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Use Selected of Fungicides for the Control Of Fusarium oxysporum f. sp. Ciceris Causing Wilt of Chickpea (Cicer arietinum L.)

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ABSTRACT

The aim of this study was to investigate the effect of fungicides on the management of Fusarium oxysporium f. sp. ciceris causing wilt of chickpea. In chemical control, the different fungicides were used to test the sensitivity against Fusarium oxysporum f. sp. ciceris by food poisoning technique. The linear growth of mycelium was measured daily and the results were expressed in terms of percent control efficacy (PCE) up to 8 days for Fusarium oxysporum f. sp. ciceris. It was noted that as the concentration increases linear growth decreases up to certain concentration. Above that concentration, there was total inhibition of the growth of fungal pathogen. This is considered as minimum inhibitory concentration (MIC) of respective fungicides. The different fungicides used were Thiram,Carbendazim, calcium polysulfide, captafol, captan, carbamate, carbamorph, carbanilate, carbendazim, carboxin Mancozeb, Copper oxychloride

Keywords: Fungicides, Fusarium oxysporium f. sp. ciceris & food poisoning technique.

I. INTRODUCTION

Mungbean (Vigna radiata (L.) Wiczek] is one of the important pulse crops in India. It is an important source of protein. A seedling disease that usually appears within a month of sowing, when patches of dead seedlings at the primary leaf stage are seen, scattered over the field. Worldwide it is grown on an area of 13.5 million hectares with a production of more than 13 million tons. It is an important crop of Indian sub-continent that usually contributes more than 66% in terms of global production, (Anon., 2013). The confirmatory symptom is rotting in the collar region that is covered with white mycelial growth; this differentiates collar rot from other seedling diseases caused by Fusarium. Yaqub and Shahzad. 2006. studied effect of fungicides on in vitro growth of Sclerotium rolfsii. Fungicides are biocidal chemical compounds or biological organisms used to kill fungi or fungal spores. Ilyas et al (1996) evaluated of some fungicides against Fusarium oxysporum f.sp. lini. Crop production is adversely affected by plant diseases which destroy in agriculture as well as drastically affect modern agriculture system. Iqbal SM, Bashir M, Rauf CA, Malik BA (1996).studied of fungicides against soil-borne pathogens of chickpea These diseases are mainly caused by seed borne pathogens like, Fusarium oxysporum f. udum etc. These are responsible for most of the losses as they spread very quickly and affect chickpea plant plant. Qayoom et al. (2006) studied of different fungicides against Fusarium wilt of cotton caused by Fusarium oxysporum. A fungistatic inhibits their growth. Fungi can cause serious damage in agriculture, resulting in critical

losses of yield, quality, and profit. Haidukowski, et al. (2005).studied the effect of fungicides on the development of Fusarium head blight, yield and deoxynivalenol accumulation in wheat inoculated. Fungicides are used both in agriculture and to fight fungal infections in plant. Cromey et al.(2001). Control of Fusarium head blight of wheat with fungicides.

With the individual fungicide treatment minimum inhibitory concentration (MIC) was determined. The minimum inhibitory concentration (MIC) of Thiram,Carbendazim, calcium polysulfide, captafol, captan, carbamate, carbamorph, carbanilate, carbendazim, carboxin Mancozeb, Copper oxychloride, Captan and Captafol. to Fusarium oxysporium f. sp. Ciceris

II. METHODS AND MATERIAL

The effect and sensitivity of different fungicides was tested by food poisoning technique as described by (Borum & Sinclair, 1968 Nene and Thapliyal, 1982). In this technique, the different concentrations of fungicides ranging from 100 to 1200 µg/mL were prepared on the basis of active ingradient. After sterilization 10 mL of prescribed fungicide concentration was added into 10 mL of PDA medium (Potato Dextrose Agar medium) in sterilized beaker. After mixing well the solution was poured in sterile petriplate and allowed to solidify. After solidification, a 5mm disc of 8 days old culture of test fungus was inoculated in the center of PDA plate.

These plates were incubated at 28□1□C. All treatments along with control i.e. by adding 10mL of sterilized distilled water in 10mL of media was prepared. Such all treated plates were prepared in triplicates of each treatment. The observations were recorded in the form of linear growth of fungal pathogen in millimeter (mm) daily for 8 days. The linear growth was measured up to the growth in control plate when filled completely. The minimum inhibitory concentration (MIC) of fungicide was recorded. The percent control efficacy (PCE) of fungicide was calculated by using following formula.

$$PCE = 100 \times [\, 1 - (X/Y) \,]$$

Where, X= Diameter of the colony treated with fungicide. Y= Maximum growth of fungus on control.

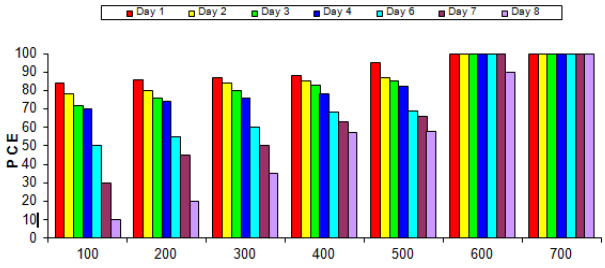
III. RESULTS

The captafol was used against Fusarium oxysporium f. sp. ciceris and observed PCE as noted in Table 1 and Fig. 1. The different concentrations were used from 100□g/mL to 1000□g/mL. The least PCE was at 100□g/mL and highest was at 1000□g/mL. The MIC was found to be 900□g/mL.

Table 1 : Effect of Captafol on percent control efficacy (PCE) of Fusarium oxysporium f. sp. Ciceris

Conc. □g/mL	Percent Control Efficacy (PCE)							
	Incubation period (Days)							
	1	2	3	4	5	6	7	8
100	78	76	70	50	35	23	20	6
200	80	79	73	53	40	35	24	10
300	82	80	72	65	59	45	35	30
400	84	81	75	68	63	60	55	43
500	85	82	77	73	70	63	57	50
600	90	84	81	78	72	68	63	53
700	93	85	82	79	77	75	65	60
800	100	100	100	85	83	77	67	63
900	100	100	100	100	100	100	100	75
1000	100	100	100	100	100	100	100	100

S.E ±	2.59	2.85	3.69	5.17	6.56	7.62	8.26	8.56
C.D. at 5%	5.85	6.44	8.33	11.68	14.82	17.22	18.66	19.41



Concentration (µg/mL)

Fig.1. Effect of Carbendazim on percent control efficacy (PCE) of Fusarium oxysporum f. sp. Ciceris

IV. DISCUSSION

Borum and Sinclair. (1968). studied for systemic fungicides protection against Rhizoctonia solani with Vitavax in cotton seedlings. Jimenez-Diaz and Trapero-Casas. (1985). reported of fungicidal treatments and host resistance to control the wilt and root rot complex of chickpeas.

Ilyas et. al. (1992). evaluated of some fungicides against Fusarium oxysporum f.sp. ciceris and chickpea wilt. Ilyas et. al. (1996). evaluated of some fungicides against Fusarium oxysporum f.sp. lini and linseed wilt. Iqbal et al. (1996). studied efficacy of fungicides against soil-borne pathogens of chickpea. Simpson et al. (2001). studied the control of head blight pathogens of wheat by fungicides. Katoch, (2001). studied the Chemical control of Fusarium oxysporum f. sp. dianthi, an incitant of carnations wilt.Cromey, et al. (2001). studied control of Fusarium head blight of wheat with Chala, et al. (2003).studied the integrated approach to the evaluation of the efficacy of fungicides against Fusarium culmorum, the cause of head blight of wheat. Mesterhazy, et al. (2003). Screened the efficacy of fungicides for control of Fusarium head blight. Chandel, and Haidukowski, et al.(2005).screened effect of fungicides on the development of Fusarium head blight, yield and deoxynivalenol accumulation in wheat. Poddar et. Al. (2004). Management of chickpea wilts through combination of fungicides and bioagents. Qayoom et al (2006). studied efficacy of different fungicides against Fusarium wilt of cotton caused by Fusarium oxysporum. Yaqub, F. and S. Shahzad. (2006). reported fungicides on in vitro growth of Sclerotium rolfsii. Arain (2006). studied the fungicides against Fusarium wilt of cotton caused by Fusarium oxysporum f. sp. vasinfectum. Mukhtar, I. (2007). screened of phytochemical and chemical control of Fusarium oxysporum f. sp. ciceris.

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