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NOTES

EFFECT OF PRETREATMENTS AND STORAGE CONDITIONS ON THE VIABILITY AND VIGOUR OF SCARIFIED HONEY MESQUITE (*PROSOPIS JULIFLORA*) SEED

P. Masilamani* & K. K. Vadivelu

Department of Seed Technology, Tamil Nadu Agricultural University, Coimbatore 641 003, Tamil Nadu, India

Honey mesquite [*Prosopis juliflora*(Sw.)DC], an important dry zone afforestation species, extensively covers waste lands, vacant sites and salt affected areas of Karnataka, Rajasthan, Maharashtra, Tamil Nadu and other states of India (Nimbal *et al.* 1990). The wood is used as fuel and charcoal, the leaf extract as piscicide and the pods as cattle feed; flowers are foraged by bees (Troup 1921, Saxena & Venkateswarlu 1991). Propagation is through seeds which, however, are dormant and need scarification to improve germination. As the seeds may have to be stored before sowing, special treatments are necessary to maintain their viability. A study was therefore conducted on the effect of pretreatments with ethrel (a growth regulator), potassium nitrate (a nutrient supplement), Thiram (a fungicide) and carbaryl (a pesticide) on the viability, vigour and storage potential of scarified *P. juliflora* seeds.

Prosopis juliflora seeds were obtained from the Institute of Forest Genetics and Tree Breeding, Coimbatore, Tamil Nadu. They were cleaned and subjected to scarification with 200 ml commercial sulphuric acid per kg (Rajasingh 1987). Acid scarified seeds were washed and dried back to the original moisture content of 9%. They were then pretreated with the stated chemicals and together with the untreated seeds placed under the following lots for germination studies:

Control (T_1); scarified seeds (T_2); scarified seeds + 2 g Thiram + 200 mg 5% carbaryl (T_3); scarified seeds + 200 ppm ethrel (T_4); scarified seeds + 200 ppm ethrel + 2 g Thiram + 200 mg 5% carbaryl (T_5); scarified seeds + 2% KNO_3 (T_6); scarified seeds + 2% KNO_3 + 2 g Thiram + 200 mg 5% carbaryl (T_7)

Treatments with ethrel and KNO_3 were conducted for 4 h after which the seeds were dried to their original moisture content.

The seeds were stored in moisture pervious cloth bags and moisture–proof polythene (700 gauge) bags at ambient temperature and relative humidity up to 10 months. The experiment was laid out in completely randomised design. At bimonthly intervals seed samples were tested for germination (ISTA 1985) and vigour index (Abdul-Baki & Anderson 1973). The germination test was conducted in a germination room with sand medium, 400 seeds in each treatment, replicated 4 times, at 25 ± 2 °C and 90 ± 3% relative humidity. Counts were made 28 days after sowing and germination expressed as the percentage of seeds which produced normal seedlings. After the germination count, 10 random seedlings were measured for root and shoot lengths. The vigour index was derived as follows: VI = germination percentage × seedling length, where seedling length is the sum of the root and shoot lengths. The results

**Present address : Agricultural Engineering College and Research Institute, Kumulur, Tiruchirappalli 621 712, Tamil Nadu, India.*

Table 1. Effect of pretreatments, storage and containers on (a) germination percentage and (b) vigour index of *Prosopis juliflora*

Pretreatment	Container	(a) Germination percentage						(b) Vigour index					
		Storage period						Storage period					
		P_0	P_1	P_2	P_3	P_4	P_5	P_0	P_1	P_2	P_3	P_4	P_5
T_1	C_1	47.5	47.8	47.5	52.5	57.5	60.0	758	572	749	779	976	1009
	C_2	47.5	50.0	52.5	52.5	57.5	60.0	762	825	814	829	885	958
	Mean	47.5	48.9	50.0	52.5	57.5	60.0	760	698	781	804	930	983
T_2	C_1	87.5	77.5	77.5	82.5	75.0	72.5	1350	1180	1153	1298	1257	1234
	C_2	87.5	77.5	80.0	82.5	77.5	72.5	1306	1089	1194	1223	1314	1329
	Mean	87.5	77.5	78.8	82.5	76.3	72.5	1328	1134	1173	1261	1286	1282
T_3	C_1	87.5	77.5	87.5	82.5	77.5	72.5	1231	1262	1501	1400	1216	1272
	C_2	87.5	77.5	85.0	82.5	75.0	70.0	1300	1217	1385	1347	1109	1152
	Mean	87.5	77.5	86.3	82.5	76.3	71.3	1265	1239	1443	1374	1162	1212
T_4	C_1	92.5	87.5	87.5	87.5	87.5	82.5	1473	1378	1417	1443	1440	977
	C_2	92.5	87.5	87.5	82.5	87.5	77.5	1416	1330	1443	1404	1256	1233
	Mean	92.5	87.5	87.5	85.0	87.5	80.0	1444	1354	1430	1423	1348	1105
T_5	C_1	97.5	97.5	87.5	87.5	87.5	92.5	1391	1561	1417	1566	1557	1465
	C_2	97.5	85.0	90.0	87.5	82.5	87.5	1417	1288	1546	1583	1415	1308
	Mean	97.5	91.3	88.8	87.5	85.0	90.0	1404	1424	1482	1574	1486	1387
T_6	C_1	92.5	77.5	77.5	77.5	80.0	82.5	1282	1191	1141	1273	1387	1443
	C_2	92.5	82.5	77.5	77.5	77.5	82.5	1352	1248	1175	1181	1181	1515
	Mean	92.5	80.0	77.5	77.5	78.8	82.5	1317	1220	1158	1227	1284	1479
T_7	C_1	90.0	77.5	82.5	77.5	77.5	77.5	1363	1207	1318	1307	1308	1273
	C_2	90.0	77.5	75.0	77.5	77.5	82.5	1265	1189	1225	1257	1239	1444
	Mean	90.0	77.5	78.8	77.5	77.5	80.0	1314	1198	1271	1282	1273	1358
CD (0.05)	Treatments (T) - 1.62			T × C - 2.89				(T) - 51.58		T × C - 72.94			
	Containers (C) - 0.86			T × P - 3.96				(C) - 27.57		T × P - 126.33			
	Storage periods (P) - 1.49			C × P - 2.12				(P) - 47.75		C × P - 178.66			

were subjected to analysis of variance and tested (*t*-test) for significant differences (p = 0.05) (Panse & Sukhatme 1967). Percentage values were arcsine transformed for statistical analysis.

Scarification of *P. juliflora* seeds had a profound influence by recording an increase of 40% germination and 74% increase in vigour index (Table 1). Among the post-scarification seed treatments, ethrel + Thiram + carbaryl (T_5) gave the highest germination of 97.5%, while ethrel (T_4) and KNO_3 (T_6) registered 92.5% each. Seed storage over the 10-month period decreased the germination percentage of all the pretreated seeds but not those of the control. The largest decrease was in seeds treated with Thiram + carbaryl (T_3) and the least in T_5 where the germination percentage at the end of the storage period was 90.0% compared to 60.0, 72.5 and 71.3% in the control, untreated scarified seeds and T_3 respectively. The best effect of pretreatment on the initial vigour index was in T_5. After storage of 10 months, T_6 recorded the highest vigour index of 1479, followed by T_5 (1387) and T_7 (KNO_3 + Thiram + carbaryl) (1358). Storage appears to enhance not only the vigour index of the control but also that of T_6 and T_7. The largest decline of vigour index on storage was in T_4 by 23.5% and the lowest in T_5 by 1.2%.

Maintenance of germination in scarified seeds has also been reported in *Acacia auriculiformis* (Ramprasad & Kandya 1992), *Albizia lebbeck* and *P. juliflora* (Wunder 1966), several *Acacia* species (Turnbull 1973), *A. senegal* (Cheema & Quadir 1973) and *Leucaeana leucocephala* (Natarajan 1983). In the present study, although scarification led to a slight decrease of germination at the end of the storage period, the overall germination was still better than in the unscarified seeds. *Prosopis juliflora* benefited from pretreatment and was not affected by the type of container used for storage. The best results were obtained from pretreatment with ethrel + Thiram + carbaryl (T_5).

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