

Studies on genetic variability, heritability and genetic advance in Potato (*Solanum tuberosum* L.)

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SUMMARY

Thirty eight genotypes of potato were evaluated for fifteen characters over two years in Tarai of Uttaranchal. The traits viz., stolon length, plant height, leaf area, number of shoots per plant, tuber volume, tuber dry matter content, specific gravity of tubers, shoot girth and tuber yield per plant had high genotypic coefficient of variation, heritability and genetic advance as per cent of mean.

Key words: Variability, Heritability, genetic advance, co-efficient of variance and potato.

The potato (*Solanum tuberosum* L.) in India, has not been confined to only 'Kitchen gardens' now-a-days but it has covered a vast agricultural area throughout the country. It contributes an important share in Indian table-food and demand is further increasing. Researches on potato aim to boost the tuber yield and improve different quality characters. Yield is associated with several characters greatly influenced by environmental factors. A knowledge of variability present in population due to genetic and non genetic factors is important to start any systematic breeding programme. Therefore, present investigation was undertaken to estimate genetic variability, heritability and genetic advance for important yield component characters in potato.

MATERIALS AND METHODS

In this investigation, thirty eight genotypes of potato (*Solanum tuberosum* L.) were evaluated in Tarai region of Uttaranchal during Rabi 1999-2000 and 2000-2001 to estimate variability in general performance of genotypes for tuber yield and yield contributing characters (Table 1 and 2). The experiment was laid out in randomized block design with three replications. The crops of each genotype was raised by planting the tubers at 20 cm distance on ridges 60 cm apart by supplementing with 20 tonnes FYM and 200, 100 and 100 kg N, P and K, per hectare, respectively. Data recorded on five tagged plants for different traits in each plot were analysed individually as well as pooled using software SPAR 1 developed by IASRI, New Delhi to study the variability in general performance of genotypes, variances, coefficients of variances, heritability, genetic advance and genetic advance as percentage of mean.

RESULTS AND DISCUSSION

The analysis of variance revealed significant

differences among genotypes for all the traits studied (Table 1). Significant variation for tuber yield, number of stems, plant height, number of tubers and tuber weight identical to present investigation have also been reported by Dixit *et al.*, (1994) and Castillo *et al.*, (2000). Range of variability for all the characters were high in individual as well as in pooled analysis (Table 2) indicating ample scope of selection for improvement in these characters including tuber yield per plant. Dayal *et al.*, (1972) and Desai and Jaimini (1977) have also observed wide phenotypic range for tuber yield per plant. Closeness in extent of genotypic and phenotypic variances for most of characters suggested that the phenotypic variability may be reliable measure of genotypic variability and environment had limited effect on expression of traits. High values of genotypic and phenotypic variances were observed for tuber yield per plant, leaf area, tuber weight, tuber volume and plant height in all the analyses.

The genotypic coefficient of variation (GCV) for most of traits were quite close to estimates of phenotypic coefficient of variations (PCV) indicating negligible environmental effect on expression of the traits for variability studies. GCV and PCV percentages were high for stolon length, plant height, number of shoots per plant, leaf area, tuber volume, shoot girth, tuber yield per plant and specific gravity of tubers in all the analyses. High values of coefficients of variation accompanied with high heritability does not mean that character will show high genetic advance. Therefore, high heritability along with high genetic advance as percentage of mean is more reliable for selection to impose. The characters viz., stolon length, plant height, leaf area, number of shoots per plant, tuber volume, tuber dry matter content, specific gravity of tubers, shoot girth and tuber yield per plant had high GCV and PCV, heritability and genetic advance as percentage of mean

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