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Screening of Tomato Varieties Against Leaf Curl Virus in Himachal Pradesh

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Abstract

Thirteen varieties of tomato were screened against leaf curl virus. Out of these, Bilahi-1, Bilahi-2 and H-24 varieties were found to be highly resistant, whereas, IIHR-1, S-7 and H-88 were found to be resistant to tomato leaf curl virus. Remaining seven varieties exhibited moderately susceptible to susceptible reaction.

Key words : Tomato, Varieties, Leaf curl virus, Resistance.

Tomato (*Lycopersicon esculentum* Mill.) is one the most popular and commercially cultivated vegetable crops throughout India. Unfortunately tomato succumbs to a number of virus diseases of which tomato leaf curl virus is a major viral disease limiting the cultivation and production of tomato during autumn in North India causing sustainable yield loss beside affecting the quality of traits (1). It has been reported that when the plants are infected within 20 days of planting the loss may be upto 92%. The only useful and practicable method for control is screening of germplasm for resistance, which is the first step towards developing appropriate resistant varieties. The information on this aspect in tomato especially from Zone-1 of Himachal Pradesh is lacking. Therefore, present study was undertaken to screen some varieties against, tomato leaf curl virus.

Methods

A field experiment was conducted at Research Station, Akrot of Himachal Pradesh Agriculture University, on different tomato varieties with Solan Gola as standard susceptible check. The nursery sowing was done on 8 June, 2002 and one month old seedlings were transplanted in 60 × 45 cm spacing. The experiment was conducted in randomized block design with three replications. All the agronomic practices were followed as per package of practices. The observations were recorded at weekly interval after the susceptible check plants showed symptoms on leaves. Data was recorded following the procedures approved for the All India Coordinated Research Project on Vegetables (2). The details are as follows :

A Scale for classifying disease reaction to tomato leaf curl virus.

	Symptom	Symptom severity grade	Response values
1	Symptom absent	0	0
2	Very mild curling (upto 25% leaves)	1	0.25
3	Curling, puckering (26—50% leaves)	2	0.50
4	Curling, Puckering (51—75% leaves)	3	0.75
5	Sever curling, puckering > 75% leaves	4	1.00

$$\text{Per cent plant infection} = \frac{\text{No. of plants observed}}{\text{No. of plants observed}} \times 100$$

A Scale for classifying coefficient of infection.

Co-efficient of infection (C.I)	Reaction
0—4	Highly resistant (HR)
5—9	Resistant (R)
10—19	Moderately resistant (MR)
20—39	Moderately susceptible (MS)
40—69	Susceptible (S)
70—100	Highly susceptible (HS)

Table 1. Reaction of tomato varieties to leaf curl virus (ToLCY).

	Varieties	Average fruit weight (g)	Fruit yield (q/ha)	Coefficient of infection	Disease reaction
1	Bilahi-1	38.3	189.9	0	HR
2	Bilahi-2	26.1	200.4	0	HR
3	H-24	57.9	200.4	0	HR
4	IIHR-1	47.9	291.7	4.37	R
5	Megha (L-15)	43.5	206.3	22.13	MS
6	Palam Pride	55.6	117.7	42.2	S
7	Hawaii 7998	26.5	190.2	32.2	MS
8	BL 333-1	50.4	124.5	42.13	S
9	Pb. Chhuhara	68.7	170.4	52.00	S
10	S-7	36.3	200.8	5.12	R
11	H-88	30.8	206.3	6.27	R
12	Roma	62.4	166.40	50.00	S
13	H-86	24.5	137.2	21.00	MS
14	S. Gola (C)	75.8	139.5	56.00	S

Results and Discussion

The relative resistant reaction to 13 genotypes of tomatoes viz., Bilali-1, Bilahi-2, H-24, IIHR-1, Megha, Palam Pride, Hawaii 7998, BL333-1, Punjab Chhuhara, S-7, H-88, Roma, H-86 and susceptible check Solan Gola are given in Table 1. The results revealed that Bilahi-1, Bilahi-2, and H-24 were highly resistant genotypes to tomato leaf curl virus showing zero co-efficient of infection. Three of the remaining varieties viz., IIHR-1, S-7 and H-88 were resistant having co-efficient of infection 4.37, 5.12 and 6.27, respectively, whereas Megha (L-15), Hawaii 7998 and H-86 were found moderately susceptible. Remaining varieties viz., Palam Pride, BL 333-1, Punjab Chhuhara, Roma and susceptible check Solan Gola had susceptible reaction to tomato leaf curl virus. Other workers have also reported the resistant reaction against leaf curl virus (3—6). In general, it was found that varieties showing highly resistant to resistant reaction had more marketable fruit yield as compared to other varieties.

In conclusion, six varieties viz., Bilahi-1, Bilahi-2, H-24, IIHR-1, S-7 and H-88 were found to be resistant to tomato leaf curl virus. Two varieties can be further used in breeding program to incorporate resistant genes in desirable but susceptible cultivars.

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