Application of FYM at 10 and 20 t/ha and wheat straw @ 5 and 10 t/ha were found beneficial in this Zn deficient sandy soil.

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(Received : October 1997 ; Revised : July 2000)

Madras Agric. J., 87(1-3): 113 - 116 January - March 2000
https://doi.org/10.29321/MAJ.10.A00433

Effective short term storage technique for mango seed

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Abstract : Propagation of mango is mainly through grafts. The recalcitrant nature of the seed interferes with the production of quality root stalk. Studies with different storage techniques in two different cultivars of mango viz. Neelum and Goa revealed that stones stored in ash and wet gunny bags retained viability for a maximum period of ten weeks. Stones sown immediately after removing the pulp had the maximum germination of 73 per cent. Storing the seeds in mud pots, saw dust and under shade was least effective. *(Key Words : Recalcitrant seed, Mango, Storage, Ash, Wet gunny, Mud pot, Saw dust, Shade)*

The demand for quality of mango fruits is steadily increasing both in the domestic market and in international trade. Hence, requirement for quality seedlings is also on the rise. To produce quality seedlings production of good quality root stalk is a pre-requisite, which in turn dependents on the viability of the seed. The mango seed due to its recalcitrant nature loses viability within five to eight days of de-pulping. Stones are usually collected from local people in an unscientific manner. A simple and practical technology to enhance the viability of the nuts available locally will be useful for people engaged in seedling production. In this context, a study was undertaken at Tamil Nadu Agricultural University to evaluate the use of locally available techniques for improving the viability of mango seeds.

Materials and Methods

Two popular mango cultivars of Tamil Nadu and Kerala viz., Neelum and Goa were chosen for the study. Cultivar Neelum is available from mid-season till the end of the season (June to August). Seeds are mostly monoembryonic . Goa, a popular variety of Kerala, arrives early (end of April) to the market. The seeds are polyembryonic and mainly used as root stalk. The treatments adopted for the storage of mango seeds were:

T1 - Storage in ash
T2 - Storage in mud pot
T3 - Storage in sawdust
T4 - Storage in shade
T5 - Storage in wet gunny.

The seeds treated with ash and saw dust @ 1 kg of seed in 5 kg of ash and 3 kg of saw dust respectively was kept in an open bucket in a room. The gunny bag was wetted periodically to maintain the moisture. Nearly 175 seeds were stored under each treatment. Ten seeds each in three replications were sown at fortnightly intervals in seed beds and the following observations were taken :

Table 1. Effect of method and period of stone storage on germination (%) of mango cv. Neelum.

Period	Ash	Mut pot	Saw dust	Wet gunny	Shade	Mean
W_0	76 (60.50)	76 (60.50)	70.2 (53.90)	73.5 (57.00)	70.8 (53.90)	73.3 (47.63)
W_2	55 (47.25)	40 (39.00)	35 (34.65)	50 (45.30)	20 (27.35)	40.0 (32.25)
W_4	50 (45.35)	25 (30.00)	15 (22.54)	35 (34.65)	15 (22.54)	28.0 (25.85)
W_6	25 (30.33)	10 (18.35)	0	20 (27.33)	5 (12.00)	12.0 (14.67)
W_8	20 (27.33)	0	0	15 (22.54)	5	7.0 (8.31)
W_{10}	15 (22.54)	0	0	5 (12.00)	0	4.0 (5.76)
Mean	40 (38.88)	25 (24.64)	20 (18.52)	33 (33.14)	18 (19.30)	
	W	M	WM			
SEd	2.53	2.53	5.66	Figures in paranthesis indicate arcsine transformed values.		
CD	5.21	5.21	11.65			

Table 2. Effect of method and period of stone storage on germination (%) of mango cv. Goa

Period	Ash	Mut pot	Saw dust	Wet gunny	Shade	Mean
W_0	77 (61.35)	77 (61.35)	76 (61.01)	72 (58.37)	73 (58.70)	75 (60.16)
W_2	57 (49.31)	39 (38.94)	36 (37.17)	56 (48.45)	31 (34.14)	44 (41.60)
W_4	49 (44.71)	25 (30.00)	17 (24.73)	39 (38.65)	16 (23.96)	29 (32.41)
W_6	30 (33.52)	12 (20.25)	0	24 (29.33)	6 (14.76)	14 (19.57)
W_8	24 (29.33)	0	0	16 (23.96)	3 (10.76)	8 (12.81)
W_{10}	16 (23.58)	0	0	8 (16.40)	0	4 (8.00)
Mean	42 (40.30)	25 (25.39)	21 (20.48)	36 (35.86)	21 (23.72)	
	W	M	WM			
SEd	(0.357)	(0.326)	(0.799)	Figures in paranthesis indicate arcsine transformed values.		
CD (P=0.05)	(0.730)	(0.666)	(1.63)			

The moisture content of the stones was estimated by keeping the stones in hot air oven at 105°C ± 2°C for 16 h and the mean value was estimated. The number of seeds germinated was counted three weeks after sowing. The germination percentage was expressed in whole numbers.

The vigour index Abdul-Baki and Anderson, 1973 was calculated using the formula as detailed below and expressed in whole number:

V.I. = Germination percentage X shoot length 30 days after sowing.

Results and Discussion

Studies conducted by Bajpai and Trivedi (1961) and Chacko and Singh (1971) have shown that mango seeds can retain viability for ten to thirteen weeks when stored at 20-23°C. The different storage techniques used for mango cultivars

Table 3. Effect of method and period of stone storage on seedling vigour of mango cv. Neelum

Period	Ash	Mut pot	Sawdust	Wet gunny	Shade	Mean
W_0	1782	1494	1450	1482	1482	1532
W_2	1132	1279	466	907	369	830
W_4	900	434	158	587	297	475
W_6	429	152	0	302	46	186
W_8	206	0	0	178	0	77
W_{10}	67	0	0	30	0	19
Mean	753	560	345	581	360	
	W	M	WM			
SEd	23.48	21.43	52.50			
CD (P=0.05)	47.95	43.77	107.22			

Table 4. Effect of method and period of stone storage on seedling vigour of mango cv. Goa

Period	Ash	Mut pot	Sawdust	Wet gunny	Shade	Mean
W_0	1861	1796	1533	1734	1761	1737
W_2	1207	790	742	1159	693	918
W_4	803	459	277	642	301	496
W_6	172	174	0	261	67	135
W_8	156	0	0	104	15	55
W_{10}	57	0	0	32	0	17
Mean	709	536	425	655	473	
	W	M	WM			
SEd	14.26	13.02	31.88			
CD (P=0.05)	29.12	26.58	65.11			

Neelum and Goa revealed that coating the seeds with wood ash and covering them with wet gunny bags retained viability for ten weeks at room temperature (Table 1 & 2). This was superior to storage in mud pots, keeping in saw dust or heaping under shade. The stones stored in ash alone could retain 50 per cent viability for four weeks while those stored in wet gunny bags retained 50 per cent viability for two weeks only. In all other treatments, the viability declined below 50 per cent by the second week of storage. Maximum decline was observed for seeds stored under shade. Seeds stored in wet condition were prone to microbial infestation. This was evident in the present study. Seeds coated with ash were less prone to insect and microbial attack. This is in confirmation with the findings of Akpactok (1974). He has suggested that ash coating acts a a physical barrier and prevents the invasion of insects and pests under storage. The study also revealed that loss of moisture was the main reason for the death of seeds. Seeds stored in sawdust, mud pot and heaped under shade tends to lose moisture faster than those coated with ash and covered with wet gunny bag.

Vigour index of seedlings of Neelum and Goa (Table 3 & 4) after one month of sowing indicated the effect of different storage techniques and also the influence of storing the seeds for different periods of time. Storing stones for long periods adversely affected the seedling performance. Stones stored for ten weeks had very low vigour, which was significantly inferior to the seedlings obtained by sowing the stones immediately after de-pulping. Seedlings obtained from ash storage gave the highest vigour followed by seedlings stored in mud pot and wet gunny bags.

The seeds stored in mud pot showed better performance and had higher vigour. Water loss brought about by rapid drying might have contributed to the quick loss of viability of the stones of this treatment. Coating the seeds with ash in improving the vigour and height of the seedlings. The effect of ash in improving shoot length has

been in conformity with the results obtained by Neeman et al., (1993) in the seeds of *Pinus cistus* and annuals.

Acknowledgment

We are grateful to the Council of Scientific and Industrial Research for the funds received for the study and also the members of the advisory committee (Drs.) C. Dharmalingam, M. Jayapragasam, M. Thangaraj and M. Shanmugam for their valid suggestions.

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(Received : March 1999 ; Revised : November 2000)

Madras Agric. J., 87(1-3): 116 - 122 January - March 2000

Bioefficiency of Nimbecidine and TNAU neem on cowpea aphid *Aphis craccivora* (Koch) applied to fieldbean

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Abstract : Two field trails were conducated at Tamil Nadu Agricultural University (TNAU), Coimbatore during 1996-97 to evaluate the effectiveness of Nimbecidine 0.03% EC and TNAU Neem 0.03% EC in comparision with methyl demeton against the field bean aphid *Aphis craccivora* Koch. The mean per cent reduction of *A. craccivora* field population, by the neem formulaions was to the extent of 50.2-96.0, 43.4-89.1, 11.2-67.2 and 1.0-28.1 per cent on 1,3,7 and 14 DAT (Days after treatment) respectively when compared to 95.6-99.7, 91.2-97.2, 74.6-87.5 and 51.9-63.4 per cent by methyl demeton at 1,3,7 and 14 DAT. Both the neem formulations were comparable in their efficacy. The effectiveness of the formulations increased with increase in dose from 200 ml to 1000 ml/ha and decreased as the days advanced. The order of efficacy was Methyl demeton 25 EC>Nimbecidine 0.03 EC=TNAU Neem 0.03 EC. *(Key Words : Fieldbean, Aphis craccivora, Neem products, Bioefficacy*

The Cowpea aphid, *Aphis craccivora* Koch is one of the major pests of field bean (*Lablab purpureus var typicus* L. Sweet.). It causes enormous damage to almost all the plant parts *viz.* leaves, inflorescence and pods. Although synthetic chemical insecticides remain indispensable in reducing pest damage, they constitute a high economic and health risk to poor farmers with few resources. Therefore in recent years, considerable efforts are being made worldwide to find safer biodegradable substitutes. The most important of them is the neem *Azadiracha indica* A. Juss, known for its legendary insecticidal properties and safety to environment. The chances of insert pests developing resistance to neem derivatives are remote (Schmutterer, 1990). These virtues make them ideal pesticides. The present investigation therefore was undertkaen to study the effectiveness of two neem formulations *viz.* Nimbecidine 0.03% EC and TNAU Neem 0.03% EC against field bean aphid.

Materials and Methods

The bioefficacy of the neem formulations was evaluated in two field trails conducted during 1996-97 in the eastern block of Tamil Nadu Agricultural University Farm, Coimbatore. Both the experiments were laid out in a randomised block