Cultivation Practices of Mustard in Jharkhand: A Complete Package of Practices

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Introduction

Mustard (*Brassica juncea*), commonly known as sarson, is one of the most important oilseed crops in India and holds a special place in the agroecosystem of Jharkhand. The agro-climatic conditions of Jharkhand, especially in the plateau regions, offer favourable environments for mustard cultivation during the *rabi* season. As mustard requires less water compared to other *rabi* crops and matures early, it is highly suitable for the rainfed and resource-constrained farming systems prevalent in Jharkhand. This article provides a comprehensive package of practices for maximizing mustard yield and profitability in the region.

Climate and Soil Requirements

- **Climate:** Mustard thrives in cool and dry climates. The ideal temperature range is 10°C to 25°C during its growth period. However, high temperatures during flowering and grain filling can reduce yields. Therefore, early planting of this crop is suggested in this region.
- **Soil:** Mustard grows best in well-drained loamy to sandy loam soils with a pH of 6.0 to 7.5. The soils of plateau regions of the state are generally suitable, but Aluminium toxicity due to soil acidity affect the crop yield. In acidic soils, liming may be required to correct pH.

Recommended Lime Dose

- For moderately acidic soils (pH 5.0–5.5): Apply 2–4 tons of lime per hectare.
- For strongly acidic soils (pH <5.0): Apply 4–6 tons of lime per hectare.

Application Method

- Apply lime at least 1-2 months before sowing mustard to allow proper soil reaction.
- Mix the lime thoroughly into the soil during land preparation for uniform distribution.
- In severely acidic soils, applying lime in split doses over 2-3 seasons helps in better soil pH correction without nutrient imbalance.

Rainfall: As a *rabi* crop, mustard relies on residual soil moisture from the *kharif* season. However, one or two light irrigations during critical stages (flowering and seed filling) can significantly boost yields.

Varietal Selection

Selecting the right mustard variety is crucial for optimizing yield, especially in Jharkhand, where farmers often face constraints like limited irrigation facilities, residual soil moisture conditions, and the need for crop rotation with short windows. Short-duration mustard varieties are particularly beneficial as they mature faster, allowing farmers to fit them efficiently into multiple cropping systems and avoid late-season moisture stress. Short duration varieties maturing in 90–110 days will help in escaping terminal drought and high temperatures during the grain-filling stage.

- **Pusa Bold:** High yielding with bold seeds, suitable for timely sown conditions.
- **Pusa Vijay:** Early maturing variety suitable for rainfed areas.
- **Varuna:** Popular for its adaptability across diverse environments.
- **NRCHB-101 & RH-30:** Good for late-sown conditions with resistance to diseases.
- **BBM-1 (**Birsa Bhabha Mustard-1): Mustard variety developed by Birsa Agriculture University (BAU) for Jharkhand. It has a medium duration of 115–120 days, and an average yield of 16–18 quintals per hectare.
- **Shivani**: An early variety of mustard developed by BAU in 2005 suitable for Jharkhand conditions.

Land Preparation

After harvesting the *kharif* crop, prepare the field by giving 1-2 ploughings followed by harrowing to break soil clods and achieve a fine tilth. Use a leveller to make the land flat, which helps in uniform moisture conservation. Incorporate well-decomposed farmyard manure (FYM) or compost at 8-10 tons/ha during the final land preparation.

Sowing Practices

- **Time of Sowing:** The best sowing window in Jharkhand is from mid-October to early

November. Timely sowing ensures better growth and yield.

- **Seed Rate:** Use 3-3.5 kg of seed per hectare for line sowing.
- **Spacing:** Maintain a row-to-row distance of 30 cm and plant-to-plant spacing of 10-15 cm.
- **Sowing Method:** Prefer line sowing using a seed drill or behind the plough for uniform plant population and easy intercultural operations.

Seed Treatment

- Treat seeds with Carbendazim or Thiram at 2.5 g/kg of seed to prevent seed-borne fungal diseases.
- Inoculate seeds with Azotobacter or Rhizobium culture for better nitrogen fixation, especially in low-fertility soils.
- Seed treatment with metalaxyl (apron 35 SD) @ 6g/kg seed can reduce the yield losses due to white rust and downy mildew.
- For control of soil borne pathogens seed treatment with *Trichoderma* @ 6g/kg seed is advised.

Inter-culture Operations

Thinning

- Thinning is a crucial practice in mustard cultivation to ensure a uniform crop stand, which promotes healthy growth and higher yields.
- It should be done 15–20 days after sowing when seedlings reach the 4–5 leaf stage.
- Weak, diseased, or overcrowded seedlings are carefully removed to maintain a spacing of 10–12 cm between healthy plants.
- Thinning after light irrigation helps minimize root disturbance.
- This practice reduces competition for nutrients, light, and water, improves air circulation, lowers disease risk, and enhances overall crop productivity.

Insect Pests Management

Insect Pest	Management
Painted Bug	• Timely sowing of the crop. Apply 25 kg 1.5% quinalphos dust/ha at final ploughing • Apply quinalphos 1.5% @ 20-25 kg/ha after insect attack • Spray Malathion 50 EC @ 1 ml/lit of water
Mustard Aphid	• Destroy infested twigs • Apply Oxydemeton methyl 25 EC/Dimethoate 30 EC/Neem seed kernel extract @ 1 ml/lit of water • Release predators like Coccinellids, Syrhid, lacewing
Mustard Sawfly	• Spray Malathion 50 EC @ 1 ml/lit of water
Bihar Hairy Caterpillar	• Collect and destroy infested leaves • Spray Malathion 50 EC @ 1 ml/lit of water

Disease Management

Disease	Symptoms	Control Measures
Sclerotinia Stem Rot	White mycelial growth on stems, rotting, and stem breakage	Seed treatment with Carbendazim @ 0.2% or Trichoderma 6 g/kg seed; Foliar spray of Carbendazim 2 g/lit at 65-70 DAS; Avoid irrigation from 25 Dec to 15 Jan
White Rust & Downy Mildew	Milky white eruptions, malformed shoots, white downy growth on leaves	Seed treatment with Metalaxyl (Apron 35 SD) @ 6 g/kg seed; Foliar spray of Ridomil MZ 72 WP 2 g/lit after disease appearance
Alternaria Blight	Circular light brown to black spots with concentric rings on leaves and pods	Collect and burn diseased plants; Apply Mancozeb (Dithane M-45) 2 g/lit of water
Powdery Mildew	White powdery growth on all plant parts	Spray Dinocap 1 g/lit or wettable sulphur 2 g/lit at disease appearance

Weeding

Weeding is crucial, with two hand hoeing's recommended at 15-20 and 35-40 days after sowing (DAS). Pendimethalin @ 1 kg/ha (pre-plant incorporation) is effective against weeds. For Orobanche control, practice crop rotation and apply glyphosate @ 25 and 50 g/acre at 30 and 55-60 DAS

Nutrient Management

Application of N: P: K @ 80:40:40 kg/ha under timely sown condition and @ 100:50:50 kg/ha under late sown condition along with sulphur @ 40 kg/ha, zinc sulphate @ 25 kg/ha and borax 10 kg/ha. Half of the nitrogen to applied as basal dose and half at 30-45 days after sowing at the first irrigation. For rainfed crop apply the full recommended dosages of nutrients at the time of sowing. Replacing of diammonium phosphate with single super phosphate (SSP) (250kg/ha) resulting in availability of sulphur.

Irrigation Management

Mustard requires 190-400 mm of water. It is sensitive to moisture deficit stress during critical stages. Provide two irrigations: one at pre-flowering (35-45 DAS) and another during siliquae formation. Micro-sprinkler and drip irrigation improve yield and water use efficiency. Avoid irrigation between 25 December and 15 January to manage *Sclerotinia* rot.

Pest and Disease Management

Major pests include painted bug, mustard aphid, sawfly, and Bihar hairy caterpillar. Diseases like *Sclerotinia* rot, white rust, downy mildew and Alternaria blight affect yields. Integrated pest and disease management practices, including cultural, biological, and chemical controls, are recommended.

Harvesting and Threshing

Harvest when 75% of pods turn golden yellow, preferably in the morning to minimize shattering. Threshing should be done preferably by using threshers. Sun-dry seeds for at least a week to reduce moisture content before storage.

Yield Potential

With proper management, mustard can yield 12-15 quintals/ha under rainfed conditions and 18-20 quintals/ha with irrigation in Jharkhand.

Conclusion

Mustard cultivation in Jharkhand offers significant potential for increasing farm income due to its low water requirement, short growth period, and suitability for rainfed conditions. By adopting improved varieties, timely sowing, balanced nutrient management and integrated pest management, farmers can achieve higher productivity and profitability. Moreover, promoting mustard cultivation can contribute to reducing the India's dependency on imported edible oils, thereby enhancing self-sufficiency of the country.

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