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IDENTIFICATION OF STABLE UPLAND COTTON

C. R. ANANDA KUMAR

Agricultural Research Station, Kovilpatti 627701

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ABSTRACT

Stability analysis was carried out in eleven upland karunganni cotton for three years. Among the cultures, TKA 283, TKA 396 and DAC-2 found to be stable over different environments. Among the three cultures, TKA 396 had unit regression and minimum deviation from regression over environments, indicating its suitability under varied conditions of cultivation.

Key words: Upland cotton, stability, genotype–environment interaction.

Karunganni cotton (*Gossypium arboreum*) is cultivated in about 4000 ha in the black cotton soil tracts of Kovilpatti (Tamil Nadu) as a pure rainfed crop during northeast monsoon. This species generally possesses drought resistance and pest and disease tolerance but is a poor yielder, producing medium staple cotton. Therefore, identification of a genotype performing well over different environments is necessary to get sustainable yields. An attempt was to identify adaptable genotype for the area.

MATERIALS AND METHODS

Trials were conducted for three years from 1987 to 1990 by testing eleven high yielding genotypes at the Agricultural Research Station, Kovilpatti. The spacing adopted was 45 x 15 cm in RBD design, and sowing was done at the time of onset of monsoon. The data on seed cotton yield were subjected to stability analysis as suggested by Eberhart and Russell [1].

RESULTS AND DISCUSSION

Analysis of variance for stability (Table 1) showed highly significant differences among the environments and genotypes used in the present study. Genotype x environment interaction was also highly significant when tested against pooled error which satisfies the requirement of stability analysis [2]. The treatment x environment (linear) effect was

Table 1. ANOVA for stability of yield in cotton

Source	d.f.	MSS	F
Treatment (T)	10	5.89	4.08
Env. + (T x env.)	22	10.08	7.54**+
Environment (linear)	1	182.14	126.3**+
Treatment x env. (linear)	10	4.14	2.87**
Pooled deviation	11	1.44	1.0
Pooled error	99	0.05	
Total	32	9.32	

**Significant at 1% level when tested against pooled deviation.

+Significant against pooled error.

Accordingly, among the eleven cultures, TKA 188, TKA 349, and TKA 355 showed significant deviation from regression (Table 2), indicating that these strains are not stable over environments. Among the stable genotypes, five strains showed significant regression (bi), indicating their better performance only in suitable environment. Three other cultures, viz., TKA 283, TKA 396 and DAC-2, did not deviate from unit regression, indicating their stable performance over environments. Among these, the cultures TKA 283 and DAC-2 had regression values more than unity, which indicates their better response in favourable environment. These strains can be recommended for fertile soils. The culture TKA 396 with regression value of 0.9, minimum deviation from regression (0.45), and yield potential 9.5 q/ha is the most stable culture and highly suitable for fluctuating environments.

significant when tested against pooled deviation, suggesting the predominance of linear component as compared to the nonlinear and indicating that the genotypes showing linear response to environment. The same trend in rice was also reported by Young and Virmani [3].

The mean yield over 3 years was maximum in TKA 188, followed by TKA 283 (Table 2). According to Eberhart and Russell [1], if the deviation from regression is not significant, the performance of a genotype for a given environment can be predicted.

Table 2. Stability parameters for yield in upland cotton

Variety	Yield (q/ha)	bi	SD^2
TKA 029	10.5	0.79**	-0.05
TKA 188	12.6	2.02	6.43**
TKA 283	12.1	1.55	1.92
TKA 291	9.6	0.53**	-0.02
TKA 332	9.1	0.58**	0.08
TKA 349	8.5	1.04	3.23**
TKA 355	8.2	0.57	2.17**
TKA 390-C	8.9	0.43**	0.41
TKA 396	9.5	0.91	0.45
DAC-2	9.8	1.23	0.26
K 10	10.4	1.37**	0.43

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