Himachal Journal of Agricultural Research 34 (1):125-126, 2008

Short Note

Performance of indeterminate tomato hybrids under mid hill conditions of Himachal Pradesh

H. R. Sharma and Deepa Sharma
Dr. Y. S. Parmar, University of Horticulture and Forestry
Horticultural Research Station, Kandaghat, District Solan -173 215, India.

Tomato (*Lycopersicon esculentum* Mill.) is one of the most important cash crop of mid hills of Himachal Pradesh grown during summer- rainy seasons. The whole produce is marketed to the distant markets of Delhi, Chandigarh, Uttaranchal and U.P. states, which fetches very remunerative prices. In H.P., tomato is cultivated over an area of 3200 ha with an annual production of 89,600 MT. Tomato is a rich source of minerals, vitamins and organic acids (healthy acids). Tomatoes are mainly consumed as raw; however, some byproducts are also being prepared such as tomato paste, puree, juice and ketchup. Tomato F_1 hybrid cultivation in H.P. was started by the growers since 1985 onwards with Naveen - F_1 hybrid from IIHR, Bangalore which proved a boon to the farmers as it gives higher yield and better shelf life. Now-a-days several hybrids from public and private sector are available which requires thorough screening for yield and different horticultural traits in summer and rainy seasons to identify the good ones. Tomato cultivation has assumed commercial status in India in recent years due to rapid development of high yielding varieties and F_1 hybrids. India being diverse climatically, tomato availability in the market is flexible which control the pricing of tomato in the market. F_1 hybrids have provided greater opportunity for transport of tomato from southern and western India to lean season in other parts of country. F_1 hybrids have the distinct advantage over the varieties for increasing productivity, uniformity, better quality and earliness. These hybrids are more responsive to fertilizer applications thus creating more biomass for higher photosynthetic activity.

The experimental material comprised of thirteen F_1 hybrids viz. Sun 7711, Sun 7730, T 1227, C 1452, Rakshita, Naveen 2000+, Himsona from private sector and Solan Sindhur, Solan Garima, K 172, K 191, K 1002 and K 1003 from Dr. Y. S. Parmar, University of Horticulture and Forestry, Nauni, Solan. The experiment was laid out at Dr. Y. S. Parmar, University of Horticulture and Forestry, Horticultural Research Station, Kandaghat, Solan (HP) during Kharif, 2005 in Randomized Block Design (RBD) with three replications. Fifty plants of each hybrid were transplanted at a recommended spacing of 90 x 30 cm. The standard cultural practices to raise the tomato crop in mid hills were followed as per the recommendations of package and practices developed by the university. The observations pertaining to yield and horticultural traits were recorded on ten randomly selected competitive plants from each plot. Mean values of each replication for all the traits were subjected to statistical analysis by using computer software package SPAR-1.

Analysis of variance for all the traits under study showed significant differences among hybrids. Mean performance of different tomato hybrids with respect to yield and other horticultural traits is given in table 1 and described below.

The tomato varieties/ hybrids with indeterminate plant height are preferred in mid hills of Himachal Pradesh due to longer harvest duration and less incidence of buckeye rot of fruits. More plant height also leads to more number of branches, which ultimately increases the yield of the plant. Data pertaining to plant height depicted that maximum plant height (3.41m) was attained by hybrid Solan Sindhur that was statistically at par with the hybrids K 172 and Himsona. Total soluble solids have been recognized as the most desirable attribute for processing as reported by Ram (1998). In the present studies, hybrid Naveen 2000+ had maximum total soluble solids (6.32°B) followed by K 1003 (6.00°B)

Storage life and ability to withstand transport without damage are greatly influenced by fruit firmness. Apart from biochemical factors, fruit firmness also depends upon pericarp thickness, number of locules and skin

Table 1. Mean performance of tomato hybrids for yield and some horticultural traits

Hybrids	Plant height (m)	TSS (°B)	Fruit firmness (kg/0.503 cm^2)	Fruit shape index	Fruit size index	No. of fruits per plant	Yield/plant (kg)	Av. Fruit weight (g)
Sun 7711	2.72	5.00	0.83	0.83	29.52	40.12	3.13	78.06
Sun 7730	2.02	5.47	0.55	0.86	29.23	55.37	3.36	60.79
T 1227	2.21	5.43	0.77	0.97	28.42	56.40	3.55	63.00
C 1452	2.21	5.73	0.48	0.96	29.70	55.40	3.19	57.75
Rakshita	2.36	5.60	0.54	0.99	38.15	61.06	4.43	72.63
Naveen 2000+	2.26	6.32	0.68	0.90	33.22	43.75	3.49	79.74
Himsona	3.36	5.10	1.11	1.01	34.32	58.72	3.35	57.02
Solan Sindhur	3.41	5.75	0.92	0.89	23.64	35.91	2.61	72.73
Solan Garima	2.78	5.55	0.57	0.79	26.35	36.95	2.90	76.35
K 172	3.33	5.28	0.81	0.89	29.74	57.83	3.40	58.76
K 191	3.02	5.00	0.71	0.98	31.94	35.92	2.45	68.14
K 1002	3.09	5.07	1.20	1.07	30.59	56.45	3.87	68.54
K 1003	2.53	6.00	1.75	0.90	24.14	57.45	3.74	65.08
Mean	2.71	5.48	0.84	0.93	29.92	50.10	3.34	67.59
CD (P=0.05)	0.09	0.10	0.07	0.10	2.84	2.93	1.50	2.13

Strength (Bekov,1968; Kalloo,1993). The best performance for fruit firmness was found in the hybrid K 1003,(1.75 kg / 0.503 cm^2) followed by K 1002 with value 1.20 kg / 0.503 cm^2. Fruit shape specifications in tomato vary with the end use of the fruits. Round tomato fruits are generally preferred for fresh market. But for processing, oblong fruits are desirable as they are more firm. Fruit shape index should, therefore, be unity for fresh and above unity for processing tomatoes. It is evident from the data that fruit shape index value varied from 0.79 (Solan Garima) to 1.07 (K 1002). The maximum index value 1.07 (K 1002) was statistically at par with four other hybrids.

Maximum fruit size index (38.15) was found in hybrid Rakshita, which was statistically higher than all other hybrids.Number of fruits per plant directly contribute to total yield per plant in tomato (Srivastava and Sachan, 1973). Present study revealed that maximum number of fruits per plant (61.06) was found in hybrid Rakshita that was statistically at par with hybrid Himsona (58.72). Every breeding programme is aimed at achieving high fruit yield along with superior quality. The highest fruit yield (4.43 kg / plant) was observed in Rakshita followed by K 1002 (3.87 kg / plant) and K 1003 (3.74 kg / plant).

Fruit weight directly contributes towards the total yield per plant. Under Indian marketing system fruit weight of 65-80 g is most desirable. Among these hybrids, maximum average fruit weight (79.74g) was found in Naveen followed by Sun 7711 (78.06g) and Solan Garima (76.35g).

References

Bekov RK 1968. Initial material and breeding tomato varieties for mechanical harvesting. Autoreft Dess. Moscow, 21pp.

Kalloo G 1993. Tomato (*Lycopersicon esculentum* Mill.). In: *Genetic Improvement of Vegetable Crops*. eds Kalloo G and Bergh BO. Vergamon Press Ltd., Headington Hill Hall Oxford, OX-3, OBW, England, pp 645-56.

Ram HH 1998. *Vegetable Breeding: Principles and Practices*. Kalyani Publishers, Ludhiana.

Srivastava LS and Sachan SCP 1973. Genetic parameters, correlation coefficient and path-coefficient analysis in tomato (*Lycopersicon esculentum* Mill.) Indian J. Agric. Sci. 43 (6): 604-07.