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Yield stability in coriander (*Coriandrum sativum* L.)

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Abstract

The yield stability of eight elite accessions of coriander (*Coriandrum sativum*) was estimated under Chattisgarh plains condition at Raigarh (Chattisgarh). The accession JCO-387 yielded the highest, exhibiting above average response but unstable reaction (high S^2di) while UD-744, DH-246 and UD-743 were promising and suitable for favourable environment.

Key words: coriander, *Coriandrum sativum*, yield stability.

Adequate information is not available with respect to adaptability of coriander (*Coriandrum sativum* L.) genotypes to seasonal and environmental variations. Hence, the present investigation was undertaken to determine genotype x environmental interaction and stability parameters for yield and identify the stable and responsive genotype(s) with respect to yield. Presence of large amount of genotype x environment interaction nullifies selection of lines based on mean performance under a particular environment. Therefore, emphasis should be given on stable performance of a line over different environments (Comstock & Moll 1963).

The present study was undertaken with eight coriander accessions namely, JCO-283, JCO-387 (Jagudan, Gujarat), LCC-133, LCC-128 (Guntur, Andhra Pradesh), UD-744, UD-743 (Jobner, Rajasthan), DH-208 and DH-246 (Hissar, Haryana) for three consecutive years (1999, 2000 and 2001) at Regional Agricultural Research Station, Boirdadar Farm, Raigarh (Chattisgarh) (237 m MSL; 21°51" N, 82°55" E; mean temperature range: 46° C (maximum) and 15° C (minimum). The soil of experimental field was sandy loam with pH 6.8. The experiment was conducted under irrigated conditions and adopting a randomized block design with three replications. The treatments in each replication consisted of 10 rows (1 m length; 30 cm row to row distance). Seeds were sown during the first fortnight of November and after 5 weeks the seedlings were thinned to keep 10 seedlings per row. NPK fertilizers were applied @ 80:60:60 kg ha^{-1}. Observations on yield was recorded at the time of harvest in April on plot basis. Statistical analysis was performed on the basis of mean value of each plot pooled over 3 years. The stability and adaptability analysis was done using the model suggested by Eberhart & Russel (1966).

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 Ganesh & Soundarapandian (1988) in rice. 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. Mishra and Mahapatra (1998) also observed similar findings in rice. The non-significant genotype x environment (linear) suggested less contribution of linear environment to genotypes. The highly significant pooled deviation (non-linear) suggests the presence of non-linear component that influenced seed yield. Genotypes having unit regression (b=1), from regression as small as possible i.e., not significantly different from zero and high mean value should be considered as stable and adaptable (Eberhart & Russel 1966). Hence, the genotypes DH-246 and UD-743 having regression coefficient close to unity (b=1.19 and 1.38, respectively), non-significant estimate of deviation from regression and mean performance close to test were average stable and these genotypes could successfully be used for general cultivation (Tables 1 and 2).

The genotype JCO-387 registered the highest mean yield followed by UD-744. The regression coefficient value of these genotypes were close to unity and significant high value of deviation from regression indicated their average response but their cultivation might be more fruitful in favourable environment. Since stability being under separate genetic control system, similar to those for other quantitative characters (Gupta *et al.* 1977), the genetic combination of JCO-387 and UD-744 with LCC-133 and DH-208 could generate plant types with considerable level of stability and yield suitable for various environments.

Table 2. Analysis of variance

Source	df	SS	MS
Total	23	376.45	-
Genotype (G)	7	70.76	10.10**
Environment (E) + (G x E)	16	305.66	19.10**
Environment (linear)	1	174.28	174.28**
G x E (linear)	7	12.51	1.78
Pooled deviation	8	118.47	14.80**
Pooled error	48	-	2.03

** Significant at 1% level

Table 1. Parameters of stability for grain yield in coriander

Genotype	Mean yield over all environments (q ha^{-1})	Per cent of test mean	Bi	S^2di
JCO-283	7.48	92.75	0.702	27.95*
LCC-133	6.74	83.62	0.697	-1.30
JCO-387	11.32	140.44	1.119	24.57*
LCC-128	5.02	62.28	0.890	5.33
UD-744	9.43	116.99	1.319	26.45
DH-208	6.82	84.61	0.700	2.02
DH-246	8.94	110.91	1.193	9.45
UD-743	8.78	108.93	1.387	7.76
Test mean	8.06	-	1.001	12.77
Se (b)	-	-	0.820	-

* Significant at 5% level

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