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## Effect of chemical control of phomopsis blight of brinjal caused by *Phomopsis vexans*

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**Abstract**

Experiment was conducted to assess the efficacy of different fungicides against Phomopsis blight of brinjal caused by *Phomopsis vexans* *in-vivo* conditions. Among all the tested fungicides the minimum disease intensity and maximum per cent disease control was recorded after third spraying with 0.1 per cent carbendazim (10.35% & 69.25%) and followed by 0.05 per cent propiconazole (11.41% & 66.10%) this treatment remains at par with each other and significantly superior over rest of the treatments. The higher yield of brinjal fruits was obtained with 0.1 per cent carbendazim i.e. 185.52 q ha<sup>-1</sup> and followed by 0.05 per cent propiconazole i.e. 183.78 q ha<sup>-1</sup>. But the highest incremental cost:benefit ratio 1:14:8 was recorded by 0.05 per cent propiconazole due to lowest market prize on Phomopsis blight of brinjal.

**Keywords:** *Phomopsis vexans*, fungicide, *in vivo*, brinjal

**Introduction**

Brinjal or egg plant (*Solanum melongena* L.) is one of the most common, popular vegetable crop grown in almost worldwide. India is considered to be the centre of origin of cultivated brinjal from where it spread to the other parts of the world (Chaudhury and Kalda, 1968) [2, 5]. The global area under brinjal cultivation has been estimated as 18.75 million hectares with total production of brinjal fruit of about 49.66 million MTs with an average productivity of 26.5 t/ha (FAO, 2014) [3]. Eggplant suffers from twelve different diseases among then Phomopsis blight and fruit rot caused by *Phomopsis vexans* major constraints in its cultivation in our country. This pathogen causes over 50 per cent losses in production and productivity in various parts of the world (Nolla, 1929; Panwar *et al.*, 1970) [7, 8]. It is reported that the losses due to this disease are to the extent of 10-20 per cent. The causal organism of the disease, *Phomopsis vexans* viable for about 14 months in soil debris and in the seed from infected fruits. The pathogen is reported both externally and internally seed borne. The disease was first reported from Gujarat in 1914 and since then it is noticed in many parts of India (Hossain *et al.*, 2013) [4]. Since sources of complete resistance are not available, Phomopsis blight of brinjal is generally managed by chemicals. In the study of different fungicides against phomopsis blight of brinjal with the object to find out the best treatment for managing the disease.

**Materials and Methods**

The trial was laid out in Randomized Block Design with three replication and seven treatments using on Aruna variety during year 2015 in *kharif* season at College of Agriculture, Nagpur. Sowing was done in 3 × 3 m<sup>2</sup> plots with 30 cm x 30 cm spacing. The tested fungicides were Carbendazim (0.1%), Propiconazole (0.05%), Hexaconazole (0.1%), Copper oxychloride (0.3%), Copper hydroxide (0.3%) and Tebuconazole (0.05%). The first spray was given after the appearance of the disease and repeated twice at an fifteen days interval. Disease intensity was recorded after the initiation of disease and after of each spraying on five brinjal plants randomly selected per treatment per replication. Disease intensity was recorded by applying 0 to 5 disease rating scale (Kalda *et al.*, 1976) [5].

Category	Description
0	No infection
1	1-5% infection
2	5-10% infection
3	10-25% infection
4	25-50% infection
5	Above 50% infection

The per cent disease intensity was calculated by following formula.

$$\% \text{ Disease intensity} = \frac{\text{Sum of observed numerical ratings}}{(\text{PDI}) \text{ Number of fruits observed} \times \text{maximum rating}} \times 100$$

The per cent disease control (PDC) was further calculated for each treatment by using following formula.

$$\% \text{ Disease control} = \frac{\text{PDI in control} - \text{PDI in treatment}}{\text{PDI in control}} \times 100$$

### Results and Discussions

The data presented in table 1 indicate that three spray of fungicides significantly reduced Phomopsis blight disease and increase yield. After third spray the best treatments in reducing the Phomopsis blight disease were carbendazim followed by propiconazole showed 10.35 and 11.41 per cent disease intensity respectively and both these treatments were at par with each other. Other promising treatments were hexaconazole, tebuconazole, copper oxychloride and copper hydroxide recorded 19.52, 21.71, 23.04 and 24.70 per cent disease intensity respectively and these treatments were at par with each other. Maximum disease intensity was observed in control 33.66.

All the fungicidal treatments reduce the disease as compared to control. Carbendazim recorded maximum per cent disease control 69.25 per cent followed by propiconazole observed 66.10 per cent. Other fungicide treatments were hexaconazole, tebuconazole and copper oxychloride which recorded 42.00, 35.50 and 31.55 per cent disease control respectively. Minimum disease control 26.61 per cent was noticed in copper hydroxide. The observation are similar with Mandal *et al.* (2013) [6] observed that foliar spraying of carbendazim 50 WP (0.1%) was found most effective

followed by contaf 5 EC (0.1%) treatment in the reduction of foliar disease severity and incidence of fruit rot along with the augmentation of fruit yield.

The data in table 1 shows differences due various treatments on yield of brinjal over control. Maximum yield of brinjal fruits was obtained in the treatment of carbendazim 185.52 q ha<sup>-1</sup> followed by propiconazole recording 183.78 q ha<sup>-1</sup> yield of brinjal fruits and both these two treatments were at par with each other. Other promising treatments were hexaconazole and tebuconazole recording brinjal fruits yield 170.69 q ha<sup>-1</sup> and 168.74 q ha<sup>-1</sup> respectively and these two treatments were at par with each other. However copper oxychloride and copper hydroxide exhibited 155.26 q ha<sup>-1</sup> and 153.04 q ha<sup>-1</sup> respectively and these two treatments were at par with each other. Minimum brinjal fruit yield was noticed control recorded 140.43 q ha<sup>-1</sup>.

The maximum increased yield over control was recorded in carbendazim followed by propiconazole recorded 45.09 q ha<sup>-1</sup> and 43.35 q ha<sup>-1</sup> respectively. Other treatments *viz.*, hexaconazole, tebuconazole and copper oxychloride recorded 30.26 q ha<sup>-1</sup>, 28.31 q ha<sup>-1</sup> and 14.83 q ha<sup>-1</sup> respectively. Copper hydroxide showed minimum increase in yield 12.61 q ha<sup>-1</sup> over control. The observation are similar with Singh *et al.* (2012) [9] reported spraying of carbendazim (0.1%) at the interval of 15 days was more effective in minimizing the disease incidence and increasing the yield. Highest yield of 235.5 q/ha was obtained with carbendazim.

Considering incremental cost: benefit ratio, the most economical treatment which recorded highest ICBR was the propiconazole 14.48 followed by carbendazim 12.87 where as other fungicidal treatments *viz.*, hexaconazole, tebuconazole, copper hydroxide showed 11.87, 8.16, 3.08 respectively. However minimum ICBR ratio was noticed in the treatment of copper oxychloride showed 2.61. Similar results were found with Beura *et al.* (2008) [1] recorded maximum fruit yield (227.25 q/ha) registering 71.12 per cent increase in yield over control with maximum cost benefit ratio of 1:12.85 and a net return of Rs. 31,329/ha with carbendazim (0.1%) spraying against phomopsis blight of brinjal.

It is concluded that per cent disease intensity with three sprays of carbendazim @ 0.1 per cent minimize the intensity 10.35 per cent of disease and achieve yield 185.52 q ha<sup>-1</sup> with ICBR 1:12.87 can be use for management of Phomopsis blight of brinjal.



Healthy Plant



Diseased Plant

**Table 1:** Effect of different fungicides on Phomopsis blight and yield of Brinjal

S. No.	Treatments	Concentration (%)	After third spray		fruits yield q ha <sup>-1</sup>	Increased yield over control q ha <sup>-1</sup>	ICBR
			PDI	PDC			
1	Carbendazim	0.1%	10.35 (18.77)*	69.25	185.52	45.09	1:12.87
2	Propiconazole	0.05%	11.41 (19.74)	66.10	183.78	43.35	1:14.48
3	Hexaconazole	0.1%	19.52 (25.22)	42.00	170.69	30.26	1:11.87
4	Copperoxychloride	0.3%	24.04 (28.89)	31.55	155.26	14.83	1:2.61
5	Copper hydroxide	0.3%	24.70 (29.80)	26.61	153.04	12.61	1:3.08
6	Tebuconazole	0.05%	21.71 (27.77)	35.50	168.74	28.31	1:8.16
7	Control	-	33.66 (35.46)		140.43	-	
F test			Sig.		Sig.		
SE(m)±			1.77		3.81		
CD(P= 0.05)			5.22		11.45		

\*(Figures in parenthesis are Arc sin values)

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