

Publication of Training Manual on "Seed Production Technology of Rapeseed-Mustard" during 2022-23.

Seed is a basic input in agriculture. In seed, the importance is given to the biological existence whereas; in grain the importance is given to the supporting tissue of the economic produce. The quality seed ensures genetic and physical purity of the crops, gives desired plant population and ensures uniform growth and maturity. It has capacity to withstand the adverse conditions and good quality seeds of improved varieties ensures higher yield of at least 10-15 %.

In view of that, ICAR-DRMR has developed and published an extension literature on "**Seed Production Technology of Rapeseed-Mustard**" in the form of training manual that will help the agricultural officials and farmers of the state for better understanding and to focus on the specific requirements, principles and activities needed to produce the quality seed of rapeseed-mustard that will ensure the sufficient availability of quality seed in the state. ICAR-DRMR has developed this training manual in English (Master copy) and that will be translated into local language by OPIU-Agriculture for printing of multiple copies and distribution to farmers will by District ATMAS. It covers importance and characteristics of quality seed, classes of seed, seed standards, scientific recommendations for quality seed production of rapeseed-mustard, etc. It will provide support to other extension methods and facilitate use at convenience and will serve as a future reference.

13. Rouging: Rouging is the activity to identify and eliminate unusual plants. The purpose of rouging is to maintain the genetic purity and variety of quality. Rouging is carried out generally from the vegetative phase to the harvesting phase. The unwanted and off-types plants are removed from the field based on the branching type, capsule size and colour of the seeds. Maximum percentage of off-type permitted is 0.10% for foundation seed production and 0.50% for certified seed production. Rouging is done repeatedly and systematically.

14. Harvesting and threshing: The crop should be harvested when 75 % of pods turn to golden yellow in colour. Threshing should be done with threshers after proper drying.

15. Storage: For safe storage, moisture content of seeds should be 8% or less, which can be achieved by sun drying of threshed seed for approximately one week.

16. Insects and diseases: Mustard aphid, saw fly, painted bug, pea leaf miner and bihar hairy caterpillar are the important insects and Alternaria blight, white rust, downy mildew, powdery mildew and Sclerotinia stem rot are important diseases commonly observed in Assam. The following strategy should be adopted for integrated management of insects and diseases of rapeseed-mustard in Assam.

- Proper cropping pattern to avoid disease and pests.
- Timely sowing.
- Mechanical removal of the crop residue of previous season.
- Seed treatment with Carbendazim 2g per (kg) seed for Sclerotinia rot and Apron 35 SD @ 6g/kg for white rust disease.
- Spray 0.2% Mancozeb to manage white rust, Alternaria blight and downy mildew and 0.1% Carbendazim for Sclerotinia rot and powdery mildew diseases.
- Pluck and destroy aphid-infested twigs thrice initially.
- For the control of mustard aphids at the economic threshold level (ETL), i.e., at least 10% plants having 26-28 aphids/plant, spray 0.025% Oxydemeton methyl 25 EC or 0.03% Dimethoate 30 EC.
- If *Coccinella septempunctata*, *Chrysoperla carnea* and *Syrphid* fly are seen in the field, then don't spray chemicals.

Strategy for self-sufficiency in quality seed of rapeseed-mustard in Assam

Strategies

- Seed rolling plan for next five year should be prepared.
- Ensure adequate and timely availability of breeder / foundation seed/quality seed as per plan.
- Training of farmers registered as seed growers in each district of the state for seed production.
- Incentives to seed growers to encourage quality seed production.
- Maintenance of seed purity and quality through regular monitoring and evaluation.
- State seed certification agency be set up in the state or to be strengthened.
- Adequate arrangement for seed procurement.
- Time bound programme for seed processing, testing and tagging.
- Construction of new processing centers, seed godowns under seed village programme.
- Seed bank to be set up in cluster villages.
- State seed farm in different agro-climatic zone of the state be strengthened and utilized properly.
- Seed testing laboratory to be set up in each district of the state
- Seed testing should be to ensure germination before distribution to the farmers.
- Post harvest drying, packaging and labelling of seeds imperative
- Conduct PVS (participatory varietal selection) to identify and disseminate farmer-preferred varieties.
- Introduce agri-clinics and agri-business centres.
- Facilitate rapid spread of quality seeds of improved hybrids/ varieties among farmers through
 - i. Demonstrations in cluster area.
 - ii. Dissemination of information on availability of quality through multimedia seeds to farmers.

***Estimated seed requirement of rapeseed-mustard for self-sufficiency in Assam**

Class of seed	Year	
	2023-24	2024-25
Proposed area (Lakh ha)	4.62	6.87
Total certified seed requirement @ 7kg/ha	3.23	4.81
Actual certified seed requirement @ 70% SRR (000 ton)	2.26	3.37
Foundation seed (Ton)	11.32	16.83
Breeder seed (Kg)	56.60	84.15
Total seed (CS+FS) (MT)	2271.3	3386.8

*Considering 70% seed replacement every year

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Training Manual / Folder No.: S/2022

Publication of technical folder on “Rapeseed-Mustard Cultivation in Assam: Frequently Asked Questions (FAQ)” during 2022-23.

Keeping in view of frequently asked queries by farmers and extension personnel, a simple and actionable farmer-friendly extension material in the form of technical extension folder on “**Rapeseed-Mustard Cultivation in Assam: Frequently Asked Questions (FAQ)**” in English was developed and published by ICAR-DRMR (master copy) and translation into local languages will be done by OPIU-Agriculture. Printing of multiple copies and distribution to farmers will be done by District ATMA. The folder contains the commonly asked questions and answers about the cultivation of rapeseed-mustard in Assam. It will help the extension personnel and farmers of the state to understand the different aspects of scientific cultivation of rapeseed-mustard in Assam and achieve higher productivity of the crop through adoption of recommended technology. The folder is handy that will provide opportunity to farmers and extension workers for reading, learning and/or referring. They are the best method for dissemination of information or a message. They save time and resources in dissemination of information to a large group of people. They can be used at any age. More efficient than oral languages.

at 35-40 days after sowing or either at 50% flowering or at early silique 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 rapeseed-mustard, mustard aphid, saw fly, painted bug, pea leaf miner and bihar hairy caterpillar are the important insects commonly seen in Assam.

- 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 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-control agents such as *Alophorasp.*, 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.
- Mustard sawfly (*Athalia proxima*):** Same foliar control measures as recommended for painted bug.
- Bihar hairy caterpillar (*Spilosoma obliqua*):** 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.

- 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.







Mustard Sawfly Painted Bug Leaf miner Aphid Bihar hairy caterpillar

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

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.

- 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 litres of water at the incidence of the disease is effective to control the disease.







Alternaria blight White Rust Downy mildew Sclerotinia rot Powdery mildew

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Rapeseed-Mustard Cultivation in Assam

Frequently Asked Questions (FAQ)



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