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STABILITY ANALYSIS FOR SEED YIELD AND ITS COMPONENTS IN CORIANDER (*CORIANDRUM SATIVUM* L.)

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ABSTRACT

The interaction between genotypes and environment (G x E) can influence the selection process and recommendation of coriander genotypes. The prime objective of this study was therefore to evaluate the influence of G x E interaction of coriander seed yield using stability parameters. Keeping of this principle thirty diverse genotypes of coriander were evaluated over three different dates of sowing during the *Rabi* season of the year 2011-2012. The data were recorded for ten different morphological characters. The environments, in which genotypes were grown, differed significantly for all the characters. Genotype x environment interaction were also significant for all the traits revealed differential response of the genotype to varying dates of sowing. Thirteen genotypes namely CGL-1, CGL-2, CGL-3, MKSM-1059, MKSM-1101, SINDHU, NDCOR-43, RCR-41, VDV/GL-2, AUSTRALIA, UD-401, MKSM-1116 and MKSM-1091 were found to be desirable and stable across the environments for seed yield. Thus, these genotypes could be included in the hybridization programme to converge the stability characteristic of seed yield for the development of a stable variety adapted to wide range of environments.

INTRODUCTION

Coriander (*Coriandrum sativum* L.) is an important seed spice crop belonging to the family Apiaceae (previously classified under the family Umbelliferae) with a diploid chromosome number 2n = 22. The unripe fruit gives smell of bed bugs and thus character is responsible for determination of the name coriander from the Greek world "Koris" meaning bed bug. The ripe fruits are pleasantly aromatic (Diederichsen, 1996). In India coriander occupied an area of 530.50 million hectares giving a total production of 482.00 metric tones during 2010-11 (Anonymous, 2011). The major coriander growing states are Rajasthan, Andhra Pradesh, Tamil Nadu, Karnataka, Gujarat, Madhya Pradesh, Utter Pradesh, Haryana and Bihar. Among these Rajasthan ranks top in area and production of coriander followed by Andhra Pradesh.

Yield stability is an interesting feature of today's plant breeding programs (Mohammadi *et al.,* 2012). According to Frey (1964), a variety having wide or good adaptability is one which gives consistently superior performance over several environments. Thus, the assessment of the nature and identification of phenotypically stable genotypes becomes important (Akcura *et al.,* 2009). This requires the screening of promising and stable genotypes over a set of environmental conditions. It is observed that the phenotypic response to change in environment is not same for all the genotypes. The consequence of variations in phenotype depend upon the environment (Hanamartti *et al.,* 2015). Genotype-environment interaction are of major consequence to the breeder in the process of evolution of improved genotypes when the varieties/genotypes are grown at several locations for testing their performance, their relative ranking do not remain the same, this cause difficulties in demonstrating significant superiority of any genotypes (Reddy *et al.,* 2015). The information about the phenotypic stability is useful for the selection of crop varieties as well as for breeding programmes (Gohil and Jadeja 2009). In coriander few studies are available on these aspect Sastry *et al*. (1989) in coriander, Jindla *et al*. (1986) in fennel, Jindla *et al*. (1985), Tomar *et al*. (2004) and Singh and Prasad (2006).

The objective of this study was to evaluate the phenotypic adaptability and stability of thirty diverse genotypes of coriander in relation to seed yield by stability analysis.

MATERIALS AND METHODS

Plant material

Material for the present investigation comprised of 30 diverse genotypes of coriander. Of which 26 genotypes were collected from the National Research Center on Seed Spices Ajmer (Rajasthan). Remaining four genotypes were collected from the Vegetable Research Station, Junagadh Agricultural University, Junagadh.

Methods of experiment

Experiment was carried out at Vegetable Research Station, Junagadh Agricultural University, Junagadh during the *Rabi* season of the year 2011-2012. Three environments were created by sowing in three different dates keeping 25 days interval between each sowing date and classified as early sown, timely sown and late sown. The soil of experimental site was medium black, alluvial in origin and poor in organic content. The climate of the area represents tropical conditions with semiarid nature. Experiments were sown in randomized block design with three replications. Each genotype was sown in single line of five meter bed with a spacing of 30 cm between lines and 10 cm between plants. Recommended crop management practices were followed for raising a healthy crop. Life saving irrigation was applied as on when required.

Data recorded

The biometrical observations were recorded for ten different characters *viz*. days to 50% flowering, plant height, number of basal leaves, number of fruit bearing branches, number of umbels per plant, number of umbellets per plant, number of seeds per umbel, seed yield per plant, 100-seed weight and harvest index. Observations of days to 50% flowering and days to maturity were recorded on plot basis, whereas data on rest of the characters were recorded on five randomly selected plants in all the three replications.

Statistical analysis

Stability analysis was done based on pooled data over three seasons following the model suggested by Eberhart and Russell (1966).

RESULTS AND DISCUSSION

Analysis of variance

The mean square due to genotype (G) and environment (E) + (G x E) were significant when tested against pooled error indicating that there were changes in the relative ranking of different genotypes over environment which is in agreement with Tomar *et al*. (2004), Sastry *et al*. (1989) in coriander, Jindla *et al*. (1986) in fennel, Jindla *et al*. (1986) and Singh and Prasad (2006) in coriander. Highly significant mean square due to environment (linear) indicated that the yield differences were influenced to a great extent under different environments. This indicated that a greater proportion of genetic response was a linear function of environments. The non-significant genotype x environment (linear) suggested less contribution of linear environment to genotypes. Significant pooled deviation suggested that genotypic performance varied with their respective linear paths of response to environment. The predominance of linear component would help in predicting the performance of the genotypes across the environments.

Stability parameter

Eberhart and Russell (1966) suggested that a genotype may be said to be stable over different environments if it shows unit slope (b_i) with low deviation from regression (S^2d_i) and high *per se* performance. The mean number of days to 50% flowering ranged from 31.89 to 40.55. The early flowering genotype was found to be IC-570325 and late flowering genotype was VDV/GL-2. Out of 30 genotypes, 11 genotypes *viz*. CGL-3, IC-570325, MKSM-1101, RCR-435, VDV/GL-173, MKSM-1110, ACR-139, RCR-41, SKCV09-40, VDV/GL-37 and UD-401 had mean values below the population mean (35.02) and they exhibited average regression coefficient (bi approaching unity) with non-significant deviation from regression (S2di close to zero), thus proving their stability in respect of days to 50% flowering on lower side (*i.e.* below population mean) over all the environment under study (Table 2).The mean values for plant height ranged from 57.97 to 68.62. The highest plant height was observed for MKSM-1059 and lowest height was observed for VDV/GL-2. Out of 30 genotypes, 9 genotypes *viz*. ACR-1, MKSM-1059, NDCOR-330, JCO-329, MKSM-1110, NDCOR-43, RCR-41, MKSM-1111 and UD-401 recorded mean values above the population mean (61.13), average regression (bi nearer to unity) and were found to be stable as far as plant height was concerned over all the environments. These genotypes also exhibited low value of deviation from regression ($S^2d_i = 0$ around zero) (Table 2).

The mean values for number of basal leaves ranged from 4.92 to 6.22. The largest basal leaf genotype was VDV/GL-173 and fewer basal leaf genotypes was JCO-329. Out of 30 genotypes, 15 genotypes *viz*. GUJ. DHANA-2, CGL-1, CGL-2, CGL-3, ACR-1, HISARS, NDCOR-330, VDV/GL-173, MKSM-1110, ACR-139, RCR-41, IC-146683, ACR-173 MKSM-1116 and MKSM-1091 recorded mean values above the population mean (5.69), average regression (bi nearer to unity) and were found to be stable as far as number of basal leaves as concerned over all the environments. These genotypes also exhibited low value of deviation from regression ($S^2d_i = 0$ around zero) (Table 2).

Table 1: Pooled analysis of variance for seed yield and its contributing characters in coriander

CH	Mean Squares Geno.(G)	Enviro.(E)	GX E	E+(GX E)	Enviro.(Linear)	GX E(Linear)	Pooled deviation	Pooled error
D. F.	29	2	58	60	1	29	30	174
X1	11.319**	478.43**	10.83**	26.42**	956.83**	11.41**	9.91**	6.46
X2	16.07**	7846.72**	31.06**	291.58**	15693.44**	36.84**	24.44**	21.40
X3	0.528	31.30**	0.57*	1.59*	62.60**	0.84*	0.28*	0.33
X4	10.020**	0.24**	7.93**	7.67**	0.47*	9.35**	6.29**	4.12
X5	14.638**	5.71**	19.82**	19.34**	11.43**	20.59**	18.40**	12.77
X6	310.565**	602.35**	454.96**	459.87**	1206.18**	476.70**	418.72**	278.31
X7	5.892**	20.45**	6.57**	7.03**	40.90**	6.41**	6.50**	4.11
X8	4.086**	7.22**	4.95**	5.03**	14.44*	5.18**	4.57**	1.42
X9	0.037*	0.19*	0.02*	0.02*	0.391*	0.02*	0.02*	1.34
X10	161.096**	7159.76**	94.17**	329.69**	14319.55**	89.55**	95.50**	29.17

*,** Significant at 5 and 1 per cent, respectively

X_1Days to 50% flowering; X_2Plant height (cm);X_3No. of basal leaves;X_4No. of fruit bearing branches; X_5Umbels per plant; X_6Umbellets per plant; X_7Seeds per umbel; X_8 Seed yield per plant (g); $X_9$100-seed weight (g); X_{10}Days to maturity

Table 2: Estimates of stability parameters in 30 genotypes of coriander for seeds yield and its contributing characters

S. No	Genotypes	Days to 50% flowering			Plant height (cm)			No. of basal leaves			No. of fruit bearing branches		
		X	Bi	S2di	X	bi	S2di	X	bi	S2di	X	Bi	S2di
1	GUJ. DHANA-2	35.78	-0.25	38.64**	61.46	0.45	34.35**	5.90	1.029	1.419	21.24	64.60	6.14**
2	CGL-1	32.33	2.56	4.91*	59.46	0.04	42.77**	5.89	-0.983	-0.290	20.60	-24.48	12.84**
3	CGL-2	33.67	0.04	11.77**	61.01	1.59	-3.23	5.91	1.267	1.156	21.60	-0.83	2.25
4	CGL-3	34.11	1.14	-0.76	60.70	1.02	-18.97	5.73	1.842	0.675	21.03	-28.07	36.96**
5	ACR-1	35.44	0.90	-4.77	61.92	1.23	-20.75	5.89	1.420	-0.196	21.81	32.24	4.12*
6	IC-570325	31.89	0.87	-5.66	58.23	1.12	-6.54	5.63	0.947	-0.252	19.91	-7.80	1.97
7	MKSM-1059	35.33	0.23	-5.27	68.62	1.08	-19.06	5.27	0.923	-0.325	19.89	-5.66	-3.25
8	MKSM-1101	34.89	1.21	-6.24	62.54	0.99	26.59**	5.63	1.579	-0.163	19.98	30.64	-3.08
9	RCR-435	34.55	0.20	-4.87	59.72	1.18	-14.95	5.42	0.853	0.061	22.33	39.25	-3.46
10	HISARS	35.44	0.39	-5.83	60.56	0.60	26.35**	6.18	1.561	-0.172	21.57	-2.40	-1.17
11	NDCOR-330	37.33	0.65	-1.85	64.40	1.07	0.35	5.86	0.710	0.345	21.06	-9.99	-4.03
12	VDV/GL-173	34.33	0.95	-0.19	62.66	1.25	8.25**	6.22	1.432	-0.337	19.73	-25.58	-2.19
13	JCO-329	36.00	1.11	-6.46	61.67	1.08	-17.87	4.92	1.248	-0.324	21.98	4.01	22.82**
14	MKSM-1110	34.00	1.31	0.06	61.42	0.95	-21.40	5.83	1.898	-0.337	21.04	-15.32	-3.27
15	ACR-139	33.44	0.71	-5.89	59.88	1.03	-21.38	5.96	-0.103	-0.316	18.71	19.93	-1.08
16	SINDHU	38.33	1.01	8.38**	60.54	0.97	-21.39	5.39	0.986	-0.169	22.44	24.43	-3.37
17	NDCOR-43	32.56	1.17	13.60**	61.59	0.95	-20.25	5.66	0.844	0.016	18.66	-27.25	-2.31
18	RCR-41	32.44	0.80	-5.71	61.94	1.09	-21.29	6.22	0.833	-0.273	21.71	-1.32	2.45
19	IC-146683	38.89	1.72	34.62**	58.27	1.14	0.66	6.00	0.811	-0.173	21.07	-41.01	-4.11
20	MKSM-1111	34.56	1.43	16.76**	61.40	0.87	-8.24	5.49	1.315	-0.283	18.98	6.09	1.77
21	VDV/GL-2	40.55	0.66	-5.92	57.97	0.97	-11.27	5.73	1.822	-0.184	22.49	7.76	11.53**
22	SKCV09-40	34.44	1.92	-5.88	60.45	1.01	-19.50	4.94	0.620	0.309	20.39	-2.87	-0.17
23	VDV/GL-37	35.00	0.63	-6.41	59.17	0.96	-5.77	5.13	1.461	-0.301	22.30	13.59	3.87
24	AUSTRALIA	32.22	1.56	19.10**	60.87	1.19	-21.20	5.55	-0.205	-0.108	23.57	-25.05	-3.05
25	UD-401	33.44	0.41	-1.62	64.02	0.92	-20.09	5.45	0.266	-0.262	18.27	-15.67	-3.62
26	ACR-173	37.33	0.92	-6.12	60.71	1.05	0.43	5.87	1.086	-0.006	22.52	39.85	-0.25
27	MKSM-1116	36.44	1.06	22.51**	60.74	1.07	-17.77	5.87	0.522	-0.132	22.46	-14.06	0.30
28	MKSM-1091	33.33	1.39	16.58**	60.98	0.88	-3.02	5.96	1.560	-0.285	21.00	5.99	2.18
29	DHANA-139	35.67	1.68	3.26	60.48	1.08	-21.00	5.60	1.274	-0.329	20.71	-21.64	-4.06
30	ACR-13	35.89	1.52	27.34**	60.72	1.03	-10.32	5.52	1.181	-0.335	19.96	8.59	-2.27
Population mean		35.02			61.13			5.69			20.96		
S. E. of Mean		2.220			3.49			0.37			1.774		

The mean values for number of fruit bearing branches ranged from 18.27 to 23.57. The genotype having largest fruiting branches was AUSTRALIA and genotype having less fruiting branches was UD-401. Out of 30 genotypes, 14 genotypes *viz*. CGL-2, ACR-1, RCR-435, HISARS, NDCOR-330, MKSM-1110, SINDHU, RCR-41, IC-146683, VDV/GL-37, AUSTRALIA, ACR-173, MKSM-1116 and MKSM-1091 recorded mean values above the population mean (20.96), average regression (b_i nearer to unity) and were found to be stable as far as number of fruit bearing branches as concerned over all the environments. These genotypes also exhibited low value of deviation from regression ($S^2d_i = 0$ around zero) (Table 2).

The mean values for umbels per plant ranged from 43.00 to 51.60. The largest umbel per plant was observed for IC-570325 whereas lowest umbel per plant was observed for ACR-173. Out of 30 genotypes 11 genotypes *viz*. CGL-1, CGL-3, IC-570325, MKSM-1110, RCR-41, MKSM-1111, VDV/GL-2, SKCV09-40, VDV/GL-37, AUSTRALIA and MKSM-1091 recorded mean values above the population mean (48.96), average regression (bi nearer to unity) and were found to be stable as far as umbels per plant as concerned over all the environments. These genotypes also exhibited low value of deviation from regression ($S^2d_i = 0$ around zero) (Table 2).

The mean values for umbellets per plant ranged from 237.60 to 264.40. The largest umbellets per plant was observed for SINDHU while lowest umbellets per plant was observed for UD-401. Out of 30 genotypes, 12 genotypes *viz*. CGL-3, IC-570325, MKSM-1059, MKSM-1101, HISARS, VDV/GL-173, ACR-139, SINDHU, IC-146683, VDV/GL-2, MKSM-1116 and DHANA-139 recorded mean values above the population mean (252.52), average regression (bi nearer to unity) and were found to be stable as far as umbellets per plant as concerned over all the environments. These genotypes also exhibited low value of deviation from regression ($S^2d_i = 0$ around zero) (Table 2).

The mean values for seeds per umbel ranged from 23.72 to 28.62. The highest seed per umbel was observed for ACR-173 while lowest seeds per umbel was observed for IC-570325. Out of 30 genotypes, 10 genotypes *viz*. ACR-1, IC-570325, MKSM-1059, VDV/GL-173, NDCOR-43, MKSM-1111, VDV/GL-2, UD-401, ACR-173, MKSM-1116 and ACR-13 recorded mean values above the population mean (25.72), average regression (bi nearer to unity) and were found to be stable as far as number of seeds per umbel as concerned over all the environments. These genotypes also exhibited low value of deviation from regression ($S^2d_i = 0$ around zero) (Table 2).

The mean values for seed yield per plant ranged from 9.96 to 14.68. The highest seed yield per plant was observed for MKSM-1116 while lowest seed yield per plant was observed for RCR-435. Out of 30 genotypes, 13 genotypes *viz*. CGL-1,

Table 2: Cont....

Sr. No.	Genotypes	Umbels per plant X	bi	S2di	Umbellets per plant X	bi	S2di	Seeds per umbel X	bi	S2di	Seed yield per plant X	bi	S2di
1	GUJ. DHANA-2	50.01	-2.20	185.1**	257.20	-8.25	1759.36**	26.60	-4.17	50.37**	12.27	-0.81	0.32
2	CGL-1	49.78	20.01	-5.06	253.80	19.92	314.75**	25.24	7.84	0.68	14.01	2.61	2.21
3	CGL-2	49.16	-22.45	59.38**	251.50	-1.32	4552.25**	25.79	3.19	4.13**	13.13	-0.35	0.59
4	CGL-3	50.27	-1.08	-5.50	258.00	0.67	-137.15	26.22	2.46	5.15**	13.91	2.34	-1.01
5	ACR-1	47.64	-2.24	-6.82	244.60	0.40	-244.99	25.73	0.05	-2.81	11.77	-3.57	-0.82
6	IC-570325	51.60	-0.60	-9.76	261.40	-0.56	-230.35	23.72	0.51	-3.28	11.71	-1.65	0.24
7	MKSM-1059	47.42	4.93	8.52**	264.00	3.37	-267.41	27.32	-0.37	1.35	13.50	5.53	-1.39
8	MKSM-1101	48.05	-1.04	-10.07	258.40	0.89	-177.79	24.11	1.86	-2.77	14.32	4.33	-1.33
9	RCR-435	48.10	5.02	-8.64	240.50	-2.65	35.83**	24.52	-2.36	6.72**	9.96	0.67	7.75**
10	HISARS	48.71	-0.45	-12.31	256.40	-1.98	-235.98	25.41	1.32	-0.95	10.78	-6.55	-0.47
11	NDCOR-330	47.29	4.46	-12.45	238.00	2.85	-144.70	24.22	1.26	8.31**	10.59	-0.14	4.60**
12	VDV/GL-173	49.52	2.91	8.95**	254.70	-1.75	-237.49	27.26	2.20	2.71	12.57	-3.24	1.15**
13	JCO-329	48.18	2.94	-8.55	250.40	1.08	-112.89	24.19	3.89	-3.28	11.98	-0.66	-0.67
14	MKSM-1110	49.00	0.60	-10.59	245.20	1.71	376.19**	25.23	2.22	-2.24	12.44	-1.13	1.32
15	ACR-139	46.67	6.37	-9.37	253.50	4.42	-9.64	26.95	2.38	18.30**	11.31	-1.45	6.43**
16	SINDHU	48.50	2.10	-10.52	264.40	2.57	-272.61	26.21	0.44	4.54**	12.62	1.10	-0.96
17	NDCOR-43	47.67	0.36	17.96**	248.60	2.67	28.96**	25.83	0.41	-4.11	12.85	2.91	0.14
18	RCR-41	50.25	-5.98	-8.64	241.90	-3.30	-195.75	24.32	2.20	-2.67	12.78	-3.10	0.97
19	IC-146683	51.11	-3.48	20.48**	254.00	1.87	-277.29	24.69	-0.46	-3.58	14.19	4.75	6.24**
20	MKSM-1111	50.81	2.83	-11.83	253.90	4.88	239.88**	26.92	1.84	-3.17	11.85	0.49	-1.00
21	VDV/GL-2	49.80	-3.25	-10.39	260.50	2.31	-46.07	25.93	2.55	-3.38	12.76	2.15	-0.04
22	SKCV09-40	50.48	2.36	-12.72	247.20	2.05	-227.41	25.00	0.53	-3.77	11.66	4.42	-0.73
23	VDV/GL-37	49.22	13.55	-12.76	247.00	-1.45	-175.39	25.04	-2.43	-4.03	11.90	2.29	2.48
24	AUSTRALIA	51.58	7.39	-9.57	252.40	1.99	270.96**	24.56	-0.23	-3.21	14.36	6.71	-0.18
25	UD-401	46.82	1.09	0.06	237.60	0.83	-278.02	25.93	0.23	-3.71	12.71	4.51	-0.63
26	ACR-173	43.00	-4.76	2.14	249.20	-0.30	-274.85	28.62	1.97	-4.03	12.07	6.42	3.10
27	MKSM-1116	48.62	5.81	-3.74	259.40	-0.17	-276.40	26.90	0.02	2.60	14.68	-0.62	2.02
28	MKSM-1091	50.22	3.56	0.77	263.50	0.66	822.36**	27.77	0.46	12.70**	13.64	4.77	-1.07
29	DHANA-139	51.31	-12.34	76.6**	259.10	2.94	-89.93	25.15	1.07	12.37**	13.07	-1.24	8.12**
30	ACR-13	48.28	3.63	-10.58	249.20	0.63	-276.04	26.41	-0.93	-4.11	12.32	-1.47	7.03**
Population mean		48.96			252.52			25.72			12.59		
S. E. of Mean		3.03			14.46			1.80			1.51		

Table 2: Cont........

Sr. No.	Genotypes	100-seed weight (g) X	bi	S2di	Harvest index (%) X	bi	S2di
1	GUJ. DHANA-2	1.04	2.35	0.10	51.21	1.164	143.792**
2	CGL-1	1.14	-2.71	-0.01	52.62	0.242	470.375**
3	CGL-2	1.05	1.32	0.03	55.19	0.837	202.271**
4	CGL-3	1.00	2.02	-0.01	49.43	1.047	-15.677
5	ACR-1	1.02	0.65	-0.01	46.11	1.168	34.967**
6	IC-570325	1.05	0.40	-0.01	47.07	1.126	25.514**
7	MKSM-1059	0.95	-0.13	-0.01	49.03	0.313	25.514**
8	MKSM-1101	1.18	0.65	0.03	56.47	1.070	355.416**
9	RCR-435	0.81	-0.01	0.00	35.66	0.996	-27.914
10	HISARS	0.91	2.38	-0.01	40.73	1.381	44.045**
11	NDCOR-330	0.89	-1.10	0.03	45.70	0.630	195.468**
12	VDV/GL-173	0.97	-1.16	0.04	45.62	0.004	-11.9
13	JCO-329	1.02	-0.10	-0.01	47.87	1.607	10.547**
14	MKSM-1110	1.09	0.52	-0.00	54.11	0.413	-14.215
15	ACR-139	0.90	1.51	-0.01	38.42	1.240	4.004**
16	SINDHU	0.99	0.97	-0.01	49.88	1.254	-20.707
17	NDCOR-43	1.01	0.43	0.01	46.20	0.315	18.074**
18	RCR-41	1.06	1.43	0.09	46.99	0.804	629.31**
19	IC-146683	1.12	1.39	-0.01	52.65	0.796	0.069
20	MKSM-1111	0.93	0.21	0.01	44.94	0.364	-20.079
21	VDV/GL-2	0.95	3.30	0.00	48.53	1.576	-2.683
22	SKCV09-40	0.90	0.81	-0.01	45.32	1.037	-17.184
23	VDV/GL-37	0.96	1.56	0.00	46.97	0.001	-29.174
24	AUSTRALIA	1.16	2.01	-0.01	53.46	1.197	41.223**
25	UD-401	1.14	1.21	-0.01	50.88	0.974	-0.169
26	ACR-173	0.98	3.05	-0.01	45.84	1.796	-24.782
27	MKSM-1116	1.10	2.72	-0.01	52.13	1.566	-24.917
28	MKSM-1091	1.04	0.35	-0.00	51.48	1.122	-25.051
29	DHANA-139	1.03	2.56	-0.01	46.80	1.156	45.346**
30	ACR-13	0.98	1.35	0.03	46.72	1.094	50.936**
Population mean		1.01			48.13		
S. E. of Mean		0.10			6.91		

*,** Significant at 5 and 1 per cent, respectively

Table 3: Genotypes showing stable performance for different characters (high mean, $b_i = 1$ and $S^2d_i = 0$)

Sr. No.	CH	Genotypes suitable for favorable environments
1	Days to 50% flowering	CGL-3, IC-570325, MKSM-1101, RCR-435, VDV/GL-173, MKSM-1110, ACR-139, RCR-41, SKCV09-40, VDV/GL-37 and UD-401
2	Plant height (cm)	ACR-1, MKSM-1059, NDCOR-330, JCO-329, MKSM-1110, NDCOR-43, RCR-41, MKSM-1111andUD-401
3	Number of basal leaves	GUJ. DHANA-2, CGL-1, CGL-2, CGL-3, ACR-1, HISARS, NDCOR-330, VDV/GL-173, MKSM-1110, ACR-139, RCR-41, IC-146683, ACR-173 MKSM-1116 and MKSM-1091
4	Number of fruit bearing branches	CGL-2, ACR-1, RCR-435, HISARS, NDCOR-330, MKSM-1110, SINDHU, RCR-41, IC-146683, VDV/GL-37, AUSTRALIA, ACR-173, MKSM-1116 and MKSM-1091
5	Umbels per plant	CGL-1, CGL-3, IC-570325, MKSM-1110, RCR-41, MKSM-1111, VDV/GL-2, SKCV09-40, VDV/GL-37, AUSTRALIA and MKSM-1091
6	Umbellets per plant	CGL-3, IC-570325, MKSM-1059, MKSM-1101, HISARS, VDV/GL-173, ACR-139, SINDHU, IC-146683, VDV/GL-2, MKSM-1116 and DHANA-139
7	Seeds per umbel	ACR-1, IC-570325, MKSM-1059, VDV/GL-173, NDCOR-43, MKSM-1111, VDV/GL-2, UD-401, ACR-173, MKSM-1116 and ACR-13
8	Seed yield per plant (g)	CGL-1, CGL-2, CGL-3, MKSM-1059, MKSM-1101, SINDHU, NDCOR-43, RCR-41, VDV/GL-2, AUSTRALIA, UD-401, MKSM-1116 and MKSM-1091
9	100-seed weight (g)	GUJ.DHANA-2, CGL-1, CGL-2, ACR-1, IC-570325, MKSM-1101, JCO-329, MKSM-1110, NDCOR-43, IC-146683, AUSTRALIA, UD-401, MKSM-1116, MKSM-1091 and DHANA-139
10	Harvest index (%)	CGL-3, MKSM-1110, SINDHU, IC-146683, VDV/GL-2, UD-401, MKSM-1116 and MKSM-1091

CGL-2, CGL-3, MKSM-1059, MKSM-1101, SINDHU, NDCOR-43, RCR-41, VDV/GL-2, AUSTRALIA, UD-401, MKSM-1116 and MKSM-1091 recorded mean values above the population mean (12.59), average regression (bi nearer to unity) and were found to be stable as far as seed yield per plant (g) as concerned over all the environments. These genotypes also exhibited low value of deviation from regression ($S^2d_i = 0$ around zero) (Table 2).

The mean values for 100-seed weight ranged from 0.81 to 1.18. The largest 100-seed weight was observed for MKSM-1101 while lowest 100-seed weight was observed for RCR-435. Out of 30 genotypes, 16 genotypes *viz*. GUJ.DHANA-2, CGL-1, CGL-2, ACR-1, IC-570325, MKSM-1101, JCO-329, MKSM-1110, NDCOR-43, IC-146683, AUSTRALIA, UD-401, MKSM-1116, MKSM-1091 and DHANA-139 recorded mean values above the population mean (1.01), average regression (bi nearer to unity) and were found to be stable as far as 100-seed weight (g) as concerned over all the environments. These genotypes also exhibited low value of deviation from regression ($S^2d_i = 0$ around zero) (Table 2).

The mean values for harvest index ranged from 35.66 to 56.47. The highest harvest index was observed for MKSM-1101 while lowest harvest index was observed for RCR-435. Out of 30 genotypes, 8 genotypes *viz*. CGL-3, MKSM-1110, SINDHU, IC-146683, VDV/GL-2, UD-401, MKSM-1116 and MKSM-1091 recorded mean values above the population mean (48.13), average regression (bi nearer to unity) and were found to be stable as far as harvest index (%) as concerned over all the environments. These genotypes also exhibited low value of deviation from regression ($S^2d_i = 0$ around zero) (Table 2).

The result of the present study indicated that certain genotypes were expressed stability for different traits. The genotypes CGL-1, CGL-2, CGL-3, MKSM-1059, MKSM-1101, SINDHU, NDCOR-43, RCR-41, VDV/GL-2, AUSTRALIA, UD-401, MKSM-1116 and MKSM-1091 was considered as a stable genotype for seed yield per plant as they have high general mean regression coefficient near to one ($b_i = 1$) and deviation from regression near to zero ($S^2d_i = 0$). The stable genotypes identified for different traits may be used as parents in future breeding programmes for the development of new stains with combination of stable strains.In summation, thirteen genotypes were found to be promising and stable for seed yield. Hence, the genotype may be recommended for wide range of environments.

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