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REVISION OF MALAYSIAN ORTHOSIPHON (LAB.)

by

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In Malaysia the genus *Orthosiphon* has gained some general interest, because one of its species, well-known under its vernacular name kumis kutjing- or remukdjung, has been recognized as a noteworthy medicinal plant, besides being of some horticultural value.

In the recent treatment by ADHLBERT in the emergency edition of Backer's 'Beknopte flora van Java' (1954) three species have been recognized, *viz O. petiolaris* MIQ., *O. aristatiis* (BL.) MIQ., and *O. stamineus* BTH. In my opinion the differences between the latter two are so small that they cannot be recognized as good species; in the herbarium they appear indistinguishable. My study has been based on the specimens in the Leyden and Utrecht herbaria.

ORTHOSIPHON

Bth. *in* Bot. Reg. 13 (1829) sub t. 1300; *in* Wall. PI. As. Rar. 2 (1831) 14; Lab. gen. (1832) 25; *in* DC. Prod. 12 (1848) 49; Miq. Fl. Ind. Bat. 2 (1858) 943; Hook. f. Fl. Br. Ind. 4 (1885) 612; Briquet, *in* E. &. P. Nat. Pfl. Fam. 4, 3a (1897) 372; Gamble, Fl. Madras (1924) 1112; Kudo, Mem. Fac. Sc. Agr. Imp. Univ. Taihoku 2, Bot. (1929) 115; Backer, Onkruidfl. Jav. Suik. (1931) 576; Doan, in Fl. Gén. I.-C. 4 (1936) 933; Mukerjee, Rec. Bot. Surv. Ind. 14 (1940) 21; Adelbert, *in* Backer, Bekn. Fl. Jav. (em. ed.) 14 (1954) fam. 201, p. 57. — *Clerodendranthus* Kudo, I.e. 117.

Herbs or small shrubs, glabrous or hairy. Leaves serrate or crenulate. Inflorescence terminal, mostly simple, with cymes of 4—6 flowers. Calyx 2-lipped, the upper one broad, ovate or rounded, recurved, the margins Recurrent on the tube, the lower one consisting of 4 narrow, aristate teeth. Corolla distincly exceeding the calyx, 2-lipped, lower one hardly longer than the 3—4-lobed upper one, faintly boat-shaped. Stamens adnate to the corolla tube up to the throat, partly or entirely included in the lower lip. Disk 4-lobed, the anterior lobe representing a nectarial gland. Style entire. Carpels rather thin-walled nuts, often not all developing.

DISTRIBUTION. About 40 species, in the tropics of the Old World, mainly in Africa, East as far as Queensland, introduced in Polynesia.

NOTE. Kudo I.e. has made *0. stamineus* = *0. aristatus* the type of a new genus *Clerodendranthus,* but the arguments for this seem to me entirely insufficient, as this species is as closely related to other *Orthosiphons* as the latter are amongst them mutually.

KEY TO THE SPECIES

1. Stamens far protruding beyond the corolla. Leaves always decurrent on the petiole ..... *1. 0. aristatus.*
1. Stamens not or hardly protruding beyond the corolla. Leaves mostly not decurrent ..... *2. 0. thymiflorus.*

1. ORTHOSIPHON ARISTATUS (Bl.) Miq. Fl. Ind. Bat. 2 (1858) 943; Merr. En. Born. (1921) 521; En. Philip. Fl. PI. 3 (1923) 422; Backer, Onkruidfl. Jav. Suik. (1931) 577; Mukerjee, Rec. Bot. Surv. Ind. 14 (1940) 26; Steen.-Krus. Select Indon. Med. PI. (1953) 26; Adelbert, *in* Backer, Bekn. Fl. Jav. (em. ed.) 14 (1954) fam. 201, p. 58; Quisumbing, Med. PI. Philip. (1951) 828. — *Clerodendron spicatum* Thunb. Fl. Jav. (1825) 22, *non* 0. spicatum Bth. 1848. — *Ocimum aristatum* Bl. Bijdr. (1826) 833; Bth. Lab. Gen. (1832) 10; *in* DC. Prod. 12 (1848) 42. — *Ocimum grandiflorum {non* L'Herit.) Bl. Bijdr. (1826) 835. — *Ocimum longiflorum* Buch.-Ham. ex Wall. Cat. (1831) no 2727, *nomen.* — 0. *stamineus* Bth. *in* Wall. PI. As. Rar. 2 (1831) 15; Lab. Gen. (1832) 29; Hassk. Cat, Hort. Bog. (1844) 129; Miq. Fl. Ind. Bat. 2 (1858) 944; Masters, Gard. Chron. (1869) 941; Hook, f. Bot. Mag. 96 (1870) t. 5833; Fl. Br. Ind. 4 (1885) 615; v.d. Burg, Geneesh. Ned. Ind. 3 (1885) 539; Buysman, Flora 117 (1915) 362; Gamble, Fl. Madras (1924) 1115; Mansfeld, Bot. Jahrb. 62 (1929) 381; Kloppenburg-Versteeg, Wenken, etc. ed. 4 (1935) Atlas t. 51; Doan, Fl. Gén. I.-C. 4 (1936) 939; Adelbert, *in* Backer, Bekn. Fl. Jav. (em. ed.) 14 (1954) fam. 201, p. 57. — *O. tomentosus* (non Bth.) T. & B. Cat. Hort. Bog. (1866) 132. — *O. grandiflorus* Bold. Zakfl. Landb. Jav. (1916) 110, *non* Terrac. 1892; Heyne, Nutt. PI. (1927) 1338; Backer, Onkruidfl. Jav. Suik. (1931) 577; Burkill, Diet. Ec. Prod. Mai. Pen. (1935) 1592; Kloppenburgh-Versteeg, Wenken, etc. ed. 4 (1935) 111; Bruggeman, Ind. Tuinboek (1939) 137; Merr. Brittonia 5 (1943) 29. — O. *spicatus* (Thunb.) Back., Bakh. & Steen. Blumea 6 (1950) 359, *non* Bth. 1848; Steen. Fl. Schol. Indon. ed. 2 (1951) 340 — *Clerodendranthus stamineus* Kudo, Mem. Fac. Sc. Agr. Imp. Univ. Taihoku 2, Bot. (1929) 117.

Rather flaccid herb,1/2 -11/2 m high. Stem sparsely short-hairy, glabrescent; internodes 4—7 cm. Leaves ovate, elliptic or rhombic, 1 1/2—3 times as long as broad, 3—8 by 2—5 cm, smaller and narrower upwards,

short-hairy to glabous, gland-dotted beneath, margin serrate-crenate, base decurrent into the petiole, apex acute to blunt; petioles sparsely hairy, 1—2 (—4) cm, shortening upwards to nearly absent in the upper leaves. Bracts sessile, obovate, *l 1/2*—2 mm, acute-acuminate. Pedicels 1 1/2—4 mm, variable in hairiness. Flowers sometimes cleistogamous in certain specimens in which case the corolla remains enclosed within the calyx and the stamens remain coiled. Calyx 2—3 mm, glabrous to hairy, glandular at the base. Corolla white to pale lilac; tube 9—12 mm, slender, outside glabrous to hairy, inside sparsely hairy, upper and lower lip of the same length, 4—10 mm. Filaments c. 2—4, protruding from the corolla-tube, glabrous. Style 4—5 1/2 cm.

DISTRIBUTION. MALAY PENINSULA: wild in the north, cultivated in the south (Burkill). SUMATRA (mainland) : *Kostermans* 786, *Lörzing* 7255, *Posthumus* 1026, *Rutten-Kooistra* 72; Simalur I.: Achmad 818; Enggano I.: *Lütjeharms* 5032. JAVA (mainland) : *Backer* 6596, 18463, *Bakhuizen van den Brink* 926, 6343, *Blume* 109 (L, type), *Buwalda* 2843, *Beumée* 803, *Elbert* 483, *Hallier* f. 279, *B. J. Karsten* 39, *Koorders* 35054, 41718, *Schiffner* 2496, *Raap* 351, *Zoilinger* 566; MADURA L: *Backer* 20050. BORNEO: *Korthals* 20. LESSER SUNDA ISLAND: Sumbawa: *Colfs* 236, *De Voogd* 1909, *Elbert* 3692, 3700, 3963; Flores: *Posthumus* 2377; Timor: *Spanoghe* 50. MOLUCCAS: Van der Burg. I.e. PHILIPPINES: *Merrill* I.e. NEW. GUINEA: *Atasrip* 143, *Cheesman* 96, *Hooglcund* 4745, *Ngf* 3983. .

From India to Indo-China and the Nicobars, throughout Malaysia to Australia, introduced in Samoa and adjacent islands, in Malaysia also frequently cultivated (the lilac race).

ECOLOGY. Generally in rather moist places, not a distinct constituent of the rain-forest but in open to half-shaded places, in the wet areas possibly flowering throughout the year, in the seasonal parts during the rainy season, up to c. 900 m, cultivated to 700 m.

USES. One of the uses is the horticultural value of the plant. Masters 1869 I.e. saw the plant on a meeting of the 'flora committee' exhibited by Veitch & Sons, imported from N. Queensland (Cape York), and wrote: "There is little doubt that this plant will be a favourite with gardeners".

Before that time it had already been in cultivation in the Botanic Gardens at Bogor and was first mentioned from being cultivated there by Hasskarl in his Catalogue (1844).

It is extremely remarkable that this rather showy plant, which is doubtless a native of Malaysia, and has been found in all the major islands

and island groups, became known so late to botanical science. None of the pre-linnean authors, Rheede van Draakensteyn and Rumphius, recorded it and it was obviously unknown to Linnaeus and his contemporaries. As far as we know Thunberg was the first who collected it in (?1775 or more probably) 1777 in Java; he described it as late as 1825. In the collections of plants or plates or in the lists of vernacular names of Noroña (1781 in Java), Hornstedt (1782 in Java), and Deschamps (1794-1798 in Java) there is no mention of it. It might have been more rare in that time and not in cultivation by the Javanese; why should it otherwise have escaped these explorers? Horsfield collected it in South Central Java, near Patjitan. Shortly afterwards, in Blume's time, it was repeatedly collected in West Java by Blume himself, by Zippel, Reinwardt, etc.; moreover, there is an ancient specimen from Semarang (leg. Waitz?) in Central Java, and a specimen from Waigeu I., collected by d'Urville, was cited by Bentham.

It is quite obvious that the Javanese did not recognize the medicinal value later attached to it, as none of the earlier authorities on medicinal plants mentioned it: Horsfield ('Short account . . . . Med. Plants', Verh. Bat. Gen. 8, 1826, 95), Waitz (Tract. Waarnemingen', 1829), Hasskarl ('Het Nut etc.', 1845), Filet ('Plants of Bot. Gard. Military Hosp. Weltevreden', 1855), and even Bisschop Grevelink (1883). Also Junghuhn makes no mention of the plant.

The first who mentioned its being in use has been Van der Burg (De Ind. Geneesheer vol. 3, p. 539) in 1885; he said that the dried leaves were on sale in drugstores, that they act as a diuretic, that even tinctura orthosiphonis was prepared in some pharmacies, and that several physicians had success with the application of the plant in curing various kidney complaints.

In continental Asia its medicinal use just indicated is, or at least was, obviously unknown. In the Malay Peninsula Burkill (1935) reports it from gardens in the south as an ornamental plant. In Indo-China Pételot (Plant, méd. du Cambodge, Laos & Vietnam p. 264) records it as cultivated but not used medicinally. The same is said by Guichard (Ann. fie. Méd. Pharm. Indochine 1, 1937, 98) and admitted by Kirtikar & Basu for India (Ind. Med. PI. 3, p. 1029).

From this I derive the remarkable conclusion that it is possibly the Eurasians and Europeans who detected the medicinal use in the later half of the nineteenth century.

Shortly before 1886 the species must have been imported in the Netherlands from Java by Mr Rip, as appears from an account by Van

Itallie (Tijd. Pharm. 1886, p. 232). At that time the plant had obviously got a reputation, as the Botanic Gardens at Bogor started a culture of it according to its Annual Report over 1886. And some plantations elsewhere followed, resulting in a regular export of the drug.

The use is now almost universal in Indonesia; in the Philippines folia orthosiphonis are used, but obviously on a much smaller scale (Quisumbing, 1951 I.e.).

In 1905 the species was officially entered in the 4th edition of the Netherlands Pharmacopeia under the name 0. *stamineus* Bth.

The leaves are used in infusa against various kinds of kidney complaints and illness, renal calculi, etc. Moreover, against catarrh of the bladder, and often together with other species, e.g. meniran = *Phyllanthus urinaria,* or kedji beling = *Desmodium gangeticum* DC. against gall stones and podagra, according to Mrs Kloppenburg-Versteegh..

The plant has repeatedly been examined phytochemically. First by Van Itallie (Tijd. Pharm. 1886, p. 232). He found a glucosid, orthosiphonin, and tannin. A. Goudswaard gave in 1934 (Pharm. Tijd. Ned. Ind. 6, p. 145) an extensive report on the phytoehemical results; orthosiphonin is not poisonous to salamanders and frogs.

The constituent responsible for the diuretic effect is not known with certainty; this is not particularly surprising as the various factors and their effect on the mechanism of the kidney are far from well known.

Some importance has been attached to the fact that the leaves and stemtips have a high potassium content, according to Boorsma (Med. Plantentuin no 52, 1902, 25), and contain furthermore urea and ureids. Dietzel & Schmidt recorded the quantity of urea (chemically bound and free) in a watery extract and in a decoct and found per 100 g dry simplex 26 mg bound and 14 mg free urea.

Shortly before the war some results of pharmacological experiments were published by A. Grevenstuk & F. W. Mreyen (Geneesk. Tijd. Ned. Ind. 81, 1941, 154-183) and L. A. van der Woerd (ibid. 706-728).

VERNACULAR NAMES: kumis kutjing, M, S, sisungui majal (Simalur), giri giri mareh (Djambi), rĕmuh djung, rĕmukdjung, ngrĕmĕk daĕng, rĕdji beling, J, kumis utjing, sinkir, S, songot kotjèng, Md, kabling-giibat, kabling-paráng, Tagalog (Philippines). The Javanese name kumis kutjing has also (wrongly) been used for the capparidaceous *Gynandropsis speciosa* and occasionally for *Tacca* species.

NOTES. Merrill has recently concluded that the oldest binary combination for the species would be *Trichostema spiralis* Lour. Fl. Coch. (1790)

371, and has consequently called it *Orthosiphon spiralis* (Lour.) Merr. Ling. Agr. Rev. 2 (1925) 137; Trans. Am. Phil. Soc. 24, ii (1935) 344.

Loureiro's description is rather scanty and might fit to other Labiatae; it may apply to our plant, as he mentioned the long-exserted stamens, but there are two points which raise our genuine doubt viz "folia integerrima tomentosa", which distinctly do not suit *Orthosiphon.* It is not clear whether Merrill has attempted to locate an authentic specimen in the British Museum collections. On our plea Mr Dandy, Keeper of the Botany Department, British Museum (Nat. Hist.), had made investigations and Mr W. T. Stearn wrote us that he has satisfied himself that there is no Loureiro specimen in the B. M. collections.

In absence of certainty I deem it premature to accept Merrill's conclusion specially with regard to the desirability to accept only name changes for useful plants if there is absolute certainty about the identity and no possibility to avoid a change of name.

2. Orthosiphon thymiflorus (Roth) *comb. nov.*—*Ocimum thymiflorum* Roth, Nov. PI. Sp. (1821) 269.—*Ocimum triste* Roth, I.e. 270.—*Ocimum viscoswm* Roth, I.e. 274.—*Plectranthus thymiflorus* Spreng. Syst. 2 (1825) 690.—*Plectranthus tristis* Spreng. I.e.—*0. tomentosus* Bth. in'Wall. PI. As. Rar. 2 (1831) 14, *non* De Wildem. 1921; Bth. Lab. Gen. (1832) 27; DC. Prod. 12 (1848) 51; Hook. f. Fl. Br. Ind. 4 (1885) 614, incl. var. *viscosus* et *glabratus*; Doan, *in* Fl. Gen. I. - C. 4 (1936) 935.—O. *glabratus* Bth. in Wall. PI. As. Rar. 2 (1831) 14; Bth. Lab. Gen. (1832) 28; DC. Prod. 12 (1848) 50; Miq. Fl. Ind. Bat. 2 (1858) 942; Gamble, Fl. Madras (1924) 1114; Mukerjee, Rec. Bot. Surv. Ind. 14 (1940) 23.—O. *viscosus* Bth. in Wall. PL As. Rar. 2 (1831) 14; Bth. Lab. Gen. (1832) 27; Moritzi, Syst. Verz. (1846) 55; DC. Prod. 12 (1848) 50; Gamble, Fl. Madras (1924) 1114; Mukerjee, Rec. Bot. Surv. Ind. 14 (1940) 23.—O. *petiolaris* Miq. FL Ind. Bat. 2 (1858) 943; Adelbert, *in* Backer, Bekn. Fl. Jav. (em. ed.) 14 (1954) fam. 201, p. 57.

Three varieties can be distinguished within this rather variable species, only one, the type variety, occurring in the Malaysian area. The main difference in the varieties is based on the degree and mode of hairiness.

Mukerjee I.e. p. 23 has accepted the binomial *O. viscosus* for this species, but Hooker f. had already combined *O. viscosus* and O. *tomentosus,* which compete priority, under the latter name (Fl. Br. Ind. I.e. 614). It seems remarkable that Mukerjee omitted from his monograph the evaluation of 4 other *Ocimums* of Roth, based on Indian material *viz Ocimum densiflorum, fastigiatum, thymiflorum,* and *urticaefolium.*

var. thymiflorus.—*Ocimum thymiflorum* Roth, 0. *glabratus* Bth., 0. *petiolaris* Miq.

Herb; stems c. 2 mm diam., glabrous or nearly so; internodes c. 2—6 cm. Leaves ovate-elliptic or rhombic, 3—5(—7) by 1—3 1/2 cm, glabrous except the basal parts of the nerves, gland-dotted beneath, the base cuneate to truncate (rarely slightly decurrent), margin serrate, apex acute; nerves 4—5 pairs; petioles 1—5 cm, glabrous to tomentose. Inflorescences terminal, distinctly demarcated, cymes of 6 flowers; internodes c. 1—2 cm. Bracts sessile, roundish, acuminate, 2—3 mm; pedicels 2—3 mm, short hairy. Calyx 3—5 mm, almost glabrous, with glands at the base. Corolla tube 7 mm, not particularly slender, outside pubescent, inside sparsely hairy; both lips 3—4 mm long. Filaments 2 1/2 mm, hardly longer than the corolla tube. Style 9—10 mm.

DISTRIBUTION. Ceylon and India to Indo-China, and in Central to East Java, obviously very rare in Java, originally found by Horsfield in Kediri, E of Djokja (type of *O. petiolaris,* in U), later also collected on Nusa Barung I. and the hill G. Sadeng near Puger, all localities in the dry, chalky, seasonal area of the southern coastal regions of Central and East Java.

var. tomentosus (Hook, f.) *comb. nov.*—*Ocimum triste* Roth, *Plectranthus tristis* (Roth) Spreng., *0. tomentosus* var. *tomentosus* Hook. f.

Leaves at both surfaces and rachis of the inflorescence light-brown tomentose.

var. viscosus (Hook, f.) *comb. nov.*—*Ocimum viscosum* Roth, 0. *viscosus* Bth., 0. *tomentosus* var. *viscosus* Hook. f.

Almost the entire plant covered with long, translucent (in vivo obviously viscid) hairs. Leaves blunt, 2 1/2 —4 by 1/2 —2 1/2 mm.

One specimen was of exactly the same habit, but the hairs were more sparse.

This variety has been reported from Java by Moritzi, the record being based on Zollinger 1873, but I have not seen this specimen.