base, up to ca. 15 m high. Leaves odd-pinnate, obovate-oblong to elliptical in outline; leaflets 5-9, ovate-lanceolate, 6-17 cm long; 3-6 cm broad, base acute to rounded or oblique, margin entire, apex acuminate-caudate, glabrous, paler beneath, shortly petiolate; petiole and rachis cylindrical, channeled above, joints of rachis not swollen, articulate. Inflorescence 2-8 flowered, peduncles stout, less than 1 cm long: pedicels stout, 1-3 cm long; bracts not evident. Calyx spathaceous, glabrous, 2.5-5 cm long, ca. 1 cm broad when closed, hooked at tip. Corolla white, fragrant; cylindrical portion of tube ca. 7-10 cm long, 4-6 mm broad, funnelform portion ca. 2.5 cm long, 1.5-2.5 cm broad, lobes rounded, 2-3 cm long, ca. 2-3 cm broad, much crisped and crenate on margins. Filaments glabrous; anthers ca. 7 mm long. Disk ca. 5 mm in diameter, ca. 2 mm high, not surrounding base of ovary. Stigma ca. 4 mm long, 3-4 mm broad. Capsules of variable lengths, 25-50 cm long, 1.7-2.5 cm broad; valves thin, semi-woody, bluntly pointed, smooth or obscurely ribbed; septum and false septa woody; seed scars evident. Seeds corky-winged, oblong in outline, 11-15 mm long, 6-9 mm broad, including wing. Flowering May-July.

*Distribution:* Mainly found in mangrove swamps and tidal marshes of the moist low country of the southeast from Negombo south to Galle. This is the most widespread species in the genus, being found primarily in coastal areas from India east through Southeast Asia and Indonesia to New Calendonia and the Solomon Islands.

*Ecology:* The trees begin flowering at a very young age and are often shrub-like in appearance. They are found in nearly pure stands along the edge of lagoons or scattered near the inner edge of mangrove swamps. The corky-winged seeds appear to be an adaptation for water-dispersal. The flowers open at sunset and fall off early the next morning. They are very fragrant and are said to be moth-pollinated.

*Illustrations:* Wight, Ic. Pl. Ind. Or. 4:t. 1339. 1848. (*Spathodea rheedii*).

Specimens Examined: COLOMBO DIST.: scattered along inner edge of mangrove swamp on outer, upper peninsula west of Negombo, *Theobald & Grupe* 2373 (A, BO, E, K, L, NY, PDA, UC, US); Negombo estuary, *Simpson* 7914 (BM, PDA). GALLE DIST.: along edge of lagoon and scattered among mangroves just south of Bentota, *Theobald & Grupe* 2388 (A, BM, E, K, L, LE, NY, PDA, SING, UC, US). KALUTARA DIST.: Paiyagala, Kalutara, *Trimen s.n.*, VIII-1894 (PDA).

Vern. **Diya-danga**, (*S.*), **Vilpadri**, (*T.*).

## 3. SPATHODEA P. Beauv.

Fl. Oware. 1:46. 1805.

Trees. Leaves opposite, simply pinnate. Inflorescence a dense, terminal raceme, peduncles usually not greatly exceeding the leaves; flowers large, showy, longer than 8 cm. Calyx large, spathaceous, recurved. Corolla orange-red; basal portion short, cylindrical, enclosed within calyx; upper portion abruptly much widened, broadly

ventricose-campanulate, erect; lobes 5, subequal, erect. Stamens 4, subequal, unequally inserted near base of swollen portion of tube, not exserted; filaments glabrous; anthers large, bilocular, locules divergent, glabrous, staminodium small. Disk annular, shallowly lobed, surrounding base of ovary. Ovary ovate-oblong, bilocular; pubescent, papillose; style slender, glabrous; stigma 2-lipped, lips flattened. Fruit a capsule, lanceolate-oblong, flattened parallel to the septum, loculicidally 2-valved; valves perpendicular to the septum, boat-shaped, woody, often remaining attached together at apex and base; septum flat. Seeds numerous, membranous-winged.

*Distribution:* A genus of 2 species native to tropical Africa. Our species has been much planted and now is widespread throughout India, Ceylon and other parts of the New and Old World Tropics.

**Spathodea campanulata** P. Beauv. Fl. Oware. 1:47, t. 27. 1805. **Fig. 1:C1-C2.**

Large trees at maturity, branching widely at top; bark smooth, light brownish-gray. Leaves odd-pinnate, obovate to oblong in outline; leaflets 13-19, elliptical-oblong to obovate, 5-9 cm long, 3-4.5 cm broad, base rounded, margin entire, apex acuminate, glabrous above, paler beneath, veins puberulent below, shortly petiolate; petiole and rachis sparsely pubescent, cylindrical, channeled above, joints of rachis indistinct, not articulate. Inflorescence on a stout peduncle, pedicels 3-4 cm long, articulate at base, glabrous; bract at base of pedicel oblong-lanceolate, ca. 2 cm long; bractlets 2, oblong-lanceolate, 7-10 mm long; near apex of pedicel. Calyx golden-brown, velutinous, glabrous within, 5-6 cm long, 2-2.5 cm broad when enfolding corolla. Corolla tube 7.5-9 cm long, 5-6 cm broad, bright reddish-orange without; tube yellowish-orange within, red spots and stripes prominent within, glandular; cylindrical portion 1.5-2 cm long, ca. 9 mm broad; inflated portion 6-7 cm long, 5-6 cm broad; lobes deltoid, 3-4.5 cm long, 3-4 cm broad, bright reddish-orange without, orange within, narrow yellow margin evident on all lobes. Filaments 4-6 cm long, glabrous; anthers ca. 8 mm long. Style ca. 6 cm long; stigma ovate-lanceolate, ca. 5 mm long, 2.5 mm broad. Disk 8 mm in diameter, 4 mm high. Capsule brownish-black, 15-23 cm long, 3-5 cm broad. Seeds winged all around, 1.7-2.4 cm broad, including hyaline wing. Flowering June-September.

*Distribution:* Not native. An introduced species which has now become very widespread in the moist lowlands and the montane region, from sea level up to elevations of 1200 meters or possibly higher. Widespread in New and Old World Tropics.

*Ecology:* Trimen reported that he had known it to fruit only once in Kandy, but today there is abundant evidence for its fruiting in many localities. The bright orange-red flowers from a conspicuous part of the landscape during the monsoon season.

*Illustrations:* Bot. Mag. t. 5091. 1859.

Specimens Examined: COLOMBO DIST.: along roadside south of Negombo, near Kadolkele area, *Theobald & Grupe* 2374 (US). KANDY DIST.: scattered in Oodewella tea plantation below summit of Hantane Mt. No. 1, *Theobald & Grupe* 2342 (BM, NY, PDA, US); along edge of rd. 3 mi south of Peradeniya on rd. to Gampola, *Theobald & Grupe* 2364 (K, L, PDA, UC, US). NUWARA ELIYA DIST.: scattered in tea plantation along edge of rd. approx. 1 mi north of Talawakelle on rd. to Dimbulla, *Theobald & Grupe* 2310 (A, PDA, US).

## 4. STEREOSPERMUM Cham.

Linnaea 7:720. 1832.

*Dipterosperma* Hassk. Flora 25, pt. 2, Beibl. 28. 1842.

Trees. Leaves opposite, simply pinnate. Inflorescence paniculate, lax, many-flowered, terminal, or sometimes lateral; bracts present; flowers small, less than 3 cm long (in ours). Calyx small, campanulate, 3-5 lobed. Corolla campanulate to tubular-ventricose, geniculate; lobes 5, upper 2 partially connate, lower 3 distinct, margins crisped. Stamens 4, subequal, equally inserted near base of tube; anthers free, bilocular; locules divergent, glabrous. Disk cupular, surrounding base of ovary. Ovary linear-oblong, bilocular; septum thickened; style slender; stigma 2-lipped, lips flattened. Fruit a capsule, linear, twisted and curved, terete to quadrangular in transection, loculicidally 2-valved, valves thin, perpendicular to the septum; septum thickened, sub-terete, corky, notched. Seeds with a deep, transverse furrow across center, embedded in notches of septum, trigonous, membranous-winged at each end.

*Distribution:* A genus of about 24 species extending from tropical Africa eastwards through India and Ceylon to South East Asia and Indonesia.

**Stereospermum personatum** (Hassk.)Chatterjee., Bull. Bot. Soc. Bengal 2: 70. 1948. **Fig. 1: D1-D3.**

*Dipterosperma personatum* Hassk., Flora 25, pt. 2, Beibl. 28. 1842.

*Stereospermum chelonoides* Auct. et DC., Prodr. 9:210. 1845. *p. p. tantum.*

*Stereospermum tetragonum* DC., Prodr. 9:210. 1845.

Usually large trees with numerous spreading branches, up to 25 m high; bark thick, rough, grayish-yellow. Leaves odd-pinnate; broadly obovate to obovate-oblong in outline, leaflets 5-9, eliptical-oblong, 3-11 cm long, 2.5-5 cm broad base acute, obtuse, or oblique, margin entire, apex narrowly caudate, glabrous, petiolate; petiole and rachis cylindrical, channeled above, petiole base and joints of rachis distinct, slightly swollen, articulate, sparsely lenticellate. Inflorescence on short peduncles, 1-7 cm long; pedicels slender, glabrous, articulated at base, bracts minute, caducous. Calyx yellowish-purple, 5-8 mm long, ca. 5 mm broad, lobes obtuse, glabrous. Corolla tube 15-18 mm long, 6-8 mm broad, basal portion narrow, cylindrical, ca. 5 mm long, 3 mm broad; upper portion campanulate-ventricose, abruptly inflated and sharply geniculate, nearly perpendicular to calyx tube, 10-13 mm long, 6-8 mm broad at throat, dull pink to yellow without, with numerous, deep reddish-purple flecks and stripes, sparsely to moderately pubescent, 2 pubescent ridges evident on lower surface within; upper 2 lobes partially fused laterally, reflexed, ca. 8 mm long, lower 3 distinct, ca. 7-10 mm long, 6-8 mm broad, each with 2 prominent ridges. Filaments glandular-pubescent at point of insertion, ca. 8 mm long; anthers ca. 1.5 mm long. Disk 1.5 mm broad, 0.8 mm high. Style ca. 10 mm long; stigma ca. 1 mm long, 1 mm broad. Capsules of very variable lengths, curved or spirally twisted, up to ca. 50 cm long, ca. 5 mm broad; valves thin, often with thickened ridges at the angles; septum ca. 4 mm thick, notches ca. 3 mm deep. Seeds 4 mm long, 4 mm wide, 3 mm high; wings ca. 6 mm long. Flowering May-August.

*Distribution:* Trimen reports the species as common along the coast and extending up to 650 meters in the moist low country. Worthington (1959-Ceylon Trees, p. 343) has reported it from Bibile (Uva Province) in the Dry Zone on east side of the island. It is also known from India east through Southeast Asia to Malaysia and possibly Borneo.

*Illustrations :* Wight, Ic. Pl. Ind. Or. 4:t.1341. 1848. (*Stereospermum chelonoides*).

Specimens Examined: KANDY DIST.: Poilakanda estate, Kadugannawa, *Worthington* 1113 (BM); Andiatenne, Kadugannawa, *Worthington* 324 (BM); Udawela village, Andiatenne, *Worthington* 342 (BM); growing at Royal Botanic Gardens, Peradeniya, *Theobald & Grupe* 2394 (A, BM, BO, E, K, L, LE, NY, PDA, SING, UC, US); *de Silva s.n.*, 6-V-1929 (PDA). KEGALLA DIST.: roadside, Kegalla, *Worthington* 148 (BM). KURUNEGALA DIST.: Kurunegala, *Gardner s.n.*, part of C.P. 1959 (PDA). LOCALITY UNKNOWN: *Gardner* 597 (K); *Thwaites s.n.*, part of C.P. 1959 (BM, K).

Vern. **Lunu-madala, Dunu-madala,** (*S.*), **Padri,** (*T.*).

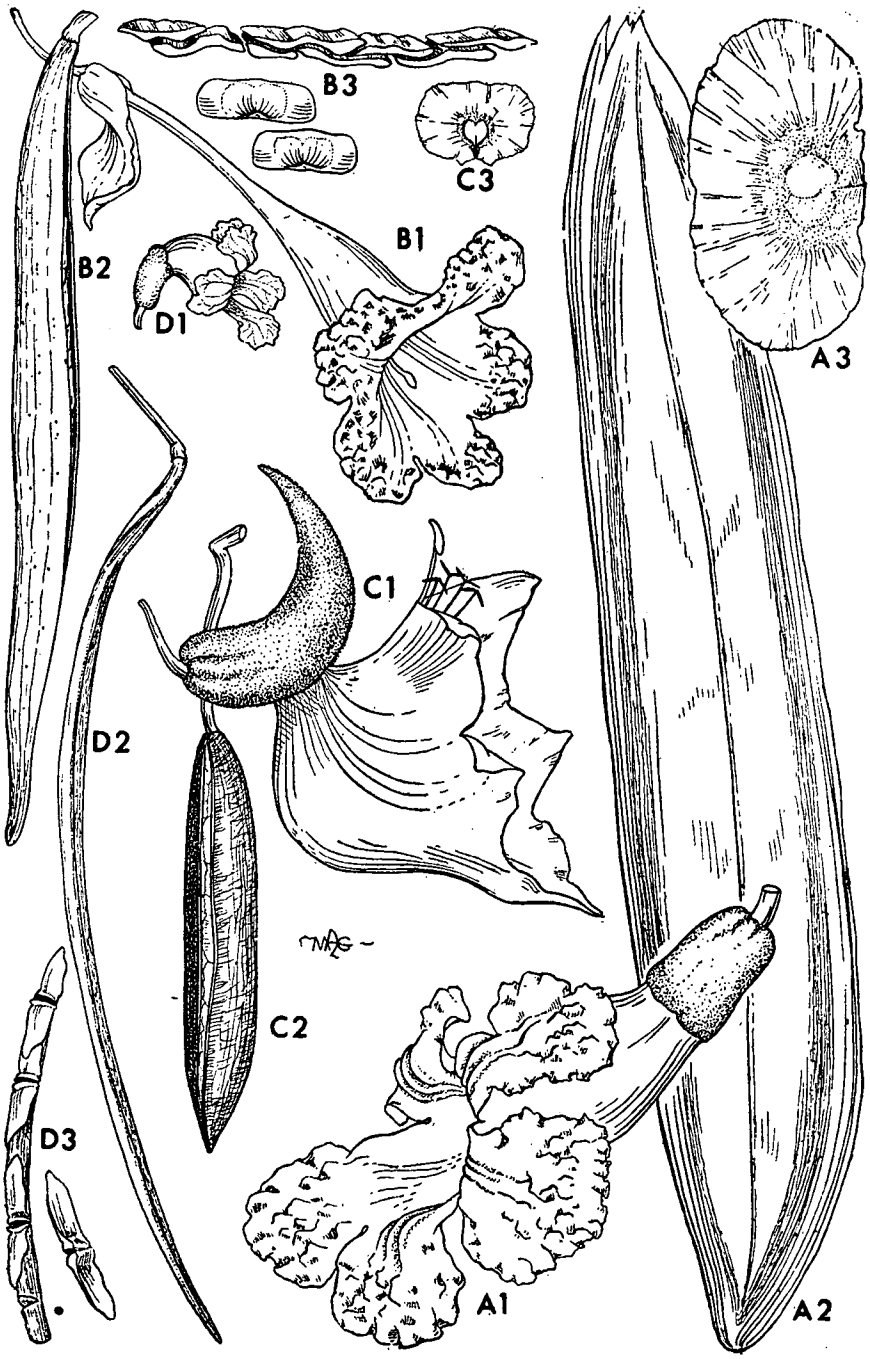


Fig. 1. Bignoniaceae. *Oroxylum indicum* Vent.: *A*-1, Flower, × ½; *A*-2, Mature fruit, × ⅓; *A*-3, Seed. × ⅔. *Dolichandrone spathacea* K. Sch.: *B*-1, Flower, × ½; *B*-2, Mature fruit, × ⅓; *B*-3, Seeds, × ⅚. *Spathodea campanulata* P. Beauv.: *C*-1, Flower, × ½; *C*-2, Mature fruit, × ⅓; *C*-3, Seed, × ⅔. *Stereospermum personatum* Chatterjee : *D*-1, Flower, × ⅔; *D*-2, Mature fruit, × ⅓; *D*-3, Seeds, × 1.



11361—6

# PEDALIACEAE

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Annual or perennial herbs, rarely shrubs, covered with mucilage-glands (at least on young parts). Leaves opposite or the upper alternate, usually simple, sometimes palmately compound; stipules absent. Inflorescence axillary, usually a single flower, sometimes a simple dichasium; conspicuous and characteristic nectar glands (metamorphosed flowers) at the base of the pedicels. Flowers hermaphroditic, usually irregular. Calyx 5-merous, deeply divided or lobed. Corolla 5-merous, gamopetalous; tube campanulate, funnelform, or tubular, often ventricose and oblique; limb 5-lobed, 2-lipped to nearly regular; lobes imbricate. Stamens 4, very rarely 2, didynamous; anthers free or connate in pairs, locules parallel or divergent; connective usually gland tipped; staminodium small or absent. Disk present, annular or asymmetrical. Ovary superior, bilocular with axile placentation, often appearing 4-locular due to incomplete false septa, sometimes the loculi again divided by spurious septa; ovules 1-many; style slender; stigma usually 2-lipped. Fruit variable, an indehiscent nut or a dehiscent capsule, often with spines or hooks. Seeds 1-many per locule.

*Distribution and Ecology:* An Old World family of about 12 genera and 50 species, especially abundant in the tropics and subtropics of Africa, including South Africa and Madagascar. It also extends eastwards into India, Southeast Asia and Indonesia. Some have become naturalized in the New World.

Most are herbaceous shore or desert plants. Of the four species found in Ceylon only two are apparently native, *Pedalium murex* and *Sesamum prostratum*. Both of these are shore plants with *Pedalium* also being found far inland along the edge of tanks (reservoirs). *Sesamum indicum* has probably been introduced into the Dry Zone where it is now widely cultivated and has become naturalized. Trimen also believed it not to be indigenous to the island. It is often confused with *S. radiatum*, another introduced species known from more moist areas around Colombo.

*Discussion:* The family is probably most closely allied to the New World family Martyniaceae of which there is only one introduced species in Ceylon, *Martynia annua*. Members of the Pedaliaceae can be distinguished from this family by their axillary flowers, axile placentation, nectar glands, and characteristic fruit shapes.

KEY TO THE GENERA

1. Fruit indehiscent, subpyramidal with 4 radiating spines; corolla subequally 5-lobed; stems round, subsucculent **1. Pedalium**

1. Fruit a dehiscent capsule, ovate-oblong to oblong, unarmed; corolla distinctly 2-lipped; stems obtusely-quadrangular, not succulent **2. Sesamum**

## 1. PEDALIUM L.

Syst. Nat. ed. 10, 1123. 1759.

Prostrate, usually branching, annual herbs; stems subsucculent. Leaves opposite or alternate, simple, toothed or lobed, petiolate. Flowers axillary, solitary, with nectar glands at the base of pedicels. Calyx 5-merous, deeply divided. Corolla tubular-funnelform, gradually tapering from the base, slender; limb spreading, subequally 5-lobed; lobes rounded. Stamens 4, didynamous, included; anthers free; locules divergent. Disk small, annular. Ovary bilocular; locules undivided; ovules 2 per locule; style slender; stigma 2-lipped. Fruit indehiscent, hard, subpyramidal, 4-angled, rounded to acute at apex with a spreading spine at the base of each of the 4 angles, abruptly contracted below spines. Seeds 1-2 in each locule, pendulous, oblong, black.

*Distribution:* A monotypic, widespread genus known from tropical East and West Africa, Socotra, and Madagascar east through India and Ceylon to Indonesia.

**Pedalium murex** L., Syst. Nat. ed. 10, 1123. 1759. **Fig. 2E.** Trim. Fl. Ceyl. 3:285.

Stems thick, subsucculent, branching throughout, 15-60 cm long, slightly rough with scaly glands or hairs. Leaves somewhat fleshy, pale green, glaucous, broadly obovate to elliptical in outline, 1.5-4.5 cm long, 1.2-3.5 cm broad, base acute, margin irregularly toothed or lobed, apex broadly rounded or truncated, glabrous above, with minute scaly-glands below; petioles 1-3 cm long. Pedicels slender, curved. Calyx deeply divided, segments lanceolate-oblong, acute, ca. 2 mm long, ca. 0.5 mm broad. Corolla pale yellow, opening in morning, glabrous, 2-2.5 cm long; tube ca. 2 cm long, glandular-pubescent within; lobes rounded, ca. 5 mm long, 5 mm broad. Filaments glandular hairy at base. Fruit glabrous or sparsely glandular, rugose or tuberculate on the face; 10-15 mm long, body 5-8 mm broad, excluding the spines; spines ca. 3 mm long. Flowering February-August, and probably throughout the year.

*Distribution:* Along sandy beaches of the dry zones on both the east and west coasts of the island. It has been collected inland at the edge of a tank (reservoir) at Anuradhapura and along roadside near Jaffna. Also known from Africa east through India to Indonesia.

*Ecology:* The prostrate plants spread out and cover an area of up to 1 meter in diameter. The flowers were observed to open in the morning and close late in the afternoon. No pollinators were observed. They are often found at the edge of beaches or in open grassy areas a short distance from the shore. They are reported to be saline soil indicators in sand or on limestone.

*Illustrations:* Pedaliaceae. Flora Trop. East Africa, p. 5. 1953.

Specimens Examined: ANURADHAPURA DISTRICT: Nuwara Wewa tank, Anuradhapura, *Simpson* 8054 (BM). BATTICALOA DISTRICT: Batticaloa, *s. coll.*, part of C.P. 1779 (PDA). JAFFNA DISTRICT: along roadside, Hwy. A-9 just north of Elephant Pass, near Hwy. marker 171, *Theobald & Grupe* 2330 (PDA, US); Jaffna, *Trimen s.n.*, II-1890 (PDA). PUTTALAM DISTRICT: Chilaw, *Trimen s.n.*, VII-1883 (PDA). TRINCOMALEE DISTRICT: along edge of sandy beach below fort at Trincomalee, *Theobald & Grupe* 2323 (A, K, L, PDA, UC, US); Trincomalee, *Simpson* 8482 (BM); along sandy beach approx. 5 mi. north of Trincomalee on rd. to Nilaveli, *Theobald & Grupe* 2327 (A, E, NY, PDA, UC, US).

Vern. **Et-nerenchi,** (*S*)., **Peru-nerinchi, Anai-nerinchi,** (*T*).

## 2. SESAMUM L.

L. Sp. Pl. 634. 1753; Gen. Pl. ed. 5. 282. 1754.

Erect or prostrate herbs with very short, white mucilagenous hairs, and often longer, articulate hairs. Leaves opposite below; alternate above, simple, entire, toothed or lobed, sometimes divided, or compound, often varying on the same plant; usually petiolate. Flowers axillary, solitary, or few and fascicled; shortly pedicellate. Calyx 5-merous, small, persistent, deeply divided or parted. Corolla 5-merous, tube campanulate-ventricose, oblique, distinctly 2-lipped, lower lobe the longest. Stamens 4, didynamous, included; filaments often with a ring of hairs at point of insertion; anthers free, locules parallel; staminodium minute or absent. Disk annular. Ovary bilocular, appearing 4-locular by presence of false septum; ovules numerous; style slender; stigma 2-lipped. Fruit a capsule, ovate-oblong to oblong, beaked or obtuse-rounded, 4-angled, longitudinally grooved, unarmed, loculicidally 2-valved, appearing 4-loculed. Seeds numerous, obovate, compressed, smooth or rugose.

*Distribution:* A genus of about 30 species, particularly abundant in tropical and South Africa, and eastward to Indonesia.

KEY TO THE SPECIES

1. Erect branching herbs; leaves variable, large and long petioled below, smaller and short petioled above; capsule longer than 15 mm.
   2. Capsule with a conspicuous, subulate beak; mature seeds finely reticulate or smooth; lower leaves often deeply divided or compound, corolla usually white, rarely pinkish-violet **1. S. indicum**
   2. Capsule rounded or obtuse, not beaked; seeds with transverse ridges radiating from center; lower leaves never deeply divided or compound; corolla pinkish-violet. **2. S. radiatum**
1. Prostrate branching herbs; leaves usually similar throughout; capsule less than 12 mm long **3. S. prostratum**

**1. Sesamum indicum** L., Sp. Pl. 634. 1753. **Fig. 2A, B.** Trim. Fl. Ceyl. 3:285.

*Sesamum orientale* L., Sp. Pl. 634. 1753.

Strong smelling, usually branching, erect annual herbs up to 1 m high; stems and branches obtusely quadrangular in upper part, furrowed. Leaves very variable; lower simple or palmately compound, 6-15 cm long, 3-10 cm broad, in less robust specimens ovate, base rounded, obtuse, or acute; margin sub-entire to irregularly dentate-serrate, apex acute or obtuse; in larger specimens 3-lobed, parted, or palmately compound; long petioled; upper leaves shorter petioled, ovate-oblong to oblong-lanceolate or linear, 3-6 cm long, 0.5-3 cm broad, base rounded to acute, margin usually entire or only shallowly toothed, apex acute; petioles of lower leaves 3-8 cm long, on upper leaves reduced to only a few mm. Pedicels 1-3 mm long. Calyx deeply divided, segments lanceolate-oblong, 3-5 mm long, ca. 1 mm broad. Corolla usually white, sometimes pale pinkish-violet, often spotted yellow within and with a yellow blotch on lower lip, 2.5 to ca. 3.5 cm long. Filaments glabrous, ring of hairs evident on tube at point of insertion, one pair ca. 8 mm long, other ca. 6 mm long; anthers glabrous or sparsely pubescent along margins, ca. 2 mm long. Ovary densely pubescent, style glabrous; lips of stigma lanceolate. Capsule erect, oblong, 15-28 mm long (beak included), 5-7 mm broad, densely villous-pubescent, apex rounded and abruptly contracted into a conspicuous subulate beak. Seeds ca. 2 mm long, pale yellow, brown, or black, finely reticulate or almost smooth when ripe. Flowering May-August, and possibly throughout the year.

*Distribution:* Widely cultivated and naturalized in the Dry Zone, especially along roadsides and in abandoned fields and waste areas. It is a plant of ancient cultivation and its area of origin is not known with certainty, although probably Africa or possibly India.

*Ecology:* A plant confined apparently to the Dry Zone with no known populations from the areas around Colombo where *S. radiatum* is known.

*Notes:* It has often been confused with *S. radiatum* but can readily be distinguished on the basis of its beaked capsule, finely reticulate or smooth seeds, and usually deeply divided or compound lower leaves.

*Illustrations:* Bot. Mag. t. 1688. 1814.

Specimens Examined: JAFFNA DISTRICT: along roadside near Hwy. marker 171, just north of Elephant Pass on Hwy. A-9, *Theobald & Grupe* 2331 (A, E, K, L, LE, NY, PDA, UC, US); Jaffna, *Gardner s.n.*, part of C.P. 2023 (PDA). MATALE DISTRICT: Pelwehera, Dambulla, *Alston* 2402 (K, PDA).

Vern. **Tel-tala** (*S*)., **Ella**, (*T*).

**2. Sesamum radiatum** Schumach. in Schumach. & Thonn., Beskr. Guin. Pl. 282. 1827. **Fig. 2C.** Trim. Fl. Ceyl. 6:221.

*Sesamum occidentale* Regel & Heer, Ind. Sem. Hort. Turic. 1842, *ex* DC. Prod. 9:250. 1845.

Strong smelling, usually branching, erect annual herbs, 2-12 dm high; stems and branches obtusely quadrangular in upper part, furrowed. Leaves variable, the lower ovate-elliptical, never deeply divided or compound, long petioled, the upper ovate to narrowly oblong or elliptical, 3-13 cm long, 1-8 cm broad, base rounded to cuneate, margin entire to coarsely dentate, apex acute or obtuse; petioles of lower leaves 2-6 cm long, on upper leaves usually reduced to only a few mm. Pedicels 4-7 mm long. Calyx very deeply divided, segments lanceolate, 4-7 mm long, ca. 2 mm broad. Corolla pinkish-violet to whitish-violet without, similar and spotted purple within, densely pubescent without, glabrous or sparsely pubescent within, 3-4 cm long. Ovary densely tomentose; style glabrous; lips of stigma lanceolate. Capsule erect, oblong, 22-30 mm long, 7-9 mm broad, densely pubescent, apex rounded or very obtuse, not conspicuously beaked. Seeds ca. 2 mm long, brown or black, with transverse ridges emanating from a central field on the broad surfaces, especially the flatter one. Flowering May-August, and probably throughout the year.

*Distribution:* Known from the vicinity of Colombo north to Negombo. Trimen reported it to be "a common weed in waste places about Colombo and elsewhere", and noted that it "no doubt spread from the Botanic Gardens". It is native to tropical West Africa and has become widespread in the Old World tropics, including India, Southeast Asia and Indonesia.

*Ecology:* It is primarily a weedy species of the more moist areas around Colombo. It has not been reported from the Dry Zone where *S. indicum* is widely cultivated.

*Notes:* It has often been confused with *S. indicum*. However, it can readily be separated on the basis of unbeaked capsule, ridged seed surface, and absence of deeply parted or compound lower leaves.

Specimens Examined: COLOMBO DISTRICT: along railroad tracks 0.3 miles north of Seeduwa Rd. crossing below Negombo Airport, *Theobald & Grupe* 2375 (A, E, K, L, NY, PDA, UC, US); Katunayake, near Negombo, *Alston* 2387 (PDA); Colombo, *s. coll.*, part of C.P. 3852, (PDA). KANDY DISTRICT: Royal Botanic Gardens, Herb. Ground, *Trimen s.n.*, I-1893, (PDA); Herb. Ground. *s. coll.*, 14-II-1905 (PDA); near head office, Peradeniya Garden, *T. Appuhamy s.n.*, 14-X-1955 (PDA).

**3. Sesamum prostratum** Retz., Obs. 4:28. 1779. **Fig. 2D.**

Strong smelling, abundantly branched, prostrate herbs; stems and branches obtusely quadrangular in upper part, furrowed, villous-tomentose. Leaves small, broadly ovate to obovate rarely shallowly 3-lobed, 6-17 mm long, 6-16 mm broad; base rounded, margin crenate-dentate, apex rounded, sparsely pubescent on upper surface, densely covered with villous hairs on veins below, numerous white mucigenous hairs between veins below; petioles 1-2 mm long. Pedicels 1-2 mm long. Calyx lobes nearly free to base, lanceolate, ca. 5 mm long, ca. 1 mm broad. Corolla reddish to pinkish-violet without, similar with purple flecks and spots within, densely pubescent without, 20-30 mm long. Capsule ovate-oblong, 6-12 mm long, 4-9 mm broad, densely villous and with white mucigenous hairs, apex rounded and truncated, beaked. Seeds ca. 2 mm long, black, reticulate-pitted. Flowering May-August, and possibly throughout the year.

*Distribution:* Known only from the southeast coast at Panama, on the sea shore. Also found along coasts of southern India.

*Illustrations:* Wight, Ic. Pl. Ind. Or. 4: t. 1346. 1848.

Specimens Examined: AMPARAI DISTRICT: Panama, on the sea shore, common, *F. Lewis s.n.*, VIII-1914 (PDA).


Fig. 2. Pedaliaceae. *Sesamum indicum* L.: *A*, Habit, × 2/3; *B*, Lower leaf, × 2/3. *Sesamum radiatum* Schumach. & Thonn.: *C*, Mature fruit, × 2/3. *Sesamum prostratum* Retz.: *D*, Habit, × 5/6. *Pedalium murex* L.: *E*, Mature fruit, × 1.

# GESNERIACEAE

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Acaulescent or caulescent herbs, or slightly woody shrubs, occasionally epiphytic, sometimes 1-foliate and the leaf cotyledonary in origin. Leaves usually opposite, sometimes whorled or alternate, simple, entire or toothed; stipules absent. Inflorescence axillary or terminal, usually a simple or compound dichasium, occasionally solitary, pseudo-racemose, or congested and sub-capitate. Bracts usually small or absent. Flowers nearly always hermaphroditic, often protandrous, usually irregular (regular in *Championia*), often large and showy. Calyx 5-merous, divided to base, or tubular and 5-lobed or parted. Corolla 5-merous, rarely 4 (*Championia*), gamopetalous, usually with distinct tube and 2-lipped; lobes imbricate, adaxial pair usually interior. Stamens usually 2 or 4, inserted on corolla tube; anthers usually connate or connivent in pairs, rarely connivent as 4, or free; staminodia often present. Disk annular, cupular, one-sided, or represented by 1-5 distinct glands. Ovary superior, unilocular with 2 bifid, usually intrusive, parietal placentae, occasionally meeting in center (bilocular); ovules numerous; style simple; stigma simple, or variously lobed. Fruit usually a capsule splitting loculicidally, sometimes septicidal or circumscissile, occasionally a hard or soft, fleshy berry. Seeds numerous, small, sometimes with hair-like appendages at either end.

*Distribution and Ecology:* A large family of about 120 genera and 2000 species, widespread in the tropics and subtropics of the New and Old World. Ten of the 14 taxa represented in Ceylon are apparently endemic, and generally of a rather restricted distribution. Known localities are primarily undisturbed sites in the moist montane and lowland forests of the central and southwestern parts of the island. Most are found in dense shade on either moist rock outcrops or in stream beds. Occasionally they are found exposed in rock crevices or on rock surfaces where there is abundant underground seepage. Nearly all of the taxa are known from only a few collections. They are also apparently unable to cope with the disturbing influences of man on their environment.

*Discussion:* The above family description has largely been confined to Old World representatives of the family, the subfamily Cyrtandroideae. Members of this subfamily have a superior ovary, usually cymose inflorescences, and cotyledons which become unequal after germination. Aside from three species of *Rhyncholglossum* they are all confined to the Old World. The New World representatives, the subfamily Gesnerioideae, have a superior, or more or less inferior ovary, usually racemose inflorescences, and cotyledons which remain equal after germination.

For an excellent series of works on the Gesneriaceae of the Old World see the articles published in the *Notes from the Royal Botanic Garden, Edinburgh* by B. L. Burtt and colleagues at that institution. These include: *Studies in the Gesneriaceae of the Old World*, a continuing series begun in volume 21, 1954. Numbers I and II (1954) include a general introduction and discussion of types and lectotypes of certain genera and groups of lower rank, respectively. Number 24 (1963) includes a tentative key to the tribes and genera. At the same institution and in the same journal J.A. Rattner (1963), alone, and in conjunction with H. T. Prentice (1964, 1967), has published a valuable series on chromosome numbers in this family. A translation from Russian of Dr. L. I. Ivanina's studies of the fruit and seeds of representative Gesneriads has also been published in this journal (Application of the carpological method to the taxonomy of Gesneriaceae. *Notes Roy. Bot. Gdn. Edinb.* 26:383-403. 1966.).

Four of the five tribes recognized by Burtt are represented in Ceylon; Cyrtandreae (*Rhynchotechum*), Trichosporeae (*Aeschynanthus*), Klugieae (*Rhynchoglossum*, *Epithema*), and Didymocarpeae (*Championia*, *Didymocarpus*, and *Chirita*). The last two genera mentioned are the largest in the country with three and five taxa, respectively. The Loxonieae, a small tribe of 4 genera, is not represented.

## KEY TO THE GENERA

1. Inflorescence a simple or compound dichasium, sometimes reduced to 1-2 axillary flowers
   2. Fruit dehiscent, oblong to long-linear; pericarp thin, dry; fertile stamens 2 or 4, variously connate or connivent; leaves basal, opposite, or whorled, if alternate borne along creeping rhizome.
      3. Fertile stamens 4.
         4. Corolla 5-merous, red, tubular, limb 2-lipped; stamens didynamous; inflorescence 1-2 flowered in axils of terminal leaves; seeds with hair-like appendage at each end. **1. Aeschynanthus**
         4. Corolla 4-merous, white, campanulate-rotate, regular; stamens equal, connivent; inflorescence a compound dichasium, lax, seeds unappendaged. **4. Championia**

3. Fertile stamens 2.

5. Acaulescent herbaceous perennials, or caulescent with a creeping rhizome; corolla tube without yellow stripe and longitudinal ridges within; anthers without tuft of hairs on back. **2. Didymocarpus**

5. Caulescent herbs or shrubs; corolla tube with a yellow stripe and 2 longitudinal ridges within; anthers with a tuft of hairs on back. **3. Chirita**

2. Fruit indehiscent, ovoid; pericarp fleshy; fertile stamens 4, free; leaves alternate, borne at end of erect stem. **7. Rhynchotechum**

1. Inflorescence pseudo-racemose, or congested and sub-capitate with a large, solitary, leafy bract.

6. Inflorescence pseudo-racemose; bracts inconspicuous, linear; leaves unequal-sided at base; corolla with oblique limb, personate; fertile stamens 4. **5. Rhynchoglossum**

6. Inflorescence congested and sub-capitate; bract solitary, large, leafy; leaves equal sided at base; corolla obscurely 2-lipped; fertile stamens 2. **6. Epithema**

## 1. AESCHYNANTHUS Jack

Trans. Linn. Soc. 14:42. 1823. *Nomen conservandum.*

*Trichosporum* D. Don, Edinb. Phil. Journ. 7:84. 1822.

Subshrubs, epiphytic or scrambling on rocks, usually with many, slender branches. Leaves opposite or whorled, fleshy or coriaceous, usually entire, veins obscure. Inflorescence terminal or axillary, 1-2 flowered, rarely dichasial or clustered, often appearing umbellate. Calyx tubular or campanulate, 5-lobed, sometimes deeply divided. Corolla showy, tubular-funnelform, curved, 5-lobed; upper lobes erect, lower larger and reflexed. Stamens 4, didynamous, exserted; anthers coherent in pairs by their tips, protandrous. Disk annular. Ovary 1-loculed with 2 deeply intruding, recurved, parietal placentae. Style slender, stigma capitate with a horizontal median groove. Fruit a capsule, long-linear, cylindrical, 2-valved, loculicidally dehiscent. Seeds numerous, small, oblong, with a thick appendage at each end, or with a long hair at the apex, and 1 or more hairs at the base.

*Distribution:* A genus of about 80 species particularly abundant in the Indomalaysian region and southern China. Only one representative in Ceylon, *A. ceylanica.* For a discussion of the generic limits of this genus and other members of the tribe Trichosporeae see: B. L. Burtt, Studies in the Gesneriaceae of the Old World XXIX: A reconsideration of generic limits in the tribe Trichosporeae. *Notes Roy. Bot. Gdn. Edin.* 28:219-225. 1968.

**Aeschynanthus ceylanica,** Gardn. Calcutta J. Nat. Hist. 6:474. 1846. **Fig. 3.** Trim. Fl. Ceyl. 3:272.

Stems long, slender, cylindrical, scandent, often rooting at the thickened nodes; bark smooth and shiny, yellowish. Leaves thick and fleshy, scattered, pale green above, whitish-green below, oblanceolate to narrowly elliptical, 4.5-9 cm long, 1.2-2 cm broad, base tapering into petiole, margin entire, apex acute to obtusely acuminate, glabrous; petioles short, thick, 2-6 mm long. Inflorescence pseudo-terminal; flowers 1-2 in axils of terminal leaves. Calyx segments divided to near base, linear-lanceolate, apex obtuse, glabrous, ca. 6 mm long, 1 mm broad. Corolla tube scarlet, ca. 25 mm long, 2.5 mm broad at base, 4-5 mm broad at throat, glandular-pubescent without, yellowish and glandular-pubescent within; throat squarish; lower 3 lobes, ca. 4 mm long, 3 mm broad, yellowish-green with a purplish-red blotch near base and scattered purplish-red flecks and stripes in front, green on back, glandular-pubescent on both surfaces, and especially along margins; upper 2 lobes slightly smaller, ca. 3 mm long, 3 mm broad, yellow with dull reddish-purple flecks and stripes in front, reddish-green on back, glandular-pubescent on both surfaces and especially along margin. Filaments violet, glandular-pubescent, upper pair ca. 22 mm long, lower ca. 18 mm long; anthers ca. 2.5 mm long, 1.5 mm broad, reddish-purple towards filament, yellowish-green above; sacs parallel, glabrous; staminode glabrous, ca. 8 mm long. Ovary glabrous; style ca. 18 mm long at maturity; stigma purple, ca. 1.5 mm long, 2 mm broad. Capsule straight or curved, ca. 15 cm long, 3 mm broad, glabrous, base empty and narrower, gynophore-like. Seeds with one long hair at each end, hairs ca. 1 cm long; seeds brown, rugose. Flowering in March, August-October, and probably throughout the year.

*Distribution:* Endemic. Climbing and rooting over rock surfaces and on trees in the montane

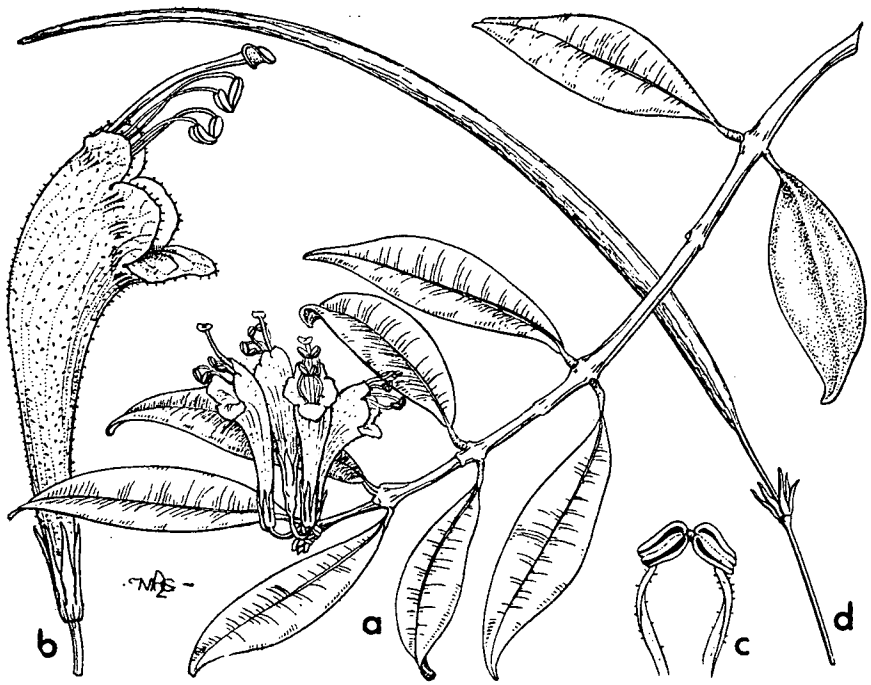


Fig. 3. *Aeschynanthus ceylanica* Gardn.: *a*, Flowering branch, × 5/6; *b*, Flower, × 2 2/3; *c*, Anthers, × 3 1/3; *d*, Mature fruit, × .88.

forests at elevations above approximately 1300 meters. Reported to be common by Trimen.

*Ecology:* Flowers exhibit extreme protandry with style and stigma deeply included in the tube at anthesis, and only expanding as the stamens begin to wither. Pollinators, unfortunately, were not observed.

*Notes:* Clarke (DC., Mon. Phan. 5:26. 1883) has described a variety, var. *pinguis*, from Ceylon and India, but neither Trimen nor we have seen it on the island. The material at Kew from Ceylon (*Mrs. Walker* 28, *Wight s.n.*), which was cited by Clarke for this variety, is definitely typical *A. ceylanica*. Additional material from India (*Pycarah*, *Wight s.n.*), which was also referred to this variety by Clarke, is in all probability typical *A. perrottetii*, a species common in southern India. Gamble (Flora of Madras 2:985. 1921) notes that var. *pinguis* is a smaller form of *A. perrottetii*. The latter species is apparently very closely allied to *A. ceylanica*, and possibly of identical coloration. It differs somewhat in leaf shape and in having the corolla slightly longer and glabrous (?) without. Cooke (Flora of the Presidency of Bombay 2:396. 1958 reprint) thought the two taxa possibly conspecific. *Aeschynanthus ceylanica* may be a smaller flowering subspecies of this taxon, but we hesitate in making the transfer until further evidence is obtained from critical examination of more *A. perrottetii* material.

Specimens Examined: KANDY DISTRICT: Hantane, *Gardner s.n.*, *part of C.P.* 1782 (PDA). NUWARA ELIYA DISTRICT: Ramboda, *Gardner* 599 (K, PDA); Ramboda, *Thwaites s.n.*, X-1853, *part of C.P.* 1782 (BM, K, PDA) jungle above Hakgala, *de Silva s.n.*, 15-III-1906 (PDA); Hakgala, *Simpson* 9080 (BM); montane forest behind Hakgala Botanic Garden, *Theobald & Grupe* 2396 (E, K, PDA, UC, US). LOCALITY UNKNOWN: *Col. Walker s.n.* (K); *Wight s.n.* (K); *Mrs. Walker* 28 (K); *Petch s.n.* (PDA).

## 2. DIDYMOCARPUS Wall.

Edin. Phil. Journ. 1:378. 1819. *nomen conservandum*

*Roettlera* Vahl, Enum. 1:88. 1805. non Willd. 1797.

*Henckelia* Spreng. Anheit. ed. 2, 2:402. 1817.

*Roettlera* subgen. *Didymocarpus* (Wall.) K. Fritsch, *in* Engler & Prantl, Naturl. Pflanzenfam. 4, (3B): 148. 1895.

Perennial, acaulescent or caulescent, herbs. Leaves simple, opposite, alternate or basal. Inflorescence a scapose, paniculate, compound dichasium (in ours), axillary. Bracts inconspicuous. Calyx small, 5-lobed or divided. Corolla campanulate; tube curved, oblique at throat; lobes 5, unequal, rounded. Stamens 2, inserted near base of corolla tube; filaments short, curved; anthers connate, applanate, bilocular, locules confluent. Staminodia 2, rarely 3, small, swollen at tip. Ovary unilocular with 2 intruding, recurved parietal placentae; style slender; stigma oblique, subcapitate, capitate, or flattened, expanded and orbicular. Fruit a linear capsule, loculicidally dehiscent. Seeds small, elliptical, smooth or reticulate.

*Distribution:* A large and widespread genus of approximately 120 species, extending from tropical Africa and Madagascar east through the Indomalaysian region and South East Asia south to Australia. Represented in Ceylon by three species, two of which are endemic, *D. floccosus*, and *D. zeylanicus*.

KEY TO THE SPECIES

1. Rhizome erect, short; leaves in basal rosette, usually rugose; petiole winged; corolla tube without prominent dark veins; capsules pubescent.
   2. Peduncles and calyx villous, corolla tube not distinctly inflated and constricted at throat. **1. D. humboldtianus**
   2. Peduncles and calyx floccose-tomentose, corolla tube distinctly inflated and constricted at throat. **2. D. floccosus**
1. Rhizome creeping, elongate; leaves scattered along rhizome, not rugose; petiole unwinged; corolla tube with prominent dark veins; capsules glabrous. **3. D. zeylanicus**


Fig. 4. *Didymocarpus. D. humboldtianus* Gardn.: *a*, Habit, × 2/3. *D. floccosus* Thwaites: *b*, Flower, × 1 1/3. *D. zeylanicus* R. Br.: *c*, Habit, × 2/3.

**1. D. humboldtianus** Gardn. Calcutta J. Nat. Hist. 6:477. 1846. **Fig. 4a.** Trim. Fl. Ceyl. 3:273.

*Didymocarpus primulaefolia* Gardn. Calcutta J. Nat. Hist. 6:478. 1846.

*Didymocarpus humboldtianus* var. *primulaefolia* (Gardn.) Thwaites, Enum. Pl. Zeyl. 207. 1860.

*Didymocarpus humboldtianus* var. *recedens* C.B. Cl., DC., Mon. Phan. 5:103. 1883.

*Roettlera humboldtiana* O. Kuntze, Rev. Gen. 2:476. 1891.

Rhizome erect, short, thickened. Leaves basal, numerous, ovate to ovate-oblong, 3.5-23 cm long, 3-11 cm broad, base rounded or obtuse, and then abruptly tapering and decurrent on the petiole, rarely acute or truncated, margin shallowly to coarsely dentate-crenate, apex rounded, surface usually rugose, venation conspicuous, villous-tomentose above and below when young, becoming less so with age above, rarely sparsely pubescent; petiole usually winged to base, ca. 1-10 cm long. Inflorescences usually several; peduncles villous, minutely glandular, 5-25 cm long; bracts linear-oblong, villous, 3-8 mm long, ca. 1 mm broad; pedicels slender, 3-20 mm long. Calyx very deeply divided, segments linear-oblong, 2-4 mm long, ca. 1 mm broad, apex obtuse, villous and glandular. Corolla very variable in size; tube not constricted at throat, 5-7 mm long above, 10-15 mm long below, pure white to pale pink or violet without, pure white, or white with a yellow spot within, glandular-pubescent without, glabrous within; throat 4-7 mm long, 3-5 mm broad; lobes white to pale pink or violet, rounded, pubescent towards back, glabrous in front, lower three lobes 3.5-10 mm long, 5-12 mm broad, upper 2 lobes smaller, 2-6 mm long, 3.5-8 mm broad. Filaments glabrous or sparsely pubescent, 3-4 mm long; anthers yellow, glabrous, ca. 2 mm broad; 3 staminodia glabrous, two ca. 2 mm long, slightly swollen and tapering at tip, other small, indistinct. Ovary oblong, pubescent; style glabrous; stigma subcapitate. Capsule linear, cylindrical, straight or slightly curved, tapering at tip, 15-25 mm long, ca. 1.3 mm broad at base, glandular-pubescent, usually dehiscing along one side. Flowering throughout the year, although individual populations apparently bloom intermittently.

*Distribution:* One of the most widespread members of the family in Ceylon. Principally in the montane region at elevations up to about 1700 meters. Also found in the intermediate and dry regions, and reported by Trimen from the moist low country. Reported from southern India (Gamble, Flora of Madras 2:989. 1921).

*Ecology:* Principally in rock crevices and on small pockets of soil on rock surfaces; Mostly in the shade, but occasionally on exposed surfaces where moist. There is considerable variation in flower size, color, and size of plants throughout its range, but no consistent patterns have yet been discerned which warrant recognition.

The flowers are protandrous with the stigma arching over the throat after anthesis. Pollinators were not observed.

*Illustrations* : Bot. Mag. t. 4757. 1853.

Specimens Examined: BADULLA DISTRICT: road, Haputale—Diyatalawa, *de Silva s.n.*, 23-V-1906 (PDA); Ooma Oya, *s. coll.*, in 1880 (PDA). KANDY DISTRICT: near summit of Hantane Mt. No. 2, Kandy, *Theobald & Grupe* 2313 (PDA, US); below summit of Hantane Mt. No. 1, Kandy, *Theobald & Grupe* 2334 (BM, NY, PDA, UC, US); rock cliff on summit of Hantane Mt. No. 1, Kandy, *Theobald & Grupe* 2327, 21-VII-1968 (E, PDA, US); *Theobald & Grupe* 2395, 13-VIII-1968 (A, E, PDA, RSA, UC, US); Hantane, *Gardner s.n., part of C.P.* 1785 (PDA), *Gardner* 601 (BM, K,); Hantane, *Thwaites s.n.*, in 1857, *part of C.P.* 1785 (BM, K, PDA); Kandy, *Moon* 698 (BM); base of Kabaragala Mt. behind Raxawa tea estates east of Dolosbage, *Theobald & Grupe* 2358 (PDA, UC, US); Tamaravelly area east of Craighead tea estate, 8 mi south of Gampola, *Theobald & Grupe* 2399 (PDA, US); Hunnasgiriya, *s. coll.*, 23-VIII-1900 (PDA); Corbet's Gap, *Simpson* 9443 (BM); near Madugoda on the Urugala rd. *Simpson* 8786 (BM). MATALE DISTRICT: Sigiriya, *Gardner s.n., part of C.P.* 1784 (PDA); Matale, *Thwaites s.n.*, in 1862, *part of C.P.* 1784 (BM, PDA). NUWARA ELIYA DISTRICT: forest behind Hakgala Botanic Garden, *Theobald & Grupe* 2302, 28-VI-1968 (US); *Theobald & Grupe* 2397, 14-VIII-1968 (A, E, K, LE, PDA, UC, US); south boundary, Hakgala, *de Silva s.n.*, 12-IV-1906 (PDA); Ramboda, 4,500 ft., *Gardner* 600 (BM, K), *part of C.P.* 1784 (PDA). DISTRICT UNKNOWN: Condegalea jungle, *Alston* 1726 (K, PDA). LOCALITY UNKNOWN: *Macrae* 245 (BM); *Col. Walker* 184 (K); *Mrs. Walker* 1291 (K); *Mackenzie s n.*, in 1839 (K); *Thomson s.n.*, in 1845 (K).

**2. Didymocarpus floccosus** Thwaites, Enum. Pl. Zeyl. 207. 1860. **Fig. 4b.** Trim. Fl. Ceyl. 3:274.

*Roettlera floccosa* O. Kuntze, Rev. Gen. 2:476. 1891.

Rhizome erect, short, stout. Leaves basal, numerous, rhomboid-ovate, 7-15 cm long, 4-9.5 cm broad; base gradually tapering and decurrent on petiole, margin shallowly serrate-crenate, apex obtuse or acute, surface rugose, venation conspicuous, very densely floccose-tomentose above and below, especially when young, becoming less so with age above. Inflorescences usually several, peduncles densely floccose-tomentose, 9-22 cm long; bracts oblong, tomentose, 4-6 mm long, ca. 1 mm broad; pedicels slender, tomentose, 5-10 mm long. Calyx very deeply divided, segments oblong, floccose-tomentose, 3-4 mm long, ca. 1 mm broad. Corolla tube inflated and then constricted at the throat, ca. 6 mm long above, 15 mm long below; white without, white with a yellow spot within, pubescent without, glabrous within; throat ca. 3 mm square; lobes pale violet, rounded, pubescent

towards back, glabrous in front; lower 3 lobes ca. 8 mm long, 8 mm broad, upper 2 lobes ca. 6 mm long, 8 mm broad. Filaments glabrous, ca. 3.5 mm long; anthers with violet spots, glabrous, ca. 2 mm broad; staminodia glabrous, 2 slightly swollen at tip, ca. 1.8 mm long; other not swollen, ca. 1.2 mm long. Ovary oblong, densely pubescent; style glabrous, stigma capitate. Capsule linear, cylindrical, usually straight, tapering at tip, 12-23 mm long, ca. 1.8 mm broad at base, pubescent, dehiscing along one side. Flowering July-September, no other data available.

*Distribution:* Endemic. Known only from the vicinity of the type locality at elevations of about 650 meters.

*Ecology:* The only observed population was found growing in rock crevices and on rock faces in a very open area adjacent to a tea plantation. There appeared to be considerable underground seepage.

*Notes:* As far as it is known this species had only been collected once on the island and at the time of its discovery by Thwaites. We have since rediscovered it, and it is possible that both collections have been made in the same area. Thwaites' type locality was the Raxawa estate, Dolosbage. This estate is presently very small and west of the town. Field work in this area only revealed populations of *D. humboldtianus* at elevations higher than that noted by Thwaites. At lower elevations the area has been completely converted to tea. Our collection, however, was made to the east of Dolosbage but at an elevation equal to that of Thwaites. Within a few miles of this collection of *D. floccosus* one finds typical populations of *D. zeylanicus* and *D. humboldtianus*. The latter is clearly the most closely allied of the two species, but can readily be distinguished by leaf and pubescence characters, flower color, and the absence of the inflated tube and constricted throat characteristic of *D. floccosus*.

*Illustrations:* Bot. Mag. t. 5161. 1860. (*D. primulaefolia*).

Specimens Examined: KANDY DISTRICT: Raxawa, Dolosbage, *Thwaites s.n.*, in 1855, *C.P.* 3368 (BM, K, PDA). KEGALLA DISTRICT: just east of waterfalls, ca. 3 mi east of Dolosbage, *Theobald & Grupe* 2403 (A, BO, E, K, LE, NY, PDA, SING, UC, US).

**3. Didymocarpus zeylanicus** R. Br. in Benn., Pl. Jav. Rar. 119. 1840. **Fig. 4c.** Trim. Fl. Ceyl. 3:274.

*Didymocarpus longipetiolata* Gardn., Calcutta J. Nat. Hist. 6:475. 1846.

*Roettlera zeylanica* O. Kuntze, Rev. Gen. 2:477. 1891.

Rhizome prostrate, elongate, branching, not appreciably thickened. Leaves few, scattered along rhizome, usually closely placed, long-petioled, ovate to orbicular, 4-8.5 cm long, 3.5-7.5 cm broad, base cordate to rounded, margin crenate-dentate to serrate, apex acute or obtuse, surface smooth (not rugose), only main vein evident, silky-pubescent above and below; petioles silky-pubescent, 3-20 cm long. Inflorescences usually few, only in axils of last few terminal leaves; peduncles villous to sparsely pubescent, ca. 7-15 cm long; bracts lanceolate, pubescent, 2-4 mm long, ca. 1 mm broad; pedicels sub-filiform, sparsely pubescent, 3-10 mm long. Calyx very deeply divided, segments linear, obtuse, spreading, sparsely pubescent, 3-5 mm long, ca. 1 mm broad. Corolla tube slightly gibbous at base, slightly constricted at the throat, ca. 11 mm long above, ca. 13 mm long below, a diffuse pinkish-violet with prominent darker veins without, color similar within, very sparsely pubescent without, glabrous within; lobes white to very pale pink, rounded, sparsely pubescent on back, glabrous in front; lower 3 lobes 6-9 mm long, 6-9 mm broad; upper 2 slightly smaller. Filaments glabrous, ca. 2.5 mm long; anthers glabrous, ca. 2 mm broad; 3 staminodia glabrous, 2 slightly swollen at tip, ca. 1.2 mm long, other minute. Ovary oblong, glabrous; style glabrous; stigma oblique, flattened, orbicular, formed from expansion of lower portion, margin entire or fimbriate, ca. 2 mm long, 1.5 mm broad. Capsule linear, cylindrical, usually straight or slightly curved, long-tapering at tip, 18-32 mm long, 1-1.5 mm broad at base, glabrous, dehiscing along one side. Flowering December-March (Trimen), and July-August; possibly throughout the year.

*Distribution:* Endemic. Known from the montane region around Adam's Peak north to the Dolosbage area at elevations between 900 and 2000 meters.

*Ecology:* Found in dense shade on rock surfaces near streams, and also in loose soil near rock areas in the forests. Rarely found at base of trees. Populations apparently bloom intermittently throughout the year with all plants within populations blooming at the same time.

Specimens Examined: KANDY DISTRICT: near Carolina Tea Factory, 1 mi south of turnoff to Watawala on rd. to Hatton, *Theobald & Grupe* 2359 (E, PDA, US); near Carolina Tea Factory, *Lunnard (?) s.n.*, 19-VI-1950 (PDA); Gartmore, Rosamaliya, *de Silva s.n.*, 29-VII-1924 (PDA); Malgama, Maskeliya, *Trimen s.n.*, V-1891 (PDA); Adam's Peak, *Gardner s.n.*, III-1846, *part of C.P.* 352 (K, PDA); Ambagamuwa, *Gardner s.n., part of C.P.* 352 (PDA). KEGALLA DISTRICT: Windsor Forest east of Dolosbage on rd. to St. Helen's Tea Estate, *Theobald & Grupe* 2401 (PDA, US). LOCALITY UNKNOWN: *Thwaites s.n.*, 8-III-1852, *part of C.P.* 352 (K, PDA); *Mrs. Walker s.n.* (K); *Col. Walker s.n.* (K).

## 3. CHIRITA Buch.-Ham. ex D. Don.

Prodr. Fl. Nep. 89. 1825.

*Roettlera* subgen. *Chirita* (D. Don) K. Fritsch, in Engler & Prantl, Naturl. Pflanzenfam. 4 (3B): 148. 1895.

*Didymocarpus* subgen. *Chirita* (D. Don) Chun, Sunyatsenia 6: 290. 1946.

Caulescent herbs or shrubs. Leaves opposite or whorled, petiolate. Inflorescence axillary, 1-flowered, or a simple or compound dichasium. Calyx large, deeply 5-parted or divided. Corolla large, tubular-funnelform, ventricose; lobes 5, rounded, upper 2 slightly connate, 2-lipped. Stamens 2, inserted near base of tube; filaments flattened, geniculate; anthers connate, applanate, with a tuft of hairs on back. Disk annular or lobed, surrounding base of ovary. Ovary unilocular with 2 intruding, recurved, parietal placentae; style slender, stigma oblique, lower lip flattened, thin, enlarged, sometimes bifid, upper reduced or absent. Fruit a capsule, linear, loculicidally 2-valved, seeds numerous.

*Distribution:* A large genus of about 80 species known from India and Ceylon east through South East Asia and north into Nepal and southern China. The five taxa found in Ceylon are all endemic and found in the moist lowlands and montane region.

*Ecology:* Two of the species, *C. moonii* and *C. walkeri*, are large caulescent shrubs found in rock crevices on steep rock faces. The other two, *C. zeylanica* and *C. angusta*, are caulescent herbs of stream areas in undisturbed forests.

The flowers of all species exhibit a similar floral biology with the anthers united and hinged in such a way that the insect vector is probably dusted with pollen when the geniculate filament arms are disturbed. A broad yellow guide line is also present. The stigma is stabilized between the ridges on the upper part of the tube, and arches over the throat at maturity and after anthesis. The insect vector transmits the pollen upon entering the flower and hitting the stigma. Unfortunately, no pollinators were observed at the times of collection during the rainy season.

*Notes:* Although members of the genus *Chirita* are readily distinguishable from those of *Didymocarpus* on gross morphological grounds, it is difficult to find any one character that is consistent for either group. (See B. L. Burtt, Studies in the Gesneriaceae of the Old World I. General Introduction. *Notes Roy. Bot. Gdn. Edinb.* 21: 185. 1954, and several subsequent articles in this series).

### KEY TO THE SPECIES

1. Caulescent shrubs of rock cliffs; flowers solitary, sometimes 2 in leaf axils, rarely a few-flowered dichasium.
   2. Calyx divided to near base; corolla greater than 7 cm long, lobes bluish to mauve-violet. **1. C. moonii**
   2. Calyx 5-parted, lobes distinct about half way; corolla less than 6 cm long, lobes deep purple. **2. C. walkeri**
1. Caulescent herbs of stream beds or moist areas; flowers in paniculate compound dichasium.
   3. Leaves broadly ovate; corolla reddish violet to purple. **3. C. zeylanica**
   3. Leaves ovate-lanceolate or oblong-lanceolate to elliptical; corolla clear blue-violet. **4. C. angusta**

**1. Chirita moonii** Gardn. Calcutta J. Nat. Hist. 6:479. 1846. **Fig. 5a, b.** Trim. Fl. Ceyl. 3:275.

*Martynia lanceolata* Moon Cat. 45. 1824. nom. nud.

*Roettlera moonii* O. Kuntze, Rev. Gen. 2:476. 1891.

Large, caulescent, irregularly branching shrubs, woody at base. Stems 6-12 dm long, slightly thickened at the nodes, silky pubescent when young, becoming glabrate with age below; leaf scars conspicuous. Leaves bright, light green, numerous at onds of branches, usually whorled, rarely opposite, narrowly oblong-lanceolate to elliptical, 7-14.5 cm long, 1.5-4 cm broad, tapering at both ends, margins entire or minutely glandular-denticulate, apex acute or sub-acuminate, silky-pubescent and shiny above and below, pinnately veined; veins numerous, oblique, conspicuous, especially below; petioles short, silky-pubescent, 0.5-2 cm long. Flowers very large, solitary, or rarely 2 in the upper leaf axils; peduncles silky-pubescent, 2-5 cm long; bracts small, linear, borne on peduncles, 1-2 mm long; ca. 0.5 mm broad. Calyx very deeply divided, separate nearly to base, segments oblong-lanceolate, 20-32 mm long, 3-5 mm broad,


Fig. 5. *Chirita*. *C. moonii* Gardn.: *a*, Flowering branch, × 2/3; *b*, Calyx, × 2/3. *C. walkeri* Gardn.: *c*, Inflorescence, × 2/3: *d*, Calyx, × .8.

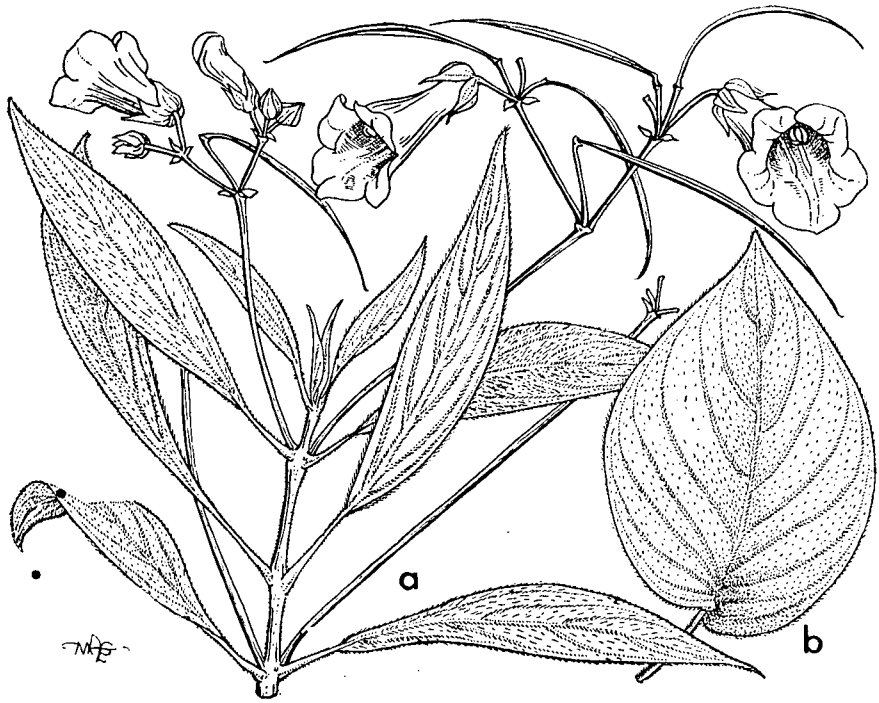


Fig. 6. *Chirita*. *C. angusta* Theobald & Grupe: *a*, Habit, × 2/3. *C. zeylanica* Hook.: *b*, Leaf, × 2/3.

apex acuminate, keeled, silky-pubescent. Corolla large, 7-9.5 cm long; tube ca. 4-6 cm long, ca. 2-3 cm broad at throat, whitish towards base with diffuse pale violet without, similar within but with a broad yellow line, 2 longitudinal ridges evident along length of tube both above and below, style within upper ridges, glandular pubescent on both surfaces; throat distinctly oblique; lobes pale bluish violet to mauve-violet with age; lower 3 lobes spreading, 3 cm long, 3 cm broad; upper 2 lobes slightly smaller. Filaments white, glabrous or sparsely pubescent, swollen at bend, twisted in lower half, lower arm 8-10 mm long, upper arm 5-6 mm long; anthers yellow, ca. 3-4 mm across, tuft of hairs on back 2-3 mm long; staminodia 3, 2 hooked, twisted near base, pubescent with a tuft of hairs near swollen apex, ca. 3 mm long; 3rd smaller. Ovary glabrous; style glandular-pubescent; stigma 2-lipped, lower lip cuneate, truncated, ca. 5 mm long, 3-4 mm broad, upper very small, deltoid, ca. 1.2 mm long, 1.2 mm broad. Capsule linear, glabrous, 7-14 cm long, 3-5 mm broad, persistent on stem. Flowering June-October (Trimen), and possibly at other times.

*Distribution:* Endemic. Known only from a few localities in the vicinity of Kandy at elevations of 500-1500 meters.

*Ecology:* Found in rock crevices on very steep rock cliffs, usually in very open locations. The large shrubs often hang down for a considerable distance.

*Notes:* Although very similar to *C. walkeri* in its habit and vegetative characteristics, the flowers are quite different in size and color.

*Illustrations*: Bot. Mag. t. 4405. 1848.

Specimens Examined: KANDY DISTRICT: near summit of Hantane Mt. No. 1, Kandy, *Theobald & Grupe* 2338 (BM, E, PDA, SING, US); Madugoda—Alutnuvara Rd., *Simpson* 9466 (BM); Hantane, *Gardner s.n., part of C.P.* 1789 (PDA); Rangala, *Alston* 462 (PDA, UC); Doluwa Kande, *s. coll.*, 7-III-1911 (PDA). KEGALLA DISTRICT: above railroad tracks just west of Kaduganawa, *Theobald & Grupe* 2372, 30-VII-1968 (PDA, US); *Theobald & Grupe* 2391, 8-VIII-1968 (A, E, K, PDA, UC, US). LOCALITY UNKNOWN; *Mrs. Walker* 42 (K); *Macrae* 16 (BM).

**2. Chirita walkeri** Gardn., Calcutta J. Nat. Hist. 6:480. 1846. **Fig. 5c, d.** Trim. Fl. Ceyl. 3:275.

*Roettlera walkeri* O. Kuntze, Rev. Gen. 2:477. 1891.

Large, caulescent, irregularly branching shrubs, woody at base. Stems 6-10 dm long, slightly thickened at nodes, silky-pubescent when young, becoming glabrate with age below; leaf scars conspicuous. Leaves bright, light green, numerous at ends of branches, usually whorled, rarely opposite, narrowly lanceolate to ovate-lanceolate or elliptic, 6-12 cm long, 2-4.5 cm broad, margin entire or minutely glandular-denticulate, apex acute or sub-acuminate, silky-pubescent and shiny above and below, becoming less so with age above; veins numerous, oblique, conspicuous, especially below; petioles short, silky-pubescent, 0.5-4 cm long. Inflorescence axillary, flowers 1-2 in the leaf axils, or a simple dichasium, rarely compound and few-flowered; peduncles 3-6.5 cm long; pedicels where present 5-9 mm long; bracts small, linear, 2-5 mm long, ca. 1 mm broad. Calyx 5-lobed, tube 6-8 mm long, 2-3 mm broad; lobes distinct to about the middle, linear-lanceolate, keeled, apex acuminate, silky-pubescent, 4-14 mm long, 1-2 mm broad. Corolla 4-6 cm long; tube 25-32 mm long, 15-20 mm broad at throat, white with diffuse purple without, similar within but with a broad yellow line below, 2 longitudinal ridges evident along length of tube above and below, style within upper ridges, glandular-pubescent on both surfaces; lobes deep purple, lower 3 lobes 7-10 mm long, 9-14 mm broad; upper 2 lobes slightly smaller; filaments white, glabrous or sparsely pubescent, swollen at bend, twisted in lower half, lower arm ca. 5 mm long, upper arm ca. 6 mm long; anthers yellow, ca. 2 mm broad, tuft of hairs on back ca. 1.5 mm long; staminodia 3, 2 hooked, twisted near base, pubescent and with a tuft of hairs near swollen apex, ca. 1.5 mm long, 3rd smaller. Ovary glabrous; style glandular-pubescent, stigma 2-lipped, lower lip cuneate, truncated, ca. 2 mm long, ca. 2 mm broad, upper lip very small, deltoid, 0.5 mm long. Capsule long-linear, glabrous, 4-13 cm long, 1-2 mm broad, persistent on stem. Flowering throughout the year (Trimen).

*Distribution:* Endemic. Subspecies *walkeri* is known only from elevations above 1,400 meters in the Kandy and Nuwara Eliya districts, while subsp. *parviflora* is only known from elevations below 300 meters in the Kalutara District.

*Ecology:* Occupies habitats identical to those of *C. moonii*.

KEY TO THE SUBSPECIES

1. Inflorescence a simple dichasium or reduced to 1-2 flowers; calyx lobes 10-14 mm long. **2a.** *subsp.* **walkeri**

1. Inflorescence usually a few-flowered, compound dichasium, sometimes simple; calyx lobes 4-7 mm long. **2b.** *subsp.* **parviflora**

**2a. Chirita walkeri** subsp. **walkeri.**

Inflorescence axillary, a simple dichasium or reduced to 1-2 flowers; calyx lobes 10-14 mm long; corolla 35-42 mm long.

*Distribution:* This subspecies is known from only a few localities between Kandy and Horton Plains in the Nuwara Eliya District.

*Illustrations* (Fig. 5c, d): Bot Mag. t. 4327. 1847.

Specimens Examined: KANDY DISTRICT: base of Kabaragala Mt. behind Raxawa tea estate east of Dolosbage, *Theobald & Grupe* 2357 (E, PDA, UC, US); Raxawa, *Thwaites s.n.*, in 1855, *part of C.P.* 2843 (PDA). NUWARA

ELIYA DISTRICT: Pidurutalagala, *Thwaites s.n.*, in 1851, *part of C.P.* 2843 (PDA): Hakgala Bot. Gdn., from a cutting originally brought from Horton Plains in 1903, *s. coll.*, 11-X-1906 (PDA).

**2b. Chirita walkeri** subsp. **parviflora** (C.B. Cl.) comb. nov.

*Chirita walkeri* var. *parviflora* C.B. Cl., DC., Mon. Phan. 5:112. 1883.

Inflorescence axillary, usually a few-flowered, compound dichasium, sometimes simple; calyx lobes 4-7 mm long; corolla 32-37 mm long.

*Distribution:* Known from only two localities in the Kalutara District.

Specimens Examined: KALUTARA DISTRICT: Rayigam Korale, *Thwaites s.n.*, in 1855 (?), *part of C.P.* 542 (PDA); Pasdun Korale, *Thwaites s.n.*, VIII-1865, *part of C.P.* 542 (PDA).

**3. Chirita zeylanica** Hook., Bot. Mag. t. 4182. 1845. Trim. Fl. Ceyl. 3:276. **Fig. 6b.**

*Chirita communis* Gardn., Calcutta J. Nat. Hist. 6:481. 1846.

*Roettlera communis* O. Kuntz, Rev. Gen. 2:476. 1891.

Caulescent, often branching, herbs, silky-pubescent, 10-35 cm high. Leaves opposite, bright green, paler beneath, fleshy (drying thin), ovate, 9-15 cm long, 4.5-8.5 cm broad, base rounded or sub-cordate, margin entire, apex acute, silky-pubescent to strigose above and below, pinnately veined; veins oblique, conspicuous below; petioles pubescent, 2-9 cm long. Inflorescence a paniculate, compound dichasium; peduncles glabrous to sparsely pubescent, 7-13 cm long; bracts ovate, caducous, 2-5 mm long, 2-4 mm broad; pedicels 5-12 mm long. Calyx segments free or weakly coalescent below, broadly ovate-lanceolate to lanceolate, glabrous, 8-17 mm long, 4-6 mm broad. Corolla 2.5-4 cm long; tube 25-30 mm long, 10-15 mm broad at throat, usually pinkish-white to reddish-purple without, white with a broad yellow line within, 2 longitudinal ridges evident along length of tube both above and below, style within upper ridges, glabrous on both surfaces; throat sub-orbicular in outline; lobes reddish-violet to purple, lower 3 lobes 5-8 mm long, 6-10 mm broad, upper 2 slightly smaller. Filaments white, glabrous to very sparsely pubescent, swollen at bend, twisted in lower half, lower arm 4-5 mm long, upper arm ca. 6 mm long; anthers yellow, ca. 2 mm broad, tuft of hairs on back ca. 1 mm long; staminodia 3, 2 hooked, twisted near base, pubescent and with a tuft of hairs near swollen apex, ca. 3 mm long, 3rd smaller. Ovary linear, glabrous; style glandular-pubescent; stigmatic upper lobe not evident, lower lobe greatly expanded laterally into rhomboidal or elliptical flattened plate, 2 mm high, 4 mm broad. Capsule long-linear, glabrous, 5-10 cm long, 1-1.5 mm broad. Flowering in March and June-August; probably irregularly throughout the year.

*Distribution:* Endemic. Rather common in undisturbed montane forests of the moist and intermediate zones at elevations above ca. 750 meters.

*Ecology:* The species appears to be confined to rocky areas in and along stream beds of undisturbed forests; usually in dense shade. It is very closely allied to *C. angusta*, but can readily be distinguished by leaf size and shape, and especially flower color.

*Illustrations*: Bot. Mag. t. 4182. 1845. (color inaccurate)

Specimens Examined: KANDY DISTRICT: 3 mi from Kotmale on Rd. to Nawalapitiya, *Theobald & Grupe* 2311 (A, BO, E, K, PDA, SING, UC, US); in forest area near summit of Hantane Mt. No. 2, Kandy, *Theobald & Grupe* 2314 (BM, E, LE, PDA, UC, US); Hantane 2300 ft., *Gardner* 602 (BM, K); Kandy, *Moon* 681 (BM); 28 miles east of Rangala rd. to Looloowatte, *Theobald & Grupe* 2316 (E, PDA, UC, US); Sentry Box East Mt. behind Raxawa tea estate, east of Dolosbage, *Theobald & Grupe* 2344 (A, E, K, PDA, UC, US). MATALE DISTRICT: Lagalla, *Alston s.n.* (PDA). DISTRICT UNKNOWN: between Weva and Delgoda, *Lewis & de Silva s.n.*, 28-III-1919 (PDA). LOCALITY UNKNOWN: *C.P.* 1788 (BM, K, PDA); *Macrae* 243 (BM); *Mrs. Walker s.n.* (K).

**4. Chirita angusta** (C.B. Cl.) comb. nov. **Fig. 6a.**

*Chirita zeylanica* var. *angusta* C.B. Cl., DC. Mon. Phan. 5:112. 1883.

Caulescent, unbranched or few-branched herbs, silky-pubescent, 5-25 cm high. Leaves opposite, bright green, paler beneath, fleshy (drying thin), ovate-lanceolate to narrowly oblong-lanceolate or elliptical, 5-14 cm long; 0.7-5.5 cm broad, tapering at base, or rarely acute to obtuse, margin entire, apex acute, silky-pubescent to strigose above and below, pinnately veined; veins oblique, conspicuous below; petioles pubescent, 1-6 cm long. Inflorescence a paniculate, compound dichasium; peduncles glabrous to sparsely pubescent, 6-14 cm long; bracts ovate-lanceolate, caducous, 3-5 mm long, 2-3 mm broad; pedicels 5-12 mm long. Calyx segments free or only slightly coalescent below, glabrous, narrowly ovate-lanceolate to lanceolate, 7-10 mm long, 2-3 mm broad. Corolla 2.7-4 cm long, tube 18-28 cm long, 8-13 mm broad at throat, white with diffuse clear blue-violet color towards lobes without, white with a broad yellow line below within, 2 longitudinal ridges evident along length of tube both above and below, style within upper ridges, glabrous on both surfaces; throat angular in outline; lobes clear blue-violet; lower 3 lobes 5-7 mm long, 7-9 mm broad; upper 2 slightly smaller. Filaments white, glabrous to sparsely pubescent, swollen at bend, twisted in lower half; lower arm ca. 4 mm long; upper arm ca. 6 mm long; anthers yellow, ca. 2 mm across, tuft of hairs on back ca. 1 mm long; staminodia 3, 2 hooked, twisted near base, pubescent and with a tuft of hairs near swollen



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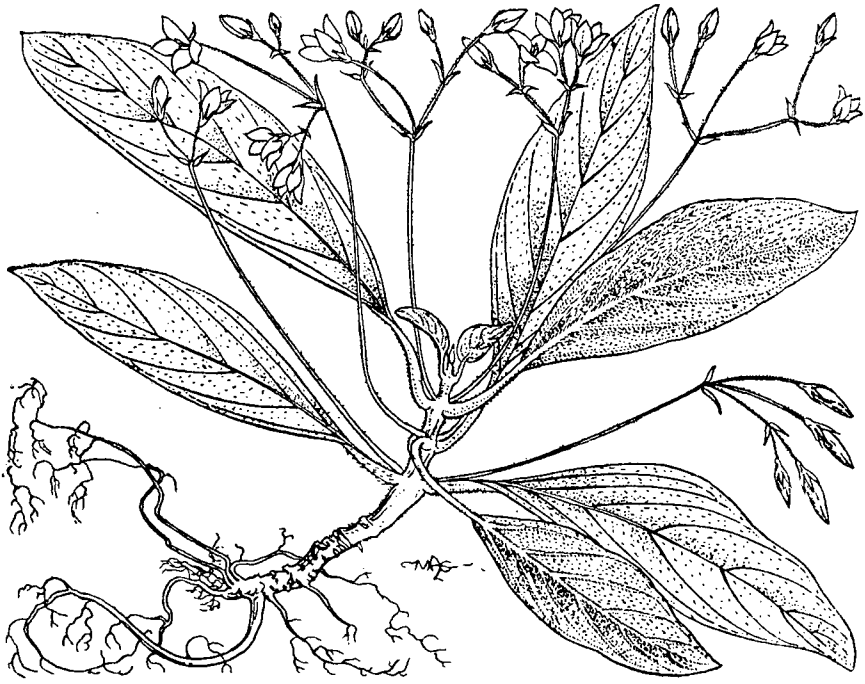

Fig. 7. *Championia reticulata* Gardn.: Habit, × 2/3.

apex, ca. 4 mm long, 3rd smaller. Ovary glabrous; style glandular-pubescent; stigmatic upper lobe not evident, lower lobe greatly expanded laterally into rhomboidal to elliptical flattened plate, 2 mm high, 4 mm broad. Capsule long-linear, glabrous, 5-7 cm long, ca. 1 mm broad. Flowering in March and August; probably irregularly throughout the year.

*Distribution:* Endemic. Forested areas of the low country from the Galle District to the foothills above Ratnapura.

*Ecology:* Found in habitats similar to those of *C. zeylanica*, but at lower elevations, (i.e., on rocks along and in small streams in undisturbed forests, usually dense shade).

*Notes:* This taxon definitely appears distinct enough to warrant specific recognition. Besides the characteristic differences in leaf size and shape there is the distinctive clear blue-violet flower color not evident in any living populations of *C. zeylanica*, and a more angular corolla throat shape. Both of these characters are not evident in herbarium material.

Specimens Examined: GALLE DISTRICT: 3.1 mi east on Forest Dept. Logging Rd., 3 miles north of Udugama on rd. to Hiniduma, *Theobald & Grupe* 2363 (PDA, US). MATARA DISTRICT: Morawaka Korale, *Trimen s.n.*, 4-III-1881 (PDA). RATNAPURA DISTRICT: Singherajah Forest, Kukul Korale, *Thwaites s.n.*, IV-1855, *C.P.* 3437 (BM, K, PDA).

## 4. CHAMPIONIA Gardn.

Calcutta J. Nat. Hist. 6:485. 1846.

Low, erect, sometimes branching, caulescent, herbaceous perennials, pubescent. Leaves opposite, petiolate. Inflorescence axillary, a compound dichasium, solitary or rarely in pairs, lax; peduncles slender, shorter than the leaves. Calyx very deeply divided, 5-merous, the segments linear. Corolla 4-merous, regular, rotate, tube extremely short. Stamens 4, equal, inserted on corolla tube; filaments short; anthers connivent, ovate-oblong 4-locular with 2 locules smaller. Disk absent. Ovary oblong-conical, unilocular with 2 T-shaped parietal placentae; style slender; stigma sub-capitate, small. Capsule oblong, pointed, loculicidally 2-valved, each valve splitting into 2 halves. Seeds minute, broadly elliptical, blunt at the ends, reticulate.

*Distribution :* A monotypic genus endemic to Ceylon and readily distinguishable by the unusual combination of a 5-merous calyx and a regular, 4-merous corolla.

**Championia reticulata Gardn., Calcutta J. Nat. Hist. 6:485. 1846. Fig. 7. Trim. Fl. Ceyl. 3:277.**

Stems unbranched or only sparsely branching from near the base, glabrous to densely pubescent, especially above, becoming glabrate with age below, 6-30 cm high. Leaves slightly fleshy, those of a pair often slightly unequal, oblanceolate-oblong, 5-14 cm long, 1.5-4 cm broad, base cuneate, obtuse, or rounded, margin entire, apex acute or obtuse, glabrous to densely pubescent above, pubescent especially along veins and margin below; petioles glabrous to pubescent, 1-3.5 cm long. Peduncles 4-9 cm long; bracts linear-lanceolate, glabrous to pubescent, 4-12 mm long; pedicels filiform, glabrous or pubescent, 5-20 mm long. Calyx segments linear-lanceolate, 4-5 mm long, ca. 1 mm broad, pubescent, persistent. Corolla white, glabrous; tube ca. ½ mm long; lobes nearly distinct to base, oblong-lanceolate, 6-8 mm long, ca. 3 mm broad, apex obtuse. Filaments glabrous, 1-2 mm long; anthers 1 mm long, 1 mm broad, dehiscing on inner face. Style ca. 2.5 mm long. Capsule glabrous, 6-8 mm long, 1.5 mm broad. Flowering February-March and July-August; probably throughout the year at irregular intervals.

*Distribution:* Moist low country from the Galle District north to the foothills of Adam's Peak and the Dolosbage area at elevations up to about 1000 meters.

*Ecology:* In dense shade and loose soil along stream beds in undisturbed forests, also rarely on forest floor near streams. Possibly self-pollinated. Whole populations apparently flower irregularly throughout the year with all individuals blooming at about one time.

*Notes:* Collections from the Galle District area are generally more pubescent than those near Adam's Peak and the Dolosbage area. There are also possible differences in corolla size and lobe shape, but unfortunately only a few flowers were seen.

*Illustrations:* C. B. Clarke, DC., Mon. Phan. 5: t 15. 1883.

Specimens Examined: GALLE DISTRICT: 2.7 mi east along Forest Dept. Logging Rd., 3 mi north of Udugama on rd. to Hiniduma, *Theobald & Grupe* 2362 (US); 2.3 mi east along same rd., *Theobald & Grupe* 2379 (NY, PDA, UC, US); 5.6 mi east along same rd., *Theobald & Grupe* 2383 (E, US, PDA); Hiniduma, *Thwaites*


Fig. 8. *Rhynchoglossum*. *R. gardneri* Theobald & Grupe: *a*, Habit, × 2/3; *b*, Inflorescence, × 1.6. *R. notonianum* B. L. Burtt: *c*, Inflorescence, × 2.

*s.n.*, VIII & IX—1863, *part of C.P.* 358 (K). KANDY DISTRICT: Adam's Peak, *Gardner s.n.* (?), III-1846, *part of C.P.* 358, 370 (K, PDA). KEGALLA DISTRICT: on rd. to St. Helen's tea estate, Windsor Forest area east of Dolosbage, *Theobald & Grupe* 2402 (A, BM, E, K, LE, PDA, RSA, UC, US). RATNAPURA DISTRICT: way to Adavi Kande, Eratne, *de Silva* 122 (PDA); Tittaweralu Kotha, near Adavi Kande, *s. coll.*, 27-III-1919 (PDA); near Eratne, ca. 1000 ft., *Trimen s.n.*, II-1892 (PDA). DISTRICT UNKNOWN: South of the island, abundant, *Thwaites s.n.*, VIII & IX—1863, *part of C.P.* 358 (PDA). LOCALITY UNKNOWN: *Mrs. Walker s.n.* (K); *Thwaites s.n., part of C.P.* 358, also collections on same sheets possibly referrable to Col. and Mrs. Walker and Gardner (BM, PDA).

## 5. RHYNCHOGLOSSUM Blume

Bijdr. 741. 1826.

*Antonia* R. Br. in Wall. Pl. As. Rar. 3:65. 1832. non Pohl.

*Klugia* Schlechtd., Linnaea 8:248. 1833.

*Glossanthus* Klein ex Benth., Scroph. Ind. 57. 1835.

Caulescent annual or perennial herbs with succulent stems. Leaves alternate, membranous, distinctly unequal-sided, cordate or rounded on one side of the unequal base, petiolate. Inflorescence pseudo-racemose, terminal, appearing lateral and opposite leaf, one sided, many-flowered. Bracts absent or minute and linear. Calyx campanulate, persistent, 5-lobed, lobes longer or shorter than the tube, 5-angled. Corolla distinctly bilabiate, personate; tube cylindrical, contracted at the throat; upper lip short, bifid, lower much longer and broader, entire or shallowly 3-lobed. Stamens 2 or 4 (in ours), included, didynamous; anthers coherent in pairs or connate as 4, bilocular, locules confluent. Disk annular or cup-shaped. Ovary unilocular, with 2 parietal placentae; style slender; stigma oblique, sub-capitate, obscurely bilobed. Fruit a capsule, enclosed in persistent calyx, 2-valved, loculicidally dehiscent. Seeds numerous, oblong, reticulate.

*Distribution:* A widespread genus of about 12 species extending from India, Ceylon, and China eastwards to the Phillipines and New Guinea. Also from Mexico to northern South America. (See B. L. Burtt, Studies on the Gesneriaceae of the Old World XXIII. *Rhynchoglossum* and *Klugia*. *Notes Roy. Bot. Gdn. Edinb.* 24: 167-171. 1962).

### KEY TO THE SPECIES

1. Calyx tube 5-angled, upper angle with rounded, wing-like crest, lobes lanceolate, shorter than the tube; lower lip of corolla usually greater than 16 mm long. **1. R. notonianum**

1. Calyx tube 5-angled, all angles about equal, narrowly winged, lobes narrowly lanceolate-acuminate, longer than the tube; lower lip of corolla less than 14 mm long. **2. R. gardneri**

**1. Rhynchoglossum notonianum** (Wall.) B. L. Burtt, Notes Roy. Bot. Gdn. Edinb. 24:170. 1962. **Fig. 8c.**

*Wulfenia notoniana* Wall., Tent. Fl. Nepal. 46. 1826.

*Glossanthus malabaricus* Klein ex Benth., Scroph. Ind. 57. 1835.

*Glossanthus notonianus* R. Br. in Horsfield, Pl. Jav. Rar. 121. 1840.

*Klugia notoniana* A. DC. in DC., Prodr. 9: 276. 1845; Trim. Fl. Ceyl. 3:277.

*Klugia glabra* Gardn., Calc. J. Nat. Hist. 6: 489. 1846.

*Rhynchoglossum scabrum* Dalz. in Hook. Journ. Bot. & Kew Misc. 2: 140. 1850.

*Klugia scabra* Dalz. in Dalz. & Gibs., Bomb. Fl. 134. 1861.

*Klugia notoniana* var. *glabra* C.B. Cl., DC., Mon. Phan. 5: 159. 1883.

*Klugia notoniana* var. *scabra* C.B. Cl., DC. Mon. Phan. 5: 160. 1883.

Erect, branching herbs, sometimes reduced to a single leaf, 1-8 dm high, glabrous, or with a villous line down one side of stem. Leaves bright green above, paler beneath, ovate-oblong in general outline, 6-20 cm long, 3-11 cm broad, base on one side obtuse to acute, other rounded-cordate, margin entire or minutely dentate, somewhat sinuate, apex acuminate, glabrous or scabrous above, glabrous below; petioles glabrous or villous above, 0.5-4 cm long. Peduncles glabrous or villous along one side, 1-4 cm long; bracts linear-filiform, glabrous, 2-5 mm long; pedicels 3-5 mm long. Calyx 8-11 mm long; tube 5-angled, upper angle with rounded wing-like crest on its lower half; crest 3-5 mm high; other angles slightly or equally crested; lobes 5,

equal, lanceolate, shorter than the tube, margin ciliated, 2-4 mm long. Corolla tube white, 7-10 mm long, 3-4 mm broad, glabrous without, pubescent within; upper lip white, ca. 3 mm high, ca. 3 mm broad at base; lower lip deep rich purplish-blue, sometimes slightly paler, with yellow spot at base, glabrous, 16-26 mm long, 15-20 mm broad. Stamens 4; filaments glabrous, one pair ca. 6-7 mm long, other ca. 1 mm shorter; anthers glabrous, ca. 1 mm broad, all 4 weakly connate. Disk cupular, Ovary glabrous; style glabrous; ca. 8 mm long. Capsule obovate, membraneous, 8-10 mm long, 5-6 mm broad.

*Distribution:* Known primarily from the montane forests of the moist and intermediate zones, also possibly at lower elevations (var. *glabra?*) of the moist zone. Also common in southern India.

*Ecology:* Usually found in stream beds at edges of forests, or sometimes in open stream areas No intermediate populations have been found between this species and the closely related, but distinctive, *R. gardneri*.

Specimens Examined: BADULLA DISTRICT: Bandarawela, flowers white (?), *Simpson* 8654 (BM, PDA); Haputale, *de Silva* 9 (PDA, UC). KANDY DISTRICT: at base of Kabaragala Mt. behind Raxawa tea estate east of Dolosbage, *Theobald & Grupe* 2356 (E, PDA, UC, US); Raxawa, *Thwaites s.n.*, II-1855, *part of C.P.* 3369 (PDA); Hunnasgiriya, *Thwaites s.n.*, IV-1851, *part of C.P.* 1787 (PDA); Dolosbage, *Trimen s.n.*, IX-1885, (var. *glabra*) (PDA). NUWARA ELIYA DISTRICT: stream behind Director's home, Hakgala Botanic Garden, *Theobald & Grupe* 2303 (A, BM, BO, E, LE, PDA, SING, US); Hakgala Garden, 5,000 ft., *Fairchild & Dorsett* 326 (UC); jungle behind Hakgala, *de Silva s.n.*, 23-V-1911 (PDA); *de Silva s.n.*, 13-IV-1906, (PDA); along rd. from Horton Plains to Agrapatana, *Theobald & Grupe* 2309 (E, K, PDA, UC, US); Horton Plains, *Thwaites s.n.*, II-1857, *part of C.P.* 3369 (PDA); Elk Plains, *Gardner s.n., part of C.P.* 1787 (PDA); Maturata, *Thwaites s.n.*, II-1857, *part of C.P.* 1787 (PDA); Pundaluoya, *Green s.n.*, I-1889, (var. *glabra*) (PDA). LOCALITY UNKNOWN: Col. *Walker s.n.* (K); *C.P.* 1787 (BM, K,); *C.P.* 3369 (BM).

Vern. **Diyanilla**, (*S*).

**2. Rhynchoglossum gardneri** nom. nov. **Fig. 8a, b.**

*Klugia zeylanica* Gardn., Calcutta J. Nat. Hist. 6: 490. 1846. Trim. Fl. Ceyl. 3:278.

Erect or prostrate herbs, 2-6 dm high, glabrous or with a sparsely villous line down one side of stem. Leaves bright green above, paler beneath, ovate to ovate-oblong in general outline, 4-9.5 cm long, 2.5-6.5 cm broad, base on one side acute to obtuse, other usually distinctly incurved and cordate, margin entire, somewhat sinuate, apex acuminate, glabrous to scabrous above, glabrous below; petioles glabrous or villous above, 0.3-3.5 cm long. Peduncles glabrous to villous along one side, 1-3 cm long; bracts linear-filiform, glabrous, 1-3 mm long; pedicels 2-5 mm long. Calyx 6-9 mm long; tube 5-angled, all angles equal and slightly winged; lobes 5, equal, lanceolate-acuminate, longer than the tube, 4-6 mm long. Corolla tube white, 8-10 mm long, 3-4 mm broad, glabrous without, pubescent within; upper lip white, ca. 2-3 mm high, ca. 3 mm broad, glabrous; lower lip bright rich blue with a yellow spot at base, 8-14 mm long, 9-14 mm broad, glabrous. Stamens 4; filaments glabrous, one pair ca. 5 mm long, other ca. 1 mm shorter; anthers glabrous, ca. 1 mm broad, all 4 weakly connate. Disk cupular. Ovary glabrous; style glabrous, ca. 7 mm long. Capsule ovate, membraneous, 4-5 mm long, 3-4 mm broad. Flowering April, July and August; probably throughout the year.

*Distribution:* Endemic. Known from the moist lowlands of the southern Ratnapura District north into the Kandy District and to elevations of about 1100 meters.

*Ecology:* Found in, or near, stream bed habitats similar to those of *R. notonianum*.

*Notes:* This species has been named in honor of George Gardner, who during the 1840's did much to further our understanding of Ceylon gesneriads, as well as many other Old World taxa.

*Illustrations:* Bot. Mag. t. 4620. 1851. (*Klugia notoniana*).

Specimens Examined: KANDY DISTRICT: forested area near summit of Hantane Mt. No. 2, Kandy, *Theobald & Grupe* 2315 (PDA, US); Hantane, *s. coll., part of C.P.* 1786 (PDA); Kandy, *Gardner* 604 (BM, K); Kandy, *Alston s.n.*, 7-VIII-1928 (PDA); Raxawa, *s. coll., part of C.P.* 1786 (PDA). KEGALLA DISTRICT: on north side of Hwy. A-1 west of Kadugannawa, just below tunnel, *Theobald & Grupe* 2370 (A, BO, E, K, LE, PDA, SING, UC, US); .4 mi east of tunnel, *Theobald & Grupe* 2371 (BM, NY, PDA, RSA, US); RATNAPURA DISTRICT: on rocks in stream at Hwy. marker 65/21 along Hwy. A-17 from Rakwana to Deniyaya, *Theobald & Grupe* 2360 (A, E, K, PDA, UC, US); LOCALITY UNKNOWN: *Macrae* 242 (BM); 443 (BM, K); *C.P.* 1786 (BM, K).

## 6. EPITHEMA Blume

Bijdr. 737. 1826.

*Aikinia* R. Br. in Wall. Pl. As. Rar. 3:65, t. 288. 1832. non Wall. 1832. nec Salisb. ex A. DC. 1830.

Small, succulent herbs, pubescent. Leaves few or solitary, lower alternate and petiolate, upper opposite and usually sessile or short petioled. Inflorescence congested and sub-capitate, a scorpioid cyme (monochasium), 1-several in the upper leaf axils, free, or confluent with the petiole, or midrib of blade. Bract large, solitary, sessile, 1-sided, concave, sub-spathaceous. Calyx campanulate, 5-lobed. Corolla small, bilabiate; tube short, terete; lobes 5, unequal. Stamens 2; filaments short, anthers coherent, applanate, short, bilocular, Disk of 1-5 distinct, flattened, yellow glands. Ovary ovoid, unilocular with 2 parietal placentae; placentae stalked, bearing ovules on both sides; style filiform; stigma small, sub-capitate. Fruit a capsule, globose, membranous, dehiscence irregularly circumscissile, enclosed in enlarged calyx. Seeds oblong or elliptical, spirally reticulate.

*Distribution:* A genus of about ten species extending from tropical Africa east through the Indo-malaysian area to the Phillipines, and Indonesia. Delimitation of species is very difficult in the genus and our sole representative is the most widespread of the group.

**Epithema carnosum** (G. Don) Benth., Scroph. Ind. 57: 665. 1835. **Fig. 9.**

*Aikinia carnosa* G. Don, Gen. Syst. 4:665. 1838.

*Epithema zeylanicum* Gardn., Calcutta J. Nat. Hist. 6: 492. 1846.

*Epithema carnosum* var. *zeylanicum* C.B.Cl., DC., Mon., Phan. 5:178. 1883. Trim. Fl. Ceyl. 3:279.

Stems with a dense cluster of adventitious roots near base, unbranched, or only few-branched from the axil of first leaf, 8-40 cm high, scabrous. Leaves membranous, light green above, paler beneath, very variable in size, lower leaf often very large, ovate-cordate, 8-20 cm long, 5-15 cm broad, margin entire, serrate or doubly serrate-dentate, apex acute or obtuse, scabrous; upper leaves much smaller, otherwise similar; petioles absent or up to 8 cm long. Peduncles 2-13 cm long; bract broadly ovate to sub-orbicular, ca. 5-10 mm long, 5-10 mm broad, serrate-dentate. Calyx scabrous, lobes lanceolate, ca. 3.5 mm long, ca. 0.8 mm broad. Corolla tube white without and within, ca. 6 mm long, ca. 1.5 mm broad, glabrous; lobes blue without and within, glabrous; lower 3 lobes larger, rounded, ca. 3 mm long, 3 mm broad; upper lobes slightly fused with distinct H-shaped purplish blotch across lobes, ca. 2 mm long, 1 mm broad. Filaments curved near anther, glabrous, 1.5-2 mm long; 2 staminodia curved and swollen at tip, glabrous, ca. 1.5 mm long. Capsule small, ca. 1.5 mm long, 1.5 mm broad. Flowering February and July-September; possibly throughout the year.

*Distribution:* Known from only a few localities in montane forests between Kandy and Dolosbage. Otherwise a very widespread species known from India and Southern China east to the Borneo region.

*Ecology:* In crevices of damp rocks in the montane forests. The plants are very variable in size and confined to dense shade. All individuals in a population seem to flower at about the same time, and from growth habit they appear to be short-lived.

*Notes:* The Ceylon populations may warrant subspecific recognition on the basis of calyx and seed size, but we hesitate making this change until better and more representative collections of *E. carnosum* are available, and chromosome counts are made for populations from both areas.

*Illustrations:* Wight, Ic. Pl. Ind. Or. 4: t. 1354. 1848. (not representative).

Specimens Examined: KANDY DISTRICT: Hantane, *s. coll., part of C.P.* 2844 (PDA); Raxawa, *Thwaites s.n.*, II-1854, *part of C.P.* 2844 (PDA); Kadugannawa, *Trimen s.n.*, VIII-1884 (PDA). KEGALLA DISTRICT: north side of Hwy. A-1 west of Kadugannawa, just below sharp bend in road on downgrade below tunnel, *Theobald & Grupe* 2366, 30-VII-1968 (A, E, K, LE, PDA, UC, US), *Theobald & Grupe* 2404, 22-VIII-1968 (BM, F, NY, PDA, RSA, US); Jatianpulana, Avisawella, *Simpson* 8434 (BM.) LOCALITY UNKNOWN: *Mrs. Walker s.n.* (K); *Gardner* 606 (K); *Macrae* 144, 244 (BM).

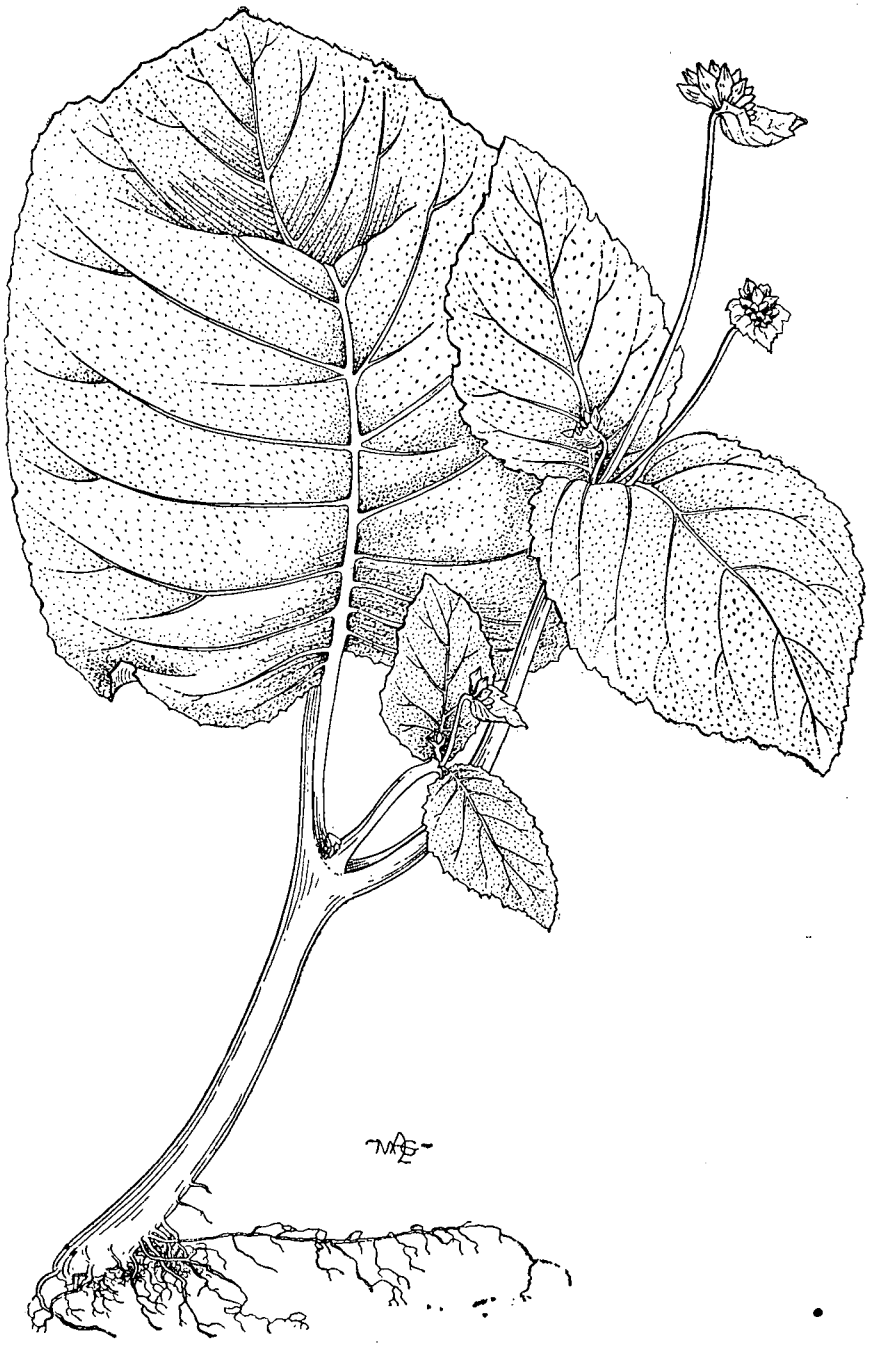

Fig. 9. *Epithema carnosum* Benth.: Habit, × 2/3.

## 7. RHYNCHOTECHUM Blume

Bijdr. 775. 1826.

*Isanthera* Nees, Trans. Linn. Soc. London 17:82. 1834.

Erect, few-branched, caulescent undershrubs, tawny-tomentose. Leaves opposite or alternate. Inflorescence a paniculate, axillary, compound dichasium; bracts narrow; flowers numerous, small. Calyx deeply divided, 5-merous, segments narrow. Corolla campanulate-rotate, 5-lobed, obscurely 2-lipped. Fertile stamens 4, inserted near base of corolla; filaments short, curved; anthers small, 2-celled; cells confluent at apex. Disk very small and annular, or absent. Ovary sessile, ovoid, unilocular with 2 deeply intruding, bifid, recurved, parietal placentae; style slender; stigma small, subcapitate. Fruit a berry, ovoid to globose, wall fleshy, indehiscent. Seeds very small, elliptical, pitted or coarsely-reticulate.

*Distribution:* A genus of about 12 species extending from Ceylon and Southern India to New Guinea and north to the Eastern Himalayas and Southern China. (See: B. L. Burtt: Studies on the Gesneriaceae of the Old World XXI. *Rhynchotechum* and *Isanthera*. *Notes Roy. Bot. Gdn. Edinb.* 24: 35-39. 1962).

**Rhynchotechum permolle** (Nees) B. L. Burtt, Notes Roy. Bot. Gdn. Edinb. 24: 39. 1962. **Fig. 10.**

*Isanthera permollis* Nees, Trans. Linn. Soc. Lond. 17: 82. 1834. Trim. Fl. Ceyl. 3:280.

*Isanthera floribunda* Gardn., Calcutta Jour. Nat. Hist. 6: 483. 1846.

Stems unbranched or rarely 1-2 branched near base, 20-60 cm high, occasionally taller, tawny, woolly-tomentose above, becoming glabrate with age below; bark whitish, marked with prominent leaf scars. Leaves alternate, closely placed terminally on stem, broadly oblanceolate-oblong, 7-22 cm long, 2.5-9 cm broad, base tapering into petiole, margin serrate, apex acute, dark green above, whitish below, tawny, woolly-tomentose on both surfaces when young, becoming glabrate with age above; petioles 1-3.5 cm long. Inflorescences solitary in the leaf axils, densely woolly-tomentose, peduncles short, 1-15 mm long; bracts linear-lanceolate. Calyx ca. 7 mm long, segments lanceolate, ca. 5 mm long, woolly-tomentose. Corolla white, glabrous, lower 3 lobes ovate, ca. 5 mm long, 4 mm broad, upper 2 only slightly smaller. Filaments glabrous, curved outward and then upward towards staminodium, 1-2 mm long; anthers yellow, glabrous, dehiscing on inner face by a crescent-shaped slit; staminodium very short, swollen at apex. Ovary minutely pubescent, ovoid, ca. 2 mm long; tapering into slender style, ca. 1.5 mm long; stigma slightly swollen. Fruit ovoid, 4-7 mm long. Flowering June to October, and probably throughout the year.

*Distribution:* Found in the moist region, both in the central mountains and in the lowlands towards the southern coast at elevations up to about 1300 meters. Also found in southern India and possibly Burma.

*Ecology:* Commonly found in dense shade in undisturbed forests, especially near small streams. The stems often lie prostrate on the ground for a short distance and root at the nodes. On occasion the plants become very robust with tall stems up to one meter high. The inflorescence and flowers are inconspicuous and no pollinators were observed. Burtt (*Notes Roy. Bot. Gdn. Edinb.* 24: 35-39. 1962) reports that *R. discolor* (Maxim) Burtt is readily self-fertile.

*Notes:* Burtt has also very clearly stated the case for the union of *Rhynchotechum* and *Isanthera*, and has also noted the astute nature of Gardner's observations regarding the latter genus (*Calcutta J. Nat. Hist.* 6: 471-493. 1846). Unfortunately, Burtt had no Ceylon material of *R. permolle* available with anthers in the proper stage for a critical study of dehiscence and determination of the possibility of any real point of difference between the two genera. Critical study of specimens in the wild clearly indicate the same type of valvular dehiscence in *R. permolle* which has been attributed to species of *Rhynchotechum* (*sensu stricto*).

*Illustrations:* Wight, Ic. Pl. Ind. Or. 4: t. 1355. 1848.

Specimens Examined: GALLE DISTRICT: 2.7 mi east along Forest Dept. Logging Rd., 3 mi north of Udugama on road to Hiniduma, *Theobald & Grupe* 2361 (E, PDA, US). KANDY DISTRICT: approx. 3 mi from Kotmale on rd. to Nawalapitiya, *Theobald & Grupe* 2312 (A, BM, E, K, LE, NY, PDA, RSA, UC, US); Kandy, *Moon* 234 (BM); Hantane 2,300 ft., *Gardner s.n.*, (BM, K,); Rangala, *Trimen s.n.*, IX-1888 (PDA). NUWARA ELIYA DISTRICT: Maturata, *Thwaites s.n.*, X-1853 (PDA). DISTRICT UNKNOWN: Ambagamuwa, *Gardner s.n., part of C.P.* 1670 (PDA). LOCALITY UNKNOWN: *Thwaites s.n.*, X-1852, *part of C.P.* 1670 (BM, K, PDA); *Col. Walker* 43 (K); *Mrs. Walker* 1761 (K).


Fig. 10. *Rhynchotechum permolle* B. L. Burtt: *a*, Flowering branch, × 2/3; *b*, Corolla, × 3 1/3; *c*, Flower, × 1.6; *d*, Anther, × 15; *e*, Pistil, × 10.

# MARTYNIACEAE

[William L. Theobald and Donald A. Grupe, Department of Biology, Occidental College, Los Angeles, California, 90041, U.S.A.]

Annual or perennial herbs, viscid-pubescent. Leaves alternate or opposite, simple; stipules absent. Inflorescence terminal, racemose; bract solitary, deciduous, borne on the pedicel; bractlets at base of calyx 1-2. Flowers hermaphroditic, irregular. Calyx 5-merous, free or partly united, sometimes spathaceous. Corolla 5-merous, gamopetalous; tube cylindrical at base, campanulate or funnelform above, often ventricose and oblique; limb 5-lobed, generally somewhat 2-lipped; lobes imbricate, adaxial pair exterior. Stamens 2(in ours) or 4, inserted on corolla tube near base of expanded portion; anthers connate or connivent in pairs, locules divaricate. Disk present, annular, glandular. Ovary superior, unilocular with 2 intrusive, parietal placentae, often cohering to form false septa; ovules few to many; style slender; stigma 2-lipped, lips flattened. Fruit beaked, a capsule with a fleshy, deciduous exocarp and a woody persistent endocarp, crested along median line above and occasionally below; style persistent and splitting at maturity into 2 horn-like processes. Seeds black, sculptured, endosperm thin or none, embryo straight, cotyledons large, fleshy.

*Discussion*: A small family native to the New World and consisting of about 5 genera and approximately 16 species. Several members of the family, including the sole representative in Ceylon, *Martynia annua*, have become naturalized in some parts of the Old World. The family has sometimes been included in the Pedaliaceae (e.g., Trimen; Hooker, Flora of British India), but can be separated from the latter by the characteristic fruit, the terminal, racemose inflorescence, and the parietal placentation. The latest revision of the family is that of Van Eseltine (1929)—A preliminary study of the Unicorn plants (Martyniaceae). *N.Y. St. Agric. Exper. Sta. Tech. Bull.* No. 149. 41 pp. For a discussion of the nomenclatural history and typification of the family, see Hevly (1969)—Nomenclatural History and Typification of *Martynia* and *Proboscidea* (Martyniaceae). *Taxon* 18: 527-534.

## MARTYNIA L.

Sp. Pl. 618. 1753 emend. Stapf, in Engl. and Prantl. Nat. Pflanzenfam. 4: 265-269. 1895.

*Carpoceras* A. Rich., *in* Desf. & Mirb., Ferrusac Bull. Sci. Nat. Geol. 21: 98. 1830.

*Disteria* Raf., Fl. Tellur, 4: 68. 1838.

*Vatkea* O. Hoffm., Verh. Bot. Ver. Brandenb. 73: 45. 1880.

Erect, often branching, annual or perennial herbs, densely viscid-pubescent. Leaves opposite, broad, palmately veined, long petioled. Inflorescence a short, terminal raceme; flowers in the axil of a large, deciduous bract, with 2 membranous bractlets at the base of the calyx. Calyx of 5 distinct sepals, upper 3 segments narrower than the lower 2. Corolla tube broadened almost from base, obliquely campanulate, ventricose; lobes unequal, lower lobe much the larger. Stamens 2, staminodia 2-3, 3rd very rudimentary when present; anther locules widely divergent. Ovary unilocular, appearing 4-locular due to intruding T-shaped placentae meeting at the middle. Fruit exocarp thin, deciduous, falling off in 2 pieces; endocarp woody, remaining attached to pedicel, with 8 longitudinal ridges (4 on each side), crested along the dorsal central suture, crowned by 2 claw-like, very sharp, short hooks. Seeds oblong.

*Discussion*: A monotypic genus of the New World, now common in waste areas and along roadsides in many parts of the Old World. For a listing of relevant literature see the discussion following the above family description.

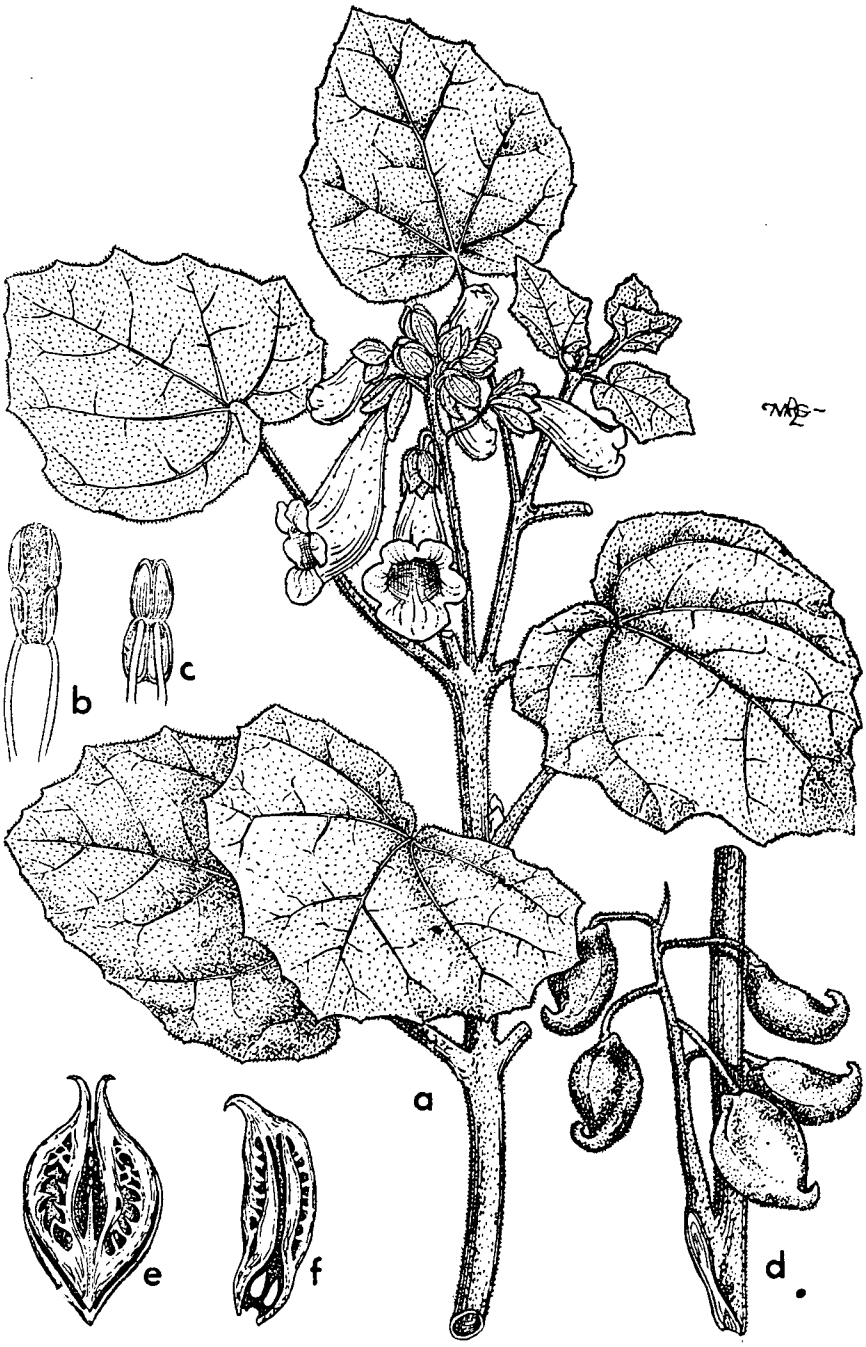


Fig. 11. *Martynia annua* L.: *a*, Habit, × 2/3; *b-c*, Anthers × 2 1/3; *d*, Fruiting inflorescence, × 1; *e-f*, Fruit endocarp × 1.

**Martynia annua** (Houstoun in Martyn) L., Spec. Pl. 618. 1753. non L., Syst. Nat. 1113. 1759. **Fig. 11.**

*Martynia diandra* Gloxin. Obs. 14, t. 1. 1785.

*Martynia angulosa* Lam. Encycl. 2: 112. 1786.

*Carpoceras angulata* A. Rich. in Desf. & Mirb., Ferrusac Bull. Sci. Nat. Geol. 21: 98. 1830.

*Disteria angulosa* Raf., Fl. Tellur. 4: 68. 1838.

*Vatkea diandra* O. Hoffm., Verh. Bot. Ver. Brandenb. 73: 45. 1880.

Plants 0.3-2 m high, somewhat woody toward base; stems sub-terete in transection and up to 1.5 cm in diameter. Leaves opposite; broadly ovate to deltoid in outline, 7-23 cm long, 7-20 cm broad, base cordate, margin repand-dentate, apex acute; petiole fistulose, 7-18 cm long. Racemes 10-20 flowered, 4-10 cm long; pedicels 5-25 mm long; bracts and bractlets usually pale pink, membranous, distinctly veined; bracts broadly ovate, 1.2-2.5 cm long, 0.7-1.3 cm broad; bractlets 2, ovate-oblong, 0.6-1.5 cm long, 0.4-1 cm broad. Calyx yellowish to greenish-white, upper 3 sepals narrowly ovate-oblong, 9-13 mm long, 3-4 mm broad, lower 2 broadly ovate, 10-13 mm long, 4-7 mm broad. Corolla glandular; tube 3-4 cm long, diffuse pale to reddish-pink without, white to pale pink within, flecked reddish-purple; lower lobe ca. 1 cm long, marked by a larger purple blotch with a yellow blotch above; other 4 lobes smaller, broadly rounded, ca. equal in size, each marked by a dark reddish-purple blotch. Filaments white, glabrous, 10-15 mm long. Fruit ovoid, flattened somewhat dorso-ventrally; deciduous exocarp green, densely viscid-pubescent; endocarp black, very hard, 2-3 cm long, 1.5-2 cm broad, the recurved claws ca. 5 mm long. Flowering throughout the year.

*Distribution:* Widely scattered throughout the dry regions of Ceylon. Native of Mexico and Central America now naturalized in many parts of the Old World.

*Ecology:* Locally common in waste areas, refuse dumps, and along roadsides.

*Illustrations*: Bot. Reg. 23: t. 2001. 1837 (*M. diandra*).

*Specimens Examined:* BADULLA DISTRICT: Ekiriyankumbura, Uva, *Trimen s.n.*, I-1888 (PDA). JAFFNA DISTRICT: along Hwy. 9 near hwy. marker 171, just north of Elephant Pass. *Theobald & Grupe* 2332 (US). KANDY DISTRICT: Royal Botanic Gardens, Peradeniya, Herbarium Grounds, *Trimen s.n.*, VII-1892 (PDA). MATALE DISTRICT: Dambulla, *Simpson* 8083 (BM). TRINCOMALEE DISTRICT: waste area behind sandy beach, approx. 5 mi north of Trincomalee on rd. to Nilaveli, *Theobald & Grupe* 2328 (PDA, UC, US). VAVUNIYA DISTRICT: roadside ditch, Mankulam, .1 mi north of intersection of Hwy. 9 and rd. to Odduchuddan, *Theobald & Grupe* 2329 (PDA, US).

Vern. **Naga-darana, S., Naka-tali, T.**