Phenotypic stability analysis of maize hybrids -2005

JAI DEV*, R.K. CHAHOTA, S.K. GULERIA[1], S. LATA, V. KALIA[2], ANAND SINGH[3], VEDNA KUMARI, J.K. JENJIHA AND B.C. SOOD

Department of Plant Breeding and Genetics, H.P. Agricultural University, PALAMPUR(H.P.) INDIA

ABSTRACT

Genotype x environment interaction has special importance in the breeding of rainfed crops, such as maize, which are more subjected to the uncertainness of weather, especially at a time when the climate change is on the cards world over. Eighteen maize hybrids along with two checks were evaluated in a Randomized Block Design with three replications during *kharif*-2005 at five locations spreading over different agro-climatic zones of Himachal Pradesh. Six hybrids (X-6060, PMZ-4, JKMH-1512, IB-6301, Navaneet-7191 and PG-2408) and one composite (Girija) showed promise with respect to their stability and general adaptability across the locations for seed yield and other traits. The hybrid Star 56-7132 exhibited stability and responsiveness to better environments for seed yield, whereas the hybrid DMH-849 displayed stableness and responsiveness to unfavourable environments for plant height. It was concluded that yield as well as various yield components may be taken into account while evaluating genotypes for stability performance over environments. To measure stability of genotypes, regression (S^2di) appeared to be a more important criterion than regression coefficient (bi).

<u>Key words</u> : Maize, H x E interaction, Regression, Stability.

INTRODUCTION

Genotype x environment (G x E) interaction is of significance to a plant breeder in developing high yielding and stable hybrids / varieties. It assumes added importance in the breeding of rainfed crops, such as maize, which are more subjected to the uncertainness of weather, especially at a time when the climate change is on the cards world over. It is, therefore, essential that stable genotypes are evolved which can withstand such fluctuating environmental conditions of Himachal Pradesh where maize is the principal crop for food and feed and is cultivated in all sorts of agro climatic conditions ranging from foot hills to high mountainous regions. Hence, an attempt was made, in the present study, to identify high yielding stable maize hybrids among 18 hybrids by evaluating them at five diverse locations in the north western Himalayan region.

MATERIALS AND METHODS

Eighteen maize hybrids along with two checks were evaluated in a Randomized Block Design with three replications during *kharif*-2005 under five locations spreading over different agro-climatic zones of Himachal Pradesh, *viz.*, Bajaura, Dhaulakuan, Kangra, Sundernagar and Palampur. The sowing was completed during the first fortnight of June at all the locations and recommended package of practices was followed to raise the crop. Data were recorded on plot basis for days to 50 per cent

tasseling, days to 50 per cent silking, days to 75 per cent maturity and seed yield; and on ten randomly taken plants for cob placement height (cm) and plant height (cm). Seed yield of each hybrid was calculated at 15per cent moisture content and converted into q/ha. Stability parameters for different characters were computed using the regression approach of Eberhart and Russell (1966).

RESULTS AND DISCUSSION

The analysis of variance of pooled data (Table 1) indicated significant differences among hybrids and environments for all the traits studied suggesting the presence of variability among hybrids and environments. Significant mean squares for hybrids x environments (H x E) interactions were observed for days to 50 per cent tasseling and silking, cob placement height, plant height and grain yield indicating differential response of hybrids across the environments for these characters. The partitioning of H x E interactions into linear and non linear components showed that mean sum of squares due to both components played an important role in total H x E interaction for different characters. Significant variance due to environments (linear) for all the characters studied indicated considerable differences among the environments and their pre-dominant effects on the characters. This could be due the variations in weather and soil conditions over different locations. The H x E (linear) interactions was significant for days to 50 per cent maturity, cob placement height and seed yield