The Pharma Innovation Journal 2021; 10(10): 475-477

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; 10(10): 475-477

www.thepharmajournal.com
Received: 01-08-2021
Accepted: 03-09-2021

SB Pawar
Department of Plant Pathology, VNMKV, Parbhani, Maharashtra, India

KT Apet
Department of Plant Pathology, VNMKV, Parbhani, Maharashtra, India

KP Nirwal
Department of Plant Pathology, VNMKV, Parbhani, Maharashtra, India

Corresponding Author:
SB Pawar
Department of Plant Pathology, VNMKV, Parbhani, Maharashtra, India

In vivo evaluation of fungicides on leaf blotch of turmeric caused by *Taphrina maculans*

SB Pawar, KT Apet and KP Nirwal

Abstract
Turmeric (*Curcuma longa*) is a native of Indian sub-continent and Southeast Asia. The fungicides (four systemic and three combi) were tested *in vivo* against *T. maculans.* Among fungicides, lowest average per cent disease incidence and intensity was recorded in propiconazole 8.67 per cent and 13.06 per cent, respectively followed by SAAF 75 WP (9.33% and 14.11%), Consortia (10.00% and 13.71%), carbendazim (11.33% and 14.48%), hexaconazole (12.00% and 15.97%), vitavax power (12.67% and 17.93%), difenconazole (16.00% and 15.11%) respectively over control (28.67% and 29.23%).

Keywords: turmeric, fungicide, leaf blotch, *T. maculans*

Introduction
Leaf blotch of turmeric caused by *Taphrina maculans* is one of the destructive diseases of this crop. It causes enormous loss in rhizome production. The disease predominantly occurs in every geographic condition where turmeric is grown. It infects plant leaves and leaf sheath. It reduces total photosynthetic area of the plant leaves under severe infection (Maurya *et al.*, 2011) [4].

Material and Methods
A field experiment was conducted during *kharif* 2018, at Breeder seed production unit (BSP, Shendra), VNMKV, Parbhani, to evaluate the effect of different fungicides for the management of leaf blotch disease of turmeric (Table No.1)

Details of experiment

Design	:	RBD
Replications	:	03
Treatments	:	09
Variety	:	Selum
Spacing	:	45 x 150 cm^2
Plot size	:	15 x 30 m^2

Systemic fungicides

T_1	:	Carbendazim 50 WP (Bavistin 50 WP)
T_2	:	Propiconazole 25 EC (Tilt 25 EC)
T_3	:	Hexaconazole 5 EC (Contaf 5 EC)
T_4	:	Difenconazole 25 EC (Score 25 EC)

Combi fungicides

T_5	:	Ridomil MZ 72 WP (Metalaxyl 8 WP + Mancozeb 64 WP)
T_6	:	SAAF 75 WP (Carbendazim 12 WP + Mancozeb 63 WP)
T_7	:	Vitavax power 75WP (Carboxin 37.5% + Thiram 37.5%)
T_8	:	Microbial Consortia (Biomix)
T_9	:	Control

Number of Sprays
Spraying of fungicides were applied starting at first appearance of disease symptoms and subsequent three sprays were undertaken at 15 days interval. Observations were recorded on *Taphrina maculans* per cent disease incidence and per cent disease severity applying 0-9 grade disease rating scale (Mayee and Datar, 1986) [6]

Leaf blotch disease incidence were recorded in all the treatments replicated by counting number of turmeric exhibiting typical leaf blotch symptoms and per cent disease incidence was calculated by applying following formula.

$$\% \text{ Disease Incidence} = \frac{\text{No. of plants showing disease symptoms/plot}}{\text{Total No. of plants/plot}} \times 100$$

Per cent disease intensity/index was calculated by applying the formula (Mc Kinney, 1923)

$$\% \text{ Disease Intensity (PDI)} = \frac{\text{Summation of all numerical ratings}}{\text{Total No. of leaves/plant observed x Maximum rating}} \times 100$$

Disease severity recorded by following grade scale given by Mayee and Datar (1986) [6] which is as follows:

Scale	Per cent area infection
0	No infection (Free)
1	01 to 10% (Very Light)
3	11 to 25% (Light)
5	26 to 50% (Medium)
7	51 to 75% (Heavy)
9	>75% (Very heavy)

Result and Discussion

The disease incidence recorded at 15 days after three spraying was found to be decreased steadily and it was ranged from 8.67 per cent (Propiconazole) to 16.00 per cent (Difenconazole) as against 28.67 per cent in unsprayed (control) treatments, and all the treatments were found significantly superior over unsprayed (control) treatments.

However, significantly least disease incidence was recorded with the fungicide *viz.*, Propiconazole (8.67%) which was found significantly superior over all treatments followed by SAAF 75 WP (9.33%), and then consortia (10%), Carbendazim (11.33%), Hexaconazole (12.00%), Vitavax power 75 WP (12.67%). The maximum disease incidence was recorded in Difeconazole (16.00%). Disease intensity was recorded rage between 13.06 per cent (Propiconazole) to 17.93 per cent (Vitavax power 75 WP) over control (29.23%), and all the treatments were found significantly superior over unsprayed (control) treatments. However, significantly least disease intensity was recorded with the fungicides *viz.*, Propiconazole (13.06%) and Consotia (13.71%) which was significantly superior over all treatments.

All treatment excluding control and Difeconazole were at par with better treatment propiconazole in managing disease incidence. Treatment T_1 (Carbendanzim), T_5 (Ridomil MZ 72 WS), T_6 (SAAF 75 WP) and T_8 (Consotia) were found at par with treatment Propiconazole in managing per cent disease intensity.

Table 1: Effect of fungicides on percent disease incidence and disease intensity of leaf blotch of turmeric under field condition

Tr. No.	Fungicides	Per cent disease incidence and Disease Intensity*										
		Before Spraying		At 1st Spraying		At 2nd Spraying		At 3rd Spraying		yield (kg) * / Plot	% increase over control	Yield (qt)/ha
		Incidence	Intensity	Incidence	Intensity	Incidence	Intensity	Incidence	Intensity			
T_1	Carbendazim	5.33 (13.35)	10.43 (18.84)	9.33 (17.79)	17.07 (24.40)	12.67 (20.85)	19.18 (25.97)	11.33 (19.67)	14.87 (22.68)	18.33 (25.35)	22.22 (28.13)	122.22
T_2	Propiconazole	6.00 (14.18)	12.18 (20.42)	8.67 (17.12)	13.71 (21.73)	10.67 (19.06)	15.26 (23.00)	8.67 (17.12)	13.06 (21.19)	24.43 (29.62)	38.61 (38.42)	162.88
T_3	Hexaconazole	5.33 (13.35)	9.89 (18.33)	10.00 (18.43)	17.38 (24.64)	14.67 (22.52)	19.62 (26.29)	12.00 (20.27)	15.97 (23.55)	21.20 (27.42)	29.25 (32.74)	141.33
T_4	Difenconazole	6.67 (14.96)	10.28 (18.70)	13.33 (21.42)	17.41 (24.66)	19.33 (26.08)	19.73 (26.37)	16.00 (23.58)	15.11 (22.87)	19.47 (26.18)	22.95 (28.62)	129.77
T_5	Ridomil MZ 72 WS	5.33 (13.35)	11.27 (19.62)	12.00 (20.27)	12.64 (20.83)	16.00 (23.58)	14.65 (22.50)	15.33 (23.05)	15.70 (23.35)	18.00 (25.10)	16.67 (24.09)	119.99
T_6	SAAF 75 WP	5.33 (13.35)	10.55 (18.95)	9.33 (17.79)	13.80 (21.81)	11.33 (19.67)	15.13 (22.89)	9.33 (17.79)	14.11 (22.06)	18.80 (25.70)	20.21 (26.72)	125.33
T_7	Vitavax power 75 WP	5.33 (13.35)	8.95 (17.41)	10.67 (19.06)	17.05 (24.39)	14.67 (22.52)	18.45 (25.44)	12.67 (20.85)	17.93 (25.05)	19.72 (26.36)	23.92 (29.28)	131.44
T_8	Microbial Consortia	6.67 (14.96)	10.43 (18.84)	9.33 (17.79)	14.65 (22.50)	13.33 (21.42)	15.26 (23.00)	10.00 (18.43)	13.71 (21.73)	28.00 (31.95)	86.67 (68.58)	186.66
T_9	Control	6.00 (14.18)	10.26 (18.68)	14.00 (21.97)	18.55 (25.51)	21.33 (27.51)	22.66 (28.43)	28.67 (32.37)	29.23 (32.73)	15.00 (22.79)	0.00 (0.00)	99.99
SE(m)±		1.39	0.75	1.42	1.41	1.39	1.85	1.91	0.73	1.61	-	-
CD at 5%		NS	NS	NS	NS	4.20	NS	5.76	2.20	4.87		

*Mean of three replications

Figures in parenthesis are angular transformed value

Yield

Highest fresh rhizome yield was obtained on treatment of consortia (186.66 qt/ha) followed by Propiconazole (162.22 qt/ha), Hexaconazole (141.33 qt/ha), Vitavax Power 75 WP (131.44 qt/ha), Difenconazole (129.77 qt/ha) against control (99.99 qt/ha).

References

1. Das A, Dutta P, Pegu J. Biological control of *Colletotrichum capsici* causing turmeric leaf spot, *in vitro*. Trends in Biosciences 2015;8(20):5690-5692.
2. Jagtap GP, Mali AK, Utpal Dey. Bioefficacy of fungicides, bio-control agents and botanicals against leaf spot of turmeric incited by *Colletotrichum capsici.* African Journal of Microbiology 2013;7(18):1865-1873.
3. Koche M, Kothikar RB, Patil CU. Fungicides and botanicals for managing follar diseases of turmeric. J Pl. Dis. Sci 2009;4(1):68-71.
4. Maurya S, Singh A, Mishra A, Singh UP. *Taphrina maculans* reduces the therapeutic value of turmeric (*Curcuma longa*). Archives of Phytopathology and Plant Protection 2011;44(12):1142-1146.

5. Mishra RS, Pandey VP, Tiwari A. Screening of genotypes and effect of fungicides against leaf blotch of turmeric. J Pl. Dis. Sci 2015;10(1):99-102.
6. Mayee CD, Datar VV. Phytopathometry, Technical bulletin–1, 1986, Marathwada agricultural university, Parbhani 1986, 94.
7. Rao SN, Kumar KR. Evaluation of fungicides against leaf blotch of turmeric caused by *Taphrina maculans* Butler. J Hortl. Sci 2013;8(1):121-124.
8. Singh RS. Plant Diseases (7th Ed). Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi 1998, 50-55.
9. Tiwari PK, Kasyap A, Awadhiya GK, Thrimurty VS. Efficacy of Bioagents, Neem Based Plant Products and Plant Extracts against *Colletotrichum capsici*. Indian Journal of Plant Protection 2008, 36(1).
10. Thakkar A, Saraf M. Development of microbial consortia as a bio-control Agent for effective management of fungal diseases in *Glysine max* L. Archives Phytopathology and Plant Protection 2015;48(6):459-474.
11. Toledo J, Liedo P, Flores S, Campos SE, Villaseñor A, Montoya P. Use of Beauveria bassiana and Metarhizium anisopliae for Fruit Fly control: A novel Approach. Fruit Flies of Economic Importance: From Basic to Applied Knowledge 2006, 127-132.