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# Seed Germination Test Methods For Home Use

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Producers can limit one unnecessary risk in crop production by knowing the germination of the seeds they plant. An adequate plant density is one of the prerequisites for optimum yields. Planting seed of unknown germination may result in inadequate stands that produce a reduced yield. This problem most often occurs when producers save their own seed or purchase seed that has not had proper germination tests.

Germination must be tested for, but seed selection should begin with a visual inspection. Avoid seed that is poorly filled, misshapen, off color or has strange odors. Also avoid seedlots that have been frosted before maturation. Poor field emergence is often blamed on weather, herbicide injury or soil crusting when seed quality, and thus poor seed germination, may be the problem.

Laboratory germination tests are recommended to ensure optimum reliability and knowledge of seed viability. Seedlots that are tested and tagged to show they meet the requirements of state and federal seed laws are generally the best buys.

This publication describes three germination tests that can be used at home — (1) the rolled towel or rag doll method, (2) blotter method and (3) sandbox method.

The three methods are easy to use and can provide producers with reliable information, but these tests should not be substituted for approved laboratory germination tests when they are available. Producers who use these tests should be certain their samples represent a fair sampling of the entire seedlot. Representative samples can be obtained by probing to obtain seed from all depths and parts of the seedlot.

## The Rolled Towel or Rag Doll Method *(for large seed)*

1. Saturate two or more paper or cloth towels with water, squeeze out excess water and place them on top of each other on a flat surface.
2. Arrange 25 to 50 seeds on the towels, leaving a border of at least 1 inch all around. Record the total number of seeds used.
3. Carefully cover the seeds with two more moistened towels.
4. Make a 3/4-inch fold at the bottom of the paper towels to prevent seeds from falling out.
5. Starting at one edge, loosely roll the paper towels together and place a rubber band around the roll.
6. Label the roll with seedlot identification and date. Avoid inks that smear when wet.
7. Stand the roll in an upright container holding 1/4 to 1/2 inch of water. This will keep the roll moist. Be careful not to have any seeds under water. Aeration is important, so do not squeeze a number of rolls together in the container. Place the container in an area with constant temperature.
8. After 4 days, unroll the towels and count the healthy seedlings. After recording the number, discard the seedlings you have already counted and reroll the towels. Be careful not to damage the remaining seeds. Moisten the towels again if necessary and replace the roll in the container.
9. After an additional 3 days, unroll the towels, count the healthy seedlings and record the number.

10. To calculate the germination percentage, add the two recorded numbers of germinated seeds to obtain the total number of healthy germinated seeds. Then divide that number by the original number of seeds used, and multiply by 100. Example:

$$\frac{81 \text{ total healthy seedlings}}{90 \text{ original seeds}} \times 100 = 90\% \text{ germination}$$

### The Blotter Method

1. Place two or more paper towels in the bottom of a watertight container, such as a pie pan, and moisten. Pour off any excess water.
2. Arrange the desired number of seeds on the paper towels. Record total number of seeds used.
3. Place the container in an inflated plastic bag to prevent moisture loss. Label with seedlot identification and date.
4. Keep the towels moist, but do not allow standing water in the container.
5. After 4 days, count healthy seedlings, record the number and discard the counted seedlings.
6. After an additional 3 days, count the number of healthy seedlings and record. For crops such as alfalfa that have hard seeds (seeds that are very slow to imbibe water but could eventually germinate), you might also wish to record the number of hard seeds.
7. To calculate the germination percentage, divide the total number of healthy seedlings by the total number of seeds used, and multiply by 100.

### The Sandbox Method

1. Place 1 to 2 inches of clean sand in a watertight container such as a cake pan. (Perlite or vermiculite can be substituted for the sand.)
2. Arrange the desired number of seeds on the sand. Record total number of seeds used. Label with seedlot identification and date.
3. Cover seeds with 1/2 inch of sand. If seeds are small, such as alfalfa, cover with 1/4 inch of sand. Do not cover seeds that need light to germinate.
4. Moisten the sand but do not allow standing water in the container. Keep the sand moist, and cover the container to reduce the rate of

moisture loss. Use a plastic bag, container lid or aluminum foil for the cover.

5. After 9 days, count the number of emerged seedlings.
6. Again, to calculate the germination percentage, divide the total healthy seedlings by the total number of seeds used, and multiply by 100.

### Cautions

1. Do not place any container in direct sunlight. Direct sunlight will not only dry the material rapidly but can cause high temperatures that will adversely affect germination.
2. Different crops germinate best at different temperatures. Corn and beans should be germinated at 75 to 80 degrees F (25 to 30 degrees C). Wheat and other cereals germinate best at 65 to 70 degrees F.
3. Wheat and certain other seeds have a dormancy period following harvest. If germination tests are run within 6 weeks after harvest, chill the seeds before testing to break the dormancy. Prechill by placing the seeds in a refrigerator between 35 and 50 degrees F for 5 days.
4. The number of seeds used can vary, but the test will be more accurate with larger numbers. Tests with fewer than 50 seeds are generally not reliable; 100 to 200 seeds should give reliable results. Most approved methods used by seed labs require 400 seeds.
5. Select seeds to represent the seedlot. Do not test only the largest seeds or the brightest, etc. Use a random sample of the seedlot.
6. Maintain moisture and temperature as evenly as possible for the duration of the test.
7. Approved laboratory germination tests are recommended because they are more reliable. The tests described here are valuable only to give you an indication of a seedlot's germination potential.

Idaho's official seed-testing laboratory is the Idaho State Seed Laboratory, 2240 Kellogg Lane, Boise, Idaho 83712 (telephone 208 334-2368). The laboratory is a division of the State Department of Agriculture. Fees for germination testing of field crops range from \$8.85 to \$20 per sample.

For additional information, contact the Cooperative Extension Service office in your county.