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Short Communication

Development of a Simple Long Storage Technique for Germplasm of Green Gram [*Vigna radiata* L. Wilczek]

B.N. DAHIYA, D.P. DESWAL[1] AND O.P. YADAV
Plant Breeding Department
CCS, Haryana Agricultural University, Hisar-125004

Seeds are the most convenient parts of plant for their storage. They are relatively small in size, easy to store, take less space and low cost of routine maintenance. During storage the viability of seeds decreases gradually mainly because of respiration. Loss in the viability varies from crop to crop and even variety to variety depending upon genetic and non-genetic factors [1 & 2]. For making the seed storage more effective several factors are to be taken into account like low moisture, low storage temperature and use of certain chemicals which sometime make the things complicated. A simple and effective seed storage technique particularly for five to ten years may find a place with researchers who have to grow the germplasm lines every year simply for their maintenance. This is particularly important in edible legumes like green gram and black gram where we have severe insect damage to seed and eventually loss of viability.

The present experiment was thus planned to devise a very simple technique using ordinary glass tubes for seed storage. The glass tubes were filled to their capacity with seeds for storage up to six years at room temperature. Basic idea was to inhibit respiration as the air in glass tube was greatly replaced by seeds. Rate of metabolic activities during storage may be reduced due to availability of limited air to seeds in glass tube. It may be helpful in delaying the aging process and ultimately maintenance of good germination and seed vigor in seeds stored in air limited conditions. It is well known fact that "Simple the technique, wider will be its adoption".

Material for the present study consisted of ten germplasm lines of green gram including commercial cultivars having different seed size (2.88g to 4.41g). Sun-dried seeds of each genotype having eight per cent moisture level were stored in glass culture tubes (50 ml capacity) at room temperature for six years i.e. from Oct. 1996 to Oct. 2002. The glass tubes filled up to brim with seeds were made air tight by putting rubber stopper. That way only very limited air was available to the seeds for their respiration and other metabolic activities. Once the seeds utilized the available Oxygen inside the tube, there was no chance of air exchange from outside. Multiple tubes were made for each genotype separately. In addition to the *air limited environment* the seeds were also kept in ordinary cloth bags for their ambient storage as control.

Standard germination, root length, shoot length, seedling length and seed vigor index of each genotype were recorded at different intervals (24, 30, 36, 40, 48, 56, 63 and 72 months) using standard germination technique [3]. The laboratory tests were conducted in three replications each time. Once the glass tube is opened the seeds inside were not stored again. So every time new tubes were opened for laboratory tests.

Under ambient storage conditions in cloth bag a drastic reduction in standard germination percentage

1. Department of Seed Science and Technology, HAU, Hisar

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Table 1. Germination (%), for genotypes of green gram under air limited (Glass tube) and under ambient storage (Cloth bag) conditions.

Genotypes	Storage period (month)								
	24		30		36		40	48	56
	Cloth bag	Glass Tube	Cloth bag	Glass Tube	Cloth bag	Glass Tube	Glass Tube		
Asha	43.7	87.7	43.3	94.6	34.7	89.3	86.0	80.7	75.7
K 851	44.3	88.3	44.3	94.0	34.6	90.7	96.7	85.3	70.0
T 44	40.3	76.7	45.0	94.3	38.3	89.3	92.7	84.0	76.0
MH 85-111	46.0	89.3	45.6	92.3	35.0	90.3	90.7	83.4	75.3
MH 94-19	47.3	77.3	45.6	98.0	38.2	94.0	92.7	87.4	78.7
MH 94-2	55.3	89.3	53.6	92.6	41.7	91.7	94.7	84.0	76.7
MH 94-7	50.3	91.3	44.7	93.3	33.3	92.0	93.7	89.4	88.7
MH 91-1	64.0	80.3	46.3	95.0	32.2	89.3	93.3	88.0	86.0
MH 92-4	67.3	70.0	44.0	94.6	31.7	93.3	94.0	89.4	88.7
MH 92-10	21.0	72.7	23.7	94.0	18.3	94.0	93.7	85.4	76.0

(SG%) was observed (Table 1) in all the genotypes after storage period of 36 months. For most of the genotypes it was between 30-40%. Ambient storage in cloth bags was thus discontinued beyond 36 months.

For air limited environment in glass tubes the SG% was found to be quite high even after 36 months. For most of the genotypes it was observed to be around 90%. Standard germination was rather having an increasing trend up to 36 months storage in glass tubes. It could be due to release of dormancy; which is sometimes reported to be as high as 35.6% [4]. Dormancy was released even up to 40 months of storage in genotypes like K851, MH91-1 and T44 (Table 1). Seed storage in glass tubes was found to be quite effective in maintaining high SG% even up to six years.

Aging is a universal physiological phenomenon occurring in living organisms. It is generally at faster rate under stresses of unfavorable environment. From time to time several workers tried various approaches to slow down this process in different plant species. Air tight storage of seeds and grains has been found to be cheap and effective for cereals. Reports on pulses are however, scanty on this aspect [5].

In the present study storage of green gram seeds in air limited conditions has been found quite effective in maintaining germination. Genotypes retained very high germination percentage (>75%) even after a storage period of fifty six months in glass tubes with limited air inside except in K 851 showing 70% germination.

During air limited storage (as we did here) oxygen in glass tube is depleted due to respiration. It is replaced by CO_2 which slows down the metabolic activities in seed. Eventually it increases the seed longevity.

However, when initial moisture content in seed is high (say 16%) it may lead to a drastic reduction in germination even after a short storage period of merely six months [5].

That way, results of our experiments have practical significance. By using the simple storage technique one can store the germplasm lines of green gram for six years without a great loss to seed viability. No special skill, electric energy or chemicals are required to follow the technique. Even the person having minimum facilities may adopt it for seed storage in green gram. This period however, may further be increased to few more years simply by reducing storage temperature. Of course it needs further experimentation before reaching some conclusion.

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