# Cultivation of Pigeonpea

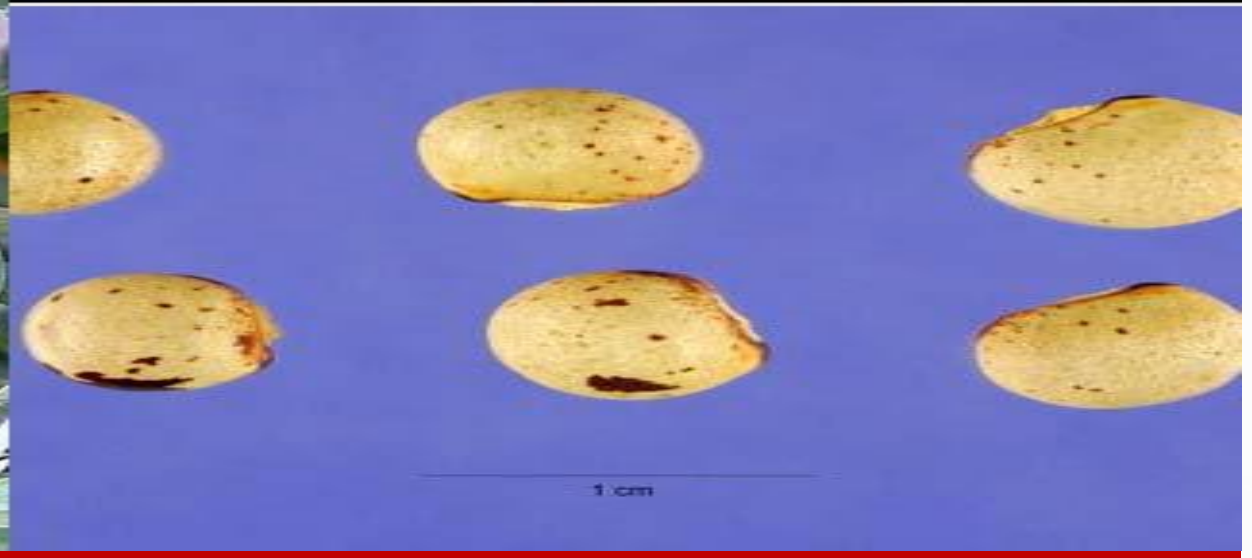
# Learning outcome

1. The students will understand the Cultivation of pigeonpea.
2. Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of pigeonpea

# School of Agriculture

**Course Code : AGRI2006** **Course Name: Production Technology for Vegetables and Spices**






**Name of the Faculty: Dr. Vivak Ujjwal** **Program Name: B.Sc. (Hons.) Agriculture**

**Semester: 3rd**

# PIGEONPEA (ARHAR)
# Botanical name; *Cajanus cajan L. Milsp.*
# Family: Fabaceae (Leguminoceae)

Pigeonpea is commonly known as redgram or *arhar. Pigeonpea seeds used as dal are rich in* protein (21%), iron and iodine. They are also rich in essential amino acids like lycine, tyrocene, cystine and arginine. The green pods are used as vegetable. The pod husk and leaves after threshing serve as a valuable fodder for cattle. Woody plant stems are used as fuel. Pigeonpea being a legume possesses valuable property as restorer of nitrogen in soil. Pigeonpea plants are also used to culture the lac producing insect in China. It is grown on mountain slopes to arrest soil erosion. The perennial pigeonpea is also useful in agroforestry
systems

# Origin

India is believed to be center of origin and diversity of pigeonpea. The theory of its African origin has not been accepted owing to lack of diversity in the region. The true wild relatives of pigeonpea are not seen. The closest wild relative of pigeonpea *Atylosia canifolia Hairs was* found in India and Australia.

# Classification

All the cultivated *Cajanus are classified into 2 groups based on maturity, floral and seed* characteristics as below. *Cajanus indicus var. bicolor: Also known as arhar comprises most of the perennial types that* are late-maturing, tall and bushy. Pods are dark coloured and each pod has 4 to 5 seeds. The standard petal, which is the largest of the 5 petals in the flower, possesses red veins on the dorsal side. Pods are synchronous in maturity. *Cajanus indicus var. flavus: Also known as tur comprises the commonly cultivated varieties,* which are relatively short statured, early maturing and bear yellow flowers and plain pods with 2-3 seeds. Pods do not mature at a time and picking is done at an interval of 15-16 days.

# Climate

Pigeonpea is a crop of arid and semi-arid climates grown between 30oN and 35oS latitudes and thrives well in areas with 500-1000 mm of rainfall. Its drought hardy nature makes it a crop of low rainfall situations; however, it can not withstand waterlogging and frost. Moist and humid conditions during vegetative phase and dry conditions during reproductive phase are suitable for successful raising of pigeonpea. Low temperature at pod filling stage results in delayed maturity. Pigeonpea is quantitatively a short day plant with critical photoperiod of 13 hours. Low light intensity at pod formation is harmful. For flowering and pod setting 24oC is the optimum.

***Seed rate and spacing***

The row spacing in *kharif varies from 40-60 cm in short and medium duration varieties to* 60-90 cm in long duration varieties. In *rabi season, the crop is grown in 30 cm rows. After* germination, the seedlings are thinned to maintain an intra-row spacing of 15-20 cm. The optimum population thus varies from 60,000-1, 00,000 in *kharif and 1.5-3.0 lakh/ha in rabi.* To achieve this, a seed rate of 8-10 and 10-12 kg/ha is required for long duration and short and medium duration varieties. During *rabi season, 15-18 kg/ha of seed is needed.*

***Seed treatment***

Before sowing, seed should be treated with agrosan GN or thiram @ 2.5 g/kg seed. Seed should also be treated with *Rhizobium culture, especially when pigeonpea is being taken for* the first time in the field or after a long duration. In pigeonpea, seed inoculation with *Trichoderma harzianum alone or serial inoculation of T. harzianum, followed by Rhizobium* may significantly reduce wilt incidence, enhance nodulation and root/shoot growth, but simultaneous inoculation of *T. harzianum + Rhizobium was ineffective.*

***Time of sowing***

Pigeonpea sowing in *kharif under rainfed condition varies from June-July, depending on* onset of monsoon. For sequential cropping of pigeonpea and wheat under irrigated condition, early sowings are preferred. In this cropping system, the crop is sown after a presowing irrigation from late May to 1st week of June. For summer pigeonpea, early May sowing is followed in north India. Time of sowing should be adjusted in such a way to avoid rains and frost at flowering and reproductive stages. For early *rabi planting in Bihar, eastern* Uttar Pradesh, West Bengal, September sowing is ideal. The *rabi cultivation of pigeonpea in* rice fallows is increasingly popular, and is sown immediately after rice harvest in southern India.

***Method of sowing***

Seed should be sown behind the plough or with the help of seed drill in rows. In northeastern plains zone and in vertisols, where excess moisture/water stagnation often causes mortality of plants during early stages, ridge planting of pigeonpea has proved superior over flat planting.

***Varieties***

The pigeonpea improvement through selection started as early as 1917 at Hebbal in Karnataka. Till date over 80 varieties have been developed, of which about 50% are elections from land races. Some of them include RG 72, SA-1, Type 66K, Hy 5, AL 15, Amar, Narendra Arhar 1, Bahar, LRG 36, etc. Through mutation breeding, 8 varieties have been developed since Co 3 released in 1977. Visakha 1, TT 5, TT 6, TAT 10, Co 5, Pusa 885, Co 6 are other varieties developed through mutation. ICRISAT has been successful in evolving first GMS (Genotypic Male Sterility) based hybrid ICPH 8. Later on, 5 more such hybrids have been developed. The difficulties in seed production (rogueing of female parent) have resulted in its limited success. This has been addressed with the development of first cytoplasmic MS based hybrid GTH 1 in Gujarat.

***Manures and Fertilizers***

The crop with 8-10 t biomass (of which 6 tonnes sticks) removes substantial quantity of nutrients. Being a legume, it can meet 60-80% of its own N requirement from symbiosis. A starter dose of 25 kg N/ha is applied at the time of sowing. At times of waterlogging for quick recovery immediately after drainage, 50 kg N/ha as top-dressing is applied to alleviate adverse effects of waterlogging. Besides N, 60 kg P2O5 is also applied as basal. The response to K fertilization is rarely noticed.

**Water management**

Long duration pigeonpea with deep root system and flushes of flowering can withstand drought. The short duration cultivars, however, are grown with irrigation only. Post-rainy season crop responds better to irrigation. The critical stages for irrigation are branching, flowering and pod filling. The crop requires 20-25 cm water to produce a tonne of grain. The water requirement and consumptive use of pigeonpea varies from 30-50 cm and 40-50 cm, respectively. At times of prolonged drought, irrigation at flowering and pod filling stages is highly rewarding in *kharif. Irrigation of after cessation of rains at 0.4-0.6 IW/CPE ratio has been* found ideal in north India. Drainage is equally important in pigeonpea. To overcome illeffects of waterlogging, ridge and furrow planting (with seeding on ridge) is followed in heavy soils.

**Weed management**

Pigeonpea is infested by several grassy and broad-leaved weeds. Some of the common weeds associated with pigoenpea are: *Cyperus rotundus L., Commelina bengalensis L., Phyllanthus niruri, Euphorbia parviflora L., Celosia argentena L., Amaranthus viridis L., Amaranthus spinosus L., Echinochloa colona (L.) Link, Digitaria sanguinalis, Dactyloctenium aegyptium (L.) Beauv, Ageratum conyzoides L., Eclipta alba L., Portulaca oleracea L., Trianthema portulacastrum L. etc.*

## Harvesting and Threshing

The best time to harvest is when two third to three-fourths of pods turn brown. The plants are usually cut with 'gandasa' or sickle within 7.5-25 cm above the ground. The harvested plants are left in sun for drying and thereafter threshing is done by beating the pods with sticks. Pullman thresher could also be used for this purpose. The proportion of seeds to pod is generally 50-60%. Threshed and cleaned produce should be further sun dried to reduce the moisture content to 10-11%.

## Yield

By adopting improved technology, pigeonpea (red gram) may yield 2.0-2.5 tonnes (*kharif),* 3.0-3.5 tonnes (*rabi) of grain/ha, 5.0-6.0 tonnes sticks, 0.8-1.0 tonnes of dry leaves and 0.2-* 0.3 tonnes of pod husk/ha.

## Attribute Value

Pods/plant: 43-260

Seeds/pod :2.6-4.7

1, 000 seed :weight (g) 45-105

# Refrences

1. Gangaiah, B. . Agronomy- Kharif Crops. Indian Agriculture Research Institute.
2. Tamil Nadu. Development of e- courses. AgriMoon.com