https://doi.org/10.29321/MAJ.10.A02545

Madras Agric. J. 71 (11) 738-742 November, 1984

STORAGE STUDIES IN KM 2 BAJRA HYBRID SEED*

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Two size grades of KM 2 bajra hybrid seed obtained from plots applied with NPK nutrients at varying doses and combinations were tested for viability and vigour in storage. Large size seed obtained from the mother crop fertilized with N, P and K at the rate of 200, 100 and 100 kg/ha and packed in 700 gauge thick polyethylene bag stored better than seeds obtained from plants fertilized with other levels or no NPK nutrients. Polyethylene bag was better than cloth bag for storing bajra seed.

Seed viability in storage is largely determined by the temperature and relative humidity that prevails around the stored seed (Justice and Bass, 1978). Nutrition to mother plant exerted a significant influence on the performance of resulting seed during storage. Hybrid seed production in bajra is a costly venture and the problem of carrying over surplus and unsold seeds to the next season is often met wth. Therefore, information for prolonging the viability and vigour under such situations may go a long way in mitigating the hardships to the seed producers.

MATERIALS AND METHODS

Hybrid seed samples retained by 5/64" (G_1) and 4/64" (G_2) diameter round perforated metal sieves from the bulk seed obtained from plots manured with the following doses of NPK nutrients (i) N_0 P_0 K_0 (T_0); (ii) N_{100} P_0 K_0 (T_1); (iii) N_{200} P_0 K_0 (T_2); (iv) N_0 P_{50} K_0 (T_3); (v) N_0 P_{100} K_0 (T_4); (vi) N_0 P_0 K_{50} (T_5) (vii) N_0 P_0 K_{100} (T_6) (viii) N_{100} P_{50} K_{50} (T_7) and (ix) N_{200} P_{100} K_{100} (T_8) were slurry treated uniformly with thiram (Tetromethyl thiruam disulphide) 75% WDP a 2g/kg of seed (2ml of water were used per kg of seed) and were dried to 10 per cent seed moisture conten and packed on 1-12-79 separately i (i) fresh gada cloth bag of size 20cn x 15cm (C_1) and (ii) 700) gauge thicl polyethylene bag of size 12cm x 10cn (C_2). The cloth bags were hand se wen, while the polyethylene bag were heat sealed.

The packed seeds were kept i storage for fifteen months under am bient conditions of temperature an relative humidity The stored seed were tested once in three months fo germination (Anon, 1976), vigo (Abdul-Baki and Anderson, 1973) an dry matter production.

* Part of Ph. D thesis approved by the Tamil Nadu Agricultural University, Coimbatore - 3.

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RESULTS AND DISCUSSION

Seed size exerted a significant influence on the germination, vigour index and dry matter production in storage (Tables 1 to 3). Large size (G_1) seed recorded higher germination, better vigour and more dry matter than medium size (G_2) seed in storage. Suriyakumar (1980) on South Indian millets reported similar results. The superiority of larger seed could be related to the "initial capital" (Ashby, 1936), which showed an initial advantage over smaller one (Hewston, 1964). The relatively low germination and vigour registered by the small seed in storage could be partly due to the lack of initial capital and in part to the inclusion of the higher proportion of shrivelled and immature seed resulting ofrom incomplete seed development (Crocker and Barton, 1953).

TABLE 1. Germination percentage

		C1						C2						Over-all Mean
	Initial	P1	P2	P3	P4	P5	Mean	P1	P2	P3	P4	P5	Mean	
	T0 96	95	93	92	83	79	90	96	93	93	90	85	92	91
	T1 98	94	91	87	86	73	88	96	90	90	90	86	92	90
	T2 97	95	90	88	81	78	88	97	92	92	90	86	92	90
	T3 95	91	92	85	81	78	87	92	92	90	89	86	91	89
G1	T4 97	96	92	88	82	88	88	97	95	92	88	81	92	90
	T5 97	94	91	85	81	73	87	95	91	89	85	83	92	90
	T6 99	97	94	88	81	75	89	98	95	92	89	85	93	91
	T7 96	95	91	85	84	79	88	94	92	90	90	87	92	90
	T8 97	95	91	90	85	81	90	97	95	93	90	87	93	92
Mean	92	95	92	88	83	77	88	96	93	91	90	85	92	90
	T0 88	88	85	84	84	78	85	89	87	85	83	83	86	86
	T1 89	89	85	84	84	74	84	88	86	86	84	82	86	85
	T2 90	90	87	84	82	75	85	89	89	85	84	81	86	86
	T3 92	91	90	85	82	75	86	91	91	89	88	80	89	88
G2	T4 91	90	84	81	80	72	83	89	88	85	82	80	86	85
	T5 90	90	87	82	80	75	84	91	87	85	83	80	86	85
	T6 92	92	91	85	83	74	86	92	89	87	86	82	88	87
	T7 93	91	87	84	81	78	86	92	90	88	86	85	89	88
	T8 91	90	85	83	83	80	85	91	89	88	85	83	88	87
Mean	91	90	87	84	82	76	85	90	88	86	85	82	87	86
Mean	92	93	90	86	83	77	87	93	91	89	88	84	90	89

CD	G	T	C	P	GxT	GxC	GxP	TxC	TxP	CxP
(P=0.05)	0.3**	0.7**	0.3**	0.6**	1.0**	0.5**	0.8**	NS	1.7**	0.8**

TABLE 2. Vigour index

		C1						C2						Over
	Initial	P1	P2	P3	P4	P5	Mean	P1	P2	P3	P4	P5	Mean	all Mean
	T0 3072	2964	2762	2604	2216	1991	2602	3062	2874	2771	2520	2287	2764	2683
	T1 3146	2942	2721	2471	2313	1883	2579	3053	2745	2655	2511	2356	2744	2662
	T2 3114	2945	2682	2543	2252	2012	2591	3075	2852	2427	2520	2339	2721	2656
	T3 3012	2830	2714	2321	2147	2028	2509	2898	2824	2691	2572	2288	2714	2612
G1	T4 3201	3120	2742	2455	2206	1894	2603	3182	3062	2742	2490	2179	2809	2706
	T5 3143	3017	2739	2389	2163	1854	2551	3059	2821	2715	2491	2299	2755	2653
	T6 3187	3088	2867	2508	2243	2054	2658	3093	2990	2835	2421	2480	2834	2746
	T7 3185	3056	2651	2367	2130	1898	2548	3156	2936	2686	2403	2312	2780	2664
	T8 3298	3201	2912	2637	2338	2122	2751	3279	3164	2689	2664	2453	2925	2838
Mean	3151	3018	2754	2477	2223	1971	2599	3095	2919	2690	2510	2333	2783	2691
	T0 2314	2270	2099	2016	1865	1638	2034	2323	2227	2082	2009	1826	2130	2082
	T1 2278	2234	2074	1982	1890	1487	1991	2235	2167	2090	2008	1763	2090	2041
	T2 2385	2340	2201	2075	1861	1568	2072	2341	2332	2142	1966	1814	2163	2118
	T3 2420	2375	2277	2066	1870	1583	2089	2384	2366	2278	2068	1752	2211	2155
G2	T4 2330	2268	2066	1879	1752	1454	1958	2252	2200	2074	1894	1704	2076	2017
	T5 2304	2268	2105	1952	1760	1508	1983	2311	2175	2057	1909	1672	2071	2027
	T6 2401	2383	2275	2032	1884	1532	2085	2392	2278	2149	1969	1788	2163	2124
	T7 1465	2402	2245	2075	1863	1669	2120	2438	2376	2262	2090	1929	2260	2190
	T8 2430	2367	2193	2058	1926	1704	2130	2421	2450	2270	2074	1851	2249	2190
Mean	2370	2323	2171	2015	1852	1571	2052	2344	2286	2156	1999	1789	2157	2105
Mean	2761	2671	2463	2246	2038	1771	2326	2720	2603	2423	2255	2061	2470	2398

CD	G	T	C	P	GxT	GxC	GxP	TxC	TxP	CxP
($P=0.05$)	15.1**	32.0**	15.1**	26.1**	45.9**	21.3**	36.9**	NS	78.4**	36.9**

The treatment effects were significant for germination, vigour index and dry matter production. The decrease in germination, vigour index and dry matter production at the end of 15 months storage was minimum in the seed obtained from N_{200} P_{100} K_{100} treatment, while it was maximum in the seed from No Po Ko treatment. The variations could be hypothesised only to the metabolic changes effected both in the mother plant and in the developing seed, due to the altered physiology caused by the N, P and K nutrients. Sikder (1965) associated the viabiliity of rice seed in storage with application of N, P and K fertilizers.

Highly significant differences observed between storage containers for germination and vigour index and dry matter production could be related to higher absorption of moisture by the seed stored in cloth bag than in polyethylene bag (Nagarajan and Kariv-

TABLE 3. Dry matter production (mg)

		C1						C2						Over all Mean
	Initial	P1	P2	P3	P4	P5	Mean	P1	P2	P3	P4	P5	Mean	
	T_0 75	74	75	70	65	60	70	75	75	72	70	67	72	71
	T1 79	79	78	74	68	61	73	80	78	76	72	66	75	74
	T2 79	78	75	70	63	59	71	79	78	74	70	65	74	73
	T3 76	76	75	70	65	60	70	76	76	74	71	67	73	72
G1	T4 77	75	75	70	65	59	70	76	75	73	69	68	73	72
	T5 78	78	75	72	66	62	72	78	78	74	69	67	72	72
	T6 77	76	75	70	64	61	71	77	77	75	71	67	74	73
	T7 82	81	80	76	65	60	74	81	81	78	72	68	77	76
	T8 82	81	80	74	66	61	74	82	82	78	71	68	77	76
Mean	78	78	76	72	65	60	72	78	78	75	71	67	75	74
	T_0 47	48	46	41	38	35	43	47	47	43	40	39	44	44
	T1 48	48	47	43	40	36	44	47	48	46	43	40	45	45
	T2 50	48	48	44	40	38	45	50	49	48	44	42	47	46
	T3 46	45	45	41	40	35	43	46	46	43	41	41	44	44
G2	T4 47	45	45	41	40	36	42	47	46	43	41	40	44	43
	T5 47	47	45	42	39	37	43	46	47	44	42	40	44	44
	T6 48	45	45	40	36	35	42	46	45	43	41	41	44	43
	T7 50	49	48	43	40	37	45	50	48	45	42	42	46	46
	T8 51	51	49	44	41	37	46	51	51	47	43	41	47	47
Mean	48	47	46	42	39	36	43	48	47	45	42	41	45	44
Mean	63	63	61	57	52	48	58	63	63	60	57	54	60	59

CD	G	T	C	P	GxT	GxC	GxP
(P=0.05)	0.23**	0.50**	0.23**	0.41**	0.70**	0.33**	0.57**
	TxC	TxP	CxP				
	NS	1.22**	0.57**				

aratharaju, 1976). Suriyakumar (1980) reported that the seeds stored in moisture vapour proof container maintained the viability and vigour for longer period in storage than those stored in moisture pervious container.

A general decrease was evident in germination, vigour index and dry matter production with period of storage. Therefore,it became evident that large size seed showed better vigour and viability in storage than small size seed. Polyethylene container protected the stored seeds better than cloth bag. Seed from plant fertilized with N_{200} P_{100} K_{100} possessed viability for longer periods with better seeding vigour in storage than that fertilized with lesser doses of NPK or no NPK.

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