

Short Communications

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Influence of Seed Age on Germination and Seeding Vigour of Aonla

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ABSTRACT

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Seed storage and germination, particularly of fruit crops, is a major problem in arid region. Therefore, the seeds of different age of aonla were evaluated for germination and vigour attributes in polythene tubes under field condition. The germination pattern & seedling growth showed a steady decline over a period of storage of seeds. However, the loss of germination percentage and vigour index was more pronounced from 10th months of storage under ambient condition. Further, there was 73.7 and 90.8 percent loss in germinability and vigour index 10th months old seed in comparison to fresh seeds. There had also seen gradual increase in time taken for germination over a period of storage.

Introduction

Aonla (*Emblica officinalis Gaertn*) owing to hardy nature, adoptability to various degraded lands, high production potential, nutritive and therapeutic value, have become an important fruit crop of the arid region (Sharma. 2004). The area under aonla cultivation is continuously increasing since last 10 years. Aonla is commercially propagated through budding of rootstock. High seed quality is essential for raising of quality rootstock. But, it has been observed that there is less availability of quality planting material, due to lack of reliable information on the effect of storage on germination behaviour and seedling attributes, which is known to deteriorate under normal conditions of storage (Agrawal, 1982). Thus, an understanding of the effect of storage

period on seed quality of aonla in terms of viability, germination and vigour attributes is needed to develop quality seedlings for successful establishment of aonla plantations. Such information would also be highly useful for those who are engaged in mass multiplication of aonla seedlings. Present investigation was therefore, under taken with the objective to gain the information in this regard.

Materials and Methods

An experiment was conducted at research farm of CAZRI, Kukma, Bhuj (Gujarat) for a period from Feb. to March 2005-06. The aonla seeds were extracted from fully ripened deshi fruits harvested in last week of January and stored in plastic container at ambient

condition. The seeds were soaked in 1% KNO₃ solution for 24 hrs and sown in polythene bags of 9” X 4” size, filled with nursery soil. The seeds were sown at monthly interval to study the seed longevity. The experiment was laid out in RBD with three replications, each having 25 polythene tubes. The observations on seed germination were recorded from 5th day of sowing to the completion of germination.

The height of the seedlings and number of leaf lets were recorded at 90 DAS. Germination speed and vigour index were calculated using following formula:

Germination speed = Germination percent/
Days taken for complete germination.

Vigour index = Germination percent X
Seedling height

The results were statistically analyzed.

Results and Discussion

The mean monthly temperature and humidity data recorded during the experimental period are shown in table 1. The maximum temp (37.64°C) and humidity (84.5%) was recorded during April- May and Aug-Sept. respectively whereas minimum temp. (15.25°) and humidity (25.66%) was recorded during Oct-

Nov. It is evident from the data (Table 2) that storage under ambient condition had significantly affected the days taken to initiate germinations, germination percentage and vigour of the seedlings. The mean days for germination have progressively increased as the seeds became aged. Maximum time was taken to initiate germination in 10 months old seed (i.e. 28.67 days). This might also be due to low temperature in winter season.

The presented data (Table 2 and 3) also indicates that ageing of seed caused loss of germination percentage and germination speed with maximum germination (88.67%) and speed (6.35% day) was registered when seeds were sown just after extraction. Thereafter, the loss of germination was comparable up to 7th month of storage but there was more pronounced reduction in germination (73.7%) on 10th month onwards storage of seed. These findings are similar to those of Kadam *et al.*, (1995) and Kumar and Majmudar (1993) who also reported that germination decline steadily in seeds of many citrus stored under ambient condition. It might be due to decline in capacity for synthesis of protein, lipid and RNA, injury to membrane and chromosomes as well as decreased repair system (Osborne, 1980 and Thakur *et al.*, 1997). Up to 5th month of seed age, there was no significant effect on seedling height and number of leaf lets/plant.

Table.1 Mean monthly weather data of experimental period

Month	Temperature (oC)		Humidity (%)	
	Maxm.	Minm.	Maxm.	Minm.
Feb.-March	34.86	18.46	57.18	30.43
April-May	37.64	25.29	74.28	37.24
June-July	35.06	28.60	76.43	51.63
Aug.-Sept.	33.19	25.00	84.50	59.65
Oct.-Nov.	34.26	22.15	56.54	25.66
Dec.-Jan.	27.36	15.25	66.77	43.80
Feb.-March	31.40	17.17	70.44	28.81

Table.2 Effect of seed age on germination and seedling vigour of aonla

Seed age (Month)	Days taken for germination	Germination percent	Germination speed	Vigour index
0-1	6.67	88.67	6.35	2612.40
2-3	6.34	77.34	5.33	2204.87
4-5	7.00	77.00	5.05	2123.13
6-7	10.22	73.34	4.08	1579.93
8-9	16.67	66.00	2.54	734.90
10-11	28.67	23.34	0.73	242.93
11-12	18.34	26.00	1.00	381.43
Mean	13.42	61.72	3.58	1411.37
CD at 5%	1.37	4.44	0.34	140.40

Table.3 Effect of seed age on germination and seedling vigour of Aonla 90 DAS

Seed age (Month)	Seedling height (cm)	No. of leaflets	Collar diameter (cm)
0-1	29.45	28.95	0.53
2-3	28.48	26.92	0.49
4-5	27.47	28.47	0.47
6-7	21.52	20.06	0.50
8-9	11.10	10.20	0.45
10-11	10.34	10.05	0.44
11-12	14.65	13.30	0.45
Mean	20.43	19.61	0.47
CD at 5%	2.18	2.03	NS

But, then after significant decrease in plant vigor was observed with increase in period of storage. Similarly, there was pronounced effect of seed storage period on vigour index, which was maximum (2612.40) in freshly extracted seed. Sasmour R.H. (1989) also observed decline in vigour of aged seeds of linum which was correlated with degradations of protein and decrease activity of related enzymes. However, the mechanism underlying the decline in germinability and seedling vigour remains to be understood in this important fruit plant.

On the basis of above observations it may be concluded that seed can be stored up to 9 month under ambient storage for propagation

of aonla seedling. The study also points to identify proper storage method and chemical priming of seed, which can help to maintain the germination and vigour potential of aged seeds.

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