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SUMMARY

Survey was carried out in two successive seasons (from June to October of 2002 and 2003) pervaded different localities in El-Qanater El-Khayria (Qalyoubiya), Derwa (Menoufiya), Belbees (Sharkiya), New Salyhia (Ismailiya) Governorates, all in North-eastern Delta, Egypt. All experiments were performed at Plant Pathology Laboratory, Greenhouse, and Molecular Biology Laboratory, Plant Pathology Institute, Agricultural Research Center (ARC), Giza to determine the fungal dieback disease frequency in pear Le Conte cv. (*Pyrus x lecontei* Rehder). An attempt was performed to reduce or eliminate (if possible) the pear dieback disease using biological and chemical means.

The top results can be summarized as follows:

- 1- Dieback disease was detected in all surveyed localities with different rate of severity, the highest recorded in Ismailiya (19.65%) and the lowest in Sharkiya (16.21%) both in 2003 growing season.
- 2- When the monthly average of some weather factors reports are considered (Institute of Agricultural Meteorology, ARC), positive correlation was found between monthly average of temperature and relative humidity and averages of disease severity percentages.
- 3- Pure culture of some related fungi were isolated and identified (through culture characteristics and microscopic observations) as *Botryodiplodia theobromae*, *Fusarium solani*, *Alternaria solani* and *Aspergillus niger*.

- 4- Pathogenicity tests demonstrated that *B. theobromae*, but not *A. solani*, *A. niger* or *F. solani*, is the causal pathogen of pear twig, branch and flowers dieback disease. Results of pathogenicity indicated that *B. theobromae* isolated from Qalyoubiya was most pathogenic among other isolates
- 5- Differential studies between the four geographical *B. theobromae* isolates (*i.e.* isolated from Qalyoubiya, Menoufiya, Sharkiya and Ismailiya governorates), showed that:
 - The pathogenicity of Menoufiya isolate was decline with increasing the incubation period to 35 days than other isolates, followed by Ismailiya, Sharkiya then Qalyoubiya isolates.
 - No considerable differences between the four isolates when incubated under increasingly temperature. Mycelial growth and sporulation of all isolates were increased with increasing incubation temperature from 10 to 30°C, and then the all declined under 35°C.
 - The same trend was noticed regarding the disease severity, when the inoculated seedlings incubated at the same temperature degrees.
 - The two isolates (from Menoufiya and Ismailiya) only were affected with the growth conditions and produced red pigments in their culture plates, while other two (from Qalyoubiya or Sharkiya) can not.

- Slightly differences between four isolates dealing growth rate were recorded. The Qalyoubiya isolate was faster (av. 65%), Sharkiya (64%), Menoufiya (62.0%), then Ismailiya isolate (58.4%).
 - Electrophoretic of water soluble protein extracted from mycelia of four *B. theobromae* isolates using SDS-PAGE revealed quantitative differences between the four isolates of *B. theobromae*, relative to their virulence.
 - The Random Amplification of Polymorphic DNA (RAPD) Polymerase Chain Reaction (PCR) revealed that there were no genetic diversity within the four tested isolates of *B. theobromae*.
 - Histopathological observations demonstrated that there was a correlation between the histological changes and symptom development. The anatomical differences were associated with aggressiveness of tested isolated *B. theobromae* and relative to their virulence.
- 6- Regarding Strategy of dieback disease control:
- Five of 7 commercial fungicides only (*i.e.* Kemdazin, Topsin, Rubigan, Topas, and Tecto) induced considerable inhibitory effect, as same order, in the mycelial growth of the four *B. theobromae* isolates *in vitro*. Meanwhile, spraying the inoculated pear seedlings with Rubigan, Topsin and Kemdazin at recommended dose under greenhouse conditions reduced dieback incidence, especially when

sprayed 1 or 7-days before and after inoculation with the causal isolates.

- Biological control was achieved using two commercial bio-products (*i.e.* Rhizo-N and Plant-guard) with recommended doses. Both tested bioagents showed the highest effective in prevent dieback incidence at different rate when applied simultaneously with inoculation or after 7-days under greenhouse conditions.

CONCLUSIONS

Dieback in pear orchards is a serious disease affecting all tree stages for several seasons especially in the summer seasons.

There are positive correlation between dieback disease severity and environmental conditions (temperature and relative humidity). So, grow only species and varieties or cultivars of trees and shrubs that are well adapted to the area and site.

During pruning, completely remove any dieback symptoms and destroyed it, then treated with suitable sterilants gave encouraged control.

Commercial bioagents (*i.e.* Rhizo-N or Plant-Guard) with recommended dose could be used to reduce the dieback disease.

Using biotechnology techniques to obtain new developed species and varieties or cultivars have tolerant or resistant against dieback pathogens.