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Effect of Root Leachate of Wheat in the Spore Germination of *Fusarium oxysporum* f. sp. *ciceri*

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Chickpea is the most important pulse crop grown mostly in rainfed areas. The crop is damaged due to wilt. Wheat is used as intercrop could help in reducing losses caused by soil borne fungi. Root exudates of various crops are known to adversely affect the pathogens build up in the soil. The root leachates of wheat evaluated against the germination of conidia of *Fusarium oxysporum* f. sp. *ciceri* in laboratory conditions. Beaker method was followed to test the efficacy of root leachates. Twenty five ml of sterilized distilled water was filled in the beaker. Ten seeds of wheat were planted on blotter paper. The root leachates of wheat collected after 10days of germination delayed spore germination of *Fusarium oxysporum* f. sp. *ciceri* by five hours while, that of five days delayed by four hours. Increasing dilution of root leachates had considerable effect on the germination of micro and macro conidia of *Fusarium oxysporum* f. sp. *ciceri*.

Key words: Chickpea, *Fusarium oxysporum* f. sp. *ciceri*, Wheat, Macro and Micro conidia Root leachates, Soil born fungi and wilt.

Chickpea (*Cicer arietinum* L) is an important pulse crop of India and suffers with various diseases caused by fungi, bacteria and virus of which vascular wilt caused *by Fusarium oxysporum* f.sp. *ciceri* is much dangerous than other diseases[2]. The incidence of the disease varies from 10-100 percent depending on the locality. In Madhya Pradesh, its incidence has been reported from 0-60 percent[1]. Wheat is used as intercrop could help in reducing losses caused by soil borne fungi[5]. Root exudates of various crops are known to adversely affect the pathogens build up in the soil[3,4,5&6]. The root leachates of wheat evaluated against the germination of conidia of *Fusarium oxysporum* f. sp. *ciceri* is reported in this paper.

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MATERIALS AND METHODS

Experiment was conducted to see the effect of root leachates on the germination of micro and macro conidia of *Fusarium oxysporum* f. sp. *ciceri*. In this experiment Beaker method was followed to test the effect of root leachates. Twenty five ml of sterilized distilled water was filled in the beaker of 100 ml capacity. One disc of blotter paper was placed in touch of the water in the beaker. Ten seeds of wheat were planted on blotter and covered with another disc of blotter paper to maintain humidity. The beaker were incubated at room temperature (30 to 32 ^{0} C). The root leachate of wheat was collected after 5 and 10 days of germination. The collected leachates were filtered through Millipore filter paper to avoid bacterial contamination. The filtered leachates served as 100 % concentrate and it was sterilized water in the ratio of 1:1, 1:2, 1:3 and 1:4 in the test tubes. Sterilized distilled water only was kept as control. The spore suspension of *Fusarium oxysporum* f.

sp. *ciceri* was prepared by suspending 5 mm disc of 10 days old culture in each of the treatment mentioned above. The number of spore germinated per microscopic field was counted after one hour and continued up 7 hour and the percentage germination was calculated with reference to total number of spores.

RESULTS AND DISCUSSION

The data of Table 1 clearly indicated that the spore germination of micro and macro-conidia of *Fusarium oxysporum* f. sp. *ciceri* was delayed up to 4 hours in concentrated root leachate collected after 5 days in wheat. Further, the percentage germination was considerable less in concentrated root leachate (10.0 to 22.0 % in micro conidia and 11.1 to 13.0 % in macro conidia) as compared to sterilized distilled water (control) and other dilution. In general, spore germination started after one hour and was maximum in sterilized distilled water over concentrated root leachate and its dilution. With the increase in dilution from 1:1 to 1:4, the percentage germination of both micro and macro conidia increased and started early. The percentage germination remained same after 6 to 7 hours in all the treatments (Table 1).

The observation presented in table 2 indicated that the root leachates of wheat collected after 10 days of germination had considerable effect on spore germination of *Fusarium oxysporum* f. sp. *ciceri*. The germination of micro conidia in concentrated root leachate started after 5 hours, while macro conidia did not germinate. As the dilution of concentrate increased from 1:1 to 1:4, the spore germination started early (17.8 % and 12.5 % in micro and macro conidia, respectively). The percentage germination started just after one hour in sterilized distilled water (72.7 and 44.4 %) and increased up to 6 hours and remained same in 7th hour. In general, the percentage germination of micro conidia was comparatively higher as compared to macro conidia in all the treatments. (Table 2).

The influence of root leachates collected after 10 days in inhibiting the spore germination of *Fusarium oxysporum* f. sp. *ciceri* was more as compared to five days in wheat.

Table 1. Effect of root leachate of wheat (collected after 5 days) on spore germination of *Fusarium oxysporum* f. sp. *ciceri*

S. N.	Treatments	Percent spore germinated after hours													
		1		2		3		4		5		6		7	
		mic	mac	mic	mac	mic	mac	mic	mac	mic	mac	mic	mac	mic	mac
1	SDW 100% (cont)	67.3	42.8	70.7	42.8	71.7	50.0	75.5	50.0	78.2	66.7	80.0	66.7	80.0	67.0
2	Root leachate con. 100 %	00.0	00.0	00.0	00.0	00.0	00.0	10.0	00.0	17.8	11.1	21.8	12.5	22.0	13.0
3	1:1	00.0	00.0	00.0	00.0	5.8	00.0	17.8	12.5	24.1	16.7	30.2	22.2	30.5	22.5
4	1:2	00.0	00.0	00.0	00.0	18.8	11.1	24.1	12.5	30.9	20.0	37.0	22.2	37.0	22.6
5	1:3	00.0	00.0	16.3	00.0	25.0	14.3	31.5	20.0	37.7	20.0	41.8	27.3	42.0	27.5
6	1:4	16.0	00.0	20.4	14.3	26.9	18.2	32.1	27.3	40.0	27.8	42.8	33.3	43.0	33.5

1:1, 1:2, 1:3 and 1:4 = Rootleachate con. (RL) 100%; Sterilized Distilled Water control 100% (SWD)
Mic =micro conidia & Mac= macro conidia

Table 2. Effect of root leachate of wheat (collected after 10days) on spore germination of Fusarium oxysporum f. sp. ciceri

S.N.	Treatments	Percent spore germinated after hours													
		1		2		3		4		5		6		7	
		mic	mac	mic	mac	mic	mac	mic	mac	mic	mac	mic	mac	mic	mac
1	SDW 100% (cont)	72.7	44.4	76.4	44.4	79.7	50.0	82.2	55.5	82.2	55.5	87.5	60.0	87.5	60.0
2	Root leachate con. 100 %	00.0	00.0	00.0	00.0	00.0	00.0	00.0	00.0	7.3	00.0	14.8	10.0	14.8	10.0
3	1:1	00.0	00.0	00.0	00.0	00.0	00.0	00.0	00.0	12.5	11.1	23.2	16.7	23.2	16.7
4	1:2	00.0	00.0	00.0	00.0	00.0	00.0	7.5	00.0	23.2	16.7	28.0	20.0	28.0	20.0
5	1:3	00.0	00.0	00.0	00.0	00.0	00.0	15.4	12.5	26.8	20.0	26.8	20.0	26.8	20.0
6	1:4	00.0	00.0	00.0	00.0	17.3	12.5	25.4	16.7	28.1	22.2	28.7	22.2	28.7	22.2

1:1, 1:2, 1:3 and 1:4 = Root leachate con. (RL) 100%; Sterilized Distilled Water control 100% (SWD)
Mic =micro conidia & Mac= macro conidia

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