SHORT COMMUNICATION

Genetic Variability in Exotic Lines of Tomato (*Lycopersicon esculentum* Mill)

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Key Words: Genetic advance, Heritability, Tomato, Variability

The assessment of variability type and magnitude of association among attributes is essential for evaluating the possibility of simultaneous improvement for many characters. Therefore, the present investigation was carried out to evaluate the exotic germplasm for improvement of tomato through studies on variability, heritability and genetic advance.

The present study was conducted at Z.A.R.S., Majhera, Nainital, during summer of 2003. The 26 materials were planted in 3.0x1.2 m plot size at a distance of 60x60 cm. The experiment was laid out in Randomized Block Design and replicated thrice. Five plants were selected at random in each replication and observation on number of flowers per clusters, flower clusters at first picking, number of fruits per cluster, weight per fruit, yield per plant (kg), total yield (q/ha), total soluble solids (TSS) (%) and juice content (%) were taken. Statistical analysis was done according to Snedecor and Cochran (1967). Genotypic and phenotypic coefficient of variation were computed according to Burton (1952). Heritability and genetic advance were estimated according to Allard (1960) and Johnson *et al.* (1955), respectively.

Dara relating to various yield and quality contributing characters (Table 1) revealed that number of flowers per cluster was variable from 4.33 to 8.33 with an average of 5.55 ± 0.56. Regarding flower cluster at first picking, genotype CLN 1466 P showed lowest number (9.66) and CL 11-31-0-38-4-0 showed the maximum clusters (58) among the germplasm lines. The average was 20 ± 0.47. GCV was high (44.26%) indicating the rich exploitable variability.

Among the yield contributing traits, yield per plant showed maximum GCV (46.44%) followed by weight per fruit (36.83%) and number of fruits per cluster (19.46%). The GCV is very high indicating the presence of exploitable variability for this character.

The total yield ranged from 90.81 to 835.10 q/ha with an average of 385 ± 47.79. CLN 2237 A had the highest yield (835.1 q/ha) followed by CLN 915-93 D_4-1-0-3 (812.6 q/ha) and CL 11-31-0-38-4-0 (730.2 q/ha). The GCV for total yield (46.59%) was high indicating adequate variability among germplasm lines.

TSS varied from 3.23 to 7.46% with mean value of 4.90 ± 0.17. Juice percentage of the fruits ranged from 35.33 to 57.96 % with an average of 46.98 ± 1.22. Both the above characters exhibited poor variability. The coefficient of variation does not offer full scope to estimate the heritable variation. The relative proportion of heritable variation assessed with the help of heritability estimates and genetic advance expressed as percentage of mean are given in Table 1. In general, heritability was high for all the characters. Broad sense heritability was found to be

Table 1. Estimates of variability, heritability and genetic advance for some agro-morphological characters in tomato cultivars

Characters	Range of Variability	Mean	Standard error	GCV	PCV	ECV	Heritability (%)	Genetic advance (%)
Number of flowers per cluster	4.33-8.33	5.50	0.56	12.22	21.47	17.65	32.41	78.87
Flower clusters at I[st] picking	9.66-58.00	20.61	1.47	44.26	45.97	12.41	92.70	18.10
Number of fruits per cluster	2.66-6.00	3.69	0.45	19.46	28.72	21.13	45.89	10.02
Weight per fruit (g)	5.83-85.00	44.92	2.98	36.83	38.59	11.51	91.10	32.54
Yield per plant (kg)	0.36-3.00	1.38	0.16	46.44	50.45	20.96	83.07	12.08
Yield (q/ha)	90.81-835.10	385.60	47.79	46.59	59.30	21.46	82.49	33.62
Total soluble solids (%)	3.23-7.46	4.90	0.17	18.92	19.89	61.62	90.41	18.47
Juice content (%)	35.33-57.96	46.98	1.22	13.24	13.99	45.25	89.54	12.13

maximum for flower clusters at first picking (92.70%) followed by weight per fruit (91.10%) and total soluble solids (90.41%).

Genetic advance were high for number of flowers per cluster (78.87%), total yiled (33.62%) and weight per fruit (32.54%). High heritability coupled with high genetic advance and coefficients of variability for weight per fruit and total yield indicate that most likely heritability for these characters is due to additive gene effects and hence direct selection may be highly effective. Characters showing high heritability with low genetic advance indicated that these characters were governed by non-additive gene action and presence of GxE interaction. The heritability is being exhibited due to favourable effect of the environment rather than genotype and hence simple selection may not be effective.

References

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