

## Genetic variability, heritability and genetic advance for yield in potato (*Solanum tuberosum* L.)

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### SUMMARY

Eighteen genotypes of potato were evaluated for twelve characters under four different environment. Characters plant height, tuber yield/plant, total tuber yield, tuber uniformity, dry matter percentage, total sugar and total starch showed moderate values for genotypic and phenotypic coefficient of variation in all the four environment and also in pooled condition. High heritability and genetic advances were observed in characters, emergence per cent, total tuber yield, harvest index, dry matter percentage, total sugar and total starch in all the four environment and in pooled condition. Results reveal that the genotypic coefficient of variation, high heritability and genetic advance may be exploited in further breeding programme.

Key words : *Solanum tuberosum* L., GCV, PCV, Heritability, Advance genetic.

Potato is an important crop and has received great attention in the recent past, as it fits well in the multiple and inter cropping systems. Considering the importance of the crop there is need to improve its yield. Yield is a complex character which is highly influenced by environments. Information on the nature and magnitude of variability present in the genetic material prior to start any selection programme are helpful in designing a successful breeding programme. Therefore, the present investigation was undertaken with the object to estimate genetic variability heritability and genetic advance of various yield and yield attributing characters in potato.

### MATERIALS AND METHODS

Eighteen genotypes of potato obtained from the germplasm maintained at Tirhut College of Agriculture, Dholi, Muzaffarpur, Bihar, were grown in randomised block design with three replication of plot size 3.0 x 2.4 m and 60 x 20 cm spacing during the year 1999-2000 in four environments. All the recommended package of practices were followed for the raising of good crop. The crop was harvested 90 days after planting and observations were recorded on five plants in each entry and in each replication and their means were calculated.

### RESULTS AND DISCUSSION

Mean sum of squares due to genotypes (Table 1) under all the four environments were significant for all characters suggesting presence of considerable genetic variation in respect of various characters. Similar results were reported earlier by Patel *et al.* (1973) and Sidhu & Pandit (1979).

The coefficient of phenotypic and genotypic variations was narrow for the characters emergence per cent, dry matter per cent, total sugar and total starch in all the four environments and also in pooled basis (Table 2)

which suggests that the genetic control over the phenotypic manifestation of these characters is highly predominant and environment plays a subdued role. Characters plant height, number of branch/tuber, number of tuber/plant, tuber yield/plant, total tuber yield, tuber uniformity, dry matter percentage, total sugar and total starch exhibited higher coefficient of phenotypic variations in all the four environments and also under combined effect of environments. The high value of PCV suggested that for these characters considerable variation is available amongst the genotypes under study. High variability for tuber yield in various potato genotypes has also been reported earlier by Dyal *et al.*, 1972; Sawant and Mandloi, 1974 and Kaminski, 1977.

All the characters under study exhibited high to moderate heritability in all the four environments and also under combined effect of environments. Comparatively high heritability was observed for emergence per cent, total tuber yield, harvest index, dry matter per cent, total sugar and total starch in all the four environments and also under combined effect of environments. This also indicated that these characters would respond more favourably to selection. Similar result were also reported by Desai and Jaimini, 1997b for the characters tuber yield, dry matter content and starch content.

High genetic advance was observed for almost all the characters under study in all the four environments and also in pooled condition except emergence per cent, per cent marketable yield, harvest index and tuber uniformity. These result are in agreement with the findings reported by Desai and Jaimini (1997b).

High heritability coupled with high genetic advance was recorded for total tuber yield, dry matter per cent, total sugar and total starch. It suggests for the preponderance of additive gene action and can be exploited by effective selection methods for development of elite genotype of Potato.

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