# PHENOTYPIC STABILITY IN UPLAND COTTON

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VARIETAL adaptability to environmental fluctuations is important for the stabilization of crop production. Stability analysis has proved a valuable tool in understanding varietal adaptation of cotton in USA[1,2,4,6,7]. Joshi[5] has advocated that due weightage should be given to stability criterion in selection of parents for hybridization. The present investigation was undertaken to study the adaptability in 15 genotypes of upland cotton (*Gossypium hirsutum* L.), at Central Institute for Cotton Research, Nagpur. The trial was conducted in randomized block design with three replications in three different environments (normal sowing in deep and shallow black soils and late sowing in deep black soil) during seasons of 1978 and 1979. Each plot had 20 plants with $60 \times 45$ cm spacing. Data were collected for seed cotton yield and stability analysis was performed[3].

Variances due to genotypes, environments, genotype-environments, environment linear and genotype-environment linear were highly significant (Table I). Higher interaction due to genotype-environment indicated that varietal performance in the different environments could not be predicted and selection based on

## TABLE I

*Analysis of variance for stability*

| Source of variation | D.F. | S.S. | M.S. |
|---|---|---|---|
| Genotypes | 14 | 346·06 | 24·72** |
| Environments | 5 | 596·67 | 119·33** |
| Genotypes × Environments | 70 | 1047·86 | 14·97** |
| Environment (Linear) | 1 | 39·56 | 39·56** |
| Genotypes × Environment (Linear) | 14 | 746·63 | 53·33** |
| Pooled Deviation | 60 | 261·67 | 4·36 |
| Pooled Error | 168 | 1559·54 | 9·28 |

S.E. = ±1·75;   C.D. 5% = 5·33;   ** Significant at 1% level.

## TABLE II

*Stability parameters for 15 genotypes in upland cotton*

| Genotype | Mean yield (q/ha) | Regression coefficient (b) | Deviation from Regression ($S^2d$) |
|---|---|---|---|
| H777 | 13·99 | 0·51* | 3·73 |
| SRT1 | 13·00 | 0·62* | 1·16 |
| Suman | 11·60 | 1·12** | 2·22 |
| D33 | 10·93 | 1·25** | 10·38 |
| K2421 | 9·93 | 1·76** | 0·75 |
| Acala 1517D | 9·92 | 1·09** | 0·95 |
| Rex | 9·89 | 1·57** | 2·73 |
| DP16 | 9·43 | 1·06** | 3·78 |
| Hencock | 9·34 | 0·99** | 7·93 |
| DP45 | 9·23 | 0·84** | 1·83 |
| Delcot | 8·74 | 0·58* | 4·80 |
| S69–973 | 8·58 | 1·44** | 1·50 |
| B1007 | 7·15 | 0·38 | 8·00 |
| L147 | 7·08 | 0·65* | 2·89 |
| SS167 | 7·02 | 0·37 | 0·73 |

Grand mean = 9·72 q/ha.    **, * Significant at 1% and 5% level respectively.

one environment would be misleading. According to Eberhart and Russell[3], a stable variety is one which has high mean yield, regression coefficient around unity and least deviation from the regression line. Based on these criteria H777, SRT1 and Suman were found to be the most stable genotypes (Table II). These widely adapted genotypes can be used as parents in breeding programmes for evolving productive commercial cultivars of cotton.

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