Indian J. Hort. 69(1), March 2012: 79-85

Stability analysis of yield and its component traits in fenugreek germplasm

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ABSTRACT

Stability and sustainability index studies were performed in 55 fenugreek genotypes including four check varieties during *rabi* 2005-06 and 2006-07 at CCSHAU, Hisar; RAU, Pusa; NDUA&T, Faizabad and in *rabi* 2005-06 at NBPGR, New Delhi alongwith *per se* performance. The analysis of pooled data indicated highly significant differences among the genotypes and environments for all the traits. The variance due to genotype and environments were highly significant for all the traits. Highly significant pooled deviation for plant height, number of primary branches per plant, pods per plant, and seed yield per hectare and highly significant G × E (Linear) interaction for plant height, pods per plant, and seed yield per hectare indicated the preponderance of non-linear components of G × E interaction. The genotype IC144260 had shown consistent performance and stability in wider environments for seed yield per hectare and pods per plant, whereas IC144243 has shown consistent performance in poor environment for seed yield per hectare.

Key words: Fenugreek, stability, sustainability index, yield, *Trigonella* sp.

INTRODUCTION

Fenugreek (*Trigonella foenum-graecum* Linn.) commonly known as '*methi*' is one of the most important seed spice crops of India. It is also used as leafy vegetable, medicinal purposes and for fodder. Fenugreek is native of eastern Europe and Ethiopia. India is also said to be a native for fenugreek, which is found growing wild in Kashmir, Punjab and upper Gangetic plains. It is rich in minerals, protein, vitamins A and C. Fresh tender leaves, pods and stems are used as leafy vegetable and seed is used as spice. The seeds are carminative, tonic, and aphrodisiac and customarily used for treatment of colic, flatulence, dysentery, diarrhoea, dyspepsia with loss of appetite, indigestion, and stimulate spleen and liver. In industries, the seed is used as dye and for extraction of alkaloids and steroids. India is the largest producer of fenugreek in the world, where it is cultivated mainly in Rajasthan, Gujarat, Uttarakhand, Uttar Pradesh, Madhya Pradesh, Maharashtra, Haryana and Punjab.

Fenugreek, a major seed spice crop, is grown in the semi-arid to arid areas. Due to its multipurpose use, cultivation is increasing in the non-traditional areas of the country. The farmers of different states grow the landraces available with them. Since, there are very few varieties and majority of them were developed from available germplasm, the performance of fenugreek germplasm at multilocation is of great importance in respect of screening them for their stability, sustainability as well as for possibility of cultivation in non-conventional areas including unfavorable environments. The G×E interaction along with sustainability index shows the differential response of genotypes to different environmental conditions and their consistency in performance over the locations. An ideal variety should have a high mean yield combined with a low degree of fluctuations when grown over diverse environments (Arshad *et al*., 1).

MATERIALS AND METHODS

The experimental materials comprising 55 [49 indigenous accessions, two exotic accessions, and four released varieties namely AM-10, AM-35, RMt-1, and Pusa Early Bunching (PEB)] fenugreek genotypes were grown during *rabi* (October to April) 2005-06 and 2006-07 at CCSHAU, Hisar; RAU, Dholi; NDUA&T, Faizabad; and in *rabi* 2005-06 at NBPGR, New Delhi. The experiment was laid in randomized block design with two replications. Each plot of 3.0 m × 0.6 m size accommodated two 3.0 m long rows spaced 30 cm with plant to plant distance of 10 cm. The observations were recorded on plant height (cm), number of primary branches, number of pods per plant, number of seeds per pod, and yield per hectare (t). The data were analysed statistically for stability parameters based on model (Eberhart and Russel,

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3). The sustainability indices (SI) were estimated as per the following formula used by earlier workers (Gangwar and Anand, 4).

$$SI = \frac{Y - \sigma_n}{Y_M} \times 100$$

Where, Y = Average performance of the genotype

σ_n = Standard deviation and

Y_M = Best performance of the genotype in any year/location

The sustainability index were divided into five groups, *viz*., very low (upto 20%), low (21-40%), moderate (41-60%), high (61-80%) and very high (above 80%).

RESULTS AND DISCUSSION

The stability analysis of variance mean data (Table 1) revealed highly significant differences among the genotypes as well as environments for all the traits. Genotype × Environment (G × E) interaction was studied for seed yield per hectare and its component characters, i.e. plant height, No. of primary branches per plant, pods per plant, and seeds per pod. G × E interactions were highly significant for plant height and seed yield per hectare. Similar observations were reported in fenugreek (Kole, 5; Basu *et al*., 2). Highly significant mean squares due to environment (linear) for all the traits indicated considerable differences among the environments and their predominant effects on the traits. This was due to variation in climatic conditions during years and locations. Highly significant pooled deviations for plant height, primary branches, pods per plant, and seed yield per hectare indicated non linear response of the genotypes due to environmental changes and greater role of unpredictable components of G × E interaction towards differences in stability of the genotypes. It is reported that both predictable and unpredictable components contributed significantly towards the differences in stability of fenugreek genotypes (Mathur and Lal, 6). However, prediction for unpredictable traits can be made by considering the stability parameters of individual genotypes (Singh *et al*., 7).

It was suggested that an ideal genotype should be having high mean performance, regression co-efficient (b_i) near unity, and deviation from regression (sd_i^2) near zero (Eberhart and Russel, 3). The stability analysis for seed yield revealed that 18 out of 55 genotypes had stable and predictable performance on account of non-significant deviation from regression (Table 2). Four genotypes namely, IC144260 (1.60 t/ha), IC279168 (1.59 t/ha), IC371755 (1.51 t/ha), and IC398123 (1. 45 t/ha) recorded higher seed yield than population mean (1.43 t/ha) and best check AM-10 (1.45 t/ha), non-significant regression co-efficient and deviation from regression were found stable and suitable for wider adaptability. IC144225 (1.50 t/ha) recorded higher seed yield than population mean (1.43 t/ha) and best check AM-10 (1.45 t/ha), significant positive regression co-efficient along with non-significant deviation from regression indicating stability and suitability for favorable environment. IC144243 (1.43 t/ha) recorded equal seed yield as that of population mean, significant regression co-efficient (b_i) value less than 1 and non-significant deviation from regression; hence found stable and suitable for unfavorable environment.

In fenugreek, taller plant height and more numbers of primary branches per plant are desirable for higher seed yield. The genotypes IC143852 (62.38 cm), IC143856 (60.83 cm), IC398093 (60.49 cm), IC144225 (60.34 cm), and IC397522 (60.07 cm) had higher plant height than population mean (59.78 cm) along with non-

Table 1. Pooled analysis of variance of traits for stability in fenugreek.

Source of variation	df	Mean square				
		Plant height (cm)	No. of primary branches per plant	Pods per plant	Seeds per pod	Seed yield per hectare (t)
Genotype (G)	54	37.19**	0.64**	34.97*	1.92**	0.14**
Environment (E)	6	201.18**	10.50**	2167.34**	4.99**	0.20**
G x E	324	22.09*	0.27	27.14	1.17	0.09*
Env. (linear)	1	11065.52**	577.60**	119202.65**	274.82**	10.97**
G x E (linear)	54	42.92**	0.09	44.22**	1.34	0.19**
Pooled deviation	275	17.60**	0.30**	23.30**	1.12	0.07**
Pooled error	378	26.22	0.31	14.19	1.05	0.02

*Significant at 5 and 1% levels.

Table 2. Stability parameters for plant height and number of primary branches per plant in fenugreek.

Genotype	Plant height (cm)				No. of primary branches per plant			
	Mean	b_i	sd_i^2	Sustainability index	Mean	b_i	sd_i^2	Sustainability index
EC520254	60.23	0.61*	-15.28	85.24	4.84	0.84**	-0.24	61.86
EC520255	62.81	0.59**	-21.24	88.22	4.91	0.85	-0.19	63.59
IC057752	59.30	0.61	26.81**	77.03	5.46	1.10	-0.08	58.73
IC143817	54.46	1.70**	-5.25**	62.88	5.04	1.10	0.05	50.54
IC143845	57.77	0.79	-21.45	82.98	5.33	0.97	-0.04	57.39
IC143849	59.33	1.21	-15.56	74.00	5.06	0.96	-0.17	58.57
IC143851	59.61	0.74*	-20.95	82.21	5.31	1.02	-0.22	57.09
IC143852	62.38	0.84	-22.31	83.10	5.91	1.26	0.62**	50.96
IC143853	58.74	0.65**	-23.75	86.43	5.54	1.12	-0.19	53.70
IC143856	60.83	1.01	-15.32	77.26	5.19	1.05	0.06	48.49
IC143858	59.46	2.36**	-15.51	62.42	5.81	1.36*	0.22*	43.75
IC144225	60.34	0.88	-20.06	81.51	5.19	1.02	-0.11	53.16
IC144243	58.19	1.74**	-0.64**	64.61	5.57	1.18**	-0.21	51.05
IC144259	61.66	1.35	-0.79**	69.59	5.63	1.16	-0.11	52.55
IC144260	58.97	1.13	-11.54	76.39	5.81	1.23	0.32*	54.40
IC144266	59.36	1.44**	-21.71	73.97	5.30	1.11	-0.05	53.74
IC144270	59.61	0.76	-17.57	82.01	5.60	1.13	0.05	58.08
IC144276	60.00	1.30**	-26.26	76.93	4.79	0.84	0.01	57.32
IC144277	59.90	1.16	-9.12*	77.64	5.00	0.92	-0.11	58.01
IC144285	64.97	1.10	0.37**	77.71	5.59	1.15	0.05	55.15
IC144286	62.49	0.66	-9.00*	84.12	5.14	0.94	-0.05	55.29
IC144287	60.63	1.68**	-4.38**	68.98	5.30	0.99	-0.09	56.06
IC144312	57.57	1.79**	-7.67*	66.33	5.31	0.95	-0.01	57.33
IC144320	60.26	1.89**	-17.56	68.90	5.19	1.03	-0.23	55.89
IC279168	60.21	0.83	-9.95*	78.16	5.40	1.19	0.36**	46.34
IC296791	61.49	0.67	4.38**	77.96	5.04	1.02	-0.07**	53.23
IC321164	58.31	1.11	4.35**	74.74	5.24	0.96	0.36	53.78
IC321165	57.76	0.81	-2.78**	77.28	5.03	1.04	0.12	46.51
IC332188	58.13	0.38*	5.25**	80.62	5.20	1.01	-0.06	54.17
IC332236	61.17	0.67	-8.43*	81.67	4.96	0.90	-0.06	58.40
IC332296	61.57	0.46**	-12.80	87.07	4.70	0.78	0.05	57.81
IC336796	59.86	0.81	-8.24*	82.07	5.14	0.83	-0.15	63.22
IC336804	59.46	0.55	-4.76**	83.05	5.09	0.84	-0.07	60.70
IC371731	60.99	0.69	-0.40**	79.75	4.63	0.71**	-0.19	60.65
IC371755	62.30	0.47	3.73**	84.01	5.10	0.74**	-0.14	66.33
IC397265	59.60	0.72	-12.77	82.48	4.89	0.79**	-0.25	63.57
IC397326	59.44	1.57	7.48**	63.61	5.69	1.27	0.54**	44.31
IC397328	62.51	0.80	-6.65*	80.78	4.77	0.92	0.17*	51.49
IC397522	60.07	0.99	-21.03	80.28	5.11	0.98	-0.19	58.17
IC397970	59.21	0.60	15.53**	80.10	5.34	1.18	-0.13	51.81
IC397994	53.07	0.24**	-17.79	89.28	5.22	0.96	-0.11	60.78
IC397995	57.10	1.24*	-22.13	74.71	5.24	1.06	-0.02	58.73
IC398004	56.77	1.48	-1.31**	69.45	5.03	1.00	0.07	55.20
IC398068	53.90	2.00	11.34**	62.69	4.77	0.89*	-0.25	57.70
IC398080	58.07	0.92	1.81**	79.37	5.20	1.10	-0.01	47.57
IC398093	60.49	1.02	-17.67	77.84	5.39	0.97	0.08	61.27
IC398123	57.60	1.24	20.15**	70.96	5.40	1.10	0.45	51.30
IC398173	64.45	0.73**	-23.80	86.30	4.90	0.85**	-0.25	60.64
IC411679	61.03	1.36	2.82**	72.55	4.80	0.80	-0.11	60.09
IC421958	59.56	0.84	-22.46	83.04	5.04	0.89	-0.21	60.69
IC427161	61.63	0.58*	-11.97	83.94	4.94	0.89	0.08	54.24
AM-10 (C)	64.56	0.44*	-3.26**	85.72	5.01	0.83	-0.02	58.69
AM-35 (C)	59.36	0.98	-2.26**	80.31	4.71	0.80	-0.11	58.65
PEB (C)	58.86	1.29**	-22.88	74.74	5.34	1.15	0.61*	44.85
RMt-1 (C)	60.41	0.69**	-21.85	85.89	4.89	0.92	-0.12	56.30
Population mean	59.78	1.0			5.18	1.0		
SE (mean)	1.71	0.30			0.22	0.17		

*,** Significant at 5 and 1% levels.

Table 3. Stability parameters for number of pods per plant and seeds per pod in fenugreek.

Genotype	No. of pods per plant				No. of seeds per pod			
	Mean	b_i	sd_i^2	Sustainability index	Mean	b_i	sd_i^2	Sustainability index
EC520254	50.44	1.22	74.25**	32.91	15.58	0.46	1.89*	80.22
EC520255	53.66	0.98	15.07	49.05	15.74	0.66	0.24	86.06
IC057752	51.60	0.89	44.24**	45.92	16.24	1.22	0.61	80.77
IC143817	52.63	0.98	2.35	45.51	15.40	1.01	1.23	79.44
IC143845	51.34	0.93	-8.79	46.52	16.54	1.10	-0.51	83.79
IC143849	50.69	0.99	-5.19	43.72	17.02	0.88	0.14	84.64
IC143851	52.62	0.96	8.22	47.94	17.00	0.64**	-0.92	92.24
IC143852	52.62	1.00	11.05	39.72	16.40	0.14**	-0.43	90.39
IC143853	54.83	0.84**	-3.46	50.27	16.06	0.86	-0.64	85.22
IC143856	51.57	0.92	-4.16	49.60	16.76	0.68**	-0.93	91.28
IC143858	54.66	0.71**	15.26	58.87	16.46	1.97**	-0.14	78.16
IC144225	48.64	0.96	-6.46	46.12	15.32	1.48	-0.06	78.24
IC144243	52.13	1.14	8.96	36.45	16.21	1.01	-0.80	86.78
IC144259	55.13	0.93	-6.54	46.54	16.71	0.35	0.84	83.35
IC144260	54.73	0.96	11.33	43.92	16.75	1.67	0.34	77.95
IC144266	53.13	1.02	1.64	42.88	15.98	0.96	0.19	79.12
IC144270	53.66	0.93	-0.88	45.68	15.77	0.90	0.22	78.14
IC144276	51.56	1.34**	3.30	34.68	16.49	1.30	0.86	79.76
IC144277	53.31	0.95*	-11.74	49.01	15.89	0.23**	-0.40	91.13
IC144285	55.56	0.96	0.67	44.72	16.60	-0.09**	0.22	85.07
IC144286	53.16	1.11	32.17**	37.37	17.35	0.72	0.50	83.52
IC144287	52.09	1.06	-4.27	41.47	16.40	0.73	0.01	85.67
IC144312	49.70	1.08	11.01	40.67	16.06	1.80	0.57	74.32
IC144320	52.80	1.05	-9.64	45.14	16.71	1.79	0.38	75.65
IC279168	55.19	1.15	19.28*	38.00	17.11	1.34	-0.76	85.80
IC296791	56.10	1.16	13.50	40.60	15.91	-0.35	3.84**	78.81
IC321164	49.59	1.01	7.57	42.55	16.56	0.84	-0.82	90.14
IC321165	52.19	0.99	-3.72	46.52	15.39	1.78	1.03	72.68
IC332188	55.24	1.08	9.37	45.62	17.06	1.57	-0.18	82.75
IC332236	54.60	1.01	12.78	48.29	16.81	1.58	-0.17	78.00
IC332296	49.93	0.97	17.38	46.01	16.90	1.33	-0.71	82.39
IC336796	53.10	1.06	16.44	38.25	16.82	1.22	-0.68	85.12
IC336804	53.07	1.18*	12.87	36.58	17.26	1.07	-0.71	86.38
IC371731	47.67	0.84	74.90*	44.13	16.68	1.07	-0.28	84.26
IC371755	53.40	0.64**	0.45	57.65	16.45	1.67*	-0.16	81.21
IC397265	54.11	0.85**	-1.66	52.75	15.91	1.14	-0.65	87.09
IC397326	55.74	1.31*	54.43**	36.15	15.24	1.78	0.52	74.88
IC397328	49.57	1.02	17.83*	37.21	16.64	0.56	-0.22	86.57
IC397522	51.59	0.77**	2.80	55.01	16.45	0.62	-0.35	87.08
IC397970	52.64	1.04	-6.14	41.39	16.81	0.65	0.38	83.24
IC397994	53.52	1.10	1.89	44.46	15.86	0.20*	0.02	84.93
IC397995	57.59	0.85	38.31**	52.39	16.75	1.45	0.10	81.21
IC398004	52.66	1.26**	20.97*	34.47	16.74	0.28	0.21	88.63
IC398068	49.80	1.06**	-12.81	41.23	16.14	1.28	0.43	81.17
IC398080	51.47	0.95	-6.01	47.17	16.34	0.86	1.07	80.88
IC398093	56.17	0.86*	0.67	50.61	16.39	0.68	0.24	87.22
IC398123	53.86	1.06	-2.79	41.48	16.41	1.24	-0.04	81.69
IC398173	55.64	0.65*	20.23*	55.69	15.14	0.79	-0.92	91.06
IC411679	56.50	1.19*	2.96	41.20	16.77	0.90	0.30	82.08
IC421958	51.33	1.01	-6.07	41.30	16.64	0.64	-0.27	87.38
IC427161	51.20	0.89	25.72*	44.62	16.43	1.32	-0.40	82.52
AM-10 (C)	54.10	0.93	-7.58	46.19	16.79	1.76	0.45	79.30
AM-35 (C)	47.36	1.13*	-8.86	35.36	16.22	0.95	-0.75	86.46
PEB (C)	52.84	1.05	0.18	46.11	16.84	1.33	-0.02	82.30
RMt-1 (C)	52.06	1.01	7.93	46.65	16.08	1.08	-0.28	84.13
Population mean	52.76	1.0			16.38	1.0		
SE (mean)	1.97	0.10			0.43	0.47		

*,** Significant at 5 and 1% levels.

Table 4. Stability parameters for seed yield per hectare in fenugreek.

Genotype	Seed yield per hectare (t)			
	Mean	b_i	sd_i^2	Sustainability index
EC520254	1.19	-1.03**	0.12**	55.20
EC520255	1.21	-1.24**	0.07**	57.67
IC057752	1.23	0.22	0.08**	51.75
IC143817	1.13	0.23	0.08**	55.77
IC143845	1.29	1.49	0.04*	46.34
IC143849	1.41	1.54	0.01	57.53
IC143851	1.45	1.13	0.03*	60.22
IC143852	1.57	0.33	0.03*	75.61
IC143853	1.44	1.16	0.07**	56.20
IC143856	1.45	1.22	0.08**	56.31
IC143858	1.39	1.69**	0.00	54.81
IC144225	1.50	1.57**	-0.01	62.30
IC144243	1.43	0.30**	-0.01	84.50
IC144259	1.66	2.06	0.09*	43.26
IC144260	1.60	1.39	0.01	62.36
IC144266	1.66	1.73	0.10*	46.09
IC144270	1.30	-0.21**	-0.01	83.91
IC144276	1.30	1.38	0.01	56.84
IC144277	1.38	2.36**	0.02	42.32
IC144285	1.55	0.43	0.08**	57.82
IC144286	1.67	3.43**	0.09**	32.38
IC144287	1.34	0.45	0.04*	61.79
IC144312	1.22	0.68	0.08**	50.76
IC144320	1.29	1.74**	-0.01	54.02
IC279168	1.59	0.64	0.01	70.18
IC296791	1.52	0.63	0.05**	70.38
IC321164	1.15	-1.11**	0.04**	55.67
IC321165	1.30	0.55	0.02	63.90
IC332188	1.44	0.74	0.10**	50.48
IC332236	1.47	-0.20*	0.10**	61.68
IC332296	1.33	0.27	0.05**	59.69
IC336796	1.46	-0.20*	0.10**	63.55
IC336804	1.66	1.83	0.07**	55.44
IC371731	1.48	1.08	0.04*	59.12
IC371755	1.51	1.68	0.02	51.23
IC397265	1.55	0.61	0.03*	66.82
IC397326	1.31	-0.11**	-0.01	83.26
IC397328	1.57	1.78	0.05**	50.68
IC397522	1.68	2.41*	0.12**	43.64
IC397970	1.36	1.45	0.05**	54.90
IC397994	1.41	1.58	0.09**	46.35
IC397995	1.50	1.95	0.06**	43.67
IC398004	1.52	1.02	0.09**	51.90
IC398068	1.27	0.18	0.05**	62.34
IC398080	1.25	2.10**	0.01	43.09
IC398093	1.60	1.92	0.16**	42.15
IC398123	1.45	0.55	0.00	75.42
IC398173	1.41	1.15	-0.01	65.33
IC411679	1.49	2.24**	0.05**	40.53
IC421958	1.41	0.37	0.04**	70.08
IC427161	1.53	2.94**	0.08**	32.76
AM-10 (C)	1.45	1.10	-0.02	68.17
AM-35 (C)	1.45	-0.17**	0.04**	65.80
PEB (C)	1.21	0.76	0.01	61.57
RMt-1 (C)	1.56	1.54	0.10**	45.15
Population mean	1.43	1.0		
SE (mean)	0.11	0.59		

*,** Significant at 5 and 1% levels.

significant regression co-efficient and deviation from regression ($sd_i^2 = 0$) and hence, stable and suitable for wider adaptability (Table 3). The accessions IC 144320 (60.26 cm) and IC 144276 (60.00 cm) recorded higher plant height than population mean (59.78 cm), significant positive regression co-efficient ($b_i>1$) along with non-significant deviation from regression indicating stability and suitability for favorable environment. The genotypes IC398173 (64.45 cm), EC520255 (62.81 cm), IC427161 (61.63 cm), and IC332296 (61.57 cm) showed more plant height than population mean (59.78 cm) and best check RMt-1 (60.41 cm) along with significant and positive regression co-efficient ($0 < b_i < 1$) and regression ($sd_i^2 = 0$) and hence, stable and suitable to unfavorable environment.

Six genotypes namely, IC144259, IC144260, IC144285, IC296791, IC332188, and IC332236 recorded more pods per plant than population mean (52.76) and check AM-10 (54.10), non-significant regression co-efficient and deviation from regression and were found stable and suitable for wider environments (Table 4). Single genotype IC411679 recorded more pods per plant (56.50) than population mean (52.76) and best check AM-10 (54.10), showed significant regression co-efficient ($b_i > 1$) and non-significant deviation from regression and were found stable and suitable for favorable environment. On the other hand, four genotypes IC143853, IC143858, IC397265, and IC398093 showed more pods per plant than population mean (52.76) and best check AM-10 (54.10), significant and positive regression co-efficient ($0 < b_i < 1$) along with non-significant deviation from regression indicating stability and suitability for unfavorable environment.

The genotypes namely, IC143858 and IC371755 possessed higher seeds per pod than population mean (16.38) and significant regression co-efficient ($b_i>1$) along with non-significant deviation from regression indicating their stability and suitability to favorable environments, whereas. IC143851, IC143852, IC143856, and IC144285 possessed higher seeds per pod than population mean (16.38) and significant regression co-efficient ($b_i<1$) along with non-significant deviation from regression indicating their stability and suitability to unfavorable environments.

It was reported that the generalization regarding stability of a variety for all the descriptors is rather difficult (Singh and Singh, 8). In the present investigations also, genotypes did not show uniform stability and linear response pattern for all the traits. However, the overall stability may be considered on the basis of compensation pattern of different traits.For seed yield per hectare the sustainability index (SI) for all the genotypes ranged from 32.38% (IC144286) to 84.50% (IC144243). The check AM-10 recorded the highest SI (68.17%) among all the checks (Table 4), indicating low fluctuations in its performance over the locations as compared to checks. Among the four genotypes identified suitable for wider adaptability, three genotypes namely, IC144260, IC279168, and IC398123 showed high SI, thus indicating that they genotypes would give better performance consistently over the diverse environments. IC144225 which showed suitability for favorable environment also showed high SI indicating consistent performance over years in favorable environment. IC144243 identified for unfavorable environment on the basis of stability parameters recorded very high SI, indicating consistent performance in unfavorable environment.

For plant height, among the five genotypes identified suitable for wider adaptability on the basis of stability parameters (Table 2), three genotypes namely, IC143852, IC144225, and IC397522 showed very high SI (>80%) and two genotypes IC143856 and IC398093 showed high SI (60-80%). IC144320 and IC144276 which qualified for suitability for favorable environment also showed high SI. All the genotypes namely IC398173, EC520255, IC427161, and IC332296 identified suitable for unfavorable environment, recorded very high SI indicating their consistent performance over years. In case of number of pods per plant, the genotypes qualified for wider adaptation namely, IC144259, IC144260, IC144285, IC296791, IC332188, and IC332236; for favorable environment (IC411679); and for unfavorable environment namely, IC143853, IC143858, IC397265, and IC398093 showed moderate SI (Table 3), thus indicating average performance over the years.

On the basis of above findings, it can be concluded that IC144260 has shown promising and consistent performance in wider environments for seed yield per hectare and number of pods per plant where as the genotype IC144243 has shown promising and consistent performance in poor environment for seed yield per hectare.

ACKNOWLEDGEMENTS

We are thankful to Director, NBPGR, New Delhi and Dr M. Anandaraj, Project Co-ordinator, All India Coordinated Research Project (AICRP) on Spices, IISR, Calicut, Kerala for their support.

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Received: April, 2011; Revised: September, 2011; Accepted : November, 2011