



BREEDING OF ELITE SEEDS

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Article history:		Abstract:
Received:	20 th July 2023	This article provides valuable information on elite seed breeding procedures, guidelines, methods, and nurseries to be established using single and mass selection, first- and second-year generations, and grading procedures.
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In seed renewal, all farms should be fully supplied with super elite and elite seeds of regionalized varieties.

Cultivation of elite seeds is aimed at restoring the valuable characteristics and qualities lost due to long-term reproduction and use of regionalized varieties in production.

The methods of cultivation of elite seeds can be different depending on the conditions of the area where they are grown, the type and variety of crops, and the volume of seed production. Institutions engaged in the cultivation of elite seeds are advised to use whichever method is most effective in their conditions.

When growing elite seeds, the following must be strictly followed:

- maintaining all the valuable biological and economic characteristics of the variety at the initial level;
- to create favorable conditions for the improvement of valuable signs;
- multiplying seeds rapidly, cleaning them from diseases and pests, preventing mechanical and biological pollution of the variety, keeping the purity of the variety at a high level.

Cultivation of elite seeds is based on the following three factors;

- testing and breeding the best varieties;
- selection of the best elite plants based on their productivity and other valuable characteristics in the cultivation of elite seeds;
- to take care of them in convenient and high-quality agrotechnics, to determine countermeasures for protection against diseases and pests.

Elite seeds of grain crops are bred by individual selection and screening of the offspring of selected plants. Also, in some cases, the mass selection method can be used in order to increase the seed quickly.

In the cultivation of the seeds of grain crops by alternating methods of individual and mass selection, the seed for planting in primary seed nurseries is obtained from any of the following nurseries:

- 1) from the seeds of ears selected individually from the breeding, super elite or elite nurseries with high purity of the regionalized varieties;
- 2) from the seeds obtained from the breeding field of institutions that own the variety;
- 3) for the first time from the seeds obtained from the breeding of regionalized varieties in scientific organizations and competitive variety testing nurseries.

The following nurseries are established when the method of single selection is used to grow elite seeds:

- 1) nursery for selection of first-year generations;
- 2) second-year seed nursery;
- 3) breeding nursery (1-2 years, sometimes up to 4 years);
- 4) super elite;
- 5) elite.

In the nursery of the selection of the first-year generations, families consisting of the seeds of ears selected individually from the fields with high productivity and variety specificity of this variety are planted. This nursery should be placed in a fertile field that is very well leveled in terms of soil surface and fertility.

About 1000 (should not be less than 300) best families are often planted in nurseries for selection of first-year generations. The number of families and their main quantitative indicators:

it should be in an amount that allows careful evaluation when comparing the length of the stem, total productivity, mass of one plant grain, productive cluster, amount of grain in a spike, mass of 1000 grains, grain quality and other valuable economic-biological characters.

Appropriate observations are made on the growth and development of plants in this nursery. Families with poor performance (diseased or contaminated) should be uprooted before harvesting on self-pollinating plants. The remaining best families are individually harvested and threshed, and after the unfit ones are eliminated by laboratory evaluation, the seeds of the remaining lines are planted the following year in the second-year progeny trial nursery.

It is appropriate to mathematically check the data of the lines selected from the nursery of the first year's generations, based on quantitative characteristics. In order to distinguish between heritable and non-heritable changes within the variety, it is best to use the main indicators of variation lines - the average expression of characters (S) and their standard deviation (X) for the entire set of lines. All lines are grouped into classes using these:

- X-3S to 1st class;
- X-2S to Class 2;
- X=S to class 3;
- X+S for 4th grade;
- X-2S to class 5;

Families with X+3S indicators are included in the 6th class.

Si the second-year generations seeds of families belonging to class X+2S are isolated and planted for planting in cannabis nursery.

The seeds of the lines selected from the first-year breeding nursery are sown in special planters or in rows in the second-year breeding nursery. In this case, it is easy to observe and exclude diseased and non-typical families. This nursery is also continuously inspected during the growing season, and out-of-species and diseased families are removed. The seeds from the second-year progeny test nursery are again examined and sorted in the laboratory, and the well-treated seeds are sown in the breeding nursery with seed drills.

Propagation nurseries can last from one to four years depending on the crop's reproduction ratio and elite seed requirements.

The job of a propagation nursery is to propagate seeds as quickly as possible. In this nursery, during the growing season, a study on the purity of the variety is carried out. In this case, some plants that are not specific to the variety and are diseased are uprooted.

The seeds grown in the breeding nursery must be absolutely pure. The crop grown in this nursery is harvested in a combine harvester, the seeds are then cleaned, sorted and treated, packed in new bags and stored in well-equipped warehouses. These seeds are used to establish super elite and then elite crops the following year (Table 1).

Table 1
The procedure for growing elite seeds of grain crops

T/p	Year	Cultivation types	Cultivation purpose	Reserve fund, %
1	1	First year generation testing (selection)	Generations are evaluated according to a number of signs and characteristics. The bad ones are removed and the good ones are selected.	100
2	2	Second year testing generations	Generations are reassessed, good ones are selected, and bad families are separated.	70-100
3	3	First year breeding nursery	Breeding seeds, breeding, keeping the purity and health of the variety.	50-70
4	4-5	Second and third year breeding nursery	Breeding seeds, maintaining the purity, cleanliness and health of the variety.	50
5	6	Super elite	Breeding seeds, maintaining the purity, cleanliness and health of the variety.	30-50
6	7	Elite	Breeding seeds, maintaining the purity, cleanliness and health of the variety.	25-30

The following nurseries are established when the mass selection method is used to grow elite seeds of grain crops:

- 1) Breeding nursery;
- 2) Super elite;
- 3) Elite.

Mass selection of the required number of typical plants, spikes for planting in the breeding nursery is carried out in the breeding nursery, super elite or elite high-yielding plots. The selected plants are checked by separating the grains from the ears and discarding the unsuitable ones. The seeds taken for planting are sorted in a laboratory and treated before planting.

In order to prevent accidental and biological pollution of varieties and to protect them from diseases, it is necessary to place them in limited areas from all the seed nurseries of one variety, especially from the selection plots of this crop.

If there are enough elite seeds of newly zoned varieties, it is allowed to use abbreviated methods in the usual way, if in small quantities. In order to quickly grow such seeds, any reproductive seeds of the variety are taken care of under high agrotechnical conditions, and the obtained harvest is formalized as elite seeds. In this case, during the growing season, plants are carefully planted in accordance with the purity of the type and variety, diseased and poorly developed plants are pulled out.

It is imperative that elite seeds grown at high speed fully meet the requirements of the state standard.

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