

PHOMA STEM BLIGHT OF OLIVE PLANTS CV. ARBEQUINA

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ABSTRACT

Olive (Olea europea L.) is an economic important crop in Greece. In spring 2008, one year old trees (cv. Arbequina) were observed with stem blight symptoms. The symptoms were associated with leaf chlorosis, defoliation, twig dieback and eventual plant collapse. A Phoma sp., were isolated from the infected plants. All isolates were produce gray-green mycelium on PDA with typical conidia and brown chlamydospores in chains. Sporulation and obsulance of pycnidia were observed on oatmeal medium three days after inoculation. Pathogenicity was assessed by inoculating healthy one year old olive plants (cv Arbequina) with spore (1x 10⁶ conidia/ml) suspensions. Control plants were treated only with water. One month after inoculation inoculated plants were observed with leaf chlorosis, defoliation and twig dieback. Two months later clear stem blight symptoms were observed. Stem blight of olive plant seedlings (cv Arbequina) caused by Phoma species is a first report in Greece.

INTRODUCTION

Olive (*Olea europaea* L.) is one of the major tree crop in Greece. The olive trees have been cultivated since the ancient times mainly for the olive oil (black olives) or for olives consumption (green olives). The planting distance for olive trees varies from 7 to 10m each way, depends mainly on the habit of the cultivar and the scheme. *Olea europaea* L., cv. Arbequina is a small olive tree with small fruits consider for high density plantings promising high yield. The production starts early after the first year and is high. Arbequina cultivar was considering tolerance to *Verticillium* wilt caused by the soilborne pathogen *Verticillium dahliae*, a magor pathogen in olive production in Mediterranean countries. In spring 2008, an unidentified disease occurred of olive trees cv. Arbequina in a new, one year, plantation in central Greece. The disease caused stem blight associated with leaf chlorosis (Figure 1a), defoliation, twig dieback and eventual plant death. Most of the infected plants were stand partially defoliated with brown roll back leaves on the field (Figure 1b). Whereas heavy infected plants were observed death (Figure 1c).

The casual organism was isolate from twenty infected plants in vitro and in planta studies were undertaken in order to prove Koch's postulates.

MATERIALS AND METHODS

The casual organism was isolate from twenty infected plants in vitro onto PDA plates. Infected stems segments from twenty infected plants were surface sterilized in 0.5% NaOCl (1 min), rinse three times in sterilized tapwater, plate onto PDA and onto V8 agar

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and incubate at 25° C in dark. The pathogen was identified according to morphological characters. Pathogenicity was assessed by inoculating soil with spore suspension (1×10^6 conidia/ml) and transplanting healthy (one year old olive plants cv. Arbequina) on it. Control plants were treated only with tap water. Treatments were 40 folds. Disease symptoms and the progress of the disease were observed 30, 60, 75 and 90 days after inoculation. The chlorophyll content of the infected and health plant leaves was estimated. Measurements were taken using Minolta SPAD-502 chlorophyll meter (Wu *et al.*, 2007). SPAD readings were taken from four top plant leaves at 60 days after inoculation. Healthy olives fruits number per plant was also observed. Measurements were taken from 40 plants per treatment. Data were analyzed with the statistical program Minitab ver. 13 and present in box plot graphs.

RESULTS

In vitro tests from all affected plant stem segments a same fungus was isolated. The fungus was identified as *Phoma* sp., based on conidia shape, chlamydospore production and colony color (Fig. 2) onto PDA, V8 and oat agar plates according to Boerema *et al.*, (2004). After four days of incubation plenty of pychnidia were observed onto V8 agar. First symptoms of the diseases were leaf chlorosis, partial defoliation and twig necrosis (Fig. 3). Those symptoms appeared 30 days after inoculation. Two months later clear stem blight symptoms with mummify olive oils remain attached and brown roll back leaves were observed (Fig. 4). Dead plants began to appear 90 days after inoculation. A *Phoma* sp. was reisolate from all the infected plants.

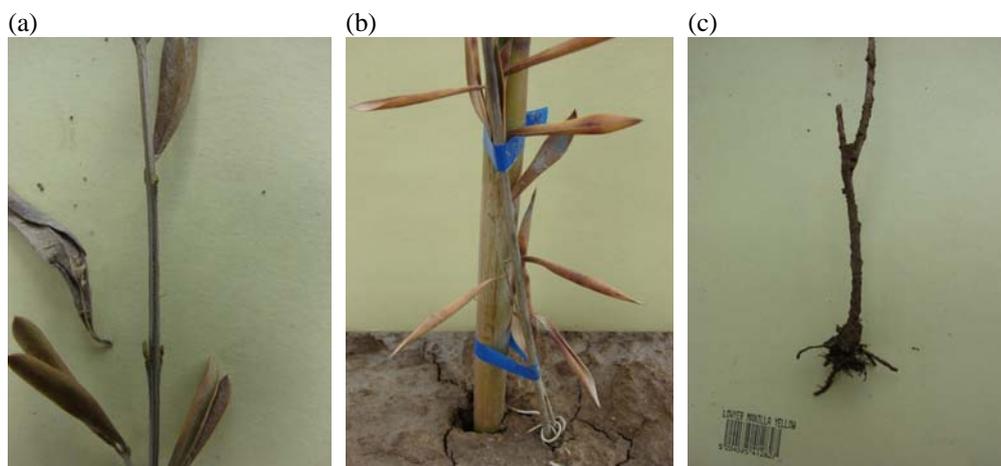


Figure 1. Disease symptoms were observed as stem blight (a), partially defoliated with brown roll back leaves (b) and death plants of cv. Arbequina with a less root system (c).

SPAD readings showed significant treatment differences at 60 days after inoculation (Graph 1). Infected plants showed significant low leaf chlorophyll contents SPAD values indicate the leaves necrosis process as mention above.



Figure 2. For the left to the right, *Phoma* sp., colony morphology on PDA, V8 and oat agar medium.

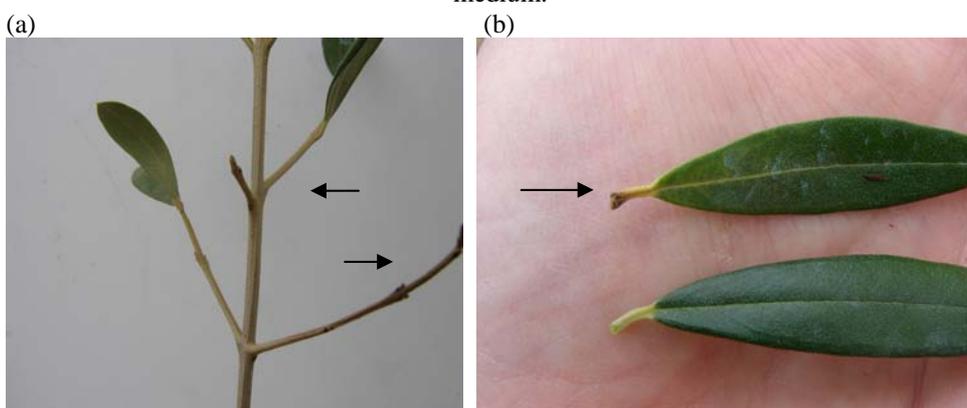


Figure 3. Branches necrosis (a & b arrows) and partial defoliation (b) occurred before plant death.

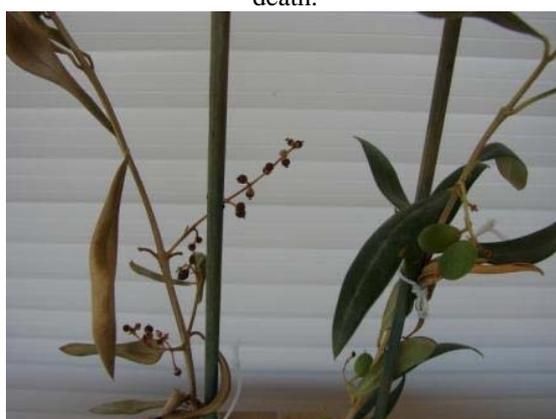
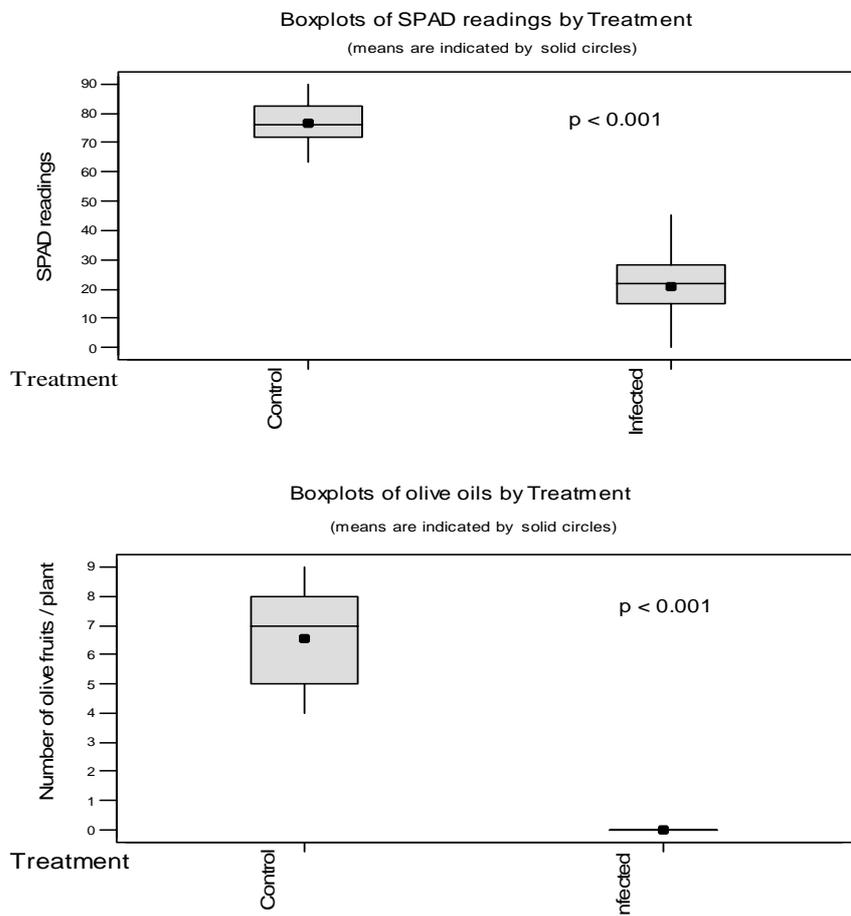


Figure 4. Infected olive plant (on the left) shows stem blight symptoms with brown leaf and mummifies fruits compared with the untreated control (right).



Graph 1. Box plot graphs (SPAD and number of olive fruits/plant) present the statistical differences for infected with *Phoma* sp., olive plants and untreated (control) at 60 days after fungus application.

DISCUSSION

To our knowledge, this is first report of stem blight caused by *Phoma* sp., on olive cv. Arbequina in Greece.

REFERENCES

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