



### QUALITY SEED PRODUCTION OF BARLEY

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#### Introduction

Barley is a one of the important cereal crop in India. Rajasthan is the largest producer of barley in the country. Seed has played a crucial role in agriculture since ancient times. In modern agriculture quality seed also is an essential input that helps in exploiting the full potential of a variety. The seed that reaches to the farmers should have high genetic purity as well as high physical, physiological and health quality. In India farmers select and save the seed for next year sowing so therefore the seed supplied to the farmers should be of best quality. Therefore best practice to produce quality seed should be followed.

#### Climate:

Barley is grown over a wide range of latitudes ranging between 600 N to 600S and altitudes ranging from sea level to an elevation up to 3,500 m in the tropics and sub tropics. The ideal condition for vegetative period is cool and moist weather and during grain formation warm and dry weather. The optimum temperature for germination is between 20-22 °C and for vegetative growth ranges from 16-22°C. During the grain development period barley requires a mean maximum temperature of about 25°C for at least 4-5 weeks.

#### Land selection:

Selection of appropriate site is very essential for quality seed production. The seed production for barley crop should be taken at well drained, clean, productive and levelled land that is properly crop rotated. The previous cropping history of the field should be known to avoid contamination from volunteer plants, noxious weed and soil borne diseases.

#### Selection of variety:

The recent variety having more demand and adapted to particular environment should be selected

#### Sowing method:

Sowing with seed drill is recommended but not essential. However row planting has an advantage over broadcasting as it requires less quantity of seed facilitates, mechanized weed control, easy inspection and rouging of off-types.

#### Sowing time in different agro-climatic zones of India:

The sowing time for irrigated timely sown in different zones is as follows:

- Northern Hills Zone: First fortnight of November
- North Western Plains Zone: First fortnight of November
- North Eastern Plains Zone: Second fortnight of November
- Central Zone: 10 to 20th of November

- Peninsular Zone: Second week of November
- Southern Hill Zone: Last week of November month to first week of December.

**Seed rate:**

The optimum seed rate for barley seed production varies with location, time of planting and method of planting. For most of the condition 100kg/ha seed is optimum.

**Fertilizer application:**

Fertilizer application for the barley should be based on soil testing results. A well balanced supply of Nitrogen, Phosphorus and Potash is essential and for proper and efficient seed production as it has influence on seed development and seed quality. On an average 150Kg Nitrogen, 60Kg Phosphorus and 40Kg Potassium for a hectare is the recommendation if soil testing results are not available.

**Water management:**

Barley crop requires 40 cm (400 mm) of water to complete its life cycle. Barley crop needs irrigation when available soil moisture falls below 50-60 per cent of the field capacity. In general this crop requires 4-6 irrigations depending upon rainfall, soil type, tillage practices and water use by the genotype. For optimum barley productivity, irrigation scheduling is the important aspect because deficits of water as well as excess application of water adversely affect the production. Depending upon the availability of irrigation water, it should be applied at critical growth stages of crop which are crown root initiation (20-25 days after sowing), tiller completion /late tillering (40-45 days after sowing), milking (90-100 days after sowing) and dough stage (105-110 days after sowing). Crown root initiation and flowering and milking & dough are the most critical stages to moisture stress. Therefore, enough moisture must be ensured at these two stages of barley crop.

**Isolation distance:**

Barley seed field should be isolated from all sources of contamination (Genetic, physical and pathological) is one of the fundamentals of seed production. The minimum isolation distance from different contaminants is summarized in table below:

Contaminants	Minimum distance(meters)	
	Foundation seed	Certified seed
Fields of other varieties	3	3
Fields of the same variety not conforming varietal purity requirement for certification	3	3
Fields of barley, with infection of loose smut ( <i>Ustilagonuda</i> (Jens.) Rostr.) disease in excess of 0.10% and 0.50% in case of foundation and certified seed respectively	150	150

The specific requirement for foundation and certified seed production is summarized below.

Factor	Maximum permitted (%)	
	Foundation seed	Certified seed
Off-types	0.05	0.20
Inseparable other crop plants	0.01	0.05
Plant affected by seed borne (loose smut)disease	0.10	0.50

**Seed standards:**

Factor	Maximum permitted (%)	
	Foundation seed	Certified seed
Pure Seed (minimum)	98 %	98 %
Inert matter maximum	2 %	2 %
Other crop seeds (maximum)	10 /kg	20 /kg
Total weed seeds (maximum)	10 /kg	20 /kg
Germination (minimum)	85 %	85 %
Moisture (maximum)	12 %	12 %
For vapour proof container	8 %	8 %

**Crop management:**

Crop management should be optimal and similar to that of grain crop. However small differences are there:

- Use lower seed rate to increase multiplication factor
- Proper spacing to facilitate rouging and inspection
- Maintaining the species and variety purity
- Controlling diseases that are seed transmitted.

**Diseases and pest management in barley seed crop:**

**Seed treatment:** Seed should be treated with Vitavax 75 WP or Bavistin @ 2.5 g per kg seed before sowing.

**Smut disease:** In the month of May-June when sunlight is very bright hot treatment should be given before storing the seed. Seed should be soaked in water for 4-6 hours and spread on floor in strong sun light to control this disease.

**Rust disease:** As soon as yellow rust is observed in the field, one spray of Propiconazole 25EC @ 0.1 per cent or Tebuconazole 250 EC @ 0.1 per cent should be given to control the disease. One ml of chemical should be mixed in one litre water and thus 500 ml of fungicide mixed with 500 L of water should be sprayed in one hectare barley crop. Farmers should spray the crop preferably in the afternoon and when weather is clear (no rain, no fog etc.). Resistant genotypes should be grown.

**Termite:** Termite attacks the crop in early stage. Seed treatment is must to control this pest. For 1 quintal of barley seed 500 ml Chlorpyrifos 20 EC in 5 litre of water used for seed treatment.

**Aphid:** Spraying of Imidacloprid @ 0.4 ml per litre water on border rows for control of aphids as soon as aphids are spotted.

**Weed control:**

Metsulfuron @ 4.0 g or 2,4-D @ 500 g or Carfentrazone @ 20 g per hectare should be applied to control the broad leaved weeds in barley crop. Pre emergence application of Pendimethalin @ 1 litre per hectare is also quite effective in controlling broad leaved weeds. For grasses Sulfosulfuron 25 g, Clodinafop 60 g, Pinoxaden 40 g, and Fenaxoprop 100g per hectare should be applied. Sulfosulfuron is effective against both grassy and broad leaved (non-grassy) weeds whereas, Clodinafop, Fenaxoprop and are specific to grasses.

**Rouging:**

Removing undesirable plant is another fundamental of seed production. These undesirable plants include off types of genetic variants of the same variety, other varieties of

barley, noxious weeds and infected plants with seed borne diseases. This practice is carried out to maintain the genetic purity of the variety, and to keep the seed crop free from seed borne diseases.

**Harvesting, cleaning and storage:**

Mechanical harvesting is common practice of seed production fields. The critical factors to be considered during harvesting are seed moisture content, mechanical damage and cleanliness of equipments. After seed crop is harvested, the seed has to be dried and cleaned. During seed processing the raw seed received is cleaned in a series of steps from pre-cleaning, drying, air screen cleaning, length separation, gravity separation, seed treatment and bag weighing. After cleaning the seed is sent for bulk storage.

Varietal purity and identity of seed is ensured through field inspection of growing crops. Land requirement, isolation distance and seed source are confirmed. The presence of off types, other varieties, other crops, and seed borne diseases are determined based on inspection of representative samples that are compared with the standards. Seed crop that meet minimum field and seed standards are accepted for certification.

**References:**

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