

2.6. TEST FOR SEED GERMINATION

The objective of germination test is to provide information of field planting value of the seed lot and to compare the potential values of different seed lots of a kind. Planting value of the seed and its capability of emergence as good and normal seedling in the field is determined from germination in laboratory which evaluates the capability of emergence and development of the essential structures of the embryo. Under favourable condition in soil such successfully germinating seed would have the ability to develop normal plants. Seedling evaluation is the basis of germination test and, therefore, two classes of seedlings are identified to distinguish germinability. These are the normal seedling showing continued growth in field and the abnormal seedling which could not continue normal growth and fail to establish in field. The sample size for germination test should be a minimum of 400 seeds constituted in four replications of 100 seeds. The source should always be the pure seed component which was separated in the purity analysis. The number of seeds should be counted by hand or with the aid of counting board, without any discrimination as to the size or appearance of the pure seed.

2.6.1. Substrates for Germination Test

The commonly used substrates are paper (paper towel, filter paper, blotting paper) sand and soil.

(i) **Paper as substrate.** The paper should be free from toxic substances. It is advisable to soak the paper in water for 2-4 hours to moisten it evenly and to remove water soluble toxic substances, if present, before germination test. The paper may be used in three different ways. The seeds are arranged systematically on paper to avoid overlap.

(a) **Germination on top of paper (TP).** Seeds are placed on one or more layers of wet paper towel/blotting paper placed in Petri dishes or in germination trays. The Petri dishes are covered and placed at room temperature, while the germination trays are placed in germinators. Glass plates covered with wet paper and placed vertically in jars/polythene bags (in racks) at about 30° containing a little water and seeds placed in rows near the top may also be used.

(b) **Germination between layers of wet paper (BP).** Seeds are placed between layers of wet papers which are placed in germination trays and kept in germinators or in plastic or glass boxes at room temperature.

In both of these methods, the Relative Humidity (RH) in the room or in the germinator must be as close to saturation as possible. The moistened paper towel or blotting papers should not contain excess of water.

(c) **Germination in pleated paper (PP).** Wet paper towel or filter paper strip is folded into 10 to 50 pleats longitudinally and stapled at the ends. Seeds are placed on the upper surface of each fold and allowed to germinate in germination trays.

(ii) **Sand as substrate.** Sand is to be washed to eliminate the toxic materials present before putting seed. The amount of water to be added to sand will depend upon its characteristics (about 50 to 60% water holding capacity of sand) and the size of the seed to be tested.

(a) **Top of sand (TS).** Seeds are pressed on the surface of moist sand taken in tray.

(b) **Between sand layers (BS).** Seeds are planted in a uniform layer of moist sand and covered with 1 to 3 layers of sand.

(iii) **Soil as substrate.** Seeds are planted on top or between layers of soil as in case of sand. This method is generally used in doubtful cases where the seedling raised on sand by methods (a) or (b) show phyto-toxic symptoms.

Standard conditions of temperature, light, RH as well as moisture and aeration of the substratum should be maintained for correct germination test. These conditions may vary depending on the size and kind of seeds. Maintenance of aseptic conditions of the equipments and materials used for germination is important. Water should be added until the consistency of soil is such that a ball formed by squeezing in on palm of hand is easily broken when pressed between two fingers. After the soil is wet, it should be rubbed through a sieve and put into the containers for the test without packing. The spacing between seeds should not be less than 1 to 5 times the width or diameter of the seed.