

No. 69. Notes on the Dutch Indian species of Rutaceae-Aurantieae.

(REVISIO AURANTIACEARUM — V.)

Tyôzaburô TANAKA,

Taihoku Imperial University

(Contribution from the Horticultural Institute No. 2)

Since BLUME's fundamental work of the flora of Dutch India was published, many additions of genera and species of Rutaceae-Aurantieae were made by later authors, but no attempt has been made to enumerate the species and varieties of the whole group based upon the up-to-date herbarium materials. The author has had an opportunity lately to make a tour through Europe, and on this occasion collections of principal herbaria were examined. Many pending questions were solved by investigating type specimens, and a number of new types were added to the old list. Before publishing a complete record of the study, the issue of separate articles of principally geographic standing is now in progress, and this paper forms one of this series. The following is a tentative list of species of Rutaceae-Aurantieae now definitely recorded from Dutch East Indies, with exception of certain new species which are now under investigation. From convenience, plants from British possessions in Borneo and in New Guinea, Bismark Archipelago, Solomon Islands and Portuguese Timor are included in this enumeration. The author expresses his cordial gratitude to Dr. Goethart and Dr. Henrard of the Rijks Herbarium of Leiden, and Prof. Went, Prof. Pulle and Mr. Lanjouw of the University of Utrecht for offering facility and help in executing his work at their institutions.

Micromelum diversifolium MIQ. in Ann. Mus. Bot. Lugd. Bat. I : 221, (1864).

Type: Halmaheira (TEYSMANN) Univ. Utrecht & Herb. Leiden.

var. *cuneata* MIQ. l. c.

Type: Batjan (TEYSMANN) Univ. Utrecht.

Note: This extremely interesting species is not known outside of Moluccas. The most remarkable feature is its extreme reduction of the number of the leaflets, exceedingly villose floral organ and wholly tomentose berry. Var. *cuneata* has a deep cupulate calyx and the reduction of fuzziness is rather noticable, but still it has occasional unifoliolate leaflets. Additional materials from Obi and Halmaheira show its fairly uniform nature.

Micromelum integerrimum (ROXB.) W. & A. Prod. Fl. Pen. Ind. Or. I: 94 (1834)

= *Bergera integerrima* ROXB. Fl. Ind. ed. 2. 376 (1842).

Type: Calcutta cult. (ROXBURGH) Brit. Mus.

Loc.: Java (TEYSMANN), Buitenzorg cult. (TREUB).

Note: This very common Indian species occurs in Andaman and Nicobar, so that its occurrence in Java is not unexpected, although it must be exceedingly rare if not cultivated exclusively.

Micromelum minutum (FORSTER) W. & A. l. c. 448 (1834).

= *Limonia minuta* FORSTER Fl. Ins. Aust. Prod. 33 (1784).

Type: Friendly Isl. (FORSTER) Brit. Mus.

Loc.: Celebes, Amsterdam Isl., Sumbawa, Amboina, Timor laut, Kei, New Guinea. Rarely in British North Borneo.

Note: This species occurs very commonly in New Caledonia, Australia, Fiji, Samoa, down to New Zealand. The western limit of this species is Annam, frequently occurring in the Philippines. It is remarkable that the species is entirely replaced by *M. pubescens* in Java and Sumatra. The distinction of the former from the latter is the much smaller size of floral organ, thin rachis of the inflorescence and thin leaflets.

Micromelum minutum var. *intermedium* TANAKA. n. var.

Folia impari-pinnata, 9—13 foliolata, foliolis alternis, chartaceis, oblongo-ovatis acutis, basi obtusis inaequilateralibus, breve petiolulatis; rachibus tenuibus minute puberulis. Inflorescentia patula, pauciflora, pedunculis crassiusculis: floribus majoribus, 5-petalis, calycibus cupulatis, obsolete 5-denticulatis, minutissime aureo-villosis. Stamina dilatata stylo vix longiora, antheris crassis. Ovarium aureo-tomentosum, stylis brevibus, saepissime villosis. Fructus tomentosus, basi non stipitatus, disci annulari brevissimi instructus.

Type: Neu-Mecklenburg (PEEKEL) 269. Berlin Bot. Mus.

Note: This variety differs from the type by few numbered larger flowers, less lobed calyx and thicker peduncle, and the leaflets are not so thin as in the former, approaching to *M. pubescens*.

The ovary of *M. pubescens*, however, is short-stipitate, and the flower bud is far more slender. The pubescence of *M. pubescens* is silvery in the dried specimens, and not golden yellow as in *M. minutum* and the variety. Similar deep-colored pubescence is characteristic to *M. diversifolium*, but it has abnormal number of leaflets and more pronounced tomentum of brownish color.

Micromelum pubescens BL. Bijdr. Fl. Nederl. Ind. 3: 138 (1825).

Type: Java (BLUME) Herb. Leiden.

Note: Common in Java, occurring in Borneo, Sumatra, Tenasserim and Andaman Malay Peninsula and Burma. It occurs in Palawan, differing from the Philippine

species *M. compressum* (BLANCO) MERR., by slender buds covered with very short silvery pubescence and hairy ovary with naked stalk. The latter Philippine species has larger, broader leaflets with very much less number of lateral veins, and the ovary is generally glabrous, except in very rare cases.

Micromelum pubescens BL. var. *villosum* TANAKA n. var.

Foliola subtus conspicue villosa.

Type: Sumatra; Sihah Drar, Kormchi, 3000 ft. (ROBINSON & KLOSS) 19 III, '14. Herb. Kew.

Note: It is common in Sumatra, and rarely occurs in Borneo and Java.

Micromelum scandens RECHINGER in Denkschr. Akad. Wiss. Wien, 89: 564 (1914).

Type: Bismark Archipelago, New Pommern, Gazelle Halbinsel, Baining Mt. (RECHINGER) Herb. Mus. Naturh. Wien.

Note: Geographically this is the region of *M. minutum*, and is beyond the natural limit of occurrence of *M. pubescens* and *M. compressum*.

The discovery of this large-leaved, large-panicled, extremely vigorous species of this genus in this region is quite unexpected, and this seems to warrant the validity of this specific name. RECHINGER'S single specimen is very poor, lacking the flower, and most closely resembles the Philippine species, *M. compressum*. It is entirely different from *M. minutum*.

Glycosmis chlorosperma BLUME Bijdr. Fl. Nederl. Indie 3: 135 (1825).

Type: Java, Salak and Burangrang (BLUME) Herb. Leiden.

Note: This common species distributes to Sumatra, Malay Peninsula, Burma to Bengal, and Borneo.

Glycosmis chlorosperma BLUME var. *Elmeri* (MERR.) TANAKA n. comb.

= *Glycosmis Elmeri* MERR. in Philip. Journ. Sci. 30: 400 (1926).

Type: Philippines, Tawitawi (RAMOS & EDANO) 1921. Bur. Sci. Manila.

Note: It seems to be rather common in Borneo, and is almost identical with the type except the larger size of the leaflets, and slightly more numerous veins which are less sunken on the upper surface and more acute-angled to the midrib.

Glycosmis citrifolia (WILLD.) LINDL. in Trans. Hort. Soc. Lond. 6: 72 (1826).

= *Limonia citrifolia* WILLD. Enum. pl. Hort. bot. Berol. 449 (1809).

Type: Berlin Bot. Gart. (—) Mus. Bot. Berlin.

Note: Common in Java, occurring also in Borneo, Sumatra, Malay Peninsula, Indo-China, Burma, Southern China and Philippines. Plants from the Philippines may be of cultivated origin. It is the most common species of *Glycosmis*, most broadly cultivated in the European gardens, Japan, America, and Africa.

Glycosmis citrifolia (WILLD.) LINDL. var. *obtusa* (MIQ.) TANAKA. n. comb.

= *Glycosmis obtusa* MIQ. in Ann. Mus. Bot. Lugd. Bat. I: 221 (1864).

Type: Java or Bali (TEYSMANN) Herb. Leiden.

Note: This is a robust unifoliolate variety, frequently occurring in Java and the Philippines. The character is constant, according to result of cultivation in Buitenzorg.

Glycosmis Clemensii TANAKA n. sp.

Folia 3—4 foliolata, foliolis ellipticis, caudato-acuminatis, basi attenuatis, marginibus serrulatis, breve petiolulatis. Inflorescentia spicata, flexilis, pauciflora, bracteis linearibus, glaberrimis. Calyx subsessilis, lobis 5, sublinearibus, ferrugineo-tomentosis: Petala 5, conspicua, elliptica, glabra. Stamina 10, filamentis late dilatatis, striatis, apice cuneatis, antheris ovatis, glanduloso-apiculatis, filamentis paulo brevioribus. Ovarium elliptico-fusoideum, medio et basi anguste constrictum, in stylum attenuatum, stylis brevibus, stigmatibus obtusis.

Type: N. Borneo, Minitindok Gorge, Mount Kinabalu (CLEMENS) 10461. Nov. 1915. Herb. Kew.

Note: This extremely characteristic species was collected only once, but is quite unique in having long-spicate inflorescences, with linear somewhat foliaceous bracts, extremely broad filaments and double constricted ovary.

Glycosmis cyunocarpa BL. Bijdr. Fl. Nederl. Indie 3: 136 (1825).

Type: Java, Salak (BLUME) Apr. 1825. Herb. Leiden.

Note: This species also occurs in Borneo, Philippines, Sumatra, Malay Peninsula, Andaman and Nicobar, Eastern Himalaya, and Burma.

Glycosmis dinhensis PIERRE ex GUILL. in LECOMTE, Not. Syst. 1: 214 (1910).

Type: Cochinchina, Baria, Mt. Dinh (PIERRE) Nos. 3070, 2796. Herb. Mus. Paris.

Note: Specimen No 30169 of KOORDERS from Boeroe, Java agrees exactly with PIERRE'S type. It occurs also in Laos and Tonkin and closely resembles the unifoliolate form of *G. Greenei*.

It is however distinct by clear venation on the upper surface of the leaves, glomerular flower cluster, large leafy calyx lobes and long-conical ovary.

Glycosmis Greenei ELMER Leaflet Philip. Bot. 4: 1512 (1912).

Type: Philippines, Magallanes. Mt. Giting-giting (ELMER) 12438.

Note: This most common Philippine species also occurs in Borneo, New Guinea, Timor laut, Kei Isl., Moluccas, Sumbawa and Australia. It seems only cultivated in Java. *Glycosmis montana* PIERRE from Cochinchina closely resembles it, but more material is needed to make their identity certain.

Glycosmis Greenei ELMER var. *angustata* TANAKA n. var.

= *Glycosmis angustifolia* TEYSM. & BINN. in Cat. Plant. Hort. Bot. Bogor. 208 (1866) non LINDL. (nomen nudum).

Folia 1—3 foliolata, coriacea, dense aggregata, foliolis minoribus, lanceolatis, acuminatis, basi plus minusve attenuatis. Inflorescentia cymosa, floribus minoribus,

filamentis filiformibus, ovario minute pellucido-punctato, stylo crasso, stigmatibus capitato.

Type: Java (TEYSMANN) Herb. Leiden 908. 203—1286.

Note: This seems to occur in Java and Celebes only, but rarely the type approaches to this in the Philippines. This variety looks near to *G. mauritiana* (LAM.) TANAKA, in crowded small thick leaflets, but the ovary is more plump and decidedly pimpled, with short thick style and capitate stigma.

Glycosmis Greenei ELMER var. *cymosa* TANAKA n. var.

= *Glycosmis cymosa* ZIPP. ex SPANOGHE in *Linnaea* 15: 178 (1841) (nomen nudum).

Unifoliolata; foliola majora, oblonga, apice obtusa vel apiculata, basi rotundata vel obtusa, brevissime petiolulata, ad apicem petiolum simplicem articulata. Inflorescentia cymosa, contracta, parviflora.

Type: Timor (ZIPPÉLIUS) Herb. Leiden 908. 203—1169.

Note: It differs from the type by constantly unifoliolate leaflets articulated with the simple petiole. The leaflets are considerably narrower than in the type.

Glycosmis Greenei ELMER var. *virgata* TANAKA n. var.

Unifoliolata: Folia oblonga, apice basique acutiuscula, subsessilia, crassissima, obsolete venosa. Inflorescentia multo contracta, subglomerata, pauciflora. Ramulus strictus, crassus, brunneo-striatus.

Type: Java, Buitenzorg cult. (TEYSMANN) Herb. Hooker 2024. Herb. Kew.

Note: The type specimen bears the name *Glycosmis virgata* T. & B., but TEYSMANN'S catalogue (6) does not list this name. This form sometimes occurs in the Philippines and resembles *G. citrifolia* var. *obtusa*, although the floral organ is entirely different.

Glycosmis macrantha MERR. Univ. Cal. Pub. Bot. 15: 114 (1929).

= *Glycosmis Oliveri* O. STAPF in sched.

Type: Borneo, Tawao (ELMER) 21456 Herb. Univ. Calif.

Note: This species closely resembles *G. chlorosperma* in the character of the leaflets, but the very characteristic stamen and ovary, as well as the extremely large flower bud and berry, make it standing quite independent. Dr. STAPF'S material is based upon BECCARI'S collection from Sarawak (No. 2595).

Glycosmis macrophylla (BL.) MIQ. Fl. Nederl. Ind. 522 (1859).

= *Sclerostylis? macrophylla* BL. Bijdr. Fl. Nederl. Indie 3: 135 (1825).

Note: BLUME gives the type locality as Java, Tjanjor, but the specimen does not bear this locality name. Later collection of JENSEN from Kei (Herb. Kopenhagen) agrees with it, so that it seems to grow only in the Molucca region.

The oblong berry resembles that of *G. cyanocarpa*, but the ovary is pubescent, like *G. sapindoides*. Probably it comes between these two species.

Glycosmis pentaphylla (RETZ.) CORR in Ann. Mus. Hist. Nat. Paris 6: 336 (1805).

= *Limonia pentaphylla* RETZ. Observ. Bot. Fasc. 5: 24 (1789).

Type: India (KÖNIG) Univ. Lund.

Note: This Indian species reaches down to Tenasserim and Andaman and very rarely occurs in Java, although it is suspicious to have escaped from garden.

Glycosmis sapindoides LINDL. ex WALL. apud OLIVER in Journ. Linn. Soc. Bot. 5 suppl. 2: 38 (1861).

Type: Penang (WALLICH) No. 6376. Herb. Kew.

Loc.: Java, Malay Peninsula, Andaman, Sumatra, Bali, Isl. Soelabesi, Kei, New Guinea. It also rarely occurs in Cochinchina, Annam and Australia.

Clausena Englerii TANAKA n. sp.

Planta robusta, rhachi 36 cm. longâ, 7-foliolatâ, foliolis ovatis, acuminato-caudatis, basi acuminatis, conspicue venosis, serratis, in siccis chartaceis, supra viridissimis subtus pallidis, venis rufescentibus, brevissime petiolutatis, toto glabris. Inflorescentia terminalis, 28 cm. longa, ramosa, paniculis multifloris. Flores minores, pentameres, breviter pedicellati. Calyx tenuis, scutellatus, lobis triangularibus, pilosis, marginibus ciliatis; Petala 5, caduca. Stamina 10, filamentis dilatatis, antheris majoribus. Ovarium cylindricum, pilosum, stylis linearibus, rectis vel curvatis, stigmatibus sub-capitato.

Type: Sumatra (LÖRZING) No. 6825. Herb. Leiden 922. 297—796.

Note: This species resembles the robust form of *G. heptaphylla*, but the latter constantly has 4-merous flowers, glabrous ovary, and entire leaflets. Such a form from Sumatra was unfortunately named by ENGLER (2) as *G. Forbesii*, but is of course invalid. This species is dedicated to him for his notorious work on this group.

Clausena excavata BURM. f. Fl. Indica 87 (1768).

Type: Java (—) Herb. Leiden 908. 203—1051.

Note: The type specimen of this cosmopolitan species is not found in Herbarium Delessert, but the above given specimen at Leiden bears an identical label which is common on other BURMANN specimens at Genève. Presumably this specimen was obtained through communication by Prof. VAN ROYEN, then resided at Leiden.

Clausena halmaheirae MIQ. in Ann. Mus. Bot. Lugd. Bat. 1: 211 (1863).

Type: Halmaheira (TEYSMANN et DE VRIESE) Univ. Utrecht & Herb. Leiden.

Note: This species is closely related to *C. Harmandiana*, but is different in having narrower leaflets with distinct black dotting, and a long branched panicle, bearing decidedly smaller berry.

Clausena Harmandiana PIERRE ex GUILL. in LECOMTE, Notulae Syst. 1: 219 (1910).

= *Glycosmis Harmandiana* PIERRE Fl. Forest. Cochinch. 4: fasc. 18 (opposite of Pl. 285). (1893).

Type: Cambodia (HARMAND) No. 3875 Herb. Mus. Paris.

Loc.: Java and Bali.

Clausena Harmandiana PIERRE ex GUILL. var. *papuana* TANAKA in Journ. Arn. Arb. 9: 141 (1928).

= *Clausena papuana* LAUTERB. in Bot. Jahrb. 55: 250 (1918).

Type: Papua, Bismark Isl. (SCHLECHTER) No. 18476 Herb. Mus. Berlin.

Clausena Harmandiana PIERRE ex GUILL. var. *contracta* TANAKA n. var.

Folia 5—7 foliolata, foliolis ovatis crassiusculis, minute pubescentibus, acutissimis, basi subacutis, brevissime petiolulatis. Inflorescentia terminalis, contracta, floribus pentameris, ovario crasso, stylo multo contracto, stigmatate capitato.

Type: Java (HORSFIELD) Herb. Kew.

Note: This variety somewhat resembles the robust variety of *C. dentata*, but is distinct by terminal, and not axillary inflorescence and contracted panicle with considerably shorter style and thick ovary.

Clausena heptaphylla W. & A. Prod. Fl. Pen. Ind. Or. 1: 95 (1834).

Type: Calcutta (ROXBURGH) Herb. Brit. Mus.

Loc.: Java, Sumatra and Timor.

Clausena Lansium SKEELS in U. S. Dept. Agr. Bur. Pl. Ind. Bull. 168: 31 (1909).

= *Quinaria Lansium* LOUR Fl. Cochinch. 272 (1790).

Type: China, Canton, cult. (LOUREIRO) Herb. Mus. Paris.

Loc.: Java and Timor (probably cultivated).

Chalcas crenulata TANAKA in Bull. Soc. Bot. Fr. sér 5, 4: 710 (1928).

= *Glycosmis crenulata* TURCZ. in Bull. Soc. Imp. Nat. Mosc. 31: 250 (1858).

Type: Philippines (CUMMING) No. 335 Herb. Leningrad.

Loc.: Celebes, Minahassa (KOORDERS).

Note: This species flourishes in Philippines and New Caledonia, and only this collection links both localities. LOBB's material (No. 469) labeled as a Java collection is undoubtedly a mistake of Philippines.

Chalcas Koenigii KURZ ex SWINGLE in BAILEY Stand. Cyclop. Hort. 2076 (1916).

= *Bergera Koenigii* LINN. Mant. Pl. alt. 563 (1771).

Type: Ind. Or. (KOENIG) Linn. Soc. London.

Loc.: Java.

Chalcas paniculata LINN. Mant. Pl. 68 (1767).

Type: India (—) Linn. Soc. London.

Loc.: Java, Sumatra, Borneo, New Guinea, Moluccas, Amboina, Timor.

Chalcas paniculata LINN. var. *Zollingeri* TANAKA in Bull. Soc. Bot. Fr. sér 5, 4: 710 (1928).

Type: Ins. Bima and Sumbawa (ZOLLINGER) No. 3351. Herb. Mus. Paris.

Note: The same variety is cultivated also in Buitenzorg, originally collected from the island of Timor.

Merrillea caloxylon SWINGLE in Philip. Journ. Sci. 13: 337 (1918).

= *Murraya caloxylon* RIDLEY in Journ. Str. Br. Roy. As. Soc. 50: 113 (1908).

Type: Siam (PENNY) and Perak (WRAY). The latter specimen at Herb. Brit. Mus.

Loc.: Sumatra (PRAETORIUS).

Feronia Limonia SWINGLE in Journ. Wash. Acad. Sci. 4: 328 (1914).

= *Schinus Limonia* LINN. Sp. Pl. 1: 389 (1753).

Type: Ceylon (HERMANN) I: 76. 175. Herb. Brit. Mus.

Loc.: Java, Banda and Sumbawa (Probably cultivated).

Feroniella lucida SWINGLE in Bull. Soc. Bot. Fr. 59: 781 (1912).

= *Feronia lucida* SCHEFFER in Nat. Tijdsch. Nederl. Ind. 31: 19 (1879).

Type: Java, cult. (TEYSMANN) Herb. Hort. Bot. Buitenzorg

Note: There occurs in Java another species, *F. pubescens* TANAKA, but the description is in press.

Aegle marmelos CORR. in Trans. Linn. Soc. London 5: 222 (1800).

= *Crateva marmelos* LINN. Sp. Pl. 1: 444 (1753).

Type: Ceylon (HERMANN) Drawing fol. 22, no. 212. (No specimen) Brit. Mus.

Loc.: Java, Celebes, Banda, Sumbawa and Timor.

Triphasia trifolia P. WILS. in Torreyia 9: 33 (1909).

= *Limonia trifolia* BURM. f. Fl. Ind. 103 (1768).

Type: Java (—) BURMANN No. 166. Herb. Delessert, Genève.

Loc.: Sumatra, Celebes, Amboina, Banda, Timor, Moluccas and Borneo.

Echinocitrus Brassii TANAKA in Journ. Arn. Arb. 9: 138 (1928).

= *Paramignya Brassii* C. T. WHITE in Journ. Arn. Arb. 7: 231 (1926).

Type: New Guinea, Rigo (BRASS) No. 817. Herb. Arn. Arb.

Lavanga borneensis HOCHR. in Bull. Inst. Bot. Buit. 19: 41 (1904).

Type: Borneo, Sambas (HOCHREUTINER) Herb. Hort. Buit.

Note: The plant is cultivated in Buitenzorg, but no subsequent collection was made in Borneo.

Lavanga crassifolia TANAKA n. sp.

Ramulus crassus, spinis curvatis, petiolis brevibus, subcrassis, foliolis crassissimis,

obovatis vel oblongo-obovatis, apice rotundatis frequenter emarginatis saepe apiculatis, basi obtusis, marginibus subrevolutis, supra nitidis, distinctissime venosis, subtus levibus, minutissime verruculosis. Inflorescentia multiflora, floribus majoribus, calycibus profunde cupulatis, filamentis connatis puberulis. Fructus major, tuberculato-foveolatus.

Type: Malacca (MAINGAY) No. 285. Herb. Kew.

Loc.: Borneo, Tawao (ELMER) No. 20443 & 21670, Sarawak No. 243, and Sumatra (YATES) No. 766.

Note: The associated characters of thick leaflets with clear venation, large flower, united filaments with minute pubescence, large deep calyx and large fruits, are well characterizing this species. It is not uncommon in Malay peninsula, but is not known east of Java.

Lavanga Motleyi OLIV. in Journ. Linn. Soc. Bot. 5 suppl. 2: 44 (1861).

Type: Borneo, Bangarmassing (MOTLEY) Herb. Kew.

Loc.: Sumatra.

Note: Combination of characters is extremely large leaflets with distinct venation, large flowers with shallow calyx, and free much hairy filaments.

Lavanga philippinensis MERR. in Philip. Journ. Sci. 3: 233 (1908).

Type: Mindanao, Zamboanga (WHITFORD & HUTCHINSON) No. 9104. Herb. Bur. Sci. Manila.

Loc.: Borneo.

Note: This species differs from *L. crassifolia*, by unparalleled venation, small flowers, free pubescent filaments and large fruits borne on small calyx.

Lavanga sarmentosa KURZ in Journ. As. Soc. Bengal 39: 69 (1870).

= *Triphasia sarmentosa* BL. Bijdr. Fl. Nederl. Ind. 3: 312 (1825).

Type: Java, Salak (BLUME) Herb. Leiden. 908. 302—1192.

Loc.: Sumatra, Borneo, and New Guinea. Also Penang, Johor, Perak and Tavoy.

Note: This species is characterized by smaller leaflets with obscure venation, small flowers, with free, very hirsute filaments and small fruits with small calyx. This is the most common species in Dutch East India

Lavanga scandens BUCH - HAM. in WALL. Cat. No. 6382 (1828).

= *Limonia scandens* ROXB. Fl. Ind. ed. 2,2: 380 (1832).

= *Limonia spectabilis* MIQ. Fl. Nederl. Ind. suppl. 500 (1860).

Type: Ind. Or. (ROXBURGH) Herb. Delessert, Genève (as *Aitonia spinosa*).

Loc.: Borneo (ELMER) No. 21707, and Sumatra (MIQUEL): (FORBES) No. 2276.

Note: This species has narrow leaflets with obscure venation, large flower with glabrous united filaments and large fruits with large calyx. Common in India, Birma, and Indo-China but rare in Malay archipelago.

- Paramignya andamanica* TANAKA in Bull. Soc. Bot. Fr. sér 5. 4: 712 (1928).
 Type: S. Andaman (KING) Herb. Kew.
 Loc: Sumatra, Sumbawa, N. Borneo.
- Wenzelia dolichophylla* TANAKA in Journ. Arn. Arb. 9: 139 (1928).
 = *Citrus dolichophylla* SCHUM. & LAUTB. Fl. Deut. Schutz. Südsee 377 (1901).
 Type: New Guinea, Ramu-Fluss region (LAUTERBACH) No. 3108 Bot. Mus. Berlin.
- Wenzelia paludosa* TANAKA in Journ. Arn. Arb. 9: 139 (1928).
 = *Citrus paludosa* LAUTB. in Bot. Jahrb. 60: 263 (1918).
 Type: New Guinea (LEDERMANN) No. 7507. Bot. Mus. Berlin.
- Pleiospermium dubium* SWINGLE in Journ. Wash. Acad. Sci. 6: 429 (1916),
 = *Limonia dubia* BLUME in Bijdr. Fl. Nederl. Ind. I: 133 (1825).
 Type: Java (BLUME) Herb. Leiden 908. 203—1318.
 Loc.: Sumatra and Borneo.
- Pleiospermium littoralis* TANAKA
 = *Paramignya littoralis* MIQ. in Ann. Mus. Lugd. Bat. I: 211 (1864).
 Type: Java, Rembang (TEYSMANN) Herb. Leiden 925.250—602.
 Loc: Bali. Also found in Annam.
- Merope angulata* SWINGLE in Journ. Wash. Acad. Sci. 5: 423 (1915),
 = *Citrus angulata* WILLD. Sp. Pl. ed. 4. 3 pt. 2: 426 (1801).
 Type: (No type in existence) Based on RUMPHIUS Herb. Amb. 2: 110, t. 32 (1750).
 Loc.: Java and New Guinea.
- Atalantia disticha* MERR. var. *paniculata* TANAKA in Journ. Arn. Arb. 9: 141 (1928),
 = *Atalantia paniculata* WARB. in Bot. Jahrb. 13: 340 (1891).
 Type: Ceram Laut (WARBURG) No. 20132. Bot. Mus. Berlin.
 Loc.: Java, Sumbawa, Kei, Biak, Timor laut, N. Borneo. Also not uncommon in Philippines.
- Atalantia spinosa* TANAKA
 = *Trichilia spinosa* WILLD. Sp. Pl. 2: 554 (1799).
 Type: E. India. WILLDENOW collection (type) Bot. Mus. Berlin.
 Loc.: Java, Buitenzorg cult. (Said coming from Banka, but dubious).
- Atalantia trimera* OLIV. in Journ. Linn. Soc. Bot. 5 suppl. 2: 24 (1861).
 Type: Timor (LESCHENAULT) Herb. Kew.
 Loc.: Java, Sampang.

Severinia monophylla TANAKA.

= *Lemonia monophylla* LINN. Mant. Pl. alt. 237 (1771).

Type: Ind. Or. (—) Herb. Linn. Soc. London.

Loc.: Java, Buitenzorg cult.

Monanthocitrus cornuta TANAKA in Journ. Arn. Arb. 9: 138 (1928).

= *Citrus cornuta* LAUTB. in LORENTZ, Nova Guinea 8: 292 (1910).

Type: New Guinea (VERSTEEG) No. 1551. Herb. Leiden 910. 205—2852.

Monanthocitrus grandiflora TANAKA in Journ. Arn. Arb. 9: 139 (1928).

= *Citrus grandiflora* LAUTB. in LORENTZ, Nova Guinea 8: 292 (1910).

Type: New Guinea (VERSTEEG) Herb. Buitenzorg. (not seen).

Fortunella japonica SWINGLE in Journ. Wash. Acad. Sci. 5: 171 (1915).

= *Citrus japonica* THUNB. in Nov. Act. Upsal. 3: 199 (1780).

Type: Japan, cult. (THUNBERG) Univ. Uppsal.

Loc.: Java, Buitenzorg, cult.

Citrus amblycarpa OCHSE in Ind. Vrucht. 217 (1927).

= *Citrus Limonellus* var. *amblycarpa* HASSK. in Flora 25, Beibl. 3: 43 (1842).

Type: No type in existence, but tree cult. in Buitenzorg.

Note: This is a well characterized species also occurring in Laos and India.

Citrus aurantifolia SWINGLE in Journ. Wash. Acad. Sci. 3: 465 (1913).

= *Limonia aurantifolia* CHRISTMANN in Linn. Pflanzensys. 1: 618 (1777).

Type: Not in existence (Based upon RUMPEIUS, Herb. Amb. 2: 107 tab. 29).

Loc.: Java, Sumatra, Banda and Aru. Commonly cultivated.

Citrus Aurantium LINN. Sp. Pl. 1: 782 (1753).

Type: Unknown locality. Linn. Soc. London.

Loc.: Buitenzorg, cult.

Citrus grandis OSBECK Reise Ostind. Chin. 250 (1765).

Type: China, Canton (OSBECK), Herb. Mus. Stockholm.

Loc.: Java, Sumatra, Timor. Lombok and Amboina.

Citrus hystrix DC. Cat. Pl. Hort. Monsp. 19 & 97 (1813).

Type: Montpellier? (DE CANDOLLE) Herb. Delessert, Genève.

Loc.: Java, Sumatra, Timor, and Celebes.

Citrus Limon BURM. f. Fl. Ind. 173 (1768).

Type: Europe, cult. (BURMANN, f.) Herb. Delessert, Genève.

Loc.: Java.

Citrus macroptera MONTR. in Mém. Acad. Lyon 10: 187 (1860).

Type: Art (MONTROUZIER) Fac. Méd.-Pharm., Univ. Lyon.

Loc.: Borneo, Celebes, Sumbawa. Ceram laut, Kei, and New Guinea. Also common in Philippines, New Caledonia, Fiji and Samoa, but not occurring in Java.

Citrus medica LINN. Sp. Pl. 1: 782 (1753).

Type: Not in existence. (Based upon current author, particularly C. BAUHIN)

Loc.: Java and Amboina.

Citrus miaray WESTER in Phil. Agr. Rev. 10. 457 (1917).

Type: Mindanao (WESTER) Bur. Sci., Manila.

Loc.: Simaloer (ACHMAN) No. 312.

Citrus microcapa BUNGE in Mém. Acad. Imp. Sci. St. Petersb. 2: 84 (1833).

Type: China bor. (BUNGE) Herb. Mus. Paris.

Loc.: Java, Sumatra, Banda, Simaloer, Lombok, Ceram laut and Amboina.

Citrus natsudaidai HAYATA Icon. Pl. Formos. 8: 29 (1919).

Type: Formosa, Shinchiku (SHIMADA) Herb. Tokyo Imp. Univ.

Loc.: Java, Buitenzorg, cult.

Citrus polyandra TANAKA in Studia Citrologica 2: 163 (1928).

Type: New Guinea (PEEKEL) No. 408. Bot. Mus. Berlin.

Citrus sinensis OSBECK Reise Ostind. Chin. 250 (1765).

Type: China (OSBECK) Herb. Naturh. Mus. Stockholm.

Loc.: Java, cult. and Lombok.

Citrus unshiu MARCOV. in Isv. Soch. Obl. Sukhum. Sad. Sel. Opyt. St. 2: 5 (1921).

Type: Probably not in existence.

Loc.: Java, Buitenzorg, cult. (BLUME: TANAKA).

Citrus Wibberii WESTER in Phil. Agr. Rev. 8: 13 (1915).

Type: Lamao (WESTER) 1915. Bur. Sci. Manila.

Loc.: Java, Buitenzorg, cult.

General notes on *Citrus*: This list does not include the mandarine type of orange such as Djeroek paseh and Djeroek Garoet, which are hitherto erroneously alluded to *Citrus nobilis*. Djeroek keprok, which was identified by OCHSE (5) as *Citrus nobilis* var. *chrysocarpa* HASSK. is most probably a tangerine, i. e. *Citrus tangerina* HORT.

All other small mandarines require critical investigations.

There are many other names given by BLUME (1), HASSKARL (3), KOORDERS (4) et al. Most of them have been reduced to synonyms of the species here enumerated. Identification of these species will be given in later publications.

Citations.

- (1) BLUME, K. L. Bijdragen tot de flora van Nederlandsch Indië, Batavia, 's Lands Druk., 1825—1826. 17 stuk.
- (2) ENGLER, A. Rutaceae in ENGLER u. PRANTL, Naturl. Pflanzenfamilien. III. Abt. 4 u. 5, p. 95—201. Leipzig, ENGELMANN, 1897.
- (3) HASSKARL, J. K. Plantarum genera et species novae aut reformatae Javensis in Flora 25: Beiblatt Nr. 3, p. 42—45. 1842.
- (4) KOORDERS, S. H. Verslag eener Botanische Dienstreis door de Minahasa, tevens eerste overzicht der Flora van N. O. Celebes. Batavia, G. KOLFF, 1898.
- (5) OCHSE, J. J. Indische Vruchten. Weltevreden, Volkslectuur Druk., 1927.
- (6) TEYSMANN, J. E. & BINNENDIJK, Catalogus plantarum quae in Horto Botanico Bogoriensi coluntur. Batavia, ter Lands Druk., 1866.