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Quality Seed Production and Storage in Wheat Crop

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Introduction

Quality seed act as catalyst for realizing the potential of all other inputs without which the investment on others inputs such as fertilizer, irrigation and pesticides will not pay desired dividends to the farmers as well as to the country. Use of quality seeds alone could increase 15-20 per cent of the yield and under optimum management condition; the increase may touch upon up to 45 per cent. Sustained increase in agriculture production and productivity is dependent, to a large extent, on development of new and improved varieties of crops and an efficient system for timely supply of quality seeds to farmers. Wheat is the second most important staple food after rice consumed by 65% of the population in India and is likely to increase further due to changes in food habits. Bread wheat which mostly consumed in the form of 'chapati' occupies 95 per cent of the total wheat area, where as Durum wheat, which is most suitable for making macaroni, noodles, semolina and pasta products, occupies about 4 to 5% of the area. Seed is one of the most critical inputs for enhancing the productivity of crops and availability of quality seeds is backbone to ensure food security of the nation.

Selection of field

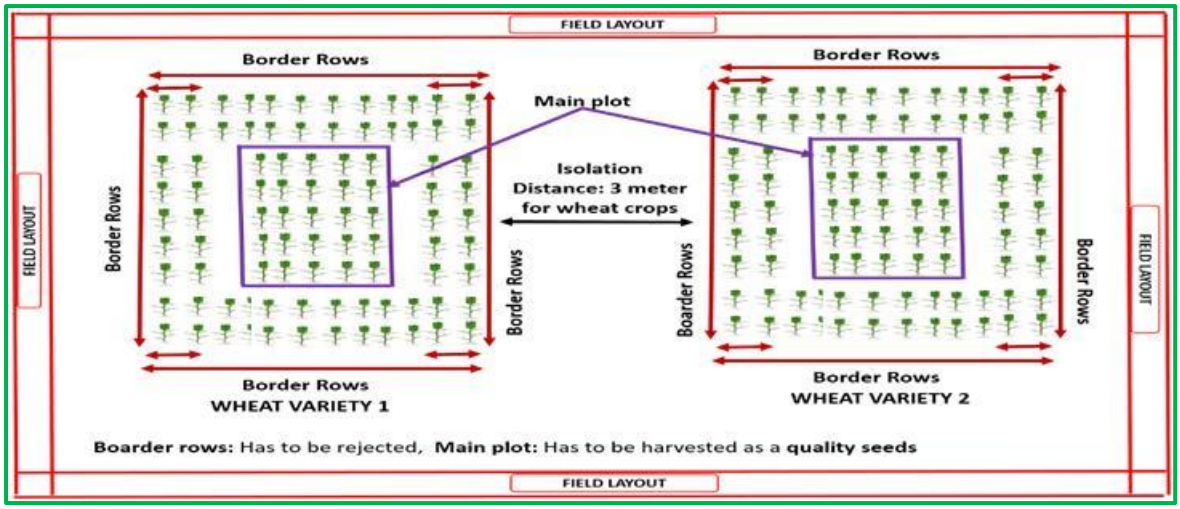
The soil in the seed production field should be fertile with adequate irrigation and good drainage facilities. The field should be devoid of high weed incidence and free from volunteer plants (Volunteer plants are the unwanted plants growing in the seed production field from the previous seasons' crop). The field should not be cultivated with the same crop in the previous season. It should have enough sunlight and proper aeration for the effective control of pest and diseases.

Land preparation

Soil condition in the selected field should be suitable for the crop. The field should be ploughed thoroughly without any lumps. Green manure crops can be raised in the field and incorporated in order to enhance the nutrient content of the soil. Organic manures like farm yard manure, compost and vermicompost can be used to enhance the soil fertility.

Field layout and Isolation distance

It is the distance maintained between the seed crops and the different varieties of the same crop located in the adjacent area in order to maintain the genetic purity of the seeds. The recommended isolation distance for variety to variety of wheat crops is 3-meter. Maintaining appropriate isolation distance avoids cross pollination and aids in maintenance of varietal purity.



Selection of variety

Selection of the variety based on preceding crops and time of sowing. The selection of variety is based on time of sowing such as early, timely and late sown variety. Early varieties will be sown on third week of October, timely sown varieties on fortnight of November and late sown varieties on 15th December to 25th December. For the quality seed production, optimal sowing date will aim to achieve a flowering date coinciding with minimal risk of heat shock and dry conditions during flowering and grain filling stage.

For example, the information on ICAR-Indian Agricultural Research Institute, New Delhi released wheat varieties are given below.

Wheat crops	Early sown wheat variety	Timely sown wheat variety	Late sown wheat variety
Date of sowing	22-24 October	15th November	15-25 December
Variety	HDCSW 18	HD-2967, HD-3086, HD-3226, HD-3237, HD 3043 etc.	HD-3059, HD-3271, HD-3298

The variety should be recently released, recommended in particular area/zones, required duration of the variety and high potential yield recovery etc. have to be selected for multiplication.

Seed rate

It varies with sowing time of wheat crops. Early and timely sowing of wheat crop required 100kg/ha and for late sown condition, it is 125kg/ha.

Seed treatment

Generally, seeds were treated with Vitavax @ 2.0 gm/kg seeds, and wherever termite infestation persist then Chlorpyriphos @ 2 ml/kg seeds is recommended.

Sowing method

Line sowing (use seed drill) is the best suited for quality seed production, row-to-row distance of 22-22.5 cm and plant-to-plant distance of 2-4 cm and depth of sowing should be at 2-3 cm.

Fertilizer doses and time of fertilizers' application

The variety give good response up to 150 Kg N, 60 Kg P and 60 Kg K/ha. All P and K and half of N can be applied as basal dose. The remaining half can be split in two equal doses, one immediately after irrigation and remaining after second irrigation. Zinc sulphate @ 25 kg/ha should also be applied at the time of sowing to harvest better yield

Weed control

- Pre emergence application of Pendimethalin @ 2.5-3 litre per ha in 500 liters of water will provide effective control both against grassy and non-grassy weeds.
- For the control of grasses and broadleaved weeds use Sulfosulfuron 75% + Metsulfuron Methyl 5% WG @ 40 g/ha can be sprayed using 500 litres of water/ha at 35-40 days after seeding.
- For the control of grasses and broadleaved weeds use Metsulfuron Methyl 20% WG @ 20 g/ha can be sprayed using 500 litres of water/ha at 35-40 days after seeding.
- For the control of complex weed flora combination of clodinafop and carfentrazone; or sulfosulfuron with metsulfuron can be applied at 30-35 days at sufficient soil moisture.

Bund weeds provides the shelter for the disease, insect and pest hence cleaning of bunds is most important activities in seed production plot.

Cleaning of bunds

Seed plots

The line sowing must be carryout, and after 08-10 lines, a gap of 50 cm should be given for easy field inspection. Seed plots must have uniformity.

Accepted seed plot

Rejected seed plot (If any variation)

Rouging

Off type plants can be identified in seed plot based on the variation noticed in features of the variety such as Auricle pigmentation, days of flowering, plant height, waxy bloom, ear color, ear shape, ear density etc. It is recommended to perform at least three rouging's i.e. one each at early vegetative growth, 75% ear emergence and maturity. The rouged plants, particularly those having physiological seed maturity, should be removed from the field and disposed-off from the seed plot to avoid any chances of its mixing with the harvested seeds.

Rouging of Off-type plant

Rouging of diseased plant

Major diseases, insect and pest control

To control stripe rust, leaf rust, karnal bunt and powdery mildew, apply propiconozole / triademefone / tebucanazole @ 500ml/ha in 500 litre of water as foliar spray twice after disease appearance at 15 days interval.

For the control of termite, use 1000ml of chlopyriphos along with irrigation or 16-20 kg of sand per hectare. For aphid, use dimethoate @ 1000ml or fenvalrate @ 500ml/ ha.

Field inspection

Field inspection is one of the most important steps in seed certification because varietal identification is worth full through inspection of standing crops in field. The seed crop is checked for proper isolation from other crops to prevent harvesting a mixture of seeds. Two to four field inspections are recommended to be done during seed production of crops.

Field inspection

Seed purity standards

A series of test should be undertaken to assess the quality seed. Generally, such tests are conducted in designed seed testing laboratories. Every state has at least on seed testing laboratory to conduct such tests.

Table 1: Minimum certification requirement of field standards

Parameters	Foundation seed	Certified seeds
Isolation distance	3	3
Loose smut disease	150	150
Off type plant (%)	0.05	0.2
Inseparable other crop plants (%)	0.01	0.05
Seed borne diseases infested plants	0.1	0.5

Source: Directorate of wheat research, Karnal-132001

Table 2: Minimum certification requirement for seed standards

Parameters	Foundation seed	Certified seeds
Pure seed (Minimum %)	98	98
Inert material (Maximum %)	2	2
Other crop seed (Maximum per kg)	10	20
Other distinguishable varieties (Maximum per kg)	10	20
Total weed seed (Maximum per kg)	10	20
Objectionable weed seed (Maximum per kg)	2	5
Germination (Minimum %)	85	85
Moisture (Maximum %)	10	11
Moisture for vapour proof containers (Maximum %)	8	8

Source: Directorate of wheat research, Karnal-132001

Harvesting

When the stem just below the spikes turn yellow from green, it is the signal that the crop is ready for harvest and it is best to cut and collect the wheat crop within 7 days of it. Generally, during the time of harvesting, moisture in wheat seed is around 20%. Wheat should be harvested in sunny day. Seed may germinate or rotten during storage, in case plant become wet by rain.

Method of harvesting of seed plots

The stalk is cut about 5-10 cm above the ground or with a stalk length of about 65-75 cm, which is easier for bundling and threshing.

Drying of quality seeds

Generally during the time of harvesting, moisture content of the fresh seeds is higher (20-25%). Seeds with high moisture contents have a high respiration rate and are susceptible to attack by micro-organisms, insects and other pests. Therefore, the harvested seeds with high moisture contents must be dried to make10-11% moisture for safe storage.

Processing of quality seeds

Once the seeds are harvested from field by following all the required field standards, it should be taken to the processing plant. Processing should be done only in the approved seed processing units. Each seed lot should accompany the processing report and each seed lot in the unit is verified with this report. Processing includes cleaning, drying, grading, treating

and other operations to improve the seed quality. Seed Officer will inspect the processing plant to check the possibility of mechanical mixtures.

Seed storage

Keep the processed and well dried seed in a gunny bag and stitch the opening. Prepare a wooden rack 15-18 cm above the floor level and stack the seed bags one above the other. Do not make the stacks more than 8-10 feet high and see that the seed bags do not touch the side wall, which will restrict the moisture from the floor and side wall reaching the seed. If the seed is well dried (optimum moisture), then it can also be kept in moisture proof polythene bags.

Do not make the stacks too high; because pressure of all the bags on the lowest bag may affect viability. The seed storage room should be airy and rat proof. Once the seed is packed and stored, put one tag inside the bag and the other tied outside the bag with the information like variety name, production date, season etc. so that the seed can be tracked back easily.

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