

TAXONOMIC NOTES ON THE INDIAN CORAL TREE (*ERYTHRINA VARIEGATA* L. VAR. *ORIENTALIS* MERR.)

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ABSTRACT

The paper deals with the taxonomic treatment, nomenclature, exhaustive synonymy and distribution of the Indian Coral Tree (*Erythrina variegata* L. var. *orientalis* Merr.). A key to the various forms is provided, together with notes on their systematics and distribution. *Erythrina mysorensis* Gamble is considered here as a part of *Erythrina variegata* L. var. *orientalis* complex and is, therefore, reduced to forma *mysorensis* (Gamble) Maheshwari, *stat. nov.* The most common and widespread form of this tree is treated as forma *orientalis* (L.) Maheshwari, *stat. nov.* Some new names are also proposed.

INTRODUCTION

The Indian Coral Tree belongs to the genus *Erythrina* L.—a group of papilionaceous trees and shrubs which are distributed in all continents except Europe, being limited to the tropics and subtropics. Their conspicuous red flowers make them interesting horticultural subjects. The genus seems to be of unusual interest because of the potential economic importance of the seeds as a source of paralyzing principles. Recently many new alkaloids, e.g. erythroidine, erythroresin, erythrine, erythric acid, erythramine, erythraline, erythratine, erysodine, erysopine, erysoccine, erysovine and hypaphorine, all physiologically active, were isolated from the seeds of various species (Folkers & Unna, 1938). The extract has been suggested as a substitute for curare. However, in literature there has been considerable confusion in the nomenclature of the cultivated species (Krukoff, 1939; McClintock, 1953). Perhaps one of the main difficulties in studying the genus was offered by the fact that some of the best characters are in the pubescence of various parts, whereas the hairs as a rule are deciduous and often are partly or completely lost from specimens in herbaria. Further, the distribution and type of pubescence and the length of hairs vary greatly due to age and to growth conditions and, therefore, a thorough knowledge of the effect of these characters on the pubescence of a given species is required if the pubescence of the herbarium specimens is to be correctly interpreted. From the citations of specimens, it appears that the genus, as it is represented in herbaria, has an unusually high number of mixed collections. This is obviously due to the fact that because many species are aphyllous at anthesis, collectors often obtain materials from several plants and distribute them under a single number. The presence of mixed collections in herbaria probably is partly responsible for the fact that certain species were overlooked and for the unusually high number of misidentified specimens. The Indian Coral Tree, generally known in our floras as

Erythrina indica Lam., has been shown to be conspecific with *E. variegata* L., the type of *E. variegata* L. being only a form of *E. indica* Lam. with variegated leaves (Merrill, 1918).

SYSTEMATIC TREATMENT

Harvey and Sonder (Fl. Cap. 2: 236, 1861) proposed two subdivisions of the genus *Erythrina*: *Chirocalyx* and *Euerythrina*, which were given the rank of sections by Taubert (in E. & P. Nat. Pfam. 3: 363, 1894). In his systematic treatment of the African Erythrinas, Harms (in Engler, Pflanzenw. Afr. 3: 656, 1915) divided the genus into four sections of equal rank: *Chirocalyx*, *Dichilocraspedon*, *Dilobochilus* and *Euerythrina*, based largely upon the nature of the calycinal limb. In considering the entire genus rather than merely the African species, Louis (Bull. Jard. bot. Etat Brux. 13: 299, 1935) established two subgenera: *Euerythrina* Harvey and *Chirocalyx* (Meissn.) Harvey; the latter comprising three sections—*Mesocraspedon* Louis, *Dichilocraspedon* Harms, and *Dilobochilus* Harms. To this was recently added a new compact species-group designated by Krukoff (J. Arnold Arbor. 20: 225-226, 1939) as *Variegatae*. Louis (loc. cit.) and Krukoff (loc. cit.), therefore, regarded that the sections *Dichilocraspedon* and *Dilobochilus*, which were established by Harms (loc. cit.) on relatively unimportant characters, should not be considered of equal rank with *Chirocalyx* and *Euerythrina*. The Indian Coral Tree (*Erythrina variegata* L. var. *orientalis* Merr.) belongs to the subgenus *Chirocalyx* (Meissn.) Harvey and species-group *Variegatae* Krukoff. The distinguishing characters of this group are: Keel petals separate, subequal to or somewhat shorter than wings, much shorter than (usually not more than three-seventh as long as) standard; standard broad; calyx spathaceous; pods woody to sub-woody, slightly or deeply constricted between seeds (occasionally moniliform); seeds red, scarlet, pale red or red and blackish; rachises, pedicels and leaflets (at

least on petiolules and costa when young) stellate-pubescent.

NOMENCLATURE AND SYNONYMY

Great confusion exists in regard to the synonymy of this well known Indian *Erythrina*. Rumphius (1750) named this plant *Gelala litorea*, which was reduced by Linné (1753) to *Erythrina corallodendrum*. Under this later name, Linné (1753) published two varieties, namely *occidentalis* and *orientalis*, which obviously are two distinct species. There seems to be complete agreement among modern systematists that the specific name *E. corallodendrum* should be applied to an American rather than an Oriental species, in as much as variety *occidentalis* appears first in the text. A form of this species with variegated leaves was named by Rumphius (1750) *Gelala alba*, which formed the basis for Linné's *Erythrina variegata* L., and in part the basis of *E. picta* L. Merrill (1917) suggests that the specific name *variegata* should be adopted and it should include not only the variegated form, but also what is known as *E. indica* Lam. He accepts, however, Linné's variety *orientalis* of *E. corallodendrum* for *E. indica* and reduces that species to *E. variegata* L. var. *orientalis* (L.) Merr.

Jackson (1912) indicates that there are no specimens in the Linnaean Herbarium labelled by Linné as "*E. corallodendrum* var. *occidentalis*" nor as "*E. corallodendrum* var. *orientalis*", and also that the specimen labelled by him "*E. corallodendrum*" was first recorded in 1767 and was not in the herbarium in 1753 nor in 1755. The valid publication of the species was made in 1753 and, therefore, the specimen in the Linnaean Herbarium cannot be considered as the type of the species.

Under the species and under variety *orientalis*, Linné (1753) gives five references. The only cited plate is Rheede, *Hort. Ind. Malab.* 6: 13, t. 7, 1686, which represents a well drawn branchlet with leaves and flowers, pod and seed, and in addition gives a fairly complete description of the plant. In his own work, *Hortus Cliffortianus* (1737) which is cited in *Species Plantarum* (1753), Linné refers to Rheede's plate, when he discusses the species and indicates Malabar, India, as the native place of the Oriental plant. Thus it seems obvious that Rheede's plate and description should be regarded as representing the plant Linné had in mind when he described *E. corallodendrum* var. *orientalis*. Rheede's plate and description were based on a plant collected from Malabar, India, which is, therefore, the type locality of the species.

In the course of my studies on the Indian Coral Tree, I have noted that this species was introduced to various countries and misidentified with the Occidental species. It has been reported naturalized in Hawaii Islands (Rock, 1920) and in America, especially in West Indies, Florida, Cuba, Jamaica, Hispaniola, Puerto Rico, Tortola, British Honduras, British Guiana and Brazil

(Krukoff, 1939). Krukoff's (1939) studies on the American species have indicated clearly that at least *Erythrina divaricata* DC. and *E. spathacea* DC., which were supposed to be American, are conspecific with the Indian species. A fuller synonymy of the Indian *Erythrina* is presented below:

Erythrina variegata L. var. *orientalis* (L.) Merr. Interpret. Herb. Amb. 276, 1917 et Sp. Blanc. 187, 1918 et Enum. Philip. Fl. Pl. 2: 306, 1923 et in Trans. Amer. Phil. Soc. N.S. 24: 208, 1935; Craib, Fl. Siam. Enum. 1: 442, 1931; Krukoff in J. Arnold Arbor. 20: 228, 1939 et Brittonia 3: 336, 1939; Smith in Sargentia 1: 39, 1942; Chopra, Poison. Pl. Ind. 1: 337, 1949; Wealth of India 3: 197, t. 127, 1952; Bor, Man. Ind. For. Bot. 93, 1953; Raizada in Indian For. 84: 484, 1958; Santapau in Rec. bot. Surv. Ind. ed. 2, 16(1): 59, 1960. *E. corallodendrum* L. β *orientalis* L. Sp. Pl. 706, 1753. *E. picta* L. Sp. Pl. (ed. 2), 993, 1763, p.p. *E. indica* Lam. Encyc. 2: 391, 1785; Moon, Cat. Pl. Ceylon 52, 1824; DC. Prod. 2: 412, 1825; Roxb. Fl. Ind. 3: 249, 1832; Wight & Arn. Prod. 1: 260, 1834; Wight, Icon. 1: t. 58, 1839; Graham, Cat. Pl. Bomb. 54, 1839; Voigt, Hort. Suburb. Calc. 237, 1845; Dalz. & Gibs. Bomb. Fl. 70, 1861; Beddome, Fl. Sylvat. 87, 1869-74; Brandis, For. Fl. 139, 1874 et Ind. Trees 226, 1907; Baker in Hook. f. Fl. Brit. Ind. 2: 188, 1876; Kurz, For. Fl. Brit. Burma 1: 368, 1877; Gamble, Man. Ind. Timb. 242, 1881 et Fl. Pres. Madras 353, 1918; Watt, Dict. Econ. Prod. Ind. 3: 269, 1890; Trimen, Handb. Fl. Ceylon 2: 63, 1894; Prain in J. Asiat. Soc. Beng. 66: 410, 1898 et Beng. Pl. 398, 1903; Cooke, Fl. Pres. Bomb. 1: 366, 1901; Duthie, Fl. Upp. Gang. Pl. 1: 238, 1903; Talbot, For. Fl. Bomb. Pres. Sind 1: 400, 1909; Foxworthy in Philip. J. Sci. (Bot.) 4: 472, t. 24, 1909; Kawakami, Pl. Formosa 28, 1910; Rama Rao, Fl. Pl. Trav. 119, 1914; Bailey, Stand. Cyclop. Hort. 2: 1141, 1914 et Man. Cult. Pl., ed. 2, 578, 1949; Bamber, Pl. Punjab 24, 1916; Haines, Descrip. List Tr. S. Circ. C. P. 68, 1916 et Bot. Bih. & Or. 3: 284, 1922; Didley, Fl. Mal. Penins. 1: 578, 1922; Parkinson, For. Fl. Andaman Isl. 152, 1923; Colthurst, Fl. Trees Ind. 33, 1924; Kirtikar & Basu, Ind. Med. Pl., ed. 2, 1: 781, 1935; Benthall, Trees Calc. 157, 1946; Cowen, Fl. Trees Ind. 25, 1950; Holttum, Pl. Life Malaya 75, 1954; MacMillan, Trop. Pl. & Gard. ed. 5, 84, 1956. *E. orientalis* Murr. Comm. Götting. 8: 35, t. 1, 1787. *E. corallodendron* Lour. Fl. Coch. 427, 1790, et ed. Willd. 519, 1793, non L. *E. divaricata* DC. Prod. 2: 414, 1825. *E. spathacea* DC. Prod. 2: 412, 1825. *E. loureiri* G. Don, Gen. Syst. 2: 372, 1832 (based on *E. corallodendron* Lour.). *E. carnea* Blanco, Fl. Filip. 564, 1837; (ed. 2) 393, 1845; (ed. 3) 2: 359, t. 217, 1879, non Dryand. *Chirocalyx divaricatus* Walp. in Flora 36: 148, 1853. *C. candolleanus* Walp. in Flora 36: 148, 1853. *Corallodendron divaricatum* Kuntze, Rev. Gen. Pl. 172, 1891. *C. orientale* Kuntze, loc. cit. 172. *C. spathaceum* Kuntze, loc. cit. 173. *Tetradapa javanorum*

Osbeck, Dagbock Ostind. Resa 93, 1757. *Mouricou* Rheede, Hort. Ind. Malab. 6: 13, t. 7. 1686.

TYPE LOCALITY: Malabar, India.

DISTRIBUTION: A very widely distributed Indo-Malaysian tree; indigenous in the deciduous forests of Konkan, North Kanara, Malabar, and from the Sunderbans along the sea coast through Arakan, Pegu, Tenasserim, Malaya, Andaman and Nicobar Islands, Java, Philippines, Polynesia and Australia. On the west coast of India, it is found above high water and according to Talbot (1909), sometimes associated with *Calophyllum inophyllum* L., *Salvadora persica* L., *Clerodendrum inerme* Gaertn., *Grewia microcos* L., *Canavalia ensiformis* DC., and *Derris uliginosa* Benth. In the Andamans it grows together with *Mimusops littoralis* Kurz, *Calophyllum inophyllum* L., *Thespesia populnea* Corr., *Hibiscus tiliaceus* L., *Terminalia catappa* L., *Heritiera littoralis* Dryand., *Intsia bijuga* Kuntze, and *Pongamia pinnata* Pierre (Troup, 1921). Haines (1922) thinks it may be wild in Khurda, where the tree is very common. Otherwise, this species is cultivated and self-sown all over India, Philippines, Tropical America, West Indies, Ceylon, Fiji, Hawaii Islands, Cochin-China and Southern China; often met with as an escape from plantations.

KEY TO THE FORMS

- A. Flowers red:
 - B. Foliage variegated and mottled:
 - C. Variegations yellow to creamy-yellow:
 - D. Leaflets with regular variegations ... 1. *picta*.
 - D. Leaflets with variable variegations running along the main veins ... 2. *parcellii*.
 - C. Variegations white-spotted ... 3. *marmorata*.
 - B. Foliage green:
 - E. Leaves broadly ovate, abruptly acuminate; flowers hardly 3 cm. in length ... 4. *mysorensis*.
 - E. Leaves ovate, acute; flowers 5 cm. or more in length ... 5. *orientalis*.
- A. Flowers white ... 6. *alba*.

Erythrina variegata L. var. *orientalis* (L.) Merr.

Forma 1. *picta* (L.) Maheshwari, stat. nov. Basi. *Erythrina picta* L. Sp. Pl. (ed. 2) 993, 1763; DC. Prod. 2: 412, 1825. Syn. *Erythrina indica* Lam. var. β Lam. Encyc. 2: 391, 1785. *Erythrina indica* Lam. var. *picta* (L.) Blatt. & Mill. in J. Bombay nat. Hist. Soc. 33: 628, 1929 et Beaut. Ind. Tr. (ed. 2) 63, 1954.

This is the typical form of *Erythrina variegata* L. var. *orientalis* (L.) Merr. An examination of the type material in the Linnaean Herbarium has shown that this plant is only a form of *E. indica* Lam. with variegated leaves. It is cultivated in Indian gardens and has been planted in the Philippines and tropical parts of America.

Forma 2. *parcellii* (Hort. ex Bull) Maheshwari, stat. nov. Basi. *Erythrina parcellii* Hort. ex Bull, Gard. Chron. 2: 392, f. 82, 1874; Rock, Legum. Pl. Hawaii 187, 1920. Syn. *Erythrina indica* Lam. var. *parcellii* (Hort. ex Bull) Blatt. & Mill. Il.cc. 628 et 67; Bailey, Stand. Cyclop. Hort. 1141, 1914.

A small, soft-wooded, quick-growing tree, 5-7 m. high, with few prickles. Leaflets ovate-deltoid, subcordate at the base, cuneate; terminal one broadly deltoid, acute or obtuse at the apex, up to 12 × 10 cm.; variegation yellow, sometimes forming a feather-like stripe along the midrib and main veins, sometimes more suffused and forming bands along the lateral veins. Racemes and flowers as in the typical form.

This form is probably native in the Pacific Islands and was brought under cultivation for its ornamental, variegated foliage and very attractive, bright cinnamon-red flowers. Often the tree flowers profusely but does not produce seeds. It can be cultivated, however, from cuttings.

Forma 3. *marmorata* (Hort. ex Veitch) Maheshwari, stat. nov. Basi. *Erythrina marmorata* Hort. ex Veitch in Planch. Fl. Serres 23: 21, 1880. Syn. *Erythrina indica* Lam. var. *marmorata* (Hort. ex Veitch) Blatt. & Mill. Il.cc., 628 et 67; Bailey, loc. cit. 1142.

It has large leaves attractively spotted with white. Cultivated in Indian gardens and also in tropical parts of America.

Forma 4. *mysorensis* (Gamble) Maheshwari, stat. nov. Basi. *Erythrina mysorensis* Gamble, Fl. Madras 354, 1918 et in Kew Bull. 222, 1919; Blatt. & Mill. Beaut. Ind. Tr. (ed. 2) 71, 1954.

This plant was originally accorded specific rank by Gamble based on an only specimen collected by A. Meebold from Mysore. An examination of the type material in the Central National Herbarium, Calcutta (ISOTYPE: A. Meebold 9728) shows that it resembles *Erythrina variegata* L. var. *orientalis* Merr. in "calyx spathaceous, supra minute dentatus; carinae petalae liberae, alis aequilongae" but differs in "floribus minoribus; foliolis abrupte acuminatis". I have, therefore, thought it best after much consideration to treat this plant as merely a form of the common and widespread *E. variegata* L. var. *orientalis* Merr.

A small tree, with few or no prickles. Leaves trifoliate; petioles 10 cm. long; petiolules 0.75 cm. long. Stipels verrucose. Leaflets subcoriaceous, broadly ovate, terminal one 12 × 9 cm., lateral ones 10 × 7 cm., apex abruptly acuminate. Racemes axillary, 12-15 cm. long. Flowers fascicled towards the tips, hardly 3 cm. long, coral red. Calyx spathaceous, split half-way down, minutely toothed above. Corolla exserted; vexillum obovate-oblong, emarginate, 3 cm. long; wings obovate, 12 mm. long; keel-petals free, wings equally long, broad falcate. Stamens diadelphous, 9+1. Ovary linear, villose; style subulate, glabrous.

Forma 5. *orientalis* (L.) Maheshwari, stat. nov. Basi.
Erythrina corallodendrum L. β *orientalis* L. Sp.
 Pl. 706, 1753. Syn. *Erythrina indica* Lam. var. α
 Lam. Encyc. 2: 391, 1785, sensu Baker in Hook. f.
 Fl. Brit. Ind. 2: 188, 1876; auct. indic. passim.

This is the most common and widespread form of *Erythrina variegata* L. var. *orientalis* Merr. It grows wild in India and elsewhere; also planted and naturalized.

Forma 6. *alba* (Blatt. & Mill.) Maheshwari, stat. nov. Basi.
Erythrina indica Lam. var. *alba*. Blatt. & Mill.
 in J. Bombay nat. Hist. Soc. 33: 628, 1929 et
 Beaut. Ind. Tr. (ed. 2) 67, 1954; Nairne, Fl. Pl.
 West. Ind. 87, 1894.

This is a white-flowered form, occasionally cultivated in Indian gardens. Nairne mentions it as occurring in Salsette Island, near Bombay. It is believed to have been discovered near an old Hindu temple at Chembur, near Trombay, and was later propagated by cuttings in the Victoria Garden, Bombay, from where the plant was distributed widely, even as far as Egypt.

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