Benha University. **Exam(4th Micro&che).**

Faculty of Science. **Time:-2 hours.**

Botany Department. **Jan 2015**

Soil microbiology

Answer the following questions:-

1- Effect of soil microorganisms on the growth of higher plant?

2- Interaction between microorganisms and higher plants?

3- Interaction among microbe – microbe populations in soil?

4-Comment on the following:-

a-Rhizosphere.
b- Influence of plants upon soil microorganisms .

With best wishes.

1-Effect of soil microorganisms on the growth of higher plant:-

A – decompose plant& animal residues to soil(organic matter or humus).

B – synthesize organic substances from inorganic compound in the soil .

C – legume plant is affected by symbiotic nodule-forming bacteria .

D – influence the concentration of gases in soil atmosphere(CO_2&O_2) .

E – Mycorrhiza act as root hairs& play role in protein synthesis(symbiosis) .

2-Interaction between microorganisms and higher plants:-

A – Nitrogen fixing bacteria

Rhizobium as well as Frankia- plant symbioses are considerable economic and environmental importance in agricultures .

B – Plant pathogenic microorganisms

The symptoms of diseases caused by phytopathogenic microorganism appear as necrosis, soft rot , vascular wilt , tumors and leaf spots.

C –Mycorrhiza

Fungi lives in symbiosis with the root surface of plants are ectotrophic (ectomycorrhiza ECM), while those enter plant are endotrophic (vasicular- arbuscular VAM).

3-Interaction among microbe – microbe populations in soil :-

1 – Neutralism : organisms absolutely no effect in cohabitants .

2 –**Positive interaction**

- Commensalism: Aerobic microorganisms use O_2 thereby ,creating conditions for anaerobic microorganism .
- Symbiotic : Algae and fungi in lichens .

3 – Negative interaction :

- Competition: on nutrient , place , air and sidrophore .
- Antagonism : suppression the growth of one organism by product of growth the second.
- Parasitism : Fungi upon bacteria, bacteria upon fungi or fungi upon insects .
- Predation : killing and eating of protozoa to bacteria .

4 a- Rhizosphere :

The region of soil adjacent to plant roots .more dense microbial than soil distant from the root due to organic substances exuded by the root in the form of amino acid ,sugar ,vitamins and hormones. Microbial rhizospher change with plant age and soil types.

4 **b- Influence of plants upon soil microorganisms** .

1 –Plant exude (organic& inorganic) favor the growth of microorganisms .

2 –Plant supply energy for the growth of microorganisms .

3 –Plant remove injurious influence upon the growth of microorganisms .

4 –Plant modify the structure of soil ,thereby favorable for development of microorganisms .