

EFFECT OF RHIZOSPHERE FUNGI ON THE NODULE NUMBER, SHOOT AND ROOT LENGTH OF *VICIA FABA* LINN.

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Effect of rhizosphere fungi on the nodule number, shoot and root length was studied. Almost all the tested fungi reduced the number of nodule, shoot and root length.

Keywords: Nodule number; Rhizosphere fungi; Shoot and root length

Bhardwaj¹, Gupta² and Kumar³ studied the effect on nodule surface fungi on nodule number, shoot and root length and reported adverse effect. Jain and Gupta^{4,5} studied the effect of nodule surface fungi and rhizosphere fungi on nodule number, shoot and root length and the reported the adverse effect on nodulation. Kumar⁶ reported that some rhizosphere fungi inhibited the number of nodules significantly.

Fungi were grown in liquid Czapek's medium in 100 ml control flasks containing 25 ml of the medium

of the following composition : KH₂PO₄ 1.0g, MgSO₄. 7H₂O. 0.5g; KCl 1.0g; FeSO₄ trace, yeast power 0.5 g; NaNO₃ 2.0g; dextrose 10.0g and distilled water 1000 ml. Fungi were allowed to grow for 10days at 25°C and thereafter the content was filtered through Whatman's filter paper No. 44. Equal amount of hyphal mat of each fungus was fractionized in pestal mortar and mixed thoroughly in equal amount of double sterilized soil and placed in earthenware pot. Surface sterilized seeds (with 0.1% HgCl₂ solution) were sown in 51 pots. Forty-eight

Table 1. Effect of rhizosphere fungi on the nodule number, shoot and root length.

Name of fungi	Average number of nodule	Value of 't'	Average of shoot length	Value of 't'	Average of root length	Value of 't'
Control	31.7	-	22.87	-	25.64	-
<i>Mucor luteus</i>	16.6	6.96**	22.36	0.58	20.17	2.54*
<i>Syncephalastrum racemosum</i>	21.1	4.64**	22.76	0.14	24.89	0.32
<i>Aspergillus flavus</i>	16.9	5.82**	20.0	3.16**	22.17	1.85
<i>A. terreus</i>	16.8	6.35**	20.38	2.46*	21.54	2.01
<i>A. luchuensis</i>	15.6	6.11**	20.08	3.29**	18.14	3.39**
<i>A. niger</i>	14.8	7.31**	20.61	3.80**	17.77	3.99**
<i>Penicillium citrinum</i>	19.8	3.07**	20.22	3.25**	22.09	1.43
<i>Torula convoluta</i>	25.2	2.51*	20.99	1.99	23.88	0.82
<i>Paecilomyces fuisporus</i>	23.6	0.75	21.13	1.79	22.59	1.70
<i>Cladosporium cladosporioides</i>	30.1	0.48	21.28	1.66	23.74	0.94
<i>Curvularia tetramera</i>	24.2	3.06**	21.13	1.67	22.98	1.22
<i>Curvularia lunata</i>	24.1	5.11**	20.73	2.84*	22.59	1.26
<i>Alternaria humicola</i>	28.8	0.28	21.66	1.40	24.35	0.61
<i>Trichoderma lignorum</i>	19.1	4.79**	21.46	1.57	23.9	0.76
<i>Fusarium udum</i>	19.0	5.45**	20.11	3.14**	19.35	3.08**
White st. mycelium	23.1	3.12**	21.46	1.48	22.89	1.35

* Significant at 5% level

** Significant at 1% level

pots had inoculum of 16 fungi (three pots for each fungus as replicate) and three uninoculated pots were kept as control. Ten seedlings were retained in each pot, which served as replicate. Equal amount of *Rhizobium* suspension was added in each pot. *Rhizobium* was isolated from the effective nodules and was grown on yeast extract mannitol agar medium.

Plants were watered with sterilized water at regular intervals. After one month, plants were uprooted carefully and number of nodules, shoot and root length was recorded and data were subjected to 't' test.

Singh⁷ reported that development of nodules in presence of fungi in sterile soil was inhibited due to the secretion of toxic substances into the soil by fungi. Bowen and Rovira⁸ showed that production and growth of root hairs of subterranean clover was markedly reduced by microorganisms. Holland⁹ found that nodulation of subterranean clover was inhibited by some antibiotic producing soil fungi in western Australia. Hely¹⁰ observed in some part of Australia was due to the presence of antagonism in rhizosphere towards *Rhizobium*. However, Bhardwaj¹, Gupta², Kumar³ and Jain and Gupta⁵ reported that in sterile soil some fungi increased the number of nodules while others inhibited.

It was observed that in the present study that the fungus when mixed with sterilized soil reduced the number of nodules in comparison to control. The number of nodules did not increase or decrease proportionately to the increase or decrease of shoot and root length (Table 1). In these experiments when different fungi were mixed in the soil, the number of nodules was found to be less than control. Root and shoot length also decreased as compared to control. *A. niger* showed maximum inhibitory effect on nodulation. Present finding is in accordance with the finding of Holland⁹, Kumar⁶ and Yadav¹¹.

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