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Varietal Screening of Newly Evolved Chilli Hybrid Comparing with Traditional Varieties against Thrips (*Scirtothrips dorsalis* Hood.) and White Fly (*Bemisia tabaci* Genn.)

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ABSTRACT

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Investigations on Varietal screening of newly evolved chilli hybrid comparing with traditional varieties against thrips (*Scirtothrips dorsalis* Hood.) and white fly (*Bemisia tabaci* Genn.) were carried out at Samajik Vigyan Kendra, Dr. B. R. Ambedkar University Rehti, (Village Bordi) Tehsil- Nasrullaganj, Distt- Sehore (M.P.) during *Rabi*, 2018-19 and 2019-20. Out of ten varieties of chilli screened against major sucking pests none of the variety was found completely free from the attack of white fly. The varieties, VNR-277 & VNR-577 were ranked as least susceptible, while Pusa Jawala and US-1003 as highly susceptible and US- 9009, MHCP-310, MHCP-317, US-7030, VNR-1921, and VNR-109 as moderately susceptible. The maximum fruit yield of chilli was also obtained in the variety VNR-277 followed by VNR-577 and US-9009 and minimum was in Pusa Jawala and US-1003.

Introduction

Chilli (*Capsicum annum* L.) is an important vegetable cum spice crop grown in almost all parts of tropical and subtropical regions of the world. It requires a warm humid climate. It belongs to the family Solanaceae and originated from South and Central America Chilli is represents a diverse plant group. The name is derived from Latin word “Capsa” that means “hallow pod”. Chilli is historically associated with the voyage of Columbus, who on his first voyage encountered a plant whose fruits mimicked the pungency of the black

pepper, he called it red pepper because of the red pod colour

The fruits are an essential spice and condiments in the Indian home known for its pungency and are used in its raw-green, ripe and dry stages. It is rich in vitamins especially vitamin A and C and E widely used for the manufacture of curry powder and preparation of sauces, soup, salad, ketchup etc. It imparts delicious taste and pleasant flavour to the cuisine. Capsanthin, a pigment in chilli used for natural colouration to jam, jellies and squashes. Since, it is natural pigment and

having no harmful or side effect on human health. Out of total production of chillies 90-95 per cent consumed within the country and about 5-10 per cent exported in the form of dry chilli, chilli powder and oleoresins (Singhal, 2003). India is the world's largest producer of chilli and the crop is grown all over the country, occupies an area of 775 thousand ha with a production of 1492 thousand tones.

India contributes about 36% to the total world production. In India Andhra Pradesh is the largest producer of chilli and contributes about 26% to the total area under chilli followed by Maharashtra (15%), Karnataka (11%), Orissa (11%), Madhya Pradesh (7%) and other states contributing nearly 22% to the total area under chilli. In Madhya Pradesh, chilli occupies an area of 54410 ha with a production of 93570 MT of chilli (Anonymous, 2015). Although, the crop has got great export potential besides huge domestic requirement, a number of limiting factors have been attributed for low productivity.

Among them occurrence of viral diseases as well as ravages caused by insect pests are significant ones. The pest spectrum of chilli crop is complex with more than 293 insects and mite species debilitating the crop in the field as well as in storage (Anonymous, 1987 and Dey *et al.*, 2001). In india nearly 25 insects have been recorded attacking chilli leaves and fruits, Among the plethora of constraints in chilli cultivation, the attack by a multitude of insect pests and mites at different crop stages is of utmost concern. One of the practical means of increasing chilli production is to minimize losses caused by major sucking pests, the most important among them are green peach aphid (*Myzus persicae* Sulzer, *Aphis gossypii* Glover), thrips (*Scirtothrips dorsalis* Hood) and yellow mite (*Polyphagotarsonemus latus* Banks) whitefly

(*Bemisia tabaci* Gennadius) and leafhoppers (*Amrasca biguttula biguttula* Ishida) (Berke and Sheih, 2000). Besides, a number of viruses are transmitted by aphids, white flies etc which result into a complex murda (Gundannavar *et al.*, 2007).

Materials and Methods

The experiment was laid out in a Randomized Block Design (RBD). Ten chilli varieties viz., VNR-577, VNR-109, VNR-277, VNR-1921, US-1003, US-9009, US-7030, MHCP-310, MHCP-317, and Pusa jwala were screened for their relative susceptibility to thrips and white fly each replicated thrice. The plot size was 2X2 m² keeping row to row and plant to plant distance of 0.5 m. and 45 cm. respectively. The recommended packages of practices except pesticide application were followed to raise the crop.

Observation to be recorded

The population of nymphs and adults of thrips and whitefly was recorded on three leaves of chilli at top, middle and bottom canopy from five randomly selected and tagged plants in each plot at weekly interval from the appearance to last picking of the chilli fruits. The population was counted visually using a magnifying lens in early morning hours (Bhede *et al.*, 2008).

Results and Discussion

Thrips, *Scirtothrips dorsalis* Hood

The data presented in table 1 showed that none of the chilli varieties screened against thrips was observed to be completely free from the attack of thrips the mean population of thrips at all the intervals ranged from 6.61 to 12.87, 7.37 to 15.10 and 6.99 to 13.99 per three leaves during 2018-19, 2019-20 and pooled, respectively.

The minimum population was observed in VNR-277 (6.61, 7.37 and 6.99/three leaves), followed by VNR-577 (6.93, 7.67 and 7.30/three leaves) however, these varieties were statistically at par to each other. The maximum population was recorded on Pusa Jawala (12.87, 15.10 and 13.99/three leaves), followed by US-1003 (12.22, 14.30 and 13.26/three leaves), and both were at par with each other. The rest of the varieties, viz., US-9009, MHCP-310, MHCP-317, US-7030, VNR-1921, VNR-109 registered thrips population of 10.12 to 12.00, 9.59 to 12.06 and 9.86 to 12.03 per three leaves,

respectively during 2018-19, 2019-20 and pooled were grouped as moderately susceptible and stood at par with each other in their degree of infestation.

However, the variety Pusa Jawala and US-1003 were also on par with VNR-109 and VNR-1921 of middle order. Based on mean data the variety VNR-277 and VNR-577 were least susceptible; while US-9009, MHCP-310, MHCP-317, US-7030, VNR-1921 and VNR-109 were moderately susceptible and variety Pusa Jawala and US-1003 was highly susceptible.

Table.1 Varietal susceptibility of chilli against major sucking pests during *Rabi*, 2018-19, 2019-20 & Pooled

S. N.	Varieties	Thrips/3 leaves			Whitefly/3 leaves			Yield (q/ha)		
		2018-19	2019-20	Pooled	2018-19	2019-20	Pooled	2018-19	2019-20	Pooled
1.	VNR-577	6.93 (2.78)	7.67 (3.50)	7.30 (3.41)	6.50 (3.35)	7.19 (3.52)	6.85 (3.44)	75.28	73.89	74.58
2.	VNR-109	12.00 (4.82)	12.06 (4.61)	12.03 (4.72)	11.77 (4.46)	11.09 (4.35)	11.43 (4.41)	61.33	62.29	61.81
3.	VNR-277	6.61 (3.23)	7.37 (3.47)	6.99 (3.35)	6.30 (3.31)	7.18 (3.51)	6.74 (3.41)	78.67	76.55	77.61
4.	VNR-1921	10.84 (4.39)	10.99 (4.46)	10.92 (4.43)	10.79 (4.16)	10.72 (4.13)	10.76 (4.15)	63.57	64.53	64.05
5.	US-1003	12.22 (4.54)	14.30 (5.08)	13.26 (4.81)	13.12 (4.84)	11.55 (4.47)	12.34 (4.66)	53.72	50.63	52.17
6.	US-9009	10.12 (4.31)	9.59 (4.17)	9.86 (4.24)	8.31 (4.01)	8.00 (3.66)	8.16 (3.84)	74.78	72.99	73.88
7.	US-7030	10.58 (4.36)	10.41 (4.34)	10.50 (4.35)	10.33 (4.13)	10.07 (4.12)	10.20 (4.13)	65.20	63.59	64.39
8.	MHCP-310	10.48 (4.15)	9.71 (4.25)	10.10 (4.20)	8.49 (3.75)	9.33 (4.00)	8.91 (3.88)	67.55	68.46	68.00
9.	MHCP-317	10.49 (4.24)	9.89 (4.34)	10.19 (4.29)	8.90 (4.07)	9.62 (4.06)	9.26 (4.07)	67.82	69.07	68.44
10	Pusa jwala	12.87 (4.88)	15.10 (5.23)	13.99 (5.06)	13.24 (4.76)	12.48 (4.68)	12.89 (4.72)	51.70	50.08	50.89
	S Em±	0.09	0.09	0.09	0.13	0.08	0.10	2.23	2.19	2.23
	CD at 5 %	0.27	0.28	0.28	0.28	0.25	0.28	6.47	6.38	6.47
	CV %	8.35	8.81	8.59	8.82	8.06	8.71			

Mean of three replications

Figures in the parentheses are $\sqrt{X+0.5}$ values

Peak population of whitefly

The present results conform with those of Panickar and Patel (2001) observed chilly cultivar ACS-92-4 and G-4 as less susceptible to thrips and Pusa Jawala and S-49 as most susceptible however, both proved to have higher yield potential. Likewise, Tatagar *et al.*, (2001) identified chilli cultivars Pant C-1, LCA-304 and LCA-312 as promising source of resistance against thrips and mites support the present findings. Kalaiyaran *et al.*, (2002) reported lower infestation of thrips was in the variety PS-64. Singh and Singh (2009) recorded lower thrips population on chilly cultivars, G-4 and Chanchal than local cultivar AM-1 and Pusa Jawala, however both showed high yield potential under high pressure of pest.

Whitefly, *Bemisia tabaci* Genn.

The data presented in table 1 showed that none of the chilli varieties screened against thrips was observed to be completely free from the attack of thrips the mean population of thrips at all the intervals ranged from 6.30 to 13.24, 7.18 to 12.48 and 6.74 to 12.89 per three leaves during 2018-19, 2019-20 and pooled, respectively.

The minimum population was observed in VNR-277 (6.30, 7.18 and 6.74/three leaves), followed by VNR-577 (6.50, 7.19 and 6.85/three leaves) however, these varieties were statistically at par to each other. The maximum population was recorded on Pusa Jawala (13.24, 12.48 and 12.89/three leaves), followed by US-1003 (13.12, 11.55 and 12.34/three leaves), and both were stood at par with each other. The rest of the varieties, *viz.*, US-9009, MHCP-310, MHCP-317, US-7030, VNR-1921, VNR-109 registered thrips population of 8.31 to 11.77, 8.00 to 11.09 and 8.16 to 11.43 per three leaves, respectively during 2018-19, 2019-20 and pooled were grouped as moderately susceptible and stood at par with each other in their degree of

infestation. However, the variety Pusa Jawala and US-1003 were also on par with VNR-109 and VNR-1921 of middle order. Based on mean data the variety VNR-277 and VNR-577 were least susceptible; while US-9009, MHCP-310, MHCP-317, US-7030, VNR-1921 and VNR-109 were moderately susceptible and variety Pusa Jawala and US-1003 was highly susceptible.

Yield performance of different chilli varieties

The data presented in table 1 revealed that maximum fruit yield of 78.67, 76.55 and 77.61 q ha⁻¹ was obtained in variety VNR-277, followed by VNR-577 (75.28, 73.89 and 74.58 q ha⁻¹) and US-9009 (74.78, 72.99 and 73.88 q ha⁻¹) during 2018-19, 2019-20 and pooled basis, respectively however, these were at par and significantly superior to other varieties. The minimum fruit yield was obtained in the variety Pusa Jawala (51.70, 50.08 and 50.89 q ha⁻¹) and US-1003 (53.72, 50.63 and 52.17 q ha⁻¹) and both were at par with each other and significantly inferior to rest of the varieties. The yield obtained in rest of the varieties *viz.*, MHCP-310 (67.55, 68.46 and 68.00 q ha⁻¹), MHCP-317 (67.82, 69.07 and 68.44 q ha⁻¹), US-7030 (65.20, 63.59 and 64.39 q ha⁻¹), VNR-1921 (63.57, 64.53 and 64.35 q ha⁻¹) and VNR-109 (61.33, 62.29 and 61.81 q ha⁻¹) during 2018-19, 2019-20 and pooled basis, respectively and these were comparable with each other. Based on fruit yield the descending order of chilli varieties were VNR-277 > VNR-577 > US-9009 > MHCP-310 > MHCP-317 > US-7030 > VNR-1921 > VNR-109 > US-1003 > Pusa Jawala.

In conclusion the present investigation was undertaken screening of chilli varieties against major sucking pests, none of them was found completely free from the attack of pests. The varieties VNR-277 and VNR-577 were categorized as least susceptible while,

Pusa Jawala and US-1003 as highly susceptible to thrips and whitefly. The maximum fruit yield was also recorded in variety VNR-277 followed by VNR-577 and US-9009.

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