Classification of seed breader

The four (4) classes of seed recognized in seed certification are defined as follows:

6.1 Breeder Seed is the original source of all classes of certified seed. It is held, maintained, and controlled by the originating plant breeder, sponsoring plant breeder or institution, in such a way to maintain its genetic purity and identity. Breeder seed provides the direct source of Foundation seed.

6.2 Foundation Seed is the progeny of Breeder or Foundation seed produced under control of the originator, sponsoring plant breeding institution, or designee thereof. As applied to certified seed, Foundation seed is a class of certified seed that is produced according to policies and procedures established by the CCIA for the purpose of maintaining genetic purity and identity of a variety.

6.3 Registered Seed is the progeny of Breeder or Foundation seed. Registered seed is produced according to policies and procedures established by the CCIA for the purpose of maintaining genetic purity and identity of a variety. In some crops or varieties there is no Registered class.

6.4 Certified seed is the progeny of Breeder, Foundation, or Registered seed. Certified seed is produced according to policies and procedures established by the CCIA for the purpose of maintaining genetic purity and identity of a variety.

GENERATION SYSTEM OF SEED MULTIPLICATION

Generation system of seed multiplication is nothing but the production of a particular class of seed from specific class of seed up to certified seed stage. The choice of a proper seed multiplication model is the key to further success of a seed programme. This basically depends upon, a. The rate of genetic deterioration b. Seed multiplication ratio and c. Total seed demand (Seed replacement rate) Based on these factors different seed multiplication models may be derived for each crop and the seed multiplication agency should decide how quickly the farmers can be supplied with the seed of newly released varieties, after the nucleus seed stock has been handed over to the concerned agency, so that it may replace the old varieties. In view of the basic factors, the chain of seed multiplication models could be.,

a. THREE - Generation model - Breeder seed - Foundation seed - Certified seed
b. FOUR - Generation model- Breeder seed - Foundation seed (I)- Foundation seed (II) - Certified seed
c. FIVE - Generation model Breeder seed - Foundation seed (I)- Foundation seed (II) -Certified seed (I) - Certified seed (II)

For most of the often cross pollinated and cross pollinated crops 3 & 4 generation models is usually suggested for seed multiplication .e.g. Castor, Red gram, Jute, Green gram, Rape seed, Mustard ,Sesame , Sunflower & most of the vegetable crops. Opel Green Classes of seed

The four generally recognized classes of seeds are: Breeder's seed, foundation seed, registered seed and certified seed.

a) Nuclus seed: The initial hand full of seeds obtained from selected individual plants of a particular variety, for the purpose of purifying and maintain that variety, by originating plant breeder.

b) Breeder's seed: Progeny of Nucleus seeds, its production is directly controlled by the originating or the sponsoring breeder or institution, providing for the initial and recurring increase of foundation seed.

b) Foundation seed: The Progeny of breeders or foundation seed handled to maintain specific genetic purity and identity. This seed is the source of all other certified seed classes.

d) Certified seed: The progeny of foundation or certified seed that is handled so as to maintain satisfactorily genetic identity and purity and that has been approved and certified by the certifying agency.

DIFFERENCES BETWEEN CERTIFIED SEED AND TRUTH FUL SEED

Certified seed	**Truthful labelled seed**
Certification is voluntary	Truthful labelling is compulsory for notified kind of varieties
Applicable to notified kinds only	Applicable to both notified and released varieties
It should satisfy minimum field and seed standards	Tested for physical purity and germination
Seed certification officer, seed inspectors can take samples for inspection	Seed inspectors alone can take samples for checking

Difference between Seed and Grain

The difference between seed and grain is given as below:

Sr.No	Seed	Grain
1	Any plant part used for propagation is seed. It includes seeds category , rhizome , grafts etc.	It is final produce of grain crops used for consumption.
2	Can be treated with fungicide, pesticide.	Not treated with fungicide and Pesticide.
3	Embryo is important.	Endosperm is important.
4	Viability is important.	Viability never considers.
5	Genetic purity must.	Genetic purity not necessary
5	Genetic purity must.	Genetic purity not necessary
6	Comes under preview of seed acts.	Comes under preview of food acts.

C

Seeds vs Grains

A seed is defined as an embryonic plant covered in a seed coat, often containing some food. It is formed from the ripened ovule of plants after fertilization. Seed formation completes the reproduction cycle in seed plants, which begins with the growth of flowers and pollination. The embryo grows from the zygote while the seed coat grows from the ovule rind.

A grain is a small edible fruit, usually hard on the outside, harvested from grassy crops. Grains basically grow in a cluster on atop the mature plant and they include wheat, oats, rice and barley. Because grains are generally grown on a large scale, they are considered staple crops and they are the number one energy providers worldwide.

Technically speaking, we can refer to a seed as an ovule containing an embryo within, while a grain is a fusion of the seed coat and the fruit. In some grains like peanut, the shell can be separated from the fruit to reveal the seed. However, in other grains like corn, the seed coat and fruit tissue cannot be separated.

A seed typically has three basic parts which are the embryo, seed coat and the endosperm. Obviously, the embryo is the most important part because it is its cells that eventually differentiate and grow into the various tissues that constitute the plant eventually. The seed coat and endosperm simply provide support, although they are critical to the embryo's development.
Grains provide food mainly from the fruit part, for instance, food from wheat grain is derived from the ground fruit, which is a part of the grain. In crops like millet, it is actually the seed that has properties very similar to those of the fruit part of the grains, and that is why it is handled as a grain in culinary terms.
In seeds like peas (and pea-like seeds), sections of their embryo have very mealy properties when they are dried comparable to those of grains. These could be ground to get flour which can be very similar to the one taken from typical grains in culinary terms.

Summary

1. A seed is an ovule containing an embryo while a grain is a fusion of the seed coat and the fruit.
2. Typically, seeds are planted to grow plants while grains are harvested for food.
3. Grains provide food from the fruit part while seeds mainly provide food from embryo parts

General principles of Seed Production

Production of genetically pure and otherwise good quality pedigree seed is an exacting task requiring high technical skills and comparatively heavy financial investment. During seed production strict attention must be given to the maintenance of genetic purity and other qualities of seeds in order to exploit the full dividends sought to be obtained by introduction of new superior crop plant varieties. In other words, seed production must be carried out under standardized and well-organized condition.

Genetic Principle

1. Deterioration of varieties: Genetic purity (Truness to type) of a variety can deteriorate due to several factor during production cycles. The important factors of apparent and real deterioration of varieties) are as follows:

a. Developmental variation: When the seed crops are grown in difficult environment, under different soil and fertility conditions, or different climate conditions, or under different photoperiods, or at different elevation for several consecutive generations, the developmental variation may arise some times as differential growth response. To minimize the opportunity for such shifts to occur in varieties it is advisable to grow them in their areas of adaptation and growing seasons.
b. Mechanical mixtures: This is the most important source of variety deterioration during seed production. Mechanical mixtures may often take place at the time of sowing, if more than one variety is sown with same seed drill; through volunteer plants of the same crop in the seed field; or through different varieties grown in adjacent fields. Often the seed produce of all the varieties are kept on same threshing floor, resulting in considerable varietal mixture. To avoid this sort mechanical contamination it would be necessary to rogue the seed fields, and practice the utmost care during the seed production, harvesting, threshing and further handling
c. Mutations: This is not a serious factor of varietal deterioration. In the majority of the cases it is difficult to identify or detect minor mutation.
d. Natural crossing: In sexually propagated crops, natural crossing is another most important source of varietal deterioration due to introgression to genes from unrelated stocks which can only be solved by prevention

Natural crossing occurs due to following three reasons

i. Natural crossing with undesirable types .
ii. Natural crossing with diseased plants.
iii. Natural crossing with off- type plants.

Natural crossing occurs due to following factors

i. The breeding system of species
ii. Isolation systems
iii. Varietal mass
iv. Pollinating agent

a. Minor genetic variations: Minor genetic variations may exist even in the

   Varieties appearing phenotypically uniform and homogeneous at the time of their release. During later production cycle some of this variation may be lost because of selective elimination by the environment. To overcome these yields trials are suggested .

   Selective influence of diseases: The selective influence of diseases in varietal deterioration is also of considerable importance. New crop varieties often become susceptible to new races of diseases often caused by obligate parasites and are out of seed programmes. Similarly the vegetatively propagated stocks deteriorate fast if infected by viral, fungal and bacterial diseases. During seed production it is, therefore, very important to produce disease free seeds/stocks.

b. Techniques of plant breeders: In certain instances, serious instabilities may occur in varieties due to cytogenetically irregularities not properly assessed in the new varieties prior to their release. Other factors, such as break down in male sterility, certain environmental conditions, and other heritable variations may considerably lower the genetic purity.

Maintenance of Genetic Purity During seed Production:

The various steps suggested), to maintain varietal purity, are as follows.

a. Use of approved seed only in seed multiplication.
b. Inspection and approval of fields prior to planting.
c. Field inspection and approval of growing crops at critical stages for verification of genetic purity, detection of mixtures, weeds, and for freedom from noxious weeds and seed borne diseases etc.
d. Sampling and sealing of cleaned lots
e. Growing of samples of potentially approved stocks for comparison with authentic stocks.

The various steps suggested for maintaining genetic purity are as follows:

a. Providing adequate isolation to prevent contamination by natural crossing or mechanical mixtures
b. Rouging of seed fields prior to the stage at which they could contaminate the seed crop.
c. Periodic testing of varieties for genetic purity.
d. Avoiding genetic shifts by growing crops in areas in their adaptation only.
e. Certification of seed crops to maintain genetic purity and quality of seed.
f. Adopting the generation system.
g. Grow out tests.

Agronomic principles

1. Selection of a Agro-climatic Region

   A crop variety to be grown for seed production in an area must be adapted to the photoperiod and temperature conditions prevailing in that area.

2. Selection of seed plot

   The plot selected for seed crop must be free from volunteer plants, weed plants and have good soil texture and fertility The soil of the seed plot should be comparatively free from soil borne diseases and insects pests.

3. Isolation of Seed crops

The seed crop must be isolated from other nearby fields of the same crops and the other contaminating crops as per requirement of the certification standards.

4. Preparation of Land

Good land preparation helps in improved germination, good stand establishment and destruction of potential weeds. It also aids in water management and good uniform irrigation.

5. Selection of variety

The variety of seed production must be carefully selected, should possess disease resistance, earliness, grain quality, a higher yielder, and adapted to the agroclimatic conditions of the region.

6. Seed treatment:

Depending upon the requirement the following seed treatment may be given

a. Chemical seed treatment.
b. Bacterial inoculation for the legumes.
c. Seed treatment for breaking dormancy.

1. Time of planting

The seed crops should invariably be sown at their normal planting time. Depending upon the incidence of diseases and pests, some adjustments, could be made, if necessary.

2. Seed Rate

Lower seed rates than usual for raising commercial crop are desirable because they facilitate rouging operations and inspection of seed crops.

3. Method of sowing

The most efficient and ideal method of sowing is by mechanical drilling.

4. Depth of sowing

Depth of sowing is extremely important in ensuring good plant stand. Small seeds should usually be planted shallow, but large seeds could be planted a little deeper.

5. Rouging: Adequate and timely rouging is extremely important in seed production. Rouging in most of the field crops may be done at many of the following stages as per needs of the seed crop.

a. Vegetative / preflowering stage
b. Flowering stage
c. Maturity stage

1. Supplementary pollination

Provision of honey bees in hives in close proximity to the seed fields of crops largely cross pollinated by the insects, ensure good seed set thereby greatly increase seed yields.

13 .Weed control: Good weed control is the basic requirement in producing good quality seed. Weeds may cause contamination of the seed crop , in addition to reduction in yield:

14. Disease and insect control: Successful disease and insect control is another important factor in raising healthy seed crops. Apart from reduction of yield, the quality of seeds from diseased and insect damaged plants is invariably poor.

15. Nutrition:

    In the nutrition of seed crops, nitrogen, phosphorus, potassium, and several other elements play an important role for proper development of plants and seed. It is, therefore, advisable to know and identify the nutritional requirements of seed crops and apply adequate fertilizers.

16. Irrigation

    Irrigation can be important at planting for seed crops on dry soils to ensure good uniform germination and adequate crop stands. Excess moisture or prolonged drought adversely affects germination and frequently results in poor crop stands.

17. Harvesting of Seed crops:

    It is of great importance to harvest a seed crop at the time that will allow both the maximum yield and the best quality seed.

18. Drying of seeds:

    In order to preserve seed viability and vigour it is necessary to dry seeds to safe moisture content levels.

19. Storage of raw seeds: The best method of sowing seed for short periods is in sacks or bags in ordinary buildings or godowns.

Ag. Technologies (Seeds)

A high germination percentage is obviously desirable for the nursery man, anything other than pure germinable seed is waste. Therefore a germination or viability test should indicate the potential germinability which, with proper handling, should reflect expected germination in the nursery. Germination potential is most directly determined in a germination test: under the appropriate conditions everything that can germinate should germinate. Germination tests are widely used in both standard seed testing and more informal simple nursery tests. However, the tests have several limitations, some of which may either over-estimate or under-estimate the actual germination potential of a seed lot. Three situations where germination tests are less applicable are the following: • Where seeds have a very short viability. Duration of a germination test is typically 3-5 weeks. For short-lived recalcitrant seed significant loss of viability may take place during the test period. Hence, the germination percentage obtained by the test may not be valid for the seed lot from which it was taken because the viability of the seed lot has declined during the test period. • Where germination is delayed or suppressed by deep dormancy. If pretreatment has been insufficient to overcome dormancy, germination may be low even if seeds are viable. • Where fast test results are required. Especially for slow germinating species (some species take several months to germinate) the duration of a germination test may be inconvenient. Where a seed lot is to be dispatched soon after collection, there is often not enough time for a germination test. Figure 11.8. Approximate conversion scale of moisture content calculated on dry weight converted to moisture content on fresh weight basis (Willan 1985). 1

Seed germination test

Germination is defined as the emergence and development from the seed embryo, of those essential structures, for the kind of seed in question, indicates its ability to produce a normal plant under favourable conditions.

Principles

Germination tests shall be conducted with a pure seed fraction. A minimum of 400 seeds are required in four replicates of 100 seeds each or 8 replicates of 50 seeds each or 16 replicates of 25 seeds each depending on the size of seed and size of containers of substrate.

The test is conducted under favourable conditions of moisture, temperature, suitable substratum and light if necessary. No pretreatment to the seed is given except for those recommended by ISTA.

Materials required
Substratum

The substratum serves as moisture reservoir and provides a surface or medium for which the seeds can germinate and the seedlings grow. The commonly used substrate are sand, germination paper and soil.

1. **Sand**

Size of sand particle

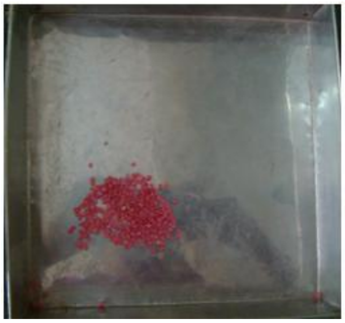
Sand particles should not be too large or too small. The sand particles should pass through 0.80 mm sieve and retained by 0.05mm sieve.

Toxicity

Sand should not have any toxic material or any pathogen. If there is presence of any pathogen found then the sand should be sterilized in an autoclave.

Germination tray

When we use the sand, germination trays are used to carry out the test. The normal size of the tray is 22.5 x 22.5 x 4 cm. The tray may either zinc or stainless steel.



Germination tray

Method of seed placement

Seed in sand(S)

Seeds are planted in a uniform layer of moist sand and then covered to a depth of 1 to 2 cm with sand.

Sand method

Top

Top of sand (TS)

Seeds are pressed in to the surface of the sand.

Spacing

We must give equal spacing on all sides to facilitate normal growth of seedling and to avoid entangling of seed and spread of disease. Spacing should be 1-5 times the width or diameter of the seed.

Water

The amount of water to be added to the sand will depend on size of the seed. For cereals, except maize, the sand can be moistened to 50% of its water holding capacity. For large seeded legumes and maize sand is moistened to 60% water holding capacity.

2. **Paper**

Most widely used paper substrates are filter paper, blotter or towel (kraft paper). It should have capillary movement of water, at vertical direction (30 mm rise / min.). It should be free from toxic substances and free from fungi or bacteria. It should hold sufficient moisture during the period of test. The texture should be such that the roots of germinating seedlings will grow on and not into the paper.

Methods

Top of paper (TP)

Seeds are placed on one or more layers of moist filter paper or blotter paper in petriplates. These petriplates are covered with lid and placed inside the germination cabinet. This is suitable for those seeds which require light.

Petriplate method

Between paper (BP)

The seeds are germinated between two layers of paper. The seeds are placed between two layers of paper and rolled in towels. The rolled towels are placed in the germinator in an upright position.

Germination paper

Seeds germinated on paper

Roll towel method

Top

Germination apparatus

Germination cabinet / Germination room

This is called chamber where in temperature and relative humidity are controlled. We can maintain the temperature, relative humidity and light required for different crops.

Room germinator

It works with same principle as that of germinator. This is a modified chamber of larger one and the worker can enter into it and evaluate the seedlings. Provisions are made to maintain the temperature and relative humidity. This is used widely in practice.

Seed germinator

Seed counting board

This is used for accurate counting and spacing of seeds. This consists of 2 plates. The basal one is stationary and top one is movable. Both top and basal plates are having uniform number of holes *viz*., 50/100, when the plates are in different position.

After taking the sample, the top plate is pulled in such a way that the holes are in one line so that the fixed number of seeds falls on the substratum.

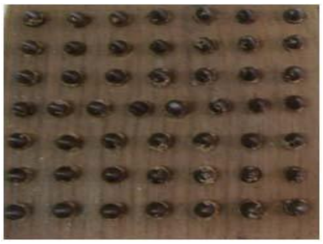
Vacuum seed counter

Consists of a head, pipe and wall. There are plates of 50 or 100 holes which can be fitted to the head.

When vacuum is created the plate absorbs seeds and once the vacuum is released the seeds fall on the substrate.

Impression board

Made of plastic / wood with 50 or 100 holes / pins. Here the knobs are arranged in equal length and space. By giving impression on the sand it makes uniform depth and spacing for seed.



Impression board

Evaluation of germination test

The germination test is evaluated as

- Normal seedlings
- Abnormal seedlings
- Hard seeds
- Fresh and ungerminated seeds
- Dead seeds

ISTA classified the seedlings into different categories based on the development of essential structures.

Normal seedlings

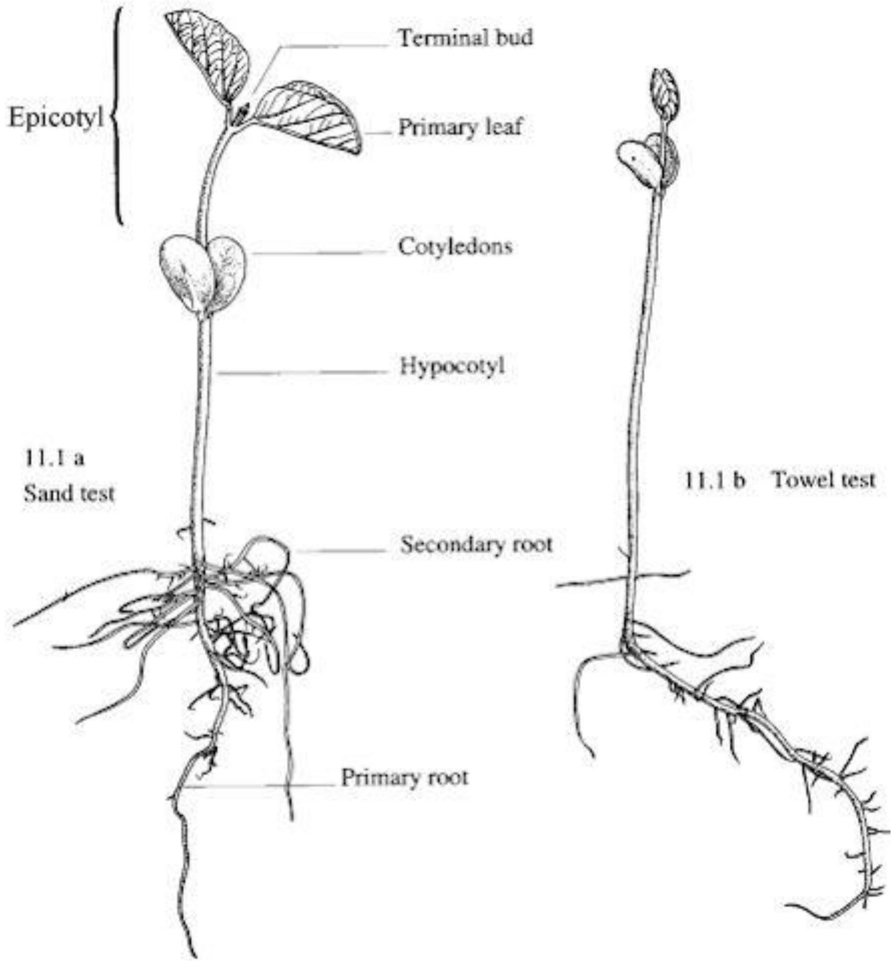
Seedlings which has the capacity for continued development into normal plant when grown in favourable conditions of soil, water, temperature and light.

Characters of normal seedlings

- A well developed root system with primary root except in certain species of graminae which normally produce seminal root or secondary root.
- A well developed shoot axis consisting of elongated hypocotyls in seedlings of epigeal germination.
- A well developed epicotyl in seedlings of hypogeal germination.
- One cotyledon in monocotyledon and two in dicotyledons.
- A well developed coleoptiles in graminae containing a green leaf.
- A well developed plumule in dicotyledons.

Normal seedlings

- Seedlings with following slight defects are also taken as normal seedlings.
- Primary root with limited damage but well developed secondary roots in leguminaceae (Phaseolus, Pisum), graminae (Maize), cucurbitaceae (Cucumis) and malvaceae (cotton)
- Seedlings with limited damage or decay to essential structures but no damage to conducting tissue.
- Seedlings which are decayed by a pathogen with a clear evidence that the parent seed is not the source of infection.



Abnormal seedlings

Seedlings which do not show the capacity for continued development into normal plant when grown in favourable condition of soil, water, temperature and light.

Top

Types of abnormal seedlings

Damaged seedlings

Seedligs with any one of the essential structures missing or badly damaged so that the balanced growth is not expected.

Seedlings with no cotyledons, with splits, cracks and lesions or essential structures and without primary root.


Damaged seedlings

Deformed seedlings

Weak or unbalanced development of essential structures such as spirally twisted or stunted plumule or hypocotyls or epicotyls, swollen shoot, stunted roots etc.

Twisted coleoptiles

Decayed seedlings

Seedlings with any one of the essential structures showing diseased or decayed symptoms as a result of primary infection from the seed which prevents the development of the seedlings.


Decayed Seedlings

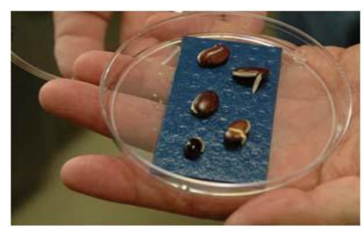
Hard seeds

Seeds which do not absorb moisture till the end of the test period and remain hard (e.g.) seed of leguminaceae and malvaceae


Hard Seeds

Fresh and ungerminated seeds

Seeds which are neither hard nor have germinated but remain firm and apparently viable at the end of the test period.


Dead Seeds

Seeds at the end of the test period are neither hard or nor fresh or have produced any part of a seedling. Often dead seeds collapse and milky paste comes out when pressed at the end of the test.


Dead seeds

Retesting

If the results of a test are considered unsatisfactory it will not be reported and a second test will be made by the same method or by alternative method under the following circumstances.

1. Replicates performance is out of tolerance
2. Results being inaccurate due to wrong evaluating of seedlings or counting or errors in test conditions
3. Dormancy persistence or phytotoxicity or spread of fungi or bacteria. The average of the two test shall be reported.

Use of tolerances

The result of a germination test can be relied upon only if the difference between the highest and the lowest replicates is within accepted tolerances.

To decide if two test results of the same sample are compatible again the tolerance table is used.

Reporting results

The result of the germination test is calculated as the average of 4x100 seed replicates. It is expressed as percentage by number of normal seedlings. The percentage is calculated to the nearest whole number. The percentage of abnormal seedlings, hard, fresh and dead seeds is calculated in the same way. These should be entered on the analysis of certificate under appropriate space. If the result is 'nil' for any of these categories it shall be reported as ‘0’.

Viability is tested through a 3 step process. 1) Cutting test -Prepare a sample of 100 randomly collected seeds -Cut along the side of each seed, and if the embryo part is fresh, the seed is regarded as viable -Calculate the percentage of viable seed as follows: Fresh seed Viability = Total cut seed Cutting test affects germination rate evaluation; seed collection; maturity assessment. Cutting test is effected by insect infection; yield of fruit and seed, weather conditions and pollination status. Cutting test is needed before maturity degree evaluation; before collection; before testing; before storage 2) Pre treatment tests need to be applied before sowing to gain maximum germination Pre treatment affects germination degree; speed; and uniformity (seeds germinate at the same time) Pre treatment is affected by seed viability; method of pretreatment; medium (moisture, status of infection); conditions (light, temperature) Pre treatment is needed when germination for a species is unknown; For species difficult to germinate in normal conditions 3) Germination tests determine viability under optimum conditions, where optimal conditions refers to best pre-treatment; sufficient moisture; optimum temperature (about 25°C), and most suitable medium (without pest and fungi infection) Methodology -Sow 4 replicates, each with 100 seeds (for big and medium seed), or 0.1-0.5g for very small seed -Count the germinated seed (seed with root growth about twice the diameter of the seed), and stop when Total germination in all replicates Germination (%) = Number of replicates Germination affects assessments of seed viability Germination is affected by genetics; degree of maturity at the time of seed collection; processing; insect and fungi infection; age of the mother tree; pre treatment; storage; germination conditions (medium, light, temperature water supply) Germination tests are needed during storage; before sale; The medium can be sand (the preferred medium within the CTSP seed lab); top of paper; or between paper. The seed of some species is structured in such a way that prevents germination under normal conditions, a state known as dormancy. Dormancy can be broken before seed is sown through methods appropriate to the type of dormancy: -Embryo dormancy After the fruit and seed are mature and collected, the embryo is still not fully developed for germination -Mechanical dormancy The fruit or seed obstructs the embryo from taking up water for development and germination -Physical dormancy The fruit or seed obstructs the embryo from absorbing water from outside, even if the seed itself is soaking in the water -Chemical dormancy Normally this affects fleshy fruit where the seed is surrounded by a chemical element such as sugar, which obstructs contact between the seed and water and sometimes blocks germination -Photo dormancy Seed requires a suitable light regime for germination -Thermo dormancy Seed requires a specific temperature for germination

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Seed certification

Definition: Seed certification is a legally sanctioned system for quality control of seed multiplication and production.

Purpose of seed certification

The purpose of seed certification is to maintain and make available to the public, through certification, high quality seeds and propagating materials of notified kind and varieties so grown and distributed as to ensure genetic identity and genetic purity.

IMPORTANCE OF CERTIFIED SEED

Certified seed is the starting point to a successful crop as well as an important risk management tool.

Here are the top 10 reasons to use certified seed:

You're getting clean seed

Certified seed is grown under stringent production requirements and has minimal weed seeds or other matter.

You're getting varietal purity

Certified seed uses systems to maximize genetic purity Off-types, other crop seeds, and weeds are guaranteed to be minimized

You're getting guaranteed quality assurance

Third party inspections in the field and at the processing plant ensure that all quality assurance requirements have been met. You can rest easy knowing your seed is what you expect it to be and can back up your assurances to others.

You're getting access to new opportunities

Many end-users are requiring specific varieties for their products.Using certified seed can open the door to new opportunities and greater sales by providing proof of varietal identity.

You're getting new genetics

Improved traits like better yield, pest resistance, drought tolerance, herbicide tolerance, and much more are delivered to farmers in certified seed. Years of research and development went into these traits and they can only be reliably accessed through certified seed use.

You’re getting substance behind your word

The blue tag is proof that you used certified seed to maintain the value traits of the crop. It’s your assurance to grain buyers and others that what you are delivering is what you say it is.

You’re getting a better deal on crop insurance

Certified seed use can, in some cases, allow you to get a better deal on crop insurance premiums. Insurers know that certified seed means a crop with reduced risk.

You’re getting maximum use of other inputs

You want the best genetics and purest fields to ensure you are making the most of your input dollars. Certified seed means you’re not wasting time and other inputs on a crop that won’t make grade.

You’re getting access to premium markets

Proper inputs make for a good crop, but seed is the only input that can get you more than higher yields. Use of certified seed can be your ticket to premium markets like tofu soybeans or high stability canola and MORE.

You’re getting traceability

Food safety and traceability are important considerations in agriculture. You can only be sure of your product if you know its origins. Certified seed is the key to that knowledge: production of this seed is carefully controlled under a quality assurance system right from the very beginning. Using certified seed will allow you to capitalize on a whole history of traceability measures.