

Pigeonpea seed production

for nutritional security

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Pigeonpea (Cajanus cajan (L.) Millsp.) has a huge untapped potential in terms of qualitative and quantitative improvement in respect of production and nutrition. It is second most important crop among major pulses. From time immemorial, it is grown in rainfed areas and less fertile soils. It is a versatile crop, mainly used as seed pulses as a source of energy and nutrients. As the world's population is increasing, food security and protein supply have become critical concerns for organisations and governments around the world. It is an excellent source of protein (20–22%), for the vegetarian community supplementing energy-dense cereal diets. To improve the productivity of the crop, it is necessary that along with advanced technology, seeds of improved varieties should be developed and made available to the farmers.

Keywords: Nutritional security, Pigeonpea, Seed production

IN India, productivity of pulses is low due to the complex socio-economic conditions of farmers, climatic conditions and lack of improved varieties. Around 5–6 million metric tonnes (MT) of pulses have to be imported every year to meet the national consumption of country. India produces 23.15 MT of pulses on average, while the requirement will be 32.64 MT by 2029–30. Share of tur/arhar dal (pigeonpea) in total area of pulses is 12% and production is about 18%. In 2020–21, pigeonpea (*Cajanus cajan* (L.) Millsp.) was cultivated in 4.56 mha with production of 3.83 MT and productivity was 751 kg/ha. Share of India in export of tur is 1.57% (4.02 thousand tonnes) and import is 7.98% (462.7 thousand tonnes). India, despite being an agricultural country, has such low productivity of pigeonpea, and thereby importing a large quantity is a matter of concern. Its productivity can be increased with advanced technology of seed production. Hence, after the development of early varieties, its area is gradually

increasing. It is a deep-rooted crop which fixes atmospheric N at 30–50 kg/ha of land, according to duration of variety.

Improved variety

According to duration, varieties of pigeonpea can be divided into the following three categories, viz. early (100–140 days), medium (140–160 days) and late (160–300 days) variety. A detailed description of varieties is given in Table 1.

Climate and land preparation

It is a major crop of tropical and sub-tropical regions and can be grown successfully in both wet and dry areas. Roots of pigeonpea can absorb water up to 3–4 m depth. Moist climate is required for its vegetative growth and sunlight is required at flowering and ripening. Loamy or sandy loam soil having pH 6–8, land with good water holding capacity and good drainage is the best for seed production. Deep ploughings should be done with soil turning plough or harrow and two ploughings should be done with the

help of cultivator or desi plough.

Isolation distance

Isolation distance for seed production area from other varieties should be 200 and 100 m for foundation seed and certified seed, respectively. For hybrid seed production, distance from one variety to other variety should be at least 300 m.

Seed and seed treatment

Seed rate of 12–15 kg seed/ha is sufficient for seed production. Before sowing, seed should be treated with Rhizobium culture @2 g/kg seed alongwith bavistin or thiram. If termite infestation poses a problem, then application of 5 ml chlorpyrifos/kg seed treatment should be done. Rhizobium culture should be used 24 h after treatment with fungicide (Table 2).

Sowing time and method

Sowing should be done from the end of May–June. The line-to-line distance at the time of sowing should be 60–75 cm and plant to

Table 1. Promising high yielding varieties of pigeonpea for seed production

Variety	Zone/state	Maturity (days)	Yield (q/ha)	Special feature
PKV, Tara (TAT-9629)	CZ	154–189	19–20	Indeterminate, semi spreading and tolerant to pod borer and pod fly
AGT2	Gujarat	170–180	15–16	Indeterminate, semi spreading, white and bold seeded, and medium maturity
Rajeev Lochan	Chhattisgarh	178	18–19	Resistant to wilt/sterility mosaic disease
WRG-65	Andhra Pradesh	150–160	14–16	Indeterminate, resistant to wilt and tolerant to pod borer
Phule T0012	CZ	135–150	18–20	Moderately resistant to fusarium wilt, SMD and tolerant to pod borer and pod fly
RGT-1	Telangana	150–160	14–15	Wilt resistant, semi-determinate, suitable to kharif and rabi
ICPH2671	Madhya Pradesh	180–190	15–16	Indeterminate, medium maturity, tolerant to wilt and sterility mosaic
BRG4	Karnataka	135–150	12–16	Indeterminate, semi-determinate, mid-early, suitable for normal/delayed sowing
IPA203	NEPZ	115–120	16–18	Resistant to sterility mosaic and tolerant to Phytophthora blight/Fusarium wilt
PRG176	Telangana	130–135	20–22	Indeterminate, semi spreading, suitable to low rainfall areas and Chalka soil
ICPH2740	Telangana	180–185	15–16	Indeterminate, semi spreading, resistant to sterility mosaic and wilt
BRG5	Karnataka	160–170	10–12	Indeterminate, semi spreading, red flowers and brown seeded (12.5 g/100 seed)
LRG52	Andhra Pradesh	170	15–18	Indeterminate, semi spreading, dark purple pods, brown and large-seeded,
Rajendra Arhar-1	Bihar	260–370	28–30	Indeterminate, erect and compact, dark brown, and oval seeds, resistant to sterility mosaic and moderately resistant to wilt.
GT103	Gujarat	140–150	15–16	Indeterminate, cream colour, and bold seeds mature in 175 days, resistant to SMD and tolerant to wilt

Source: Project Coordinator Report, Annual Group Meet on Pigeonpea, 2016–17, AICRP, ICAR, IIPR, Kanpur, Uttar Pradesh, India.

Table 2. Proper levelling for seed standard

Seed standard	Foundation seed	Certified seed
Pure seeds (min.)	98.0%	98.0%
Inert matter (max.)	2.0%	2.0%
Other crop seeds (max.)	5/kg	10/kg
Weed seeds (max.)	5/kg	10/kg
Other distinguishable varieties (max.)	10/kg	20/kg
Germination including hard seeds	75%	75%
Moisture (max.)	9.0%	9.0%
For vapour proof containers (max)	8.0%	8.0%
Off types (min.)	0.1%	0.20%
Isolation distance	200 m	100 m
Field visit	2	2

plant distance should be 10–15 cm.

Fertilizers/nutrient management

For seed production, 20 kg N and 50 kg P are required per hectare. In areas where there is a deficiency of Zn and K, use of zinc sulphate and muriate of potash is beneficial based

on soil testing report in those areas. While sowing, a full quantity of fertilizers is beneficial to use as seed drill.

Irrigation and drainage

Generally, irrigation is not required in pigeonpea. If there is

no rain for a long time, then first irrigation at 30–35 days after sowing (DAS) and second at flowering is required to obtain good yield.

Weed control and removing unwanted plants

It is advisable to do one weeding after 25–30 days of sowing. Rouging is an important process to maintain genetic purity of seeds. The first rouging at 30–35 DAS and the second rouging should be done at the flowering stage.

Insect Control

Blister beetle: Its outbreak occurs at flowering. These pests cause heavy damage by eating flowers. For its control, 1 litre of Nuwan or 2 litre of Decis/ha should be dissolved in 500–600 litre of water and sprayed.

Pod borer: It is the major pest of pigeonpea. It enters inside the pod and eats grains. For its control,



Crop at early stage



At flowering



Pod development

decis 2 ml/litre of water should be sprayed at flowering, and 15 days after first spray, second spray with monocrotophos or chlorpyrifos @1 ml/litre of water should be done. At pod formation stage, avant should be sprayed @0.5 ml/litre of water. Use insecticide at flowering stage should be avoided as it affects pollination.

Disease control

Fusarium wilt: This is main disease of pigeonpea. Attack of this fungus occurs at all stages of growth. After sowing, fungus attacks new born plants more due to non-availability of water after germination. Due to its infestation,

leaves start drying and root near the stem turns black. For its control, the affected plants should be removed along with root and burnt or buried deep in soil. Deep ploughing should be done in summer.

Yellow mosaic: It is a disease spread by a virus. Due to its infestation, plants remain small, leaves also become smaller, later turn yellow, and irregular-shaped spots are also formed on them. For its control, crop should be weed-free and the diseased plants should be uprooted and burned.

Harvesting and threshing

When pods are fully mature, they should be cut and kept for drying. After complete drying, the plants should be swept over a wooden surface, seed should be separated by thresher. While harvesting/threshing, special care should be taken that threshing machine is also cleaned.

Seed yield

Average seed yield of 2.5–3.0 t/ha can be obtained depending on variety. Pigeonpea seed production is a profitable business.

Grading, packing and storage

Before grading, seeds should be thoroughly dried and cleaned. For grading, bottom mesh size is 5.0 mm in grading machine. After grading, the seeds are placed on a wooden or plastic rack 6 inches above ground in warehouse and fumigated with sulphous in room kept closed

completely for 10 days, so that gas does not come out. After this, usually 2 or 6 kg packets are made and a tag is put on the packet by mixing them with thiram 2.5 g. Packing should be done only after seed testing. The seed is valid for sale for 9 months from date of the germination test. Name of the producer, crop name, variety name, bulk number, physical purity (minimum), germination percentage (minimum), genetic purity (minimum), net weight, test date, and validity date must be written on top of the tag.

SUMMARY

The ability of pigeonpea to survive drought makes it a suitable crop for smallholder farming. It has a deep taproot system that allows it to extract water and nutrients from the secondary level of the soil profile, allowing the plants to survive during the period of water scarcity. It is a versatile crop and is mainly used as seed pulses, source of energy and nutrients. India is poised to become a leading consumer with a growing population and hence, to improve the productivity of crop, it is necessary that alongwith advanced technology, seeds of improved varieties should be developed and made available to the farmers. In this regard, pigeonpea seed production offers economic and nutritional security for the farming community.

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