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Modern Agrotechniques for cultivation of Black gram / Urdbean (Vigna mungo L.)

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Importance of Black gram:

1. It is one of the important pulse crop grown throughout India.
2. Generally it is consumed in the form of 'Dal'.
3. It is the chief constituent of 'papad, idly and dosa'
4. For milch cattle, it is used as nutritive fodder.
5. It is also used as green manuring crop.
6. It controls soil erosion and compete with weeds effectively due to its deep root system and foliage cover.
7. It contains protein (25%), carbohydrates (60%), fat (1.3%) and rich in phosphoric acid

8. It accounts 13 % total pulses area and 10 % total pulses production in India.
9. It fixes atmospheric nitrogen into soil and improve the soil fertility.

Climate :

1. It is generally grown in kharif/rainy and summer season.
2. It grows best in hot and humid condition with ideal temperature range between 25 to 35oC.
3. It can be grown successfully from sea level up to an elevation of 1800 meters.
4. Heavy rains during flowering are harmful.
5. It is best suited to areas having an annual rainfall of 60 to 75 cm.

Soil:

1. Black gram does well on heavier soils such as black cotton soils which retain moisture better.
2. It can be grown all types of soils ranging from sandy loam to heavy clay, except the alkaline and saline soils.
3. Loam or slightly heavy soils with neutral pH are best suited for urdbean.
4. Soil should be well drained and having good water holding capacity.
5. Waterlogged, saline and alkaline soil should be avoided.

Land preparation:

1. Good land preparations are necessary for better yield of black gram.
2. Land should be ploughed in summer followed by two to three harrowing at pre-monsoon for kharif season.
3. For summer black gram, after harvest of rabi crops, field prepare with criss-cross moghda once followed by two harrowing
4. Land should be well leveled.
5. Collect the weeds, previous crops stubbles, stones and clean the field for sowing.
6. Mix five to six tons of FYM or compost at last harvesting.
7. If necessary, one pre-sowing irrigation should be given.

Sowing:**a. Selection of seed:**

1. Seed should be free from insect, pest and diseases.
2. It should be free from any inert matter i.e. dust particles, weed seeds etc.
3. It should be purchased from Agril. Research station, universities, KVK's and registered seed companies /Agri. Service centers/Agriclinics.
4. Seeds should be viable and genetically pure.

b. Method of sowing:

1. Sowing should be done in line sowing\drilling method with tractor drawn ferti-cum-seed drill or by bullock drawn ferti-cum-seed drill/tifan.
2. Ferti-cum-seed drill should be used for the application of fertilizers and seed sowing at a time.
3. Seeds should not be sown more than 5 to 6 cm in depth.

c. Time of sowing:

1. Second fortnight of June (15 to 30 June) is the proper time of black gram sowing in kharif season.
2. In summer, sowing should be done from third week of Feb. to First week of April.
3. Late sowing should be avoided

d. Seed treatment:

1. Seed should be treated with thiram @ 2.5 g / kg seed
2. It should be treated with rhizobium culture for atmospheric N fixation.

e. Seed rate and spacing

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

Varieties:

Sr. No.	Varieties	Duration (Days)	Production (Q/ha)	Characters
1.	BDU-1	70-75	10-12	Bold seed
2.	TAU-1	65-70	10-12	Bold seed, Fast growth
3.	TPU-4	70-75	10-12	Bold black seed
4.	TAU-2	70-75	10-12	Bold seed, suitable for heavy soil
5.	Pant U-35	80-85	12-15	Medium black seed, high yielding
6.	Azad-1	80-90	12-14	Medium black seed
7.	Naveen	90-95	10-12	Light yellowish green colour seed
8.	Pusa-1	80-90	12-15	Resistant to yellow mosaic virus

9.	Krishna	90-100	8-10	Bold seeds
10.	Pant U-30	68-75	12-15	Hairy and black pods

Fertilizer management:

The recommended fertilizer dose for black gram is 20:40:40 kg NPK/ha. Fertilizer dose should be applied as per soil test report.

Sr. No.	NPK dose (kg/ha)	Fertilizer (kg/ha)	Time of application
1.	20 kg N	44 kg Urea	Basal application at the of sowing with ferti-cum-seed drill
2.	40 kg P	250 kg SSP	Basal application at the of sowing with ferti-cum-seed drill
3.	40 kg K	67 kg MOP	Basal application at the of sowing with ferti-cum-seed drill

Irrigation management:

Irrigation is not needed in rainy season, but in summer season irrigation should be given as per critical stages and availability of irrigation water. Number and frequency of irrigation depend upon the soil type and weather. The crop should get irrigation at an interval of 10-15 days. From flowering to pod development stage, there is need of sufficient moisture in the field.

Weed management:

One or two hand weeding should be done up to 40 days of sowing depending upon the weed intensity. Weeds can be controlled by the use of herbicides i.e. Fluchloralin (Basalin) 1 kg a.i. / ha in 800-1000 litres of water as pre-planting application.

Disease and insect pest control:

Sr. No.	Disease / insect pest	Control measure
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1.	YM virus	Grow resistant varieties like Pusa-1, KM-2. Spray Metasystox & Melathion
2.	Leaf curl	2-3 sprays of Metasystox at 10 days interval
3.	Seed/seedling rot	Seed treatment with Thiram/carbendazim 2.5 g/kg seed.
4.	Anthraco nose	Spray Mancozeb/zineb @2 kg in 1000 lit. of water
5.	Hairy caterpillar	Dusting 2n % methyl parathion @25-30kg/ha
6.	Leaf hopper	Basal application of Phorate @10 kg/ha. Spray monocrotophos @1ml/lit.water.
7.	Jassids	Basal application of Phorate @10 kg/ha. Spray monocrotophos @1ml/lit.water.

Signs of maturity, harvesting & threshing:

Pods and plant dried, Grains become hard, and moisture percent in grain at harvesting should be 20-22 %. Pod shattering is common problem in pulse. Therefore picking should be done as soon as pods mature. Harvesting should be done 2-3 pickings. The pods or whole crop after complete drying should be threshed manually or by machine.

Yield:

A well managed crop, as indicated above, may produce 12 to 15 quintals of grain per hectare.

Farmers Says There is A Drop in Black Gram Yield

Tamil Nadu: There is a fall in yield in black gram owing to scanty rainfall says farmers. In irrigated fields in Velukudi, Kombur and Neermangalam the crop has been raised. But there is depletion in groundwater table because of the failure of monsoon.

A farmer of Velukudi told that he had incurred an expenditure of Rs. 12,000 an acre and in three acres he raised the ADT 5 variety. He could realise only 150 kg against the normal yield of 4,000 kg per acre. These farmers pleaded for adequate compensation from the state government.

In the district mainly as a rice-fallow crop in Nagapattinam and Mayiladuthurai blocks, black gram had been raised on about 45,000 hectares. Normally the average yield was about 450 kg per hectare but because of the poor rainfall, the yield had been affected very much.

Normally the crop is usually raised during April in 85 to 90 days. In last year, due to timely showers the yield was highly appreciable. But the summer showers had failed this year and it is resulting in fall in yield.

The yield would even go up to one tonne a hectare under irrigated condition. The black gram yield is badly affected due to depletion in groundwater.

Source:<http://www.thehindu.com/>

Eight Steps to Get High Production of Black Gram

Step 1. Field Preparation: Prepare the land to fine tilth and form beds and channels.

Amendments for soil surface crusting: To tide over the soil surface crusting apply lime at the rate of 2t /ha along with FYM at 12.5 t/ha or composted coirpith at 12.5 t/ha to get an additional yield of about 15 - 20%.

Step 2. Seed Rate: Optimum plant population 3,25,000/ha

Step 3. Seed Treatment:

Seed treatment will protect the seedlings from seed borne pathogens, root-rot and seedlings diseases. So treat the seeds with Carbendazim or Thiram @ 2 g/kg of seed 24 hours before sowing (or) with talc formulation of Trichoderma viride @ 4g/kg of seed (or) Pseudomonas fluorescens @ 10 g/kg seed. Bio control agents are compatible with bio fertilizers. First treat the seeds with Biocontrol agents and then with Rhizobium. Fungicides and biocontrol agents are incompatible.

Seed Treatment with Biofertilizer: Treat the seeds with 3 packets (600 g/ha) of Rhizobial culture CRU-7 + 3 packets (600 g/ha) of PGPR and 3 packets (600 g/ha) of Phosphobacteria developed at TNAU using rice kanji as binder. If the seed treatment is not carried out apply 10packets of Rhizobium (2000 g/ha) + 10 packets of PGPR (2000 g/ha) and 10 packets (2000 g) of Phosphobacteria with 25 kg of FYM and 25 kg of soil before sowing.

Step 4. Fertilizer Application:

Apply fertilizers basally before sowing.

Rainfed: 12.5 kg N + 25 kg P₂O₅ + 12.5 kg K₂O +10 kg S*/ha

Irrigated: 25 kg N + 50 kg P₂O₅ + 25 kg K₂O + 20 kg S*/ha

Applied in the form of gypsum if Single Super Phosphate is not applied as a source of phosphorus
Soil application of 25 kg ZnSo₄/ha under irrigated condition. Soil application of micronutrient mixture @ 5 kg/ha as Enriched FYM (Prepare enriched FYM at 1:10 ratio of MN mixture & FYM ; mix at friable moisture & incubate for one month in shade).

Step 5. Sowing of Seeds:

For irrigated crop dibble the seeds adopting 30 x 10 cm cm spacing.

For rainfed crop dibble the seeds adopting 25 cm x 10 cm spacing.

Step 6. Water Management:

Irrigate immediately after sowing, followed by life irrigation on the third day. Irrigate at intervals of 7 to 10 days depending upon soil and climatic conditions. Flowering and pod formation stages are critical periods when irrigation is a must. Avoid water stagnation at all stages. Apply KCl at 0.5 per cent as foliar spray during vegetative stage if there is moisture stress.

Step 7. Spraying of Diammonium Phosphate or Urea, NAA and Salicylic Acid:

Foliar spray of Spray of NAA 40 mg/lit and Salicylic acid 100 mg/lit once at pre-flowering and another at 15 days thereafter.

For rice fallow crops foliar spray of DAP 20 g/lit once at flowering and another at 15 days thereafter. For irrigated and rainfed crops, foliar spray of DAP 20 g/litre or Urea 20 g/litre once at flowering and another at 15 days thereafter.

Foliar spray of salicylic acid 100 mg/litre once at preflowering and another at 15 days thereafter.

Step 8. Weed Management:

Pre emergence application of Pendimethalin 3.3 litres/ha under irrigated condition 2.5 litres/ha under rainfed condition on 3 days after sowing using Backpack/ Knapsack/Rocker sprayer fitted with flat fan nozzle using 500 litres of water for spraying one ha followed by one hand weeding at 20 DAS (or) EPOE application of quizalofop ethyl @ 50 g ai/ha-1 and imazethapyr @ 50 g ai ha-1 on 15 – 20 DAS. If herbicides are not applied give two hand weedings on 15 and 30 days after sowing.

For the irrigated black gram PE isoproturon @ 0.5 kg ha-1 followed by one hand weeding on 30 DAS.

Source:<http://agritech.tnau.ac.in/>

Black Gram: Black Gram Sowing is in Progress Briskly

Hopes among the farmers raised because of excess rain in Prakasam district which is in Andhra Pradesh. Farmer hopes to get some decent returns at least during kharif season this year and make good their losses incurred due to drought.

In case of some crops like black gram, red gram, groundnut, chillies etc. sowing is in progress briskly. "The crop coverage is likely to surpass the normal extent of 2.35 lakh hectares," said J. Muralikrishna, Agriculture Joint Director. Going by the prediction of the Met Department of 106 per cent rainfall in the district, where kharif and rabi seasons overlaps every year.

He said that, there is no shortage of seeds in the district, the department had positioned so far 7,000 quintals of seeds, including red gram (1,494 qtl), Sunhemp (1,416 qtl), green gram (1,396 qtl), black gram (208 qtl), as against the allotment of 17,878 qtl of subsidised seeds and if the situation warrants then they will procure additional quantity of seeds.

Prakasam District Agricultural Advisory and Transfer of Technology Centre (DATTC) released 10 new seed varieties coinciding with the kharif cropping season.

DATTC scientist O. Sharadha suggested the new red gram varieties LRG 104, LRG 105, and LRG 160

would be ideal for sowing during kharif by farmers to avert pest attack, and adding ryots could also go for black gram variety GBG1 and green gram variety GGG1.

Source: <http://www.thehindu.com/>

Black Gram: Now a Days Black Gram Cultivation Looks Advantageous

In the delta areas of Tiruchi district, the recent market prices of black gram has encouraged farmers to raise the crop under irrigated condition.

This indicates a shift in the cropping pattern adopted by farmers, who are from the canal irrigated delta areas of the district, says officials of Agriculture Department.

Generally after cultivating samba paddy the farmers go for a single black gram or gingelly crop, but now this time, in the filter point areas farmers have chosen a second black gram crop during summer. In other parts of the district under rainfed condition, the Black gram is raised.

Official say that, the normal area under irrigated summer blackgram in the delta area of the district is around 300 hectares and gingelly about 2000 ha. But due to the sudden spike in the blackgram price, which is currently ruling at more than Rs.100 per kg up by about Rs.30 a kg from the same period last year, more farmers have opted for the crop.

This summer, the area under irrigated gingelly has come down to 700 ha and the area under irrigated black gram is more than 1200 ha whereas. Most of the farmers in villages like Anbil, Komakudi, Kattur, Manakkal and Sathamangalam have cultivated VBN-6 black gram variety popularised by Agricultural Department, but these villages are traditional gingelly growing areas of the district.

Officials said, VBN-6 black gram variety is highly resistant to yellow mosaic virus disease, a dreaded disease in summer black gram which affects the yield drastically, has synchronized flowering and pod setting and comes to harvest in 70 days. This characteristic of the variety has encouraged the farmers to go for the variety.

The department has distributed certified seeds of the VBN-6 black gram variety with a subsidy of Rs.25 per kg under National Food Security Mission – Pulses (NFSM) through the agricultural extension centres in current year.

Officials are popularising the DAP foliar spray technology among farmers to provide adequate nutrients for the crop to boost the yield of black gram.

Source:<http://www.thehindu.com/>

IMARC Report for Setting up a Black Gram Processing Plant

The International Market Analysis Research and Consulting Group is a leading adviser on management strategy and market research worldwide. IMARC is one of the world's leading research and advisory

firms.

IMARC Group in its latest study provided detail information about global black gram market and the various requirements to set-up a black gram processing plant.

Analysis includes details about market trends, machinery, manufacturing process, land requirements, market size, profit margins, feedstock requirements, machinery requirements, etc. This study covers all the requisite aspects of the Black Gram industry.

IMARC's latest study "Black Gram Market – Industry Trends, Manufacturing Process, Plant Setup, Machinery, Raw Materials, Cost and Revenue" provides a techno-commercial roadmap for setting up a Black Gram processing plant.

Source:<http://www.pressreleaserocket.net>

Summer Sun Affects Black Gram and Delta Paddy Crops

More number of farmers were encouraged to take up summer paddy and pulses as the last monsoon season was heavy which recharged the groundwater level.

In Tamil Nadu, unforgiving heat is forcing the black gram farmers to increase the frequency of irrigation. From once in 10 days, they are now watering the fields once in 6-7 days.

Black gram – is cultivated in only around 2,000 hectares at present, this area under cultivation is expected to go up to 15,000 hectares in this Chithirai pattam. Black gram as it is expected to fetch them Rs.13, 000 per 100 kg.

The moisture is evaporating quickly due to the heatwave this year so farmers have to irrigate the fields once in two days using bore wells.

The normal area under summer paddy cultivation has seen increased this year. This year near about 37 per cent excess rainfall happened in last North East Monsoon. This excess rainfall brought up the average groundwater level to 3.58 metres below the ground level.

Source:<http://www.newindianexpress.com>

High Yield from Black Gram Farming in Kerala

In Kerala group of enthusiastic farmers have proved that sates climatic conditions are favourable for cultivation of black gram. A group of 15 women, engaged in works under the Mahatma Gandhi Rural Employment Guarantee Scheme successfully raised the leguminous pulse crop.

The group took up black gram cultivation on a trial basis on four cents of land and found it successful. The harvest was made after one and half months of sowing. After getting good returns from black gram crop they have raised a second crop and are awaiting harvest.

Black gram is generally cultivated in States such as Andhra Pradesh, Maharashtra and Madhya Pradesh. Due to higher market value of the crop, the area under the black gram cultivation is increasing.

Source:<http://www.thehindu.com/>

BARC's Black Gram Seeds Getting Popular Among Farmers

The Agriculture department had procured variety of seeds from the Bhabha Atomic Research Centre, Trombay, that are resistant to the yellow mosaic virus (YMV) and had given it to a few farmers so that they can be sown and more seeds produced. Impressed by the resistance of TU- 40 variety of black gram more farmers want the seeds.

Farmer G. Bhaskaran of Sozhampoondi village in Villupuram district, who got five kilos of the BARC variant, said that not even one plant got the bug that the crop is notorious for.

Though he and his neighbours were sceptical when they first sowed the seeds, they were doubly happy with the harvest. An official in the agriculture department, explained that, now around 360 kilos of urad dhal have been given back to the department so that it can be used as seed. Around 18 hectares could be cultivated using this quantity.

The YMV is a huge problem when it comes to urad dhal and many times, even up to 50 percent of the crop has been damaged. Another farmer said "The virus does not allow the pod to form. We can only prevent the spread of the bug but not repair damage it causes. This variety also seemed to be water resistant. The crop stood in water for over two weeks but managed to give such a good harvest."

An official of the agriculture department informed that, "The farmers were impressed by the yield of the plants and their resistance to the bug. We will now cultivate these seeds and get more seeds and then take them to more villages. Along with eliminating the bug, it will help increase pulse production." The seed had been earlier tried out in Tirunelveli district and there too the harvest was very good.

Sources in the BARC informed that the TU-94-2 variety had been released and notified for Tamil Nadu, Andhra Pradesh, Kerala and Karnataka. Farmers in other States have been using the seeds for over a decade now since the plant grows like a creeper.

Source:<http://www.thehindu.com/>

High Demand for Organic Black Gram in Tamil Nadu

In the last year there was an acute shortage for black gram in open market. The black gram cultivation has been taken up by the farmers extensively across the tail-end delta. As the overall demand for black gram has increased, farmers are encouraged to grow the cash crops.

The black gram cultivated through organic methods has been receiving good response from the urban populace of the State than their inorganic counterparts. Farmers here said that the demands for such consumer friendly black gram are such that they could not address the towering demands coming up

from neighbouring States.

According to district agriculture department, it is said that the black gram and green gram cultivation are extensively taken up across 85,500 hectares majority being in Mayiladuthurai, Sirkazhi, and Kuthalam area.

Black gram cultivation, strengthens the soil nutrients as black grams are known for imparting nitrogen content to soil.

Since the production of black gram has been facing a downfall leading to towering demands, the organic farmers here exploiting the heavy demands have constituted an organic pest repellent cum fertilizer for prevent pest attack and also to enhance the black gram yield for matching the demands.

As a kilogram of inorganic black gram fetches Rs. 120, the organically grown black gram has been fetching Rs.175 per kilogram. Farmers despite the heavy prices for organic black gram produce reasoned that batter made of organic black gram was found denser than the batter made with inorganic black gram.

Source: <http://www.newindianexpress.com>

Introduction

Black gram (*Phaseolus mungo* Roxb.,) is a highly prized pulse, very rich in phosphoric acid. It is also used in preparing papad (a kind of wafer) and barian (spiced balls of ground dal) and together with rice in preparing dosa and idli. The main areas of production being Madhya Pradesh, Uttar Pradesh, Punjab, Maharashtra, West Bengal, Andhra Pradesh, and Karnataka.

Requirement

•Climate

It is grown as rainfed crop in the warm plains as well as in the cool hills, up to an altitude of 2,000 metres. The cooking quality of black gram produced in the hills or in moist climate is claimed to be better.

•Soil

It prefers water retentive, stiff loamy or heavy soils, and does well on both black cotton soils and brown alluviums.

Varieties

'T 9', 'T 27', 'T 77', 'No. 55', 'Khargone-3', 'Mash-48', 'G 31', 'Pusa-1', 'H 10', 'UPU-1', 'UPU-2', T.P.U.-4, T.A.U.-1, T.A.U-2

Cultivation

For the pure crop in the kharif season, the land is ploughed once or twice and harrowed to obtain a rough tilth. The crop can be sown dry in furrows in between the rows of the previous crop, followed by irrigation.

Sowing

The sowing may be done either in February (early spring) or June-July (rainy season) or October-November (autum), depending on climatic and agricultural conditions and the variety grown. The seed rate is 10-15kg ha.

Fertilizer

Manuring with 25-40kg per ha of phosphorus (P₂O₅) and 25kg per ha of nitrogen (N) should be given at the time sowing. Also seed treatment with biofertilizer viz. Rhizobium at the rate of 25gram per kg of seed is beneficial.

Irrigation

Being kharif crop black gram is not required irrigation unless there is dry spell during the kharif season. Irrigation should be given according to soil type. Irrigation interval should be 8-10 days in summer. Flowering and pod filling are the critical stages for irrigation.

Plant protection

Pests

Aphids

The nymphs and adults suck the sap. The affected leaves turns yellow, get wrinkled and distorted. The insect also exude honeydew on which fungus develops, rapidly covers the plant with sooty mould that interferes with the photosynthetic activity of the plant.

•Control

Spraying with 0.05% Endosulfan, 0.02% Phosphamidon, 0.03% Dimethoate, Methyl demeton or Thiometon control the pest effectively.

Thrips

The adults and nymphs feed on leaves. They scrape the epidermis and such the oozing sap. As a result, light brown patches appear on infested leaves. The affected leaves curl and become dry.

•Control

Spraying with 0.05% Endosulfan, 0.02% Phosphamidon, 0.03% Dimethoate, Methyl demeton or Thiometon control the pest effectively.

Pod borer

Caterpillars feed on tender foliage and young pods. They make holes in the pods and feed on developing

seeds by inserting anterior half portion of their body inside the pods.

●**Control**

In early stage of attack handpicking of the caterpillars and their destruction. Ploughing fields after the harvest of crop would expose the pupae, which would be destroyed by birds. Spraying the crop with 0.05% Quinalphos or Fenitrothion can successfully control the pest. Spray with HaNPV @ 250 LE/ha.

Disease

Leaf spot

Angular brown or red spots, with grey or brown centre and reddish-purple border on leave, stalk and pods

●**Control**

Spray with Bordeaux mixture (5:5:50) or 0.2% Ziram.

Powdery mildew

White powdery patches on leaves and other green parts, later becoming dull coloured and are studded with black dot.

●**Control**

Dust the crop with finely powdered sulphur (200-mesh) @ 20kg/ha.

Harvesting and yield

To avoid loss because of the shattering of pods, the crop is harvested before it is dead ripe. One or two rounds of the picking of pods are also recommended to avoid losses because of the shattering. The plants are uprooted or cut with a sickle, are dried on the threshing-floor for a week or ten days and threshed by beating with sticks, and are winnowed with baskets. The average yield of grain from a pure crop varieties from 5-6q per ha, whereas yields up to 10-15q per ha.