

# OCCURRENCE OF CAJANINAE IN THE INDIAN SUBCONTINENT, BURMA AND THAILAND<sup>1</sup>

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(With three plates and five maps)

The ICRISAT Gene Bank houses the world's most exhaustive collection of pigeonpea, *Cajanus cajan*, and its close relatives, which are classified in the subtribe Cajaninae, tribe Phaseoleae, family Leguminosae. Wild relatives have a significant role in pigeonpea improvement at present and in the future. Many of them are under threat of extinction, and some may be already extinct. ICRISAT botanists have been collecting Cajaninae from their major areas of occurrence which include India, Nepal, Burma and Thailand from 1975 onwards. This paper highlights the manner and frequency of occurrence of the species of *Cajanus* (incl. *Atylosia*), *Rhynchosia*, *Dunbaria*, *Flemingia*, *Paracalyx*, and *Eriosema* as observed during recent collection trips compared with herbarium records. Evidently the habitats of several species have shrunk. Some species, such as *C. elongatus* and *C. villosus* from NE India and *C. grandiflorus* in N and NE India are so difficult to find that they may be close to extinction. These species need to be salvaged. Others may be extinct in some habitats, such as *C. sericeus* from the Eastern Ghats.

## INTRODUCTION

Pigeonpea, arhar, tur, or red gram, *Cajanus cajan* (L.) Millsp., is an important food legume in India. In 1983 India grew 2 498 600 ha (Anon. 1983). The world area was 2 951 000 ha in 1980, and India produced 1 800 000 out of 2 017 000 tons (unpublished FAO data file). Outside India pigeonpea is one of the major pulse crops in Eastern Africa, particularly Kenya, Uganda, Malawi and Tanzania, and in the Caribbean region. It is grown to a smaller extent in many other tropical countries between 30 S and 25 N, often in mixtures or in subsistence-farming situations, and is therefore

not properly accounted for in statistical reports. In those cases a survey on the basis of herbarium records can give better information about the distribution of pigeonpea (van der Maesen 1983), even when plant explorers often ignored cultivated plant species, and it does not specify the extent of cultivation.

For pigeonpea improvement a large germplasm collection is a prerequisite. The genetic resources of any crop include wild species, which have been exposed to severe selection pressures. Wild relatives of the pigeonpea have the potential to contribute desirable genes, and provide insight into the evolution and diversification of the crop. These species are often difficult to obtain, due to genetic erosion in impoverished or diminishing habitats, and local endemism. On the other hand, rare species may prove of more common occurrence than expected from the records, when intensively sought.

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In a taxonomical revision of *Cajanus* DC. (van de Maesen 1985) *Atylosia* has been declared congeneric with *Cajanus*, based on comparative morphology, cytology, chemical data and crossability. The earlier distinction between the genera was mainly based on the absence or presence of a seed strophiole. *Cajanus cajan* has a vestigial strophiole, conspicuous in the developing seeds, and in some cultivars this structure persists at maturity. Some pigeonpea seeds are indistinguishable from *Atylosia* seeds, all of which have a persistent strophiole. The enumeration lists all 17 species of *Cajanus* from the area under consideration, in total this genus now has 32 species. Maps 1 and 2 show the distribution of the species, based on herbarium study and explorations. We still have not yet collected four of these species from India and Burma.

Other wild genera related to pigeonpea, *Rhynchosia*, *Dunbaria*, *Flemingia*, *Paracalyx*, and *Eriosema*, are also classified in the subtribe Cajaninae of the tribe Phaseoleae. Other Cajaninae genera not mentioned here are small and mainly of African distribution (Lackey 1980). Both species described in the genus *Endomallus* are synonyms of *Cajanus goensis* Dalz. (van der Maesen 1985). Although less closely related, it would be useful to continue and complete collection of these genera for possible future utilization, and possibly to salvage them from extinction.

#### OCCURRENCE OF *Cajanus* SPP. AND OTHER CAJANINAE

Other than the basis of information gathered from herbaria and literature, several pointed collections were made between 1975 and 1983 to collect Cajaninae. In India generally two periods are suitable for collection of seeds of wild legumes: in October-November after the

monsoons, and from February to April after the cool season, depending on area and species. After a wet monsoon the plants will flower longer, and produce seeds for a longer span of time. In some areas of South India, December and January are also suitable for collection.

Precise location data of the collected Cajaninae are listed in various Genetic Resources Unit Progress Reports (limited availability at ICRISAT), hence they are not repeated here. The locations of *Cajanus* spp. are also listed for the specimens examined in a monograph (van der Maesen 1985). This paper summarizes the recent findings in comparison with the old records, in an attempt to visualize the present distribution of *Cajanus* species on maps, and to point to possible extinction.

#### WILD SPECIES IN PIGEONPEA IMPROVEMENT

Several cross combinations of wild with cultivated *Cajanus* produce viable hybrids, which can be used as intermediaries to introduce genes from wild to cultivated genotypes. So far several Cajaninae have been screened and found to possess desirable traits. Remanandan (1981) summarized the utility of certain species. For instance, accession of *C. albicans*, *C. lineatus*, *C. sericeus* and *C. crassus* possess resistance to sterility mosaic, *C. scarabaeoides* has antibiosis to the pod borer, *Heliothis armigera*, and most species have high protein contents. Biochemically the relatives of pigeonpea are very interesting, for they have protease inhibitors that could provide selective resistance against certain insects, and are destroyed by cooking (Singh and Jambunathan 1981).

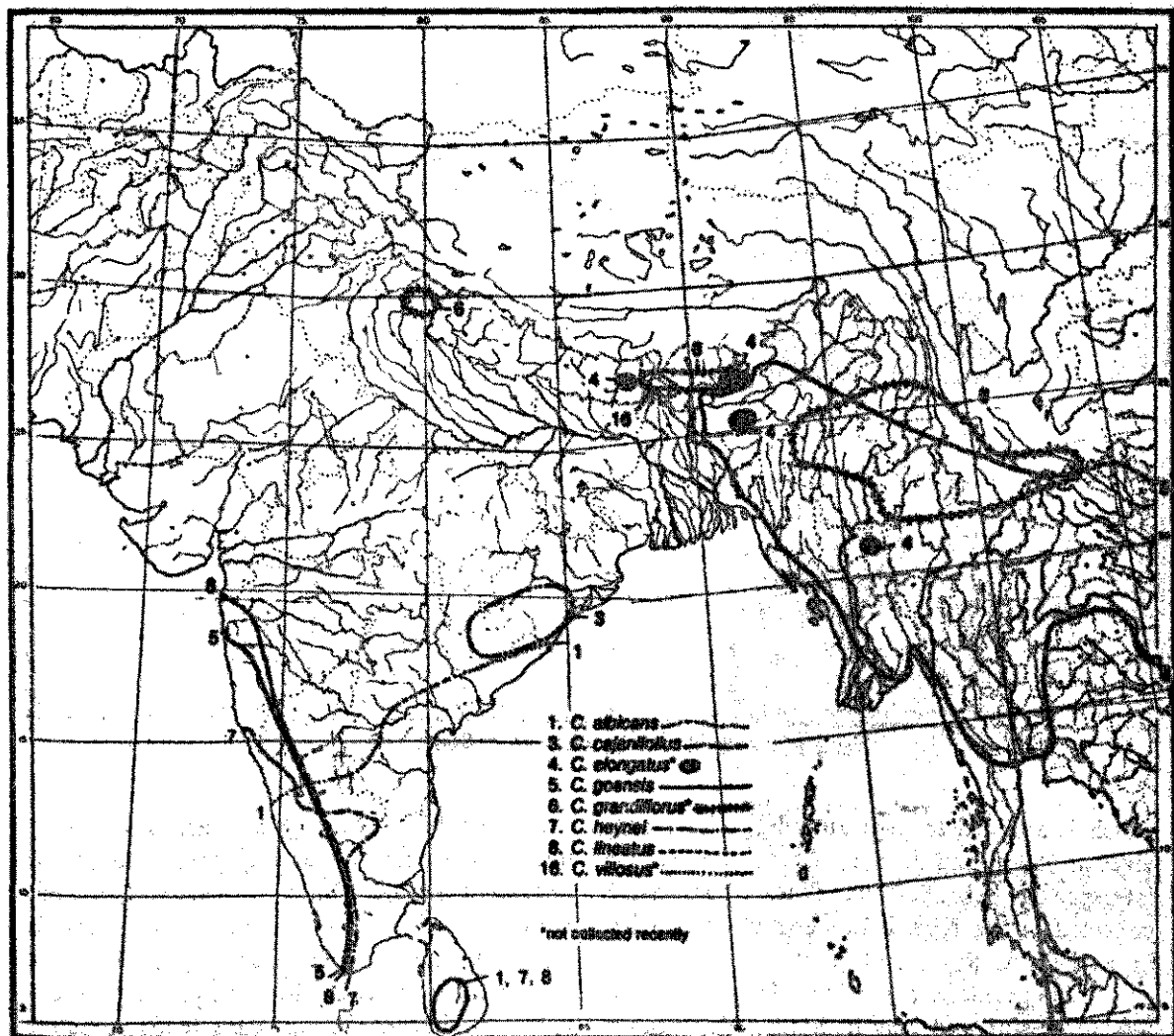
Many species are now on hand in the ICRISAT collection, but quite a few are rare and could not be found during our recent

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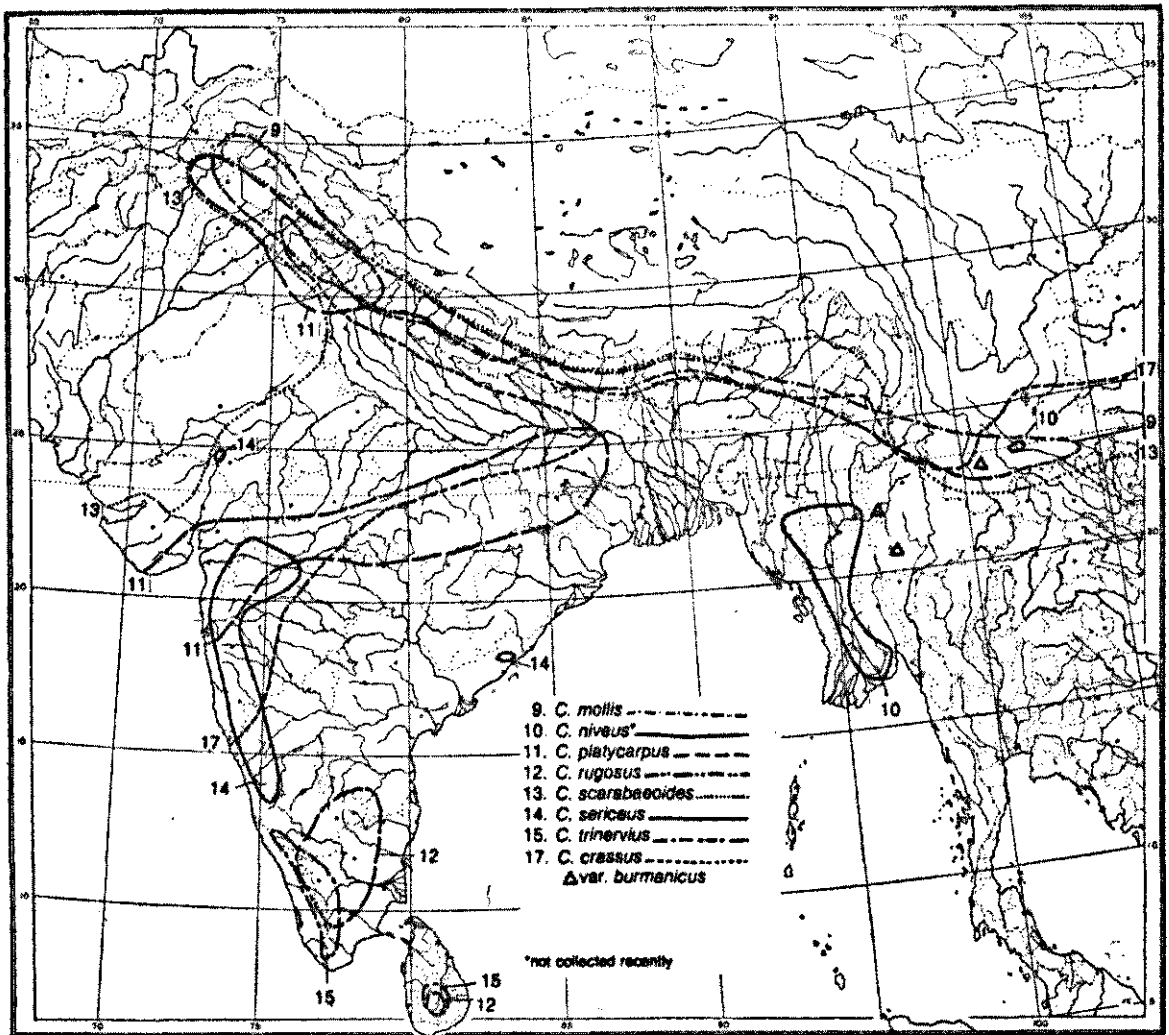
explorations. For introgression purposes viable seeds are required. We make an appeal to botanists to keep an eye on Cajaninae (and rare relatives of any crop species), and ICRI-SAT would be grateful to receive seed and herbarium samples of Cajaninae, in particular the species that have so far eluded collection. Detailed location data can be supplied upon request.

MAINTENANCE OF CAJANINAE

Most Cajaninae have been grown successfully in ICRI-SAT's Botanic Garden. Those species native to India flower about the same time as in nature, except *Cajanus mollis* from the lower hills of the Himalayas, which flowers in early August at our Center instead of from mid-September onwards. *Cajanus trinervius*,



Map 1. Distribution of *Cajanus* spp. in South Asia.



Map 2. Distribution of *Cajanus* spp. in South Asia.

which is adapted to high altitudes, hardly survives at 600 m and does not flower. To execute interspecific hybridization, flower buds were collected in the Nilgiri hills and stored on ice in a thermos flask, and used for pollination c. 48 hours after collection. This technique was successful, and may be applicable to other species not adapted to the place of research.

At ICRISAT the species are not grown under shade, and apparently perennate not as well as in nature. On the other hand, growth tends to be luxurious, because competition is removed, and the plants are irrigated. Insect pests have to be controlled by spraying insecticides, for instance *C. albicans* tends to suffer from scale insects, especially in the second

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year of growth. In nature pod borers and pod flies also attack *Cajanus*, but e.g. *C. scarabaeoides* possesses mechanical resistance and antibiosis against pod borers. Seeds shatter and have to be collected daily or biweekly. The foliage of most Cajaninae appears palatable to cattle, another factor limiting the survival of wild pigeonpeas.

Many seeds of Cajaninae have hard seed-coats, and tend to exhibit dormancy. As a routine, seeds are scarified before sowing by a sharp instrument. Seed dormancy can also be removed by sulphuric acid 98% treatment for 30 minutes (N. K. Rao *et al.*, n.d.)

At ICRISAT seeds are preserved at +4 C and 30% RH, to ensure longevity and viability.

### ENUMERATION OF CAJANINAE

#### *Cajanus* (incl. *Atylosia*)

##### *Cajanus albicans* (Wt. & Arn.) vdMaesen

INDIA: Andhra Pradesh, Karnataka, Kerala, Tamil Nadu. SRI LANKA (500-1700 m). Quite common, recent finds many. Retreated to more or less undisturbed forests, near open spaces, climber in trees or shrubs. Fl. Oct.-Apr.

##### *Cajanus cajan* (L.) Millsp.

PANTROPICAL (0-2000 m). Widely cultivated in India, the pigeonpea, arhar, tur or red gram. Very rarely surviving as an escape, since grazing is severe outside protected areas. Fl. Sept.-April.

##### *Cajanus cajanifolius* (Haines) vdMaesen

INDIA: endemic of the E. Ghats of NE Andhra Pradesh, Puri and Koraput district of Orissa, and Bastar district of Madhya Pradesh (Bailadila) (500-1280 m). Very rare, found in more locations when searched for. So far known from less than twenty accessions. The closest relative of pigeonpea. Erect shrub in not too dense forests. Fl. Nov-Apr.

##### *Cajanus crassus* (Prain ex King) vdMaesen (= *C. volubilis* sensu Gamble)

BURMA, INDIA: quite widely distributed except Rajasthan, Kerala and Tamil Nadu, nowhere frequent. JAVA, NEPAL, MALAYA, PHILIPPINES, THAILAND, VIETNAM (0-800 m). Climber on trees or shrubs, sal, teak or pine forests, along streams and on dry soils. In Burma var. *burmanicus* pods have long semi-caducous golden brown hairs, var. *crassus* has short puberulous pods. The only wild pigeonpea on the Andaman Islands. Fl. Jan.-March.

##### *Cajanus elongatus* (Benth.) vdMaesen

BHUTAN, BURMA, INDIA: Assam, Meghalaya: Khasi hills, Iseira river, Mairung, Sorjung, Mowphlang, Nongpoh, Nunkloes, Laitlyngkot, near Kynshi, Nilpara (up to 2000 m), last collected in India in November 1957, in West Bengal: Nilpara; NEPAL, last collected in 1967; VIETNAM. Very rare, not found recently despite thorough searches, may have faced extinction due to habitat destruction. Collection and preservation warranted. Twiner on grasses. Fl. July-Nov.

##### *Cajanus goensis* Dalz.

BANGLADESH, BURMA, CHINA: Yunnan; INDIA: Arunachal Pradesh, Assam, Karnataka, Kerala, Maharashtra, Meghalaya, Mizoram, Tamil Nadu, Tripura; INDONESIA, LAOS, MALAYSIA, THAILAND, VIETNAM (0-1500 m). A peculiar disjunct distribution. Climber in shrubs and trees, dry deciduous or moist forests, in shade or near open places. Fl. Aug.-March, mainly Jan.-Febr.

##### *Cajanus grandiflorus* (Benth. ex Baker) vdMaesen

BHUTAN, BURMA, CHINA: Yunnan; INDIA: NE Uttar Pradesh: Bagesar (Bageshwar), Kumaon; Upper Garhwal, Manipur: Huining, Naga Hills, Laimatak; Sikkim: Little Rangit river; lower hills. In India last found in Mani-

pur in 1948. Collection warranted. Fl. July-Nov.

**Cajanus heynei** (Wt. & Arn.) vdMaesen  
(= *Dunbaria heynei* Wt. & Arn.)

INDIA: W. Ghats of Goa, Karnataka, Kerala, Maharashtra, Tamil Nadu, also rarely in the plains. Not uncommon, this species found a refuge over a large area in S. India, but frequency of occurrence is low. Climber on shrubs and trees. Fl. Dec.-March.

**Cajanus lineatus** (Wt. & Arn.) vdMaesen

INDIA: W. Ghats of Goa, Karnataka, Kerala, Maharashtra, Nilgiri hills of Tamil Nadu; SRI LANKA, found there only once and not traced recently (400-1660 m). The commonest of shrubby *Cajanus* spp., surviving on ungrazed ledges, hillsides of difficult approach or where grazing is limited, here and there in large populations. Fl. Oct.-Apr.

**Cajanus mollis** (Benth.) vdMaesen

BHUTAN, INDIA: Arunachal Pradesh, Himachal Pradesh, Meghalaya, Sikkim, Uttar Pradesh, Himalaya hills; NEPAL, PAKISTAN (700-2000 m). Not uncommon, always found in populations of a few or single plants. Climbing on shrubs, pine and broadleaf trees. Fl. Sept.-Nov.

**Cajanus riveus** (Benth.) vdMaesen

BURMA, CHINA: Yunnan (0-1350 m). Last found in 1950 between Mandalay and Maymyo, open jungle, hill sides of upper and lower Burma, may be found in NE India. Fl. Aug-Dec. Collection warranted.

**Cajanus platycarpus** (Benth.) vdMaesen

INDIA: Bihar, Delhi, Gujarat, Himachal Pradesh, Madhya Pradesh, Maharashtra, Orissa, Uttar Pradesh; INDONESIA, NEPAL, PAKISTAN (50-2600 m). Trailing in grasses, along roadsides, in pine forests, this species suffers from grazing and is far from common except when left alone. The earliest flowering species, tends to grow annual, perennates when conditions

are favourable. Not always found where collected earlier. Fl. Aug.-Oct.

**Cajanus rugosus** (Wt. & Arn.) vdMaesen

INDIA: South peninsular hills; SRI LANKA (1300-2400 m). Recently only found in the Shevaroy hills and Sri Lanka. Tends to be confused with *Rhynchosia filipes*, which is common around Kodaikanal. Twining and creeping in forests, low shrubs and in open grassy downs. Fl. June-July, Sept.-April, mainly Dec.-Jan. Appears to be on the verge of extinction.

**Cajanus scarabaeoides** (L.) du Petit-Thouars

S and SE ASIA, parts of OCEANIA, coastal AFRICA, MADAGASCAR, JAMAICA (0-1000 m). The commonest wild species, creeping/climbing in open grass lands, dry scrub or (semi) deciduous forests such as sal and teak. The only species which is of frequent occurrence almost all over India. Fl. Sept.-April.

**Cajanus sericeus** (Benth. ex Baker) vdMaesen

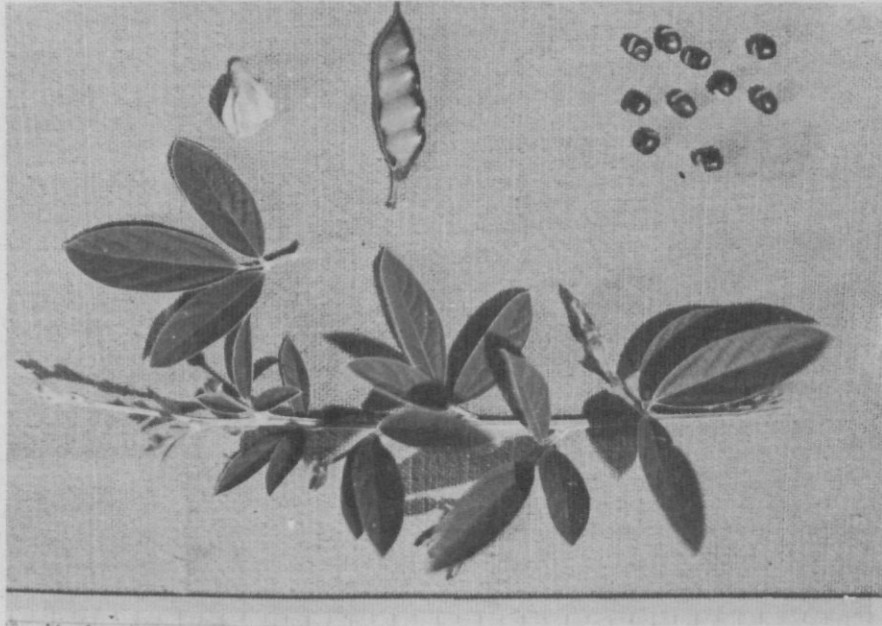
Endemic of INDIA: Western and Eastern Ghats, Mt Abu, Satpura Mts. (500-1300 m). Recently only found in the Western Ghats near Pune, not found on Mt Abu, Endrika Hill of Visakhapatnam Hills. Undershrub in dry deciduous forests, grassy lands and hill slopes. Fl. Sept.-Febr.

**Cajanus trinervius** (DC.) vdMaesen

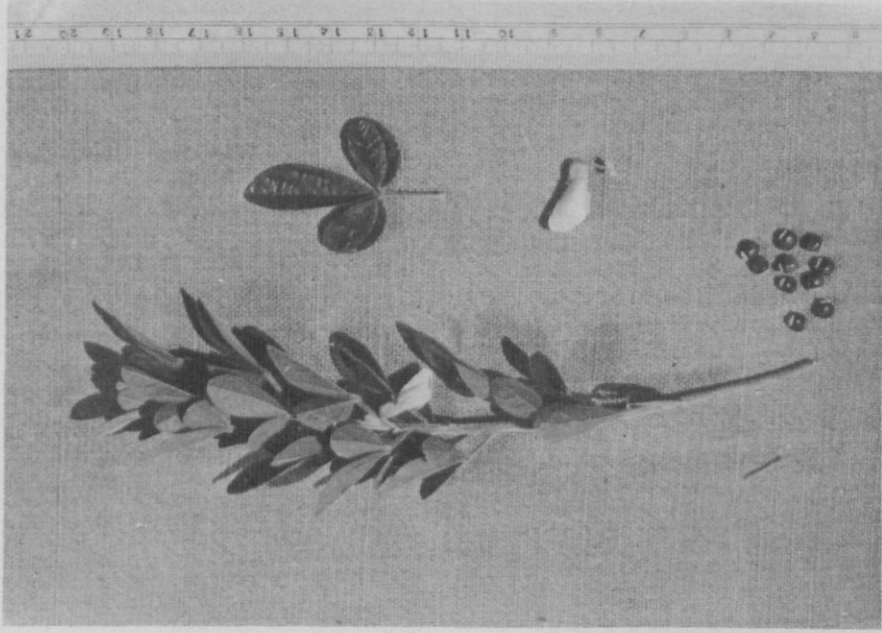
Hills and hill tops of S INDIA and SRI LANKA (850-2650 m). In shrub vegetation, semi-open evergreen forest, grasslands, between boulders. Quite localised, this shrub forms populations of a few dozen plants where left undisturbed. Flowers throughout the year, except July, seeds most likely to be present Jan.-March.

**Cajanus villosus** (Benth. ex Baker) vdMaesen

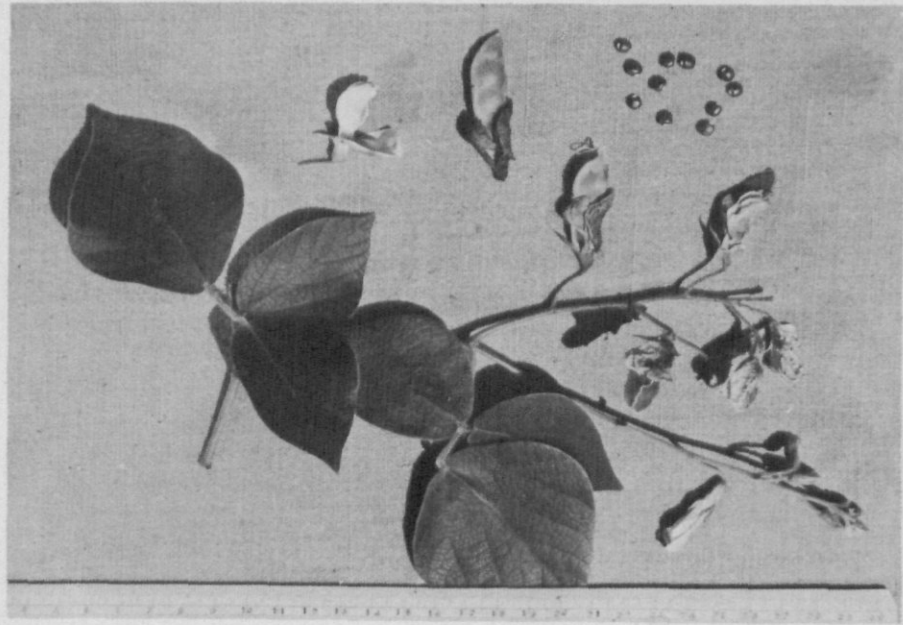
INDIA: endemic of Sikkim and NW Bengal, Terai plains, and foothills (150-1300 m). Creeper in grasses and low shrubs, very rare, last collected in 1895 in the Eastern Duars. Possibly extinct. Fl. Sept.-Oct.



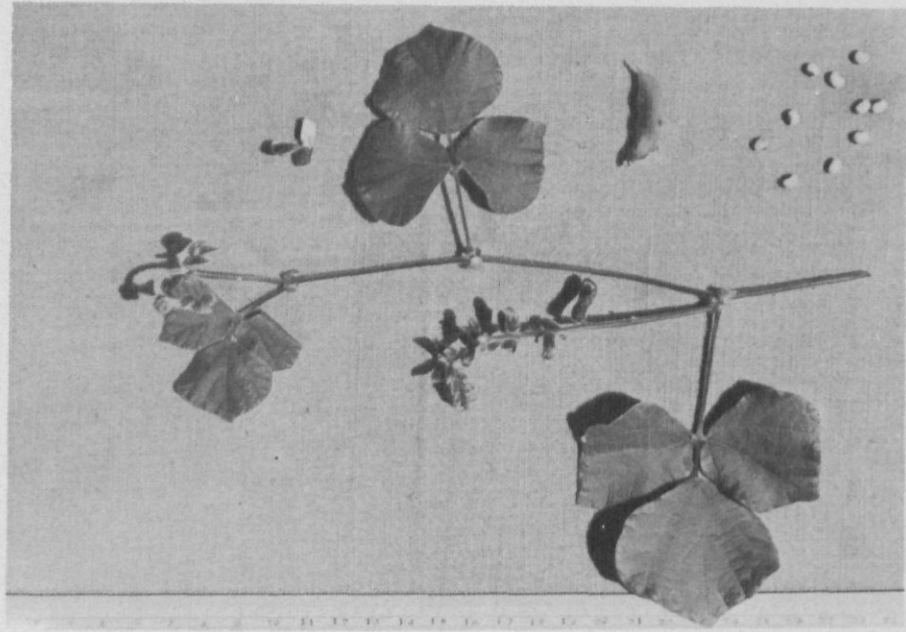
*Cajanus cajanifolius* (JM 2739)



*Cajanus lineatus* (W. Ghats)



*Dunbaria ferruginea* (JM 3509)



*Rhynchosia rothii* (JM 2296)



*Dunbaria**Dunbaria circinalis* Baker

BURMA, INDIA: Assam, Sikkim. A slender climber.

*Dunbaria debilis* Baker

INDIA: Meghalaya, Nurtung or Nurtiung (1300 m). Only known from a few old specimens.

*Dunbaria ferruginea* Wt. & Arn.

Hills of S INDIA, SRI LANKA. More common and vigorous than most large *Cajanus* climbers, this species is commonly found in populations of a few large specimens covering shrubs or entire trees. Fl. (Sept.-) Dec.-Febr.

*Dunbaria fusca* (Wall.) Kurz

BURMA, INDIA, LAOS, THAILAND, VIETNAM (0-1500 m). A rather little-known species.

*Dunbaria glandulosa* (Dalz.) Prain

INDIA: Assam, Maharashtra. Fl.: Aug.-Sept. Rare, localised.

*Dunbaria podocarpa* Kurz

BURMA, CHINA, CAMBODIA, INDIA: Assam: Lushai hills, Mizoram: Aizal; LAOS, VIETNAM (1000-1500 m). A climber. Fl. Nov.-April.

*Dunbaria rotundifolia* (Lour.) Merr.

(= *D. conspersa* Benth.)

AUSTRALIA, BANGLADESH, BURMA, CHINA, INDIA: Assam, West Bengal, Peninsula; MALAY PENINSULA, PHILIPPINES. Found once recently, near Jalpaiguri. Climber on grasses. Fl. Nov.

*Eriosema**Eriosema chinense* Vogel

AUSTRALIA, BURMA, INDIA: Himalaya foothills; MALAYSIA, PHILIPPINES, SRI LANKA. The only species in India, in Africa this genus counts many species. Not found by ICRISAT collectors. Tubers edible (Singh & Arora 1978).

*Flemingia* (= *Moghania*)

We follow the treatment of Nguyen Van Thuan (1979), which does not conform with

those in Prain (1903), Gamble (1918) or Ali (1977). Ali recognizes the Baker (1876) varieties as species. Thuan does not distinguish them for the flora of Vietnam, but some are distinct enough. Nair (1977) uses the split species, under *Moghania*. The genus is presently receiving attention for the Flora of India (Thothathri, pers. commun.). The species and the recent finds are reflected in Map 3.

*Flemingia chappar* Ham. ex Benth.

BURMA, CAMBODIA, INDIA: Bihar, E Himalayas, Orissa, S. India, THAILAND, LAOS (0-1000 m). In dry, open forests, on poor soils, common in eastern part of area. Erect shrub. Fl. Dec.-Jan.

*Flemingia ferruginea* Grah. ex Benth.

BHUTAN, BURMA, INDIA: Nilgiris; LAOS, PHILIPPINES, THAILAND. On the plains, along streams, and in wet inundated forests. Erect shrub.

var. *fluminalis* (C. B. Clarke ex Prain) Nguyen Van Thuan.

BURMA, CHINA, INDIA, LAOS, VIETNAM (0-500 m). Along rivers, on sandy and clay loam soils.

var. *glutinosa* Prain

BURMA, LAOS, THAILAND, VIETNAM. Open forests, uncultivated areas. Erect shrub with long glandular hairs.

*Flemingia grahamiana* Wt. & Arn.

AFRICA, BURMA, CHINA, INDIA: Nilgiri and Palni Hills, W Karnataka; LAOS, VIETNAM (0-1500 m). Of very localised occurrence, not rare. Fl. Oct.-Febr.

*Flemingia involucreta* Benth.

S & SE ASIA, INDIA: E Himalaya, Assam, Sikkim, Konkan (0-1100 m). In open forests, along coast, hillsides. Erect shrub.

*Flemingia lineata* (L.) Roxb. ex Ait. f.

var. *lineata*.

CAMBODIA, INDIA: widely distributed; LAOS, SRI LANKA, VIETNAM (0-600 m). Erect shrub

in plains, open forests, along rivers. Fl. Febr.-March.

**Flemingia macrophylla (Willd.) Prain**

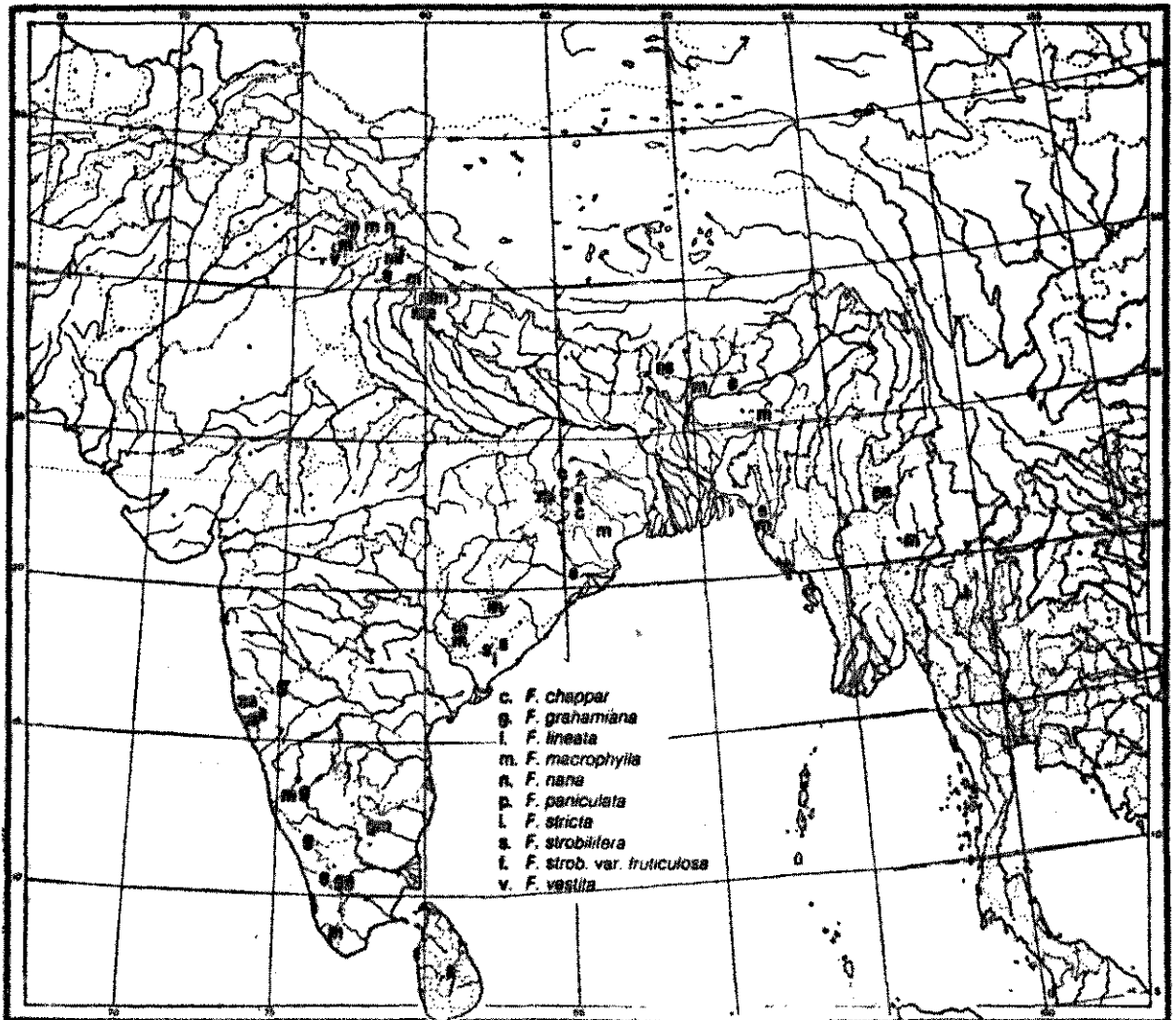
BURMA, CAMBODIA, CHINA, INDIA: from the Himalayas to South Peninsula. LAOS, PAKISTAN, SRI LANKA, THAILAND (0-2000 m). In dense and open forest, hedges, on hills, along rivers, on red and clay soils. Quite common, often collected, also recently. Fl. Oct.-March.

var. *nana* (*F. nana* Roxb.)

INDIA: C & E Himalayas, Konkan (800-1600 m). Found twice recently, possibly not very rare.

**Flemingia paniculata Wall. ex Benth.**

BURMA, INDIA: C & E HIMALAYA; LAOS, THAILAND (0-1100 m). Localised in bamboo forests. Erect shrub. Fl. March.



*Flemingia procumbens* Roxb.

(= *F. vestita* Benth. ex Baker?)

S & SE ASIA, INDIA (0-1700 m): Himalayas.

*F. vestita* is wild, and also cultivated for its edible tuber (Singh & Arora 1974). Fl. Oct.-Nov. Synonymy by Thuan questionable.

*Flemingia stricta* Roxb. ex Ait. f.

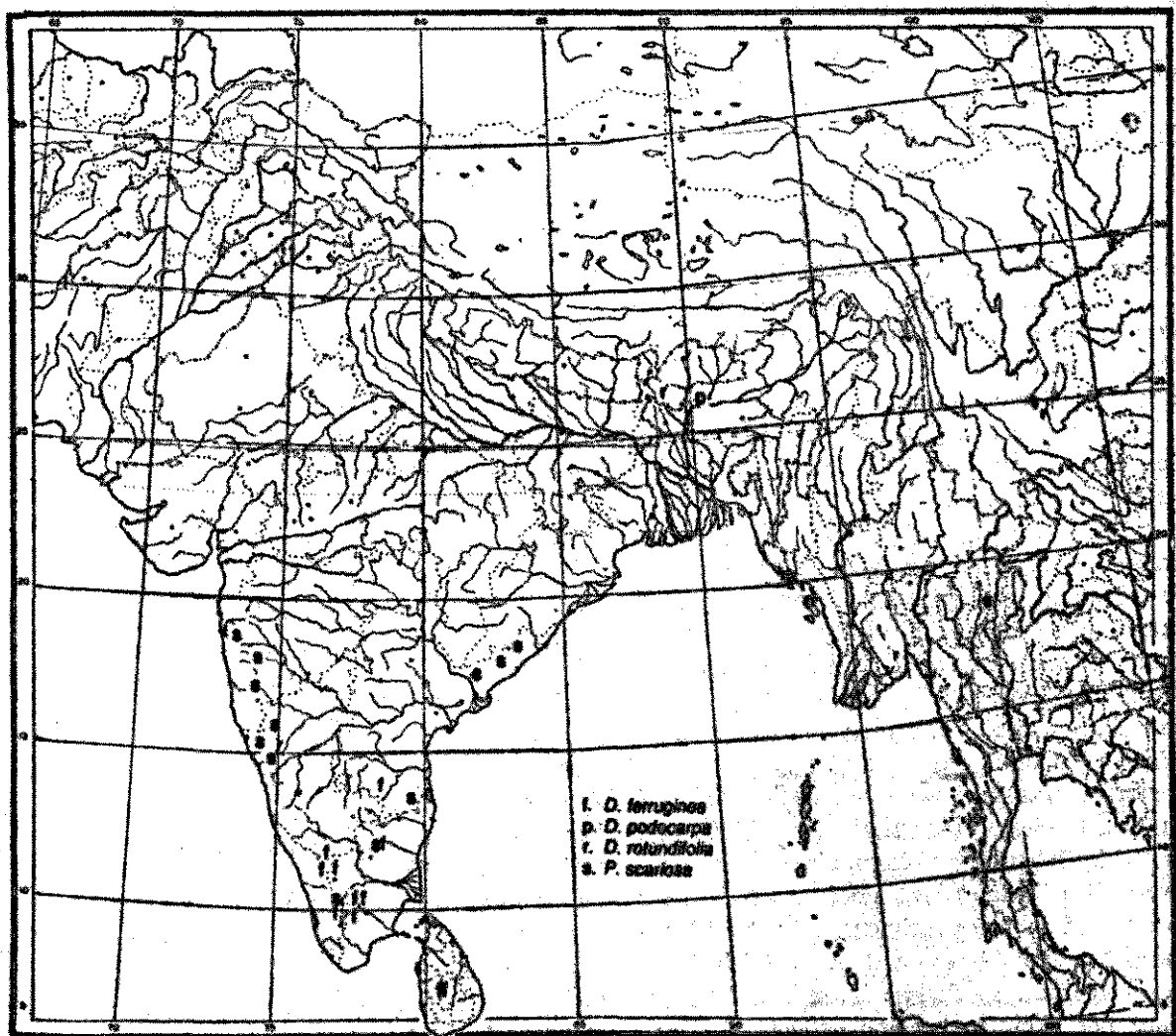
S & SE ASIA, INDIA: Assam, W. Peninsula

(0-1200 m). In dense or open forests, along streams, near rice fields and on rocky soil. Robust shrub. Fl. Oct.-March.

*Flemingia strobilifera* (L.) Ait. f.

var. *strobilifera*.

S & SE ASIA, INDIA, PAKISTAN (0-1500 m). Open forests and grasslands, reasonably common, tall erect shrub. Fl. Oct.-March.



Map 4. Locations where *Dunbaria* and *Paracalyx* spp. have been found recently in South Asia.

var. *fruticulosa* Baker.

INDIA, NEPAL, PAKISTAN (up to 1600 m). Forests, a prostrate form. Fl. Oct.-March.

*Flemingia tuberosa* Dalz.

INDIA: Maharashtra, W Ghats along the coast. Trailing herb. The tuberous roots are eaten (Singh & Arora 1978). Fl. Sept.-Oct.

*Paracalyx*

*Paracalyx scariosa* (Roxb.) Ali

BURMA, INDIA: forest edges and roadsides of Goa, Karnataka, Maharashtra, and Orissa; THAILAND (0-1300 m). Conspicuous with its white papery extended calyx. Of occasional occurrence. Fl. Nov.-Febr.

*Rhynchosia*

*Rhynchosia acutissima* Thwaites

INDIA: Kerala, Meghalaya, Sikkim; SRI LANKA. Rare, specific status under review. Fl. Dec. (Kerala).

*Rhynchosia avensis* Benth. ex Bak.

BURMA: endemic (800-1200 m). Rare, specific status under review. Fl. Nov.-May.

*Rhynchosia aurea* DC.

INDIA, SRI LANKA (0-800 m). Creeper on grasses, widespread and quite frequent, harvested along with grasses for hay and grazed extensively. Not unequivocally distinguishable from *R. nummularia* DC. and *R. capitata* (Roth) DC. Ali (1977) retained *R. capitata*, and did not discuss *R. aurea*. Fl. Sept.-Jan.

*Rhynchosia bracteata* Benth. ex Bak.

BURMA, INDIA: Upper Gangetic Plain, S Andhra Pradesh, LAOS, THAILAND (0-1000 m). Found by ICRISAT collectors in a large population E of Mandalay, along roadside near forest, and in few specimens near the Mahanandi Temple (A.P.), and in NW Thailand. Very vigorous, so despite its scattered occurrence not likely to become extinct. Fl. Dec.-March.

*Rhynchosia cana* DC.

INDIA, Peninsula; SRI LANKA (200-1400 m). A small erect shrub, not common and infrequent. Fl. Sept.-Febr.

*Rhynchosia densiflora* DC.

INDIA: Peninsula; E. AFRICA (200-1600 m). Slender twiner in grasses or shrubs. Not common. Fl. Nov.-Jan.

*Rhynchosia falconeri* Baker

INDIA: Garhwal, Shalhi. Trailing herb, rare, not found recently, as also stated by Nair (1977).

*Rhynchosia filipes* Benth.

INDIA: Nilgiri and Palni Hills (1400-2300 m). A creeper on grasses, or hanging from cliffs. Endemic to small area, relatively frequent there. Fl. (Oct.-) Dec.-Febr.

*Rhynchosia heynei* Wt. & Arn.

INDIA: Andhra Pradesh, Karnataka, Tamil Nadu (c. 1000 m). An erect low shrub, collected twice in recent times from the Tirumalai hills, not common. Fl. Febr.-March.

Grows with difficulty at ICRISAT Center near Hyderabad (600 m).

*Rhynchosia himalensis* Benth. ex Baker.

BURMA, INDIA: Himachal Pradesh, N Punjab, Kumaon, Garhwal; PAKISTAN (1400-1700 m). Climber or trailing shrub, quite rare, collected once recently. Fl. Aug.-Oct.

*Rhynchosia hirta* (Andrews) Meikle &

Verdcourt [= *R. cyanosperma* Benth., *R. albiflora* (Sims) Alston]

INDIA, SRI LANKA, E. AFRICA (600-1200 m). A robust woody climber in forests with peculiar blue seeds. Occasional. Fl. Dec.-March, mainly Jan.-Febr.

*Rhynchosia memnonia* DC.

ARABIA, PAKISTAN, TROPICAL AFRICA. Hardly more than a variety of *R. minima*, status under review.

*Rhynchosia minima* DC.

INDIA, everywhere in the plains and up to



*Above: Flemingia strobilifera* (PR 4664).

*Below: Cajanus lineatus* on hillslope near Devala, Wynad, Kerala.

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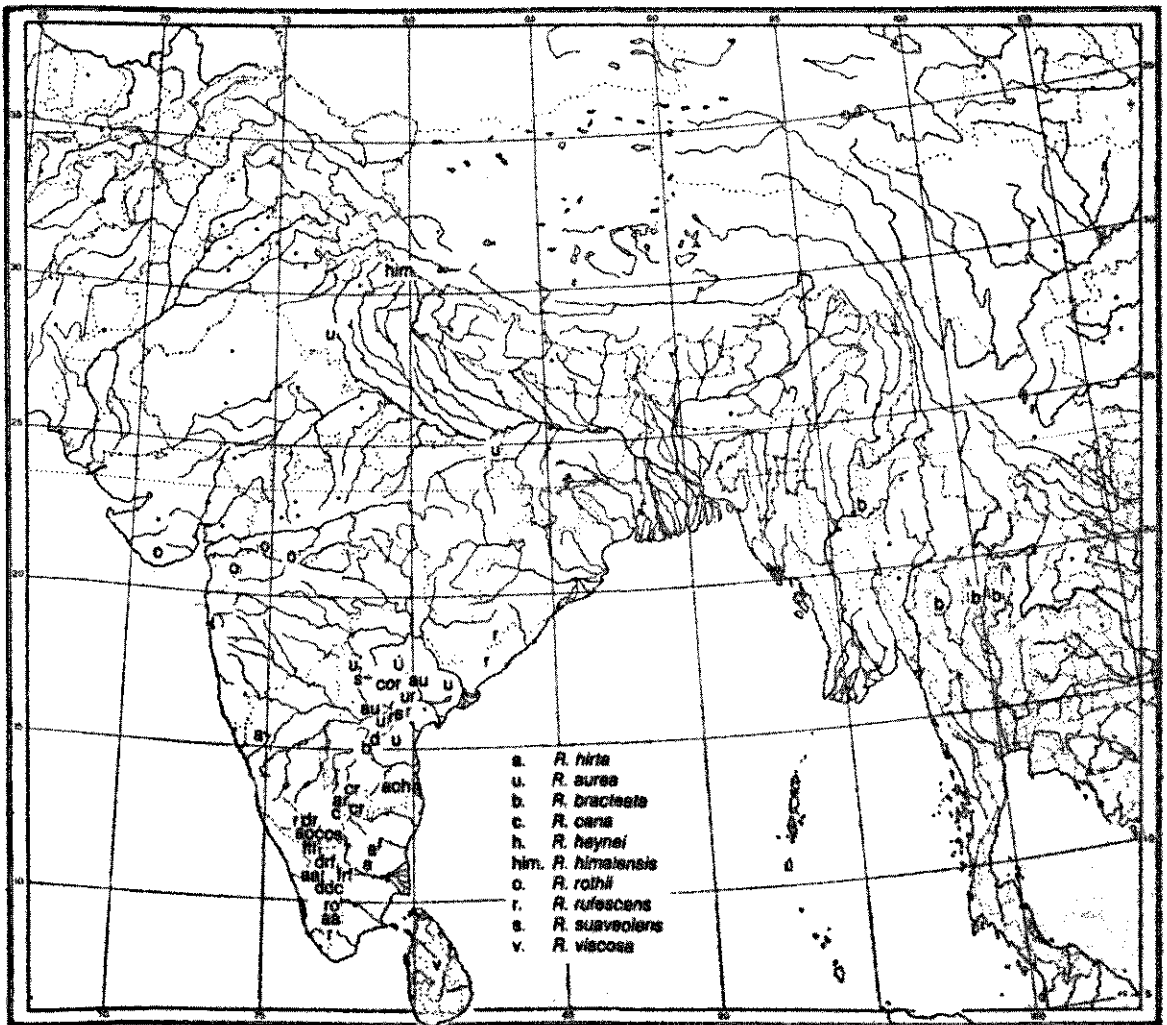
c. 1200 m in the Himalayas, COSMOPOLITAN. A slender creeping annual, very common in grasses and scrub vegetation. A useful pasture legume. Var. *laxiflora* (Camb.) Baker is, it seems, found more often as a climber. Fl. July-March.

*Rhynchosia pilosa* Wall. nom. nud.

BURMA, Seguen along the Irrawaddy. Rare, status under review.

*Rhynchosia pseudo-cajan* Camb.

INDIA: W. Himalayas; PAKISTAN (800-3000 m). An erect shrub, poorly represented in the herbarium and apparently rare. Not found when searched for. Last specimens are 1953 finds in RAW from Poonch, and in DD from Jakhri and Neerath in Himachal Pradesh. Fl. May-Oct.



**Rhynchosia pulverulenta** Stocks

AFRICA, ARABIA, INDIA: Rajasthan, PAKISTAN: Karachi (0-200 m?). Found also recently. Fl. Jan.-July.

**Rhynchosia rothii** Benth. et Aitchis.

(= *R. sericea* Span.)

INDIA, from the Himalayas to the S Peninsula; PAKISTAN, MALAYAN PENINSULA (200-1300 m). Quite common in Southern India, climber perennating from woody roots, with purple and cream flowers. Fl. Sept.-Febr.

**Rhynchosia rufescens** (Willd.) DC.

BANGLADESH, INDIA: South Peninsula, SRI LANKA, JAVA (0-1800 m). A suberect low shrub with trailing branches, not rare in S. India, found recently at many occasions in forests and along roadsides. Fl. Oct.-April.

**Rhynchosia schimperii** Hochst. ex Boiss.

ARABIA, EGYPT, INDIA: Rajasthan; PAKISTAN: Thar desert. Quite rare. Altitude not reported. Fl. Sept.-March.

**Rhynchosia suaveolens** DC.

INDIA: South Peninsula, SRI LANKA (200-1000 m). Another low shrub with trailing branches, not rare in forests. Fl. Nov.

**Rhynchosia velutina** Wt. & Arn.

INDIA: Henry & Swaminathan (1979) rediscovered the species in South India: Vivekanandapuram near Cape Comorin.

**Rhynchosia viscosa** DC.

AFRICA, INDIA: widespread; MALAYA, MADAGASCAR, MAURITIUS, SRI LANKA (0-1000 m). Flowers yellow, not easy to distinguish from *R. rothii* if flower colour is unknown. Fl. Febr.

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