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Short Communication

STABLE GENOTYPES OF GRASSPEA FOR MID HILL CONDITIONS OF HIMACHAL PRADESH

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Twenty four diverse and determinate land races were collected from different places of Kangra valley and designated as L.S.P-1, L.S.P-2, — L.S.P-24. All these germplasm lines were raised in randomized complete block design in three different environments (E1, E2 and E3) with three replications during *rabi* 1995-96. Each genotype was grown in 1.5 × 1.4 m plot with inter row and inter plant spacings of 30 and 15 cm, respectively. The recommended cultural practices were followed to raise the crop. Ten plants were selected randomly for recording data on various morphological characters and yield components such as plant height, number of branches, days to flower, days to podding, days to maturity, pods per plant, seeds per pod, 100- seed weight and seed yield per plot. The biochemical analysis for seed neurotoxin content was carried out following the standard procedure [2]. The data were analysed statistically for stability parameters following Ebeshart and Russell [3]. The significance of stability parameter (bi) and its deviation from unity. were tested by t- test.

The environment wise ANOVA for each character revealed that the mean squares due to genotypes were significant for all the traits indicating the presence of substantial genetic variations among the genotypes under study. Significant mean squares due to environments suggested that the environment played a major role in developing genetic variation among genotypes for seed yield. However, the G × E interaction component showed significance for days to flower, days to podding, days to maturity, pods per plant and seeds per pod indicating that the genotypes markedly interacted with the environments for these characters. Partitioning of G × E interaction into its linear (G × E linear) component showed that the linear responses of genotypes to environments differed significantly for days to flower, days to podding, pods per plant and seeds per pod. Thus, the selection for better or poor environments for these characters was feasible. The non-significant variances for remaining characters indicated that the response of genotypes for these characters was identical across environments.

Table 1. Stability paramenters for seed yield and its components in *Lathyrus sativus* L.

Trait / Genotype**	Days to flower			Days to podding			Pods per plant		
	$\bar{x}$	bi	s^2di	$\bar{x}$	bi	s^2di	$\bar{x}$	bi	s^2di
L.S.P-1	128	0.5*	–4.0	153	0.8*	–3.1	48.0	2.8*	278.7*
L.S.P-2	112	1.6*	5.2	142	1.6*	0.2	34.0	1.2	–29.8
L.S.P-3	124	0.8*	–2.4	152	0.9*	–3.0	43.9	0.7	–22.1
L.S.P-4	128	0.5*	10.0*	153	0.8*	–2.7	47.3	0.6	–26.9
L.S.P-5	121	1.0*	–5.3	154	1.2*	–3.0	48.3	–0.2	–1.4
L.S.P-6	128	0.5*	5.5	152	0.9*	–3.1	52.0	2.1*	–3.6
L.S.P-7	124	0.8*	–3.5	151	1.0*	0.7	57.2	–0.2	13.1
L.S.P-8	126	0.8*	1.0	154	0.7*	–3.1	62.3	1.2	–28.7
L.S.P-9	127	0.4*	5.4	152	0.7*	–2.0	54.7	1.6*	–14.3
L.S.P-10	124	0.8*	–0.6	153	0.8*	–2.6	46.8	1.3	–23.1
L.S.P-11	127	0.4*	–4.8	152	0.8*	–1.3	49.7	1.5*	–27.1
L.S.P-12	124	0.8*	–3.0	154	0.9*	–2.8	57.1	0.8	–28.7
L.S.P-13	128	0.4*	8.4*	152	0.8*	–0.2	48.4	1.2	–28.0
L.S.P-14	127	0.5*	–5.2	152	1.0*	–2.5	65.4	2.2*	19.7
L.S.P-15	124	0.8*	–5.2	151	0.8*	–0.2	53.7	1.3	–29.9
L.S.P-16	127	0.7*	–2.2	153	1.0*	–1.8	53.9	1.8*	–14.1
L.S.P-17	125	0.7*	–5.0	152	0.9*	–2.7	58.9	1.8*	–12.8
L.S.P-18	127	0.5*	–4.3	152	0.9*	–2.5	59.8	1.9*	–7.6
L.S.P-19	116	1.5*	–5.3	147	1.2*	0.3	35.1	–1.3	96.0*
L.S.P-20	113	1.6*	8.4*	147	1.3*	1.7	31.9	0.6	–27.9
L.S.P-21	103	2.3*	12.2*	145	1.0*	–2.5	32.8	0.0	–3.4
L.S.P-22	103	2.1*	27.7*	143	1.3*	0.3	29.4	1.9*	–3.6
L.S.P-23	103	2.0*	26.0*	141	1.3*	5.9	40.3	1.7*	–29.8
L.S.P-24	110	1.8*	32.2*	147	1.3*	0.3	42.3	3.1*	45.8*
Mean	121	1.0		150	1.0		4.1	0.7	
SE±(m)	2.1	0.2		0.9	0.1		4.1	0.7	

Trait / Genotype	Seeds per pod			Seed yield per plot			Mean neurotoxin content (%)
	$\bar{x}$	bi	s^2di	$\bar{x}$	bi	s^2di	
L.S.P-1	3.0	0.1	–0.03	211.1	–0.4	1910.3*	0.56
L.S.P-2	2.9	–0.4	–0.03	162.9	1.3	–467.0	0.43
L.S.P-3	2.9	0.6	–0.03	189.4	0.6	–589.1	0.58
L.S.P-4	3.2	–0.5	–0.03	209.7	0.3	–431.2	0.53
L.S.P-5	3.1	0.4	–0.04	199.9	0.5	–712.0	0.69
L.S.P-6	3.4	1.0*	–0.02	223.4	1.3	–367.1	0.73
L.S.P-7	3.1	1.0	–0.03	216.7	–0.04	617.4	0.53
L.S.P-8	3.3	2.5*	0.00	245.7	1.2	1314.6*	0.71
L.S.P-9	3.3	1.9*	–0.03	216.1	–2.2*	–246.5	0.66
L.S.P-10	3.2	0.1	–0.03	197.2	0.2	934.4	0.62
L.S.P-11	3.0	1.3*	–0.04	226.0	0.6	–21.2	0.74
L.S.P-12	3.4	1.4*	–0.03	219.7	1.6*	–157.9	0.62
L.S.P-13	3.2	1.2*	–0.03	191.4	1.4	–2.7	0.69
L.S.P-14	3.7	1.9*	–0.03	271.2	1.8*	10191.6*	0.74
L.S.P-15	3.0	–0.5	–0.02	219.7	0.8	4722.5*	0.69
L.S.P-16	3.0	0.3	0.01	211.2	1.5	–416.3	0.73
L.S.P-17	3.4	1.4*	–0.02	232.3	1.6*	953.7	0.46
L.S.P-18	3.6	1.5*	–0.03	246.4	1.1	–176.5	0.70
L.S.P-19	2.7	1.5*	–0.03	112.6	1.3	6442.5*	0.44
L.S.P-20	2.7	0.1	0.05*	94.5	2.2*	–200.1	0.11
L.S.P-21	2.6	1.2*	–0.02	60.4	0.5	–568.4	0.34
L.S.P-22	2.3	2.5*	–0.01	63.0	1.1	–393.2	0.30
L.S.P-23	2.7	1.3*	–0.03	79.5	0.9	644.7	0.27
L.S.P-24	2.8	2.3*	–0.03	103.1	0.6	1681.4*	0.31
Mean	3.1	1.0		183.4	1.0		
SE±	0.08	0.4		29.7	0.8		

$\bar{x}$= mean; bi = regression coefficients; s^2di = deviation from regression; *significant at P = 0.05. **genotypes were collected from different villages of Kangra valley around 25 km radius from the experimental farm area

In the present study, the mean ($\bar{x}$) and deviations from regression (s^2di) for each variety were considered for stability and linear regression (bi) was used for testing the varietal response. The magnitude of regression coefficient and deviations from regression varied from genotype to genotype. A simultaneous consideration of all the three parameters ($\bar{x}$, bi and s^2di) for seed yield per plant showed that the genotype L.S.P-14 was found significant for both regression coefficient as well as deviations from regression, although it showed above average stability, non- significant s^2di and high mean for pods per plant. The five other genotypes showed significant deviations from regression and hence, no prediction can be made for these genotypes. The six genotypes namely, L.S.P-6, L.S.P-9, L.S.P-12, L.S.P-16, L.S.P-17 and L.S.P-18 with more seed yield per plant recorded regression coefficient greater than unity ($bi > 1$) and non-significant deviations. Such genotypes may be suitable for favourable environments only as their performance is predictable. These genotypes also possessed above average response for yield components such as pods per plant (L.S.P-17 and L.S.P-18) and seeds per pod (L.S.P-9, L.S.P-12, L.S.P-17 and L.S.P-18). Further, two genotypes such as L.S.P-4 and LS.P-11 were identified as suitable genotypes for unfavourable environments as indicated by their low regression value ($bi < 1$). The genotypes L.S.P-6 and L.S.P-7 could be considered as stable genotypes with predictable performance for more seeds per pod as they showed stable response over the environmental variations. Hence, such genotypes could be grown over a wide range of environments.

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