Madras Agric. J. 77, (9-12): 510-511 (1990)

https://doi.org/10.29321/MAJ.10.A02009

PHENOTYPIC STABILITY FOR SEED YIELD IN TARAMIRA

A. HENRY[1] and H.S. DAULAY[2]
Central Arid Zone Research Institute, Jodhpur
Rajasthan - 342 003

ABSTRACT

Genotype x environment interactions investigated for seed yield in taramira (**Eruca sativa** L.) during winter seasons over three years revealed significant variation for genotypes and genotype x environment interaction for seed yield. The major portion of the interaction was accounted for by the presence of linear components as non-linear component was non significant. The genotype RTM-1 gave the maximum mean seed yield and showed near unit responses under fluctuating environments. Genotypes LDCH-2 and RTM-2 performed better under favourable and unfavourable growing seasons respectively.

KEY WORDS : Taramira, stability.

Taramira (Eruca sativa L.) is an important drought hardy rabi oilseed crop. It could be grown successfully under conserved moisture or with very meagre irrigation resources of the farmers of Rajasthan including desert districts. It is generally grown under no input management conditions. The yielding ability of crop plant is a quantitative character, showing continuous variation and is highly influenced by environmental factors. The characterization of G x E interactions would be of great importance if it is estimated over the prevalent management practices related to the taramira cultivation in the region. Information is scanty on the stability of seed yield in taramira.

MATERIALS AND METHODS

The experimental material consisted of five important genotypes of taramira, namely, LDCH-1, LDCH-2, ITSA, RTM-1 and RTM-2 grown in field trials during rabi season of 1982-83 to 1984-85. The experiment was laid out in randomized block design with 4 replications during all the seasons under study. The plot size was 16 m^2. The seeds were sown in lines with inter and intra row spacing of 40 cm and 10 cm, respectively. The crop received a basal dressing of @ 20 kg N/ha and 20 kg P/ha during rabi season of 1982- 83 and 1983-84, whereas, no fertilizer was applied in year 1984-85. The crop was given only one irrigation of 5 cm at the time of flowering during all the seasons. The stability parameters were estimated according to the procedure outlined by Eberhart and Russell (1966)

RESULTS AND DISCUSSION

The differences due to genotypes for seed yield (q/ha) were significant during all the three seasons. The mean square due to genotype-environment interaction was found to be significant revealing thereby that the genotypes interacted with the environmental conditions (Table 2). Similar results were reported by Kumar *et al.* (1986) for seed yield per plant in taramira. The total environment differences as well as the linear component due to environment interaction was also observed to be significant. However, the non-linear component was nonsignificant reflecting that the prediction of most of the genotypes is possible. The environmental mean for seed yield varied from 3.59 to 5.46 q/ha. The mean yield of all the genotypes ranged from 3.18 q/ha to 6.72 q/ha (Table 1).

The study of genotype-environmental interaction lead to successful evaluation of stable genotypes which could be used in future breeding programmes. Finlay and Wilkinson (1963) considered linear

[1] Scientist S-2 (Plant Breeding), [2] Scientist S-4 (Agronomy)

Table 1. Estimates of stability parameters (mean, b and s^{-2} d) for seed yield in taramira

Genotypes	1982-83	1983-84	1984-85	Mean	'b'	$s^{-2}d$
LDCH 1	4.62	4.25	1.93	3.60	1.49	0.06
LDCH 2	6.01	5.21	3.17	4.80	1.52	0.06
ITSA	3.50	3.70	2.35	3.18	0.69	0.12
RTM 1	7.89	6.53	5.73	6.72	1.05	0.28
RTM 2	5.30	4.90	4.77	4.99	0.25	-0.02
Mean	5.46	4.92	3.59	4.66	1.00	
SEm ±	0.28	0.23	0.20			
CD 5%	0.82	0.67	0.59			

regression slope as a measure of stability. Eberhart and Russell (1966) emphasized the need for considering both the linear (b) and non linear ($s^{-2}d$) components of genotype-environment interaction in judging the stability of a genotype. Breese (1969) and Paroda and Hayes (1971) advocated that linear regression would simply be regarded as a measure of response of a particular genotype, whereas, the deviation around the regression line is considered as a measure of stability, genotypes with the lowest deviation being the most stable. In the present investigation the deviation from regression was non significant for all the genotypes (Table 1).

Genotype RTM 1 had the highest mean seed yield among all the genotypes tried and had responses nearing to unity to the changing environmental conditions and was also stable. This genotype gave consistent better performance during all the three years. Genotype RTM 2 was found to be responsive especially for adverse growing conditions as indicated by low be value (b = 0.25) and genotype LDCH 2 performed better under favourable growing situations as indicated by high 'b' values (b = 1.52). Genotypes like LDCH 1 and ITSA had less seed yield potential than the population mean yield and hence were not suitable.

Table 2. Analysis of variance for genotype x environment interaction for feed yield in taramira.

Source	df	MS
Genotypes	4	5.75^{**++}
Env. + (genotypes x env.)	10	1.21^{**+}
Env. (linear)	1	9.29^{**++}
Genotypes x env. (linear)	4	0.55**
Pooled deviations	5	0.13
Pooled Error	36	0.16

** P = 0.01 against pooled error
++ P = 0.01 against pooled deviation
+ P = 0.05 against pooled deviation

The present investigation revealed that genotype RTM-1 gave consistent high seed yield during all the three seasons and was stable under fluctuating environmental conditions. This genotype, therefore, could be exploited for cultivation under environment prevailing in western Rajasthan and for use in breeding programme for further improving the productivity of the crop.

ACKNOWLEDGEMENT

The authors are grateful to the Director, Central Arid Zone Research Institute Jodhpur for providing necessary facilities.

REFERENCES

BREESE, E.L. 1969. The measurement and significance of genotype x environment interactions in grasses. **Heredity., 24,** 27-44.

EBERHART, S.A. and RUSSELL, W.A. 1966. Stability parameters for comparing varieties. **Crop Sci., 6:** 36-40.

FINLAY, K.W., and WILKINSON, G.N. 1963. The analysis of adaptation in a plant breeding programme. **Aust. J. Agric. Res., 14:** 742-754.

KUMAR, D., YADAV, I.S. and SHARMA, S.C. 1986. Stability of siliqua traits and seed yield in taramira. **J. Oilseeds Res., 3:** 239-241.

PARODA, R.S. and HAYES, J.D. 1971. An investigation of genotype-environment interactions on rate of ear emergence in sparing barley. **Heredity., 26:** 167-175.