at 35-40 days after sowing or either at 50% flowering or at early siliqua formation stage. In case, a rainfall of 20-25 mm is received during this period, no post sowing irrigation is essential.

- Q.13. What is the suitable time of harvesting, threshing and storage management?
- Ans. The crop should be harvested when 75 per cent of pods turn to golden yellow in colour. At this stage, majority of seeds are firm when pressed between fingers. The oil content in the seed is the maximum at this stage. For manual harvesting, use a sickle like Naveen sickle. After harvesting, the harvested plants are made into bundles and stacked in the sun for 7-8 days before threshing. Threshing should preferably be done by using threshers. Threshing is followed by winnowing, where the seeds are separated from the straw. The seeds should be sun dried for approximately one week to reduce the moisture content. For safe storage, moisture content of seeds should not be more than eight per cent.
- Q.14. What are the major insects of rapeseed-mustard in Assam and their control measures?
- Ans. Important insects: Among the major insect in rapeseedmustard, mustard aphid, saw fly, painted bug, pea leaf miner and bihar hairy caterpillar are the important insects commonly seen in Assam.
  - Y Mustard aphid (Lipaphis erysimi): Early sowing of the crop, using the recommended fertilizer dose, plucking and destroying infested twigs 2-3 times at 10 days interval can help the crop to avoid the infestation by mustard aphid. Use predators such as coccinellids, syrphid and lacewing, etc to minimise the incidence. Chemical control is done by spraying oxydemeton methyl 25 EC-or dimethoate 30 EC @ 1.0 litre dissolved in 800-1000 litres of water/ha.
  - Painted bug (Bagrada cruciferarum): Deep ploughing of the Ϋ́ field in summer, clean cultivation by weeding, hoeing and destroying of debris in and around the field, seed treatment with imidacloprid 70WS @5g/kg seed, conserving bio-contro agents such as Alophoraspp, applying first irrigation 3-4 weeks after sowing of the crop helps in reducing the population of insect. Chemical control is done by spraying malathion 50 EC @ 500 ml in 500 litres of water/ha in case of severe infestation during early stages.
  - Y Mustard sawfly (Athalia proxima): Same foliar control measures as recommended for painted bug.
  - Y Bihar hairy caterpillar (Spilosoma obligua): Dust the border of field with malathion 5% dust to check the spread of larvae to new fields. Dust the crop with malathion 5% @ 25-30 kg/ha against young caterpillars. Spray the crop with malathion 50 EC @ 1.0 litre in 500 litre of water/ha.

Y Pea leaf miner (Chromatomyia horticola): Foliar spray of systemic insecticide such as oxydemeton methyl 25 EC or dimethoate 30 EC @ 1.0 litre in 600-800 litre of water/ ha controls the pest effectively.





Q.15 What are the major diseases of rapeseed-mustard in Assam and their control measures?

Aphid

**Bihar hair** 

caterpiller

Mustard Sawfly Paninted Bug Leaf miner

- Ans. Important diseases: The important diseases affecting the production and productivity of rapeseed-mustard in Assam are Alternaria blight, white rust, downy mildew, powdery mildew and Sclerotinia stem rot.
  - Y Alternaria blight or leaf spot (Alternaria brassicae): Spraying of Iprodione or Mancozeb (Dithane M-45) @ 2 gm/lit of water at 15 days interval with a maximum of three sprays, normally at 45, 60 and 75 days after sowing is effective to control the disease.
  - White rust (Albugo candida) and Downy mildew (Hyaloperonospora parasitica): Seed treatment with Metalaxyl (Apron 35 SD) @ 6 g/ kg seed can minimize the spread. Spray the crop (maximum three sprayings) with Ridomil MZ 72 WP or Mancozeb (Dithane M-45) @ 2 gm/lit of water at 15 days interval with a maximum of three sprays.
  - Sclerotinia rot (Sclerotinia sclerotiorum): Seed treatment with Trichoderma 10 gm / kg seed, collecting and burning of the diseased plants along with sclerotia, follow crop rotation with non-host crops, sowing of healthy seeds free from the sclerotial bodies and spray of carbendazim @ 2gm or tebuconazole @ 1ml/litre of water at 60-70 DAS twice at 50 and 70 DAS will reduce its infestation.
  - Powdery Mildew (Erysiphe cruciferarum): Spray of 1 kg dinocap or 2 kg wettable sulphur/ha dissolved in 800 liters of water at the incidence of the disease is effective to control the disease.



Alternaria blight Whit Rust Downy mildew Sclerotinia rot Powdery mildew

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# **Rapeseed-Mustard Cultivation** in Assam Frequently Asked Questions (FAQ)



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# **RAPESEED-MUSTARD CULTIVATION IN ASSAM** FREQUENTLY ASKED QUESTIONS (FAQ)

- Q.1. What is the status of rapeseed-mustard production in Assam?
- Ans. The state of Assam is among the six major rapeseed-mustard crop producing states in the country. Among rapeseed-mustard, sesamum, niger, linseed and groundnut grown in Assam, rapeseed-mustard is the principal oilseed crop in Assam, contributes more than 92 per cent of the total oilseed area (2.86 lakh ha) and production (1.85 lakh tonnes) of the state during 2020-21. Assam contributes about 4.5 per cent of area and 2.05 percent of production of total rapeseed-mustard in India. Though rapeseed-mustard is grown in substantial area in Assam, but productivity is very low (647 kg/ha) in comparison to national (1524 kg/ha) as reported during 2020-21.
- Q.2. What is the scope of rapeseed-mustard production in Assam?
- Ans. Expansion of the crop to non-traditional areas, especially in ricefallow of Assam, is one option to increase production, because rapeseed-mustard is capable of growing under diverse agroclimatic zones. The vast availability of natural resources and fertile land offering ample scope to promote oilseed cultivation in Assam. Rapeseed-mustard has good production potential, if cultivation is supported with suitable technological interventions and knowledge inputs. There is a great yield potential of rapeseed-mustard in Assam as shown by the experimental/ demonstration yield of 10-15 g /ha against farmers' yield of 5-8 q/ha.
- Q.3. What is the regions of rapeseed-mustard low production in Assam?
- **Ans.** The following major regions of low production are:
- Ø Use of traditional varieties i.e. locally available materials, especially short duration toria (mostly nondescript naturally out crossed) varieties.
- Ø Non availability of quality seeds.
- Ø Low seed replacement Rate (44%).
- Ø Non adoption of improved production technologies (poor land preparation, sowing method, spacing, no balance fertilizers, no intercultural operations, harvesting at improper stage).
- Ø Delayed sowing due to the adoption of long duration rice varieties.
- Ø Non adoption of plant protection measures against Infestation of insect and diseases like mustard aphid, sawfly and painted bug, White rust, downy mildew and Alternaria Blight.
- Ø Low and erratic rainfall during winter.
- Ø Inadequate moisture conservation techniques.
- Q. 4. What is the strategic interventions for enhancing rapeseedmustard production in Assam?

Ans. Awareness and popularization of scientific cultivation of rapeseed-mustard in Assam, identification of suitable rapeseed-mustard varieties, facilitation of timely availability of quality seeds of improved varieties, improving adoption of production and protection technology through field demonstrations of varieties and technology, use of short or medium duration varieties of rice so as to complete timely sowing of rapeseed- mustard (latest by first week of November), optimum plant population through use of recommended seed rate and spacing, intercultural operation and use of recommended dose of fertilizers and adoption of need based plant protection measures are strategic interventions to enhance rapeseed- mustard production in Assam.

Motivation of farmers coupled with identification, use of inclusive technology package and provision of close institutional support for cultivators will be a great step to increase production and productivity of rapeseed-mustard.

- Q.5 What is suitable time of sowing and soil for rapeseedmustard cultivation in Assam?
- Ans. Delayed sowing of the crop could result in reduced yield and increased incidence of pest and diseases. Since rapeseedmustard crops are grown in diverse agro-climatic conditions, the optimum sowing time varies widely. It should also be ensured that crop is sown when the maximum day time temperature is not more than 32°C, which is essential for proper germination of the seeds. The optimum time of sowing in Assam is third week of October to middle of November. Toria can be sown up to last week of November. Early sowing helps in escaping the attack of aphids. The crop generally do well in well drained, leveled, and light to medium textured sandy loam-to-loam soils with pH 7. sandy/light loam soils. However, other light soils are also equally good.

### Q.6. How field preparation should be done?

**Ans.** Proper field preparation helps for maintaining a proper health and other soil characteristics required for the crop growth and to reduce the pest and diseases infestation. A fine seed bed is essential for rapeseed-mustard. The field should be ploughed 4-6 times followed by planking in order to obtain a fine tilth. Pulverize the soil, using cultivator or rotator before sowing. As moisture conservation tillage practice for rapeseed after sali rice, one cross ploughing by power tiller incorporating rice stubbles is recommended.

# Q.7. What are suitable varieties for Assam?

Ans. The DRMR-150-35. NRCHB-101 and PM-28 of Indian mustard and TS-38 of toria are the suitable varieties for Assam. It is suggested that Indian mustard varieties should be sown by second week of November preferably in irrigated situation while

Ans. To maintain the optimum plant population per unit area and uniform plant growth, thinning operation by removing the extra plants should be done at 15 to 25 days after sowing to maintain a distance of 10-15 cm between plants in a row. Intercultural operations helps in removal of weeds and conservation of soil moisture, especially in rainfed areas. Intercultural operation should be done 15-25 days or 35-40 DAS with khurpi or double wheel hand hoe before the first irrigation to keep the field weed free. The weeding should be done either along with thinning or immediately after thinning.

toria can be sown by end of November in irrigated as well as rainfed situation.

#### Q.8. How to treat the seed before sowing?

Ans. Seed should be treated with metalaxyl (Apron 35 SD) @ 6 gm/kg seed for white rust and downy mildew and carbendazim @ 2 gm/ kg seed or Trichoderma 10 g/kg seed for Sclerotinia stem rot disease. Seed should also to be treated with Azotobactor and PSB each @ 50 gm /kg seed.

### Q.9. What is recommended seed rate and spacing?

Ans. Seed rate of 7 kg/ha for toria and 6 kg/ha for mustard is optimum for broadcasting method. Seed rate can be reduced to 4-5 kg/ ha for line sowing through seed drill. 30 cm rows to row and 10-15 cm plant to plant distance should be maintained in irrigated condition.

# Q.10. What is the recommended dose of fertilizers for rapeseedmustard Cultivation?

 $\emptyset$  60-80 kg N, 40 kg P<sub>2</sub>O<sub>5</sub> and 30-40 kg K<sub>2</sub>O in irrigated and 40-60 kg N, 35-40 kg P<sub>2</sub>O<sub>5</sub> and 15-30 kg K<sub>2</sub>O in rainfed condition are recommended for different zones. However soil testing should be done for computing the exact fertilizer doses.

Ø Rapeseed-mustard have been found to respond well to the application of borax in some agro-climatic zones of Assam. Borax @ 10 kg/ha for North Bank Plains Zone, 5-10 kg/ha for Upper Brahmaputra Valley Zone and 7.5kg/ha for Central Brahmaputra Valley Zone are recommended, in addition to recommended dose of fertilizers.

Ø If SSP is not used as source of P, sulphur @ 20 kg/ha in the form of gypsum (135 kg/ha) should be used.

Ø Application of Lime: Ca  $CO_3$  in the form of dolomitic lime @ 500 kg/ha should be applied 15 days before seeding and incorporate in the soil in areas where multiple cropping is practiced.

Ø For rainfed crop apply the full-recommended dosages of nutrients at the time of sowing.

# Q.11. What is the importance of thinning and intercultural operations?

# Q.12. How many irrigations are recommended in rapeseedmustard?

Ans. In general, one irrigation of 6 cm depth of water may be applied