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EFFECTS OF SOME SOIL ISOLATES OF FUNGI ON SEEDLING EMERGENCE OF PULSES

Dhekle Neeta Marotirao

Associate professor & Head, Department of Botany, ACS College, Shankarnagar Tq. Biloli Dist. Nanded (MS), India

Abstract

During the present studies some soil isolates of fungi were screened for seedling emergence of pulses. For this, the seeds of pulses like Green gram (Vigna radiata L.), Black gram (Vigna mungo L.), Chick pea (Cicer arietinum L.) and Pigeon pea (Cajanus cajan L.) were surface sterilized with 0.1 % $HgCl_2$ and subsequently washed to remove the fungicide. The seeds were then infested with 2 ml of spore suspension of test soil fungi. These seeds were then sown in earthen pots (25 cm diameter) containing sterilized soil and grown for ten days and on eleventh day percent seedling emergence, shoot and root length was recorded. The seeds without infestation of the test fungi were served as control.

Materials and Methods

In order to study effects of some soil isolates of fungi on seedling emergence, shoot length and root length of pulses, the seeds of test pulses like Green gram (*Vigna radiata* L.), Black gram (*Vigna mungo* L.), Chick pea (*Cicer arietinum* L.) and Pigeon pea (*Cajanus cajan* L.) were surface sterilized with 0.1 % $HgCl_2$ and subsequently washed to remove the fungicide. The seeds were then infested with 2 ml of spore suspension of test soil fungi. These seeds were then sown in earthen pots (25 cm diameter) containing sterilized soil and grown for ten days and on eleventh day percent seedling emergence, shoot and root length was recorded. The seeds without infestation of the test fungi were served as control.

Results and Discussion

Table-1: Effect of some soil isolates of fungi on seedling emergence of Green gram (*Vigna radiata* L.) by pot sowing method (After ten days of incubation).

Sr. No.	Soil isolates of fungi	Green gram (*Vigna radiata* L.)		
		Seedling emergence (%)	Shoot length (cm)	Root length (cm)
1	*Aspergillus flavus*	50	10	9
2	*Aspergillus fumigatus*	60	10	10
3	*Aspergillus niger*	40	5	5
4	*Drechslera tetramera*	40	7	7
5	*Fusarium moniliforme*	70	13	12
6	*Rhizopus stolonifer*	80	12	10
7	Control	90	14	10

The results presented in table-1 and plate-1 clearly suggest that, all test fungi caused more of less reduction in seedling emergence, shoot and root length of Green gram. The fungi *Aspergillus niger* and *Drechslera tetramera* affected most adversely the seedling emergence (40 % each, control 90 %), shoot length (5 cm, control 14 cm), and root length (5 cm, control 10 cm) respectively. The fungus *Rhizopus stolonifer* affected less adversely to seedling emergence compared to rest of the fungi (seedling emergence 80 %, control 90 %), shoot length (12 cm, control 14 cm) and root length (10 cm, control 10 cm). Shoot length was less affected in case of seeds infested with *Fusarium moniliforme* (13 cm, control 14 cm). Root length was not affected in case of seeds treated with *Rhizopus stolonifer* and *Aspergillus fumigatus* but more root length (12 cm) was recoded in case of seeds infested with *Fusarium moniliforme* over control.

Table-2: Effect of some soil isolates of fungi on seedling emergence of Black gram (*Vigna mungo* L.) by pot sowing method (After ten days of incubation).

Sr. No.	Soil isolates of fungi	Black gram (*Vigna mungo* L.)		
		Seedling emergence (%)	Shoot length (cm)	Root length (cm)
1	*Aspergillus flavus*	50	06	07
2	*Aspergillus fumigatus*	60	09	10
3	*Aspergillus niger*	40	10	08
4	*Drechslera tetramera*	80	12	09
5	*Fusarium moniliforme*	50	09	10
6	*Rhizopus stolonifer*	60	11	12
7	Control	100	16	17

The results presented in the table-2 and plate-1 show that, all test fungi affected adversely seedling emergence, shoot and root length in more or less degree of Black gram. The fungi which caused much reduction in seedling emergence of Black gram were *Aspergillus niger* (40 %, control 100 %), followed by *Aspergillus flavus* and *Fusarium moniliforme*. In case of *Drechslera tetramera* seedling emergence was much closer to that of control (80 %, control 100%). There was much reduction in shoot and root length in seedlings due to the *Aspergillus flavus.*

Table-3: Effect of some soil isolates of fungi on seedling emergence of Chick pea (*Cicer arietinum* L.) by pot sowing method (After ten days of incubation).

Sr. No.	Soil isolates of fungi	Chick pea (*Cicer arietinum* L.)		
		Seedling emergence (%)	Shoot length (cm)	Root length (cm)
1	*Aspergillus flavus*	30	07	06
2	*Aspergillus fumigatus*	80	09	08
3	*Aspergillus niger*	50	06	05
4	*Drechslera tetramera*	30	08	09
5	*Fusarium moniliforme*	70	07	10
6	*Rhizopus stolonifer*	60	09	10.2
7	Control	90	10.2	15.2

The results presented in table-3 and plate-1 reveal that, all test fungi caused reduction in seedling emergence, shoot and root length of Chick pea in more or less degree. Much reduction in seedling emergence was recorded with *Aspergillus flavus*, *Drechslera tetramera* and *Aspergillus niger* (respectively 30 %, 30 % and 50%). There was much reduction in shoot and root length due to *Aspergillus niger*, *Aspergillus flavus* and *Drechslera tetramera*.

Table-4: Effect of some soil isolates of fungi on seedling emergence of Pigeon pea (*Cajanus cajan* L.) by pot sowing method (After ten days of incubation).

Sr. No.	Soil isolates of fungi	Pigeon pea (*Cajanus cajan* L.)		
		Seedling emergence (%)	Shoot length (cm)	Root length (cm)
1	*Aspergillus flavus*	60	14	15
2	*Aspergillus niger*	50	12	13
3	*Drechslera tetramera*	70	10	12
4	*Fusarium moniliforme*	80	09	11.3
5	*Aspergillus fumigatus*	60	08	12.5
6	*Rhizopus stolonifer*	70	11	12.2
7	Control	90	15.2	17

The tabulated results presented in table-4 and plate-1 show that, all test fungi were having negative effect on seedling emergence, shoot and root length of Pigeon pea. *Aspergillus niger* was main fungus in reducing seedling emergence of the test seeds (50 %, control 90 %); followed by *Aspergillus fumigatus* (60 %, control 90 %) and *Aspergillus flavus* (60 %). There was great reduction in the shoot length over control due to *Aspergillus fumigatus*, *Fusarium moniliforme*, *Drechslera tetramera* etc. Root length was also reduced to grater extent due to infestation of *Fusarium*

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Photo Plate-1:

Infested

Control

Green gram

Black gram

Chick pea

Pigeon pea

Plate-1: Effect of soil isolate of *Aspergillus flavus* on seedling emergence of different pulses