

# *The Strategies Used in the Cultivation Practices of Black Gram (*Vigna mungo* L.) in Summer Season*

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## **ABSTRACT**

A crucial leguminous crop recognized for its high nutritional content and capacity to improve soil is black gram, also referred to as urad bean. Its sensitivity to changes in moisture and temperature makes it difficult to cultivate in the summer without special techniques. Choosing heat-tolerant and early-maturing cultivars, deep plowing, and adding organic matter to improve soil fertility and water retention are important tactics. To guarantee consistent germination and the establishment of seedlings, precision sowing techniques like line sowing and ideal seed depth are used. Water management is essential, utilizing effective technologies like sprinklers or drip irrigation as well as irrigation scheduling. Common summertime pests and illnesses are addressed with integrated pest management techniques, which include biological control agents, resistant cultivars, and low-chemical insecticides. During the crop's growth phases, balanced fertilizers with both macro- and micronutrients are given to satisfy the unique demands of the crop. Timely harvesting to prevent losses from over-ripening or insect damage, along with appropriate storage methods to preserve seed quality, are all part of post-harvest management. In order to cultivate black gram in the summertime with high productivity and sustainability, a comprehensive strategy including crop management, soil health, water conservation, insect

control, and nutrient management is needed.

## INTRODUCTION

**B**lack Gram (*Vigna mungo* L.), scientifically known as black gram, is a well-known member of the *Leguminosae* family. In India, black gram is referred to by various names, such as urd bean, urid bean, matimah, matikolai, mash kalai, black matpe, uddu, and ulundu parippu, among others. Black gram is highly valued by people in India who follow a vegetarian diet. It can be consumed whole or cooked and is also used as flour to make bread, biscuits, porridge, and upma. Additionally, several dishes are prepared using its green pods. Black gram contains 9.7% water, 23.4% protein, 1.0% fat, 57.3% carbohydrates, and 3.8% fiber. Each gram of black gram contains 154 mg of calcium, 9.1 mg of iron, 0.37 g of riboflavin, and 0.42 g of thiamine. Its production can be affected by nutritional deficiencies, particularly those related to low soil fertility, especially low nitrogen. Nitrogen (urea) should be sprayed on the leaves before flowering to promote healthy development and an optimal plant population (Elayaraja, & Angayarkanni, 2005). Factors such as the appropriate seed rate and variety are crucial to realizing the high yield potential and net profit of black gram (Elayaraja, & Angayarkanni, 2005; Verma et al., 2011). It is a self-pollinating crop with yellow blooms and side inflorescences. It typically grows to a height of 30 to 50 cm. Black gram is one of the oldest and most significant crops in Asia (Kokani et al., 2014). As noted by FAOSTAT, it spread throughout Asia through trade and has become an important food grain legume in other regions of the world. According to Ministry of Agriculture and Farmers Welfare (2021), pulses are grown on 93.54 million hectares worldwide. India is the largest producer of pulses, with 287.83 lakh hectares under cultivation, producing 4.72 lakh metric tons

and achieving a yield of 885 kg per hectare. In India, Tamil Nadu alone has 8.03 lakh hectares under cultivation, with a productivity of 588 kg per hectare. Additionally, the summer black gram crop is rich in phosphorus and antioxidants, which promote healthy skin, blood circulation, immunity, and digestion. Black gram has two main uses: it can be utilized as animal feed or as a catch crop.

### Importances of black gram and pulses:

1. Pulses are a well-known plant-based source of protein, full of essential nutrients, and an important component of everyday diets in India.
2. When pulses and cereals are combined, high-quality protein is produced that the body may use up to 78% of.
3. According to the Directorate of Pulses Development, 60 g of pulses for adult males and 55 g for females are available daily, but Indian per capita availability is only 42 g daily.
4. The Indian government also actively promotes pulses production by offering minimum support prices (MSP) for cultivators.
5. Black gram advantages include enhanced digestion, enhanced energy levels, increased bone density, regulated blood sugar levels, and skin health promotion.
6. Black gram helps in relieving joint pain and promoting heart health, aiding in detoxification, and by including it in your diet, it can enhance well-being.
7. Black gram is a basic ingredient in South Asian cuisine utilized in 'dals', stews,

curries, and South Indian meals like Idlis and dosa (Nitin, 2023).

### Varieties of black gram suitable in the summer season:

Sr. No.	Varieties	Developed by	Maturity period	Seed potential (kg/ha)	
1.	BDU-1	TNAU	75 to 80 days	800 to 900	It is resistant to the yellow mosaic virus and drought-tolerant.
2.	TAU-1		70 to 75 days		
3.	TPU-4		65 to 70 days	1000 to 1100	
4.	Azad-1	IARI	70 to 75 days	900 to 1000	
5.	Pusa-1		65 to 70 days	1000 to 1100	
6.	Pant U-35	G.B. Pant University of Agriculture and Tech.	75 to 80 days	900 to 1000	
7.	Krishna, Naveen, Barkha (RBU-38), T-9, Pant-U-30, and IPU-2000 are some other varieties.				

According to Indian Agricultural Research Institute (IARI), “Recommended Varieties for Pulse Crops,” 2020.

### Land preparation and soil type:

To cultivate black gram in summer, select land free from previous year weeds and diseases, plough properly, harrow 2-3 times, level the land, and remove stubbles. Sow in April, the second fortnight after harvesting the Rabi crop. Use genetically pure, vigorous, and healthy seeds from authorized sources. It highlights how crucial loamy, well-drained soils with a perfect pH range of 6.0 to 7.0 are (FAO, 2019). The three main nutrients that are necessary for soil fertility are nitrogen, phosphorus, and potassium. Complete plowing, appropriate drainage, and soil testing before planting are examples of land preparation techniques. The preparation of seed beds is also covered in the book, along with recommendations for pre-planting fertilization and the benefits of organic matter and green manure for enhancing soil fertility and structure. There is also a discussion on sowing techniques, with suggested approaches according to local climate and seasonal conditions. Post-sowing care involves

waterlogging prevention, weed control, and irrigation techniques that are specific to the area (Marimuthu, & Surendran, 2015).

### Seed treatment:

A talc formulation of Trichoderma viride at 4 g/kg of seed, Pseudomonas fluorescens at 10 g/kg of seed, or carbendazim or Thiram at 2 g/kg of seed should be applied 24 hours before seeding. Biofertilizers and biocontrol agents are compatible; apply biocontrol agents to the seeds first, followed by rhizobium. However, biocontrol agents and fungicides are incompatible, as per the Agricultural Department, Government of India, Pulses Seed Treatment Guidelines, 2019.

### Seed rate and spacing for the black gram:

Season	Seed rate	Spacing
Kharif	12 to 15 kg / ha	30 X 10 cm
Summer	20 to 25 kg / ha	20-25 X 10 cm

#### Source:

[https://indiaagronet.com/indiaagronet/crop%20info/black\\_gram.htm](https://indiaagronet.com/indiaagronet/crop%20info/black_gram.htm)

### Climate Requirement:

1. It is often grown during the summer and kharif/rainy seasons.
2. It thrives in hot, humid climates with optimal temperatures between 25 and 35 degrees Celsius.
3. From sea level to an elevation of 1800 meters, it can be grown with success.
4. It is detrimental to have heavy rainfall during flowering.
5. It works well in regions with 60 to 75 cm of yearly rainfall (FAO, 2019)

### Irrigation management:

After seeding, water right away, and on the third day, water continuously.

Depending on the level of soil moisture, water every 7 to 10 days.

The stages of pod production and flowering are when irrigation is most important.

At every stage of crop growth, avoid water stagnation.

Additionally, drip fertigation is advised (FAO, 2018).

#### Nutrient management:

Nutrient management significantly impacts crop yield and growth, with nitrogen (N), phosphorus (P), and potassium (K) being the most important nutrients. The use of chemical fertilizers, organic manure, and biofertilizers can sustain agriculture by ensuring high crop yields without deteriorating soil health. Farmyard manure (FYM) is a crucial organic source for Indian farmers. Combining fertilizers with farmyard manure and vermicompost can improve black gram crop yield. In the summer, a moderate dose of nitrogen, phosphorus, and potassium is recommended, with gypsum applied at 125 kg/ha. Organic manure can also enhance soil fertility. Rhizobium culture can further improve black gram growth (Kumar, & Kushwaha, 2018).

#### Weed management:

According to Agricultural University of Maharashtra, "Weed Management in Pulses," 2021, three days after seeding, apply 1.0 liters of pendimethalin or pendimethalin + imazethapyr (ready mix) per hectare. On days twenty to twenty-five, weed by hand or by machine.

(Or)

Three days after seeding, pendimethalin was applied pre-emergence at 1.0 liter per hectare, and on 15–20 DAS, a tank mix of quizalofop

ethyl (500 ml per hectare) and imazethapyr (1 liter per hectare) was applied.

#### Pest and diseases management:

Sr	Pest and diseases	Management
1.	Yellow Mosaic Virus	<ul style="list-style-type: none"> <li>A viral disease transmitted by whiteflies causing yellowing, curling, and distorting of leaves.</li> <li>Controlled through cultivating resistance varieties, removing infected plants, seed soaking with borax, seed treatment with imidacloprid 600 FS, soil application of Bacillus subtilis, and yellow sticky traps.</li> </ul>
2.	Powdery Mildew	<ul style="list-style-type: none"> <li>Causes white powdery mass on leaves, stems, and pods, reducing photosynthesis and seed quality.</li> <li>Controlled through resistance varieties, avoiding dense planting, removing infected plant debris, and spraying fungicides.</li> </ul>
3.	Root Rot or Wilt	<ul style="list-style-type: none"> <li>Soil-borne fungal disease-causing yellowing, wilting, and potentially death of plants.</li> <li>Controlled through seed treatment with fungicide Trichoderma asperellum or Bacillus subtilis, avoiding continuous cropping, improving soil drainage, and applying organic manures.</li> </ul>
4.	Aphids	<ul style="list-style-type: none"> <li>Controlled through resistant varieties, weed removal, neem oil or soap solution, and seed treatment with imidacloprid 600 FS.</li> </ul>
5.	Pod Borer	<ul style="list-style-type: none"> <li>Controlled through pheromone traps, handpicking, destroying infested pods, applying neem oil and soap solution, and spraying neem-based insecticides.</li> <li>Controlled through intercropping with sowing three rows of sorghum or maize seed.</li> </ul>

#### Harvesting management:

##### Yield:

12–15 quintals of grains per hectare may be produced by a well-managed Urd crop. According to ICAR, "Guidelines for Harvesting and Post-Harvest Management of Pulses (2019)," when 80% of the pods are mature, or when the grain color changes from green to black and the leaves begin to turn yellow and shed, the crop is harvested to prevent loss due to pod cracking. Pods are threshed by trampling with a tractor, using a multi-crop thresher, or beating with a stick after being dried on the threshing floor for a week or ten days.

## CONCLUSION:

A thorough strategy is needed to overcome obstacles including high temperatures, scarce water supplies, and insect pressures while growing black grams in the summer. Utilizing heat-tolerant and early-maturing cultivars shortens the crop's growth season and increases resilience. Maintaining soil health and moisture availability requires effective water management techniques like precision irrigation as well as proper soil preparation techniques like deep plowing and organic matter inclusion. Biological controls, resistant cultivars, and targeted pest management are examples of Integrated Pest Management (IPM) techniques that limit crop loss and lessen the need for chemical pesticides. In order to fulfill the crop's nutritional demands at different phases of growth, encourage healthy development, and maximize yield potential, nutrient management is crucial. Adherent post-harvest procedures maintain the quality of the seed and reduce wastage, guaranteeing that the end product fulfills the intended criteria. Farmers may increase the profitability, productivity, and sustainability of black gram production by combining these tactics holistically. This will boost food security and agricultural resilience in harsh climatic situations.

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