

Short Communication

Phenotypic Stability for Seed Yield and Yield Attributes in Sesame

Z.S. Solanki and Deepak Gupta

Agricultural Research Station, Mandor, Jodhpur 342 008, India

A breeding program aimed to develop phenotypically stable varieties needs information on the extent of stability for seed yield and associated quantitative characters. However, little work has been carried out on this aspect, especially in sesame. Hence, present investigation was undertaken to evaluate phenotypic stability of 12 sesame genotypes under three different environments.

Twelve genotypes of sesame, developed at Agricultural Research Station, Mandor, Jodhpur, were grown in a randomized block design with three replications. Six rows of 5 m length for each genotype were sown during three successive kharif seasons (1995 to 1997) at 30 x 15 cm spacing. All the recommended agronomical practices were adopted to raise the crop. Observations for seed yield were recorded on per plot basis and number of capsules and plant height were recorded on five randomly selected plants. Statistical analysis was done as per Eberhart and Russell (1966).

The mean squares due to genotypes were highly significant for seed yield, capsules per plant and plant height, indicating the presence of variability among the genotypes for all the traits under study. Mean squares due to environment were also significant when tested against pooled

error and pooled deviation for all the characters. Genotype x environment interaction effects were also significant for all the characters, showing differential response of genotypes in different environments. Kumar (1998) also observed significant G x E interaction for plant height, days to maturity, number of capsules on main shoot and seed yield per plant. Highly significant mean square due to environment (linear) for all the characters indicated considerable differences among environments and their predominant effects on all the characters. Both linear and non-linear components of G x E interaction were significant for seed yield, but only non-linear component was significant for number of capsule per plant and plant height.

Out of 12 genotypes tested for seed yield, four genotypes (RT-105, RT-174, RT-212 and TC-25) showed stability over environments as indicated by their non-significant deviation from regression. Out of these RT-174 is considered to be an ideal genotype, whereas two genotypes, RT-212 and TC-25, were identified as suitable under unfavorable environmental conditions, as indicated by their low regression coefficient value ($b_i < 1.0$), but these are low yielders. On the other hand, high-yielding genotypes RT-46 and RT-106, though found unstable, performed better

Table 1. Pooled analysis of variance to seed yield and yield attributing characters in sesame

Source of variance	d.f.	Mean squares		
		Seed yield	No. of capsules per plant	Plant height
Genotype (G)	11	6338.0**	105.8**	62.9**
Environment (E)	2	405982.4**++	2588.6***	13004.5***
G x E	22	6264.0**	49.5**	28.7*
E + (G x E)	24	39657.7**++	261.1**	1110.0***
Environment (linear)	1	813964.7**++	5177.1**++	26008.9**++
G x E (linear)	11	4992.6**	23.6	22.6
Pooled deviation	12	6907.3**	69.1**	32.0*
Pooled error	72	956.6	20.7	16.8

under different environmental conditions and under favorable environmental conditions. The remaining genotypes were low yielders as well as unstable.

For number of capsules per plant, most of the genotypes were stable over environments as indicated by their non-

significant deviation from regression. Genotypes RT-11 and RT-46 were stable under different environmental conditions ($bi = 1$), but genotypes RT-105 and RT-172 were stable under favorable environmental conditions ($bi > 1.0$). Genotypes RT-174, RT-216, RT-240 and TC-25 were stable

Table 2. Estimations of stability parameters for seed yield and yield attributing characters in sesame genotypes

Genotype	Seed yield per plot (g)			Number of capsule per plant			Plant height (cm)		
	x	bi	s ² d	x	bi	s ² d	x	bi	s ² d
RT-11	36.1	0.79	5220.1*	42.5	0.97	-11.6	111.3	0.97	2.7
RT-65	355.1	1.23	3683.7*	43.8	0.76	215.4**	108.6	0.94	3.8
RT-105	315.2	1.01	-754.1	45.5	1.09	40.7	109.6	0.82	-7.7
RT-106	441.4	1.22	7546.9*	55.0	1.48	85.8*	106.7	0.99	11.0
RT-111	350.7	1.22	4375.6*	43.1	1.26	120.1	106.0	1.18	80.2*
RT-172	303.0	1.08	11275.2**	42.2	1.20	-20.6	99.7	0.96	-5.7
RT-174	365.6	0.98	1502.8	54.3	0.74	-50.5	98.5	0.92	72.6
RT-212	305.1	0.64	-919.4	44.2	1.11	103.2*	105.0	0.95	7.3
RT-240	410.1	1.30	7774.0	41.8	0.89	-10.1	114.4	1.14	-13.3
RT-46	412.9	0.94	12066.2**	37.6	0.94	-5.6	108.1	1.11	-15.5
TC-25	307.9	0.42	801.5	34.1	0.76	1.5	110.0	1.02	36.4
GM	355.7			43.7			106.9		
SE (bi)		0.32					0.12		

* and ** significant at 5% and 1% level against pooled error, respectively.

under unfavorable environmental conditions ($b_i < 1.0$). Among these stable genotypes, RT-174 also had high number of capsules per plant.

As regards plant height, most of the genotypes were stable in different environments as indicated by their non-significant deviation from regression, except RT-111 and RT-174. Among the stable genotypes RT-11, RT-65, RT-106, RT-172, RT-212, RT-216 and TC-25 showed average response under change of environmental conditions as indicated by their regression coefficient near to unity, while genotype RT-46 was suitable under favorable environmental conditions.

A simultaneous consideration of all three parameters (x , b_i and s^2_d) showed that genotype RT-174 is the most adaptable as it has high seed yield, maximum number of capsules per plant with least mean square deviation (s^2_d) and unit regression coefficient (b_i).

References

- Eberhart, S.A. and Russell, W.A. 1966. Stability parameters for comparing varieties. *Crop Science* 6: 36-40.
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