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Genetic Resources
Progress Report 31

Pigeonpea Collection in Attappadi Hills and Atylosia Collection in Silent Valley South India

26 January-11 February 1981

P. Remanandan

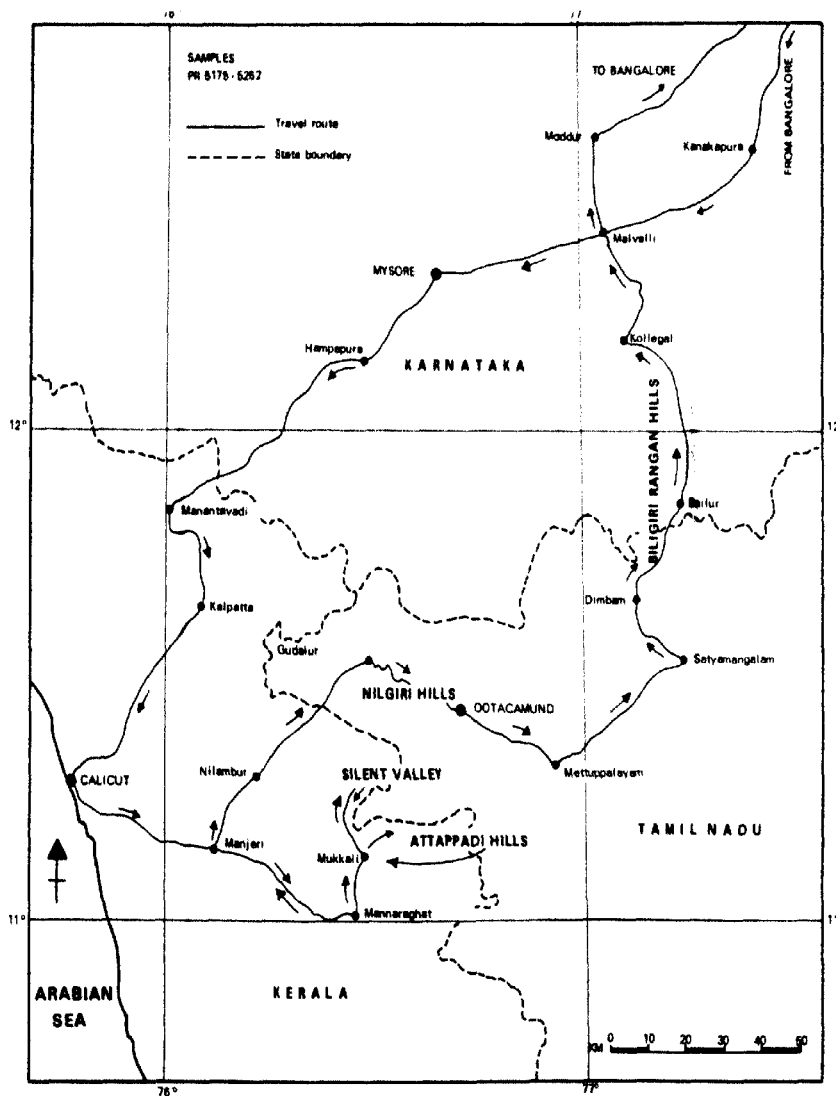


ICRISAT

**International Crops Research Institute for the Semi-Arid Tropics
ICRISAT Patancheru P.O.
Andhra Pradesh 502 324, India**

**PIGEONPEA COLLECTION IN ATTAPPADI HILLS AND ATYLOSIA
COLLECTION IN SILENT VALLEY, SOUTH INDIA--P. Ramamadan**

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Gomphium Collection in Attappadi Hills, Silent Valley, and Biligiri Rangan Hills (Kerala, Tamil Nadu and Karnataka, S. India) 1981.

PIGEONPEA COLLECTION IN ATTAPPADI HILLS AND ATYLOSIA COLLECTION IN
SILENT VALLEY, SOUTH INDIA
(26 Jan-11 Feb 1981)

P. Ramamandan*

1. OBJECTIVES

- (1) Collection of pigeonpea landraces from the Attappadi Hills of the Western Ghats
- (2) Search for Atylosia species in Silent Valley and Biligiri Rangan Hills.

2. SUMMARY

The Attappadi Hills are known for pigeonpeas of good quality for "dal". The ICRISAT gene bank had no substantial representation from this area. During the present mission the entire pigeonpea growing area of this region was covered which resulted in securing a richly varied representative collection. In total, 39 samples were collected, some from adjoining areas, and field observations were made.

Pigeonpeas of the Attappadi Hills are late indeterminate cvs with mostly large white seeds. There is considerable variability in seed color pattern and pod characteristics. Many of them have high potential for the "vegetable type" pigeonpea breeding and utilization.

Silent Valley is botanically little explored. The present search for Atylosia resulted in the collection of Atylosia lineata, A. scarabaeoides, A. goensis, and Rhynchosia rothii with plenty of ripe seeds. The vegetation of this undisturbed area is the richest in the Western Ghats and the possibility of even more species occurring here certainly exists.

*Botanist (pigeonpea), Genetic Resources Unit, ICRISAT.

Apart from this, ripe seeds of Atylosia trinervia and Dunbaria ferruginea were collected from the Nilgiri hills. On the way back the route through the Biligiri Rangan Hills of Karnataka yielded ripe seeds of Atylosia albicans and Rhynchosia rothii. Rhynchosia suaveolens and R. heynei were also located in the protected forests of B.R. Hills, but the seeds could not be obtained as these mature early. The first week of January is the right time to collect in B.R. Hills.

3. PLANNING

3.1. Time and Area of collection

Information on the pigeonpea growing areas of Attappadi Hills was gathered during an earlier visit of nearby hills. The late cvs grown in this area mature during January end. Hence the collecting time was planned to coincide with the harvest period.

Silent Valley is located in the Attappadi Hills. This being a botanically little explored area there is no record of the occurrence of Atylosia here. However, from our experience of the distribution of Atylosia species and their ecological preference, we expected several species here. Search for Atylosia in Silent Valley could be combined with the pigeonpea collection in Attappadi Hills, as the period of collection was just the right time to collect Atylosia seeds in ripe stage as based on our previous experience in the adjoining Nilgiri Hills and Bandipur-Mudumalai forests.

It was further planned to return through the Nilgiri Hills of the adjoining area and Biligiri Rangan Hills of Karnataka, to visit more locations of Atylosia.

Contacts were established with the Forest Department of Kerala for obtaining permission to visit Silent Valley, which is no longer open to the public without prior sanction.

3.2. Collecting Team

P. Ramanandan, Botanist, Genetic Resources Unit

H.S.M.I. Riyabani, Driver-cum-General Assistant, Genetic Resources Unit

3.3. Itinerary

January 26 Hyderabad - Bangalore.

27 Bangalore - Kanakapura - Malvalli - Mysore - Hampapura -
Manantavadi - Kalpetta.

28 Kalpetta - Calicut - Manjeri - Mannaraghat - Mukkali.

29 Mukkali - Anakatti - Mukkali.

30 Mukkali - Mannaraghat - Mukkali.

31 Mukkali - Silent Valley - Mukkali.

February 1 Mukkali - Pollachi - Mukkali.

2 Mukkali - Pedagiri - Mukkali.

3 Mukkali - Silent Valley - Mukkali.

4 Mukkali - Minakshipuram.

5 Minakshipuram - Malappuram.

6 Malappuram - Manjeri - Nilambur - Gudalur - Ootacamund.

7 Ootacamund - Dodabetta - Ootacamund.

8 Ootacamund.

9 Ootacamund - Coonoor - Mettupalayam - Satyamangalam.

10 Satyamangalam - Dimban - Bailur - Kollegal - Malvalli -
Maddur - Bangalore.

11 Bangalore - Hyderabad.

4. HIGHLIGHTS

4.1. Pigeonpeas of Attappadi Hills

The Attappadi Hills are located in the northeastern corner of Palghat district of Kerala and on the northwestern side of Coimbatore district of Tamil Nadu.

It descends like an extended cliff from the Nilgiri plateau which is to the north. Facing the Arabian sea, these hills receive the full blast of the southwest monsoon. In a span of 3-4 months they have a rainfall of 5000-6000 mm. In contrast, the eastern side receives only around 400 mm of rain.

From the southwest monsoon the area receives rain from June to September. June-July is the peak period declining from August to September. During September-December the area receives rain from the northeast monsoon. Paddy is cultivated throughout this area in the valleys. Mostly two crops are taken: in June-October and in November-March. Other crops grown include pigeonpea, black gram, cotton, cassava, and sorghum. Groundnut, chickpea, and finger millet are grown in limited areas. Thavalam, a village between Mukkali and Annakkatti grows groundnut. My attempt to secure seeds from farmers' houses was only partially successful, as many of them do not store the seeds. The crop is grown in considerable area in the hilly region of Palghat district and needs to be collected. It is sown in May, often intercropped with pigeonpea, and is harvested during October. Some samples of finger millet could be obtained from farmers' stores. Many farmers plant the millet in the pigeonpea-groundnut field after the harvest of groundnut.

The Attappadi pigeonpea is very popular in Kerala and adjoining Tamil Nadu as the housewives prefer its "dal" for making "sambar". A consistent character of almost all the samples collected from this area is the high seed weight (Table-1) and the white seed coat. They are late cvs with indeterminate growth habit. However, considerable variability exists in branching pattern, pod and seed color pattern. The incidence of diseases and pests was rather low.

Pigeonpea is usually sown on the onset of Southwest monsoon. It is grown either as a garden crop or in small fields intercropped with cereals or groundnut. January end is the harvest time. It was striking to note that the early cvs with smaller seeds grown in the adjoining Coimbatore district are never found in this hilly region. I learned from one of the progressive farmers that the early cvs do not fare well here, probably because they mature before the rains cease.

We went deep inside the village areas in all directions and obtained a truly representative collection. Some of the fields were very impressive and this collection should broaden the base for the breeding of vegetable

pigeonpeas as well as for improvement of "dal" quality.

4.2. Atylosia in Silent Valley, Kerala

Silent Valley, in the Palghat district is a part of the extensive, though broken, stretch of Western Ghats forests, which once extended from the Mahendragiri hills in Kanyakumari district to Goa as a massive green belt. Now the Silent Valley forest covers only less than 9,000 ha. It descends from a height of 2,520 m to 150 m across a distance of 3-4 km. Its steep slopes and numerous hills and gorges have enabled it to escape human interference till recent times. The warm climate and peculiar geological features that result in unusually prolonged period of abundant rain have resulted in the evolution and preservation of an exceptionally rich living gene bank and hence this forest enjoys a unique position in Southeast Asia.

Being an almost unexplored area, the floristic composition of Silent Valley has not been fully understood. However, several Atylosia species were reported and still occur in the Western Ghats and therefore we believe that this is an important area for the evolution and diversification of Atylosia. Several species of Atylosia and related genera like Dumbaria and Rhynchosia have been collected from the forests with comparable topographical and environmental situations during earlier missions undertaken in Western Ghats (GRU Progress Reports 4, 17, 20).

We searched for Atylosia and related genera from Mukkali to Silent Valley Dam site. Mukkali is a small village located about 25 km from Silent Valley. Tribals like Kurumban, Mudukan, Irlas, and new settlers, inhabit this village. The Kerala Government has a farm for the upliftment of tribals at Chindakki. Mukkali is more or less completely deforested for cultivation of paddy in the low land and in upland pigeonpea, black gram, cotton, sorghum, horse gram, sugar-cane, finger millet, banana, cassava, etc., are cultivated. The Bhavani River is the main source of irrigation for rice. Kuntipuzha, a tributary of the Bharatapuzha, originating in the Silent Valley, runs north-south, and reaches the Mannaraghat plains after a course of about 30 km through the mountain ranges. These hills are covered by virgin forests and here we searched for Atylosia spp. ..6.

We collected Atylosia garabacoides from Mukhali with ripe seeds. However, the species is not very common here. From Mukhali to the Silent Valley dam site is a distance of about 25 km. The road passes through the heart of rainforest. Atylosia lineata was in full bloom and fruiting stage in a vast region in Silent Valley. We secured plenty of ripe seeds and specimens. Our efforts to penetrate deep inside the rainforest were not always very successful due to the danger of wild animals (particularly elephants) which were freely wandering around even at daytime. At one occasion we almost bumped into a pair of leopards. The rainforest is thoroughly infested with leeches, particularly the species with a white spot on head is very dangerous. Also we came across the famous lion-tailed monkey of Silent Valley. The rare animal, which is now restricted to a few pockets of the world, can be distinguished from the Nilgiri langur by its broad face and short tail. Atylosia goensis was located at one spot in flowering stage. Most of the pods were still green but we could get a few ripe seeds. The precise location of the species is given in the Table. Rhynchosia rothii too was collected from the same location with plenty of mature seeds. Desmodium rufescens, Vernonia divergens, V. cinerea, Justicia procumbens, etc. grow abundantly in this location.

4.3. Nilgiri Hills, Tamil Nadu

The Nilgiri Hills are the northernmost meeting point of the Western Ghats and the Eastern Ghats. While coming we passed through the Nilgiri-Wynaad tract which is full of semi-tropical and deciduous lands interspersed with stunted shola growths. On return we took the route through Ootacamund-Coonoor where the climate is salubrious on the plateau. The Moyar in the north and the Bhavani in the south are the main rivers draining these hills. The area gets heavy rains from the Southwest and the Northeast monsoons. Devala on the Gudalur side receives the highest rainfall (over 3000 mm) and is called the "Cherrapunji" of the south. However, most of the natural flora of this region has been replaced by industrial plantations or secondary forests.

The main food crops grown are rice, finger millet, wheat, and potatoes. About 22,000 ha are under tea and coffee plantation occupies over 8200 ha. Eucalyptus and Wattle plantations have replaced most of the remaining area of natural forests, and these secondary forests hardly support any vegetation underneath.

We collected Atylosia trinervia from Doddabetta, the highest peak (2600 m) of Tamil Nadu, near Ooty. The search for the species at other locations around Ooty was not successful. The species appears to have been wiped out at many locations of lower altitudes and is now restricted to a very few places. So far we could not locate it at any other place in India and the accession which Dr. L.J.G. van der Maesen collected from Sri Lanka in 1980 from 1000 m altitude is strikingly different in morphology from the one thriving in the high altitude of Nilgiris. More accessions of the species need to be salvaged before their extinction.

Dunbaria ferruginea was collected from Coonoor-Mettuppalayam road where it is fairly common. This area has a good vegetation. The steep slopes have prevented the cultivation of the land which is otherwise very fertile.

4.4. Nilgiri Range Hills, Karnataka

These hills of Mysore district are isolated from both the Western and Eastern Ghats. They receive both the northeast and southwest monsoon rains. At foot-hills occur dry deciduous forests, at the top wet evergreen forests and in between the moist deciduous forests. The land has not yet been much exploited for large scale cultivation. However, grazing, indiscriminate timber felling, shifting cultivation, and forest fires have reduced the richness of the flora.

Atylosia rugosa has been reported from this area by earlier explorers, apart from some Rhynchosia species and Paracalyx. However, we were a bit late for these species. The climate is much warmer and hence these species mature early. Biligiri Rangan betta and the surrounding areas, from where Atylosia species have been reported, were searched, but we could not locate A. rugosa. Biligiri Rangan betta is granitic with large boulders forming the hill. The vegetation in this area is of the moist deciduous and wet evergreen types with Terminalia tomentosa as the most dominant tree. Other common trees are Allophylus rheedii, Sterculia guttata, Syzygium cumini, etc. Common shrubs are Indigofera wightii, Murraya paniculata, Solanum torvum, Lantana camara, Acacia pennata, etc.

Our search for Atylosia was limited to the roadside as the time was limited and also because the area has a very large population of elephants. Wild elephants were found almost everywhere, and when they hide between clumps of the giant bamboo (Dendrocalamus strictus) it is not even easy to notice them.

We could not locate the main target species of this area, Atylosia rugosa, but while looking for it, we did collect Atylosia albicans and Rhynchosia rothii with ripe pods. Atylosia albicans had already shattered the seeds like most other legumes here. However, we could secure a few seeds. We collected two interesting other Cajanineae from here during this process without securing the seeds. They are tentatively identified as Rhynchosia suraveolens and R. heynei on the basis of vegetative characters. The precise locations of these species are given in the Table 1. The seeds of these species need to be secured. Late December-early January should be the right time.

From the short time I spent in this area I felt that this is an area which is rich in Cajanineae and needs to be re-explored in more detail. But as mentioned earlier these reserved forests have a rich variety of wild animals and one has to be extremely cautious of the elephants, which move freely even during daytime.



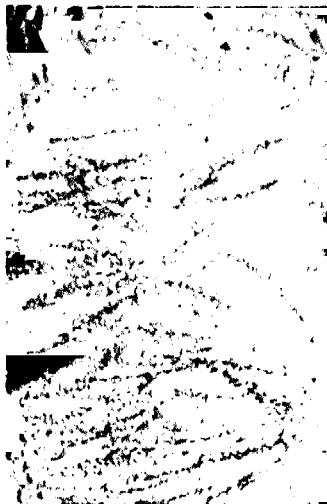
1. Profusely branching indeterminate pigeonpea covering the area vacated by cereals, Attappadi Hills, Kerala.



2. Vegetable type pigeonpea of Attappadi Hills



3. Variation in seeds per pod and pod colour pattern



4. Acyloisia lineata in Silent Valley.

5. Table: Material collected in Attappadi Hills, Silent Valley & Biligiri Rangan Hills (26 Jan-11 Feb. 1981)

PR No.	Species	Location	Alt. (m)	District	Seed color pat-tern	Main seed color	100 seed wt. (g)	Re- marks
1	2	3	4	5	6	7	8	9
5175	Cajanus cajan (L.) Millsp.	Virchandra village	720	Bangalore	P	B	07.52	
5176	-do-	Gabbadi	710	-do-	S	W	15.62	
5177	-do-	New Gabbadi	650	-do-	P	O	07.50	
5178	-do-	Thoppagana halli	600	-do-	P	O	07.45	
5179	Penisetum holcooides Schott.	Munantavadi	-	Kozhikode	-	-	-	
5180	Cajanus cajan	Chindakki	500	Palghat*	S	W	16.52	
5181	-do-	-do-	"	-do-	S	W	16.92	
5182	-do-	-do-	"	-do-	S	W	16.15	
5183	-do-	-do-	"	-do-	S	W	17.91	Few brown seeds
5184	-do-	-do-	"	-do-	S	W	15.87	
5185	-do-	-do-	"	-do-	S	W	17.88	
5186	-do-	-do-	"	-do-	S	W	16.68	
5187	-do-	-do-	"	-do-	S	W	15.35	
5188	-do-	-do-	"	-do-	S	W	17.26	
5189	-do-	-do-	"	-do-	S	W	17.13	Few orange seeds
5190	-do-	Kakkappadi	470	-do-	S	W	17.56	Good veg. type
5191	-do-	Kalkandi	480	-do-	S	W	17.00	
5191-1	-do-	-do-	"	-do-	M	W	12.96	
5192	-do-	Chennanur	"	-do-	SH	W	16.18	
5193	-do-	-do-	"	-do-	SH	W	19.23	Good veg. type
5194	-do-	-do-	"	-do-	P	W	17.56	Purple strikes on pod
5195	-do-	Pakulam	485	-do-	S	W	19.33	6-seeded pods

*Palghat includes Attappadi Hills.

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1	2	3	4	5	6	7	8	9
5196	Cajanus cajan	Pakulam	485	Palghat	P	H.C	17.40	
5197	-do-	-do-	470	-do-	S	W	16.66	
5198	Perisetum americanum (L.) Leeke	Thavalam	480	-do-	-	-	-	
5199	Cajanus cajan	Karavadam	"	-do-	S	W	15.20	Desi type
5200	Cicer arietinum L.	-do-	"	-do-	-	-	-	
5201	Arachis hypogaea L.	-do-	"	-do-	-	-	-	
5202	-do-	-do-	"	-do-	-	-	-	
5203	Cajanus cajan	-do-	"	-do-	S	W	16.59	
5204	-do-	Karavangadi	520	-do-	S	W	16.80	
5205	Arachis hypogaea L.	-do-	"	-do-	-	-	-	
5206	Cajanus cajan	Kammundikal	"	-do-	S	W	16.28	Few wilted plants
5207	Kleusine coracana (L.) Gaertn.	-do-	"	-do-	-	-	-	
5208	Cajanus cajan	Wannanthora	510	-do-	S	W	17.03	Orange seeds mixed
5209	-do-	Mannanthura	500	-do-	S, SM	W, L.B	15.37	
5210	-do-	-do-	"	-do-	S	W	15.50	
5211	-do-	Kadathara North	"	-do-	S	W	14.37	
5212	-do-	Pattimala	490	-do-	S	W	15.60	
5213	-do-	-do-	"	-do-	S	W	14.32	Purple streaks on pods
5214	Arachis hypogaea L.	Chavadiyoor	500	-do-	-	-	-	
5215	Arachis hypogaea L.	-do-	"	-do-	-	-	-	
5216	Kleusine coracana (L.) Gaertn.	-do-	"	-do-	-	-	-	
5217	Sorghum bicolor (L.) Moench	-do-	"	-do-	-	-	-	
5218	Kleusine coracana	Nattathakad	510	-do-	-	-	-	
5219	Cajanus cajan	Anakkatti	500	-do-	S	W	15.01	
5220	Amaranthus cruentus L.	-do-	"	-do-	-	-	-	
5221	-do-	-do-	"	-do-	-	-	-	White & red grain
5222	Kleusine coracana	Anakkatti	520	-do-	-	-	-	
5223	Sorghum bicolor	-do-	"	-do-	-	-	-	White & red grain
5224	-do-	-do-	"	-do-	-	-	-	

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1	2	3	4	5	6	7	8	9
5225	<i>Sorghum bicolor</i>	Anakkatti	520	Palghat	-	-	-	-
5226	<i>Alysicarpus corabaeoides</i>	Mukhalli	500	-do-	-	-	-	-
5227	<i>A. lineata</i> W. & A. (L.) Benth.	Silent Valley, 23km from Mukhalli to Campahed	910	-do-	-	-	-	Profusely branching
5228	<i>Acanthaceae</i>	-do-	"	-do-	-	-	-	-
5229	<i>Desmodium rufescens</i> DC.	-do-	"	-do-	-	-	-	-
5230	<i>Emilia sonchifolia</i> DC.	-do-	"	-do-	-	-	-	-
5231	<i>Lagotis alata</i> Sch.	-do-	"	-do-	-	-	-	-
5232	<i>Vernonia divergens</i>	-do-	"	-do-	-	-	-	-
5233	<i>Vernonia cinerea</i> Less. (Roxb.) KDC	-do-	"	-do-	-	-	-	-
5234	<i>Vernonia divergens</i>	-do-	"	-do-	-	-	-	-
5235	<i>Fogoseum mollis</i> Benth.	-do-	"	-do-	-	-	-	-
5236	<i>Jussiaea procumbens</i> L.	-do-	"	-do-	-	-	-	-
5237	<i>Vernonia</i> sp.	-do-	"	-do-	-	-	-	-
5238	<i>Vernonia cinerea</i> Less.	-do-	"	-do-	-	-	-	-
5239	<i>Opisthenus compositus</i>	-do-	"	-do-	-	-	-	-
5240	<i>Crocalaria</i> sp. (L.) Beauv.	-do-	"	-do-	-	-	-	-
5242	<i>Desmodium</i> sp.	-do-	"	-do-	-	-	-	-
5243	<i>Rhynchosia rochii</i> Benth. ex Atch.	Karavaraagundu, 9km from Cheekpost to Panthode	850	-do-	-	-	-	Flowering & podding
5244	<i>Alysicarpus goensis</i> (Dalc.) Dalc.	-do-	"	-do-	-	-	-	Flowering with green pods
5245	<i>Papilionaceae</i>	-do-	"	-do-	-	-	-	-
5246	<i>Cajanus cajan</i>	Mukhalli	500	-do-	S	W	16.70	-
5247	<i>Ulex europaeus</i> L.	Dodabeta	2580	Mllgilla	-	-	-	-
5248	<i>Alysicarpus cineraria</i> (DC.) Gamble	-do-	"	-do-	-	-	-	-
5249	<i>Dumetia ferruginea</i> W. & A.	20 km to Mettuppa- Layan from Coonoor	960	-do-	-	-	-	-
5250	<i>Cajanus cajan</i>	Kangampalayam	320	Colabecore	P	O	08.08	-

1	2	3	4	5	6	7	8	9
5251	Cajanus cajan	Satyamangalam	310	Coimbatore	SM	W	15.10	
5252	-do-	Chikola Dam	630	-do-	P	W	09.58	
5252-1	-do-	-do-	"	-do-	S	W	11.06	
5253	-do-	Dishan	"	-do-	-	-	-	
5254	Pennisetum sp.	-do-	"	-do-	-	-	-	
5255	Clematis gouriana Roxb.	Billigiri Rangan Hills	1150	Mysore	-	-	-	
5256	Macuna sp.	10 km to Yelandur from B.R. Hills	930	-do-	-	-	-	Veg. stage
5257	Cajaniinae?	-do-	"	-do-	-	-	-	
5258	Rhynchosia rothii	-do-	"	-do-	-	-	-	
5259	Alysicarpus albicans W. & A.	-do-	"	-do-	-	-	-	
5260	Crotalaria linifolia L.	-do-	"	-do-	-	-	-	
5261	Rhynchosia suaveolens DC.	-do-	"	-do-	-	-	-	Seeds shattered
5262	Rhynchosia heynei W. & A.	-do-	"	-do-	-	-	-	-do-

Col. 6: M = Mottled; P = Plain; S = Speckled; SM = Speckled + Mottled.

Col. 7: B = Brown; C = Cream; LB = Light Brown; O = Orange; W = White.

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