Scholarly Research Journal for Interdisciplinary Studies,
Online ISSN 2278-8808, SJIF 2019 = 6.38, www.srjis.com
PEER REVIEWED & REFERRED JOURNAL, SEPT-OCT, 2019, VOL- 7/53

EFFECTS OF SOME SOIL FUNGI ON SEED HEALTH OF PULSES

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Abstract

During the present studies some soil isolates of fungi were screened for seed health (seed germination, shoot length and root length) of pulses, 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. These seeds were then infested with 2 ml of spore suspension of test soil fungi and incubated on moist blotter at room temperature for ten days. On eleventh day seed germination, shoot and root length were recorded. The seeds without infestation of the test fungi of were served as control. The results presented showed that all the test soil isolates of fungi caused reduction in seed germination shoot and root length of pulses in more or less degree.

Materials and Methods

In order to study effects of some soil isolates of fungi on seed health (seed germination, shoot length and root length) of pulses, the 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. These seeds were then infested with 2 ml of spore suspension of test soil fungi and incubated on moist blotter at room temperature for ten days. On eleventh day seed germination, shoot and root length were 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 seed health (seed germination, shoot length and root length) of Green gram (*Vigna radiata* L.) by blotter plate method (After ten days of incubation).

Sr. No.	Soil Isolates Fungi	Green gram (*Vigna radiata* L.)		
		Seed germination (%)	Shoot length (cm)	Root length (cm)
1	*Aspergillus flavus*	40	2.2	3.1
2	*Aspergillus fumigatus*	50	2.0	2.2
3	*Aspergillus niger*	30	1.5	3.0
4	*Drechslera tetramera*	60	4.0	3.4
5	*Fusarium moniliforme*	70	3.0	3.8
6	*Rhizopus stolonifer*	80	2.2	4.2
7	Control	100	6.3	5.1

The results presented in table-1and plate-1 reveal that, all the test soil fungi retarded percent seed germination shoot and root length of Green gram (*Vigna radiata* L.). *Aspergillus niger* causes maximum reduction in seed germination (30 %) followed by *Aspergillus flavus* (40 %) and *Aspergillus fumigatus* (50 %). On the contrary *Rhizopus stolonifer* and *Fusarium moniliforme* showed better seed germination (80 % and 70 % respectively). There was maximum suppression in shoot and root lengths due to fungi like *Aspergillus niger* and *Aspergillus fumigatus*.

Table-2: Effect of some soil isolates of fungi on seed health (seed germination, shoot length and root length) of Black gram (*Vigna mungo* L.) by blotter plate method (After ten days of incubation).

Sr. No.	Soil Isolates Fungi	Black gram (*Vigna mungo* L.)		
		Seed germination (%)	Shoot length (cm)	Root length (cm)
1	*Aspergillus flavus*	50	1.0	0.0
2	*Aspergillus fumigatus*	89	2.1	4.1
3	*Aspergillus niger*	30	2.2	3.1
4	*Drechslera tetramera*	60	2.1	4.1
5	*Fusarium moniliforme*	70	3.1	3.2
6	*Rhizopus stolonifer*	40	2.1	4.1
7	Control	90	5.0	4.0

The results presented in table-2 and plate-1indicate that, all the test soil fungi showed suppression in seed germination, shoot and root length of Black gram (*Vigna mungo* L.). The fungus *Aspergillus niger* was most restrictive on seed germination showing only 30 % seed

germination (control 90 %) followed by *Rhizopus stolonifer* (40 %) and *Aspergillus flavus* (50 %). *Aspergillus fumigatus* did not affect much adversely the seed germination as compared to control. *Aspergillus flavus* caused much reduction in shoot length and completely inhibited growth of root in Black gram (*Vigna mungo* L.).

Table-3: Effect of some soil isolates of fungi on seed health (seed germination, shoot length and root length) of Chick pea (*Cicer arietinum* L.) by blotter plate method (After ten days of incubation).

Sr. No.	Soil Isolates Fungi	Chick pea (*Cicer arietinum* L.)		
		Seed germination (%)	Shoot length (cm)	Root length (cm)
1	*Aspergillus flavus*	30	2.0	2.1
2	*Aspergillus fumigatus*	60	4.1	5.2
3	*Aspergillus niger*	40	1.0	1.1
4	*Drechslera tetramera*	20	0.0	1.2
5	*Fusarium moniliforme*	60	2.2	3.4
6	*Rhizopus stolonifer*	50	2.1	4.1
7	Control	100	3.4	6.1

The results presented in the table-3 and plate-1 show that, all the test soil fungi caused reduction in seed germination shoot and root length of Chick pea (*Cicer arietinum* L.) in more or less degree. *Drechslera tetramera* showed maximum retardation in seed germination (20 %) followed by *Aspergillus flavus* (30 %) and *Aspergillus niger* (40 %). *Drechslera tetramera* completely inhibited shoot length, where as *Aspergillus niger* showed much reduced shoot length (1 cm, control 3.4 cm) and much reduced root length (1.1 cm, control 6.1) in Chick pea (*Cicer arietinum* L.).

Table-4: Effect of some soil isolates of fungi on seed health (seed germination, shoot length and root length) of Pigeon pea (*Cajanus cajan* L.) by blotter plate method (After ten days of incubation).

Sr. No.	Soil Isolates Fungi	Pigeon pea (*Cajanus cajan* L.)		
		Seed germination (%)	Shoot length (cm)	Root length (cm)
1	*Aspergillus flavus*	40	1.1	4.5
2	*Aspergillus fumigatus*	70	3.2	4.1
3	*Aspergillus niger*	60	0.0	1.0
4	*Drechslera tetramera*	80	4.2	3.4
5	*Fusarium moniliforme*	60	1.2	1.1
6	*Rhizopus stolonifer*	70	3.1	4.0
7	*Control*	90	3.3	4.2

The result presented in the table-4 and plate-1 show that, all the test soil fungi caused reduction in seed germination shoots length and root length of Pigeon pea (*Cajanus cajan* L.) in more or less degree. Seed germination was much adversely affected by *Aspergillus flavus* (40 %, control 90 %), than *Fusarium moniliforme* and *Aspergillus niger* with both showing seed germination of 60 %. Shoot length was completely suppressed and root length was minimum in case of *Aspergillus niger*. However there was increase in shoot length over control in case of *Drechslera tetramera* (4.2 cm) and also increase in root length of Pigeon pea (*Cajanus cajan* L.) in case of *Aspergillus flavus* (4.5 cm) over control.

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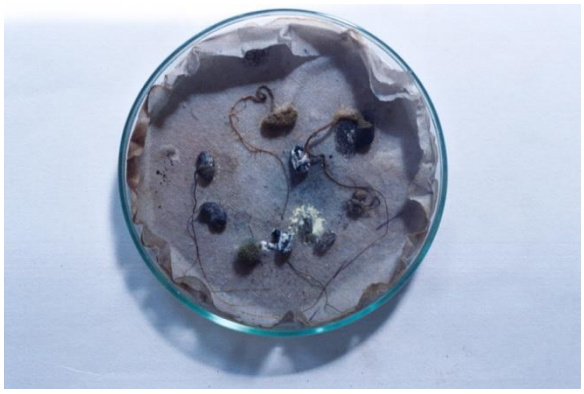
Photo plate-1:

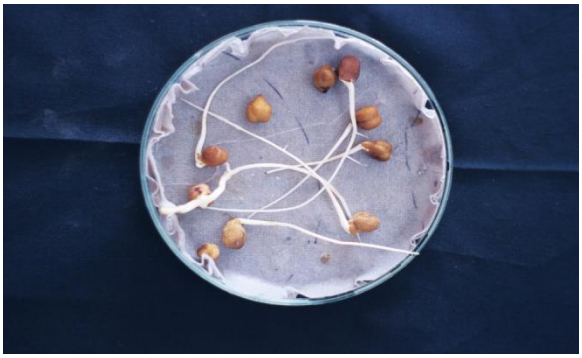
Control

Infested

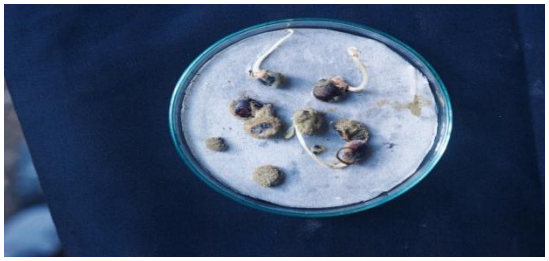
Green gram



Black gram



Chick pea



Pigeon pea

Plate-1: Effect of soil isolate of *Aspergillus flavus* on seed germination of different pulses by blotter method