The world collection of germplasm assembled at ICRISAT contains a wide range of the variability existing in all important traits (Table 1). Examples are days to maturity, plant type, seed size, number of seeds per pod, and resistance to environmental and biotic stresses. Future pigeonpea improvement will depend largely upon the effective utilisation of this diversity.

TABLE 1. Range of variability in the pigeonpea germplasm.

Character	Minimum	Maximum	No. of lines evaluated
50% flowering (days)	55.0	210.0	8582
75% maturity (days)	97.0	260.0	8561
Plant height (cm)	39.0	385.0	8526
Primary branches (no.)	2.3	66.0	5812
Secondary branches (no.)	0.3	145.3	5793
Racemes (no.)	6.0	915.0	5812
Seeds per pod	1.6	7.6	8413
100 seed weight (g)	2.8	22.4	8475
Harvest index (%)	0.6	62.7	5772
Shelling ratio (%)	5.8	86.6	5759
Protein percentage	12.4	29.5	8206

Based on genetic variation, the germplasm has been classified into a number of well defined sections and a catalogue will soon be published. The germplasm maintained at ICRISAT is available to anyone who wishes to use it, and depending upon the need of the user a search for genotypes with the desired combination of traits can be efficiently done now with the aid of the Institute's computer.

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The Potential of Early Maturing Pigeonpea Hybrids

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Early maturing pigeonpeas are becoming important because of their ability to fit into a wide variety of cropping systems including their adaptation to higher latitudes. Unlike other pulses, the presence of natural out-crossing (average 20%) in pigeonpea coupled with the discovery of a stable genetic male sterility (Reddy et al. 1978) has opened the possibility of commercial exploitation of heterosis in this crop.

Extensive evaluation of experimental pigeonpea hybrids at ICRISAT and in the All India Coordinated Trials has clearly shown that substantial gains in seed yields are possible in pigeonpea hybrids over a range of conditions (Saxena et al. 1985). Among early maturing hybrids ICPH 8 was found to be the most promising. In 1981, 1983, and 1984 station trials at Hisar this hybrid yielded on an average 53% more than the control cultivar UPAS 120 (Table 1).

TABLE 1. Performance (kg/ha) of hybrid ICPH 8 in station trials at Hisar.

Entry	1981	1983	1984	Mean % increase over control
ICPH 8	3900	3560	3752	53.1
UPAS 120 (control)	2225	2569	2528	
SE	± 145	± 176	± 363	
CV%	7.8	12.6	23.3	

This hybrid also performed well in multilocation trials conducted in 1984 in India. In 15 of these trials the yield of the hybrid ranged from 480 to 4310 kg/ha. The superiority of the hybrid over the control cultivar in these tests ranged from -5% to 124%, averaging 26%.

To attempt to stabilise the performance of hybrids across environments and production systems, improved early maturing male steriles with high combining ability, large seed size, and resistance to major diseases are being bred at ICRISAT.

Large scale hybrid seed production in pigeonpea is fairly easy and cheap where labour costs are relatively low. Estimates of the cost of hybrid seed production in India (Rs.2/kg; excluding land cost) should not pose a problem for the acceptance of pigeonpea hybrids by farmers in developing countries. This cost should be even further lowered by reducing the number of pollinator rows and the use of relatively photo-insensitive parents that can be ratooned to produce more than one harvest from the same plants within a single year without the need for further roguing.

The heterotic advantage of 30% or more over commercial varieties demonstrated by ICRISAT in pigeonpea hybrids has attracted the attention of two private seed companies in India. Although no hybrid pigeonpea seed is presently available commercially it is only a matter of time before it will be.

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Improved Food Legume Genotypes for Bangladeshi Farming Systems

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INCREASING population has resulted in a steady transformation of the traditional farming systems of Bangladesh. Increasing demand for staple cereals has continuously relegated the pulses towards more marginal growing conditions (Shaikh 1977). Consequently their total area, production and even productivity have declined (Anon. 1975). Breeding efforts have, therefore, been directed towards development of varieties with higher yield, higher protein content, synchrony in pod maturity, altered plant architecture, resistance to diseases and pests, wider adaptability and early maturity for fitting in the changed intensive farming systems. Induction of mutations has been used intensively, due to the narrow genetic base in this group of crops (Shaikh et al. 1978). A mutant variety of chickpea named Hyprosola (high-yielding-high-protein chickpea) with 20% higher yield and 4% greater protein than its parental cultivar, Faridpur-1, was released in 1982. Increases in its yield and protein content combine to give 45% higher protein production/unit area of land. There is no change in its amino acid content (Shaikh et al. 1982). It has less branching and semi-erectness providing possibilities of an increased population/unit area, increased pods and seed/plant and higher harvest index. It matures earlier than Faridpur-1, making possible earlier sowing of jute and summer-rice. It has increased field tolerance to *Alternaria* spot disease and pod borer.

Gamma-irradiated mungbean populations yielded dwarf, erect, bold seeded, synchronous and higher-yielding mutants. Some mutants showed varying resistance to MYMV and *Cercospora* leaf spot (Ahmed et al. 1978). Traditionally mungbean is grown during winter in Bangladesh. But short-duration, photo-insensitive summer strains with higher yield have been identified from local and exotic germplasm for sowing in August-September i.e. in between major crops such as jute and wheat, winter and autumn rice, and for April sowing replacing the fallow phase now preceding autumn rice in the northwest region (Begum et al. 1983). Two cycles of single plant selections from a local line have resulted in the development of MB-55, a winter strain with resistance to *Cercospora* leaf spot and 15% higher yield than the commercial variety, Kishoregonj.

The black gram mutant M-25 is a dwarf, higher yielding than the parent B-10, and moderately resistant to YMV and Cercospora leaf spot. Mutant M-23, although lower yielding, is determinate and bears upright pods compared to downward/horizontally-borne pods of the existing cultivars. The altered architecture of the mutants may permit an increased plant density and consequent higher yield (Shaikh et al. 1983).

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