

EVALUATION OF SOME FUNGI AND BACTERIA AS BIOLOGICAL AGENTS TO FUSARIUM WILT OF BANANA

Ziedan, E. H. ¹; Eman S. Farrag² and Moataza M. Saad³

1- Plant Pathology Dept. National Res. Center, Cairo, Egypt.

2- Agric. Botany Dept. Fac. of Agric. South Valley Univ. Quina, Egypt.

3- Microbial chem. Dept. National Res. Center Cairo, Egypt.

ABSTRACT

Fusarium oxysporum Schlechtend : Fr f.sp. *cubense* (FOC) (E F. Smith). Snyder & Hansen were the most causal organism causing wilt disease of banana plant at Beheira , Gharbea and Assuit Governorates, Egypt. *Fusarium* wilt disease of banana showed to be similar to those of other plants. Discoloration brown to dark of pseudostem and rhizomes was the most indicator of *Fusarium* wilt of banana plants.

In vitro four microbial isolates from the banana root and rhizosphere showed highly antagonistic activity to *F.oxysporum* f. sp. *cubense*. These isolates were identified as *Bacillus subtilis* (Ehrenberg) Cohn (No.1), *Pseudomonas fluorescens* Migula (No.3), *Trichoderma harzianum* Rifai (No.6) and *Laetisaria arvalis* Burds (4). *Bacillus subtilis* (Ehrenberg) Cohn (No.1); *Pseudomonas fluorescens* Migula (No.3) and *T. harzianum* isolates were the most antagonistic isolates inhibiting mycelial growth of *F. oxysporum* f.sp. *cubense*. These antagonistic strains were excreted antifungal lytic enzymes on liquid medium containing dead mycelium of *F. oxysporum* f. sp. *cubense* i.e. chitinase, β 1-3, β 1-4 glucanases and protease. Chitinase and protease enzymes were the most lytic produced by all antagonistic strains. while β 1-3 and β 1-4 glucanases were produced at a moderate rate.

Bacillus subtilis (Ehrenberg) Cohn (No.1) was the most antagonistic strain producing chitinase and protease followed by *L. arvalis* and *T. harzianum*. On the other hand, *Bacillus subtilis* and *L. arvalis* were the most antagonistic producing diffusible and volatile antibiotics followed by *P. fluorescens*. while, *T. harzianum* was the least antagonistic phase of antibiotics. Pot trails conducted during a summer season, revealed that dipping banana roots transplanting root in the suspension of *B.subtilis*, *P.fluorescens* Migula, *T.harzianum* Rifai and *Laetisaria arvalis* Burds 3×10^8 (CFU/ ml) for one and two hours or soil drench with 100 and 200 ml / pot were effectively reduced wilt disease incidence of banana plants, respectively. Under field naturally infestation with *F.oxysporum* f.sp. *cubense* soil dranch of banana around rhizome region by suspension of *B.subtilis*, *P.fluorescens* Migula, *T.harzianum* Rifai, and fungicide (Topsin) reduced the wilt incidence than control . Soil drenched with 300 ml of *B. subtilis* significantly reduced the wilt incidence by 50% compared with control. Whereas the *P. fluorescens* Migula failed to control *Fusarium* wilt. *B. subtilis* was the most promising biocontrol agent against wilt disease of banana.

Keywords: Banana, *Fusarium oxysporum* f.sp. *cubense*, biological control, *Fusarium* wilt .