Induction of Mosaic Resistance in Chillies through Introduced Germplasm

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Chilli is an important vegetable in Kerala grown in garden lands, paddy fields and field bunds. The commercially cultivated chilli varieties belong to *Capsicum annuum* though in the homesteads *Capsicum frutescence* and *Capsicum chinense* are also cultivated. Chilli cultivation in Kerala is constrained by several biotic factors of which virus diseases are serious in summer and bacterial wilt in the rainy season. The important viral diseases that affect chilli in Kerala are the leaf curl and chilli mosaic. Management of disease through vector control is often not fully successful. A viable alternative is the development of resistant varieties. One of the accepted methods for inducing resistance to viral diseases is through breeding programmes using resistant sources.

A project was undertaken at Regional Agricultural Research Station, Pattambi, Kerala Agricultural University, to develop chilli varieties that are resistant/tolerant to mosaic caused by potato virus Y. One hundred and fifty six accessions of chillies both indigenous and introduced were screened for mosaic incidence. Artificial inoculation with virus isolates was done using carborandum leaf wipe method. The initial screening revealed that 11 of the accessions were resistant to mosaic of which six were introduced ones. The resistant sources identified from the introduced germplasm include Tam Mild Jalapino, Hildago Serrano, Tam Mild Chile 2, PI 163201, Tumpang and LV 2722. Five resistant sources were also identified from the indigenous collections (George and Jyothi, 2002). Twenty six accessions were tolerant which included six introduced ones. The details of the resistant and tolerant types are presented in Table 1.

Attempts were made to transfer the resistance to cultivated varieties. The varieties selected for crossing with resistant sources included Manjari, Ujwala, Jwalamukhi, Jwalasakhi (varieties released from Kerala Agricultural University) and KTPL 16 and KTPL 18. Seventeen cross combinations were developed. Twenty five plants were raised for screening and evaluation. Selections were made from the segregant population based on field resistance to mosaic and horticultural attributes. Selection was continued up to the F6 generation. From the F6 population, resistant plants that yielded more than 100 g per plant were selected. Nine selections were thus identified. These selections were characterized as per the minimal descriptors (Srivastava *et al.*, 2001).

Table 1. Identified sources of resistance/tolerance to chilli mosaic

S. No.	Accession No.	Name	Source	Reaction to mosaic
1.	CA109	Tam Mild Jalapino	Texas A&M University	Resistant
2.	CA 107	Hildago Serrano	Texas A&M University	Resistant
3.	CA 108	Tam Mild Chile 2	Texas A&M University	Resistant
4.	CA 118	IHR 384	IIHR, Bangalore	Resistant
5.	CA 119	IHR–517–1	IIHR, Bangalore	Resistant
6.	CA 121	Koppam Local	Kerala	Resistant
7.	CA 128	Pusa Jwala	New Delhi	Resistant
8.	CA 138	PI 163201	Malayasia	Resistant
9.	CA 141	Pusa Sadabahar	New Delhi	Resistant
10.	CA 142	Tumpang	Indonesia	Resistant
11.	CA 144	LV 2722	Indonesia	Resistant
12.	CA 64	EC 339052	NBPGR	Tolerant
13.	CA 65	SA 2225	NBPGR	Tolerant
14.	CA 66	578	NBPGR	Tolerant
15.	CA 69	643-1	NBPGR	Tolerant
16.	CA 73	582-1	NBPGR	Tolerant
17.	CA 75	CO–4	TNAU	Tolerant
18.	CA 76	PKM–1	Periyakulam	Tolerant
19.	CA 77	PKM–2	Periyakulam	Tolerant
20.	CA 79	Local	Kerala	Tolerant
21.	CA 81	Local	Kerala	Tolerant
22.	CA 87	Local	Kerala	Tolerant
23.	CA 91	Local	Kerala	Tolerant
24.	CA 97	Local	Kerala	Tolerant
25.	CA 101	Local	Kerala	Tolerant
26.	CA 111	IHR–1616–8	IIHR, Bangalore	Tolerant
27.	CA 112	IHR–1618	IIHR, Bangalore	Tolerant
28.	CA 113	IHR –1680	IIHR, Bangalore	Tolerant
29.	CA 115	IHR–582	IIHR, Bangalore	Tolerant
30.	CA 116	IHR 544	IIHR, Bangalore	Tolerant
31.	CA 117	IHR–1617 -5	IIHR, Bangalore	Tolerant
32.	CA 135	HDA 832	France	Tolerant
33.	CA 136	Criollo de Morelos 334	Mexico	Tolerant
34.	CA 137	Cili Langkap	Malayasia	Tolerant
35.	CA 139	Acc. 365	Italy	Tolerant
36.	CA 140	Perennial HDV	France	Tolerant
37.	CA 143	IR	Indonesia	Tolerant

Table 2. Important characters of selections from crosses between resistant/tolerant sources and commercial varieties

S.No.	Crosses	Plant height (cm)	Plant canopy width (cm)	Colour of fruits	Fruit shape	Fruit number	Fruit length (cm) (g)	Average single fruit weight	Yield/ plant (g)
1.	*IR x Manjari	60.5	44.3	Deep Red	Long	49.8	6.7	1.8	101.0
2.	*LV2722 x KTPL 18	54.5	37.0	Red	Long	29.9	7.4	4.5	120.0
3.	*IR x Jwalamukhi	80.5	65.8	Deep Red	Long	33.2	10.5	2.8	104.5
4.	*Tumpang x Jwalamukhi	84.3	64.0	Red	Long	33.5	7.5	3.1	115.0
5.	*Tumpang x Manjari	46.5	25.0	Red	Long	46.6	7.5	1.9	107.0
6.	*IR x KTPL 18	75.5	51.0	Red	Long	37.0	13.5	4.6	175.7
7	IHR 384 x Jwalamukhi	60.0	34.1	Deep red	Long	21.1	9.7	5.2	120.9
8.	IHR 384 x KTPL 18	86.0	54.0	Deep red	Long	37.0	7.5	4.1	164.0
9.	IHR-517-1x Jwalamukhi	47.5	28.8	Deep Red	Long	27.3	7.6	3.7	109.8

*introduced sources

The important characters of the selections are presented in Table 2.

The selections from the crosses IR x KTPL 18 and IHR 384 x KTPL18 recorded high yields. All the selections had long fruits and red to deep red colour. Single fruit weight was lowest in IR x Manjari and Tumpang x Manjari.

Conclusion

Screening and evaluation studies showed that mosaic resistance could be successfully transferred to cultivated varieties from three exotic sources and two indigenous sources. The selections made are to be further evaluated for stability and improvement in yield characters.

Reference

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Performance of Exotic Collections of Cabbage in the North-western Mid-Hill Conditions of India

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Key Words: Cabbage, Evaluation, Germplasm

Cabbage (*Brassica oleracea* var. *capitata*) is an important vegetable having the largest area (0.28 m ha) and production (6.10 m ton) among the cole crops in India (Anonymous, 2002). Availability of germplasm with considerable amount of variability is a prerequisite for crop any improvement programme. It is also necessary to have information about the performance of the genetic materials in the environment where improvement work is to be undertaken. Therefore, the present investigation was aimed to collect germplasm of cabbage from the place of its origin or diversity and identify the promising collections under the mid hill conditions of India for their further utilization in breeding work.

Fifty germplasm of cabbage bearing EC No. 490156-490205 were obtained from the Horticulture Research International, Wellesbourne (UK) through NBPGR, New Delhi and put under evaluation during winter 2002-03 along with 5 others collected indigenously at the IARI, Regional Station, Katrain (32°N, 77°E, 1500 m above mean sea level). Plant-to-plant and row-to-row spacings were maintained at 45 cm each in a plot size of 3 m x 3 m. Each entry was replicated twice in a randomized complete block design and observations were recorded on 5 randomly selected plants for number of non-wrapper leaves, frame size, stalk length, head size index, gross plant weight and net head weight.