

Evaluation of tomato (*Lycopersicon esculentum* Mill.) cultivars / lines against multiple diseases under intermediate hill conditions of Jammu & Kashmir

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An experiment was conducted at research farm of Regional Agriculture Research Station, Rajouri to screen out the resistant varieties of tomato against *Fusarium* wilt, early leaf blight, powdery mildew and buck – eye rot in the intermediate hill zone of J&K. Out of seventeen cultivars Punjab Chuhara, RCMT-2 and Pant T-8 were found to be completely resistant against all diseases with highest yield potential (147.67q/ha, 132.65 q/ha and 125.87 q/ha respectively) where RCMT-1, Pant T-3 and Pusa Ruby, were moderately resistant against all diseases but CO -3 and S-22 were found susceptible against all diseases and gave poor yield. (55.73 and 87.94 q/ha respectively). Lowest yield was recorded in local cultivar while it was resistant against all diseases.

Key words: *Fusarium* wilt, Buck-eye rot, resistant cultivars

Tomato (*Lycopersicon esculentum* Mill.) is one of the most common vegetable crops grown all over the world. In intermediate hill condition it is ranked as prized commodity in the vegetable market during *rabi* and *kharif* seasons (Raina and Razdan 2010). In many countries it is considered as poor man's orange (Singh *et al.* 2004) because of its attractive appearance and nutritive value. Tomato is a very versatile vegetable for culinary purpose. In India, the major biotic constraints in the cultivation and production of tomato are the occurrence of many insect and diseases. Tomato is susceptible to large number of diseases caused by various pathogens and caused a great concern in the production as well as in quality.

Indiscriminate introduction of newly released high yielding cultivars has replaced the conventional varieties and within few years after intensive cultivation such high yielding varieties became susceptible. In intermediate hill conditions the diseases are considered to be a most important limiting factor in successful cultivation of tomato during *kharif* season in India.

The trial was conducted at research farm of Regional Agriculture Research Station, Rajouri in two consecutive years 2008 and 2009 in *kharif* season. This station is located at 950 m above sea level and 33° 42'N Latitude and 74° 13' E Longitude, average temperature ranges from 17°C to 36.5°C maximum and 4.5°C to 21°C minimum and average rainfall 722.35 mm during *kharif* season. Total seventeen cultivars/lines were screened out against fungal diseases in natural conditions. The trial was laid out in randomized block design in three replications. Five week old tomato seedlings of seventeen cultivars/lines including one local were transplanted in 1.8 X 1.8 m plot size and disease incidence of early blight was recorded in 1-9 (Posya and Tu, 1993) scale.

Disease intensity of powdery mildew was recorded using 1-9 rating scale resistant (score 1-3), tolerant (score 4-5) and susceptible (score 6-9) (Jan., 1999) *Fusarium* wilt incidence was based on the percentage of infection in the field as : 0-10 % = Highly resistant (HR), 10-25 % = Resistant (R), 25-50 % = Moderately susceptible (MS), 50-75 % = Susceptible (S), 75-100 % = Highly susceptible (HS) as suggested by (Shanmugam *et al.*, (2009).)

Out of seventeen cultivars Punjab Chuhara, RCMT-2 and Pant T-8 found completely resistant against all diseases with highest yield potential (147.67q/ha, 132.65 q/ha and 125.87 q/ha respectively) among all, followed by RCMT-1, Pant T-3 and Pusa Ruby, were moderately resistant against all diseases but CO -3 and S-22 were found susceptible against all diseases and give poor yield performance (55.73 and 87.94 q/ha respectively). Lowest yield was recorded in local cultivar while it was resistant against all diseases. Kamble *et al.*, (2007) were screened, twenty one advanced lines and five varieties under field conditions. None of the varieties and advanced lines showed resistant reaction. Five advanced lines were moderately resistant.

Table 1: Pooled data of disease incidence and yield of different cultivars/lines of tomato

Cultivars /genotypes	<i>Fusarium</i> wilt %	Leaf Blight %	Powdery Mildew %	Buck E. Rot %	Yield (q/ha)
Pusa Ruby	R	9.58	4.23	1.8	110.02
V T G 85	R	12.09	7.54	8.45	96.76
Pant T-8	HR	2.5	1.36	3.24	125.87
DVRT-2	MR	13.02	4.12	4.72	96.82
RCMT-2	HR	5.69	3.8	3.55	132.65
RCMT-1	MR	4	7.05	2.81	116.56
CO-3	S	16.78	21.37	16.91	55.73
CTES-1	R	8.04	7.72	7.23	110.3
CTES-2	MR	11.01	7.31	10.68	105.02
DVRT-1	MR	11.97	2.65	5.5	98.76
Pant T-3	MR	11.73	0	3.82	117.37
S-22	S	12.99	10.22	11.32	87.94
PKM-1	MR	8.51	2.61	2.49	123.73
Summer Special	R	12.06	3.7	8.93	93.31
Punjab Chuhara	HR	2.89	2.48	3.79	147.67
VFN-8	MR	13.06	12.87	12	94.4
Local	HR	18.64	4.03	1.35	30.03

While one variety and four advanced lines were moderately susceptible and thirteen advanced lines and four varieties were found to be susceptible to early blight of tomato.

Lohith *et al.*, (2009) observed that out of 52 genotypes, four genotypes EC 251709, EC 251717, EC 164295 and LE 15 showed highly resistant reaction with Per cent Disease Incidence (PDI) ranged from 0-10%; whereas LE 44 was resistant (PDI 10.1-25%); EC 165690, EC 163681, EC 136711, EC 163683, LE 16, LE 35, LE 54, LE 85, LE-172 and LE-189 were moderately resistant (PDI 25.1-40%). The disease reaction (PDI) in other 23 ranged between 40-50% and categorized as susceptible. 11 genotypes were found highly susceptible with PDI more than 50%.

A study was conducted with 23 genotypes of tomato in Meghalaya. There was considerable diversity among genotypes for 8 morphological characters. Among them, plant height and fruit number contributed to the divergence. Crosses involving L-964 and L-154 with Arka Abha and LE-79 were recommended for improved yield and better fruit size as reported by Parthasarathy and Aswath (2002).

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