SUMMARY

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This investigation aimed at investigating the role of vascular arbuscular Mycorrhizae in controlling damping-off and root-rot diseases of faba bean plants (*Vicia faba L.*) under sterilized and unsterilized soil in the greenhouse. The effect of the two species of VA-Mycorrhizal fungi and Rhizobium (*Rhizobium leguminosarum*) was also studied. Seed dressing with fungicides and fertilization with phosphate and their effects on VA-Mycorrhizal fungi and its role in controlling damping-off and root-rot diseases were studied.

The results could be summarized as follows:-

1- The fungi isolated from infected roots of plants collected from the Farm of Faculty of Agriculture at Moshtohor, were *Fusarium solani* (Mart.) and *Rhizoctonia solani* (Kuehn).

2- *R. solani* was the most virulent pathogen causing pre-emergence damping-off and root-rot followed by *F. solani*.

3- Infection by *R. solani* pathogen decreased the plant height and root length of the **Giza 2** and **Ribaya 40** cultivars more than infection with *F. solani*. Also, it reduced the fresh and dry weight of roots and shoots, number of leaves and nodulation especially in the sterilized soil. This was more evident in **Ribaya 40** than **Giza 2**.

4- **Ribaya 40** cultivar grown in sterilized soil showed the lowest percentages of healthy survival plants in uninoculated or inoculated soil with the pathogenic fungi and also in unsterilized or sterilized soil compared with **Giza 2** cultivar.

5- Addition of VA-Mycorrhizae increased the percentage of healthy survival plants and decreased the percentage of root-rot disease of faba bean plants with the presence of ***F. solani*** or ***R. solani*** pathogen than those inoculated with ***F. solani*** or ***R. solani*** only.

6- Addition of VA-Mycorrhizae increased plant height, root length, shoot and root dry matter in the presence or absence of infection with ***F. solani*** or ***R. solani***.

7- Effect of ***Glomus australe*** on plant growth was higher than ***Glomus macrocarpum*** especially in the presence of infection with ***F. solani*** or ***R. solani***.

8- Addition of VA-Mycorrhizae to soil-increased the root colonization with VA-Mycorrhizae in case of the sterilized soil more than in the case of the unsterilized soil. The number of VA-Mycorrhizae arbuscules, vesicules and mycelium in the case of inoculation with ***G. macrocarpum*** was higher than in the case of inoculation with ***G. australe***.

9- Infection with ***R. solani*** reduced the number of VA-Mycorrhizae colonization in root. Infection with ***F. solani*** increased the number of

VA-Mycorrhizae in roots especially in case of soil inoculation with ***G. australe***.

10- The percentage of healthy survival plants in plants previously inoculated with ***R. leguminosarum*** was lower than with uninoculated plants especially in the sterilized soil. The percentage of root-rot was not affected by ***R. leguminosarum*** inoculation.

11- Addition of VA-Mycorrhizae and inoculation with ***R. leguminosarum*** increased the percentage of healthy survival plants and reduced the percentage of root-rot infection in the presence or absence of ***F. solani*** or ***R. solani***.

12- Addition of VA-Mycorrhizae and inoculation with ***R. leguminosarum*** increased root length and the number of nodules / plant in case of **Giza 2** cv., whereas they increased the root length, root dry matter, No. of leaves and N. of nodules / plant in case of **Ribaya 40** cv.

13- Dual inoculation with VA-Mycorrhizae (***G. macrocarpum*** or ***G. australe***) and ***Rhizobium leguminosarum*** increased root colonization with VA-Mycorrhizae more than inoculation with VA-Mycorrhizae alone.

14- Dual inoculation with VA-Mycorrhizae and ***R. leguminosarum*** in the presence of ***F. solani*** or ***R. solani*** increased the root colonization with VA-Mycorrhizae and ***R. leguminosarum*** or ***F. solani*** or ***R. solani*** only.

20- Infection with F. solani or R. solani reduced plant height, root length, number of leaves, root and shoot dry matter especially in case of absence of phosphate , whereas VA-Mycorrhizal treatments increased them.

21- Soil inoculation with VA-Mycorrhizae (***G. macrocarpum*** or ***G. australe***) without adding rock or super phosphate fertilizers increased faba bean root colonization with VA-Mycorrhizal fungi compared with those uninoculated with VA-Mycorrhizae. On the other hand, fertilization with rock phosphate and inoculation with VA-Mycorrhizal fungi more than super phosphate.