MEDEDELINGEN LANDBOUWHOGESCHOOL
WAGENINGEN • NEDERLAND • 81-9 (1981)

A REVISION OF CATHARANTHUS ROSEUS (L.) G. DON (APOCYNACEAE)

A. C. PLAIZIER

Laboratory of Plant Taxonomy and Plant Geography, Agricultural University, Wageningen, The Netherlands

Received: 11-II-1981

Date of publication: 22-IV-1981

H. VEENMAN & ZONEN B.V. - WAGENINGEN - 1981

CONTENTS

INTRODUCTION

The present publication is a revision of *Catharanthus roseus* (L.) G. Don. This species is indigenous to Madagascar, but it was introduced as an ornamental and subsequently it became a weed throughout the tropics.

This paper is based on study of herbarium specimens, which were, fortunately, well preserved and richly provided with flowers and/or fruits, and of living material.

It was possible to trace the type specimen of this species.

MARKGRAF (1976) distinguishes 7 species (excluding *C. pusillus*, which is indigenous to India and Sri Lanka) in the genus *Catharanthus* G. Don, among which *Catharanthus roseus* (L.) G. Don.

As MARKGRAF's publication appeared recently and as the present author only intends to contribute a paragraph to the chapter on the *Apocynaceae* for several Floras of countries in continental Africa, this paper is confined to this species only. The other species of this genus are natives of Madagascar, India and Sri Lanka.

The phytochemical chapter is written by N. G. BISSET.

HISTORY OF THE GENUS

In 1759 LINNAEUS described the genus *Vinca* and distinguished 4 species among which *Vinca rosea*. REICHENBACH (1828: 134) proposed *Lochnera* as a new genus without describing it, but in which he combined *Vinca rosea*. For want of a description his genus is invalidly published (according to the current rules of nomenclature). Eventually the genus *Lochnera* was validated in August 1838 by ENDLICHER, who published an adequate description.

In the meantime, i.e. between 1835 and 10 April 1838 (STEARN, 1975: 13–17), G. DON (General System of Gardening and Botany, part 4:95) had placed *Vinca rosea* in his new genus *Catharanthus*, providing it with a clear description.

1837 is generally accepted as the year of publication of the first pages of part 4 of G. DON's General System... (STAFLEU & COWAN: 670).

Thus *Catharanthus* G. Don, being validly published, proves to be earlier, and therefore has priority over *Lochnera* Rchb. ex Endl., which is a homotypic synonym.

GEOGRAPHICAL DISTRIBUTION AND ECOLOGY

The genus *Catharanthus* comprises 8 species. Seven species are endemic to Madagascar and one is confined to India and Sri Lanka. Of the Madagascan species *C. roseus* is cultivated and naturalized all over the tropics, and occasionally in the subtropics of both hemispheres, especially on sandy places along the coast, but also inland on dunes in savannas and on dry, waste places,

sometimes on a rocky soil. *C. roseus* has a high salt tolerance, up to 2000 ppm, and is usually found near sea level, occasinally on somewhat higher altitudes.

RELATIONSHIP TO OTHER GENERA

Catharanthus belongs to the subtribe *Catharanthineae* Pichon (1948: 237) of the tribe *Plumerieae* in the subfamily *Plumerioideae.*

Within the genus the sections *Lochnera* and *Cupa-Veela* are distinguished by DE CANDOLLE (1844: 382). PICHON (1948: 205) added a new section *Androyella* to it. This view is followed by several authors, but the present author is of the opinion, that the characters used to distinguish these sections are quite useful in an identification key to the species, but they lack sufficient weight to support sections in *Catharanthus.*

The other genera which PICHON (1948: 201–207) placed in the subtribe *Catharanthineae* are: *Rhazya, Amsonia,* and *Vinca.*

Catharanthus is very closely related to *Vinca.* LAWRENCE (1959: 113–118) illustrated and tabulated a number of differences between *Vinca* and *Catharanthus.*

GENUS DIAGNOSIS

Catharanthus G. Don, 1837: 95; Codd, 1963: 267; Markgraf, 1976: 140.

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

Homotypic synonyms: *Lochnera* Rchb. [1828: 134 (nomen nudum)] ex Endlicher, 1838: 583; Spach, 1839: 526; Schumann, 1890: 145; Stapf, 1902: 118; *Ammocallis* Small, 1903: 935, 936.

Herbs, perennial or annual, often woody at the base, few to much branched.

Leaves herbaceous to thinly coriaceous, opposite, mucronate, with a fringe of intra- and interpetiolar colleters; secondary veins forming an angle of at least 45° with the costa.

Inflorescences terminal, but apparently lateral due to pseudomonopodial continuation of the stem by alternating development of one of the axillary buds of the apical leafpair, 1–2-flowered.

Flowers 5-merous, actinomorphic.

Sepals narrowly to very narrowly oblong, subulate, without glands.

Corolla purple, red, pink, or white, salvershaped; tube laxly puberulous or glabrous, constricted and woolly to velvety at the throat; lobes spreading, obliquely obovate, apiculate.

Stamens inserted at the widest portion of the corolla tube, which is usually distinctly above the middle; anthers free, oblong, at the base obtuse.

Pistil: ovary of two very narrowly oblong carpels; disc composed of two narrowly triangular to narrowly oblong glands, the bases of which touch each

other at the abaxial sides of the carpels; style filiform; clavuncula cylindrical, at the base provided with a reflexed hyaline frill; stigma glabrous; ovules numerous.

Fruit composed of two follicles; each follicle cylindrical, acute, laxly puberulous to glabrous.

Seed black, oblong; testa rugose; hilum lateral; cotyledons flat, shorter than the radicle; endosperm scanty.

Distribution: 8 species, one restricted to India and Sri Lanka, all the other species endemic in Madagascar. Of the latter group one, *C. roseus* (L.) G. Don cultivated and naturalized all over the tropics, especially along coasts.

DESCRIPTION

Catharanthus roseus (L.) G. Don, 1837: 95; Pichon, 1948: 238; Farnsworth, 1961: 106, 107; Codd, 1963: 267; Markgraf, 1976: 152 (p.p. excl. *Hottonia litoralis* Lour.) – 156. **Fig. 1, Photo 1.**

Basionym: *Vinca rosea* L., 1759: 944; Gaertner, 1791: 172, 173, t. 117; Curtis, 1794: t. 248; De Candolle, 1844: 381, 382; Mueller Arg., 1860: 69; Bailey, 1927: 3471. Types: Cult. England, Chelsea Garden, *Miller 1849* (BM, lectotype; designated by Stearn, in Taylor & Farnsworth, 1975: 35); *Miller, 1757: 124, t. 186* (paratype).

Homotypic synonyms: *Pervinca rosea* (L.) Moench, 1794: 463; *Vinca speciosa* Salisbury, 1796: 147 (illegitimate synonym); *Lochnera rosea* (L.) Rchb. [1828: 134 (nomen nudum)] ex Endlicher, 1838: 583; Spach, 1839: 526, 527; Schumann, 1890: 145; Stapf, 1902: 118; *Ammocallis rosea* (L.) Small, 1903: 936.

Heterotypic synonyms: *Catharanthus roseus* (L.) G. Don var. *angustus* v. Steenis ex Bakh.f., 1950: 384; Markgraf, 1976: 155 (**syn. nov.**). Type: Cult. Indonesia, garden in Buitenzorg (= Bogor), *v. Steenis s.n.* (L, holotype). Homotypic synonym: *Lochnera rosea* (L.) Rchb. ex Endl. var. *angusta* v. Steenis, 1936: 18 (nomen invalidum).

Catharanthus roseus (L.) G. Don var. *nanus* Markgraf, 1972: 222. Type: Madagascar, *Descoings 1021* (holotype, not seen, not in P).

Undershrub, 30–100 (–200) cm high, erect or decumbent, usually with white latex; roots up to 70 cm long.

Stems approximately terete, green or yellowish-green, sometimes slightly to heavily suffused with red or purple, laxly pubescent or glabrous.

Leaves decussate, petiolate; petiole (0.1–)0.3–1 cm long, laxly puberulous or glabrous, with a fringe of colleters in the axil, the outer ones of which are longer than the inner and have some strigose hairs; blade rather variable in shape, elliptic, obovate or narrowly obovate, 1.9–3 × as long as wide, (3–)4–9 × (0.8–)1.5–3.5 cm, obtuse or acute, with a mucronate tip and sometimes slightly

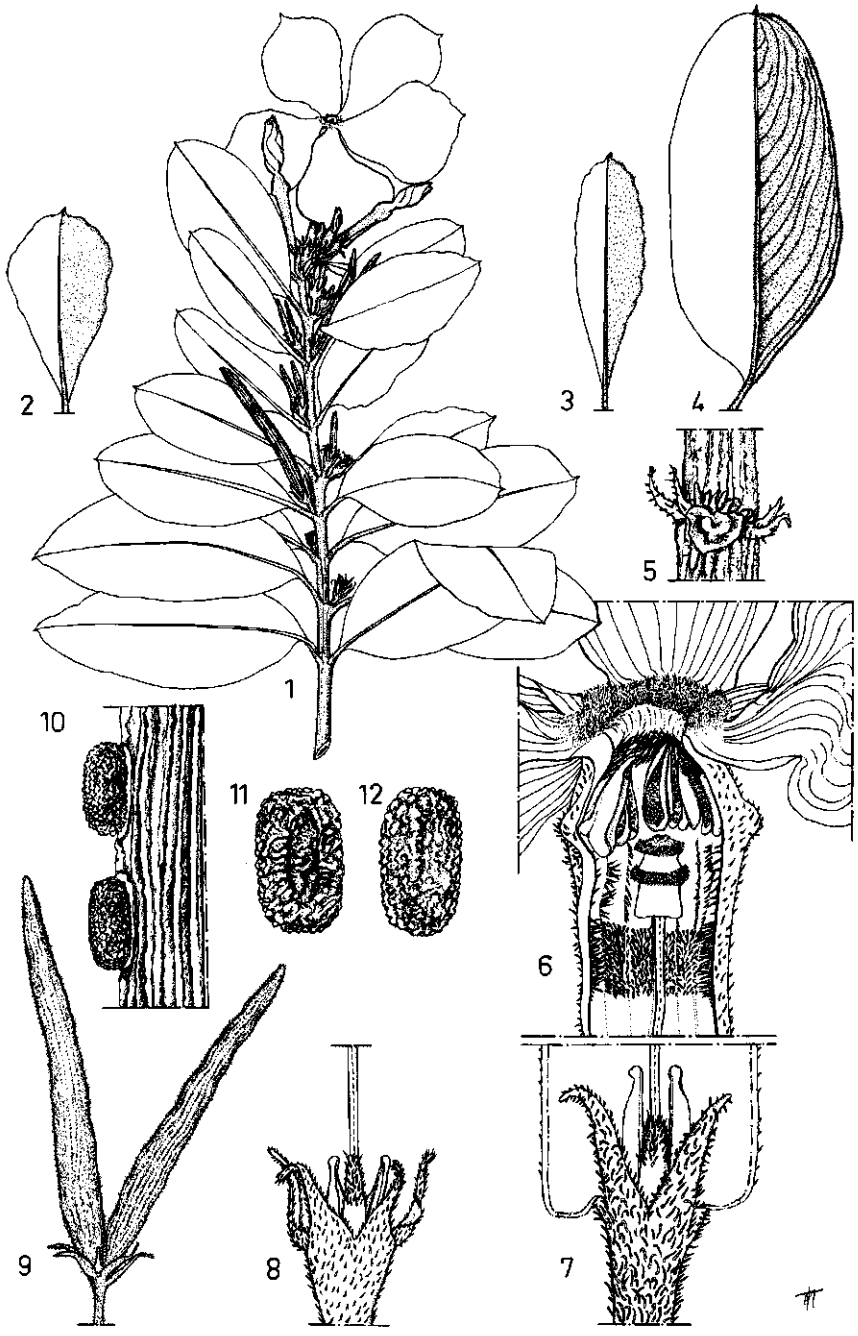

FIG. 1. *Catharanthus roseus* (L.) G. Don – 1. habit × 2/3; 2, 3, 4. leaves × 2/3; 5. colleters in leafaxil × 6; 6. apical portion of the corolla tube and apex of the pistil × 6; 7, 8. calyx with pistil base and disc glands × 6; 9. fruits × 1.2; 10. seeds on the placenta × 8; 11. seed, adaxial × 8; 12. seed, abaxial × 8. – (1. *Van Meer 627*; 2, 3. *Leeuwenberg 10887*; 4, 9, 11, 12. *Wild 4423*; 5. *Schlieben 2653*; 6, 7. *Stubbings 198*; 8. *Hunziker 11*; 10. *Decary 18858*).

emarginate, cuneate or obliquely cuneate at the base, flat or undulate, above (slightly) glossy and dark to pale green, beneath mat, usually paler green, laxly pubescent to glabrous on both sides; veins prominent, paler; secondary veins more or less conspicuous, 7–11 on each side; tertiary venation inconspicuous.

Inflorescence: bracts absent.

Pedicel green, 0.1–0.2 mm long, laxly puberulous to glabrous.

Flowers (3–)4–5(–5.6) cm long.

Sepals green, slightly connate at the base, sometimes slightly unequal, 2.7–4.7 × as long as wide, (2–)3–5 × 1–1.5 mm, outside laxly puberulous or glabrous, inside glabrous, sometimes towards the apex with some minute white hairs, entire, erect.

Corolla often white with a purple, red, pink, pale yellow or white centre; tube often slightly greenish, a long narrow cylindrical basal and a short wider upper portion, (4.2–)5–8(–12.5) × as long as the calyx, 2.2–3 cm long, in narrow portion 0.1–0.2 cm wide, up to 0.3 in the widened portion, outside laxly puberulous or glabrescent, inside in the throat at the level of the anthers with an about 0.5 mm densily strigose ring, and then in the widened portion velutinous for 1–1.5 mm on the veins from the base of the filaments and below it with a 1.5–2 mm wide sericeous ring, situated just below the level of the clavuncula; the narrow basal portion glabrous; throat 1.5–2 mm in diam.; lobes usually paler outside, (0.8–)1.2–2(–2.8) × (0.6–)0.9–2 cm, broadly obovate, almost rounded, with a 1–1.5 mm long tip, glabrous, spreading, flat to undulate, entire, sometimes ciliate, at the claw with (10–)13–16 veins; in bud overlapping to the left, laxly puberulous to glabrous.

Stamens included, inserted 0.4–0.6 cm below the corolla mouth; filament white, very short, 0.25–0.5 mm, filiform, glabrous; anthers subsessile, creamy to greenish, acute at the apex, cordate at the base, 2.3–3 × 1–1.3 mm, introrse, completely fertile.

Pistil 17–26 mm long; carpels 1.5–2(–2.8) × 0.8–1 × 0.5–1 mm, coherent at the base, rounded at the apex, puberulous at the apex and glabrous towards the base; disc composed of two 2–2.8 × 1–2 mm glands, which are often longer than the ovary; style inserted at the apices of the carpels, 16–24 × 0.3 mm, sometimes slightly split at the base, glabrous; clavuncula 1.3–2.3 mm long, at the apex with a woolly ring, (0.1–)0.3 × 0.8–1.3 mm, at the base also with a woolly ring, 0.3–0.5 × (0.8–)1–1.5 mm, and in between with a glabrous or puberulous, 0.4–0.8 × 0.5–1 mm wide zone, and at the base with a reflexed hyaline frill, 0.5–1 × 0.8–1.5 mm; stigma glabrous; ovules 2 – seriate.

Fruit green, also when mature, composed of two follicles, sometimes one aborted or reduced, erect or slightly spreading with an angle up to 60°.

Follicle cylindrical, striate, 5.2–13.5 × as long as wide, 1.2–3.8 × 0.2–0.3 cm, inside glabrous, dehiscent at the adaxial side, seeds numerous.

Seed grooved at one side, 1–2 × 0.5–0.8 mm; cotyledons slightly shorter than the radicle.

Distribution: Indigenous to Madagascar. Cultivated and naturalized all

PHOT. 1. *Catharanthus roseus* (L.) G. Don (phot. J. W. MUGGE).

over the world in the tropics and even sometimes in the subtropics.

Dispersal of the seeds: Falling down next to the mother plant; also transported by ants (*Cardiocondyla nuda* Meyr – v. STEENIS, 1934: 32).

Ecology: Locally common on sandy places near the coast, on riverbanks, on dunes in savannas; or on waste places, among houses, and along road sides. Usually on sandy soil, occasionally on rocky soil. Occasionally common in the undergrowth of closed to light forests or in dry shrub woodlands. Alt.: 0–1500 m.

Uses: Decoctions of all parts are used against diseases, e.g. malaria, skin diseases, cancer, Hodgkin's disease, diarrhoea, diabetes. Also used as a stipic or abstergent.

Vernacular names: The vernacular names of Madagascar and the Comores are given by MARKGRAF (1976: 153).

Ethiopia:	'Phlox' (Eritrea)
Sierra Leone:	'Ngyange'
Cameroun:	'Pervenche de Madagascar'
Zambia:	'Star of Bethlehem'
Moçambique:	'Flor'
Zimbabwe:	'Periwinkle'
South Africa:	'Kanniedood' (Transvaal)
S. Nicolau, Fogo, and Santiago (Cape Verde Isl.):	'Sempre Noiva'
S. Antão (Cape Verde Isl.):	'Flor de Anjo'
Fogo:	'Bigalo'
French Guiana:	'Kakapoule' (Creole)

A selection of the about 300 specimens examined of continental Africa; naturalized specimens only; if these were not available, then cultivated ones cited:

LIBYA: 9 km E. of Tripoli (fl.) *Devor 24* (A).

EGYPT: Coast, sin. loc. (fl., fr. July) *Sickenberger 319* (Z).

SENEGAL: St. Mary (fl., fr.) *Brummer annis 1839* (G); Sin. loc. (fl.) *Dupuis annis 1789* (G).

GUINEA BISSAU: Punubé (fl., fr. Oct.) *Santo 1543* (BR, K).

SIERRA LEONE: Mano Salija (fl., fr. Dec.) *Deighton 441* (K); Kenema (fl., fr. Jan.) *Thomas 753* (K), (fl., fr.) *7816* (K); Gbambaia (fl., fr.) *Thomas 9079* (P).

LIBERIA: Buchanan (fl., fr. May) *Dinklage 1896* (Z); Sinkor (fl., fr. Aug.) *v. Harten 29* (WAG), (fl., fr. Aug.) *30* (WAG).

MALI: Cult., Bougouni (fl., fr. Sept.) *Adam 15303* (P).

IVORY COAST: Region of San Pedro (fl., fr. May) *Aubréville 1274* (P); Port Bouet (fl.) *Bamps 2014* (BR, P); W. of Grand Bassam (fl. Dec.) *Leeuwenberg 2131* (WAG); Lebleko (fl., fr. Apr.) *Leeuwenberg 12125* (WAG); 1 km N. of Trepoint (fl., fr. May) *Leeuwenberg 12150* (WAG).

UPPER VOLTA: Cult., Dédougou (fl. Nov.) *Bille 2988* (P).

GHANA: Cult., Achimota (fl., fr. Mar.) *Morton 25393* (K, WAG).

TOGO: Anécho (fl., fr. Apr.) *Hunziker 11* (Z); Lomé (fl., fr. May) *J. W. A. Jansen 2608* (WAG); Sin. loc. (fl., fr. Mar.) *Williamson 62* (K).

BENIN: Cotonou (fl., fr. Dec.) *Krimpe 105* (BR); Ibid. (fl., fr. Mar.) *Dedeaux 167* (P); 10 km E. of Ouidah (fl., fr. Mar.) *v. Zon 519* (WAG).

NIGER: Sin. loc. (fl.) *Roberty 1557* (P).

NIGERIA: Western Region: Lagos (fl. Sept.) *Dodd 431* (P); Ado Odo (fl., fr. Febr.) *Leeuwenberg 11931* (WAG), (fl., fr. Febr.) *11932* (WAG); Idanre (fl., fr. Febr.) *v. Meer 627* (WAG); Eastern Region: Cult., Port Harcourt (fl., fr. Aug.) *Stubbings 198* (K).

CAMEROUN: 80 km S. E. of Banyo (fl., fr. June) *Biholong 234* (P); Yaoundé (fl., fr. Jan.) *Dang 185* (BR, P); Ngaoundéré (fl., fr. Apr.) *Dang 543* (P); Buea (fl., fr.) *Kutter 25 Dec. 1936* (Z); Ndong Lake (fl., fr. Sept.) *Meurillon 93* (P).

GABON: Ogooué Riv. (fl.) *Thollon 139* (P).

ZAÏRE: Equateur Prov.: Yambata (fl., fr. Mar.) *De Giorgi 1775* (BR); Orientale Prov.: Nat. Park Garamba (fl., fr. Apr.) *De Saeger 455* (BR); Yangambi (fl., fr. Aug.) *Léonard 1108* (BR); Kivu Prov.: Mayumbe (fl., fr. Jan.) *Flamigni 10528* (BR, WAG); Uvira (fl., fr. June) *Kinet 152* (BR); Leopoldville Prov.: Kinshasa (fl., fr.) *Fr. Salésiens 877* (BR); Boma (fl., fr.) *Wilverth 96* (BR); Kisantu (fl., fr.) *Vanderyst 25636*[b] (BR); Kasai Prov.: Colouabourg Mission (fl., fr.) *Vanderyst 21053* (BR); Shaba Prov.: Pweto (fl., fr. Apr.) *Robyns 1996* (BR, WAG).

ETHIOPIA: Eritrea: Asmara (fl. Oct.) *Colville 72* (K).

UGANDA: Northern Prov.: W. Nile distr.: N.W. of Maracha (fl., fr. Aug.) *Chancellor 84* (K); Buganda Prov.: Mengo distr.: Entebbe (fl., fr. Jan.) *Snowden 1941* (K).

RWANDA: Bugarame (fl., fr. June) *Runyinga 113* (BR).

BURUNDI: Bujumbura Prov.: Bujumbura (fl., fr. Oct.) *Lewalle 2246* (BR); Kabezi (fl. May) *Lambinon 80/432* (BR, seen by LEEUWENBERG).

KENYA: Central Prov.: N.E. of Ruira (fl., fr. Dec.) *Perdue & Kibuwa 8181* (WAG); Nyanza Prov.: Kisumu (fl., fr. Apr.) *Dümmer 1811* (K); Between Achego and Luora (fl., fr. Mar.) *Plaizier 725* (WAG), (fl., fr. Mar.) *726* (WAG); Coast Prov.: Jilore Forest St. (fl. Nov.) *Spjut & Ensor 2631* (K); Ndololo (fl., fr. Jan.) *Zúmer 96* (UPS).

TANZANIA: Lake Prov.: Mwanza (fl., fr. Oct.) *Windish-Graetz* in *Bally 7573* (K); Tanga Prov.: Maragu (fl. Apr.) *Manchangu 1* (K); Eastern Prov.: Kilindoni (fl., fr. Aug.) *Schlieben 2653* (BR, C, G, LISC, M, P, Z); Kerongwe (fl., fr. Aug.) *Greenway 5162* (K).

ZAMBIA: Lusaka (fl. July) *King 47* (K).

MALAWI: Kundwelo (fl., fr. July) *Newman & Whitmore 278* (BR, SRGH, WAG); 8 km E. of Mzuzu (fl., fr. Mar.) *Phillips 3321* (WAG).

MOÇAMBIQUE: Cabo Delgado: Chilambo (fl., fr. July) *Braga 176* (Z); Nampula: Ribauè (fl., fr. Mar.) *Correia 217* (LISC); Zambézia (fl., fr. Febr.) *Rogers 4559 (SRGH)*; Manica e Sofala: Andrada (fl., fr. Nov.) *Vasse 120* (P); Inhambane (fl., fr. Sept.) *Torre 1589* (COI, LISC); Maputo:

Bay of Maputo (fl., fr.) *Junod 15* (Br, G, Z); Inhaca Isl. (fl., fr. July) *Mogg 31702* (K, SRGH); Marracuene (fl., fr. Nov.) *Marques 34* (LMU); 5 km N. of Maputo (fl., fr. Mar.) *Rodin 4153* (K, MO).

SOUTHWEST AFRICA: Damaraland: Otjisewa (fl., fr. Jan.) *Kinges 4931* (M); Okahandja (fl.) *Zschokke annis 1928* (Z).

BOTSWANA: Gabarene (fl., fr. Apr.) *Mett 243* (SRGH); Mochundi (fl., fr. Mar.) *Mitchison 66* (K).

ZIMBABWE: Mashonaland North Prov.: Chirundu (fl., fr. Mar.) *Hack 184/50* (SRGH); Mashonaland South Prov.: Gwanda-Mazunga (fl., fr. Oct.) *Worris-Rogers 150* (SRGH); Midlands Prov.: Gwelo (fl., fr. Febr.) *Biegel 939* (SRGH); Manicaland Prov.: Mupudzi Riv. (fl., fr.) *Eyles 7344* (SRGH); Chipinga (fl., fr. Mar.) *Goodier 244* (K, SRGH); Victoria Prov.: Victoria (fl., fr.) *Monro 1872*[a] (Z); Bikita (fl., fr. Dec.) *Wild 4423* (C, K, MO, SRGH).

SOUTH AFRICA: Transvaal: Soutpansberg distr.: Duiwelskloof (fl., fr. Jan.) *Scheepes 965* (K, M, WAG); Kruger Nat. Park, Krokodilbrug (fl. Nov.) *v. d. Schijff 149* (K), (fl., fr. Aug.) *3184* (K); Pretoria: Brummeria (fl., fr. Febr.) *Leeuwenberg 10887* (WAG); Nelspruit distr.: Barbeton (fl. Aug.) *Rogers 21427* (Z); Louwsburg distr.: Itala Nat. Res. (fl., fr. Jan.) *Brown & Shapiro 404* (K); Natal: km 18 from Ingwavuma (fl., fr. Nov.) *Moll 5463* (K, LISU); Ndumu (fl., fr. Nov.) *Strey 10303* (K); Tugela Ferry (fl., fr. Dec.) *Werdermann & Oberdieck 1337* (A, BR, K, WAG), (fl., fr. Dec.) *1340* (A, BR, K, WAG); Durban (fl., fr.) *Forbes May 1926* (C); Ibid. (fl., fr.) *Rehmann 8900* (Z); Ibid. (fl., fr. June) *Schlechter 2881* (G, K, P, Z); Port St. Johns (fl., fr. Dec.) *Hutchinson 1745* (K).

MADAGASCAR: East: 13 km N. of Antalaha (fl., fr.) Imbert 392 (P); Maroa (fl., fr.) *Mocquerys 101* (G), N. of Mananara (fl., fr. May) *SF 26106* (P); Tamatave (fl. fr. Sept.) *Viquier & Humbert 210* (P); Ambita (fl., fr. May) *Benoist 842* (P); Between Ambita and Tampina (fl.) *Boiteau 674* (P); Fort Dauphin (fl., fr. May) *Scott-Elliot 2445* (P); Ibid. (fl., fr. July) *Catat 4301* (P); Ibid. (fl. Sept./Oct.) *Humbert 5972* (A, P); South: 10 km S. of Tranoroa (fl., fr. May) *Bosser 14049* (P); Ibid. (fl., fr.) *Keraudren 918* (P); Between Tranoroa and Beloha (fl., fr. Nov.) *Leandri 417*[b] (P); Mandrare, Anadabolava (fl., fr. Dec.) *Humbert 12603* (P); Manambola (fl., fr. Dec.) *Humbert 12988* (P); Ambovombe (fl., fr. May) *Decary 2723* (P), (fl., fr. Aug.) *9134* (C, P); Beroroha (fl., fr. Febr.) *Decary 18858* (P).

Aside from the specimens cited above, naturalized and cultivated specimens have been examined from:

Atlantic Ocean: Canary Isl., Cape Verde Isl., São Tomé, Annobon, Ascension.
Indian Ocean: Seychelles, Zanzibar, Aldabra Isl., Farquar Isl., Mascarenes, Kerguelen Isl.
Asia: Thailand, Vietnam, Cambodia, Malaya (Peninsula of Malacca), Indonesia, Philippines.
East Asia: China, Taiwan, Hong Kong.
Pacific Ocean: Cook Isl., Fiji Isl., Marquesas Isl.
U.S. of America: Florida.
Central America: Mexico, Guatamala, Paraguay.
South America: Venezuela, Colombia, French Guiana, Suriname, British Guiana, Brazil.
Caribbean: Cuba, Jamaica, Haiti, Dominican Rep., Puerto Rico, Guadeloupe, Martinique, Saba, St. Maarten, St. Eustatius, Aruba.

EXCLUDED NAMES

Hottonia litoralis Lour., Fl. Cochinch. 105, 1790, ed. Willd. 128. 1793 (as *littoralis*), and with the homotypic synonyms *Erythraea cochinchinensis* Spreng., 1825: 580 and *Centaurium cochinchinensis* (Spreng.) Druce, 1917: 613.

LOUREIRO's description is that of a plant which most likely belongs to the *Gentianaceae* and may belong to a genus related to *Centaurium*.

PHYTOCHEMISTRY

It was the reported use of *C. roseus* as an oral hypoglycaemic agent which stimulated the very lengthy investigations that have culminated in the isolation of about 70 alkaloids – more than from any other plant. Galenical preparations of the plant, however, apparently do not show such activity, although certain of the alkaloids obtained (e.g. leurosine, vindolinine, and isovindolinine) do indeed exhibit a moderate hypoglycaemic action. More important by far is that resulting from these investigations it has been found that several anti-tumour dimeric indole bases occur in *C. roseus*. Two of these, vincaleukoblastine (or vinblastine; VLB) and leurocristine (or vincristine; VCR), have been employed in clinical practice during the last 20 years. The yield of these substances from the plant is only a few grams per ton and considerable effort has been, and is being, expended in developing efficient methods for the partial or total synthesis of them and related biologically active compounds.

Constituents of *C. roseus* other than alkaloids have received little attention.

See: W. I. Taylor & N. R. Farnsworth (eds.), The Catharanthus Alkaloids, Marcel Dekker Inc., New York, 1975; J. Kerharo & J. G. Adam, La Pharmacopée Sénégalaise Traditionelle, Vigot Frères, Paris, 1974, pp. 158–162; P. Potier, J. Nat. Prod. **43:** 72–86 (1980); W. C. Bowman & M. J. Rand, Textbook of Pharmacology, 2nd ed., Blackwell Scientific Publications, Oxford, London, Edinburgh, Melbourne, 1980.

N. G. Bisset

PALYNOLOGY

Pollen morphological studies in the *Apocynaceae* with special reference to fine structure have been investigated by S. Nilsson and M. van Campo (1978: 250–254). Their study is based on pollen material of herbarium specimens, and by using electron microscopical techniques they could give a clear description of pollen of *Catharanthus roseus* (L.) G. Don, illustrated with five fine photographs. In the same paper they describe pollen of other apocynaceous taxa. The relevant complete description is as follows:

Catharanthus roseus (Liberia; *Van Harten 29*, WAG) – Pl. 3, figs. 9–13.

Pollen grains 3-colporate, subprolate to prolate, 55–61 × 48–55 µm. Apocolpium diameter 15–20 µm. Colpi relatively long, 45–48 µm and 2–3 µm wide. Endoapertures 10 × 4 µm.

Exine 1–2 µm thick at the centre of mesocolpia, 4–5 µm at the apertures. The exine consists of a tectum, a granular layer and a foot-layer, beneath which an endexine is visible at certain places. The outer exine surface is smooth with numerous perforations. The inner exine surface is differentiated into three well-delimited mesocolpial, oval-shaped areas and three apertural plates each enclosing an endoaperture, and finely granular areas. The oval-shaped areas and the apertural plates are smooth with a few minute perforations.

Catharanthus lanceus and *C. longifolius* have the same type of pollen. Only minor differences in size and shape were noted between the various *Catharanthus* species and a second specimen of *C. roseus*.

CYTOLOGY

A recent publication of Mrs. Y. VEYRET (1974: 297–307) deals with the cytology of *Catharanthus*. The present author has summarized her publication to underline the value of it.

All species of the genus *Catharanthus* have a chromosome number of 2n = 16. Occasionally hybrids are found in nature, but in cultivation many usually fertile hybrids can be made between the various *Catharanthus* spp.:

C. coriaceus	× *C. trichophyllus*
C. longifolius	× *C. ovalis* ssp. *grandiflorus*
C. ovalis ssp. *grandiflorus*	× *C. roseus*
C. ovalis spp. *ovalis*	× *C. trichophyllus*
C. roseus	× *C. trichophyllus*

In Madagascar the populations of the different *Catharanthus* spp. are not separated by any geographical barrier and sometimes *Catharanthus* spp. are found in the same area, but exceptionally side by side in the same vegetation. Examples are: *C. roseus* & *C. scitulus* and *C. longifolius* & *C. ovalis* ssp. *ovalis*, only of the latter two taxa a natural hybrid has been found.

The various *Catharanthus* spp. and most of the hybrids made in cultivation are self-compatible, only *C. roseus* is self-incompatible.

As pointed out earlier in the present paper, *C. roseus* has an important medical value, because of the contents of e.g. vincaleucoblastine, which is used in the medication of various forms of cancer. It may be possible to increase the alkaloid contents by producing polyploids and by selection. V. R. DNYANSAGAR and I. V. SUDHAKARAN (1969: 227–241) have undertaken a detailed cytogenetic study of *Catharanthus roseus* and they induced tetraploidy in it with colchicine. It appeared that a tetraploid plant with 4n = 32 possessed a much higher alkaloid content than a diploid, but the doubling of the chromosome number resulted in a reduction of the pollen fertility and as well as in a very poor seed setting.

ACKNOWLEDGEMENTS

The present author is greatly indebted to the Directors and Curators of the herbaria cited for putting material at his disposal: A, BM, BP, BR, C, COI, E, G, GH, GOET, K, L, LISC, LISU, LMU, M, MAU, MO, NY, P, S, SRGH, U, UC, UPS, WAG, WU, Z.

He is very grateful for the help received from the Laboratory of Plant Taxonomy and Plant Geography of Wageningen. He acknowledges especially Dr. A. J. M. LEEUWENBERG for his supervision, Mr. W. A. BRANDENBURG for his efforts to find the type specimen of *C. roseus* var. *nanus*, Mr. G. BOELEMA for his assistance in correcting the proof, Mr. J. J. Bos for trimming the text, Miss. Y. F. TAN for her drawing, and Mr. J. W. MUGGE for the photograph.

He also wishes to express his gratitude for the grant received from the Wageningen Agricultural University Fund, that enabled him to visit the herbaria of Paris (P), London (BM, K), and Oxford (FHO, OXF).

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REGISTER

The main entries of the correct taxon names are indicated by **bold** printed page numbers. The figure and photograph are indicated by an asterisk attached to their indexed page numbers. Synonyms are printed in *italics*.