SUMMARY

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Vasicular- arbuscular mycorrhizae are commonly make asymbiotic association bet ween plant root and the mycelium of mycorrhizal fungi which mainly associate within plant root cortex.Today more than 90% of the higher plants especially the agricultural onces make mycorrhizal association. The benefits of the mycorrhizal association to plants have been attributed to improve nutrients absorption particularly phosphorus, nitrogen, sulphur and other microelements. It helps plants by producing enzymes which transfere soil organic compounds into simple for ms. These compounds transport inside plants via fungal hyphae VAM fungi produce also phytohormones which increase plant growth. It has an important role in plant protection against soil pathogens. It helps plants to over come against many environmental stress conditions like, drought and nutrient defficiency . The experimental results indicate that:

A. Ecological studies:

Of the 72 plant species collected from interesting areas of Egyptian soils. 64 showed VA-mycorrhizae and 8 plants were non-mycorrhizal. All agronomic plants were collected from the agricultural areas of El-Sharkya, El-Munofia, El-Behera, El-Gharbia, El-Kalubia, Esmaillia, El-suez, Alexandria, North Sinai, South Sinai. North Coast, Beny Swaf and Aswan, had VA my corrhizal colonization.

The given data show that

1. Some field crops are heavy infected by VA mycorrhizal fungi e.g. Bean, onion, clover, cotton, eg. lettus, maize, wheat cotton, barely,

clover and phaseolus bean however, a small number of plant species belonging mainly to the Juncaceae, Cyperaceae, Zygophyllaceae, Cruciferae and some species of Chenopodraceae are non-mycorrhizal.

2. There is no relationship between the number of spores isolated from the rhizoshere area and the rate of colonization within the root of the host plant, that is because spore production in the rhizosphere depends on many factors, eg. the infection of the plant by other pathogens, the age of the growing plant and the kind of the cultivated soil.

3. There is a clear relationship bet ween the number of the spores present in the rhizosphere and the physico-chemical propertics of the cultivated soil, also the amount of the soluble phosphorus present in the soil. It is clear that when the amount of the soluble phosphorus increase the number of mycorrhizal spores decrease. In the sandy soil, where the available phosphorus is very low, the number of mycorrhizal spores are ranged bet ween high, slightly high or low. But in sandy clay and sandy loam soil, alhough the amount of available phosphorus is high, there are a moderatly high numbers of VAM spores.

4- The increase in organic matter in soil leads to better mycorrhizal development and spore production.

5- High soil salinity appears to be a determining effect on the endogonaceous spore number and percentage of mycorrhizal infection.

6. Spores collected from the different Egyptian soils belonged to four genera: *Glomus, Gigaspora, Acaulospora and Sclarocystis. Spores* belonging to the genus Glomus were the most dominant in this survey.

B. Studies of VA mycorrhizae and *Bradyrhizobia* functions on Acacia growth:

Pot experiment has been done in the season (2000) to study the effect of inoculation with VA mycorrhizae and bradyrhizobium and fertilization by two levels of ammonium sulphate (40-20 Nunit/feddan) on the growth of Acacia seedling. The experiment has been done in pots under the conditions of green house in Desert Research center by using sandy soil obtained from the 10th of Ramadan and all pots had received rock phosphate fertilizer. The used rhizobial strain and VAM spores were prepared in Microbiology lab of Desert Research center and the pots have been arranged in complete random manner in the green house. The soil and plant samples were collected at 3, 6 and 9 months and the obtained results are summarized in the following:

1. The increasing of plant height, branching, fresh and dry weights and total chlorophyll contents by inoculation *Bradyrhizhobia* especially in treatment received double inoculation and fertilized by 20 Nunit.
2. The increasing of nitrogen fertilizers have a negative effect on VAM spore production and rate of root colonization .
3. Inoculation with VAM leads to the increasing of the number of root no dules also the increasing of fresh and dry weights and the

total content of nitrogen of the nodules. This is due to the high ability of VAM to facilitate phosphorus nutrition to the plants which is very important in nodules formation especially when added to the soil in unsoluble form.

4. The increasing of the soil total nitrogen in inoculated treatments either with VAM or and *Bradyrhizobia*. But *Bradyrhizobium* was more effective than VAM. The highest values were recorded in double inoculated treatment which recerived full dose of nitrogen fertilizer (40 N unit).

5. The increasing in phosphorus concentrations and total phosphorus contents in shoots and roots of Acacia plants which were inoculated with VAM especailly when received the half dose of nitrogen fertilizer (20 N unit). The phosphorus concentrations were higher in shoots than that in roots, but it was reversed in case of total phosphorus content. This was due to the increasing of the shoot dry weight.

6. Inoculation of Acacia seedling with VAM and *Bradyrhizobium* led to increasing of nitrogen concentrations in both nitrogen fertilizer levels. But nitrogen concentration was higher in roots than in shoots. In case of total nitrogen contents, inoculation with *Bradyrhizobium* and VAM increased total shoot nitrogen contents than that of root especially when received 20 N units in all growth stages.

7. Studies the effect of inoculation of Acacia seedlings with VAM and *Bradyrhizobia* on microelements absorption (Fe, Zn, Co, Mo, Cu and Mn). The data indicated that, inoculation with VAM and

Bradyrhizobia stimulated microelements absorption by Acacia seedlings. The highest data were recorded in treatment which received double inoculation and fertilized by half dose of nitrogen fertilizer in all plant growth stages. Microelements concentration were higher in roots than in shoots, but total micronutrient content were high in shoots due to dry weight increasing.

8. Also inoculation with VAM and *Bradyrhizobia* play an important role in increasing of phytohormones production (Ouxins, Gibberlins and Cytokinines) which are very important in plant growth .