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Biological control of leaf spot, crown and root rot disease of tomato caused by *Drechslera halodes* in Iraq

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Tomato (*Lycopersicon esculentum*) belongs to solanaceae family, it is an important vegetable crop. *Drechslera halodes* (Drechsler) Subram and B. L. Jain is a common plant pathogen fungus causing leaf spot, crown and root rot disease of several plant species including tomato worldwide. Isolation from infected tomato plants from three provinces in the middle and south of Iraq were Babil, Karbala and Wasit demonstrated the presence of the pathogen. *D. halodes* was predominant while appeared in 83.33% of the samples with frequency of 50.25%. Pathogenicity test of 55 isolates of the fungus were estimated on tomato seedling under greenhouse conditions and the results indicated that all of the isolates were pathogenic, the isolate Kkd-6 exhibited maximum values of disease severity of the shoot and root system were 88.33%, 92.85% respectfully compared with control which was 0%. Biocontrol agents were collected from the rhizosphere of the healthy tomato plants, sixty four bacterial isolates were isolated and purified, antifungal activity of the bio-agents were carried out using dual culture technique on the potato dextrose agar, four isolates of them were Wb-12, Kb9, Bb18 and Kb-18 significantly reduced the mycelial growth of the pathogen *in vitro*, while exhibited 14.28% antagonism efficiency, identification of the bio-agents using Vitek 2 compact system technique showed that isolates Wb-12, Kb-9 belong to *Bacillus subtilis* isolate Bb-8 belong to *Enterococcus columbae* and isolate Kb18 belong to *Pseudomonas putida*. Under greenhouse conditions all of the bio-agents were reduced significantly the percent of disease incidence to 5-10% and severity of shoot and root system to 5.00-8.33%, 2.14-7.14% respectfully compared to control which exhibited 100% disease incidence and severity of shoot and root system of 90.00%, 93.57% respectfully. It appears that the disease of the leaf spot, crown and root rot disease is spread widely in the tomato growing area in Iraq control the disease using local isolates of the rhizobacteria consider as one of the most friendly ecosystem method of disease management, since the indiscriminate uses of the pesticides raised the resistance of the pathogen against the active substance of the pesticides. This is first report of *Drechslera* leaf spot; crown and root rot disease of tomato in Iraq.

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Biodiversity and seasonal distribution of wild mushrooms at ENPOST forest in Ilesa, southwest Nigeria

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This study was conducted on the diversity and seasonal distribution of wild mushrooms at ENPOST forest, Ilesa, Osun State, southwest Nigeria. Mushrooms found growing in the lignicolous and terrestrial habitats of the forest were collected, identified and enumerated 2 to 3 times on a weekly basis for a period of 13 months (March 2014 to March 2015), combining both rainy and dry seasons. A total of 152 mushroom species belonging to divisions Basidiomycota (146) and Ascomycota (8) were obtained during the sampling regime. The highest species richness 70(16.7%) was obtained in October 2014, whereas March 2015 had the least 11 (2.6%). In the same vein, relative abundance of mushrooms found growing in the terrestrial habitat was higher in May, September and October 2014, than those in the lignicolous habitats. *Hygrocybe vitellina* and *Schizophyllum commune* predominated in the terrestrial and lignicolous habitats respectively. Species richness and evenness, expressed as Shannon-Wiener index in the lignicolous and terrestrial habitats during the rainy season were 3.912 and 3.304 respectively and found higher than the dry season (3.019 and 2.167 respectively). Correlation analysis revealed that average monthly precipitation positively correlated with the relative abundance of mushrooms in the terrestrial habitat ($r=0.7018$, $p=0.024$). All the mushroom species investigated were specific to their respective habitats. The findings of this study show the diversity of mushroom flora at ENPOST forest, Ilesa, southwest Nigeria, thereby necessitating strict and sustainable conservation measures especially for mushrooms with great economic values.

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