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# Organic Farming of Pigeonpea : Diseases and Management

**Pigeonpea is a major Pulse crop of our Country and grown in Maharashtra, Andhra Pradesh, Gujarat, Uttar Pradesh, Madhya Pradesh and Karnataka. The crop is rich in Carbohydrates, Vitamins, Calcium, Minerals and useful for human health. This crop is also affected by many diseases and pests and how to control them also given in this article besides the agronomical practices followed. However, good crop yield is obtained by raising the crop with organic methods.**

## INTRODUCTION

Pigeonpea is the major pulse crop of our country mainly grown during the Kharif season. Among pulses, this crop has second place after Chickpea in India. Maharashtra, Uttar Pradesh, Gujarat, Madhya Pradesh, Karnataka and Andhra Pradesh are the major Pigeonpea producing states in India. This crop is sown alone and also with other crops like jowar, millet, urd and cotton. The plant can grow up to 1-2 meter in height with very dense branches and stem can be up to 15 cm long. Its leaves are ovate, branching in solitary order and color is dark green. Its flowers are yellow and red in color. Long-term varieties of this crop increases soil fertility and productivity by stabilizing atmospheric nitrogen.

## NUTRIENT CONTENT

This crop has 20-21 percent protein; Carbohydrates- 62.78 grams, Fiber-15 grams, Vitamins like Thymine (B1) 0.643mg, Riboflavin (B2) (16%) 0.187mg, Niacin (B3) 2.965mg and minerals such as Calcium, 130mg, Iron 5.23mg, Magnesium 183mg, Manganese 1.791mg, Phosphorus 367mg, Potassium 1392mg, Sodium 17mg, Zinc 2.76 mg, etc. are available which is useful for human health.

## TYPES OF PIGEONPEA

It is grown as an annual or half-yearly crop. There are four types of Pigeonpea plants according to their species

- (1) As large plant or tree
- (2) Long varieties
- (3) Dwarf varieties
- (4) Small shrubs varieties



## CLIMATE

It can be grown well in both wet and dry areas but it requires irrigation in dry parts. In the early stage of harvest a warmer, moist climate is required for good growth of plants. However, areas with very heavy rainfall are not considered good for the cultivation of plants but crop can be grown well in areas with 75-100 cm annual rainfall. This crop is preferably sown by farmers in arid regions. Its cultivation can be beneficial in non-irrigated areas as it is the most suitable crop in arid regions due to its deep root and leaf-folding properties in high temperature conditions.

## FIELD SELECTION

Sandy loam soil with good drainage is the best field for growing this crop. The stagnation of water in the field causes great harm to the crop. Proper drainage and mild slopping fields are best for Pigeonpea cultivation. It cannot be cultivated successfully in saline and alkaline soil.

## FIELD PREPARATION

For Field preparation after first plowing of field, 2-3 plowing should be done with a native cultivator. However, after every plowing, it is necessary to provide adequate irrigation and drainage arrangements should be made in the field.

## ORGANIC FERTILIZER

The standard of organic manure for pigeonpea based on nutrients is that the crop should get 30 kg of nitrogen / ha like-

1) Indigenous cow dung manure contains 0.5% -1% nitrogen so 3-6 t / ha; Poultry manure contains 1.5-2% nitrogen so 1.5-2 t / ha and earthworm manure contains 1-1.5% nitrogen so 2-3 t / ha is good to use organic manure after soil testing in field. It is considered beneficial to use organic product to get a good yield.

2) Micro Gold 40 kg and Micro Neem 20 kg should be mixed thoroughly and sprayed in the ground before sowing seed and mixed well in the soil at the time of first plowing and other 2-3 ploughing by native cultivator.

## MAIN APPROVED VARIETIES OF PIGEONPEA

### UPAS-120

Maturity period 130-140 days

Average yield is 16-18 q / ha

For Pigeonpea-Wheat crop cycle

### JAGRITI (ICPL-151)

Maturity period 130-140 days

Average yield is 18-20 q / ha

For Pigeonpea -Wheat crop cycle

### SPRING

Maturity duration 240-250 days

Average yield is 20-25 q / ha.

Obstructive to infertile disease

Time and late sowing (September 1-20)

### TYPE 21

Maturity duration 160-170 days

Average yield is 16-20 q / ha

Pigeonpea - Sugarcane for crop cycle

### TYPE-17

Late ripening variety, crop duration of 270 days, plant length, semi-spreading, seed medium-sized and light brown, yield capacity is 20-25 q / ha, sparing and infertility mosaic disease.

### GWALIOR-3

Late variety, crop 240 days duration, plant long and spreading, suitable for cultivation mixed with sorghum, seeds short and light brown, average yield is 20-25 q / ha. There are other more progressive species such as Narendra Pigeonpea-1, Narendra

Pigeonpea-2, Azad Pigeonpea, Amar Pusa-9, Upas-120, Paras Sharad, Type-7, Prabhat and Pusa-84 etc.

### SOWING TIME

Early sowing of Pigeonpea crop is beneficial when proper irrigation facility available and sowing of crop should be done in between 1-15 June. Moreover, sowing should be done in the first week of July in areas dependent on rain water since the time of sowing has a direct effect on yield, hence sowing after first week of July gives yield loss.

### METHOD OF SOWING

Mix cropping is also done with Jowar and Bajra, etc. It is always best to sow the crop in rows. The distance of the rows always depends on sown peanut crop, maize, millet, moong and urd etc. Based on research in adverse conditions, it has been found that sowing crop in row's gives higher yield.

### SEED TREATMENT METHOD

To protect against seed borne diseases, biological fungicide *Trichoderma viride* was found effective @ 10 gm/ kg seed. For fertilizer management, treating seeds of pulses is also beneficial by Rhizobium culture. One packet of Rhizobium culture is sufficient for 10 kg of Pigeonpea seeds with the help of 50 gram of jaggery or sugar and mix well so that paste of the culture is attached on each seed. Treated seeds can be sown in the second day after drying. Never dry treated seed in the sun and do the seed treatment afternoon.

### DISTANCE

Row by row

45-60 cm and (quick ripening)

60-75 cm (medium and late ripening)

Plant to plant

10-15 cm (quick ripening)

15-20 cm (medium and late ripening)

### SEED RATE

12-15 kg per ha

### IRRIGATION

Since crop is sown in un-irrigated condition and irrigating should be done in the crop when there is no prolonged rainfall and at the time of pre-flowering stage and grain formation. For high pigment production, proper drainage in the field is the first condition so it is best to sow on ridges in low drainage

areas. Sowing of early crop should be done by pestering and sowing of other species in sufficient moisture during the rainy season.

### WEED CONTROL

Two weed controls should be done in this crop first 25-30 days after sowing and second 45-50 days after sowing. Weed control should be done within 30 days in early ripening species and 40-45 days after sowing in middle or late ripening species.

### MAIN PESTS OF PIGEONPEA AND THEIR MANAGEMENT

Pod borers, warp fly, juice sucking insects, leaf-eating insects and aphids-like insects cause damage up to 20-100% in this crop. The insect causes damage to early species from August to October. It weaves webs into inflorescence, beans and leaves. The insect eat sap inside inflorescence and buds causes damage. This pest reduces yields by about 20-35%.

### PEST MANAGEMENT

- All farmers should sow Pigeonpea crop in time.
- Crop trappings should be applied.
- Put pheromone trap or light traps.
- Shake the plants, drop the crates and collect them and destroy them and spend the expenses of sitting birds in the field for mulching.
- Take 5 liters of native cow's urine and grind it in Asafetida equal to 15 grams, soak the seeds in solution and keep it for 2 hours and then sow it. This is sufficient for 1 acre of field.
- Neem 250 ml (to make neem water, grind 25 kg of neem leaves thoroughly and boil them in 50 liters of water till 20-25 liters of water remains, then remove it and filter it) use 25 ml micro-jaaem and add one ml of magnesium in 1 kg in 200 liters of water and mix it well with micro-sprinkler and sprinkle.
- Grind 500 gm of garlic, 500 gm of hot green chilies and grind them in 150-200 liters of water and sprinkle on the crops. This will control the worms and suck the insects.
- Boil the *Ipomoea carnea* leaf and fruit of Dhatura, boil it in 33 liters of water, filter it after remaining half water, add 500 gram of Chickpea (Gram) to this water and boil it. Put this Gram near the bills of the mice in the evening and it will get rid of mice attack.

- Inter-cropping method will give full yield and in case of an outbreak of insect in the main crop or adverse weather conditions at any point of time, the crop will have definite benefit.
- Spraying of Neem oil or Karanja oil 10-15 ml + 1ml of sticky substance (eg. Sendovit Tiplal) solution per liter of water will give good yield.

## MAJOR DISEASES AND PREVENTION OF PIGEONPEA CROP

In pigeon crop damage is caused by several diseases and reduces yield by 10-50%.

### 1. WILT DISEASE

This disease is caused by fungus which is known as *Fusarium udum*. Plants can be infected with this disease at any stage after one month at the time of flowers, fruits and pods stage. The main symptom of this disease is light yellowing of leaves and withering of the plant. Such dry plants appear randomly in the field. However, from the disease plant, a brown stripe is seen moving upwards from the ground to the surface of the main stem. Removal of the skin of this part of the stem shows brown stripe at the bottom mainly it is a soil borne disease but its spread is also found by seeds.

### PREVENTION

Seed treatment with *Trichoderma viride* at the time of sowing of pigeonpea @ 5 kg / ha prevents from diseases such as Spotting. Disease free variety should be sown to avoid this disease such as Narendra, NPR (WR) 15, Sharda, Pigeonpea-2, C-11, Jawahar KM-7, BSM Sow RR-853 and Prabhat, etc.

### 2. STERILITY DISEASES OF PIGEONPEA

The disease is caused by a virus known as Pigeonpea Sterility virus. It is transmitted by a microscopic insect called *Aseria cajuni*, the main symptom of this disease is that plant becomes dwarf, clump-shaped and light-colored; the leaves are much smaller and thinner than normal and irregularly shaped on them. Light green and deep spots occur. Plants with disease remain small in length and have many branches due to which it starts appearing and shrunken. The growth of reproductive organs in the affected plant stops due to which there are no flowers and pods in it hence called as sterile disease.

### PREVENTION

To avoid this disease, sow disease free variety such as Bahar, Eh Y-3 C, spring, NP etc.

### 3. ALTERNARIA

The cause of this disease is a fungus called *Alternaria alternata* and *Alternaria tenuisima*, small circular brown spots are found on the leaves of pigeonpea. These spots get mixed together and turn into big spots due to which leaves scorch and branches dries when its infestation is high and its spots are also found on pods.



### PREVENTION

Disease free variety should be sown to avoid this disease such as Bahr, Basant, C-11, Jawahar KM-7, NP, etc. Make 10% solution of cow urine and buttermilk and spray it at a gap of 10 days.

### 4. PHYTOPHTHORA

The cause of this disease is a fungus known as *Phytophthora dressleri* and it infects only Pigeonpea and related plants. It is a soil borne disease and leaf part and stem of the pigeonpea plants are affected and not roots. Plants up to 1-7 weeks are damaged by this disease. This disease appears more in the medium and late ripening species than early ripening pigeonpea. Filling more water in the field is the main reason for this disease, so the infection of the disease is more in the lower part of the field where water logging is more due to lack of proper drainage facility.

### PREVENTION

Proper management of drainage should be done in the fields and sowing of seeds in the middle of June month.

### **HARVESTING**

Crop duration ready for ripening is 120-300 days and early crop is harvested in November to December month and late maturity crop is harvested in March to April month.

### **YIELD**

Yield of grains is achieved up to 15-35 quintals /ha.

### **STORAGE**

After drying the grain properly, percentage of moisture in it remains 10-12% and should be stored in proper store.

### **CONCLUSION**

Pigeonpea is an important pulse crop and very rich in protein, carbohydrates, vitamins, minerals and useful for human health. The crop is raised by using organic fertilizer and gives good yield. There are many pests and diseases affecting this crop and various management practices used for controlling are given in this article.