role of the microganisms of the rhizosphere on the growth and production of one curbetae and biological control of root disease

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The experiment had been done in pots under the conditions of greenhouse in Desert Research Center by using sandy soil obtained from 10th of Ramadan district and all the pots have received (1%) sheep manure as organic matter. Calcium ammonium nitrate 33.3% N was added at a rate 300 kg/feddan, calcium supper phosphate 15.5% P2O5 was added at a rate 150 kg /feddan and potasium sulphate 48% K20 was added at a rate 100 kg/feddan. The aim of this study was to evaluate the effect of inoculation with the most efficient strains of Azotobacter or Azospirillum or Streptomyces or as a mixture di or tri on the growth and yield of cucumber plants grown in sandy soil and on controlling of root-rot disease causing by Rhizoctonia solani. The used biofertilizer strains were isolated from Egyptian soils under different plants and different locations, but for pathogenic fungus, it was isolated from rotted roots of cucumber plants grown in Noubaria city.Identification of the selected organism was also carried out. The rhizosphere samples were collected at different stages of plant growth i.e. vegetation, flowering, fruiting and harvesting to determine the total microbial counts, actinomyces counts, azotobacters and azospirilla densities for cucumber plants, different parameters (shoots height, roots length, fresh and dry weights of both shoots and roots, chlorophyll content, number of flowers and fruits/plant, fruit fresh weight/ plant and total nitrogen of fruits) were recorded.The obtained results can be summarized as following :A number of 117 N2-fixing diazotrophs and actinomycetes have been isolated from different localities of Egyptian soils cultivated with different plants. These isolates were 25 N2-fixing diazotrophs and 11 actinomycetes.Pathogenic fungus was isolated from rotted cucumber roots collected from Noubaria city and identified as Rhizoctonia solani.The nitrogen fixation ability of Azotobacter and Azospirillum were tested. Also, antagonistic activity of Azotobacter, Azospirillum and actinomycetes were tested and the most active isolates of them (2 isolates of each) were chosen.Azotobacter isolate Rf (isolated from 10th of Ramadan soil cultivated with Foeniculum and Azospirillum isolate lc isolated from El Khatatba soil cultivated with cuminum proved to be the most active isolates for nitrogen fixation (280 ppm and 133 ppm), respectively. Actinomycetes isolate, Ncui isolated from Noubaria soil cultivated with cucumber, Azotobacter Rf and Azospirillum lc were the most active isolates in antagonizing the pathogenic fungus. (The inhibition zone diameter were 22, 15 and 17 cm respectively.For root colonization ability the three strains Rf, KG,

Ncu, were the most active ones and ranged descendingly as Azospirillum sp. K (63.5%), Azotobacter sp. Rf (62%) and Streptomyces sp. Ncui (41.4%).These isolates were identified as Rf (Azotobacter chroococcum),(Azospirillum lipoferum) and N., (Streptomyces lydicus) Pathogenic fungus isolated from rotted cucumber roots was identified as Rhizotonia solani.Inoculation with N2-fixers and Streptomyces lydicus reduce the disease severity index (DSI) of infected cucumber plants from 75% to 50%.Inoculation with strains Rf, Kc,Ncui, individual or in a mixture di or tri stimulated the growth of total microbes in infested and uninfested sandy soil cultivated with cucumber plants. The highest total microbial count was noticed in inoculated treatment with a mixture in unifested and infested soil being 276, 240 x 104 cfu/g dry soil comparing with control treatment being 128, 112 x 104 cfu/g dry soil at fruiting growth stage, respectively.10.Inoculation with a mixture of N2 fixers diazotrophs (Re + Kc) and Streptomyces lydicus N., increased actinomyces counts to considerable extents. The highest counts of actinomyces (99 and 87 x 103 cfu/g dry soil) were recorded in infested and uninfested soil at fruiting stage of cucumber plant growth, respectively.11.Inoculation with strains Rf, lc, N., as a mixture increased azotobacters, density. The highest densities of azotobacters (1.1, 0.84 x 104 cells /g dry soil) were recorded in infested and uninfested soil applied with a mixture of lc + Ni. + Rf at fruiting stage of plant growth, respectively.Inoculation with Rf , Ke, Nie strains reduced the effect of R. solar?’ on azospirilla densities as the densities in infested soil less than uninfested one . The densities of azospirilla in inocualted treatments wee more than control. The highest densities (1.3, 1.7 x 104 cells /g dry soil) were recorded in soil applied with a mixture of (Rf + +New) strains in infested and uninfested soil at fruiting stage, respectively.13.Inoculated treatments increased cucumber plants height from 113.6 cm in control uninfested soil to 160.1 cm using a mixture of biofertilizer. However cucumber plants cultivated in infested soil were shorter than, those cultivated in uninfested ones being 87.8 cm in infested control soil and 124.7 cm using a mixture inoculation.14.Inoculated treatments gave the highest root length being 38.1 and 43.7 cm in the presence of a mixture of Rf, Kc, Neu, strains for infested and uninfested soil at harvesting stage of plant growth, respectively.15.Inoculation with a mixture strains under study gave remarkable increases in the stem fresh weights being 37.2 and 45.5 gm and 3.5 and 5.2 for stem dry weights in infested and uninfested soil at harvesting stage of cucumber plant growth, respectively.16.Inoculation with tri strains Rf + + New decreased the harmful effect of pathogenic fungus R. solani in fresh or dry weights of cucumber roots. The highest fresh weight were (4.85 and 5.9 gm) for infested and uninfested soil at harvesting growth age of.cucumber plants, respectively. The corresponding figures for dry weights of roots were 0.91 and 1.2 gm.17.The highest chlorophyll content was at flowering stage in uninfested soil 47.9% using a mixture of Rf, IC, Ned but the lowest one was 44% with Streptomyces inoculation comparing with control 35.6%, while infested control soil recorded only 33.3 % .18.Inoculation with a mixture strains increased cucumber flowers and fruits number in uninfested soil comparing with infested one (54.6, 39.3) flowers/plant and (22.7, 16) fruits/plant.19.Cucumber plants cultivated in inoculated treatments had fresh weight for fruits more than uninoculated. Inoculation treatments decreased the

reduction in fruits fresh weight caused by infection with R. solani for plants. The maximum weight was 297.3 gm/plant using a mixture strains in uninfested soil. For infested one inoculation with Rf, Re and Ned increased the length to 201.6 gm/plant comparing with infested control 83.9 gm/plant.20.Cucumber plants cultivated in infested soil had lower fruit N-content and protein than those cultivated in uninfested ones.21.The highest total N and protein % of cucumber fruits cultivated in uninfested soil treated with mixture strains were 1.52; 9.5% but for infested soil were1.4; 8.75 %, respectively.