

Genotype x season interaction and phenotypic stability for yield and quality in egg plant

Y. SUNEETHA*¹, K.B. KATHIRIA² AND T. SRINIVAS¹

B.A. College of Agriculture, Gujarat Agricultural University, Anand Campus, Anand- 388 110 (Gujarat) India

¹ Agricultural Research Station, Ragolu – 532 484, Srikakulum District (A.P.) India

² Main Vegetable Research Station, Anand Agricultural University, Anand Campus, Anand- 388 110 (Gujarat) India

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SUMMARY

Studies on the genotype x season interaction effects in egg plant genotypes revealed significant mean squares due to seasons, indicating variable expression of the traits in different seasons. The results on environmental indices revealed rainy season to be congenial for fruit yield per plant and few yield components; while summer season was observed to be ideal for quality traits, namely, total soluble sugars and total phenols; and late summer for fruit drymatter and leaf area per plant. Further, the partitioning of season + (season x genotype) mean squares revealed higher magnitudes of season (linear), compared to genotype x season (linear) indicating that predictable component accounted for the major part of total variation observed for fruit yield per plant. However, mean squares due to pooled deviation were also observed to be significant for fruit yield per plant, days to first picking, plant height, total soluble sugars, total phenols and leaf area per plant, indicating the role of both predictable and unpredictable components in the differential response of the genotypes for stability of these traits. The parents, PLR 1 and JBPR 1 were observed to be stable for fruit yield and few yield contributing characters, indicating their utility in egg plant breeding programmes aimed at incorporation of stability. Further, the hybrids, PLR 1 x JBPR 1, Morvi 4-2 x JBPR 1 and Surati Ravaiya x JBPR 1 were identified as high yielding and stable hybrids suitable for cultivation during all the seasons studied; KS 224 x Bombay Gulabi, KS 224 x JBPR 1, AB 98-10 x JBPR 1, AB 98-13 x JBPR 1 and Morvi 4-2 x Surati Ravaiya for cultivation during rainy season; and AB 98-10 x Morvi 4-2 for cultivation during late summer season.

Key words : Egg plant, Stability, Seasons, Yield, Yield attributes.

Egg plant is one of the most common, highly productive and popular vegetable crops grown in India. It is quite popular as the poor man's crop and is widely cultivated in Gujarat. Egg plant hybrids are also becoming quite popular, owing to their low cost and high yields. Further, egg plant hybrids with high fruit drymatter and total soluble sugars in addition to low seed weight and total phenols are highly desired by the consumer and fetch premium price in the market. The crop is mostly raised in the rainy season. However, it is also being increasingly grown during summer season, as an off-season vegetable for its premium price during the season. The summer crop is normally sown during first week of February. However, under contingency conditions of extreme and prolonged winter, sowing of the crop gets delayed, as low soil temperatures adversely effects germination and therefore, a late summer crop, sown in the second fortnight of February is raised.

Assessment of the genotype x environment interactions in crop breeding programs is assuming importance for the identification of genotypes with wider adaptability. This is more so in egg plant, which is grown round the year and is highly influenced by varied agro-climatic conditions (Chadha and Singh, 1982). The nature and importance of magnitude and pattern of genotype x environment interactions have been discussed in detail by several workers in different field crops, and several methods have been proposed to evaluate stability (Comstock and Moll, 1963; Allard and Bradshaw, 1964). Freeman and

Perkins (1971) gave an early review of the statistical methods for analyzing genotype x environment interactions. The statistical model for stability analysis, suggested by Eberhart and Russell (1966) is widely utilized to assess the genotype x environment interactions and draw valid conclusions regarding stability of the genotypes. Studies on stability of egg plant over the different cropping seasons are quite limited. In this context, the present investigation was undertaken to elucidate information on the stability of egg plant genotypes for fruit yield, yield components, quality and physiological characters with regards to the three different cropping seasons, namely summer, rainy and late summer.

MATERIALS AND METHODS

The experimental material comprised of ten elite homozygous lines, namely, KS 224, JB 64-1-2, AB 98-10, AB 98-13, PLR 1, Gandhinagar Local, Bombay Gulabi, Morvi 4-2, Surati Ravaiya and JBPR 1 obtained from the germplasm collections maintained at the Main Vegetable Research Station, Gujarat Agricultural University, Anand and their 45 hybrids derived from the 10 x 10 diallel mating (excluding reciprocals) of these lines. The hybrids and parents were evaluated along with the check, GBH 1 in a randomized block design with three replications for fruit yield and yield component characters namely, days to first picking, plant height, primary branches per plant, fruit length, fruit diameter, fruit weight and number of fruits per plant at the

*Author for correspondence