

Erythrineae (Fabaceae) in southern Africa

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ABSTRACT

The two genera represented in the flora of southern Africa, *Erythrina* L. and *Mucuna* Adans. are revised. Keys to the indigenous species and the commonly cultivated exotic species are provided.

UITTREKSEL

Die twee inheemse genusse, *Erythrina* L. en *Mucuna* Adans. word hersien. Sleutels vir die inheemse spesies en vir uitheemse spesies wat gewoonlik gekweek word, word voorsien.

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ERYTHRINEAE

Tribe **Erythrineae** Hutch., The genera of flowering plants 1: 431 (1964); Dyer: 230 (1975). Tribe Phaseoleae DC., subtribe Erythrininae Benth.: 113 (1837); Benth.: 452 (1865); Lackey: 312 (1981). Type genus: *Erythrina* L.

Trees, shrubs, suffrutices, woody lianes or herbaceous climbers. *Leaves* stipulate, stipellate, trifoliolate; foliar and foliolar pulvini present. *Inflorescences* terminal or axillary, paniculate, pseudoracemose, subumbellate or consisting of fascicles of flowers scattered along a leafy axis. *Flowers* non-resupinate or resupinate. *Calyx* gamosepalous; tube various; limb of 5 lobes or teeth or obsolete, variously hirsute or glabrous. *Corolla* papilionaceous; petals glabrous, velutinous or hairy. *Stamens* (9) + 1 or (10); anthers monomorphic or dimorphic; intrastaminal nectariferous disc present. *Ovary* sessile or stipitate, few- or many-ovulate; style terete, straight or incurved, glabrous or proximally pubescent; stigma terminal, capitate, small. *Fruit* dehiscent along both sutures or one suture; pericarp ligneous, subligneous, coriaceous or chartaceous, glabrescent or hirsute. *Seeds* exendospermic, smooth, brown, red or particoloured; hilum short or girdling; rim aril inconspicuous or conspicuous.

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An artificial assemblage of nine genera, the relationships of which are obscure, grouped together for convenience rather than by conviction. Representatives of two genera, *Erythrina* and *Mucuna* are indigenous in the FSA region.

KEY TO INDIGENOUS GENERA

- Carina shorter than vexillum; anthers monomorphic, sub-basifixed; fruit glabrescent, often moniliform; stipels glandular or, rarely, coriaceous; trees, shrubs or suffrutices *Erythrina*
- Carina exceeding vexillum; anthers dimorphic, alternately dorsifixed or versatile and sub-basifixed, the shorter often bearded; fruit with indumentum of irritant hairs; stipels non-glandular; woody lianes or climbing herbs *Mucuna* (p. 17)

ERYTHRINA

Erythrina L., Species plantarum edn 1: 706 (1753); L.: 316 (1754a); Lam.: 392 (1786); DC.: 411 (1825); Spreng.: 243 (1826); Guill., Per. & A. Rich.: 224 (1832); E. Mey.: 15 (1836); A. Rich.: 213 (1847); Harv.: 236 (1862); Benth.: 531 (1865); Bak.: 181 (1871); Bak.: 188 (1876); Taub.: 363 (1894); Harms: 659 (1915); Phillips: 336 (1926b); Hutch.: 406 (1927); Bak. f.: 370 (1929); Burt Davy: 415 (1932); Louis: 295 (1934–5); Collett: 219 (1941); Phillips: 422 (1951); Hepper: 562 (1954); Majot-Rochet & DuVign.: 120 (1954); Codd: 507 (1955); Torre: 247 (1966); Schreiber: 38 (1970); Verdc.: 541 (1971); Hennessy: 1 (1972); Krukoff & Barneby: 332 (1974); Dyer: 269 (1975); Compton: 277 (1976); Troupin: 306 (1982). Type species: *Erythrina corallodendrum* L.

Corallodendron Mill.: 372 (1754); Kuntze: 172 (1891). Type species: *Erythrina corallodendrum* L.

Tetradapa Osbeck: 93 (1754). Type species: *Tetradapa javanorum* Osbeck = *Erythrina variegata* L.

Mouricou Rheede ex Adans.: 326 (1763). Type species: *Erythrina corallodendrum* L. var. *orientalis* L. = *E. indica* Lam. = *E. variegata* L.

Xyphanthus Rafin.: 103 (1812). Type species: *Xyphanthus hederifolius* Rafin. = *Erythrina hederifolia* Spreng. = *E. herbacea* L.

Chirocalyx Meisn.: 97 (1843). Type species: *Chirocalyx mollissimus* Meisn. = *Erythrina latissima* E. Mey.

Micropteryx Walp.: 739 (1850). Type species: *Micropteryx poeppigiana* Walp. = *Erythrina micropteryx* Poepp. = *E. poeppigiana* (Walp.) O.F.Cook.

Duchassaingia Walp.: 741 (1850). Type species: *Duchassaingia glauca* Walp. = *Erythrina glauca* Willd. = *E. fusca* Lour.

Macrocymbium Walp. 149 (1853). Type species: *Macrocymbium vogelii* (Hook. f.) Walp. = *Erythrina vogelii* Hook. f.

Stenotropis Hassk.: 183 (1855). Type species: *Stenotropis berteroi* Hassk., nom. illeg. = *Erythrina poianthes* Brot. = *E. speciosa* Andrews.

Hypaphorus Hassk.: 197 (1858). Type species: *Hypaphorus subumbrans* Hassk. = *Erythrina subumbrans* (Hassk.) Merrill.

Trees, or shrubs, or suffrutices with enlarged subterranean rootstocks; armed with conical or falcate prickles; variously hirsute. *Leaves* synanthous or hysteranthous, pinnately trifoliolate, deciduous, stipulate; stipules persistent or caducous; leaflets stipellate; stipellae glandular or coriaceous. *Inflorescences* subterminal or axillary pseudoracemes, contemporary with the leaves or precocious. *Flowers* subverticillate in groups of 3, bracteate; bracts and bracteoles hirsute, caducous. *Calyx* gamosepalous, variously hirsute; tube narrowly or broadly campanulate, truncate or shallowly bilabiate or spatulate; limb well developed with 5 long or short lobes, obsolescent or obsolete. *Corolla* papilionaceous; vexillum conduplicate-falcate, shortly clawed, minutely velutinous or subglabrous; alae falcate, shortly clawed, sometimes auriculate near base; carina petals free or connate, shortly clawed, rarely auriculate. *Stamens* 10, monadelphous, or diadelphous with the vexillary stamen free or partly coherent; anthers uniform, sub-basifixed, bithecate with longitudinal dehiscence. *Ovary* stipitate, linear, multi-ovulate, densely tomentose; style terminal, straight or incurved, hirsute proximally, glabrous distally; stigma small, capitate, terminal. *Fruit* usually falcate, moniliform, liginous or sublignous, smooth or aculeate, dehiscing along adaxial suture. *Seeds* red or brown, smooth, elliptic; hilum short; rim aril inconspicuous. $2n = 42$.

A genus of more than 100 species distributed throughout the tropics and subtropics. Nine indigenous species occur in the FSA region of which *E. decora* and *E. acanthocarpa* are endemic while a third, *E. caffra*, may also be endemic. Four natural hybrid taxa occur in the area, one of which is \pm fully fertile (*E. \times dyeri*) and the other three \pm sterile.

The generic name *Erythrina* is derived from the Greek *erythros*, meaning red, in allusion to the colour of the vexillum and of the seed of most species.

Within the genus 5 subgenera have been recognised (Krukoff & Barneby 1974) with 26 (25) sections. I am unable to uphold Krukoff's (l.c.) separation of sections *Erythrina* and *Corallodendra* which, in my opinion, intergrade. Because of this separation of these two sections, Krukoff (l.c.) found it necessary to set aside the original generitype, *E. corallodendrum* L. (which he proposed as the type of section *Corallodendra* Krukoff) and substitute *E. herbacea* L. as lectogeneritype. If section *Corallodendra* Krukoff is sunk in section *Erythrina*, as I propose, the generitype remains *E. corallodendrum* L.

All five subgenera are represented on the African continent, but only two have indigenous representatives in southern Africa. Because several exotic species of *Erythrina* are in cultivation in southern Africa, with a strong likelihood of more being successfully introduced, a synoptic key (p. 3) to all the subgenera is provided, together with synoptic keys to the indigenous (p. 4) and the most commonly cultivated exotic species (p. 12).

POLLINATION AND FLORAL MORPHOLOGY

Pollination in *Erythrina*, a predominantly red-flowered genus, is effected principally by birds. Southern African and all other Old World species are pollinated by passerine (perching) birds, whereas among New World species, some are passerine bird-pollinated and others are hummingbird-pollinated.

Passerine bird-pollinated species are characterised by having the inflorescence axis usually held horizontally in arborescent species, by inward-facing, \pm gaping flowers, by a copious supply of hexose-rich nectar (Baker & Baker 1983) and by pollen grains somewhat sticky, varied in size and ornamentation between species, almost invariably with either small lumina or with sexinous granules present (Hemsley & Ferguson 1985).

Hummingbird-pollinated species differ in having the inflorescence axis vertical, the horizontally held, outward-facing flowers 'tubular', smaller quantities of nectar with a higher sucrose:hexose ratio (Baker & Baker l.c.) and dry, powdery, medium-sized pollen grains with a simple, regular, reticulate ornamentation and no sexinous granules in the lumina (Hemsley & Ferguson l.c.).

Inflorescence, flower and pollen morphology of the arborescent species, *E. lysistemon*, *E. caffra* (subgenus *Erythrina*), *E. latissima* and *E. decora* (subgenus *Chirocalyx*) is typical of passerine bird-pollinated species with the peduncle providing a perch and the essential whorls of the flower directed towards the proximal end of the peduncle, i.e. inward-facing towards the perch. The flowers of *E. lysistemon* gape less widely than those of the other three species. The inflorescence attitude of *E. abyssinica* (subgenus *Chirocalyx*) is unusual in that the axis is vertical.

Inflorescence attitude of the four non-arborescent species, *E. humeana*, *E. zeyheri*, *E. acanthocarpa* (subgenus *Erythrina*) and *E. mendesii* (subgenus *Chirocalyx*) differs from that of the arborescent species in that the flower-bearing part of the rhachis is erect. The inflorescence axis of *E. humeana*, *E. zeyheri* and *E. mendesii* elongates markedly as flowering progresses. The proximal part of the axis in taller specimens of *E. humeana* (a shrub) is often horizontal with the distal part remaining vertical. Erect, progressively elongating inflorescences in low-growing species probably serve to keep the flowers visible and accessible to pollinators above the level of the surrounding vegetation.

Although birds do not appear to discriminate between species (Jacot Guillarmod *et al.* 1979), any one plant being visited by a number of local bird species, it may be significant that sunbirds (which have finer feathers at microscopic level than other passerine birds, particularly on the feathers of the patches of iridescent plumage on the throat and head of the males), are the main pollinating agents of *E. humeana* and *E. zeyheri*. (The pollinators of *E. acanthocarpa* and *E. mendesii* are not known.) New World hummingbirds alone have similar plumage. Possession of long, often curved beaks is another feature shared by the unrelated African sunbirds and American hummingbirds. Hemsley & Ferguson (l.c.) noted that pollen of *E. humeana* and some pollen of *E. zeyheri* is

morphologically similar to 'hummingbird-type' pollen. The erect inflorescences and deflexed, 'tubular' flowers of section *Humeanae* they consider to be adaptations for pollination by sunbirds, which, like hummingbirds, carry pollen on their beak and on the specialized head and throat feathers, whereas other passerine birds carry pollen on the coarser chest feathers.

ECONOMIC USES

Apart from the use of *Erythrina* spp. as ornamental plants and as shade plants, little commercial value has, until recently, been attached to the genus. Various parts of the plants have, however, long been used as ingredients in tribal medicine and magic. Phytochemical analyses have shown that as well as several poisonous alkaloids the seeds contain a protein which simplifies separation and purification of tissue plasminogen activator by acting as a preferential inhibitor. Tissue plasminogen activator is a possible solvent for blood clots (thromboses) in man. Extraction of the inhibitor from seeds of *Erythrina* section *Caffrae* is being carried out commercially by a pharmaceutical company in South Africa.

KEY TO THE SUBGENERA OF *ERYTHRINA* WORLD-WIDE

- 1a Calyx dehiscent apically at anthesis, lacking true limb:
- 2a Calyx tube shallowly campanulate, broader than long; carina petals connate; carina falcate, at least half as long as vexillum; filaments connate for \pm three-quarters their length, shortly or scarcely exerted from carina; seeds brown or blackish, sometimes mottled I. *Micropteryx*
- 2b Calyx tube campanulate or tubular, longer than broad; carina petals free or connate; carina more-or-less straight, less than half as long as vexillum; filaments connate for \pm two-thirds their length, long-exserted from carina; seeds usually red:
- 3a Calyx symmetrically long-bilabiate at anthesis; carina petals free; fruit inflated, longitudinally winged along sutures; leaflets palmately lobed II. *Tripterolobus*
- 3b Calyx denticulate or asymmetrically shortly bilabiate at anthesis; carina petals free or connate; fruit wingless; leaflets not palmately lobed III. *Erythrina*
- 1b Calyx dehiscent longitudinally to the base at anthesis, becoming spathaceous; limb with 5 long or short lobes:
- 4a Calyx tube dehiscent abaxially; carina petals free or connate IV. *Chirocalyx*
- 4b Calyx tube dehiscent adaxially; carina petals free V. *Erythrastrer*

SYNONYMY OF ALL SUBGENERA AND SECTIONS REPRESENTED IN SOUTHERN AFRICA

I. Subgenus **Micropteryx** (Walp.) Bak. in Hook. f., The Flora of British India 2,1: 189 (1876); Krukoff & Barneby: 339 (1974). Type species: *Micropteryx poeppigiana* Walp. = *Erythrina poeppigiana* (Walp.) O.F. Cook.

(3 sections; none indigenous in southern Africa.)

II. Subgenus **Tripterolobus** Barneby & Krukoff in Lloydia 37: 410 (1974). Type species: *Erythrina greenwayi* Verdc.

(1 section; monotypic, not indigenous in southern Africa.)

III. Subgenus *Erythrina* Harv. in *Flora capensis* 2,1: 236 (1862); Louis: 299 (1935); Verdc.: 542 (1971); Krukoff & Barneby: 348 (1974). Type species: *Erythrina coral-lodendrum* L.

(16 sections, 3 in southern Africa.)

Section *Caffrae* Barneby & Krukoff in *Lloydia* 37: 404 (1974). Type species: *Erythrina caffra* Thunb.

Section *Humeanae* Barneby & Krukoff in *Lloydia* 37: 407 (1974). Type species: *Erythrina humeana* Spreng.

Section *Acanthocarpae* Barneby & Krukoff in *Lloydia* 37: 408 (1974). Type species: *Erythrina acanthocarpa* E. Mey.

IV. Subgenus *Chirocalyx* (Meisn.) Harv. in *Flora capensis* 2,1: 236 (1862); Louis: 299 (1935); Verdc.: 542 (1971); Krukoff & Barneby: 411 (1974). *Chirocalyx* Meisn.: 97 (1843). Type species: *Chirocalyx mollissimus* Meisn. = *Erythrina latissima* E. Mey.

(5 sections, 1 in southern Africa.)

Section *Chirocalyx* Verdc. in *Flora of tropical East Africa, Leguminosae* (4)—*Papilionoideae* (2): 542 (1971); Krukoff & Barneby: 418 (1974). *Erythrina* subgenus *Chirocalyx* section *Merocraspedon* Louis: 302 (1935). Type species: *Erythrina latissima* E. Mey.

V. Subgenus *Erythraster* Barneby & Krukoff in *Lloydia* 37: 429 (1974). Type species: *Erythrina variegata* L.

(1 section, not indigenous in southern Africa.)

KEY TO INDIGENOUS SUBGENERA AND SECTIONS

- 1a Calyx dehiscing abaxially, becoming spathaceous at anthesis; limb with 5 long or short lobes; trees or suffrutices IV. Subgenus *Chirocalyx* Section *Chirocalyx* (spp. 1-4)
- 1b Calyx dehiscing apically at anthesis, finally campanulate and shortly bilabiate or shortly denticulate, without true limb; trees or shrubs or suffrutices . III. Subgenus *Erythrina*
- 2a Calyx shortly bilabiate at maturity; vexillum acute; trees Section *Caffrae* (spp. 5-6)
- 2b Calyx shortly denticulate at maturity; vexillum obtuse; shrubs or suffrutices:
- 3a Calyx narrowly campanulate, distinctly 5-toothed, the teeth arising behind the rim; vexillum scarlet, obtuse; carina petals free or connate, shorter than alae, included; intrastaminal nectariferous disc with ten obtuse lobes; fruit unarmed; shrub or suffrutex Section *Humeanae* (spp. 7-8)
- 3b Calyx broadly campanulate, obscurely 5-toothed and often shallowly and obscurely bilabiate; vexillum red proximally, grading through orange to yellow distally with green tip, obtuse; carina petals free, exceeding alae, with long-acuminate, shortly exerted apices; intrastaminal nectariferous disc with or without ten distinct lobes; fruit aculeate; much-branched shrub with tuberous rootstock Section *Acanthocarpae* (sp. 9)
- 2a Trees up to 15 m tall with stout trunks; bark thick, corky, with deep longitudinal and transverse fissures; leaves large; flowers red:
- 3a Calyx lobes exceeding 10 mm, filiform:
- 4a Inflorescence held \pm vertically; vexillum \pm 30-40 \times 20-24 mm; stamens included; terminal leaflet 25-140 \times 30-160 mm 1. *E. abyssinica*
- 4b Inflorescence held \pm horizontally; vexillum more than 45 \times \pm 30 mm; stamens exerted; terminal leaflet 100-250 \times 120-300 mm 2. *E. latissima*
- 3b Calyx lobes \pm 2 mm long, thickened; inflorescence held \pm horizontally; vexillum 40-47 \times \pm 20 mm; terminal leaflet 42-110 \times 45-140 mm 3. *E. decora*
- 2b Suffrutex with aerial stems up to 0.45 m tall; leaflets rhomboid or parabolic; terminal leaflet 60-100 \times 35-80 mm; inflorescence held \pm vertically; calyx lobes 1-3 mm long, thickened 4. *E. mendesii*
- 1b Calyx dehiscing apically at anthesis, finally campanulate and shortly bilabiate or shortly denticulate, without true limb; trees, shrubs or suffrutices:
- 5a Calyx shortly bilabiate at maturity; trees:
- 6a Vexillum twice as long as broad, slightly arcuate enclosing the inner floral parts, scarlet, flesh pink or white; alae long-clawed, less than 15 \times \pm 5 mm; carina segment \pm 10 \times \pm 7 mm 5. *E. lysistemom*
- 6b Vexillum one and a half times longer than broad, strongly arcuate exposing the inner floral parts, vermilion-red, orange or cream-coloured; alae short-clawed, \pm 25 \times \pm 12 mm; carina segment \pm 22 \times \pm 15 mm 6. *E. caffra*
- 5b Calyx shortly denticulate at maturity; shrubs or suffrutices:
- 7a Calyx narrowly campanulate, distinctly 5-toothed; vexillum scarlet, or very rarely, flesh pink; alae exceeding carina segments; intrastaminal nectariferous disc with ten rounded or truncate lobes; fruit unarmed, seeds red:
- 8a Shrubs up to 3 m tall; stipules less than 10 mm long; leaflets very variable, ovate subacute, ovate long-acuminate or hastate, unarmed or sparingly aculeate on the veins abaxially; calyx teeth spreading; seed 6-7 mm long 7. *E. humeana*
- 8b Suffrutex with annual aerial stems to 0.5 m long; stipules more than 10 mm long; leaflets ovate, ovate-rhomboid, broadly ovate or subrotund with obtuse or subacute, or rarely, shortly acuminate apex, aculeate on veins on both surfaces, or rarely, on abaxial surface only; calyx teeth clasping vexillum; seed 10-17 mm long 8. *E. zeyheri*
- 7b Calyx broadly campanulate, obscurely 5-toothed; vexillum tricoloured, vermilion red proximally, grading through orange to yellow and green distally; alae exceeded by long-acuminate free carina segments; fruit aculeate, seeds brown 9. *E. acanthocarpa*

1. *E. abyssinica* Lam. ex DC., *Prodromus systematis naturalis* 2: 413 (1825); A. Rich.: 214 (1847); Louis: 306 (1935); Gillett: 426 (1962); Torre: 248 (1966); Verdc.: 555 (1971); Hennessy: 33 (1972); Krukoff & Barneby: 427 (1974); Codd: t. 1738 (1977); Coates Palgrave: 329 (1977); Troupin: 306 (1982); Van Rensburg: 20 (1982). *Chirocalyx abyssinicus* (DC.) Hochst.: 600 (1846). *Corallodendron abyssinicum* (Lam.) Kuntze: 172 (1891). Type: a plant cultivated at Petit Trianon, Paris, from seed collected by Bruce in N Ethiopia and sent to De Candolle by Thonin (G, holo.-K, photo!).

Chirocalyx tomentosus Hochst.: 600 (1846). Type: N Ethiopia, near Adua, Schoata, *Schimper* 531 (B, holo. \dagger ; K, iso.!).

E. tomentosa R. Br. ex A. Rich.: 213 (1847); Bak.: 184 (1871), pro parte; Bak f.: 373 (1929); Majot-Rochez & Duvign.: 120 (1954); White: 152 (1962). Types: Ethiopia, *Salt* s.n. (BM, syn.!), *Schimper* 531 (B, syn. \dagger ; K, isosyn.!), Choa, Morotte, *d'Hericourt* s.n. (P, syn.); Taccaze Valley, Djeladjeranne, *Quartin Dillon* s.n. (P, syn.); Shoho and Djeleukote, *Petit* s.n. (P, syn.); Bruce, Voy. Abyss., t. 19 in part (syn.!).

KEY TO INDIGENOUS SPECIES

- 1a Calyx dehiscing abaxially \pm to the base at anthesis, spathaceous; limb with 5 long or short lobes; trees or suffrutices:

E. suberifera Welw. ex Bak.: 183 (1871). *Corallodendron suberifera* (Welw.) Kuntze: 173 (1891). *Erythrina abyssinica* Lam. ex DC. subsp. *suberifera* (Welw. ex Bak.) Verdc.: 284 (1970), pro parte. Types: Angola, Welwitsch 2229 (BM, syn.); Welwitsch 2230 (BM, syn.; K, isosyn.).

E. huillensis Welw. ex Bak.: 183 (1871); Bak. f.: 372 (1929). Type: Angola, Huilla, Welwitsch 2231 (BM, holo.).

E. comosa Hua: 52 (1898). Types: Schweinfurth Ser. II, 60, 1799, 1868, 1882 (K, isosyn.).

E. mossambicensis Sim: 43 (1909); Bak. f.: 370 (1929). Types: Mozambique, Sim 5833 (?), †; Sim: t. 54 (1909), (lecto.! designated by Hennessy, 1972).

E. bequaertii De Wild.: B 15 (1920); Bak. f.: 376 (1929). Types: Zaïre, Lake Albert, Irumu, Bequaert 2729 (BR, syn. - K, photo.); Ruwenzori, Butagu, Bequaert 3948 (BR, syn.).

E. kassneri Bak. f.: 375 (1929). Type: Kenya, Kitui District, Galunka, Kassner 794 (BM, holo.).

E. tomentosa R. Br. ex A. Rich. var. *longicauda* Bak. f.: 374 (1929). Type: Kenya, Charangani Hills, Kitale, Paget-Wilkes 0103 (BM, holo.).

E. warneckeii Bak. f.: 375 (1929); Verdc.: 560 (1971). Type: Tanzania, Amani, Warnecke 330 (BM, holo.; K, iso.).

E. platyphylla Bak. f.: 376 (1929). Types: Kenya, Machakos District, Kilima Kiu, Decie s.n. (BM, syn.); Tanzania, Bukoba District, Karangwe, Speke & Grant 426 (K, syn.).

E. eggelingii Bak. f.: 238 (1938). Type: Uganda, Acholi District, Keyo, Lamogi, Eggeling 1645 (BM, holo. - K, photo.).

Icons: Sim: t. 54 (1909); Hennessy: t. 12 (1972); Codd: t. 1738 (1977); Troupin: t. 105 (1982); Van Rensburg: 20 (1982).

Tree with stout trunk; juvenile parts lanate-tomentose. Leaves hysteranthous, coriaceous; leaflets broadly elliptic, or broadly ovate-rhomboid with obtuse or emarginate apex; stipels triangular, coriaceous. Inflorescences erect, precocious; flowers deflexed at anthesis, not gaping. Calyx spathaceous, scarlet; tube 10–22 mm long, split abaxially at anthesis; lobes 10–40 mm long. Corolla scarlet; vexillum enfolding inner floral parts at anthesis, minutely velutinous; alae exceeding carina; carina segments free, suborbicular, 5–6 × 4 mm. Stamens diadelphous with vexillary stamen partly coherent. Fruit ligneous, falcate, moniliform, smooth. Seeds scarlet, 9–12 × 6–7 mm; hilum oval, prominent, blackish, 5.5–7.0 × 3.0–4.0 mm.

A single gathering, P.A. Smith 2928 (K, PRE) from a rocky outcrop 63 km distant from Francistown in Botswana, has been identified by me as *E. abyssinica* on the basis of its leaf and stem morphology alone as the material lacks flowers and fruit. The natural occurrence of *E. abyssinica* in northern Botswana is not unexpected as this species is widely distributed in west, central and east Africa, including Angola, Zambia, Malawi and Mozambique (Figure 1). Cultivated in Transvaal and Natal. Late winter/spring-flowering.

This is a morphologically variable species which is closely allied to *E. latissima* E. Mey. from which it is distinguished by its usually smaller leaves; the erect attitude of its inflorescences; the brilliant scarlet, very conspicuous calyces; the smaller, deflexed vexilla which are neither spread nor reflexed at maturity and which become mahogany brown with age, contrasting strongly with the scarlet calyx.

Voucher: P.A. Smith 2928 (K, PRE).

2. *E. latissima* E. Mey., Commentarium de plantis africae australioris 1: 151 (1836); Collett: 222 (1941); Codd:

510 (1955); Batten & Bokelmann: 77 (1966); Hennessy: 12 (1972); Palmer & Pitman: 959 (1972); Van Wyk: 223 (1972); Krukoff & Barneby: 427 (1974); Compton: 227 (1976); Hennessy: t. 1710 (1976); Coates Palgrave: 331 (1977); Jacot Guill. et al.: 523 (1979); Van Rensburg: 8 (1982). *Corallodendron latissimum* (E. Mey.) Kuntze: 173 (1891). Types: South Africa, 'Passim inter Basche et Omtata, frequentius inter Omaziana et Omsamwubo, alt. 1000–2000 ped.', Drège s.n. (B, holo. †); South Africa, '13 miles W of Port St Johns', ix. 1956, Codd 9744 (K, neo.!, here designated; PRE!).

Chirocalyx mollissimus Meisn.: 98 (1843). Type: South Africa, Natal, Tafelberge. Port Natal, viii. 1839, Krauss 263 (K, holo.!, PRE, iso.!).

E. sandersoni Harv.: 39 (1859). Type: South Africa, Natal, Port Natal about Sterk Spruit, Aug.-Sept. 1858, Sanderson 44 (K, holo.!).

E. gibbsiae Bak. f.: 374 (1929). Type: Zimbabwe, Matopo Hills, Gibbs 73 (BM, holo.!).

E. tomentosa sensu Bak.: 184 (1871), pro parte; sensu Wood: t. 384, 385 (1906); sensu Sim: 201 (1907), non A. Rich.

E. abyssinica sensu Marloth: 81 (1925), non DC.

Icons: Harv.: t. 91, 92 (1859); Wood: t. 384, 385 (1906); Marloth: t. 29 (1925); Batten & Bokelmann: t. 65,2 (1966); Palmer & Pitman: 958, 960 (1972); Van Wyk: 244 (1972); Hennessy: t. 12 (1972); Hennessy: t. 1710 (1976); Van Rensburg: 8, 9 (1982).

Tree with stout bole; juvenile parts lanate-tomentose. Leaves hysteranthous, coriaceous with minute, triangular, coriaceous stipels; leaflets very large, oblate, broadly elliptic or obliquely ovate with obtuse, sometimes apiculate apices. Inflorescences ± horizontal, precocious, stout, compact; flowers ± horizontal, gaping at anthesis. Calyx spathaceous, dull scarlet; tube 30 × 8–10 mm; lobes 10–16 mm long. Corolla red; vexillum scarlet becoming crimson later, spread and partly reflexed at anthesis, minutely velutinous; alae exceeding carina; carina petals free, suborbicular, 18–20 × 14–15 mm. Stamens 10, diadelphous with vexillary filament partly coherent. Fruit ligneous, falcate, moniliform, smooth. Seeds crimson, 11–15 × 10–1 mm; hilum oval, prominent, blackish, 7–8 × 5–6 mm.

The holotype, a Drège gathering from Transkei, has not been located and was presumably destroyed during World War II, nor has any isotype or syntype material been found.

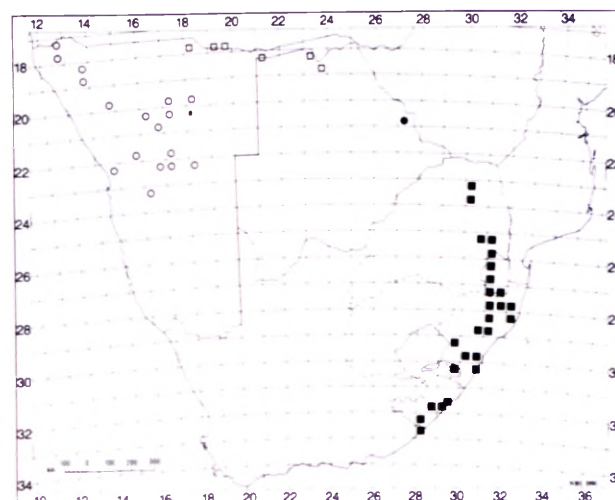


FIGURE 1. — Distribution of *Erythrina abyssinica*, ●; *E. latissima*, ■; *E. decora*, ○; *E. mendesii*, □.

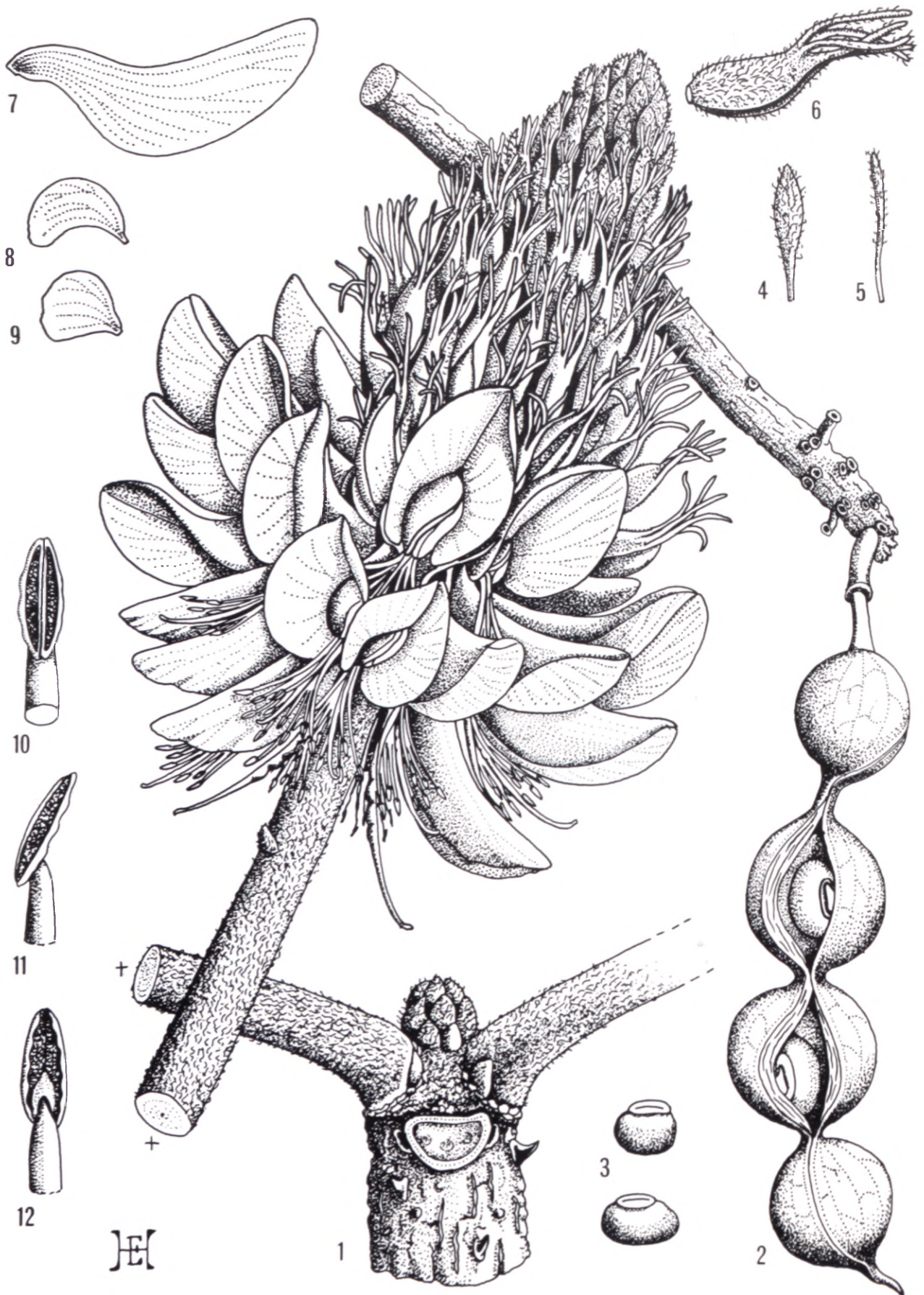


FIGURE 2. —*Erythrina latissima*: 1–3, Hennessy 384; 4–12 Ward s.n. (flowers in spirits). 1, inflorescence; 2, infructescence; 3, seeds; 4, bract; 5, bracteole; 6, calyx; 7, vexillum; 8, ala; 9, carina petal, all $\times 0,8$; 10, 11, 12, anther, three views, $\times 4,7$.

Accordingly, I have chosen a Codd gathering made near Port St John in Transkei in 1956 as neotype of *Erythrina latissima*.

Trees of this species occur in open savanna, often on rocky outcrops where they may have been afforded some degree of protection from fire damage. Juvenile plants seem rare in the wild which suggests that some form of protection, especially from fire, should be afforded this species. *Erythrina latissima* is recorded from Zimbabwe, Mozambique, Swaziland, Transvaal, Natal and the eastern Cape (Figure 1). Late winter/spring-flowering.

This species is closely allied to *E. abyssinica* Lam. ex DC. from which it is distinguished by its usually larger leaves; the \pm horizontal attitude of its inflorescences; less conspicuous calyces; larger, spreading and somewhat reflexed vexilla which are the most conspicuous part of the inflorescence, turning crimson with age (Figure 2).

Vouchers: *Acocks 13163* (K); *Codd 4418* (K, PRE); *Compton 27947* (NBG, PRE); *Pegler 235* (BOL, GRA, K, SAM); *Scheepers 1171* (K, PRE).

3. *E. decora* Harms in Engl., Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie 49: 441 (1913); Schreiber: 38 (1970); Hennessy: 27 (1972); Palmer & Pitman: 962 (1972); Krukoff & Barneby: 421 (1974); Coates Palgrave: 330 (1977); Van Rensburg: 19 (1982). Types: South West Africa/Namibia, *Dinter 796* (B, syn. †; SAM, isosyn.!), *Dinter 796a* (B, syn. †; BM, isosyn.; M, lecto., designated by Krukoff & Barneby (1974)); *Dinter 1354, 1505, 1548* (B, syn. †); *Gürich 42* (B, syn. †).

Icones: Hennessy: t.9 (1972); Krukoff & Barneby: 421 (1974).

Tree with very stout trunk; juvenile parts lanate-tomentose. *Leaves* hysteranthous, coriaceous; leaflets oblate, suborbicular, obovate or rhomboid-ovate with emarginate, obtuse or shortly acuminate apices; stipels small, conical, glandular. *Inflorescences* \pm horizontal, precocious; flowers \pm horizontal, not gaping. *Calyx* spathaceous, dull red; tube 15–20 mm long; lobes thickened, \pm 2 mm long. *Corolla* red; vexillum scarlet, \pm enfolding inner floral parts at anthesis, minutely velutinous; alae exceeding carina; carina petals free, suborbicular, 6–7 \times 5–6 mm. *Stamens* diadelphous with vexillary stamen partly coherent. *Fruit* subligneous, falcate, moniliform, smooth. *Seeds* scarlet, 10–13 \times 6–8 mm; hilum oval, prominent, blackish, 4–5 \times 2–3 mm.

This species is known only from Namibia where it occurs on outcrops of rock (often granite) mainly (solely?) of the Damara sequence (Figure 1). The only other species of *Erythrina* indigenous in Namibia, *E. mendesii* Torre, is suffrutescent, not arborescent and occurs in unconsolidated Tertiary to Quaternary sediments. Although the flowers of these two species are similar, it is not possible to confuse the identity of the plants. Spring/summer/autumn-flowering.

Vouchers: *De Winter & Leistner 5601* (WIND); *Keet 1614* (WIND); *Rusch 7957* (BOL, K); *Vahrmeijer & Du Preez 2555* (PRE); *Walter 614* (WIND).

4. *E. mendesii* Torre in Boletim da Sociedade Broteriana, ser. 2, 39: 212 (1965); Torre: 248 (1966); Schreiber: 38 (1970); Hennessy: 31 (1972); Krukoff & Barneby: 420 (1974). Type: Angola, 'Chibia, entre Chibia e o rio Caculo-var,' xii. 1955, *Mendes 1079* (LISC, holo.; BM, COI, K!, LUA, SRGH, iso.).

E. baumii sensu Codd: t. 1412 (1963); sensu Van Rensburg: 19 (1982), non Harms.

Icones: Codd: t. 1412 (1963); Torre: t. 23 (1966); Hennessy: t. 10, 11 (1972); Van Rensburg: 19 (1982).

Suffrutex with branched subterranean horizontal stems arising from a tuberous rootstock; aerial stems erect, unbranched; juvenile aerial parts tomentose. *Leaves* synanthous, chartaceous; stipels glandular, truncate; leaflets equally or unequally rhomboid with obtuse apices. *Inflorescence* erect; peduncle and rachis progressively elongating; flowers \pm horizontal, not gaping. *Calyx* spathaceous, red; tube 12–18 mm long; lobes thickened, 1–3 mm long. *Corolla* red; vexillum scarlet, \pm enfolding inner floral parts at anthesis, minutely velutinous; alae exceeding carina, cochleariform with a triangular lobe towards the base on adaxial side, 5–7 \times 4–5 mm; carina petals free, of similar shape to alae, 4–6 \times 4–5 mm. *Stamens* diadelphous, the vexillary filament partly coherent. *Fruit* subligneous, falcate, moniliform, smooth, 50–90 \times 15 mm. *Seeds* not seen.

This suffrutescent species is known from Zambia, southern Angola, Caprivi Strip and northern Botswana (Figure 1) where its habitat is unconsolidated Kalahari sands usually in river valleys and seasonally dry water courses. It is distinguished from *E. baumii* Harms which occurs in savanna habitats in Angola, Zaïre and Zambia by leaflet shape (rhomboid in *E. mendesii*; elliptic-ovate in *E. baumii*) and ala length (\pm 6 mm in *E. mendesii*; \pm 15 mm in *E. baumii*). When specimens of the two species are seen together, the difference in leaflet morphology is immediately apparent. There has been some confusion as to the identity of the specimens collected in Namibia and northern Botswana, but examination of material of both species has shown that all gatherings to date from this area are *E. mendesii*. Summer-flowering.

Vouchers: *De Winter 3745* (K, PRE, WIND); *Henriques 238* (K); *P.A. Smith 1872* (K, PRE); *West 3276* (K).

5. *E. lysistemon* Hutch. in Kew Bulletin 1933: 422 (1933); Collett: 223 (1941); Codd: 507 (1955); Letty: 169 (1962); Batten & Bokelmann: 77 (1966); Verdc.: 547 (1971); Hennessy: 17 (1972); Palmer & Pitman: 957 (1972); Van Wyk: 225 (1972); Krukoff & Barneby: 406 (1974); Compton: 278 (1976); Coates Palgrave: 332 (1977); Jacot Guill. *et al.*: 523 (1979); Van Rensburg: 11 (1982). Type: South Africa, Transvaal, Belfast, Rietvlei, Crocodile River, vi. 1932, *J.C. Smuts 66* (K, holo.!, BM, iso.).

E. caffra Thunb. var. *mossambicensis* Bak. f.: 238 (1938). Type: Mozambique, Nyassa, Maniamba, *Torre 523* (COI, holo.; BM, iso.).

E. caffra sensu Harv.: 236 (1862); sensu Wood: t. 542 (1912); sensu Phillips: t. 59 (1922); sensu Marloth: 81 (1925); sensu Bak. f.: 369 (1929); sensu Bak. f.: 238 (1938); sensu Burt Davy: 415 (1932); sensu Collett: 223 (1941), pro parte; sensu Codd: 70 (1951), non Thunb.

Icones: Wood: t. 542 (1912); Phillips: t. 59 (1922); Codd: t. 3 (1955); Codd: t. 66 (1951); Letty: t. 84.3 (1962); Batten & Bokelmann: t. 65.1

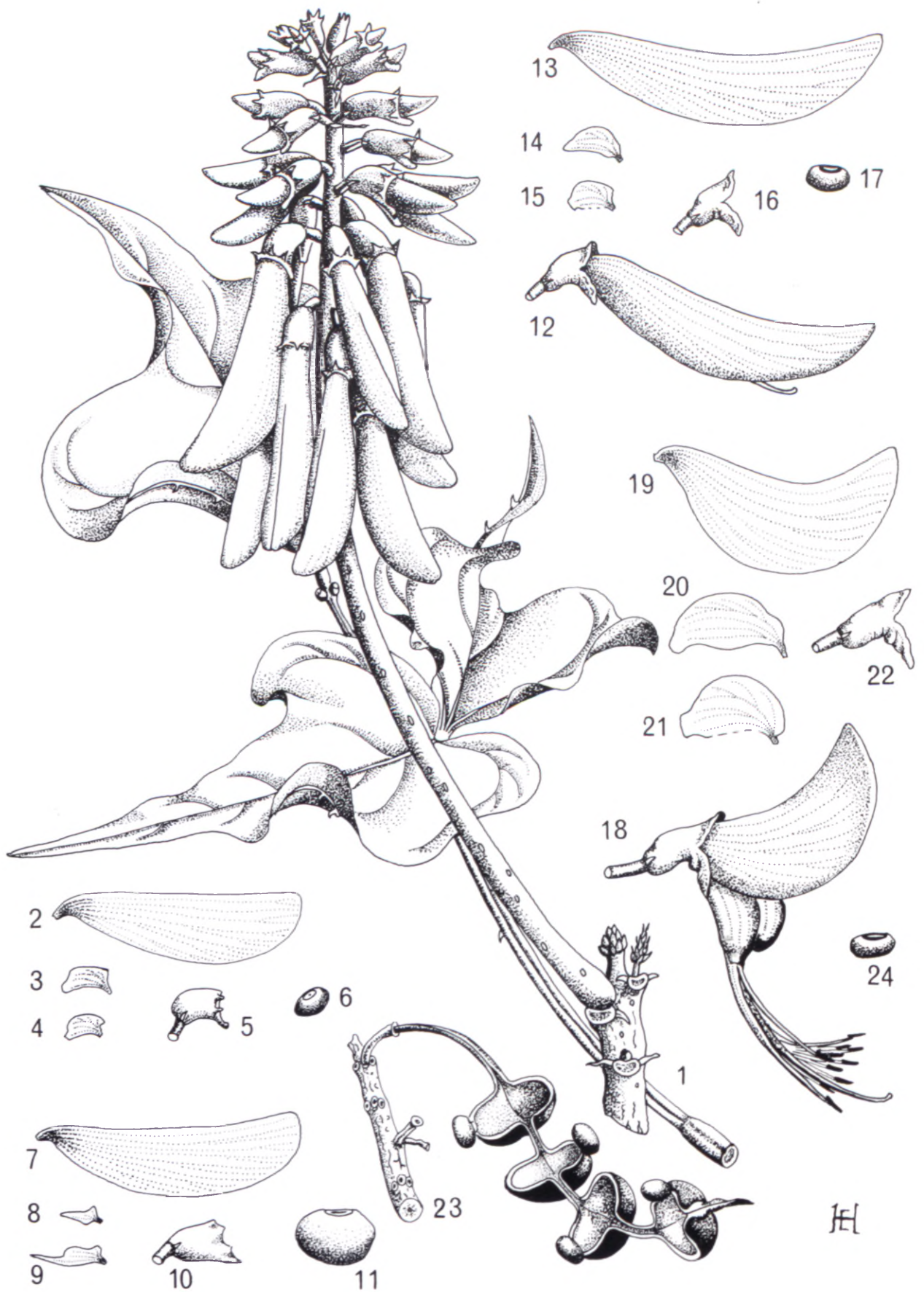


FIGURE 3.—*Erythrina humeana*, 3.1–3.6, Hennessy 44l: 1, inflorescence and leaf; 2, vexillum; 3, ala; 4, carina petal; 5, calyx; 6, seed, all $\times 0.8$. *Erythrina acanthocarpa*, 3.7–3.11, McCulloch s.n. (flowers in spirits): 7, vexillum; 8, ala; 9, carina petal; 10, calyx; 11, seed, all $\times 0.8$. *Erythrina lysistemon*, 3.12–3.17, Hennessy s.n. (flowers in spirits): 12, flower; 13, vexillum; 14, ala; 15, carina segment; 16, calyx; 17, seed, all $\times 0.8$. *Erythrina caffra*, 3.18–3.24, Hennessy s.n. (flowers in spirits): 18, flower; 19, vexillum; 20, ala; 21, carina segment; 22, calyx; 23, infructescence; 24, seed, all $\times 0.8$.

(1966); Hennessy: t. 1, 5 (1972); Van Wyk: 245 (1972); Van Rensburg: 11, 12, 13 (1982).

Tree up to 10 m tall; juvenile parts pubescent. *Leaves* hysteranthous, chartaceous; leaflets broadly ovate, base cuneate, apex acute, obtuse or acuminate; lateral leaflets 50–130 × 45–95 mm; terminal leaflet 50–130 × 45–130 mm; stipels glandular. *Inflorescences* ± horizontal, precocious; flowers deflexed at anthesis, not gaping. *Calyx* brown; tube ± campanulate, splitting laterally to become shallowly bilabiate at anthesis, 10–15 mm long; lobes obsolescent, the thickened abaxial lobe prognathous in bud. *Corolla*: vexillum scarlet, or more rarely, flesh pink or off-white, enfolding inner floral parts at anthesis, 45–78 × 20–35 mm, subglabrous; alae exceeding carina; carina segments partly connate abaxially, 9–15 × 4–8 mm. *Stamens* diadelphous with vexillary stamen free or partly coherent. *Fruit* subligneous, falcate, moniliform, smooth. *Seeds* scarlet or vermilion red, 8–10 × 5–6 mm; hilum oval, depressed, blackish, ± 4 × 2 mm (Figure 3.12–3.17).

This winter/early spring-flowering species is distinguished from *E. caffra*, with which it has often been confused, by its smaller stature; its narrower, chevron-shaped inflorescences; the scarlet (as opposed to vermilion red) colour of its vexilla; its longer, narrower, less strongly arcuate vexilla which do not spread or reflex at maturity but enfold and conceal the inner floral parts. The fruit and seed of *E. lysistemom* and *E. caffra* are alike. These species have not yet achieved perfect reproductive isolation. Where their ranges overlap they hybridise. The hybrid, *E.* × *dyeri*, is fertile.

Erythrina lysistemom is tolerant of a wider range of climatic and soil types than is *E. caffra* and has a wider distribution range (Figure 4). North of the Flora region it occurs in Mozambique, Zimbabwe, Zambia, Malawi and Tanzania.

Vouchers: *Codd 7987* (GRA, K, PRE); *Dyer 5748* (K, PRE); *Hemm 155* (PRE); *Prosser 1038* (K, NBG, PRE); *Ward 4274* (PRE).

6. *E. caffra* Thunb., *Prodromus plantarum capensium* 2: 559 (1823); DC.: 412 (1825); Spreng.: 243 (1826); E. Mey.: 149 (1836); Eckl. & Zeyh.: 259 (1836); Harv.: 236 (1862), pro parte; Sim: 201 (1907); Marloth: 81 (1925), pro parte; Collett: 223 (1941), pro parte; Codd: 508 (1955); Batten & Bokelmann: 78 (1966); Hennessy: 15 (1972); Palmer & Pitman: 955 (1972); Krukoff & Barneby: 405 (1974); Hennessy: t. 1709 (1976); Coates Palgrave: 329 (1977); Jacot Guill. *et al.*: 522 (1979); Van Rensburg: 2 (1982) Batten: 162 (1986). *Duchassaingia caffra* (Thunb.) Walp.: 741 (1850). *Coralloidendron caffrum* (Thunb.) Kuntze: 172 (1891). Type: South Africa, 'e Cap. b. Spei', *Thunberg s.n.* (UPS, holo.; K!, MO, PRE! UDW!, – photo.).

E. fissa Presl: 69 (1832). *Chirocalyx pubescens* Walp.: 741 (1850), nom. superfl. Type: a cultivated plant from Palermo Botanical Garden (PRAHA, holo.).

E. viarum Todaro: 62 (1861). *E. insignis* Todaro: 66 (1861). Type: a cultivated plant from Palermo Botanical Garden (K, lecto!).

E. constantiana Micheli: 542 (1896). Type: 'a cultivated plant in a garden at Golf Jouan near Cannes, Villa Niobe, owned by Mr A. Constant, Fl. April.' 1896, *Micheli s.n.* (K, holo.).

Icones: Presl: t. 46 (1832); Micheli: facing p. 524 (1869); Sim: t. 53 (1907); Codd: t. 1, 2 (1955); Batten & Bokelmann: t. 66.1,2 (1966); Hennessy: t. 4 (1972); Palmer & Pitman: 954 (1972); Hennessy: t. 1709 (1976); Van Rensburg: 2 (1982); Batten: 163 (1986).

Tree, 10–18 m tall, juvenile parts pubescent. *Leaves* hysteranthous, chartaceous; slightly larger than those of *E. lysistemom*; stipels glandular. *Inflorescences* ± horizontal or deflexed, precocious; flowers horizontal or ascending, gaping. *Calyx* brown; tube campanulate, splitting laterally to become shallowly bilabiate at anthesis, 17–20 mm long; lobes obsolescent, the thickened abaxial lobe prognathous in bud. *Corolla*: vexillum vermilion red, orange, or, rarely, creamy-white, spread and reflexed at anthesis, exposing the inner floral parts, 42–70 × 27–40 mm, subglabrous; alae slightly exceeding carina; carina segments partly connate abaxially. *Stamens* monadelphous with filament tube split right or left of vexillary stamen or, rarely, diadelphous with vexillary filament free or partly coherent. *Fruit* and *seeds* like those of *E. lysistemom*.

This winter/early spring-flowering species is limited in its distribution to the eastern Cape and southern Natal coastbelt with outlying populations in forest in northern Zululand and on Inhaca Island off Maputo which may or may not be natural (Figure 5). It usually occurs in coastal and streambank forests in deep sandy soils. It differs from other southern African members of subgenus *Erythrina* in having a widely gaping flower (Figure 3.8–3.24).

Vouchers: *Archibald 5906* (PRE); *Bauer 249* (K, SAM); *Flanagan 319* (BOL, PRE, SAM); *Fourcade 4466* (BOL, STE); *Ward 3014* (K, NU).

7. *E. humeana* Spreng., *Caroli Linnaei systema vegetabilium* 3: 243 (1826); Sim: 202 (1907); Sim: 43 (1909); Phillips: t. 112 (1923); Marloth: 81 (1925); Collett: 225 (1941); Codd: 72 (1951); Batten & Bokelmann: 77 (1966); Hennessy: 21 (1972); Palmer & Pitman: 961 (1972); Codd: 269 (1974); Krukoff & Barneby: 408 (1974); Compton: 277 (1976); Coates Palgrave: 331 (1977); Jacot Guill. *et al.*: 522 (1979); Van Rensburg: 5 (1982). Type: Bot. Reg. 9, t. 736A (1823) (lecto.! designated by Codd, 1974).

E. princeps A. Dietr.: 305 (1834). *Coralloidendron princeps* (A. Dietr.) Kuntze: 173 (1891). Type: Field Museum Nat. Hist., Chicago, negative no. 2375 (neo.! designated by Krukoff & Barneby 1974).

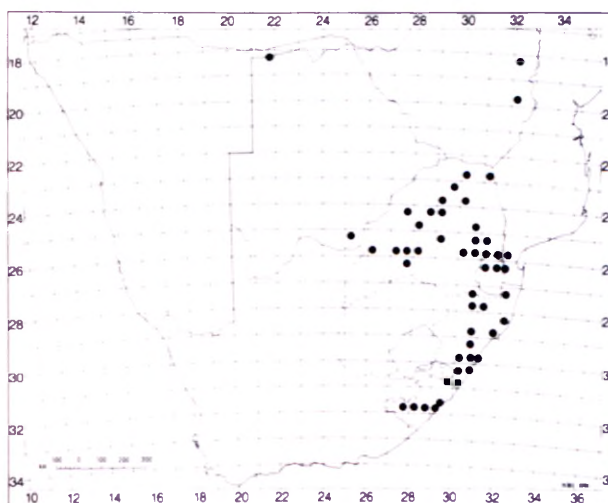
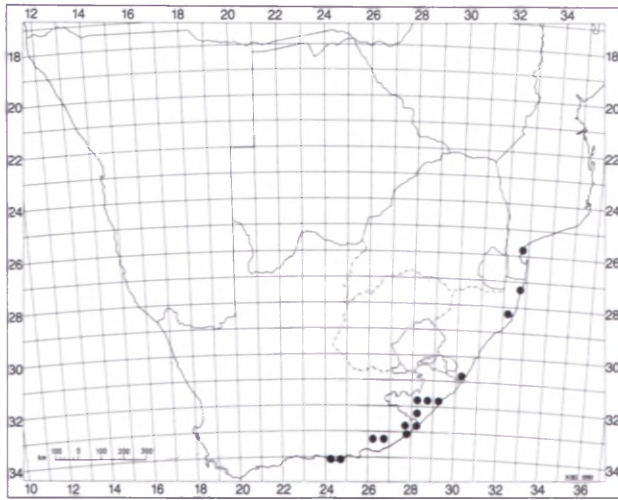


FIGURE 4. — Distribution of *Erythrina lysistemom*.

FIGURE 5.—Distribution of *Erythrina caffra*.

E. humei E. Mey.: 150 (1836); Harv.: 237 (1862); Bak.: 182 (1871); Bak. f.: 370 (1929). *Coraliodendron humei* (E. Mey.) Kuntze: 173 (1891). Types: South Africa, 'between Kovi and Kaprivier', *Drège s.n.* (B, syn. †); 'between Keiskamma and Basche R., 1836', *Drège s.n.* (B, syn. †; K, isosyn.!).

E. raja Meisn.: 96 (1843). *E. humei* var. *raja* (Meisn.) Harv.: 237 (1862). Type: South Africa, Umlaas, Port Natal, Nov. 1839, *Krauss* 62 (K, holo.!).

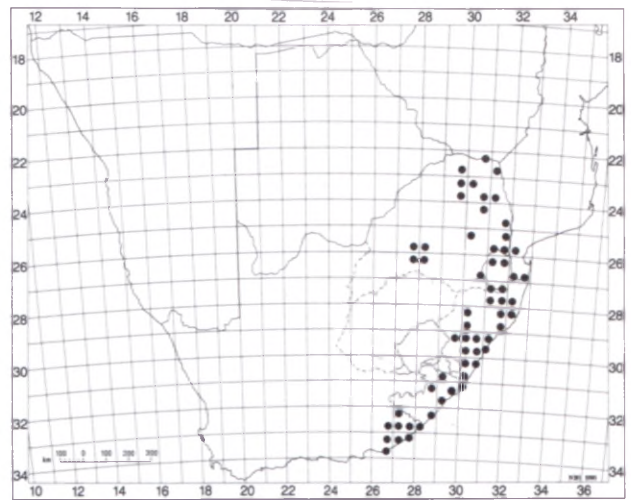
E. hastifolia Bertol. f.: 568, t. 38 (1850). *E. humei* var. *hastifolia* (Bertol. f.) Bak. f.: 370 (1929). Type: Bertol. f., in Mem. Acc. Sc. Bologna 2: 568, t.38 (1850). (icono.).

E. caffra sensu Ker-Gawl.: t. 736 (1823); sensu Sims: t. 2431 (1823); sensu DC.: 412 (1825), pro parte; sensu Reichb.: t. 312 (1836), non Thunb.

Icones: Ker-Gawl.: t. 736 (1823); Sims: t. 2431 (1823); Reichb.: t. 312 (1836); Marloth: t. 29 (1925); Batten & Bokelmann: t. 66.2 (1966); Hennessy: t. 6 (1972); Van Rensburg: 5, 6 (1982); Batten: 167 (1986).

Shrub 0,5–3,0 m tall; juvenile parts thinly pubescent. *Leaves* synanthous, chartaceous; petiole, rachis and sometimes veins aculeate; leaflet shape variable, obovate, ovate-subacute, ovate-long-acuminate, or hastate; lateral leaflets 45–130 × 30–90 mm, terminal leaflet 45–130 × 45–120 mm; stipels glandular, obtuse or truncate. *Inflorescences* lax, contemporary with the leaves, distally erect; peduncle and rachis progressively elongating to ± 500 mm; flowers deflexed at anthesis, not gaping. *Calyx* red; tube narrowly campanulate, subtruncate; teeth spreading, the abaxial tooth oblong, others acute, ± 2 mm long. *Corolla*: vexillum scarlet, deflexed, obtuse, 35–50 × 14–21 mm, subglabrous; alae oblong-arcuate, 6–12 × 3 mm; carina segments partly connate abaxially or, rarely, free, quadrangular-unguiculate, 6–8 × 3–4 mm. *Stamens* included, diadelphous with vexillary filament partly coherent. *Intrastaminal nectariferous disc* with 10 rounded lobes, white. *Fruit* subligneous, falcate, moniliform, blackish, smooth. *Seeds* scarlet, 6,0–7,0 × 5,0–6,2 mm; hilum oval, depressed, pale, 3,5–4,0 × 2,0 mm (Figure 3.1–3.6).

The amount of variation in leaflet shape in this species is noteworthy. Specimens with broadly ovate leaflets occur mainly in the southern part of the distribution range and those with long, narrowly hastate leaflets further north.

FIGURE 6.—Distribution of *Erythrina humeana*.

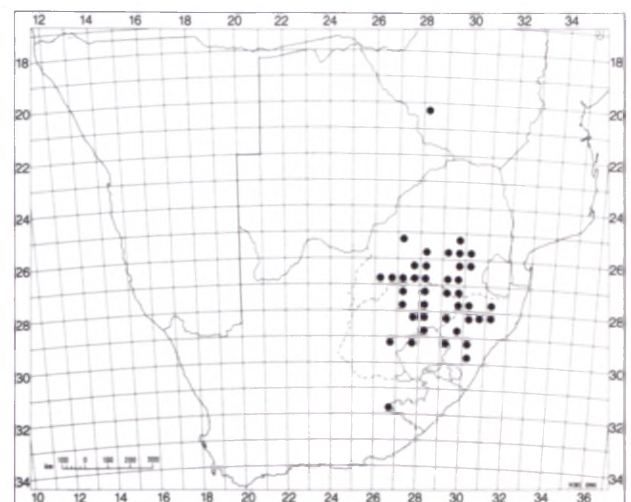
Between the two extremes intermediates occur. *Erythrina humeana* is distinguished from *E. zeyheri* mainly by its habit; its smaller stipules; smaller, chartaceous, sparsely armed or unarmed leaflets; smooth unridged peduncle; spreading calyx teeth and smaller fruit and seeds. Although there is some overlap in the distribution ranges of these two species, (Figures 6 & 7), *E. humeana* is the less cold-tolerant and does not occur at high altitudes. Its range extends northwards into Mozambique and Zimbabwe. Summer-flowering.

Vouchers: *Codd* 6413 (K, PRE); *Comins* 1435 (PRE); *Dyer* 2236 (GRA); *Venter* 7890 (PRE); *Wearne* 80 (NU, PRE).

8. *E. zeyheri* Harv., *Flora capensis*: 236 (1862); Marloth: 82 (1925); Collett: 227 (1941); Dyer: t. 1011 (1947); Hennessy: 23 (1972); Krukoff & Barneby: 408 (1974); Jacot Guill. *et al.*: 525 (1979); Van Rensburg: 15 (1982). Types: South Africa, 'Betchuanaland, 1841', *Zeyher* 531 (K, syn.!, PRE, SAM, isosyn.!) and 'inter Mooye river et Macalisberg, 1841', *Burke* 69 (K, syn.!).

Icones: Dyer: t. 1011 (1947); Hennessy: t. 7 (1972); Van Rensburg: 15 (1982).

Suffrutex with branched, corky, perennial subterranean stems and enlarged rootstock; aerial stems annual, semi-

FIGURE 7.—Distribution of *Erythrina zeyheri*.

erect or decumbent, 0.3–0.5 m; juvenile parts pubescent. *Leaves* synanthous, coriaceous, aculeate on petiole, rhachis and veins; stipules ovate or oblong, chartaceous, 10–20 mm long; lateral leaflets 40–150 × 20–170 mm; terminal leaflet 55–320 × 35–250 mm; stipels coriaceous, triangular. *Inflorescences* lax, contemporary with the leaves, erect; peduncle and rhachis progressively elongating, up to 490 mm long, longitudinally ribbed or terete. *Flowers* deflexed at anthesis, not gaping. *Calyx* red or green flushed with pink; tube narrowly campanulate, subtruncate; teeth clasping not spreading, the abaxial tooth fleshy, oblong; others acute, ± 2 mm long. *Corolla*: vexillum scarlet, deflexed, obtuse, 24–44 × 14–22 mm, subglabrous; alae oblong-arcuate, 9–15 × 3–5 mm; carina segments free, oblong with a proximal triangular lobe and 1 or 2 short triangular lobes abaxially near the truncate apex, 7–10 × 4–6 mm. *Stamens* included, diadelphous with vexillary filament free or shortly coherent. Intrastaminal nectariferous disc with 10 rounded or truncate lobes. *Fruit* subligneous, falcate, moniliform, blackish, smooth. *Seeds* scarlet, 10–17 × ± 10 mm; hilum oval, depressed, pale, 4–5 × 2–3 mm.

The suffrutescent habit in *Erythrina* is considered (Krukoff 1974) to be advanced. Eight species, six of them placed in subgenus *Erythrina*, are suffrutescent. These are *E. montana* Rose & Standley, *E. leptorhiza* DC., *E. horrida* DC. (section *Leptorhizae*) which inhabit temperate habitats at high elevations in Mexico; *E. herbacea* L. subsp. *herbacea* (section *Erythrina*) at the northern, temperate limit of its range in North Carolina; *E. resupinata* Roxb. (section *Suberosae*) which occurs at high elevations in north India and *E. zeyheri* (section *Humeanae*) which occurs in damp areas at higher elevations than any other southern African species (Figure 7). In subgenus *Chirocalyx*, section *Chirocalyx*, *E. baumii* Harms (including *E. pygmaea* Torre) and *E. mendesii* Torre occur in damp depressions at elevations between 900 and 1 450 m. It would be an oversimplification to state that dwarfing in *Erythrina* is an adaptation for high altitude survival alone. Several arborescent species occur at high elevations in the high rainfall regions of the tropics, therefore it is probable that a combination of high altitude, low rainfall and edaphic factors have resulted in the development of the suffrutescent habit in taxa occurring towards the extremes of the range of the genus. Summer-flowering.

Vouchers: Acocks 18843 (PRE); Codd 9406 (K, PRE); Dieterlen 547 (NH, PRE, SAM); Schrire 632 (NH); K. Smith 27 (BOL).

9. *E. acanthocarpa* E. Mey., *Commentariorum de plantis africae australioris*: 151 (1836); Harv.: 237 (1862); Sim: 202 (1907); Marloth: 81 (1925); Phillips: t. 203 (1926a); Collett: 225 (1941); Batten & Bokelmann: 78 (1966); Hennessy: 25 (1972); Krukoff & Barneby: 409 (1974); Jacot Guill. *et al.*: 521 (1979); Van Rensburg: 17 (1982). *Coraliodendron acanthocarpum* (E. Mey.) Kuntze: 172 (1891). Type: South Africa, 'in vallibus inter Klipplatrivier et Zwartkey, alt. 3000–4000 ped., 1836', Drège s.n. (B, holo. †); 'zwischen Windvogelberg und Zwartkey auf einer Grasfläche, 3000–4000 ped., F. Nov.', Drège s.n. (BM, lecto. –K, photo.!, designated by Krukoff & Barneby 1974).

Icones: Sim: t. 52 (1907); Marloth: t. 25 (1925); Phillips: t. 203 (1926a); Batten & Bokelmann: t. 65.3 (1966); Hennessy: t. 8 (1972); Van Rensburg: 17 (1982).

Shrub, 1–2 m tall with enlarged, succulent rootstock and much-branched, perennial aerial stems; juvenile parts pubescent. *Leaves* synanthous, chartaceous, aculeate on petiole, rhachis and veins; leaflets broadly ovate or transversely elliptic, apiculate or subacute; lateral leaflets 25–47 × 20–45 mm; terminal leaflet 30–48 × 25–55 mm. *Inflorescences* lax or compact, erect, contemporary with leaves; flowers horizontal or ascending at anthesis, not gaping. *Calyx* green with purple flush; tube broadly campanulate, sometimes obscurely bilabiate, shortly toothed, the abaxial tooth obtuse, the others acute, 1–3 mm long. *Corolla*: vexillum tricoloured, red proximally grading to yellow distally with green tip, horizontal or ascending, obtuse, 42–55 × 22–32 mm, minutely velutinous; alae rhomboid-acute, 4.0–7.0 × 1.5–2.0 mm; carina segments free, exceeding alae, lanceolate long-acuminate, 7–15 × 1.5–4.0 mm, with tips exerted. *Stamens* exerted, diadelphous. *Intrastaminal nectary* discoid or obscurely 10-lobed. *Fruit* subligneous, slightly or not constricted between the seeds, brown, aculeate. *Seeds* brown, 16 × 10–12 mm; hilum oval, depressed, pale, 2.0–3.0 × 1.5–2.0 mm (Figure 3.7–3.11).

The profusely branched, perennial aerial system of this species makes it, by definition, a shrub, yet the greatly enlarged subterranean rootstock is a modification best developed elsewhere in the genus in the suffrutescent species. This species is isolated in the genus by the combination of habit, small leaflets, unique colouration of the vexilla, unusual shape and proportions of alae and carina, aculeate fruit and brown seeds. Some specimens have been shown to be tetraploid (Darlington & Wiley 1955) with $n = 42$. It is not known whether any individuals in this endemic taxon (Figure 8) are diploid. Spring/summer-flowering.

Vouchers: Acocks 18843 (PRE); Galpin 1653 (BOL, GRA, NU, PRE); McCabe & Atherstone 41 (K); Tyson s.n. (BOL, K).

NATURAL HYBRIDS

10. *E. × coddii* Barneby & Krukoff in *Lloydia* 37: 443 (1974). Type: South Africa, Natal, Zululand, Hlabisa District, Hluhluwe Game Reserve, Deane 7 (K, holo.!).

Icon: Krukoff & Barneby: 444 (1974).

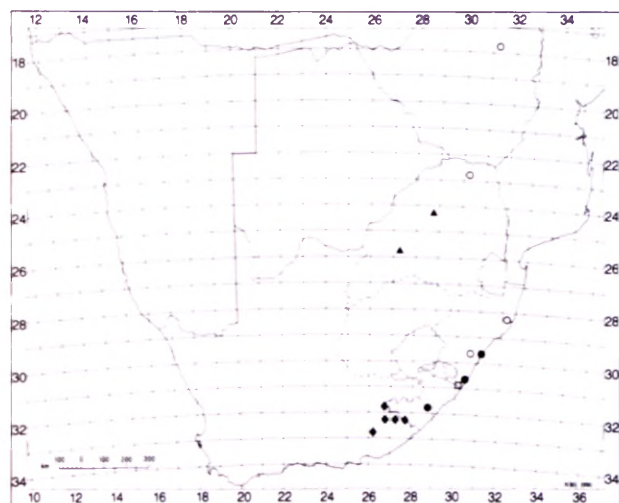


FIGURE 8.—Distribution of *Erythrina acanthocarpa*, ◆; four natural hybrids, *Erythrina × coddii*, ○; *Erythrina × johnsoniae*, □; *Erythrina × dyeri*, ●; *Erythrina × hennessyae*, ▲.

Tree with stout bole, juvenile parts densely or sparsely hirsute. *Leaves* hysteranthous, variable, intermediate in texture, size, shape and indumentum between those of the putative parents, *E. latissima* and *E. lysistemon*. *Inflorescences* precocious, \pm horizontal, compact; flowers slightly gaping at anthesis. *Calyx* dull reddish-brown; tube spathaceous splitting abaxially to the base; lobes distinct, of varying lengths. *Corolla*: vexillum deep scarlet, somewhat spreading, narrower than that of *E. latissima*; alae exceeding carina; carina segments partly connate as in *E. lysistemon*, or free as in *E. latissima*. *Stamens* diadelphous vexillary filament partly coherent. *Fruit* unknown.

Specimens of this apparently sterile hybrid taxon are at present known from the Hluhluwe Game Reserve in northern Natal, from Ndwedwe in Natal, from the northern Transvaal and outside the Flora region from Harare in Zimbabwe (Figure 8). The putative parents, *E. latissima* and *E. lysistemon* are sympatric in these areas and the hybrid shows characters which are intermediate between those of these two species. Spring-flowering.

Vouchers: *Lugg s.n. sub NH 40477* (NH); *Mugwedi 19* (J); *Ward 2954* (NH).

11. *E. × johnsoniae* *Hennessy* in *Flowering Plants of Africa* 48, t. 1911 (1985). Type: South Africa, Natal, Mitchell's Farm between Ramsgate and Southbroom, *Codd 9403* (PRE, holo.!; NH, iso.!).

Icon: *Hennessy*: t. 1911 (1985).

Tree, juvenile parts densely or sparsely hirsute. *Leaves* hysteranthous, resembling those of *E. latissima*, but smaller. *Inflorescences* precocious, \pm horizontal, compact; flowers gaping at anthesis. *Calyx* olive green; tube spathaceous, splitting \pm abaxially to the base; lobes distinct, to 5 mm long, or obsolete. *Corolla*: vexillum bright scarlet, spread and partly reflexed, smaller than those of *E. latissima* and *E. caffra*: alae exceeding carina; carina segments partly connate as in *E. caffra*. *Stamens* diadelphous or vexillary stamen absent. *Fruit* unknown.

This apparently sterile hybrid taxon is known only from the Port Shepstone District in southern Natal (Figure 8) where the putative parents, *E. latissima* and *E. caffra* are sympatric. One tree in the garden of the Natal Herbarium in Durban was established from a truncheon planted in 1957. Like *E. × coddii* this hybrid is the product of a cross between parents belonging to different subgenera and shows some characters of each subgenus. It differs from *E. × coddii* mainly in its consistently more coriaceous leaflets; more nearly horizontal flowers; more widely gaping flowers and brighter red vexilla. Spring-flowering.

Vouchers: *S.M. Johnson 1332* (K, NH, PRE); *Nichols 779* (NH); *Schrire 1854* (NH).

12. *E. × dyeri* *Hennessy* in *Bothalia* 16: 48 (1986). Type: Natal, Durban, *Hennessy 445* (UDW, holo.!; NH, PRE, iso.!).

Icon: *Hennessy*: 50 (1986).

Tree, intermediate between its putative parents *E. lysistemon* and *E. caffra*, therefore impossible to dis-

tinguish accurately from either in the vegetative phase. *Inflorescences* compact, \pm horizontal, precocious; flowers gaping, not deflexed, resembling those of *E. caffra*. *Calyx* tube campanulate, bilabiate at anthesis, brown; lobes obsolete except the abaxial lobe prognathous in bud. *Corolla*: vexillum bright scarlet like that of *E. lysistemon*, spread and reflexed like that of *E. caffra*, shorter than that of either parent; alae and carina intermediate in size and shape. *Stamens* intermediate. *Fruit* and *seeds* indistinguishable from those of either parent.

This fertile hybrid of the two members of section *Caffrae* occurs in areas where the parents are sympatric (Figure 8) or grow together in cultivation. At maturity the hybrid is a slightly smaller tree than *E. caffra*. The inflorescence shape, attributable to the gaping, \pm horizontal flowers, is like that of *E. caffra*, but the colour is like that of *E. lysistemon*. The extent to which introgression occurs is not known. Winter-flowering.

Vouchers: *Codd 7983* (PRE); *Codd 7999* (K, PRE).

13. *E. × hennessyae* *Barneby & Krukoff* in *Lloydia* 37: 448 (1974). Type: South Africa, Transvaal, Waterberg, Shangri La Guest Farm near Nylstroom, *Meeuse 9335* (K, holo.!).

Icones: none known.

Shrub up to 3 m tall. *Leaves* sparsely aculeate; leaflets long-acuminate from a broadly ovate base, like those of some forms of *E. humeana*. *Inflorescences* compact, \pm horizontal, contemporary with the leaves; flowers deflexed, not gaping. *Calyx* russet, narrowly campanulate, shortly bilabiate at anthesis; lobes obsolete. *Corolla*: vexillum red, subacute like that of *E. lysistemon*; alae, carina and stamens similar to *E. lysistemon*. *Fruit* unknown.

The first recorded gathering of this rare (Figure 8), apparently sterile hybrid was made at Rustenburg in 1911. Subsequently a second specimen was discovered on a koppie near Nylstroom and several plants were established in the gardens of Shangri La Guest Farm from cuttings taken from the wild specimen. In stature, foliage and the synanthous condition, this hybrid resembles *E. humeana*; in flower morphology it closely resembles *E. lysistemon*. Its sterility confirms the validity of the separation of sections *Caffrae* and *Humeanae*. Late winter/spring-flowering.

Vouchers: *McGregor s.n. sub Moss 2628* (J); *O. Nation s.n.* (K).

EXOTIC SPECIES OF *ERYTHRINA* COMMONLY IN CULTIVATION IN SOUTHERN AFRICA

Synoptic key to exotic species

(the hybrid taxon, aff. *E. × sykesii* is not included in this key)

1a Calyx dehiscing apically at anthesis, lacking true limb:

2a Calyx tube shallowly campanulate, broader than long; carina falcate, at least half as long as vexillum; filaments connate for \pm three-quarters of their length, shortly exerted from carina; seeds brown or blackish, some times mottled (Subgenus *Micropteryx*):

- 3a Abaxial calyx lobe distinct, fleshy; vexillum rhombic-ovate, long-unguiculate, fully reflexed at anthesis, yellowish-orange; alae well developed, \pm half as long as carina; carina obliquely ovate, connate; pod subligneous, slightly constricted between the seeds; seeds mottled, brown (Section *Duchassaingia*) 14. *E. fusca*
- 3b Abaxial calyx lobe not as above; vexillum ovate, shortly clawed, spread but not fully reflexed at anthesis; alae minute; carina lanceolate:
- 4a Inflorescence lax, terminal or lateral; hypanthium short, not or scarcely differentiated from calyx tube; vexillum deep red or scarlet; alae truncate; pod subligneous, not or slightly constricted between the seeds; seeds brown, mottled (Section *Cristae-galli*):
- 5a Inflorescences terminal, leafy; fruit dorso-ventrally compressed with interseminal constrictions, \pm 12 mm broad; funicle not persistent 15. *E. crista-galli*
- 5b Inflorescences lateral, leafless; fruit laterally compressed, without interseminal constrictions, \pm 20 mm broad; funicle persistent 16. *E. falcata*
- 4b Inflorescence compact, secund, lateral; hypanthium stipe-like, clearly differentiated from the turbinate calyx tube; vexillum orange-scarlet; alae obtuse; pod chartaceous, without interseminal constrictions; seeds brown, usually mottled (Section *Micropteryx*) 17. *E. poeppigiana*
- 2b Calyx tube tubular or narrowly campanulate, longer than broad; carina \pm straight, half, or less than half as long as vexillum; filaments connate for \pm two-thirds of their length, long-exserted from carina; seeds usually red or partly red (Subgenus *Erythrina*):
- 6a Vexillum scarlet, enfolding inner floral parts; carina petals free, linear-oblong, half as long as vexillum; pod subligneous, without interseminal constrictions; seeds brown, mottled (Section *Stenotropis*) 20. *E. speciosa*
- 6b Vexillum pink, enfolding inner floral parts; carina petals free, obtusely spatulate, a quarter as long as vexillum; pod subligneous, with interseminal constrictions; seeds particoloured red and black (Section *Erythrina*) 21. *E. pallida*
- 1b Calyx dehiscing longitudinally along median abaxial line to the base at anthesis, becoming spathaceous (Subgenus *Chirocalyx*):
- 7a Leaflets ovate; inflorescence slender, lax, subsecund; vexillum red, enfolding inner floral parts; carina segments connate, toothed, pod subligneous, with interseminal constrictions; seeds red (Section *Macrocymbium*) 18. *E. senegalensis*
- 7b Leaflets palmately lobed; inflorescence stout, compact; vexillum red, spread and partly reflexed at anthesis; carina petals free, obtuse; pod subligneous, with well-defined interseminal constrictions; seeds orange-red (Section *Chirocalyx*) 19. *E. livingstoniana*

Section *Duchassaingia* (Walp.) Krukoff in Lloydia 37: 340 (1974). *Erythrina* 'group' *Fuscae* Krukoff: 226 (1939b). *Duchassaingia* Walp.: 741 (1850). Type species: *Duchassaingia glauca* Walp. = *Erythrina fusca* Lour.

14. *E. fusca* Lour., Flora cochinchinensis 427 (1790); Merrill: 209 (1935); Krukoff: 229 (1939b); Verdc.: 547 (1971); Krukoff & Barneby: 340 (1974); Hennessy: 23 (1975); Hennessy: t. 1754 (1977). Types: Cochinchina (Vietnam), *Louriero s.n.* (syn., not found); *Gelala aquatica* Rumph., Herb. Amboin. 2: 235, t. 78 (1750) (icono.).

E. glauca Willd.: 428 (1801). Type: Venezuela, Caracas, based on notes by F. Bredemeyer (fide Krukoff).

E. ovalifolia Roxb.: 254 (1832); Sprague: 198 (1909). Type: India, Calcutta, Roxburgh drawing 972 (K, lecto., designated by Verdc. 1971).

Icones: Krukoff & Barneby: 341 (1974); Hennessy: t. 1754 (1977).

Tree up to 24 m tall. *Leaflets* ovate-elliptic, silvery beneath; lateral leaflets 105–165 \times 70–105 mm; terminal

leaflet 130–190 \times 110–115 mm. *Inflorescences* precocious; flowers widely gaping. *Calyx* broadly campanulate with fleshy abaxial lobe forming a solid spur 2–4 mm long. *Corolla*: vexillum long-clawed, reflexed \pm 90° at anthesis, pale yellowish or pale orange; alae rhomboid, exposed, bicoloured red/cream or deep orange, shorter than carina; carina segments partly connate, obliquely ovate, paler than alae. *Stamens* diadelphous. *Fruit* subligneous, slightly constricted between the seeds, blackish. *Seeds* dark brown, mottled, 12–18 \times 5–8 mm.

This species is cultivated on the Natal coastbelt. Until 1984 no fruit set had been observed in the Natal plants which were propagated from cuttings. Viable seed was produced in 1984 by trees in the Natal Provincial Administration garden at Mayville in Durban, which suggests that some of the trees have been 'adopted' by an effective pollinator. Several species of birds visit the trees, including Indian mynahs (*Acridotheres tristis*). Late winter/spring-flowering.

Erythrina fusca has a wider distribution range than any other species of *Erythrina*, occurring naturally on three continents, Africa, Asia and South America in the littoral and sublittoral zones, and on many tropical islands. Its seeds are reputed to be distributed by ocean currents and in river water. It was one of the first tree species to recolonise the island of Krakatau after the cataclysmic volcanic eruption of 1883.

Vouchers: Hennessy 385, 387 (UDW).

Section *Cristae-galli* Krukoff in Lloydia 37: 342 (1974). *Erythrina* 'group' *Crista-galli* Krukoff: 227 (1939b). Type species: *Erythrina crista-galli* L.

15. *E. crista-galli* L., Mantissa plantarum 99 (1767); DC.: 413 (1825); Krukoff: 228 (1939b); Verdc.: 543 (1971); Hennessy: 37 (1972); Krukoff & Barneby: 342 (1974); Hennessy: 23 (1975); Van Rensburg: 22 (1982). Type: Herb. Linn. Cat. no. 888.4 (lecto.).

Icones: Hennessy: t. 14 (1972); Krukoff & Barneby: 343 (1974); Van Rensburg: 21, 22 (1982).

Tree up to \pm 5 m tall locally. *Leaves* synanthous; leaflets ovate, glabrous or glabrescent, \pm 60–90 \times 30–60 mm. *Inflorescences* terminal, leafy, usually with 3 flowers in axil of each leaf; flowers widely gaping, resupinate. *Calyx* broadly campanulate, \pm 10 \times 24 mm; abaxial lobe acuminate, \pm 5 mm long. *Corolla*: vexillum ovate, shortly clawed, \pm 50 \times 35 mm, deep crimson, scarlet or pale red; alae minute, obtuse; carina segments partly connate, lanceolate-acute, falcate, \pm 40 \times 11 mm. *Stamens* shortly exserted. *Fruit* subligneous, dorso-ventrally compressed, constricted between the seeds, \pm 12 mm broad, brown. *Seeds* dark brown, mottled, \pm 12 \times 10 mm; funicle not persistent.

This, the most widely cultivated species of *Erythrina*, in South Africa and elsewhere, is indigenous in eastern Bolivia, Paraguay, northern Argentina and Uruguay. Production of an annual crop of flower-bearing leafy branches from each woody branch, only the strongest of which persist to continue growth while the remainder wither, die and drop off, results in mature trees which

appear to have been pollarded, and are of relatively short stature. Spring/summer-flowering.

The common name 'Cock's comb' coral tree from the Latin *crista-galli* (cock's comb), is an allusion to the short fan-shaped free portion of the stamens which is exerted beyond the keel.

Characters which separate *E. crista-galli* from *E. falcata* are summarised in the key to exotic species.

Vouchers: *Atkinson s.n. sub J 31397* (J); *Dahlstrand 2382* (J); *Eliovson s.n. sub J 26210* (J).

16. *E. falcata* Benth. in Martius, Flora brasiliensis 15: 172 (1859); Krukoff: 232 (1939a); Krukoff: 684 (1941); Krukoff & Barneby: 344 (1974). *Corallodendron falcatum* (Benth.) Kuntze: 172 (1891). Type: Brazil, *Martius s.n.* (M, holo.).

Icones: Krukoff: t. 1, 2a, 2b (1941); Krukoff & Barneby: 344 (1974).

Tree up to 10 m tall locally. *Leaves* hysteranthous; leaflets ovate, glabrescent, 20–60 × 18–32 mm. *Inflorescences* lateral, crowded towards tips of branches, lax, leafless; flowers widely gaping. *Calyx* broadly campanulate, ± 6 × 11 mm. *Corolla*: vexillum short-clawed, ovate-orbicular, ± 35 × 32 mm, vermilion red; alae minute, truncate; carina segments partly connate, lanceolate, obtuse, falcate, ± 25 × 7 mm. *Stamens* hardly exerted. *Fruit* subligneous, not or hardly constricted between seeds, ± 20 mm broad, brown. *Seeds* dark brown, mottled, ± 15 × 10 mm; funicle persistent, ± 3 mm long.

Indigenous in subAndean southern Peru, Bolivia, eastern Brazil, Paraguay and northern Argentina, this species is cultivated as an ornamental street tree in parts of South America, in Australia and in South Africa; several trees are known in Johannesburg. Fruit and seeds have been collected from one of the Johannesburg plants (*Herdman s.n. sub J 48618*). All the trees in our area are red-flowered, but the occasional white-flowered form has been recorded in Bolivia. Spring/summer-flowering.

Vouchers: *Herdman s.n. sub J 48618* (J); *Jack s.n. sub J 36293* (J).

Section *Micropteryx* Krukoff in Lloydia 37: 344 (1974). *Erythrina* 'group' *Vernae* Krukoff: 234 (1939a). Type species: *Micropteryx poeppigiana* Walp. = *Erythrina poeppigiana* (Walp.) O.F. Cook.

17. *E. poeppigiana* (Walp.) O.F. Cook in Bulletin of the United States Department of Agriculture, Botany 25: 57 (1901); Krukoff: 235 (1939a); Krukoff & Barneby: 347 (1974); Hennessy: 23 (1975). *Micropteryx poeppigiana* Walp.: 740 (1850). *Erythrina micropteryx* Poeppig in Urban: 327 (1899). Type: Peru, *Poeppig s.n.* (F, holo.; GH, NY –photo.).

Icon: Krukoff & Barneby: 347 (1974).

Tree up to 20 m tall locally. *Leaves* hysteranthous; leaflets broadly ovate-deltate; lateral leaflets subtended by a pair of cupulate stipels. *Inflorescences* lateral, crowded towards tips of branches, ± compact, secund; flowers gaping. *Calyx* turbinate, expanded distally, ± 10 × 7 mm. *Corolla*: vexillum short-clawed, ovate, acute, ± 40 × 15

mm, bright vermilion red; alae minute, suborbicular; carina segments partly connate, lanceolate, acute, falcate, ± 35 × 8 mm. *Stamens* shortly exerted. *Fruit* chartaceous, not constricted between the seeds. *Seeds* brown, immaculate or mottled.

Widely cultivated in the tropics as an ornamental tree and frequently grown for shade in coffee and cacao plantations, this species is indigenous in Venezuela, Panama, subAndean Colombia, Ecuador, Peru and Bolivia. Mature specimens exist in the Durban area where, although fruit set is initiated, the follicular pods abort early and no mature seeds have been observed. *E. poeppigiana* is easily recognisable as its cup-shaped stipels are unique in the genus. Spring-flowering.

Voucher: *Hennessy 399* (UDW).

Section *Macrocybium* (Walp.) Barneby & Krukoff in Lloydia 37: 414 (1974). *Macrocybium* Walp.: 149 (1850). Type species: *Macrocybium vogelii* (Hook. f.) Walp. = *Erythrina vogelii* Hook. f.

18. *E. senegalensis* DC., Prodomus systematis naturalis 2: 413 (1825); Guill. & Perr.: 224 (1832); Bak.: 181 (1871); Aubrev.: 296, t. 118A (1936); Hutch. & Dalz.: 406 (1927); Hepper: 562 (1965); Krukoff & Barneby: 414 (1974); Hennessy: t.1786 (1979). *Duchassaingia senegalensis* (DC.) Hassk.: 194 (1858). Type: Senegal, *Roussillon s.n.* (not traced).

E. latifolia Schumach.: 333 (1827). *Chirocalyx latifolius* (Schumach. & Thonn.) Walp.: 148 (1853). Type: Guinée, collector undesignated (K, iso.).

E. guineensis G. Don: 371 (1832). Type: Sierra Leone, collector undesignated (not traced).

Icones: Aubrev.: t. 118 A (1936); Krukoff & Barneby: 415 (1974); Hennessy: t. 1786 (1979).

Tree up to 5 m tall. *Leaves* synanthous or hysteranthous; leaflets ovate, glabrous, 50–120 × 30–75 mm. *Inflorescences* lateral, crowded towards tips of branches, lax, subsecund; flowers deflexed, not gaping. *Calyx tube* spathaceous with oblique mouth, splitting abaxially, ± 12 × 6 mm; lobes obsolescent, represented by 5 black papillae. *Corolla*: vexillum ovate, subobtusate, short-clawed, ± 35 × 18 mm, scarlet; alae oblong, ± 12 × 5 mm; carina segments partly connate, quadrangular-unguiculate with distal margin toothed abaxially, ± 7 × 10 mm. *Stamens* ± included. *Fruit* subligneous, moniliform, ± 12 mm broad. *Seeds* orange to vermilion red, 6,0–7,5 × 5,0–5,5 mm.

Cultivated specimens of *E. senegalensis*, which is indigenous in West Central Africa and the Sudan, have been established in tropical Australia and in South Africa in the Durban area. The specimens in Australia produce fruit and seeds, but to date those in Durban have failed to do so. Spring/early summer-flowering.

Voucher: *Hennessy 393* (UDW).

19. *E. livingstoniana* Bak. in Flora of tropical Africa 2: 182 (1871); Sim: 43 (1909); Bak. f.: 370 (1929); Hennessy: 39 (1972); Krukoff & Barneby: 421 (1974); Coates Palgrave: 331 (1977); Hennessy: t. 1737 (1977).

Type: Malawi, '14–19° S. lat., 60 miles up river Shire', *Kirk 154*, with fig. (K, holo.).

Icones: Sim: t. 48 (1909); Hennessy: t. 15 (1972); Hennessy: t. 1737 (1977).

Tree up to 20 m tall, heavily armed with antrorse prickles. *Leaves* hysteranthous; leaflets 90–200 × 85–190 mm, trilobed or sub 5-palmatilobed, terminal lobe deltate, subacute or obtuse, lateral lobes subquadrangular or sub-bilobed. *Inflorescences* lateral, crowded towards tips of branches, compact; flowers horizontal, gaping. *Calyx* spathaceous, splitting abaxially; lobes obsolete. *Corolla*: vexillum ovate, obtuse, shortly clawed, arcuate, spreading, ± 50 × 45 mm, scarlet; alae cochleariform, ± 20 × 10 mm; carina segments free, suborbicular, ± 17 × 15 mm. *Stamens* exposed. *Fruit* ligneous, moniliform, ± 30 mm broad, grey-buff. *Seeds* bright orange, 12–15 × 9–11 mm; hilum depressed, white.

An African species indigenous in parts of Malawi, Mozambique and possibly in the Triangle region of Zimbabwe, now in cultivation in South Africa in the Durban area where it was introduced by Dr Vincent Wager in 1951. Flowering of the Durban trees is erratic, occurring in late summer with not all the trees flowering in a single year. Fruit and seed development occur and the number of plants grown from seed is rapidly increasing. The formidable armament of the stems makes propagation from truncheons difficult. This is a spectacular species which requires a lot of water. The heavy armament and palmatilobed leaflets make this species easily recognisable.

Vouchers: *Hennessy 389* (UDW); *390* (K, PRE, UDW); *Sim 21134* (NU).

Section *Stenotropis* (*Hassk.*) *Krukoff* in *Lloydia* 37: 359 (1974). *Erythrina* subgenus *Stenotropis* (*Hassk.*) *Bak.*: 188 (1876). *Erythrina* 'group' *Speciosae* *Krukoff*: 243 (1939a). *Stenotropis* *Hassk.*: 183 (1855). Type species: *Stenotropis berteroi* *Hassk.*, nom. illeg. = *Erythrina poianthes* *Brot.* = *E. speciosa* *Andrews*.

20. *E. speciosa* *Andr.*, *The botanist's repository* 7, t. 443 (1806); *Krukoff*: 243 (1939a); *Krukoff*: t. 1, figs. 5a, b (1941); *Krukoff & Barneby*: 360 (1974); *Hennessy*: 21 (1975). Type: *Bot. Rep.* t. 443 (lecto., designated by *Krukoff 1974*).

E. poianthes *Brot.*: 342 (1824). Type: a cultivated plant of unknown origin.

E. reticulata *Presl*: 22 (1834). *Micropteryx reticulata* (*Presl*) *Walp.*: 741 (1850a). *Corallodendron reticulatum* (*Presl*) *Kuntze*: 173 (1891). Type: a cultivated plant of unknown origin.

Stenotropis berteroi *Hassk.*: 183 (1855) (nom. illegit.)

Icones: *Andrews*: t. 443 (1806); *Krukoff & Barneby*: 360 (1974); *Hennessy*: 21 (1975).

Small tree. *Leaves* hysteranthous or synanthous; leaflets broadly ovate or parabolic, acute or acuminate, ± 150 × 120–180 mm. *Inflorescences* lateral, compact, erect; flowers horizontal-ascending, cylindrical, not gaping. *Calyx* campanulate, truncate, with triangular-subulate abaxial tooth 1.5–2.0 mm long. *Corolla*: vexillum narrowly elliptic-oblong, acute, shortly clawed, distally falcate, ± 60 × 15 mm, scarlet; alae ± 9.0 × 2.5 mm; carina segments free or connate for ± 6 mm, linear-oblong,

obtuse, ± 27.0 × 4.5 mm. *Stamens* included. *Fruit* subligneous with slight interseminal constrictions. *Seeds* dark brown (not seen locally).

Indigenous in south-eastern Brazil and cultivated in tropical South America, New Zealand, Australia and in South Africa in the Durban area where flowering occurs in late winter or early spring contemporary with *E. lysistemon* and *E. caffra*. The sterile hybrid taxon, *E. × sykesii* *Barneby & Krukoff* (*E. hybrida* of horticultural literature) which is cultivated in parts of southern Africa may have as one of its parents *E. speciosa*.

Vouchers: *Hennessy 395, 444* (UDW).

Section *Erythrina* *Krukoff & Barneby*: 365 (1974), including sect. *Corallodendra* *Krukoff*: 394 (1974). Type species: *E. corallodendrum* *L.*

21. *E. pallida* *Britton & Rose* in *Bulletin of the Torrey Botanical Club* 48: 332 (1922); *Krukoff*: 263 (1939a); *Krukoff & Barneby*: 399 (1974). Type: Trinidad, *Britton 2656* (NY, holo.; GH, US, iso.).

E. corallodendron sensu *Hennessy*: 35 (1972), non *L.*

Icones: *Hennessy*: t.13 (1972); *Krukoff & Barneby*: 399 (1974).

Tree up to 10 m tall. *Leaves* hysteranthous; leaflets broadly ovate or parabolic, acute or obtuse, 70–100 × 60–90 mm. *Inflorescences* lateral, compact, erect; flowers horizontal, cylindrical, not gaping. *Calyx* campanulate, truncate with obtuse abaxial lobe ± 2 mm long, deep purple. *Corolla*: vexillum linear-oblong, obtuse, shortly clawed, minutely adpressed pilose distally, ± 70 × 20 mm, pink; alae oblong, obtuse, ± 12 × 6 mm; carina segments free, obtusely spatulate, ± 9 × 5 mm. *Stamens* included. *Fruit* subligneous, moniliform, black. *Seeds* particoloured red/black, ± 10 × 7 mm.

The unusual combination of deep purple calyx and pink corolla make *E. pallida* easily recognisable. The specific name, *pallida* refers to the pale vexilla. Indigenous in several West Indian islands and Venezuela, this species is widely cultivated in South America, Australia, tropical east Africa and South Africa. The cultivated plants were initially misidentified as *E. corallodendrum* *L.*, a closely related, red-flowered species with glabrous vexilla. Spring-flowering.

Vouchers: *Davidson 2240* (J); *Hennessy 447* (UDW); *Hilliard 4710* (UDW).

22. *Erythrina* aff. *E. × sykesii* *Barneby & Krukoff* in *Lloydia* 37: 447 (1974). Type: *C.T. White 9073* (NY, holo.).

Icon: *Krukoff & Barneby*: 447 (1974).

Tree up to 10 m tall. *Leaves* hysteranthous; leaflets resembling those of section *Caffrae*. *Inflorescences* lateral, compact, semi-erect or ± horizontal; flowers horizontally ascending, gaping. *Calyx* campanulate, unilaterally or bilaterally asymmetrically cleft at anthesis, abaxial tooth triangular-subulate. *Corolla*: vexillum ovate, acute, shortly clawed, slightly spreading, 50–60 × ± 25 mm, bright scarlet; alae linear-oblong, obtuse, ± 20 × 5 mm; carina

segments partly connate, oblong-ovate, $\pm 25 \times 10$ mm. *Stamens* exposed. *Fruit* and *seeds* unknown.

The history of the introduction of this hardy taxon into southern Africa is unknown. It is widely cultivated in the western Cape, southern Cape, parts of Namibia and at least one specimen (purchased in the western Cape) is established in Pietermaritzburg, Natal. The plants agree with the description of *E. \times sykesii* except that the carina is invariably partly connate in locally cultivated plants. *E. \times sykesii* was described from plants cultivated in New Zealand and Australia and in photographs of the Australasian plants made by Dr Ian Whitton, the habit, inflorescence and flower structure appear identical to those of the specimens grown in southern Africa.

The parentage of the hybrid is unknown. In inflorescence shape and attitude; the well-developed triangular-subulate abaxial calyx tooth; the scarlet colour of the vexillum and in shape and relative proportions of alae and carina, the hybrid resembles *E. speciosa*. In shape of leaflets; the asymmetrically bilabiate calyx; the gaping flower with exposed stamens and in connation of the relatively large carina segments, the hybrid is like *E. caffra*. Both *E. speciosa* and *E. caffra* are cultivated in Australasia and their flowering times overlap. Although Krukoff & Barneby (1974) have suggested *E. lysistemon* as a putative parent because the hybrid possesses a calyx of the type known only in section *Caffrae*, this seems unlikely as *E. lysistemon* has a closed flower with included stamens. The stature of the mature trees more closely resembles that of *E. caffra* than that of *E. lysistemon*. Until the hybrid is successfully resynthesised, the parentage of this taxon remains speculative. Winter/spring-flowering.

Vouchers: *Coetzee s.n. sub NBG 16949* (NBG); *Hennessy 461* (UDW).

SPECIMENS EXAMINED (ERYTHRINA)

The specimens are listed alphabetically according to the name of the collector. The figures in parentheses refer to the number of the taxon in the text. The herbaria in which the specimens examined are housed, are indicated by the letter codes of Holmgren & Keuken, Index herbariorum (1974), except that of the University of Durban-Westville, UDW, which is as yet unlisted.

Abbott 1263 (5) NH. *Acocks 10233* (7) NH. PRE; *10733* (8) NH. PRE; *13163* (2) K; *18843* (9) PRE. *Ahrens 14* (7) NU. *Allsopp 1009* (7) NH. NU. PRE. *Archibald 5906* (6) PRE. *Atkinson s.n. sub J 31397* (15) J.

Badri s.n. (5) UDW. *Balkwill 361* (7) J. *Barber 786* (8) K. *Barbour s.n.* (9) K. *Barnard s.n. sub SAM 33302* (3) SAM. *Barrett 375* (7) PRE. *Baur 249* (6) K. SAM. *Bavuri s.n.* (7) NBG. *A. Bayer 1389* (5) NU. *F. Bayer s.n. sub NH 21765* (8) NH. *Bayliss BRI-B-114* (6) GRA; *2079* (7) NBG; *2983* (9) NBG; *7046* (5) K. *Bennie s.n.* (7) GRA. *Beswick s.n. sub Galpin 7370* (8) BOL. *Bolus 6298* (8) BOL. K; *7733* (5) BOL; *8886* (9) BOL; *11831* (7) BOL; *11832* (2) BOL. *Bokelmann s.n.* (5) NBG. *Boitha s.n.* (7) K. PRE. *Bourquin 6* (8) NU; *259* (5) NU. *Bowker s.n.* (7) K. *Brayshaw II* (5) NU; *106* (8) NU. *Bredenkamp 356* (8) PRE; *1480* (7) PRE. *Breyer s.n. sub TM 19416* (7) PRE; *s.n. sub TM 24377* (5) PRE. *Brown & Shapiro 380* (2) K. *Burchell 3701*, *3920* (6) K. *Burke 69* (8) K. SAM; *s.n.* (8) K; *s.n.* (5) K. *Burt Davy 615* (5) BOL; *999* (8) NH; *4108* (8) BOL; *15024* (8) J. K.

Carnegie 1490/31 (2) NBG. *Chase 5800* (5) K. *Chetty 19* (7) UDW. *Clinning s.n.* (4) WIND. *Codd 1896* (2) PRE; *1978* (8) PRE; *4418* (2) K. PRE; *6042* (2) PRE; *6149* (5) PRE; *6413* (7) K. PRE; *6547* (5) PRE; *7807* (7) K; *7817* (5) PRE; *7982* (5) GRA. K. PRE; *7983* (12) K; *7987* (5) GRA. K. PRE; *7988* (6) K; *7990* (6) K; *7991* (5) K; *7993* (5) GRA.

PRE; *7994* (5) K; *7998* (5) NH. PRE; *7999* (12) K. PRE; *8000* (6) K; *8002* (5) NH. PRE; *8003* (5) K; *8005* (5) GRA. PRE; *8006* (5) GRA; *8008* (5) NH; *9297* (7) GRA. K. PRE; *9403* (11) NH. PRE; *9406* (8) K. PRE; *9744* (2) K. NBG. PRE; *10080* (8) K. PRE. *Codd & Dyer 4636* (7) K. PRE. *Coetzee 254* (5) PRE; *s.n. sub NBG 16949* (22) NBG. *Collector un-named s.n. sub A 3* (7) GRA. PRE; *s.n. sub NH 14466* (2) NH; *s.n. sub Wood 13078* (7) NH. *Collins s.n. sub J 32003* (5) J. *Colvin s.n. sub Moss 23024* (5) J. *Comins 411* (7) NU; *440* (5) NU; *1435* (7) PRE. *Compton 17745* (2) NBG; *19105* (7) BOL. NBG; *19794* (5) BOL. NBG; *26643* (7) K. NBG; *26977* (5) K. NBG. PRE; *27446* (2) NBG; *27903* (5) NBG; *27947* (2) NBG. PRE; *29774* (7) NBG; *31134* (5) NBG. *Conrath 245* (8) K. *Cooper 204* (6) K; *267* (9) BOL. K; *992* (8) K. *Crewe 45* (7) K. NU. *Culverwell 908* (5) PRE.

Dahlstrand 2382 (15) J. *Davidson 2240* (21) J; *2276* (7) J; *22975* (5) J. *Davies s.n. sub A 7143* (7) GRA. *Deane 7* (10) K. PRE. *Dersley s.n. sub J 30513* (8) J. *De Winter 395* (5) PRE; *3745* (4) K. PRE. WIND; *3927*; *4110* (4) PRE. *De Winter & Leistner 5601* (3) WIND. *Dieterlen 547* (8) NH. PRE. SAM. *Dinter 769* (3) SAM. *Dohse & Lindahl 106* (7) NH. *Drège 1691* (6) BOL; *s.n. 1836* (i), *1836* (ii), *1837* (9) K. *Du Plessis 15* (4) PRE. *Du Toit 547* (8) NH. PRE. SAM.

Ecklon 1836a (6) K; *1836b* (9) K. *Ecklon & Zeyher 1692* (9) SAM. *Edwards 765* (7) NU; *1026* (8) NU. *Eliovson s.n. sub J 26210* (15) J; *s.n. sub J 26293* (8) J. *Eyles 5065* (10) K.

Flanagan 125 (7) BOL. NU. SAM; *319* (6) PRE; *1827* (8) SAM. *Fiddes 5* (8) NU; *12* (7) NU. *Fisher 412*, *413* (8) NU. *Forbes 350* (5) NH. *Fourcade 1406* (6) STE; *4466* (6) BOL. STE. *Francois 89* (8) NU. *Frankish 8* (7) NU.

Galpin 67 (6) GRA; *494* (5) BOL. GRA; *1653* (9) BOL. GRA. NU. PRE; *3388* (7) PRE; *11906* (7) K; *12989* (8) BOL. K. PRE; *14734* (7) BOL. K. NH. PRE. *Geldenhuis 270* (6) PRE. *Germishuizen 350* (5) PRE; *1632* (7) PRE; *3870* (8) PRE. *Gerrard 134* (8) K. *Gerstner 3356* (5) PRE; *4292* (8) NH; *5920* (7) PRE. *Getliffe 157* (2) NU. *Gibson 25*, *225* (3) WIND. *Giffen 1043* (7) PRE. *Giess 11515* (3) WIND. *Gillett 2903* (5) K. *Gilliland 3005*, *s.n. sub J 26231* (8) J. *Glen 268* (7) J; *446* (5) J. *Goodman 889* (7) NU; *1110* (2) NU. *Goossens 810* (8) K. *J.L. Gordon-Gray s.n.* (6) NU. *K.D. Gordon-Gray s.n.* (8) NU. *Green 14* (5) J. *Gueinzus s.n. sub SAM 15586* (7) SAM. *Guy & Jarman 249* (5) NU.

Haagner s.n. sub A 7145 (8) GRA. *Hafström & Acocks 2309* (7) PRE. *Hall s.n. sub J 46746* (7) J. *Hanekom 2321* (5) K. PRE; *2454* (8) K. PRE. *Harris s.n. sub NH 28844* (2) NH. *Harrison 260* (5) PRE; *262* (7) NH. *Hattingh 1* (5) PRE. *Helner 356* (9) PRE. *Hemm 155* (5) J. PRE; *851* (7) J. *Henderson 1503* (7) NBG; *1949* (8) NBG. *Hennessy 264* (7) UDW; *385*, *386* (1) UDW; *387* (14) UDW; *389*, *390* (19) UDW; *393* (18) UDW; *395*; *444* (20) UDW; *399* (17) UDW; *445* (12) UDW; *447* (21) UDW; *461* (22) UDW; *s.n.* (8) UDW; *s.n.* (11) UDW. *Henrici 1210* (8) PRE. *Henriques 238* (4) K. *Herbst s.n.* (8) NBG. *Herdman s.n. sub J 48616* (16) J. *Hillary 388* (5) NU. *Hillary & Robertson 570* (5) PRE. *Hilliard 1339* (7) NU; *2191* (8) NU; *4710* (21) UDW. *Hinges 3706* (3) PRE. *Hoffe 16* (8) PRE. *Holland s.n. sub NBG 306/26* (7) BOL. *Holt 344* (2) PRE. *Hornby 2722* (19) K. *Hosken 16* (7) NU. *Howlett s.n.* (5) NH. *B. Huntley 697* (7) NU. *K.D. Huntley 223* (2) NU. *Hutchinson 2531* (7) BOL. *Hutchinson & Gillett 4155* (5) K.

Jack s.n. sub J 36293 (16) J. *Jacobsen 2602* (7) PRE. *Jacot Guillarmod 8502* (6) K. *Jankowitcz 574* (3) WIND. *Jarman & Guy 36* (7) NU. *Jenkins s.n. sub TM 9294* (8) PRE. *Jenkinson s.n. sub TM 7339* (5) PRE. *Johnson 1332* (11) K. NH. PRE.

Keerath II (5) UDW. *Keet 1614* (3) WIND. *Kemp 21689* (5) J. *Kerfoot 7379* (7) J. *Killick 304* (7) NU. *Kirk 154* (19) K. *Kluge 1386* (5) PRE. *Krauss 62* (7) K; *263* (2) K. PRE; *286* (5) K. *Krupko 25826*, *27258* (7) J.

Langham s.n. sub NH 12129 (8) NH. *Lansdell s.n. sub NH 16114* (2) NH. *Larson 82* (5) J. *Lawn 1012* (2) NH. *Lawson 285* (7) NH. *Leach 8463* (7) K. *Leendertz 217* (5) PRE; *693* (8) PRE; *953* (5) PRE; *2681*, *3899* (8) PRE. *Leith s.n.* (8) PRE. *Le Roux 216* (4) PRE. WIND. *Liengme 453* (7) PRE. *Louw 541* (8) NH. PRE. *Lucas 32* (8) J. *Lugg s.n. sub NH 40477* (10) NH.

Macnae 1582 (8) J. *MacOwan 1216* (7) BOL. K. SAM; *1413* (6) BOL. K; *1435* (9) K; *s.n.* (7) GRA. *Maguire s.n. sub Moss 22208* (5) J. *Malcomess s.n.* (6) NBG. *E. Marais s.n.* (5) PRE. *W. Marais 476* (6) PRE; *1331* (8) K. PRE. *Markötter s.n. sub STE 31572* (2) STE. *Martin s.n.* (6) NU. *Martindale s.n.* (5) NU. *McCabe & Atherton 41* (9) K. *McClean & Ogilvie s.n. sub NH 27899* (5) NH. *McDonald 178* (5) NU;

254 (2) K. NU. PRE. *McGregor s.n. sub Moss 2628* (13) J. *McKen s.n.* (7) K. *Meeuse 9335* (13) K. *Melville 70/276* (5) K. *Merxmüller & Giess 1241* (3) WIND. *Methven 156* (5) K. *Miller 10* (5) NU. *Mogg 18222, 23431, 33387* (5) J.; *18372, 23360, 25235* (8) J.; *21368* (7) J. *S.B. Mogg s.n. sub Mogg 18147* (8) J. *Mohle 398* (5) PRE. *Moll 1241*; *s.n.* (9) NH. *Moll & Strey 3887* (7) K. NH. PRE. *Molyneux s.n.* (6) K. NH. *Morris 225* (7) NU; *534* (7) K. NH. NU. PRE. *Moss 4548, 4551* (5) J.; *4549, 8606, 10623, 18231* (8) J.; *4552* (7) J.; *4553* (2) J. *Moss & Rogers 1134* (8) J. *Mugwedi 19* (10) J.; *1299* (2) PRE.; *1520* (2) J. *D.B. Muller 1052* (8) PRE. *M. Müller 3502* (3) WIND. *Munro 21638* (5) J.

D.B. Naidoo 13 (5) UDW. *V. Naidoo 4* (5) UDW. *Nation s.n.* (13) K. *Neethling s.n.* (8) K. *Nel 177* (2) NH. *Nelson 84* (7) K.; *223, 522* (8) K. *Netschisaulu 2200* (2) PRE. *Netshungani 851* (7) PRE. *Nichols 779* (11) NH. *Nicholson 2* (5) NH. *Noel s.n. sub A 1415* (5) GRA.

Onderstall 740 (2) PRE.

Pascoe & Waugh 6 (7) NH. *Patel 1* (5) UDW. *Pegler 89* (6) GRA. K. PRE. SAM; *235* (2) BOL. GRA. K. SAM; *1134* (6) BOL.; *1179* (7) BOL. GRA. SAM. *Peitch & Son s.n.* (9) K. *Pelletier s.n. sub J 30478* (5) J. *Pennefather 81* (2) NU. *Phelps 283* (19) K. *Phillips s.n.* (5) PRE. *Pole Evans 13212* (8) K.; *s.n.* (9) PRE. *Pont 530* (8) PRE. *Pooley 815* (7) NU. *Porter 326* (7) J. *Porter & Ward 279* (7) NH. *Pott s.n. sub TM 15084* (8) PRE.; *s.n. sub J 37663* (2) J.; *s.n. sub J 37870* (5) J. *Preller 135* (8) PRE. *Pretorius s.n.* (8) NBG. *Pringle s.n.* (9) NBG. *Prior 26* (5) K. PRE.; *359* (2) K. PRE. *Prosser 1038* (5) J. K. NBG. PRE.; *1155* (8) J. K. NBG. PRE.; *1356* (7) J. K. NBG. *Purchase 2* (5) J.; *57* (7) J.

Ramsay s.n. sub Wilson s.n. (8) PRE. *Rehmann 6282* (2) K. *Reynolds 1606* (9) K. PRE.; *5770* (8) K.; *9673* (2) NBG. *Roberts 2887* (8) PRE. *Rodda 6* (5) NU. *Rodin 3976* (7) BOL. K. *Rogers 1629* (7) J.; *4634* (7) K.; *14814* (8) J. K.; *23010* (2) J.; *s.n. sub A 7142* (9) GRA. *Rose-Innes 47* (5) J. K. PRE. *Ross 1282* (5) NU; *2123* (5) PRE. *Ross & Moll 5053* (2) K. PRE.; *5069* (6) NH. *Rudatis 23* (7) STE.; *268* (8) STE.; *412, 781* (5) K. *Rudd 4* (5) NU. *Rump s.n.* (2) NU. *Rusch f. 7958* (4) BOL. K. *Rycroft 2980* (8) NBG.

Sanderson 44 (2) K.; *863* (8) NH. *Saunders s.n. sub NH 3440* (8) NH. *Scharedfezen 1/300* (3) WIND. *Scheepers 429* (5) PRE.; *1171* (2) K. PRE. *Schlieben 7009* (5) K. *Schrire 479* (7) NH.; *632* (8) NH.; *1854* (11) NH. *Seydel 369* (3) K.; *4048* (3) WIND. *Shirley s.n.* (8) NU. *Short s.n. sub Mogg 25887* (5) J. *Sim 1254, 1255* (7) BOL. NU. PRE.; *1256* (6) NU; *1257* (9) NU; *1258* (2) NU; *1362* (2) BOL.; *21134* (19) NU. *Singh 13* (5) UDW. *Smellie s.n. sub J 22490* (8) J. C. A. *Smith 308* (5) PRE.; *7051* (2) PRE. *K. Smith 27* (8) BOL. P. A. *Smith 1872* (4) K. PRE.; *2928* (1) K. PRE. *Smuts 66* (5) K. PRE.; *s.n.* (5) PRE. *Somers s.n.* (7) NH. *Standard VII D1* (8) PRE. *Stephen 703* (7) K. PRE. *Steyn 810* (8) NBG. *Stirton 8206* (5) NH. *Store s.n.* (8) K. *Story 1528* (5) PRE. *Steinke s.n. sub UDW 9291* (14) UDW. *Strey 3614* (7) K. PRE.; *3994* (7) PRE.; *5698* (7) NU, UDW; *6663* (6) NH. PRE.; *9018* (5) K. NH. *9069* (2) NH.; *9134* (2) PRE.; *10574, 10575, 10579* (5) NH.; *11157* (7) K. NH. NU. *Sutherland s.n.* (2) K. *Swierstra s.n. sub T.M. 6231* (8) PRE.

L.E. Taylor 5453 (7) NBG. *R. Taylor 26* (7) NH. *Tinley 756* (7) NU. *Thakersee 2* (5) UDW. *Theron 1472* (5) PRE. *Thode s.n. sub A 2799* (8) PRE.; *s.n. sub STE 31574* (2) STE.; *s.n. sub STE 31575/6* (8) STE.; *s.n. sub STE 31577* (7) STE.; *s.n. sub STE 31578* (6) STE.; *s.n. sub STE 31580/1* (5) STE.; *s.n. sub STE 31582* (8) STE. *Thunberg s.n.* (6) (photo.) K. *Trauseld 870* (8) NU. *Turner 16* (5) K. *Tyson 1053* (2) BOL. SAM; *1761, 3124* (7) SAM; *s.n.* (9) BOL. K.

Vahrmeijer & Du Preez 2555 (3) PRE. *Van der Bijl s.n. sub STE 31579* (5) STE. *Van der Schijff 13* (5) PRE.; *402* (5) PRE.; *1126* (2) PRE. *Van Vauren 1225* (5) PRE. *Van Wyk 1656* (5) PRE. *Venter 7890* (7) PRE. *Venter & Vorster 167* (5) PRE. *Verdoorn s.n. sub PRE 22839* (8) PRE. *Von Koenen 582* (3) WIND.

Wade s.n. (5) NU. *Walter 305, 614* (3) WIND. *Ward 481* (5) NU; *1135* (7) NU; *1511* (5) NH. NU; *2232* (7) NU; *2688* (2) K. NH. NU. PRE.; *2954* (10) NH.; *3014* (6) K. NU. *4274* (5) PRE. *4306* (6) NH. NU; *5779* (6) NH. NU. UDW. *M.C. Ward 192* (7) NU. *Watt s.n.* (4) WIND; *s.n. sub J 25519* (8) J. *Wearne 80* (7) NU. PRE. *Wells 1465* (5) NU; *1547* (2) NU; *2114* (7) K. *Werdermann & Oberdieck 1934* (7) K ex B. PRE.; *1226* (8) K ex B. *Werger 176* (8) K. *West 133* (7) K. NH. *2134* (2) NH.; *3276* (4) K. *Wiss 372* (3) PRE. *Wood 4076* (8) K. NH.; *9776* (7) NH.; *10016* (5) BOL. NH.; *s.n. sub Galpin 3388* (7) PRE. *R. Wood 164* (4) NU. *Wylie s.n. sub Wood 9224* (7) NH. *s.n. sub NH 22344* (7) NH. PRE.

Young 1140 (8) J.

Zeyher 531 (8) K. PRE. SAM; *s.n. sub SAM 32895* (7) SAM.

MUCUNA

Mucuna Adans., Familles des Plantes 2: 325 (1763), nom. cons.; DC.: 404 (1825); Benth.: 533 (1865); Bak.: 184 (1871); Bak.: 185 (1876); Taubert: 266 (1894); Taubert: 194 (1897); Prain: 404 (1897); Phillips: 337 (1926b); Hutch.: 405 (1927); Bak. f.: 378 (1929); Phillips: 423 (1951); Hauman: 126 (1954); Hauman: 98 (1955); Hepper: 561 (1965); White: 160 (1962); Hutch.: 433 (1964); Torre: 250 (1966); Verdc.: 287 (1970); Verdc.: 561 (1971); Dyer: 269 (1975); Compton: 278 (1976); Verdc.: 743 (1980); Lackey: 312 (1981); Troupin: 319 (1982). Type species: *Mucuna urens* (L.) DC. (conserved type).

Stizolobium P. Br.: 290 (1756) nom. rej. Type species: *Stizolobium pruriens* (L.) Medik. = *Dolichos pruriens* L. = *Mucuna pruriens* (L.) DC.

Zoophthalmum P. Br.: 295 (1756) nom. rej. Type species: *Dolichos urens* L. = *Mucuna urens* (L.) Medik.

Cacuvallum Medik.: 392 (1787). Type species: *Cacuvallum altissimum* (Jacq.) Medik. = *Dolichos altissimus* Jacq. = *Mucuna altissima* (Jacq.) DC.

Citta Lour.: 456 (1790). Type species: *Citta nigricans* Lour. = *Mucuna nigricans* (Lour.) Steud.

Marcanthus Lour.: 460 (1790). Type species: *Marcanthus cochinchinensis* Lour. = *Mucuna utilis* Wall. ex Wight = *M. pruriens* (L.) DC. var. *utilis* (Wall. ex Wight) Bak. ex Burck.

Hornera Neck.: 43 (1790). Type species: *Hornera urens* (L.) Neck. = *Dolichos urens* L. = *Mucuna urens* (L.) Medik.

Negretia Ruiz & Pav.: (1794). Type species: *Negretia urens* (L.) Ruiz & Pav. = *Dolichos urens* L. = *Mucuna urens* (L.) Medik.

Labradia Swed.: 164 (1801). Type species: *Labradia urens* (L.) Swed. = *Dolichos urens* L. = *Mucuna urens* (L.) Medik.

Carpopogon Roxb.: 54 (1814); Roxb.: 283 (1825). Type species: *Carpopogon giganteum* (Willd.) Roxb. = *Dolichos giganteus* Willd. = *Mucuna gigantea* (Willd.) DC.

Macroceratides Raddi: fig. 5 (1820). Type species: *Macroceratides pseudo-stizolobium* Raddi = *Mucuna macroceratides* DC.

Pillera Endl.: 91 (1833). Type species: *Pillera macrocarpa* (Wall.) Endl. = *Mucuna macrocarpa* Wall.

Woody lianes or herbaceous climbers; hirsute or glabrescent. Leaves stipulate, stipellate, pinnately trifoliate. Inflorescences axillary, paniculate, pseudoracemose or subumbellate; bracts and bracteoles deciduous; flowers

maroon, cardinal red, lilac or green. *Calyx tube* broadly campanulate, limb bilabiate, adaxial lip of two \pm connate lobes, abaxial lip 3-lobed. *Corolla*: vexillum shorter than alae and carina, ovate-orbicular, shortly clawed, proximally auriculate; alae slightly shorter than or equalling carina; carina rostrate, beak horny. *Stamens* 10, diadelphous; anthers dimorphic, 5 large sub-basifixed alternating with 5 shorter versatile or dorsifixed, anthers barbate in subgenus *Mucuna*, glabrous in *Stizolobium*. *Ovary* sessile or stipitate, few-ovuled; style filiform, incurved, proximally pubescent; stigma capitate, small. *Fruit* ovoid or oblong, valves thick, with an indumentum of irritant bristles; sutures wingless or winged. *Seeds* biconvex lenticular, exarillate, with elongated hilum girdling more than half the circumference (subgenus *Mucuna*) or ellipsoid-oblong with conspicuous rim aril and short linear hilum (subgenus *Stizolobium*). $2n = 22$.

A genus of \pm 100 circumtropical and subtropical species, three of which are indigenous in the FSA region.

Pending revision of the genus on a world basis, *Mucuna* is retained in its broad sense, with two well-defined subgenera, *Mucuna* and *Stizolobium* (P. Br.) Prain. Both subgenera are represented in southern Africa.

POLLINATION AND ECONOMIC IMPORTANCE

Red-flowered species of *Mucuna* are mostly bird-pollinated; green or pale-flowered species mainly bat-pollinated and Kenneally (in Verdcourt 1980) has suggested that at least one Australian species, *M. reptans* Verdc., a prostrate plant with musk-scented, mottled blackish purple, red, yellow, or green flowers, is rodent-pollinated.

Despite the attractiveness of the flowers of many species the genus has little economic value because the irritant bristles make the material difficult, even dangerous to handle. Exceptions are *M. nova-guineensis* Scheff., 'red jade vine', a woody liane cultivated for its spectacular flowers and *M. pruriens* (L.) DC. var. *utilis* (Wall. ex Wight) Bak. ex Burck, 'Florida velvet bean', an innocuous, large-seeded cultivar of unknown origin cultivated as a fodder crop. Both these taxa are grown in the FSA region.

Ingestion of irritant bristles of many species induces severe diarrhoea. In primitive medicine, potions containing irritant bristles derived mainly from pods were employed as vermifuges. Severe dermatitis and inflammation of the eyes result from contact with the urticating bristles, and inflammation of nasal and buccal mucosa, laryngitis and gastro-intestinal disturbance from inhalation and/or ingestion of the bristles. Cases of dementia and even death induced by accidental exposure of domestic animals to *Mucuna* bristles have been reported (Burt Davy 1932).

A pruritogenic proteolytic enzyme, mucunain, and a histamine-releasing substance, 5-hydroxytryptamine (serotonin) are toxic principles isolated from the irritant bristles of *Mucuna* spp. (Watt & Breyer-Brandwijk 1962).

Vernacular names of the two indigenous species of subgenus *Stizolobium* are hell-fire bean, brandboontjie, jeukpeul and isifefeta.

I. Subgenus *Mucuna*: Verdc.: 561 (1971). *Zoophthalmum* P. Br.: 295 (1756). Subgenus *Zoophthalmum* (P. Br.) Prain: 406 (1897). Type species: *Mucuna urens* (L.) Medik.

Woody lianes; anthers dimorphic, barbate; fruit with winged sutures; seeds biconvex lenticular, exarillate; hilum elongated girdling more than half the circumference of the seed.

II. Subgenus *Stizolobium* (P. Br.) Prain in Journal of the Asiatic Society, Bengal 66: 406 (1897); Verdc.: 561 (1971). *Stizolobium* P. Br.: 290 (1756). Type species: *Mucuna pruriens* (L.) DC.

Herbaceous climbers; anthers dimorphic, beardless; fruit wingless; seeds ellipsoid-oblong with conspicuous rim aril; hilum short, linear.

KEY TO INDIGENOUS SPECIES OF *MUCUNA*

- 1a Woody liane; flowers green or greenish white; anthers hirsute; fruit 80–150 \times 40–60 mm, each suture bordered longitudinally by two wings; seeds biconvex lenticular, \pm 25 mm diameter; hilum girdling, \pm 50 mm long 1. *M. gigantea*
- 1b Herbaceous climbers; flowers dark red, purple or lilac; anthers glabrous; fruit 50–90 \times 10–15 (20) mm, sutures wingless; seeds ellipsoid-oblong, 10–18 \times 7–12 mm; hilum straight, \pm 5 mm long:
- 2a Leaflets chartaceous, acute or acuminate, not blackening when dried, grey pilose; calyx silvery grey pubescent with or without admixed orange irritant bristles; fruit with or without irritant bristles; rim aril cream:
- 3a Fruit thickly invested with golden orange or red-brown irritant bristles; pericarp with longitudinal wrinkles obscured by indumentum; seeds pinkish brown with darker mottling or dark blackish brown, \pm 10 \times 8 mm 2a. *M. pruriens* var. *pruriens*
- 3b Fruit lacking irritant bristles, glabrous or velutinous; pericarp with obvious longitudinal wrinkles; seeds white, mottled or black, 12–18 \times 10–12 mm 2b. *M. pruriens* var. *utilis*
- 2b Leaflets coriaceous, obtuse, blackening when dried, grey velutinous or grey pubescent; calyx indumentum of admixed adpressed golden irritant bristles and golden pubescence; fruit thickly invested with golden orange irritant bristles; pericarp lacking longitudinal wrinkles; seeds pinkish brown or mottled, \pm 8 \times 7 mm; rim aril black 3. *M. coriacea*

1. *M. gigantea* (Willd.) DC., Prodomus systematis naturalis 2: 405 (1825); Verdc.: 546 (1971); Hennessy: t. 1998 (1989). *Dolichos giganteus* (Willd.) Roxb.: 1041 (1802). *Carpopogon giganteum* (Willd.) Spreng.: 281 (1827). Type: India, Malabar; Rheede, Hort. Malab. 8: 63, t. 36 (1688) (icono.).

M. quadrialata Bak.: 186 (1871); Bak. f.: 379 (1929). *M. gigantea* (Willd.) DC. subsp. *quadrialata* (Bak.) Verdc.: 287 (1970); Verdc.: 564 (1971). Types: Mozambique, Zambezi River, Kirk s.n. (K, syn.); Zanzibar Is., Kirk s.n. (K, syn.).

M. longipedicillata Hauman: 98 (1955). Type: Congo, Kivu, Ghesquiere 3771 (BR, holo.; K, iso.).

M. flagellipes sensu Bak. f.: 379 (1929), quoad *Bagshawe* 1312, non Hook. f.

Icones: Rheede: t. 36 (1688); Verdc.: fig. 82.2 (1971); Wilmot-Dear: fig. 2A,B,C (1984); Hennessy: t. 1988 (1989).

Woody liane \pm 30 m long, \pm 70 mm diameter at base; branches glabrous. *Petiole* pulvinate, 50–100 mm long; rhachis 20–35 mm long; stipels filiform, \pm 3 mm long; petiolules \pm 6 mm long; leaflets coriaceous, ovate or elliptic, the laterals asymmetrical, 40–120 \times 20–75 mm, acuminate and apiculate, adpressed pale-hirsute at first, later glabrous. *Inflorescences* borne on woody stems 2–3 years old; axillary, paniculate, pendent; peduncle (80–)130–200 mm long, floriferous in distal 25–30 mm; secondary branches 5–11, \pm 10 mm long, each (2-) 3-flowered; flowers resupinate or not; pedicels 12–22 mm long, hirsute; bracts oblong, 7.0 \times 2.5 mm, caducous, hirsute, green becoming black; bracteoles paired at apex of pedicel, oblong, 12 \times 5 mm, caducous, hirsute, blackening. *Calyx* green (R.H.S. Agathia green 60), velutinous with admixed golden stinging bristles; tube broadly cup shaped, \pm 10 \times 15 mm; lobes 5, unequal, broadly triangular, subacute, 4.5–5.0 \times 5.5–10.0 mm, the upper pair connate forming an emarginate lip. *Corolla*: vexillum green (R.H.S. pod green 061), glabrous or hirsute near proximal margins, suborbicular with obtusely bilobed apex, \pm 30 \times 30 mm; alae green (R.H.S. pod green 061/2), proximally hirsute, lanceolate, subacute, \pm 50 \times 15 mm; carina partly connate, green (R.H.S. pod green 061/3), upcurved \pm 90° in free, thickened, distal 5 mm with incurved horny apiculus \pm 1.5 mm long, \pm 47 \times 10 mm. *Stamens* diadelphous, \pm 45 mm long; anthers included, dimorphic alternating, adaxial versatile, ovoid, densely barbate; abaxial sub-basifixed, obelliptic, sparsely hirsute. *Intrastaminal nectariferous disc* 10-lobed, \pm 1.5 mm high. *Ovary* sessile, densely hirsute, 3-ovuled; style proximally hirsute, flexed midway, distally glabrous, upcurved; stigma capitate, shaggy proximally. *Fruit* (2-)3-seeded, oblong or elliptic-oblong, 80–150 \times 40–60 mm, each suture 2-winged; indumentum dense, of golden irritant bristles. *Seeds* brown, mottled, biconvex lenticular, 25–29 \times 21–25 mm, exarillate; hilum girdling, 50 mm long (Figure 9).

Recorded in the FSA region from two localities, Mdloti River estuary and Sihadla, Kosi River system in Natal (Figure 10), from Mozambique, Uganda, Tanzania, Kenya, Zaïre, Zanzibar Is, Mascarene Is, Seychelles Is, and also India, Malesia, China, Taiwan, Japan, Australia and Polynesia. Over much of its range its habitat is coastal, near water, on forest margins, but in East Africa it has been recorded inland from altitudes up to 1 140 m.

The Mdloti population is rooted on the landward side of an estuarine fringe of *Barringtonia racemosa* (Lecythidaceae), with the vine-like stems extending into the upper canopy. The pendent, green-flowered, pseudo-umbellate inflorescences are in the canopy and very difficult to discern. Anthesis occurs simultaneously in an inflorescence. Nectar production is copious. Olive sunbirds (*Cyanomitra olivacea*) visit the flowers, yet no seed-set has been observed in this population, therefore it is assumed that the sunbirds are not effective pollinating agents for this species. This assumption is strengthened by the observation that fallen flowers are untripped, with anthers and stigma included in the carina. It is thought that *M. gigantea* is chiropterophilous and that the more southerly local population may lie south of the normal range of the effective pollinator(s).

Vouchers: Gillett 21573/B (K); Mogg 28907 (K, J); Muir 4769 (K); Vaughan 2124 (BM); Ward & M.C. Ward 40 (K, UDW); Ward, M.C. Ward & R. Kyle 92 (UDW).

2. *M. pruriens* (L.) DC., Prodr. systematis naturalis 2: 405 (1825); Bak.: 187 (1871); Bak.: 187 (1876); Hutch.: 405 (1927–28); Bak. f.: 380 (1929); Hauman: 128 (1954); Hepper: 561 (1954); White: 160 (1962); Torre: 252 (1966); Verdc.: 566 (1970). *Dolichos pruriens* L. in Stickman: 23 (1754b); L.: 1162 (1759). *Stizolobium pruriens* (L.) Medik.: 399 (1787). Type: Indonesia, Rumphius Herb. Amb. 5, t. 142 (1750) (icono!).

2a. var. *pruriens*

Icones: Rumphius: t. 142 (1750); Browne: t. 31.4 (1756); Hauman: fig. 2A, B, C (1954); Verdc.: fig. 82.7 (1970).

2b. var. *utilis* (Wall. ex Wight) Bak. ex Burck in Annales du Jardin botanique de Buitenzorg 11: 187 (1893). *M. utilis* Wall. ex Wight: 280 (1840). Type: not designated.

Marcanthus cochinchinensis Lour.: 461 (1790). Type: Cochin China, *Louriero* s.n. (BM, holo.).

Carpogon niveus Roxb.: 54 (1814). *M. nivea* (Roxb.) Wight & Arn.: 255 (1834). Type: Roxburgh drawing no. 1601 (K, lecto., designated by Wilmot-Dear 1984).

C. capitatus Roxb.: 284 (1832). *Mucuna capitata* (Roxb.) Wight & Arn.: 255 (1834). Type: Roxburgh drawing no. 285 (K, lecto., designated by Wilmot-Dear 1984).

M. velutina Hassk.: (1842). Type: specimens cultivated at Bogor.

Stizolobium deeringianum Bort: 31 (1909). *Mucuna deeringiana* (Bort) Merrill: 118 (1910). Type: Argo, Florida, 1890, S.C. Carleton (not located).

Icones: Bort: 31.2.3 (1909); Hauman: fig. 2D.

Twining herb up to 3 m long. *Stems* hirsute becoming glabrous. *Petiole* 70–260 mm long; stipels subulate, 4–5 mm long; leaflets chartaceous; terminal leaflet ovate, obovate or elliptic, (55–)85–140(–160) \times (45–)80–100(–115) mm, acute, acuminate or, rarely, obtuse, apiculate; lateral leaflets markedly asymmetrical, (55–)70–190 \times (45–)80–190 mm, with sparse to dense adpressed whitish indumentum. *Inflorescence* axillary, paniculate, deflexed or pendent; peduncle (20–)30–40 mm long, silvery pubescent; secondary branches 5 mm long, 2–3-flowered; bracts and bracteoles caducous; pedicels 2–4 mm long. *Calyx* green with adpressed whitish indumentum; tube cupuliform, 6 \times 10 mm; lobes 3–9 mm long, abaxial lobe narrowly triangular, laterals broadly triangular, the upper pair connate to form an acute lip. *Corolla*: vexillum maroon or pale lilac, ovate, 17–22 \times 14–15 mm; alae 26–35 \times 12 mm; carina 27–28 mm long with sharply upcurved apical horny beak. *Stamens* diadelphous; anthers dimorphic, glabrous. *Ovary* and style-base densely hirsute; style flexed midway; stigma capitate, sparsely fringed. *Fruit* 4–5(–6)-seeded, oblong or sigmoid, 40–110 \times 13–15(–20) mm, longitudinally wrinkled, with dense indumentum of brown or rufous stinging bristles (var. *pruriens*) or, in cultivated forms (var. *utilis*), glabrescent or velutinous. *Seeds* black or mottled brown, oblong-ellipsoid, compressed, 10 \times 7.5 mm (var. *pruriens*) or, in cultivated forms (var. *utilis*), white, brown, mottled or black, 12–19 \times 10–13 mm; rim aril creamy white (Figure 11).

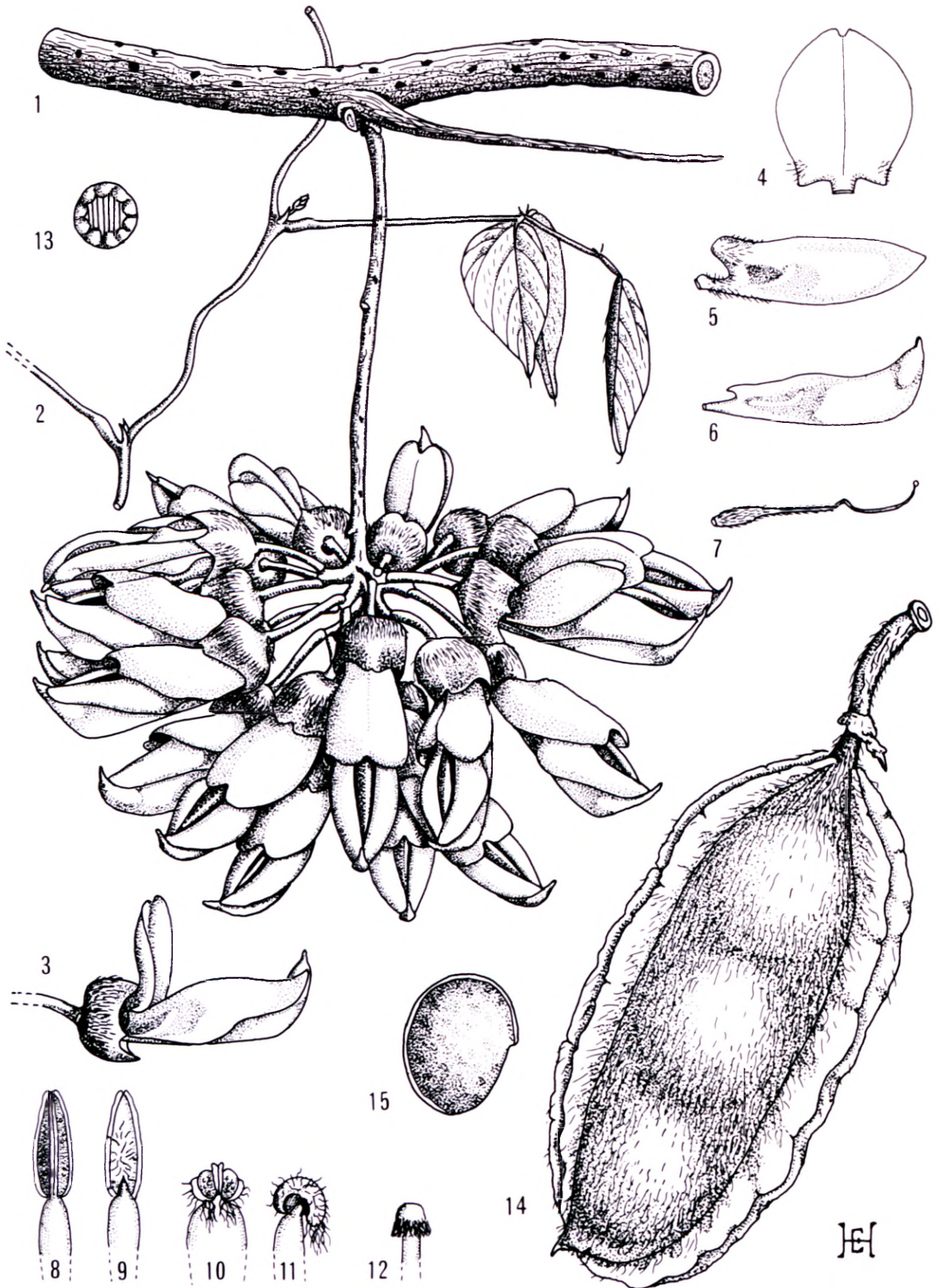


FIGURE 9.—*Mucuna gigantea*: 1–12, Ward & Hennessy s.n. (flowers in spirits); 14, Gillett 21573/B; 15, Muir 4769. 1, inflorescence; 2, juvenile shoot and young leaf; 3, fully open flower; 4, vexillum; 5, ala; 6, carina segment; 7, gynocodium, all $\times 0.8$; 8, basifixed anther, face view after dehiscence; 9, basifixed anther, dorsal view; 10, versatile anther, face view after dehiscence; 11, versatile anther, lateral view prior to dehiscence, all $\times 5.3$; 12, stigma, $\times 8$; 13, lobed nectary, $\times 2.3$; 14, fruit, $\times 0.8$; 15, seed, $\times 0.8$.

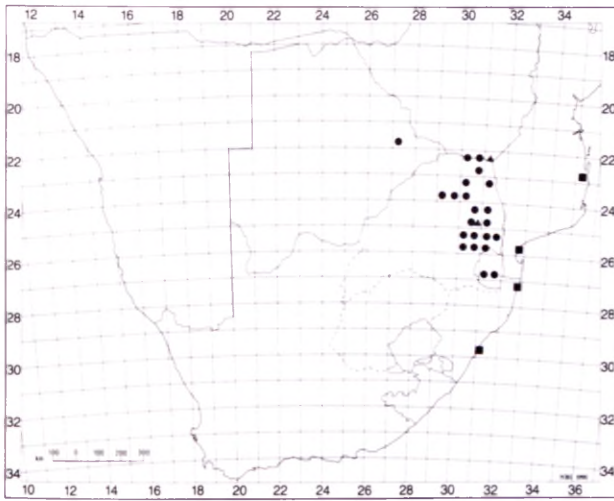


FIGURE 10. — Distribution of *Mucuna gigantea*, ■; *M. pruriens* var. *pruriens*, ▲; and *M. coriacea*, ●.

The wild form, *M. pruriens* var. *pruriens* has been recorded from only two localities in the FSA region to date (Figure 10). Elsewhere widely distributed in tropical Africa, Madagascar, Asia and tropical America. The innocuous cultivated form, var. *utilis*, which is larger in all its dimensions than var. *pruriens* and is of unknown origin, is widely used as a fodder crop and as green manure.

M. pruriens var. *pruriens* is distinguished from *M. coriacea* mainly by its thinner, larger, usually acute or acuminate leaflets; the silvery calyx indumentum; the longitudinally wrinkled pericarp and the white aril.

Vouchers: var. *pruriens*: Codd 6545 (K, PRE); Glen s.n. sub TM 11460 (PRE); Glen s.n. sub TM 11554 (PRE). var. *utilis*: Du Plessis s.n. sub PRE 53353 (PRE); Schrire 908 (NH).

3. *M. coriacea* Bak. in Flora of tropical Africa 2: 187 (1871); Bak. f.: 380 (1929); Verdc.: 288, 291, 292 (1970); Verdc.: 567 (1971); Compton: 378 (1976). Types: Mozambique, Chupanga, Kirk s.n. (K, syn.!); Malawi, Manganja Hills, Meller s.n. (K, syn.!).

subsp. *irritans* (Burt Davy) Verdc. in Kew Bulletin 24: 292 (1970); Verdc.: 568 (1971); Onderstall: 116 (1984). *M. irritans* Burt Davy: 414 (1932). Type: Transvaal, Nelspruit, Rogers 20255 (K, holo.!, J, iso.!).

M. coriacea sensu Hauman: 131 (1954), non Bak. sensu stricto. Icon: Onderstall: p. 117 (1984).

Twining herb \pm 3 m long. Stems with adpressed fulvous hairs. Petiole 30–60 mm long; stipels subulate; leaflets coriaceous, elliptic-ovate, obtuse and apiculate, 40–90 \times 30–70 mm, the laterals asymmetrical, with adpressed fulvous hairs, becoming subglabrous. Inflorescence axillary, paniculate, deflexed or pendent; peduncle (12–) 25–70(–110) mm long, fulvous pubescent; secondary branches \pm 5 mm long, 2–3-flowered; bracts and bracteoles caducous; pedicels 4–10 mm long. Calyx green with dense indumentum of mixed fulvous pubescence and adpressed tawny stinging bristles; tube cupuliform, 6 \times 10 mm; lobes broadly triangular, the upper pair connate to form an emarginate lip. Corolla: vexillum maroon, ovate

with emarginate apex, \pm 35 \times 22 mm; alae maroon with a zone of golden hairs, \pm 40 \times 14 mm; carina \pm 40 mm long with sharply upcurved horny beak. Stamens diadelphous; anthers dimorphic, glabrous. Ovary and style-base densely hirsute; style flexed midway; stigma capitate, sparsely fringed. Fruit 4–5-seeded, oblong, curved, 50–80 \times 10–15 mm, without longitudinal wrinkles, with dense indumentum of golden orange irritant bristles. Seeds brown or mottled brown, elliptic-oblong, compressed, 8–9 \times 7–7.5 mm; rim aril black (Figure 11).

Material of this African species from Tanzania, Zambia, northern Mozambique and Malawi has been placed in subsp. *coriacea* and larger-flowered forms from Tanzania, Uganda, Zaïre, Zimbabwe, Angola, southern Mozambique and southern Africa in subsp. *irritans* (Figure 10). The indumentum of the pericarp of subsp. *irritans* is heavier than that of subsp. *coriacea*, whereas that of the leaves is more dense in subsp. *coriacea*. The merit of the separation of two subspecies is questionable as intermediates exist.

Characters which distinguish *M. coriacea* from *M. pruriens* are mentioned under *M. pruriens*.

Vouchers: Compton 27664 (K); Crawford 465 (PRE); Hemm 903 (J); Netshungani 903 (PRE); Stirton 8682 (PRE).

SPECIMENS EXAMINED (*MUCUNA*)

The specimens are listed alphabetically according to the name of the collector. The figures in parentheses refer to the number of the taxon in the text. The Herbaria in which the specimens examined are housed, are indicated by the letter codes of Holmgren & Keuken, Index herbariorum (1974), except that of the University of Durban-Westville, UDW, which is as yet unlisted.

Bagshawe 1312 (1) BM; 1404 (3) BM. Balsinhas & Marrime 381 (2a) BM. Bayliss 2719 (3) NBG. Bingham 208 (2a) (BM). Bruyns-Haylett 131 (3) NU. Burger 29 (3) PRE. Burt 2202 (3) BM. Burt Davy 2578 (3) K. Button s.n. sub PRE 56597 (3) PRE. Chase 888 (2a) BM. N.C. Chase s.n. (3) NU. Codd 6545 (2a) K, PRE; 7813 (3) K, PRE; 7900 (3) PRE. Compton 27664 (3) NBG, PRE. Crawford 465 (3) PRE. Cross 22 (3) NBG.

Du Plessis s.n. sub PRE 53353 (2b) PRE. Du Toit 2423 (2b) NH. Dyer 3161 (3) K, PRE.

Eyles 361 (3) BOL, SAM.

Faulkner 250 (3) BM.

Galpin 9647 (3) PRE; 9670 (3) K, PRE. Gillett 2173/B (1) K. Glen s.n. sub TM 11460 (2a) PRE; s.n. sub TM 11554 (2a) PRE. Gosswiler 5656, 6538 (2a) BM. Grobbelaar 579, 1096 (3) PRE.

Hemm 903 (3) J. Holland s.n. (3) BOL. Holt 248 (3) PRE.

Leach 12735 (3) K, PRE. Leeuwenberg 11024 (3) PRE. Legat s.n. sub PRE 150 (3) PRE. Lemos & Marrime 324 (2a) BM. Liebenberg 2453 (3) PRE.

Mogg 28907 (1) J; 30431, s.n. sub J 36208, s.n. sub J 35333 (3) J. Mogg & Pedro 3877 (3) PRE. Moss 18449 (3) J. Moss & Rogers 196 (3) J. Muir 4769 (1) K. Mundy 2799 (3) BM.

Netshungani 903 (3) PRE.

Obermeyer 29216 (3) PRE.

Pearson 2168 (2a) BOL. Pierce 19 (3) PRE.

Repton 883 (3) PRE. Rodin 4138 (3) BOL, K, PRE. Rogers 20225 (3) J, K, 20829 (3) PRE; 23850 (3) K; 23857 (3) J.

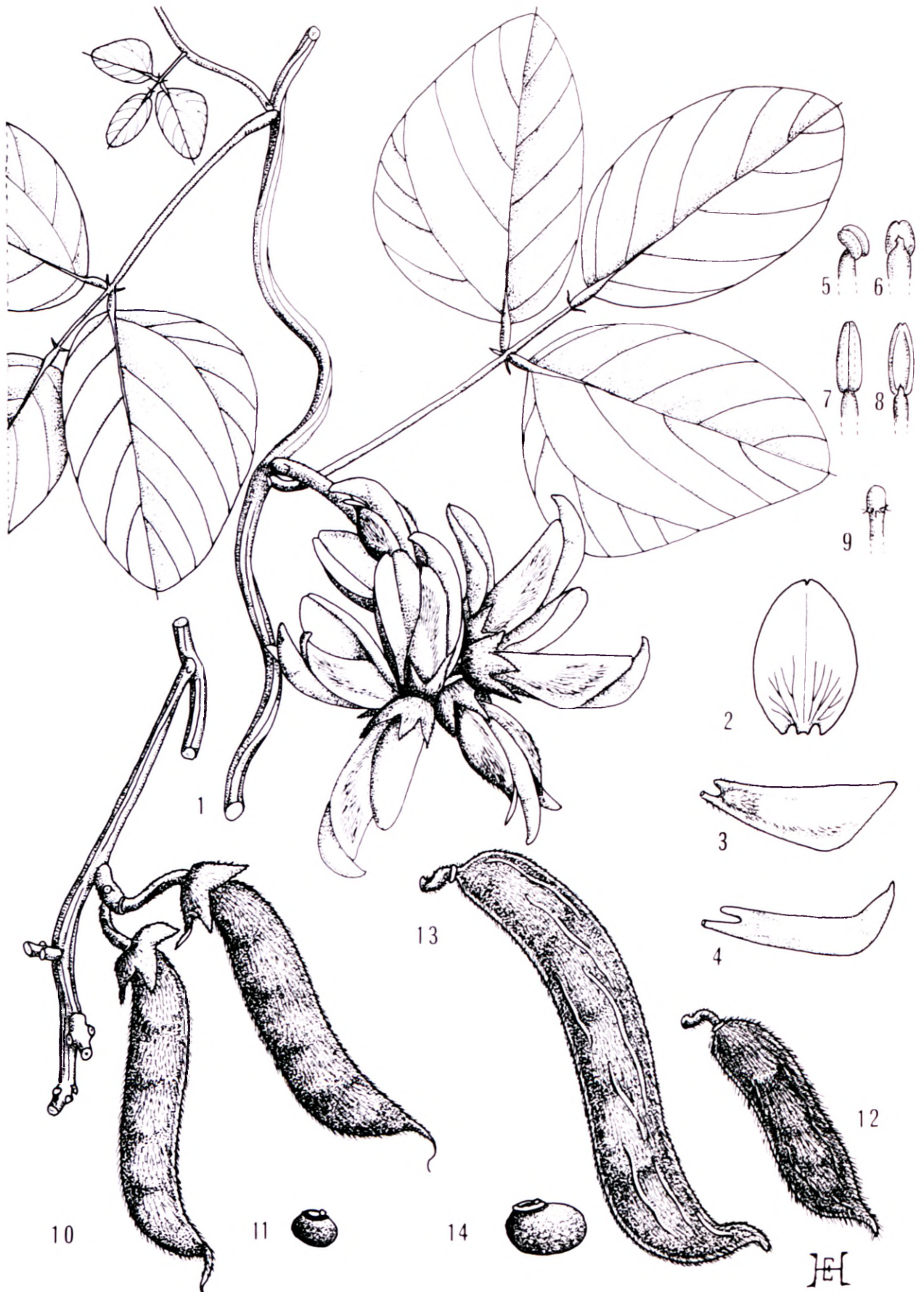


FIGURE 11.—*Mucuna coriacea* subsp. *irritans*: 14.1–14.9. *Grobbelaar* 579; 14.10, 14.11. *Stirton* 8682. 1, part of flowering shoot; 2, vexillum; 3, ala; 4, carina segment, all $\times 0.8$; 5, 6, versatile anther, side and dorsal views, $\times 5.4$; 7, 8, basifixed anther, face and dorsal views, $\times 5.4$; 9, stigma, $\times 9.6$; 10, infructescence, $\times 0.8$; 11, seed $\times 0.8$. *Mucuna pruriens* var. *pruriens*, *Glen* s.n. sub *TM* 11554: 12, fruit, $\times 0.8$. *Mucuna pruriens* var. *utilis*, *Du Plessis* s.n. sub *PRE* 53353: 13, fruit, $\times 0.8$; 14, seed, $\times 0.8$.

Sampson s.n. (3) K; s.n. sub PRE 4412, s.n. sub PRE 53348 (3) PRE. Saunders 166 (3) K. NH. Scheepers 123, 218 (3) PRE. Schlechter 4552 (3) BOL. Schlieben 6281 (3) BM. Schrire 908 (2b) NH. Sim 20716 (3) NU. Smuts s.n. sub PRE 53390 (3) PRE. Stephen 210, 297 (3) PRE. Steinacker 3544, s.n. sub PRE 172 (3) PRE. Stirton 1753 A (3) K; 8682, 8739 (3) PRE. Swynnerton 450 (3) BM.

Teague 495 (3) BOL, STE. Thorncroft 406 (3) NH. Torre 198 (3) BM.

Van Dam s.n. sub TM 211, s.n. sub TM 22929 (3) PRE. Van der Schijff 2653 (3) K. PRE. Vaughan 2124 (1) BM.

Ward & Hennessy s.n. (1) UDW (in spirits). Ward & M.C. Ward 40 (1) K. UDW. Ward, M.C. Ward & R. Kyle 92 (1) UDW. Watt 2340 (3) J. Wright 574 (3) NU.

Young 1500 (3) J.

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