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## SUMMARY

*Fusarium* rot diseases caused by species of *Fusarium* are one of the important diseases that attacks onion plant for seed and bulb production. Therefore, the present investigation was planned to study the role of onion seeds in fungus transmission, the association of *Fusarium oxysporum* f. sp. *cepae* and *F. moniliforme* with diseased onion parts, the variation of pathogenic capability of *Fusarium oxysporum* f. sp. *cepae* and *Fusarium moniliforme* on onion cv. Giza 6 seed and bulb onion, the variation within fungal species and isolates using molecular biological approaches e.g. protein profile isozyme analysis and PCR., Pathogenesis related Proteins chemical analysis of onion for seed production and for bulb production and the constitute of root exudates for amino acids and sugars and their role in pathogenesis process and the effect of some bioagents against *Fusarium oxysporum* and *Fusarium moniliforme*.

Results of this work can be summarized as follows:

- 1 - Eighteen onion seed samples were collected from different parts of Assiut, New Vally, El-Mina and Beni Sweef Governorates.
- 2 - Ten isolates of *Fusarium moniliforme* and 8 isolates of *F. oxysporum* f. sp. *cepae* were obtained either from onion seeds, onion diseased parts or from onion rhizosphere.
- 3 - All the tested isolates proved to be pathogenic on seed and bulb onion with different degrees of virulence.

4 - Quantitative differences in the electrophoretic patterns of protein profiles were found among all tested isolates *Fusarium oxysporum* (8 isolates) and *F. moniliforme* (10 isolates). Several protein bands were found to be common proteins in all tested isolates of the two species and considered as genus specific proteins. However, other protein bands were common in the isolates of the same species and considered as species specific proteins. Meanwhile some other protein bands were expressed only on one or more of the isolates. Estimates of similarity indices revealed moderate to high similarities between the tested isolates of the same species of *Fusarium*.

5 - Cluster analysis of the obtained protein profiles provided clearcut differentiating features between *F. moniliforme* and *F. oxysporum*.

Results suggested that the similarity in protein patterns also reflects the similarity in virulence of the isolates and could be used as molecular marker (indicator) for virulence between the different isolates of *F. moniliforme* and *F. oxysporum*. The comparative analysis of protein patterns revealed that the virulent isolates of both *F. moniliforme* and *F. oxysporum* characterized by some specific protein bands which were not found in the least virulent isolates.

6 - Protein bands detected in the virulent isolates of *F. moniliforme* differed from those detected of *F. oxysporum* which indicated that the mechanism of virulence in *F. moniliforme* differed from that in *F. oxysporum*.

- 7 - Results suggested also that infection of mean both for bulb or seed production of Giza 6 variety with *F. oxysporum* f. sp. *cepae* induced the synthesis of new sets (8-proteins) of low molecular weight proteins which may have an important role in inducing resistance against further infection by the pathogen.
- 8 - 15 amino acids (Aspartic, Threonin, Serine, Glutamic, proline, Glycine, Alannise, Cystine, Valine, Methionine, Isoleucine, Leucine, Tyrosine, Phenylalanine, Histidine, Lysine and Arginine) were present in root exudates of seed and bulb onions and the amount of amino acids secreted by seed onion was much higher.
- 9 - The mycelial weight of growth of the most virulent isolates of *F. oxysporum* and *F. moniliforme* increased by root exudates of seed onion compared to root exudate of bulb onion.
- 10 - Chemical analysis for root – exudates of onion for bulb production proved the presence of alcohol sugar (Meso-Erythritol) while root exudates of onion for seed production proved to contain Galactos sugar.
- 11 - *Trichoderma harzianum* have a destructive effect on the growth of the two tested fungi whereas *Epicoccum nigrum* and *B. subtilis* gave the lowest.
- 12 - This results recommend that the use of *T. harzianum* as a bioagent may be taken in consideration through a control program against the causal pathogens.