In-vitro screening of some fungicides against *F. Oxysporum f.sp. lycopersici* causing Wilt in Tomato.

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Abstract :

The efficacy of five fungicides evaluated at different concentration by poisoned food technique against *F. Oxysporum f.sp.lycopersici* under *In-vitro* conditions. The observations on colony diameter and percent inhibition of linear growth of *F. Oxysporum f.sp.lycopersici*. In vitro evaluation of fungicides, the treatment Mancozeb + Carbendazim (0.125 + 0.05) inhibited 100per cent growth of pathogen followed by Thiram + Carbendazim(0.15 + 0.05 %) which inhibited 93.75 per cent, Carbendazim(0.1 %) inhibited 92.50 per cent, Thiram (0.3 %) inhibited 90 per cent, Carboxin (0.2 %) inhibited 87.50 per cent, Captan (0.25 %) inhibited 81.25 per cent, Propiconazole (0.2 %) inhibited 67.50 per cent and Mancozeb (0.25 %) inhibited 62.50 per cent growth of pathogen F. oxysporum".

Key words : Tomato,leaf blight,*F.Oxysporum f.sp.lycopersici* fungicides, Management.

1. INTRODUCTION

Tomato (*Solanum lycopersicum*) is one of the hugest vegetable plants on earth. It started in western South America, and preparing is thought to have occurred in Central America. "Considering its criticalness as sustenance, tomato has been imitated to improve proficiency, regular item quality, and security from biotic and abiotic stresses. Tomato has been comprehensively used as sustenance, yet also as research material". The tomato plant has numerous captivating features, for instance, substantial regular item, a sympodial shoot, and compound leaves, which other model plants (e.g., rice and Arabidopsis) don't have. A huge

part of these characteristics are agronomically noteworthy and can't be mulled over using other model plant structures. “These wild tomatoes are huge for raising, as wellsprings of alluring characteristics, and for transformative assessments. Current progression on the tomato genome sequencing adventure has delivered significant information to help in the examination of tomato. Likewise, the tomato has a spot with the incredibly gigantic family Solanaceae and is solidly related to various monetarily noteworthy plants, for instance, potato, eggplant, peppers, tobacco, and petunias. Data got from thinks about drove on tomato can be successfully applied to these plants, which makes tomato huge research material”. In perspective on these real factors, tomato fills in as a model living being for the family Solanaceae and, expressly, for muscular fruited plants.

2. REVIEW OF LITERATURE

Evaluation of fungicides

Quadri et al.(1982) reported that the “in vitroefficacy of eight fungicides against Fusarium oxysporum sp. and found that Difolatan (0.2 %), Thiram (0.2 %), Carbendazim (0.2 %), Mancozeb (0.2 %) found effective against this fungi”.

Kalra and Sohi (1984) studied “the efficiency of different fungicides against F. oxysporum in in vitro condition and reported that, the systemic Fungicides Carbenda zim, Benomyl and NH-44 completely inhibited the growth of F. oxysporum . Difolatan, Mancozeb and Thiram also suppressed its growth completely whereas Blitox-50 and Zineb failed to suppress the growth”.

Kore and Kharwade (1987) reported that “Bavistin and Benlate completely inhibited the growth of Fusarium oxysporum in in vitro . While mancozeb and Fytolan failed to suppress the growth of fungus”.

Dwivedi et al.(1995) reported that "Thiram were the most effective at 800 mg/g soil, reducing populations of F. oxysporum f.sp.lycopersici by 83.4 per cent after 45 days".

Poddar (2004) reported that the "use of four systemic fungicides viz., Carbendazim, Propiconazole, Thioph anate methyland Tubeconazole were evaluated and then found that the Carbendazim inhibited maximum growth of pathogen Fusarium oxysporum in vitro" .

Weitang Song et al.(2004) reported that the "percentage inhibition was determined as [(Dc – Dt)/ Dc x 100] where Dc was the average diameter increase of fungal colony with control and Dt was the average diameter increase of a fungal colony in treatment. Musmade et al.(2009) reported that in vitro Carbendazim (0.1 %) completely inhibited the growth of tomato wilt pathogen".

3. MATERIALS AND METHODS

The details of materials and methods followed during the present investigation are presented in this chapter.

3.1 Materials

The following material was used during the present investigation.

3.1.1 Diseased samples

"The wilted plants of tomato were collected from Uttaranchal University".

3.1.2 Culture media

Potato Dextrose Agar (PDA) as "common laboratory media was used for isolation of fungus associated with the wilt of tomato ,and also for poison food technique studies".

3.1.3 Chemicals

"The chemicals used for the preparations of different media were obtained from Department of Plant Pathology and Agricultural Microbiology Uttaranchal University".

3.1.4 Fungicides

The following six Fungicides alone and in combination were used in vitro

1. Thiram

a. Chemical Name : Tetramethyl thiram disulphite

b. Active ingredient : 75 per cent wettable powder

c. Concentration used : 0.3 per cent

2. Captan

a. Chemical Name : N (Trichloromethyl-thio-4 tetra cyclohexane-1, 2 dicarboximide)

b. Active ingredient : 75 per cent wettable powder

c. Concentration used : 0.25 per cent

3. Carbendazim

a. Chemical Name : Methyl-2-benzimidazole carbamate (MBC)

b. Active ingredient : 50 per cent wettable powder

c. Concentration used : 0.1 per cent

4. Mancozeb

a. Chemical Name : Zinc ion manganese ethylene bisdithiocarbamate

b. Active ingredient : 75 per cent wettable powder

c. Concentration used : 0.25 per cent

5. Propiconazole

a. Chemical Name : 1-[2-(3, 4-dichlorophenyl) 4-propyl-1, 3 dioxolem 24 methyl], 1 H, 1, 2, 4, triazide

b. Active ingredient : 25 per cent EC

c. Concentration used : 0.2 per cent

6. Vitavax

a. Chemical Name : 2, 6 dihydro-2-methyl 1, 4 oxathin 3-carboxanilide

b. Active ingredient : 75 per cent wettable powder

c. Concentration used : 0.2 per cent

3.1.5 Glassware's

"The various sorts of Borosil brand glass products utilized in exploratory work. The normal glass products utilized were petriplates, test tubes, conelike carafe, estimating chamber, glass bars, microslides, spread slips, containers and pipettes".

3.1.6 Equipments

"The laboratory Equipments used were autoclave, laminar breeze stream unit, biological oxygen demand incubator, cooler, investigate amplifying focal point, compound leveling, pH meter, stove, water shower, Thermometer, Hygrometer, etc".

3.2 Methods

In present investigation different methods used are given below

3.2.1 Isolation

"Separation of pathogen related with shrink of tomato was done by tissue partition strategy on PDA. For disengagement of pathogen, the spoiled piece of the root tests were cut into proper pieces, washed by and large in fixture water so as to remove soil and other devotee particles.

The pieces were then purified by 0.1 percent mercury chloride answer for two minutes followed by washing in three changes of cleaned water to empty the traces of mercury chloride plan, three to four such pieces were then plated aseptically on sanitized potato dextrose agar in each petriplate". "The petriplate were agonized at room temperature (28 +10C), particularly isolated parasitic advancement freed from sullying was moved to PDA slants by hyphal tip methodology. By single spore disengagement methodology, the fungus Fusarium oxysporum f.sp. lycopersici purified and PDA slants showing unadulterated culture of fungus advancement were kept up for extra examinations".

3.2.2 Evaluation of fungicides against *F. Oxysporum f.sp.lycopersici (in vitro)*

"The investigation was embraced to test the adequacy of various fungicides against wither causing pathogen (Fusarium oxysporum). The toxin nourishment system was received to evaluate the adequacy of various fungicides with the given focuses. eight treatment and one control treatment, three replications were done. Potato dextrose agar was set up in mass and circulated in aliquots of 100 ml medium in 250 ml limit Erlenmeyer carafes. After sanitization, the medium was permitted to cool up to about 400C. The deliberate amount of every fungicide was added independently to every flagon. Three plates were poured for every fungicide". Potato dextrose agar without fungicide filled in as control.

$$I = \frac{100\ (C-T)}{C}$$

Where,

I = Percent inhibition of fungal growth

C = Colony diameter of the test fungus in control

T = Colony diameter of the fungus in treatment

Table 1. Details of fungicides used in the experiment

Sr. No	Trade Name	Common Name	Conc. Percent	Chemical Name
1	Bavistin	Carbendazim 50 % WP	0.1	Methyl-2-benzimidazole carbamate (MBC) CgHgN3O2
2	Captan	Captan 50 % WP	0.25	N -trichloromethyl thio-4-cyclohexene 1, 2-dicarboximide
3	Tilt	Propiconazole 25 % EC	0.20	1 2-(2, 4 dichlorophnyl 4 propy 1, 3-dioxolon -2- methyl] 1 H 2, 4 trizole
4	Thiram	Thiride 75 T WDP	0.30	Tetramethyl thiram disulphide
5	Mancoze	Indofil M-45	0.25	Zinc ion manganese ethylene bisdithio carbamate

6	Vitavax	Carboxin 75 per cent	.20	2, 6 dihydro-2-methyl 1, 4 oxathin 3 carboxanilide

4.Results

In vitro evaluation of fungicides against *Fusarium oxysporum f. sp. lycopersici*

"The results of fungicides against *Fusarium oxysporum f.sp. lycopersici* of tomato are presented in Table 5. It was observed that fungicide Mancozeb + Carbendazim (0.125 + 0.05 %) completely inhibited the growth of the pathogen Fusarium oxysporum on the potato dextrose agar media. A separate field experiment was conducted to test the interaction of Post emergent Herbicide (Imazethapyr) with Pyraclostrobin 20% WDG on the Collar rot Management and quality of Groundnut crop. The same set of treatments as followed in the field studies were used and tested for the interaction effect with the post emergent herbicide viz., Imazethapyr". "The different treatments were given as per schedule and the post emergent herbicide Imazethapyr was applied along with the test fungicides as per schedule at 20 DAS. A plot size of 5×4 m was used for each treatment and the experiment has been designed in RBD with seven treatments each replicated thrice. This shows thatthe fungicides Mancozeb + Carbendazim of the given concentration were 100 per cent effective against to the rest of fungicides regarding inhibiting the growth of pathogen. This was followed by Thiram + Carbendazim 0.15 + 0.05 per cent inhibited.percentage of 93.75 per cent growth, then Carbendazim 0.1 per cent inhibited 92.50 per cent growth of pathogen and ultimately in all above treatments there was no sporulation".

Sr. No	Fungicides	Concentration (%) used	Mean colony diameter	Sporulation (n)	Percent inhibition of growth

			(mm)* after 7 days of inoculation		
1	Mancozeb + Carbendazim	0.125 + 0.0 5 %	0.0	-	0.00
2	Thiram + Carbendazim	0.15 + 0.05 %	5.0	-	93.75
3	Carbendazim	0.1 %	6.00	-	2.50
4	Thiram	0.3 %	8.0	-	90.00
5	Carboxin	0.2 %	10.00	-	87.50
6	Captan	0.25 %	15.0	+	81.25
7	Propiconazole	0.2 %	26.00	++	67.50
8	Mancozeb	0.25 %	30.00	++	62.50
9	Control	-	80.00	++++	-
	SE		0.76		
	CD at 5%		2.28		

However, the fungicides namely Thiram (0.3 %), Carboxin (0.2 %), Captan (0.25 %), Propiconazole (0.2 %) and Mancozeb (0.25 %) alone inhibited 90.00 per cent, 87.50 per cent, 81.25 per cent, 67.50 per cent and 62.50 per cent growth of pathogen respectively. This shows that, the fungicide Mancozeb were less effective than Mancozeb + Carbendazim and other fungicides.

In the treatment Mancozeb + Carbendazim, Thiram +Carbendazim, Carbendazim, Thiram and Carboxin, there was no sporulation while captan had poor sporulation and propiconazole and mancozeb had moderate sporulation.

5. CONCLUSIONS

In vitro evaluation of fungicides, the treatment Mancozeb + Carbendazim (0.125 + 0.05) inhibited 100per cent growth of pathogen followed by Thiram + Carbendazim(0.15 + 0.05 %) which inhibited 93.75 per cent, Carbendazim(0.1 %) inhibited 92.50 per cent, Thiram (0.3 %) inhibited 90 per cent, Carboxin (0.2 %) inhibited 87.50 per cent, Captan (0.25 %) inhibited 81.25 per cent, Propiconazole (0.2 %) inhibited 67.50 per cent and Mancozeb (0.25 %) inhibited 62.50 per cent growth of pathogen F. oxysporum".

6. REFERENCES

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