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Capacity building and technology dissemination to enhance quality seed production through mega seed project SKUAST-Jammu (J&K)

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Abstract

Production of high-quality seed is fundamental to modern agriculture. Seeds are the foundation of agriculture. Technology has modernized much of farming's day-to-day operations, but without a steady supply of high-quality seed, yields and crop quality would be greatly decreased. Seed quality plays an important role in the production of agronomic and horticultural crops.

Characteristics such as trueness to variety, germination percentage, purity, vigor, and appearance are important to farmers planting crops. Seeds can serve as the delivery system not only for improved genetics but also for new planting and production methods and crop protection strategies that improve the overall efficiency of agriculture and reduce its environmental impact. To achieve the same a series of one day HRD Training programmes, Five day training programme on "Quality seed production of cereal crops", trainings under HRD component and Tribal sub plan at Rajouri (J&K) were conducted by Mega Seed Project-SKUAST-Jammu in the year 2018-19. The farmers and Officers of the alien departments were benefitted for improving the quality seed production.

Keywords: Quality seed production, capacity building, mega Seed project

Introduction

With the increased access to the information technology, the farmers are becoming more aware of the importance of quality in seed. The growers demand high quality seed that is capable of healthy and uniform emergence in the fields. Quality seed is one of the cheapest and most essential inputs for crop production. The quality traits that a seed lot intended for multiplication must meet follow:

Seed quality: Seed quality refers to the planting value of the seed. Seed is a living embodiment possessing production potentials and other traits like disease and insect resistance and quality etc. It is a vehicle of continuity of inherited characters and software of translating breeder's efforts into crop production in the field. The seed must possess some measurable attributes, which help determine its value for sowing.

Following are the most important quality characteristics for sowing. The ultimate aim of seed certification and testing is to make available high quality seed possessing the following indicators:

1. Analytical purity (Physical or mechanical purity): Analytical purity is the most important component of seed quality. It indicates how much of the seed material of the species named on the label is intact. It protects the farmers against the use of impure and adulterated seed having contamination of other crop species and inert matter etc. Analytical Purity has definite standards for various crop species, generally not less than 98%.
2. Species purity: It resembles analytical purity except for degree of admixture of other crop seeds like barley in wheat.
3. Varietal purity (cultivar purity): All field crop species have a number of varieties with different agronomic and botanic characteristics. Varietal purity refers to the genetic purity ascertained in the field, by examining growing plants, because as a general rule, varieties cannot be identified by an examination of their seeds in the lab except those possessing distinct characteristics.

4. Freedom from weeds: Weeds are a very serious problem of seed crops. So weed seeds are taken separately then other species. Weed seeds are present in almost all seed lots. There are some weeds that are very common and can be tolerated subject to the standards, but there are other weeds, which are noxious in nature and should be completely absent from the sowing seed. What is of importance is not the weight of weed seeds that is sown in a field but the number.
5. Germination capacity: The germination capacity indicates the potential of a seed lot to establish seedlings under good field conditions. A lot with high purity will be of no use for sowing if the seeds are incapable of germinating and producing strong seedlings in the field. The germination capacity of a seed lot is the percentage by number of pure seeds, which produce normal seedlings in a laboratory test. Germination capacity is the most important characters of a seed lot, so a seed lot with a higher germination capacity will always prove to establish more seedlings than the lot with a lower germination capacity.
6. Vigor: The germination capacity of a seed lot is the ability of producing normal seedlings under good field conditions, whereas the vigor represents its ability to do so under poor conditions. Seed lots with same germination capacity, especially with low percentage may perform differently under adverse or abnormal field conditions. Generally, high germination capacity is associated with high vigor. There is no standard vigor test however; high germination capacity may be taken as a good indication of vigor. Therefore, high germination should be preferred while purchasing the seed for sowing.
7. Seed size: Large seed size is taken as indication of vigor. The seeds contain an embryo alone or with endosperm as reserved food for developing seedlings. The bigger the size of seed, the greater will be the size of seedling with larger leaf area for photosynthesis. Further, a large seed if sown deep into the soil have more chances to reach the surface than a smaller one. In fact, it is not necessary that large seed size always produce higher yields. In wheat, it has been observed that plants from small seeds having similar populations and good field conditions can produce an equivalent yield of grain as large seeds. Seed size is expressed as the weight of a thousand seeds, 000 seed weight, or g/1000 seeds.
8. Moisture content: Moisture content is very important. It is the key factor in determining whether or not the seed will retain its germination from harvest to sowing time. Moisture can be determined in the laboratory. Moisture meters can help make quick on the spot assessment of moisture expressed as percentage by weight.
9. Homogeneity (Uniformity): The seed lot must be homogenous for its components. Every seed lot may have some mixture of inert matter, other crop and weed seeds. To make the contents of a seed lot consistently uniform, it should be thoroughly blended and made homogeneous before packaged and marketed.
10. Health: Seed health is important in controlling certain diseases particularly the seed-borne diseases, where the infection is carried over from one year to the next by the seeds like cereal smut and bunt. It is possible to identify most of the pathogens in the laboratory. Seed-borne diseases can be controlled by chemical treatment of the seed. Nevertheless, it would always be a good policy to use seed harvested from healthy crops.

Benefits of Using Quality Seeds: They are genetically pure (true to type). The good quality seed has high return per unit area as the genetic potentiality of the crop can be fully exploited. Less infestation of land with weed seed/other crop seeds. Less disease and insect problem. Minimization of seed/seedling rate i.e., fast and uniform emergence of seedling. They are vigorous, free from pests and disease. They can be adopted themselves for extreme climatic condition and cropping system of the location. The quality seed respond well to the applied fertilizers and nutrients. Uniform in plant population and maturity. Crop raised with quality seed are aesthetically pleasing. Good seed prolongs life of a variety. Yield prediction is very easy. Handling in post-harvest operation will be easy. Preparations of finished products are also better.

Material and methods

Capacity building and technology dissemination is required to reach to the masses/farmers and make them aware about the quality seed. In Various Seed Producing components of SKUAST–Jammu: Stations/Farms/Div./KVK's etc contributed for providing the quality seed/Planting material for processing/distributing to the Dept. of Agriculture/Farmers. The name of the centers contributing for the same are: The Seed production farm at Chakroi, Research Farm-Chatha, Division of Plant Breeding and Genetics, Division of Fruit Science, Div. of Vegetable Science and Floriculture, Div. of Agroforestry, ACHR-Udheywala, Adv. Centre for Rainfed-Dhiansar, RHRSS-Bhaderwah, Pulse Research Centre-Samba, Rainfed Research Sub-Station for Sub-tropical Fruits-Raya, KVK's of SKUAST-Jammu. Trainings are organized for the farmers and Officers of Agriculture/Allied departments.

Results and discussion

Training programmes on Quality seed production of various crops were conducted for generating awareness among farmers. The detail of seed production during 2018-19 (Table 1) and the training programmes (Table 2) conducted by Mega Seed Project, SKUAST-Jammu emphasizes the use of good quality and latest variety of seeds. The HRD trainings were undertaken with the objective to make aware the farmers and Officers/Personnel from Dept. of Agriculture about the importance of quality seed production. By increasing the seed replacement rate using high quality seed material the economy of the farmers will be enhanced. Quality seed is produced in various Seed Producing components of SKUAST –Jammu: Stations/Farms/Div./KVK's for processing/distributing to the Dept. of Agriculture/Farmers (Pardeep Wali *et al.* 2015-16, Dadlani M. *et al.* 2009, Hosamani J. *et al.* 2012, Kaddi G. *et al.* 2015, Singh B. and Tomar B.S. 2015) ^[1-5].

In Kharif 2018 total 239.65 quintals of quality seed was produced and in Rabi 2018-19, 629.00 quintals of seed was produced. Under HRD component five trainings were conducted in various places of Jammu region: Raya, Udampur, Chatha, Jammu on topics namely: Promotion of under utilized fruits in Rainfed area of Jammu sub tropics, Training program for Women farmers engaged in *Dhingri* cultivation, Quality seed production in Oats, Demonstration of propagation techniques in citrus crops for production of quality planting materials and Seed production and processing technology of cereal crops. Under tribal sub plan five training were conducted on titles namely: Seed production of composite Maize and its cultivation Forage production and management under semi temperate conditions, Seed

production of Okra under farmers field conditions, A sustainable approach to enhance production potential of existing farming system of tribal farmers of Budhal block of Rajouri, Importance of pulses and its scientific cultivation under mid hill conditions. A five day training programme on

quality seed production of cereal crops for Officials of University, KVK's and Dept. of Agriculture was conducted at SKUAST-J University campus.

Th training programmes conducted will surely have impact on the production and economy of farmers.

Table 1: Quality Seed Production during 2018-19 (In Quintals)

Particular	Kharif 2018		Rabi 2018-19		Total Production
	In Institute/University farm		In Institute/University farm (Approx. yield)		
Field Crops	Target	Achievement	Target	Achievement	
Breeder seed	32.85	39.65	105.00	126.50	137.85
Foundation seed	197.00	200.00	250.00	252.50	314.0
Certified seed	0.00	0.00	200.00	250.00	200.0
Total	229.85	239.65	555.00	629.00	651.85
Planting materials (Nos.)	-	-	-	-	4,12,599.00

Kharif crops: Rice, Urdbean, Til

Rabi crops: Wheat, Peas, Oilseed, Toria, Mustard, Oats

Table 2: Trainings organized (Number with brief details of different stakeholders)

Trainings	Title of the Training programme	Dated	Number	Stakeholders
HRD	Promotion of under utilized fruits in Rainfed area of Jammu sub tropics	12-06-2019	102	Farmers
	Training program for Women farmers engaged in <i>Dhingri</i> cultivation	27-06-2019	50	Woman Farmers
	Quality seed production in Oats	21-12-2018	50	Farmers
	Demonstration of propagation techniques in citrus crops for production of quality planting materials	10-09-2018	105	Farmers
	Seed production and processing technology of cereal crops	22-03-2018	25	Officers
TSP (Rajouri)	Seed production of composite Maize and its cultivation	19-06-2018	20	Farmers
	Forage production and management under semi temperate conditions	13-03-2019	20	Farmers
	Seed production of Okra under farmers field conditions	17-03-2019	20	Farmers
	A sustainable approach to enhance production potential of existing farming system of tribal farmers of Budhal block of Rajouri	18-03-2019	20	Farmers
	Importance of pulses and its scientific cultivation under mid hill conditions	21-03-2019	20	Farmers
NRSTC training	Organized Five days training Programme” Quality seed production of cereal crops”	22-26 th Oct. 2018	25	Officers

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