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## Screening and identification of chilli leaf curl virus resistance genotypes in chilli

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#### Abstract

The performance of nine genotypes of chilli namely; KDSC-410, Phule Jyoti, Punjab Lal, AKC-89/38, Pant C-1, Japani Longi, CV-2, Kalayanpur Chanchal (Check-1) and Pusa Jwala (Check-2) was assessed for yield attributes and CLCV tolerance at Research farm of Nalanda College of Horticulture, Noorsarai, Nalanda (Bihar Agricultural University, Sabour, Bhagalpur) Bihar during 2015-2016. Among the nine genotypes, Japani Longi exhibited significant superiority with the highest production of No. of fruit per plant (206.500), fruit yield/plant (367.990 g.) with lowest days to 50 % flowering (52.530 days) and low CLCV incidence (9.130%), over the genotypes under investigation. On the other hand, out of nine screened genotypes, variety Pujab Lal showed lowest incidence of chilli leaf curl virus (5.770%) and also registered higher no. of fruits per plant (195.700) and fruit yield /plant (322.840 g). Pant chilli also showed low incidence of CLCV (6.330 %) and highest values for fruit diameter (11.390 mm), fruit length (8.800 cm). On the basis of overall performance of the genotypes, Japani Longi is the superior genotype for most of the traits studied among the nine chilli genotypes followed by Pujab Lal and Pant C-1.

**Keywords:** Chilli, leaf curl virus and fruit yield

#### Introduction

Chilli (*Capsicum annum L.*) belongs to the family Solanaceae and is an important spice cum vegetable crop commonly used in Indian dietary. It is grown throughout the year as a cash crop and used in green and red ripe dried stage for its pungency, colour and other ingredients in all culinary preparations of rich and poor alike to impart taste, flavour and colour. It is also called as sweet pepper, bell pepper or green pepper. Nutritionally, it is a rich source of vitamin A, B and C. Capsaicin an alkaloid responsible for pungency in chillies has medicinal properties and it prevents heart attack by dilating the blood vessels (Gill, 1989). Chilli is one of the most popular and highly remunerative vegetable crops grown throughout the world. India is the largest consumer and exporter of chilli in the world with an area of 7.74 lakh ha and production of 14.92 lakh MT (NHB, 2015). Chilli is susceptible to various pathogens including viruses, which can cause heavy production losses. So far 65 viruses have been reported, including begomo viruses causing chilli leaf curl virus disease (ChiL CVD) infecting chilli throughout the world (Nigam *et al.* 2015) [6]. ChiL CVD is the most destructive virus in terms of incidence and yield loss. In severe cases, 100 per cent losses of marketable fruit have been reported (Senanayake *et al.* 2007; Kumar *et al.* 2011a, b; Senanayake *et al.* 2012) [8, 5, 9]. The typical symptoms consisting of leaf curling, rolling and puckering; blistering of interveinous areas, thickening and swelling of the veins, shortening of internodes and petioles, crowding of leaves and stunting of the whole plant. Evasive measures, such as pesticide sprays to control vectors, removal of diseased plants and agronomic interventions have been tried without much success. Exploitation of host plant resistance is effective, economical, ecologically safe and durable approach to disease management, especially the ones caused by viruses. So, the present investigation was planned to be carried to draw baseline information on chilli leaf curl virus resistance genotypes.

#### Materials and methods

The present investigation on Screening and identification of chilli leaf curl virus in resistant genotype in chilli was carried out at Research farm of Nalanda college of Horticulture, Noorsarai, Nalanda, (Bihar Agricultural University, Sabour, Bhagalpur) Bihar during 2015-2016. The experimental material consisting of 90 genotypes screened during 2014-15.

Out of which 09 germplasms viz., KDSC-410, Phule Jyoti, Punjab Lal, AKC-89/38, Pant C-1, Japani Longi, CV-2, Kalayanpur Chanchal (Check-1) and Pusa Jwala (Check-2) showed field tolerance against chill leaf curl virus. The experiment was laid out in Randomised Block Design with three replications with two checks. The experimental soil is newly formed alluvial soil with pH around neutral. Seedlings of screened 09 germplasms were planted at a distance of 60x45 cm in the month of February. All the cultural practices were followed as per recommended for chill cultivation. Observations were recorded on days to 50 % flowering, fruit diameter (mm), fruit length (cm), no. of fruits/plant, fruit yield/plant (g) and CLCV incidence (%).

## Results and discussion

### Days to 50% flowering

A close perusal of the data presented in Table-1 showed significant differences in 50% flowering of the screened genotypes. Cultivar Japani Longi taken minimum days to 50% flowering i.e. 52.530 days followed by Pant C-1 (54.590 days) and AKC-89/38 (55.280 days). The latest cultivar with respect to days to 50 % was Phule Jyoti (63.860 days).

### Fruit diameter

The data on fruit diameter revealed significant differences among all the screened genotypes against CLCV (Table-1). The genotypes Pant C-1 (11.390 mm) showed significant superiority over all the genotypes screened with respect to fruit diameter over checks. The highest data was followed by Kanpur Chanchal (check-1) (9.910mm) and AKC-89/38 (9.170 mm). On the other hand lowest fruit diameter was registered in variety Japani longi (7.080 mm). Such variation of the fruit diameter different genotypes due to genetics make up of genotypes. The similar variation in fruit diameter was observed by Ukkund *et al.* (2007) [13], Tembhone *et al.* (2008) [11] and Thul *et al.* (2009) [12].

### Fruit length

Like-wise the data on fruit diameter, significant difference among all the genotypes were also observed with fruit length (Table-1). Variety CV-2 (4.970 mm) showed significant superiority with respect to fruit length among all the screened varieties. The maximum value with respect to fruit length was followed by Phule Jyoti (4.650 cm), Punjab Lal (3.930 cm), Japani Longi (3.870cm). However, the lowest fruit length

(0.970 cm) was found in variety Pant C-1. Variation of the fruit length in different genotypes under study could be attributed to the genotypes characteristics, difference in the genetic makeup of genotypes. The similar variation in fruit length was observed by Ukkund *et al.* (2007) [13], Tembhone *et al.* (2008) [11], Thul *et al.* (2009) [12] and Vijaya *et al.* (2014) [14].

### No. of fruits/plant

The data on no. of fruits/plant has been presented in Table-1. A close perusal of the data proclaimed significant differences among all the screened genotypes with regard to no. of fruit/plant. Highest no. of fruit/plant were found in variety Japani Longi (206.500) followed by Punjab Lal (195.700). While, lowest no. of fruit/plant were counted in genotype Pant C-1 (38.900). All the screened genotypes showed significant superiority over checks except Pant C-1. The variation in the number of fruits per plant among different genotypes might be due to fruit set percentage reported by Todankar Chaitali (2014), moderately by GCV and less effect of environment. Similar variation in above character was also reported by Sharma *et al.* (2010) [10] and Amit *et al.* (2014) [1].

### Fruit yield/plant

Data on fruit yield/plant revealed significant difference among all the cultivars screened against CLCV (Table-1). The highest fruit yield per plant was observed in genotype Japani Longi (367.990 g) and lowest fruit yield was recorded in genotype Pant C-1 (84.870g). The highest value for fruit yield per plant was followed by Punjab Lal (322.840 g.) and Phule Jyoti (318.830 g.). The difference in fruit yield per plant may be due to fruit set percentage (Chaitali, 2014). Similar results were also recorded by Sharma *et al.* (2010) [10], Vijaya *et al.* (2014) [14] and Ukkund *et al.* (2007).

### CLCV incidence

All the genotypes screened against CLCV showed significant superiority over the check (Pusa Jwala). Lowest CLCV % incidence was observed in genotype Punjab Lal (5.770 %) followed by Pant C-1 (6.330 %) and Japani Longi (9.130 %). Besides highest CVCL incidence was noted in genotype Pusa Jwala (90.670 %). In partial agreement to the findings of present investigation, Manju and Sreelathakumary (2002) [5] and Yatagiri *et al.* (2017) [15] also reported similar variation in CLCV incidence.

**Table 1:** Performance of chilli genotypes against CLCV.

Varieties	Days to 50% flowering	Fruit diameter (mm)	Fruit length (cm)	No of Fruit/Plant	Fruit yield/Plant(g)	CLCV INSIDENCE%
KDSC- 810	55.960	7.733	2.440	112.700	171.650	17.330
Phule Jyoti	63.860	8.540	4.650	156.120	318.830	23.330
Punjab Lal	60.770	7.640	3.930	195.700	322.840	5.770
AKC-89/38	55.280	9.170	4.330	156.100	306.330	13.670
Pant- C-1	54.590	11.390	8.80	38.900	84.870	6.330
Japani Longi	52.530	7.080	3.870	206.500	367.990	9.130
CV-2	56.990	8.750	4.970	134.800	286.120	19.670
Kalyanpur Chanchal (Check-1)	58.370	9.910	3.970	80.200	280.940	12.330
Pusa Jwala (Check-2)	55.620	7.780	3.490	56.400	180.160	90.670
C.D.	1.479	0.940	0.371	3.563	4.830	1.675
SE(m)	0.489	0.311	0.123	1.178	1.597	0.554
SE(d)	0.692	0.440	0.174	1.666	2.259	0.784
C.V.	1.483	6.212	5.870	1.615	1.073	4.357

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