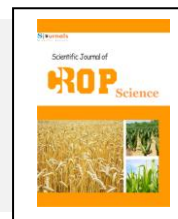


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CROP ScienceJournal homepage: www.Sjournals.com**Original article****Occurrence, distribution and survey of Tobacco streak virus (TSV) of cotton****G.P. Jagtap^{a,*}, T.H. Jadhav^a, D. Utpal^a**^a*Department of Plant Pathology College of Agriculture, Marathwada Krishi Vidyapeeth, Parbhani – 431 402 (MS)*

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ABSTRACT

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Occurrence and distribution of cotton mosaic disease of cotton survey was conducted in September and December in Beed, Parbhani, Nanded, and Hingoli districts of marathwada region. It is revealed that the disease was found to occur in early flower developoement stage of plant, later at maturity and boll development stage. The symptoms disappear slowly and in December the incidence is difficult to detect. The incidence was found to be 10 to 19 per cent in the month of September but in December it was about 0 to 2 per cent only. The varieties of Bt cotton specially Tulsi showed higher incidence of cotton mosaic disease. The disease was identified as cotton mosaic disease and the virus causing disease was tobacco streak virus (TSV) a member of ilar virus group. This is the first report of TSV causing cotton mosaic disease in field condition from Marathwada region.

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1. Introduction

Cotton (*Gossypium spp.*) is most important commercial cash crop of India. Cotton locally known as “white gold” is also a king of cash crops. Cotton belongs to genus *Gossypium* of the family Malvaceae and has several different species but Cotton varieties grown in India belongs to four distinct species viz.

G. arborium, G. herbaceum, G. hirsutum and G. barbadense. It is said to have two centers of origin viz. old world India Indo-China or tropical Africa and new world Mexico or Central America. G. arborium and G. herbaceum belongs to old world are known as deshi cotton, where as G. hirsutum and G. barbadense are new world cotton. G. arborium is indigenous to India while G. herbaceum seems to have been introduced from Central Asia, and G. hirsutum constitutes the American uplands or Compadia cottons. In India cotton is grown in almost all the states of the India but Maharashtra, Gujarat, Andhra-pradesh, Madya-pradesh, Punjab, Rajasthan, Tamilnadu and Karnataka accounts for more than ninety per cent of the area and out put. In India cotton occupies on area of nearly 9.5 million hector with production of 31 million bales, which is 16 per cent of global production. India contributes about 29.9 per cent of total Indian agricultural gross domestic product ranking third in the world after USA and China. The lint productivity of cotton is 599kg lint/ha. which is lowest and is below that of the world average of 627kg/ha (Anonymous,2008). In Maharashtra, cotton occupies ten per cent of total area of India. This area is about thirty four per cent of total area cultivated under the cotton crop and seventeen per cent of total cotton production of India with lint productivity of 320kg lint/ha as against 667kg lint/ha in Andhra Pradesh, 630kg lint/ha in Punjab, 669kg lint/ha in Hariyana and 667kg lint/ha in Karnataka (Anonymous, 2007-08). In Marathwada region Bt cotton is now forthcoming most cultivated advance technological crop in the sense it is developed by genetic engineering techniques for the resistance to boll worm pests of cotton.

Viral diseases were reported initially causing significant damage or yield losses but with passage of time some viral diseases began to appear on crop. Of these, a virus disease imparting veinal chlorosis, leaf and stem necrosis extending to midveins and petioles, chlorotic and necrotic spots, leaf distortions resulting in stunting was observed in early stage of crop development (NCIPM -2006) And also mosaic type of symptoms are observed in Punjab and Pakistan which has been caused by Tobacco streak virus (TSV). The virus belongs to ilar group transmitted by thrips. It is forth coming disease by studying history of virus in other crops such as peanut, sunflower, soybean, tomato and chilly it has taken epidemic form and causes heavy yield losses.

2. Materials and methods

2.1. Occurrence and distribution of Tobacco strek virus (TSV)

To study the occurrence and distribution of cotton mosaic disease of cotton in marathwada a survey in October and December was undertaken in the year 2007-2008. In September month both the local varieties of cotton and Bt cotton fields were visited. Fields of only Bt cotton were found to have symptoms of TSV. Fields of cotton having at least size of a hectare were selected to record the incidence of cotton mosaic disease. Five sampling units of a sequence meters each were selected across the diagonals of the field. Incidence of the disease was recorded by counting total number of healthy and disease plants including cotton mosaic plants in sampling unit. The information in respect of date of sowing, variety used and spacing was collected, so as to correlate the role of these factors with disease incidence on farmer's field.

2.2. Survey

Cotton mosaic disease of cotton was recently reported (Sharma, 2006) in Marathwada region of Maharashtra state and it assumed to be serious taking its establishment on cotton crop in Marathwada region. Therefore cotton growing areas of Parbhani, Nanded, Beed and Hingoli districts were surveyed twice during September and December of 2007-08 for cotton mosaic disease. In Beed district farmer's fields in Majalgaon, Pathrud, Dindrud, Telgaon, Wadwani, Beed, Gadhi, Georaj, Kaij, Dharur, Hole, Ambaejogai, and Shirsala were surveyed. In Parbhani district farmer's field in Dharmapuri, Zari, Bori, Takli, Kumbhari, Pungala, Purna, Gangakhed, Pedgaon, Jjintur, Shinganapur were undertaken. In Nanded

district Loha, Nanded, Asegaon, Kandar, Bhoker, Umeri, Dharmabad, Billoli, Kundalwadi, Deglur, Narsi, Naygaon, Bodan, Mudkhed farmer's fields were undertaken. In Hingoli district farmer's fields in Ghar, Aunda, Shengaon, Hatta, Vasmat, Jawlabazaa, Goregaon, Akhada balapur were observed.

3. Results and discussion

3.1. Occurrence and distribution of cotton mosaic disease of cotton

For noting occurrence and distribution of cotton mosaic disease of cotton survey was conducted in September and December in Beed, Parbhani, Nanded, and Hingoli districts of marathwada region. The data of survey is presented in Table 1. It is revealed from the Table that the disease was found to occur in early flower developoement stage of plant, later at maturity and boll development stage. The symptoms disappear slowly and in December the incidence is difficult to detect. The incidence was found to be 10 to 19 per cent in the month of September but in December it was about 0 to 2 per cent only. The varieties of Bt cotton specially Tulsi showed higher incidence of cotton mosaic disease.

Table 1

Occurence and distribution of cotton mosaic disease.

Sr. No.	District	Location	Variety	Date of sowing	Incidence (per cent)	
					Sept.	Dec.
1.	Parbhani	1) Zari	Ankur	3-6-07	11	01
		2) Bori	Rashi-2	5-6-07	14	00
		3) Jintur	Tulsi	14-6-07	19	02
		4) Pungala	Brahma	1-6-07	12	01
		5) Gangakhed	Rashi-1	29-5-07	11	00
		6) Palam	Ankur	7-6-07	15	01
		7) Shingnapur	Rashi-2	12-6-07	16	00
		8) Parbhani	MRC-6301	1-6-07	18	01
2.	Beed	1) Majalgaon	Rashi-2	2-6-07	16	00
		2) Telgaon	Rashi-2	5-6-07	17	00
		3) Wadwani	Bunny	9-6-07	15	01
		4) Beed	Baba	1-6-07	12	01
		5) Gadhi	Tulsi	4-6-07	19	02
		6) Georai	Brahma	29-5-07	13	02
		7) Shirsala	Tulsi	5-6-07	18	02
		8) Parli	Ankur	6-6-07	16	00
		9) Ambejogai	Rashi-1	14-6-07	15	00
3.	Nanded	1) Loha	Mallika	4-6-07	13	01
		2) Kandhar	Kanak	5-6-07	18	01
		3) Nanded	Tulsi	29-5-07	19	02
		4) Bhoker	2 maroti	9-6-07	11	01
		5) Deglur	Akka	12-6-07	15	00
		6) Asegaon	Tulsi	6-6-07	19	01
		7) Narsi	Rashi-2	5-6-07	12	00
4.	Hingoli	1) Aundha	Mallika	3-6-07	18	01
		2) Jawala bazar	Ankur	6-6-07	18	00
		3) Basmat	Rashi-1	4-6-07	13	01
		4) Hingoli	Tulsi	1-6-07	18	02

Tobacco streak virus (Cauquil and Folin ,1983.;Ahmed and Nelson, 1997) viral diseases of cotton have historically been of only sporadic importance to global cotton production. Recent devastating epidemics in Pakistan and other areas of India like Andhra Pradesh. The cotton mosaic disease is reported in various countries by Martelli & Carvalho (1961) in Brazil, Cauquil and Folin (1983) in USA and Ahmed and nelson (1997) in Pakistan and Punjab. Disease is identified as Cotton mosaic disease caused by Tobacco streak virus of Ilar group. The virus has shown epidemic from in Punjab recently.

In survey of Marathwada region TSV was found to be 10-19 per cent in September and 0-2 per cent in the month of December. Tobacco streak virus (TSV) has not caused disease epidemics in cotton crop but by the observations of TSV in crops such as Ground nut, Sunflower and Soybean it has taken epidemic form so needs to be carefully studied. Many a times it is difficult to distinguish between TSV and PBNV . TSV infects many host plant which are economically very important and survive on many weed hosts under field conditions. Parthenium, a widely distributed and symptom less carrier of TSV, plays a major role in perpetuation and spread of the disease

The role of the flower inhabiting thrips in the transmission of TSV has been established. Seed transmission of TSV in Cotton and other crop plants as well as in weed hosts requires further investigation. Variuos proposed disease management practices could not be validated on-farm due to lack of natural disease pressure in subsequent years. However, based on field observations and laboratory tests the development of tolerant or resistant varieties is having wide scope in the future. Seed treatments may be good controlling measure in case of seed transmitted crops.

4. Conclusion

The disease incidence was observed in urban areas of districts where Tobacco is grown. This may be due to the bringing of infected seedlings from different regions, which acts as primary source of inoculum for spread of disease in such areas. The disease was also severe in some commercial fields where extreme symptoms like clear chlorosis type of symptoms on major leaves of plants but in sap inoculated plants veinal chlorosis and mosaic type of symptoms were found to be common. In field conditions infected plants grew erect and had less boll formation. Some of the orchards were seen abandoned because of necrotic lesions, which not only lost marketable value but also keeping quality. This may be attributed to cultivation of single variety like Pusa Komal and planting in close spacing, which facilitate easy movement of thrips from plant to plant. There was less disease in remote places. This may be due to absence of viruliferous thrips.

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