INTERROGATION OF SEASONAL INFLUENCE ON SEED QUALITY OF GROUND NUT (ARACHIS HYPOGAEA L MERRIL)

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Abstract: There were six varieties JL 24, JL 286, TAG 24, JL 501, RHRG 6083 and RHRG 6021 in kharif season while SB XI, TPG 41, TAG 24, JL 501, RHRG 6083 and RHRG 6021 in summer season were sown in three sowing date. After harvesting of the trial all the 18 treatment combinations are subjected for accelerated aging at 0, 3, 6, and 9 days in each season and tested for physiological parameters after accelerated ageing. After accelerated ageing of seed at 450 C temperature and 95 % humidity all the physiological parameters viz: germination, vigour index, viability, root shoot length, seedling dry weight, SME were decreased steadily. Thus, Groundnut storability could be predicted by the use of accelerated ageing test within 3-9 days ageing. The important main factor effect of varieties, sowing date and accelerated aging were favored by the JL 501 followed by RHRG 6021 irrespective of other factors, these varieties are good storer while TAG 24 deteriorate faster in both seasons and TPG 41 in summer. Therefore, the seeds of groundnut when accelerated aged at 450 C temperature and 95 % humidity for 3-9 days was the best vigour test for predicting the groundnut storability.

Keywords: Accelerated aging, Ground nut, and growing season.

Introduction: The Groundnut (Arachis hypogaea L.) is a valuable food and oilseed crop. It is commonly called as the King of vegetable oilseeds crops or Poor man's nut. It belongs to family Leguminoceae. Groundnut appeared to have originated in South America i.e., North-West of Brazil and the secondary centre of its cultivation is in Africa and then spread to other part of the world (Vavilov, 1951). India is one of producer and rank second in groundnut production after China.

Influence of season has great impact on viability of groundnut seed, for example the seed produced in the summer season lose their viability quickly than the seed produced in kharif. The pre- and post-harvest environmental condition seems to be mainly responsible for this seasonal variation in seed viability in groundnut. Studies at National Research Centre of groundnut showed the groundnut produce obtained from in the summer season can not be stored for a longer period as it loses its viability about >60 % within 3-4 months of storage. The produce , however obtained from kharif could be used for the seed purposes and stored for 12 months. Initial germination and seedling vigour were lower in the produce of summer than kharif season. The seed obtained from the summer crop lost 30-70% viability after four months of storage. The main cause of rapid loss of seed viability in the produce obtained in summer seems to be high temperatures during curing and drying, and high temperatures and humidity in the months of rainy season(June- September). However, kharif produce is harvested in the month of October-November when the environmental condition become favourable for the storage of groundnut.

Accelerate aging test is very popular and most frequently used in seed testing laboratories because it is rapid, simple, inexpensive, no sophisticate equipments are needed and it could be done by any one without training . Besides, seed vigor test for predicting field emergence it can also be used in evaluating storage potential crop seed. Surveys of seed testing laboratories in North America have shown that the accelerated aging test is one of the most frequently used vigor tests . The accelerated aging method has been proved as indicator of seed vigor in wide range of crop species and has been successfully related to field emergence and stand establishment. AOSA and ISTA have recommended common conditions for accelerated aging test as seed vigor test in various crops

Material and methods:

The experiment was conducted during kharif 2010 and summer 2011 at AICRP on Groundnut Scheme, MPKV, Rahuri with Varieties JL-24, JL-286, TAG-24,JL-501, RHRG- 6083 & RHRG-6021 in kharif and TPG-41,SB-11,TAG-24,JL-501,RHRG-6083 & RHRG-6021 in summer. The seeds were sown on 14th July, 02nd August & 17th August in Kharif and 06th February, 22nd February & 08th march in Summer. After harvesting the seed were accelerated aged at 0, 3, 6, 9 days and observation were recorded. The field experiment was laid out in a randomized block design with factorial concept having three replications and Factorial Completely Randomized Design (FCRD) for Laboratory experiment.

Result and Discusion: The results were presented in table 1 and 2revealed that there was significant difference between the season. The kharif season recorded higher germination percentage (77.8), viability (84.07), Vigour index I (1409), Root - shoot

length (18.85) seed mobilization efficiency . But, maximum Vigour index II (265) was noticed from the seeds of summer season, and lower electrical conductivity was recorded from kharif season (0.73S-1m)and ph of leachete (3, 4, 5,6) .

Among the genotypes, maximum per cent germination, viability, Vigour index I and II and root –shoot length was recorded in JL-501 in both season. seed mobilization efficiency and seedling dry weight by RHRG 6021 and TPG 41 in summer while TAG 24 and JL 286 in kharif respectively. The better seed quality parameters like speed of germination, shoot length and root length, seedling dry weight and vigour index, in the seed produce of kharif season may be probably due to abundant availability of moisture, nutrition during crop growth and low temperature during harvesting and drying period (8, 9).

Among the sowing date in kharif , the germination and vigour index I is highest in sowing date 14th July , root-shoot length in 2nd august and viability, vigour index II, SME and seedling dry weight in 17th August. In Summer season , germination, viability and vigour index II in sowing date 22nd Feb. and vigour index I, root-shoot length and seedling dry weight in 8th February (7).

Similar findings were reported by Delouche and Manjunath in groundnut. The variation in quality parameters in different genotypes grown in kharif and summer may be due to variation in varietal duration and response to genotypes to different environmental conditions (2, 3, 5, 6, 7, 8 and 9).

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Table 1: Effect of genotype, sowing date and accelerated aging on seed quality parameters of Groundnut in *Kharif* season.

Sr No	Observation / Varitey	Germination %	Viability %	Vigour Index (L)	Vigour Index (M)	Root – Shoot length (cm)	SME	Seedling dm %	Seedling dry wt (g)
Genotype									
1	JL 24	72.33 (59.53)	82.08 (66.09)	1368.26	213.91	18.31	11.39	80.26	3.73
2	JL 286	75.72 (62.28)	85.25 (69.40)	1404.12	266.74	18.05	14.39	77.09	4.49
3	JL 501	78.16 (63.78)	85.86 (70.37)	1654.85	266.94	20.71	10.01	77.86	4.36
4	TAG 24	66.55 (56.57)	81.83 (67.10)	1330.04	219.10	18.96	9.70	79.15	4.00
5	RHRG 6083	68.58 (58.12)	83.33 (68.89)	1267.61	235.26	17.65	13.93	78.13	4.19
6	RHRG 6021	77.72 (62.86)	87.91 (71.96)	1433.90	231.96	18.19	16.07	80.28	3.49
	SE +_	0.323	0.184	1.740	3.228	0.94	0.568	0.339	0.115
	CD at 5%	0.905	0.515	30.025	9.026	0.264	1.588	0.948	0.323
Sowing date									
1	14th July	74.06 (60.69)	84.50 (68.29)	1452.18	226.62	18.92	9.25	79.90	3.70
2	1st August	71.34 (59.67)	83.77 (69.13)	1393.60	225.63	18.93	12.61	79.40	4.37
3	17th August	73.86 (61.19	84.86 (69.49)	1383.62	264.69	18.09	15.88	77.09	4.06
	SE +_	0.229	0.130	7.594	2.283	0.066	0.401	0.239	0.081
	CD at 5%	0.640	0.364	21.231	6.382	0.187	1.122	0.670	0.228
Accelerated aging									
1	A_{o-} o days	95.38 (78.13)	98.16 (83.10)	2155.18	310.29	22.57	7.50	81.20	4.08
2	A_1-3 days	82.66 (65.57)	91.38 (73.37)	1565.49	271.80	18.90	9.69	79.65	3.90
3	A_2-6 days	63.57 (53.00)	82.00(64.97)	1115.25	207.96	15.49	16.97	78.18	4.14
4	A_3-9 days	50.75 (45.39)	65.96 (54.43)	803.27	165.88	13.63	16.16	76.15	4.06
	SE +_	0.264	0.150	8.769	2.636	0.077	0.563	0.277	0.094
	CD at 5%	0.739	0.420	24.515	7.370	0.216	1.296	0.774	0.263

Figures in parenthesis are Arc-sine values.

Table 2: Effect of sowing date, genotype and accelerated aging on seed quality parameters of Groundnut in *Summer* season.

Sr. no.	Observation / Variety	Germination %	Viability %	Vigour Index (L)	Vigour Index (M)	Root – Shoot length (cm)	ME	Seedling dm %	Seedling dry wt (g)
Genotype									
1	SB 11	66.26 (55.89)	79.33 (65.54)	1310.97	250.02	18.40	248.8	76.34	3.01
2	TPG 41	65.11 (55.09)	78.05 (64.69)	1223.62	290.11	16.40	243.6	74.59	3.53
3	JL 501	69.97 (58.85)	81.50 (67.51)	1505.76	302.43	20.31	242.0	74.23	3.38
4	TAG 24	67,41 (57.12)	79.86 (66.21)	1415.47	270.78	19.40	236.5	76.01	3.27
5	RHRG 6083	60.27 (52.22)	75.86 (62.96)	1043.10	252.00	15.89	253.3	74.81	3.48
6	RHRG 6021	62.41 (54.03)	76.80 (63.93)	1150.37	224.94	16.91	291.4	76.90	2.98
	SE +_	0.410	0.195	11.945	9.345	0.096	3.182	0.499	0.034
	CD at 5%	1.146	0.545	33.395	26.12	0.270	8.895	1.395	0.095
Sowing date									
1	6th Feb.	62.38 (53.23	76.04 (63.10)	1180.02	224.91	17.34	270.5	77.83	3.05
2	22nd Feb.	68.48 (57.72	82.25 (67.55)	1272.04	301.33	17.49	226.2	73.26	3.21
3	8th March	65.80 (55.65	78.43 (64.77)	1322.58	268.91	18.83	261.2	75.35	3.57
	SE +_	0.290	0.137	8.446	6.608	0.068	2.250	0.352	0.024
	CD at 5%	0.811	0.385	23.614	18.47	0.190	6.290	0.986	0.067
Accelerated aging									
1	A_{o}- o days	94.37 (77.18	97.72 (81.95)	2267.43	385.40	23.98	302.3	79.19	3.24
2	A_1-3 days	73.59 (59.15	92.18 (74.06)	1406.84	290.47	19.09	262.4	78.62	3.26
3	A_2-6 days	53.25 (46.90	72.94 (58.71)	821.90	221.47	15.28	230.9	74.10	3.26
4	A_3-9 days	39.68 (38.91	51.42 (45.83)	536.70	162.69	13.19	214.8	70.01	3.33
	SE +_	0.334	0.159	9.753	7.630	0.078	2.598	0.407	0.027
	CD at 5%	0.936	0.445	27.267	21.332	0.220	7.263	1.139	0.077

Figures in parenthesis are Arc-sine values.

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