

Response of Watermelon Cultivars against Viral Diseases under Natural Field Condition

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Article Info	Summary
Article History Received : 12-03-2011 Revised : 19-05-2011 Accepted : 20-05-2011	Watermelon (<i>Citrullus lanatus</i> (Thunb) Mastum and Nakai, synonyms: <i>C. vulgaris</i>) is a very common summer crop in World. It is also grown in lower Himalayan region to other parts of India such as Punjab, Haryana, Karnataka, Assam, West Bengal, Orissa, Himanchal Pradesh, Tamil Nadu Rajasthan and Uttar Pradesh. It is an excellent source of vitamin A and C and one cup of watermelon juice contain 48.59 mg of vit. C and 556.32 IU of vit. A besides 48 calorie of energy. At present almost all the cultivated varieties are found to be susceptible for virus infection. No symptomatic studies have been done on management of watermelon through host resistance. The present investigation was under taken to identify resistant/tolerant cultivar for viral diseases of watermelon.
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Introduction

The fruit contains 92% water, 0.2% protein, 0.3% minerals and 7.0% carbohydrates [1]. In India, it is grown in an area of about 200,000 ha with production of 25,500 tones and productivity is 127.50 q/ha [2]. The low productivity of watermelon is mainly due to various diseases incited by fungi, bacteria, viruses, nematodes and phytoplasma. Among viruses, watermelon mosaic virus-1 (WMV-1), watermelon mosaic virus, cucumber mosaic virus etc. are gaining importance in recent years. These viruses are major limiting factor of watermelon yield affecting its production very drastically. Sometime it is difficult to find even a single plant free from infection at the end of the growing season, and thus results in severe yield reduction [3]. These viruses cause severe mosaic mottling, blistering and malformation of leaves of watermelon [4, 5].

Materials and Methods

Watermelon cultivars were screened out, under natural field condition against viral diseases. The experiments were conducted during summer seasons of 2007-08 and 2008-09 with a set of 20 cultivars obtained from Indian Institute of Vegetable Research, Varanasi, (U.P.) and private seed agencies. Healthy seeds of watermelon cultivars were sown in the field with plant to plant and row to row distance of 1.5x2m. All recommended agronomical and cultural practices were followed for raising a good crop. Each cultivar was sown in two rows with 10 plants in each row. Two rows of susceptible check cultivar (Sugar Baby) were sown all around the field to create epiphytotic conditions. Periodical fungicidal sprays were given to avoid fungal diseases. Five plants of each cultivar were randomly selected for recording data on the disease incidence starting from sowing till maturity at weekly interval. Disease incidence was recorded in all selected plants between Feb. to May under natural field

conditions to know the occurrence of virus (es) in watermelon cultivars during both years.

Disease rating was done by standard scale given by Strange *et al.* [3], using 1-9 grade (where 1= no symptom (Immune), 2=Tendrils absent (Moderate resistance), 3=tendrils absent, slightly stunted growth (Moderate resistance), 4= mosaic patches and/or necrotic spots on leaves (Moderate susceptible), 5= Leaves near apical meristem deformed, meristem yellow and reduced in size (Moderate susceptible), 6= Apical meristem withered and brown (Susceptible), 7= Apical meristem dead with more basal leaves dying (Susceptible), 8= Most of the leaves dead, main stem green/yellow (Highly Susceptible), 9= Plant dead (Highly Susceptible)) and finally transformed in per cent disease incidence.

$$\text{Disease incidence (\%)} = \frac{\text{Number of diseased plants}}{\text{Total number of plants}} \times 100$$

Results and Discussion

Out of 20 varieties, none of the variety was found resistant and immune against natural infection of viruses. Only two i.e. Arka Jyoti and MHW-6 were found moderately resistant against viruses. Five varieties viz., Nath-102, Nath-202, Special Number-1, NS-246 and NS-295 were rated as moderately susceptible. Eight varieties viz., Pusa Bedana, Improved Shipper, Arka Manik, MHW-11, Madhu Milan, Century-12, MHW-12 and MHW-15 were rated as susceptible. Five varieties viz., Sugar Baby, Durgapur Keshar, Durgapur Meetha, Asahi Yamato and Mohini were rated as highly susceptible, during both crop seasons.

Strange *et al.* [6] screened 1275 watermelon germplasm against WMV-1 and they found 4 germplasm viz, PI-244018, PI-244019, PI-255137 and PI-482299 highly resistant to this diseases. It is noticed that PI-244018 and PI-244019 was resistant against WMV.

Although, little information on the mechanism of resistance in this crop is available. A detailed research,

therefore, is needed to identify the situation. However, two varieties being reported in our study, having less than 20 % diseases incidence may be utilized in breeding programme as to evaluate resistant / tolerant varieties against viral infection in watermelon.

Table1: Response of watermelon cultivars against virus infection under natural field condition.

S. No.	Cultivars	Disease incidence (%)		Reactions	
		2007-08	2008-09	2007-08	2008-09
1	Sugar Baby	79.30	77.40	HS	HS
2	Arka Jyoti	19.50	18.25	MR	MR
3	Pusa Bedana	66.40	64.35	S	S
4	Durgapar kesar	76.45	73.55	HS	HS
5	Durgapur Meotha	82.10	80.25	HS	HS
6	Improved Shpper	46.24	43.30	S	S
7	Arka Manik	53.56	51.25	S	S
8	Nath-102	34.28	31.30	MS	MS
9	Nath-202	20.35	21.25	MS	MS
10	MHW-6	18.95	16.75	MR	MR
11	MHW-11	47.25	45.09	S	S
12	Special No.-1	29.65	27.45	MS	MS
13	Madhu Milan	57.42	54.85	S	S
14	Asahi Yamato	73.25	70.56	HS	HS
15	Mohini	78.75	76.81	HS	HS
16	NS-246	43.95	41.65	MS	MS
17	NS-295	39.25	37.35	MS	MS
18	Century-12	64.48	61.15	S	S
19	MHW-12	45.35	42.35	S	S
20	MHW-15	63.65	62.09	S	S

I=0, MR=2, S=8, R=0, MS=5, HS=5

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