

Pigeonpea Collection in Indonesia

July - August 1990

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The world collection of pigeonpea germplasm maintained at ICRISAT has only 12 accessions from Indonesia. The crop has been under cultivation in the islands of Indonesia for the last several centuries. Therefore, Indonesia was identified as one of the priority regions for pigeonpea germplasm collection.

Agroclimatic Remarks

Indonesia lies between 95°E and 141°E and between 6°N and 11°S. Four major regions are distinguishable in Java, which is one of the islands of Indonesia. They are west Java, central Java, east Java, and the eastern spur of Java which includes the island of Madura.

High, uniform temperature, abundant rainfall, high humidity, and light winds are the chief characteristics of the Indonesian climate. Virtually the entire area lies within the equatorial belt. Moderating influence of the surrounding sea penetrates deeply inland. Humidity is intense in the equatorial zone and two peaks occur during the height of the monsoons (April and November respectively). The dry season is often intense in the eastern parts of Indonesia. The average annual temperature at sea level is a little above 26°C for the whole archipelago and

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is fairly uniform throughout the year. The mean annual relative humidity throughout Indonesia is 80 per cent. The west monsoon months are roughly from December to February and the east monsoon months June to August.

Indonesia's agriculture is composed of subsistence farming and large scale estate cultivation of rubber, tobacco, cinchona, coffee, tea, sugarcane, oil palm, and agave. Rice is the most important crop in subsistence farming. Average farm land holding in Java is approximately 0.9 ha. Indonesia is dependent on a highly developed irrigation system to sustain its rice cultivation. River irrigation by gravity method is used. Rice is grown in well prepared fields with intensive inputs which include application of chemical fertilizers and phytohormones.

Maize is receiving increasing emphasis from the government as a nutritious substitute for rice. It is grown mainly on dry less fertile soils. Soya bean is an important crop grown in dry fields situated above 500 m. Cassava cultivation is important in Java and Madura. It is an important food crop. Most of the sugarcane estates are located at elevations between 100 m and 500 m. Tobacco cultivation is usually found in areas above 2,200 m. Often tobacco farmers follow crop rotation with maize, cassava, and soya beans. Coffee is among the oldest crops of Indonesia. In Java the coffee cultivation is centered in the east. Tea is cultivated in west, central, and east Java. There is a good deal of small scale plantations particularly in west Java. Cinchona cultivation is centered mainly in the mountains

of west Java. The coconut palm (*Cocos nucifera*) grows throughout Indonesia. Oil palm (*Elaeis guineensis*) is cultivated primarily along the north coast of central and east Java. Sisal is cultivated mainly on estates in Java. Lemon grass (*Cymbopogon nardus*), which produces citronella oil on distillation is cultivated extensively on small plantations in west Java.

Area and Route of Collection

Pigeonpea cultivation in Indonesia is usually in limited areas, mainly on field boundaries and around houses. The crop is grown all over the islands, but more in the dry areas of Java, Sulawesi, and the eastern islands such as Bali, Lombok, Sumbawa, Flores, Sumba, and Timor. As the area is spread over several islands we planned to carry out the collection in two phases. In the first phase we planned to cover Java, Bali, and Lombok.

The planning of the collection was done in consultation with the AGLN office and ICRISAT's cooperators in Indonesia. The main collaborating institutes were Central Research Institute for Food Crops (CRIFC), Bogor., Bogor Research Institute for Food Crops (BORIF), Bogor, and Malang Research Institute for Food Crops (MARIF), Malang.

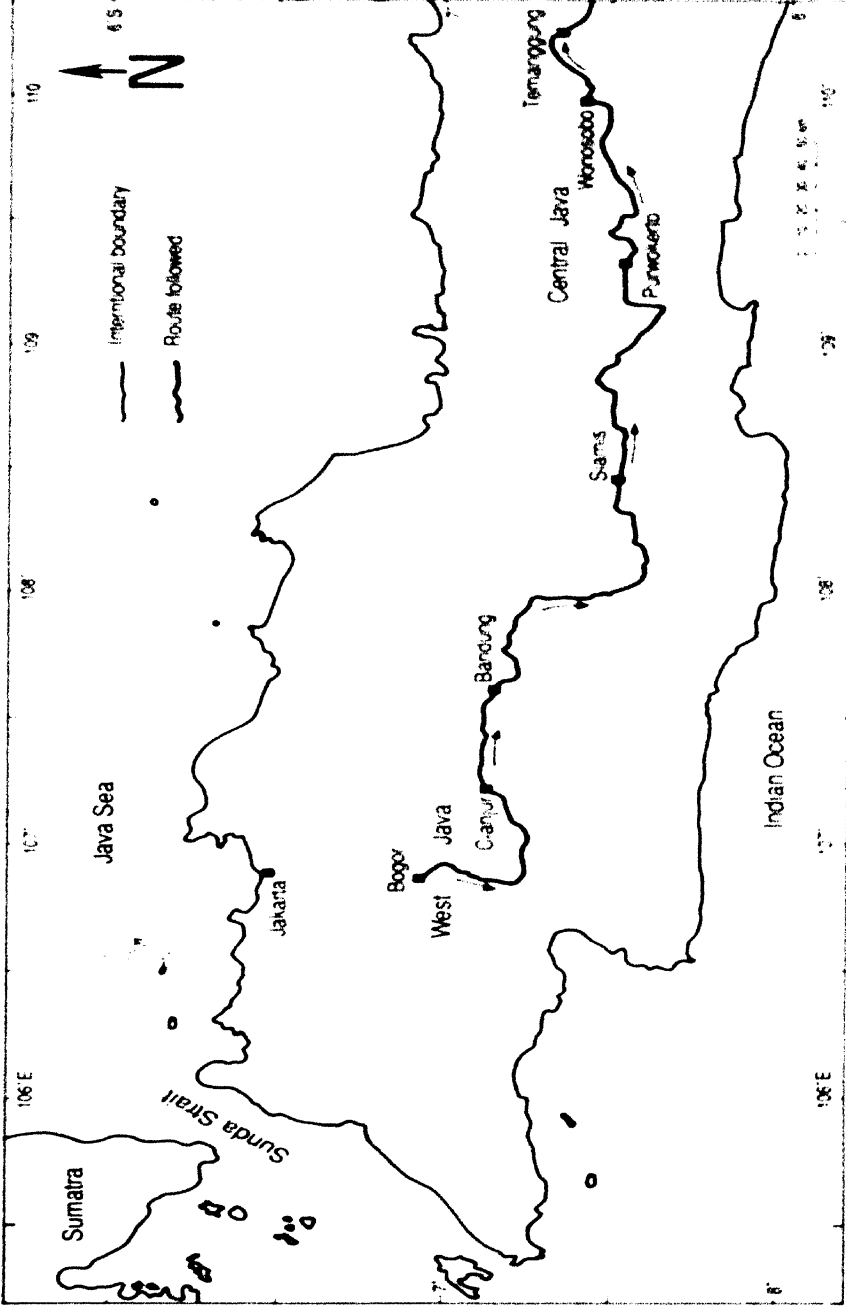
We started the collection from Bogor. Ir. K. Soetjipto, Head of Germplasm Unit, BORIF, participated in the collection in Java. We travelled from Bogor towards east and collected germplasm on the route. We visited MARIF. On arriving at Malang, with the guidance of Dr. Sumarno, Director, MARIF, we organized collection

in the eastern part of Java and Bali. At this stage Ir. Soetjipto returned to Bogor and Ir. Suwasik Karsono, Head, Muneng Substation joined in the collection mission. Collection in this area was most rewarding. The traditional landraces grown in the northeastern part of Java (Fig. 1) are good agronomic types and insect damage is comparatively less. Eastern parts of Java receives less rainfall and this is the area which have high potential for pigeonpea cultivation.

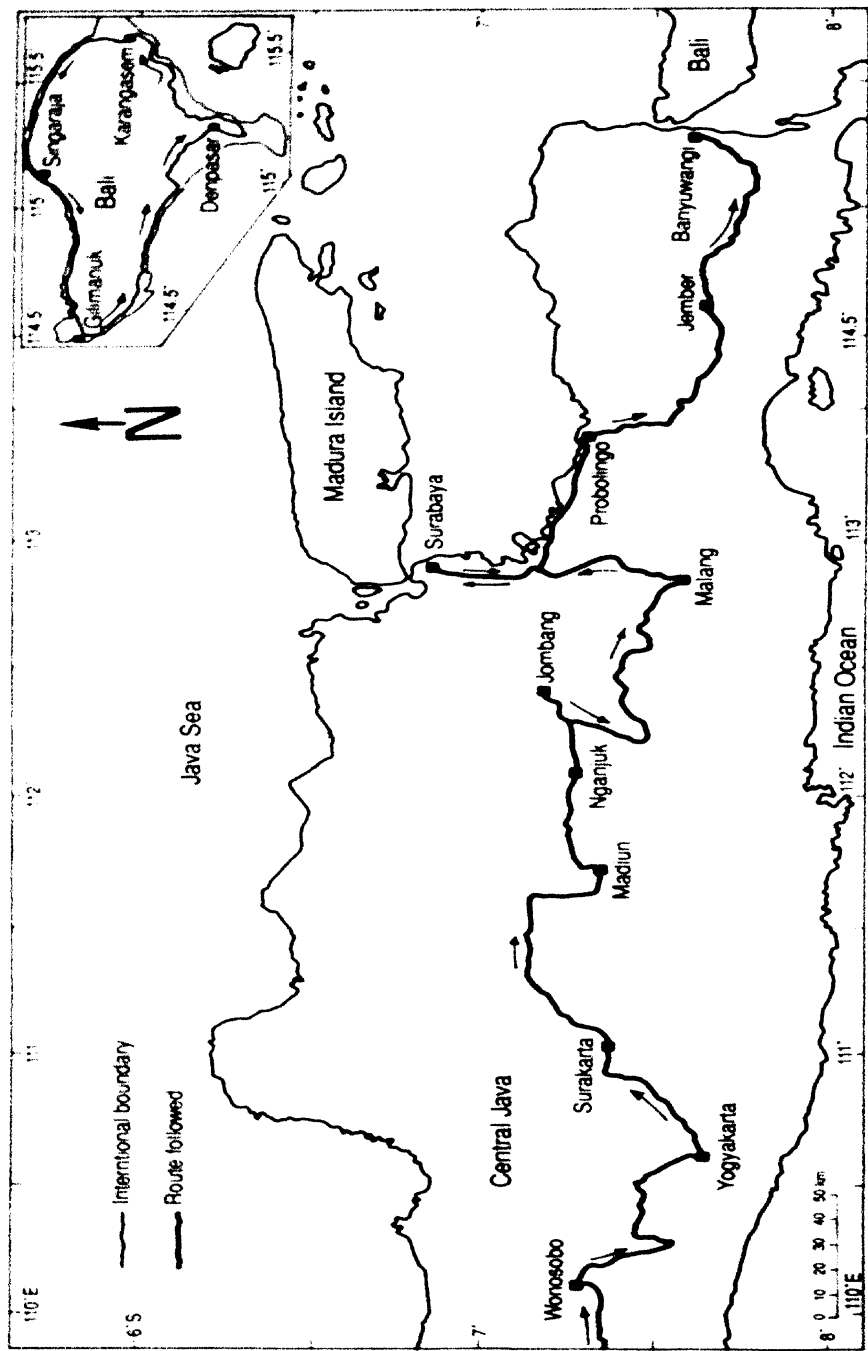
After completing collection in eastern Java and Bali P. Remanandan (PR) flew to Mataram for collection in the Lombok and Ir. Karsono returned to Muneng. In Lombok, Ir. Triwidowo, from Dinas Pertanian Tanuman, provided the logistic support and Ir. Muzani Mirza of the same organization participated in collection in Lombok.

Post Collection Operations

After completing collection in Lombok PR returned to Bogor. Collected samples were threshed, cleaned, and treated with pesticide and the samples were divided into two sets and one set of samples was deposited at BORIF, Bogor, and the other set was brought to ICRISAT and forwarded to Indian Plant Quarantine Station, Rajendranagar, Hyderabad. A total of 36 samples was cleared by the Indian Quarantine and the material is now growing in the Postentry Quarantine Isolation Area (PEQIA), ICRISAT.



Map 1. Pigeonpea Collection in Indonesia, July 1990



Map 2. Pigeonpea Collection in Indonesia, July 1990

Pigeonpea in In-onesia

Field data of the collected germplasm are summarized in Table 1. Pigeonpeas grown in Indonesia are late-maturing, semi-spreading indeterminate types with considerable variation in seed mass and number of seeds pod⁻¹. The crop is heavily damaged by insect attack, mainly pod borers (*Helicoverpa* and *Maruca*) and blister beetle (*Mylabris pustulata*). Insect damage is the major yield reducing factor. *Cercospora* leaf spot (Fig. 2) was observed in some fields in central Java.

Fields around Probolinggo in the eastern part of Java had comparatively less insect damage. Muneng substation of MARIF is located here. The station had various trials of ICRISAT and Queensland lines. However, the local lines (Fig. 1) appeared to be the most adapted. The pigeonpea line "Hunt" was recently released in Indonesia with the name "Megha". However, I did not come across this cultivar anywhere in Indonesia except at Muneng Substation.

Early-maturing pigeonpeas may face severe insect problems and without adequate insect control measures, these may not be successful in this region. The late-maturing local cultivars are suited to the existing system as these mature during the dry season when insect population is on the decline. The traditional cultivars grown in farmers' fields in this area have good agronomic traits such as high number of secondary branches, high number of racemes and desirable pod and seed characteristics.

Insect damage was strikingly less. The germplasm from this area needs to be intensively screened for insect tolerance.

Acknowledgements

We are grateful to Dr. Ibrahim Manwan, Director, CRIFC, Bogor and Dr. Sumarno, Director, MARIF, Malang, for guidance in organizing the collection and providing logistic support. We appreciate the local assistance provided by Dinas Pertanian Tanaman, Lombok.

AGLN's help during the initial planning and its support in the implementation of the collection program is appreciated.



Fig. 1. Traditional landraces of pigeonpea from eastern Java at Muneng substation (MARIF).



Fig. 2. *Cercospora* leaf spot on pigeonpea.



Fig. 3. *Flemingia bracteata*, a wild relative of pigeonpea.

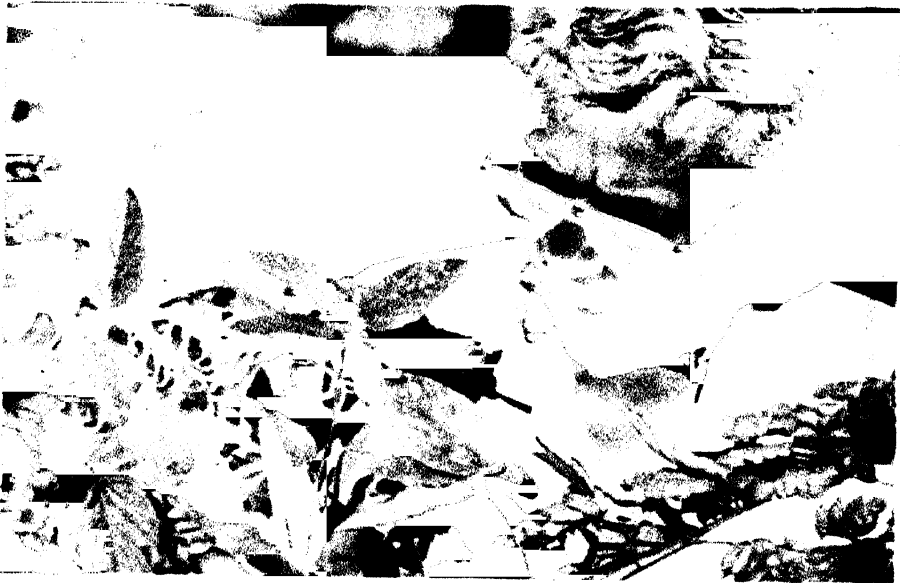


Fig. 4. K. Soetjipto (BORIF) assessing insect attack on *Flemingia*.

Itinerary

07 July	Hyderabad - Delhi
08 July	Delhi - Jakarta - Bogor
11 July	Bogor - Ciamis
12 July	Ciamis - Wonosobo
13 July	Wonosobo - Yogyakarta
14 July	Yogyakarta - Nganjuk
15 July	Nganjuk - Malang
16 July	Malang - Probolinggo
17 July	Probolingo - Banyuwangi
18 July	Banyuwangi - Denpasar
19 July	Denpasar - Karagasam - Denpasar
20 July	Denpasar - Bangli - Denpasar
23 July	Denpasar - Mataram - Senggigi
24 July	Senggigi - Mataram - Senggigi
25 July	Lombok
26 July	Mataram - Denpasar
28 July	Denpasar - Jakarta - Bogor
31 July	Bogor - Cibadak - Bogor
01 August	Bogor - Cigudeg - Bogor
03 August	Bogor - Perung - Bogor
04-06 August	Bogor
07 August	Bogor - Jakarta
08 August	Jakarta - Madras
09 August	Madras - Hyderabad

Table 1. List and field data on pigeonpea germplasm collected in Indonesia - July-August, 1990.

PRS No.	Location	Growth habit	Stem color	Pod color	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
1	Bojongpicung, Cianjur, Haurwangi	SS	G	GM	-
2	Suci, Garut, Karangpawitan	SS	G	G	-
3	Sukaharja, Ciamis	-	-	-	From store
4	Tayem, Cilacap, Karangpucung	-	-	-	6 seeds pod ⁻¹
5	Lumbir, Cilacap	SS	G	G	6 seeds pod ⁻¹
6	Kalimanah Wetan, Banyumas, Kalimanah	SS	G	-	Heavy insect & fungal damage
7	Sawangan, Wonosobo	SS	G	G	6 seeds pod ⁻¹
8	Putat, Gunungkidul	SS	G	P	6 seeds pod ⁻¹
9	Bunder, Gunungkidul	SS	G	G	6 seeds pod ⁻¹
10	Bunder, Gunungkidul	-	-	-	Market sample
11	Bunder, Gunungkidul	SS	G	P	-
12	Bunder, Gunungkidul	-	-	-	<i>Rhynchosia</i> sp.
13	Pondokbramen, Klaten, Klaten Utara	SS	G	P	Insect damage
14	Gendingan, Ngawi, Widodaren	SS	G	G	Pod sucking, bug damage
15	Gendingan, Ngawi	-	-	-	<i>Flemingia bracteata</i>
16	Dungus, Ngawi	SS	G	G	Pod borer & pod sucking bugs

(1)	(2)	(3)	(4)	(5)	(6)
17	Pulorejo, Madiun, Wilangkenceng	SS	G	G	6 seeds pod ⁻¹ , heavy insect damage
18	Sengkalan, Sidoarjo, Palang Pendo	SS	G	G	"
19	Sengon, Pasuruan, Purwosari	SS	G	G	"
20	Suklan, Pasuruan, Rejoso	SS	G	G	Free from insect damage
21	Muneng, Nguling, Probolingo	-	-	-	From research station
22	Setarum, Pasurwan	SS	G	G	-
23	Sumberagung, Pasurwan	SS	G	G	-
24	Tanjungrejo, Tongas Probolingo	S	G	G	-
25	Tanjungrejo, Tongas Probolingo	S	G	G	-
26	Patalan, Wonomerto, Probolingo	SS	G	G	-
27	Tampuran, Bantaran, Probolingo	SS	G	G	-
28	Wondayu, Ranuyoso, Lumajang	SS	G	G	-
29	Katungechanlang, Klakah, Probolingo	SS	G	G	-
30	Rambipuji, Jember	SS	G	G	Pod sucking bugs
31	Kertosari, Pakesaji, Jember	SS	G	P	6 seeds pod ⁻¹ up ₁ to 8 seeds pod ⁻¹
32	Kertosari, Pakesaji, Jember	-	-	-	-
33	Sumberklampok, Grogak, Buleleng	SS	G	M	-

(1)	(2)	(3)	(4)	(5)	(6)
34	Koris, Grogak, Buleleng	SS	G	M	-
35	Penyabangan, Grogak, Buleleng	S	G	G	6 seeds pod ⁻¹
36	Penyabangan, Grogak, Buleleng	-	-	-	-
37	Banjarasem, Slirit, Buleleng	S	G	G	-
38	Git Git, Sukasada, Singaraja	SS	G	G	-
39	Chandikuning, Baturiti, Tabanan (1100 m)	SS	G	P	Large pods 7 seeds pod ⁻¹
40	Krejung, Mengut, Badung	S	G	M	Large pods 6.5 seeds pod ⁻¹
41	Sipedam, Karangasem, Pebandem	SS	G	G	7 seeds pod ⁻¹
42	Kediri, Lombok Barat	SS	G	G	7 seeds pod ⁻¹
43	Ubung, Jonggat, Lombok Tengah	SS	G	G	7 seeds pod ⁻¹
44	Aik Mual, Praya, Lombok Tengah	SS	G	G	-
45	Bodak, Praya, Lombok Tengah	SS	G	G	-
46	Barabali, Batukliang, Lombok Tengah	-	-	-	Groundnut
47	Keru, Narmada, Lombok Barat	SS	G	G	-
48	Tanakbeak, Narmada, Lombok Barat	SS	G	G	-
49	Sembung, Narmada, Lombok Barat	SS	G	G	-

Expansion of codes

Column 3 : S = Spreading, SS = Semi-spreading

Column 4 : G = Green, P = Purple

Column 5 : G = Green, M = Mixed (green & Purple), P = Purple