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Genetic variability and inter-trait association in Muskmelon (*Cucumis melo* l.) under arid conditions

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Muskmelon (*Cucumis melo* L.) is one of the most important cucurbits and consumed as 'Dessert fruit'. It is an excellent cash crop in Asia and South American countries and unavoidable item of Western dietary. India being the centre of diversity provides a wide range of variation for genetic improvement of muskmelon (Lal and Singh, 1997 and Pandey *et al.*, 2005). Persistence of large variability in muskmelon ensures better chances to select new genotypes for specific traits. Thus, evaluation of the variability is prerequisite in any crop improvement programme. Yield is polygenic trait which is highly influenced by environment and thus complicate the selection processes therefore, the knowledge of correlation is also necessary for effective selection (Choudhary *et al.*, 2004 and Pandey *et al.*, 2005). Hence, the present investigation was undertaken with the objectives to measure the extent of variability, heritability, genetic advance and degree of inter-trait association between the various horticultural traits in muskmelon.

Key words: Muskmelon, variability, heritability, genetic advance, correlation.

Material and methods

The experimental material for the present investigation consisted of twenty diverse genotypes/ varieties of muskmelon. The available material was evaluated in Randomized Block Design with three replications at Research Farm, Central Institute for Arid Horticulture, Bikaner, Rajasthan located at 28°N latitude, 73°18'E longitude at an altitude of 234.84m above sea level during summer season of 2012. The soil of experimental field was loamy sand with a pH of 8.7, EC 0.20 dS m^{-1} and organic carbon 0.07 per cent. The spacing maintained between rows was 2.5m and between plants 0.60m. Fertilization, irrigation through drip system, other cultural practices and need based plant protection measures were followed as per recommendation. The data were recorded on 12 qualitative characters on five randomly selected plants from each replication. Diameter of fruits was measured with the help of Digital Vernier Caliper (MITU-TOYO, 300mm, 0.01mm reading capacity). The pH of fresh fruit juice was determined with pH Tester (EUTECH, ± 0.01 pH resolution). Total soluble solids (TSS) were tested with the help of digital hand Refrectometer (ATAGO-Japan) 0-53% readability. The recorded data were statistically analyzed for genotypic coefficient of variation (GCV), phenotypic coefficient of variation (PCV), heritability, genetic advance and correlation using INDOSTAT statistical package (Indostat Services, Hyderabad).

Results and discussion

The extent of variability among 20 genotypes was measured in terms of mean, range, genotypic coefficient of variation (GCV), phenotypic coefficient of variation (PCV), heritability in broad sense (h^2), genetic advance (GA) and genetic advance as per cent of mean. The range of variation was maximum in rind thickness (0.12-0.41cm) followed by fruit weight (0.36-1.22kg) and marketable fruit yield/ plant (1.20-3.90kg) with the general mean of 0.20 ± 0.03, 0.76 ± 0.09 and 2.67 ± 0.33, respectively. It is suggested that the characters which showed high range of variation should be given priority in selection. The highest GCV and PCV was also recorded in rind thickness (33.08 and 40.2) followed by marketable yield/ plant (25.69 and 33.41) and fruit weight (22.58 and 31.07), respectively. High magnitude of GCV is an indication of high genetic variability among the genotypes which provides ample scope for improvement of these characters through simple selection. A high estimate of heritability for these traits in muskmelon was also reported by Vijay (1987) and Pandey *et al.* (2005). The heritability estimates in broad sense were higher for rind thickness (67.49), TSS (65.15) and marketable fruits/ plant (59.11) along with high genetic advance 55.98, 18.32 and 40.68 per cent, respectively which can be made selection criteria in improvement programme of muskmelon. These findings are in close agreement with Vijay (1987), Lal and Singh (1997) and Pandey *et al.* (2005). The marketable fruit yield/ plant had positive and significant correlation with fruit weight (0.908), number of fruits/ plant (0.439), fruit diameter (0.398) and width of seed cavity (0.343) at phenotypic level. This indicated that selection based on fruit weight, fruit diameter and fruits/ plant results in an appreciable improvement in yield of muskmelon. Vijay (1987), Somkuwar *et al.* (1997) Choudhary *et al.* (2004) and Pandey *et al.* (2005) also found similar association of components with yield and among themselves in muskmelon.

Conclusion

The traits like rind thickness, TSS and marketable fruits/ plant showed high heritability in broad sense along with high genetic advance as per cent of mean which could be improved through selection. Fruit weight, fruit diameter and fruits/ plant had positive and significant effect on marketable fruit yield/ plant thus these traits could be utilized in selection of high yielding genotypes of muskmelon suitable for arid conditions.

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