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Study on Seed Dormancy and Longevity Behaviour of Groundnut (*Arachis hypogea* L.) Genotypes

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ABSTRACT

Groundnut is one of the important oilseed crop. Dormancy and storage behaviour of the species is required for conserving the seeds. Therefore an experiment was conducted with seed lots of six groundnut genotypes on seed germinability (using germination test in three- three months interval up to 15 months) dormancy and longevity behaviour of seeds in ambient storage conditions. Perusal of data revealed that dormancy is overcome from 3 to 5 months of ambient storage in all six genotypes of groundnut. Highest longevity of 12 months (up to IMSCS) was exhibited by variety Chitra, Utkarsh and TG37A followed by Kaushal, Prakash and Amber i.e. 9, 6, 6, months, respectively.

Key words: *Groundnut, Storage, Dormancy, Seed longevity.*

INTRODUCTION

Groundnut (*Arachis hypogea* L.) is the king of oilseed crops containing 48 percent edible oil and 25 per cent high quality protein. Being a legume, it occupies a unique position in the farming system. It is the world's fourth most important source of edible oil and third most important source of vegetable protein.

Major factors affecting the seed quality during storage are temperature and relative humidity of the storage which result in drastic deterioration of seed[5]. A part from this, storage pests and fungi associated with stored seeds are chiefly responsible for deterioration of quality and reduction in germination potential[6].Seed dormancy has been defined as the failure of an intact, viable seed to complete germination under favourable conditions[2]. In groundnut seed dormancy has been reported to be controlled by two hormones: abscisic acid which inhabits sprouting and ethylene[8], which is accumulated in storage to break dormancy to allow germination, as well as different parts of groundnut seed being involved in imposing dormancy which is include the seed coat, cotyledons and embryo[10,11,9]. Short period of seed dormancy is necessary to reduce losses.

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Despite the importance of dormancy in groundnut production[12], there has been few studies conducted on the inheritance of its fresh seed dormancy which creates problem to seed technologist to get a true prediction in standard germination test[2].

Groundnut being rich in oil and protein contents. The seeds loose germination and vigour much faster than other crop seeds. Poor storability of summer produce is another major problem faced by the groundnut seed producers[4]. It is noticed that about 50 percent seed viability is lost within four to five months of storage[1]. This is mainly because of subjecting the crop to higher temperature regimes during pod maturation stage and also during post harvest handling of the seed produce. Other than this, the seed is stored during monsoon months where it is exposed to higher atmospheric relative humidity.

MATERIALS AND METHODS

Certified genetically pure freshly harvested six varieties (Kaushal, Utkarsh, Prakash, Chitra, Amber and TG37A) of groundnut (*Arachis hypogea* L.) were collected.

The seeds were kept in jute gunny bags and stored under ambient condition after taking the initial seed moisture content (7 %), in the Department of Seed Science and Technology. The following test were carried out for the study at tri monthly interval (January, 2011 to April, 2012).

For germination test (as shown in fig.1), four random sample of each treatment were taken, each being of 100 seeds. These seeds were kept between paper for germination at 25^0C temperature. Final count were recorded on 10^{th} day. Germination test was conducted every third month from January, 2011 up to April, 2012.

RESULTS AND DISCUSSION

The resting period of seed is known as seed dormancy, when in favourable conditions seed is not ready to germinate and delay their germination until time and place are right is an important survival mechanism in plants.

The groundnut genotypes (Kaushal, Utkarsh, Prakash, Chitra, Amber and TG 37A) were obtained, the seeds of these genotypes were freshly, harvested and then stored ambiently at 7 per cent seed moisture content for 15 months i.e. from January 2011 to April 2012. Initially germination test was conducted in January 2011 and found that all six genotypes have dormancy and exhibited less germination per cent, because all showed fresh un-germinated seeds[7].

- Significant effect of genotypes/varieties (V) months of storage (M) and then interaction (V x M) was exhibited for germination (%) for 15 months of ambient storage.
- Overall significantly highest germination was exhibited by genotype Utkarsh, TG37A, Kaushal next was Chitra which showed similar performance to Kaushal and TG 37A and followed by Prakash and Amber.
- Influence of storage period had a significant influence on germination as it showed significant increase in 3 month of stage over 0 month than significant decrease in germination, up to 15 months of ambient storage was observed where as highest decrease in germination was observed from 12 to 15 months of storage that, may be due to high humidity.
- Significant increased in germination in 3 months of ambient storage showed that significant number of fresh un-germinated seeds may be germinated after resting period of 3 months.

From the investigation it was clarified that all six genotypes (Kaushal, Utkarsh, Prakash, Chitra, Amber and TG37A) of groundnut braked their dormancy between three to five month of ambient storage, because observations of germination was taken with tri-monthly intervals i.e. zero, three, six, nine, twelve, fifteen month[12]. All the genotypes showed less germination in 0 month but germination percent increased in third month but when germination per cent taken in six month it again decreased (Table 1).

Longevity of seeds differed from species to species and variety to variety. It is also depend upon the stored food material in seed and affected by the temperature and humidity.

Longevity is taken here as long as germination is retained above the IMSCS. Highest longevity (up to IMSCS) of 12 months was exhibited by Chitra, Utkarsh and TG37A followed by Kaushal, Prakash and Amber i.e. 9, 6 and 3 months respectively. But genotype Amber maintained germination of 69.7 per cent in 6 months. So the longevity of Amber can be of 6 month in place of 3 months. In this month it maintained germination (73.0 %).

Table 1: Showing Mean germination (%) of different genotypes of groundnut during ambient storage

Months / Varieties	M_1 (0 months)	M_2 (3 months)	M_3 (6 months)	M_4 (9 months)	M_5 (12 months)	M_6 (15 months)	Mean
Kaushal (V_1)	71.0 (57.42)	85.3 (67.61)	82.0 (64.95)	77.6 (61.89)	68.3 (55.77)	58.6 (44.99)	73.8 (59.60)
Utkarsh (V_2)	79.6 (63.22)	91.3 (72.92)	82.3 (65.82)	76.0 (60.82)	70.0 (56.79)	54.6 (47.68)	75.6 (60.90)
Prakash (V_3)	66.3 (54.54)	80.0 (63.55)	76.3 (60.94)	65.0 (53.76)	62.6 (52.34)	51.6 (45.96)	66.9 (55.01)
Chitra (V_4)	74.0 (59.38)	80.0 (63.55)	76.0 (60.68)	74.6 (59.79)	73.3 (58.96)	59.3 (50.38)	72.9 (58.79)
Amber (V_5)	61.0 (51.36)	73.0 (58.71)	69.7 (56.59)	64.3 (53.35)	62.3 (52.15)	49.0 (44.43)	63.2 (52.76)
TG37A (V_6)	81.6 (64.68)	86.6 (68.62)	81.0 (64.18)	72.3 (58.28)	70.0 (56.79)	57.3 (49.22)	74.8 (60.29)
Mean	72.3 (59.09)	82.7 (64.99)	77.9 (62.19)	71.6 (57.98)	67.8 (55.20)	55.1 (47.94)	

Mean angular value in parenthesis:

	V	M	V x M
S.E. (d)	0.82	0.82	2.02
C.D.	1.64	1.64	4.02

Fig. 1:

A. Radicle formation

B. Radicle and Plumule formation(A&B)

Fig 16 : Showing Mean germination (%) of different genotypes of groundnut during ambient storage

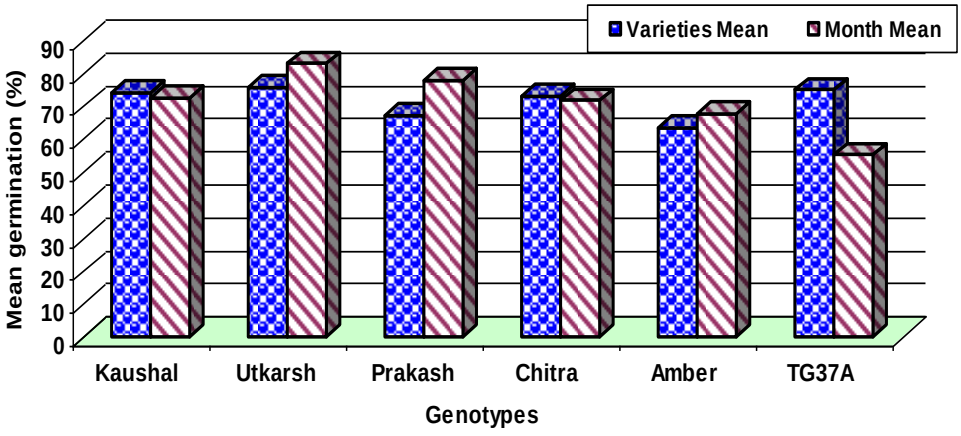
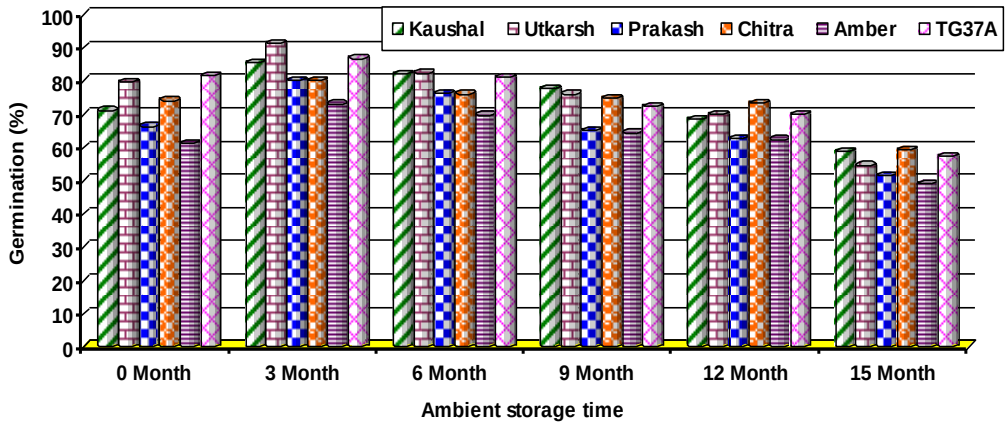


Fig 17 :Showing Mean germination (%) of different genotypes of groundnut during ambient storage



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