

ABSTRACT

ATEF SABRY ABD EL AZIZ ALY: Studies on Verticillium wilt of olive in Egypt. Unpublished Doctor of Philosophy in Agricultural Science, Ain Shams University, Faculty of Agriculture, Department of Plant Pathology, 2006.

The holy olive tree, *Olea europea L.*, is symbol of love and peace which was told at all angelic holy books, i.e. TAWRA, BIBLE and QURAN.

Olive Verticillium wilt disease caused by *Verticillium dahliae* kleb., is a destructive soil borne disease, considered one of the most important and economic disease of olive. It causes serious yield losses and affect quantitvely and qualitatively on the olive fruits and oil production. Disease spread was increased in the last few years on olive crop in Egypt according to extension of cultivation in new reclaimed lands where olive became an economic fruit crop. Therefore, the present work was planned to study the disease survey in certain production farms of olive, the symptoms of Verticillium wilt of olive were defined as leaves on one or more branches suddenly collapse and die, dead leaves, bloom and flower clusters remain on the trees. The olive plant samples showed typical symptoms of disease were collected and 1654 isolates of *Verticillium dahliae* kleb. were yielded, purified and identified, then classified according to morphological characters to 22 groups. The inspected governorates showed that the highest number and percentage of natural infected trees with Verticillium wilt were recorded at **Matrouh, Beheira and North Sinai** governorates. The most frequent isolates of *Verticillium dahliae* were coded with numbers 1-12-11-5-6-7-26, meanwhile the less frequent isolates were 2-16-34-21-20-14-13.

Pathogenicity test showed that, all the 22 isolates of *Verticillium dahliae* kleb. were pathogenic with different degrees of disease incidence and disease severity to olive transplants of both **Agizi Shami** and **Coronaiki** cultivars. Isolates No. 1-3-5-7-6-11-12-2 were most virulent, however, isolates No. 34-21-20-14-13 were less pathogenic. Screening of 15 cultivars of olive transplants, revealed that all inoculated cultivars exhibited the typical symptoms of Verticillium wilt disease but varied in their susceptibility with different degrees of infection and could be divided into 3 groups according to their susceptibility as follows: The highly susceptible group consisted of Agizi Shami, Hamed, Mission, Manzanillo, Coratina and Coronaiki cvs., while the moderate susceptible group of cultivars were Picual, Toffahi, Kalamata and Dolci, cvs., meanwhile the less susceptible group of cultivars were Frantio, Wardan, Arbqueen, Waitaken and Shemlali cvs. Polyacrylamide gel electrophoresis, **SDS (PAGE)** of protein pattern of the tested twenty two isolates of *Verticillium dahliae* kleb. proved that isolates from different infected olive trees in different locations were clearly different in protein pattern. According to over all similarity level, isolates were classified to 6 groups. However, molecular fingerprinting of 22 isolates of *Verticillium dahliae* kleb. were characterized by using genetic markers obtained after their DNA PCR amplification with **DNA (RAPD)** primers. Three primers i.e. P1, P2 and P3 were used, results indicated that primer P1 was the most appropriate to detect the genetic variations among different isolates where it classified isolates to 6 groups. However primers No. 2 and 3 arranged 3 groups of isolates.

Chemical control were tried in this study to evaluate the efficacy of nine fungicides namely, Opus 12.5% E.C., Eminent 12.5% E.C., Score 25% E.C., Topsin M-70% W.P., Benlate 50% W.P., Hista 70% W.P., Actazim 50% W.P., Aliette 80% W.P. and Tecto 45% F.L.

In reducing the mycelial growth of the pathogen on PDA medium and minimizing the disease severity of wilt disease of olive transplants inoculated with isolate No. 1 of *Verticillium dahliae* (the highest virulent). Such fungicides were applied in pot experiments to evaluate their efficiency under greenhouse conditions against Verticillium wilt disease of two olive cultivars i.e. **Agizi Shami** and **Coratina**. Soil drench method of fungicides application showed the highest therapeutic effect followed by injection into stem and spray application on reducing the percentage of infection and disease severity of olive wilt disease after two months from fungicides application.

KEY WORDS:

Olive tree, *olea europaeae L.*, olive diseases, soil-borne fungi, *Verticillium dahliae* (kleb), isolates, microsclerotia, wilt, Cultivar reaction, chemical control Fungicides, Olive oil, olive variety or cultivar, Genetic Markers, pathotypes, in planta detection, Molecular diagnosis, Pathogen – free certification programs, Variant identification, Molecular fingerprinting, Random amplified polymorphic DNA (**RAPD**), polymerase chain reaction (**PCR**), sodium dodecyl sulphate (**SDS**), polyacrylamide gel electrophoresis (**PAGE**), Air temperature, soil temperature, Air Relative Humidity, soil moisture.

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