

**FICUS CARICA ROT ROT DISEASE CAUSED BY ARMILLARIA MELLEA AND
ROSELLINIA NECATRIX IN GREECE**

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KEY WORDS: *Ficus carica*, Rot rot disease, *Armillaria mellea*, *Rosellinia necatrix*

ABSTRACT

Armillaria mellea and *Rosellinia necatrix* were observed as the most aggressive rot pathogens of *Ficus carica* cultivar (Smyrna) in central Greece. Both pathogens cause fig rot root, stress old trees and kill young plants. Common symptoms shown by infected trees are, yellowing of the leaves, early leaf fall, premature autumn color, splitting of the bark, plant defoliation and plant death. Both diseases are confirmed by the presence of white mycelium found under the bark and on the infected roots. Infections are common in fig cultivars near the forest.

INTRODUCTION

Armillaria mellea and *Rosellinia* spp. is recorded all over the world as a root rot pathogen of forest and orchard trees, and is common in both temperate and tropical regions. *A. mellea* is a vigorous pathogen of many important trees (Arora 1986). The fungus lives as parasites on living host tissue or as saprophytes on dead plant material. *A. mellea* invades healthy trees via the roots and develops a white mat mycelium under the bark. An infected tree wilts and dies (Singer 1986).

Many species of the Genus *Rosellinia* occur as saprophytes, out of which some live endophytically and occasionally turn into pathogens and only a few species are known to occur as primary root pathogens (Hoopen and Krauss 2006). Among the most well-known root pathogen is *R. necatrix* Prill. (anamorph: *Dematophora necatrix* Hartig).

R. necatrix is a pathogen that causes root rot of many plants (Sivan and Holliday 1972), mainly trees, including forest trees (Anselmi & Giorcelli 1990) and orchard trees, such as almond, peach, plum, apple, pear, olive, cherry and avocado (Sztejnberg and Madar 1979; Sousa et al. 1995; Schena et al. 2002).

Apart of trees, there are numerous reports of serious infections caused by *R. necatrix* on a variety of crops, weeds and important plants over the world. There is no record of the disease on fig tree orchards. This research reports a new record of infection and symptoms caused by *R. necatrix* on fig trees.

In the northern region of the island of Evoia, Greece, fig seedlings and trees in fig tree orchards were reported to decline and die from an unknown disease. In May 2008 the problem was investigated and the disease was attributed to *A. mellea* and *R. necatrix*.

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RESULTS

Concerning disease symptoms, caused by *A. mellea* white mycelial fan of the fungus were observed under the bark at the base of the infected fig trees in a distance more than 15 cm up the stem (Fig. 1). Infected young trees wilt and died in 1-2 cultivation periods. Abundance of fungus fruits bodies, the brown mushrooms of *A. mellea* were observed under the base of the infected old trees (Fig. 2).

Concerning disease symptoms, caused by *R. necatrix* main roots of infested trees or seedling stem base, are covered by a white cottony mycelium and mycelia strands whereas leaves turn yellow. The pathogen attacks and kills seedlings and young trees in a few months and older trees in 1-2 cultivation periods.

The cultivation of fig tree (cv. Smirnis) is almost a monoculture in northern Evoia, Greece, for over of 80 years. In the past 4 years, many trees in this region showed a general decline and many of them died over prolonged warm summer periods in July and August. In summer 2008, typical disease symptoms were observed both on old (50 years old) trees and younger (10-15 years old) trees. Diseased trees were shown a general decline with yellow leaves (Fig. 3). When two years old trees were planted to replace dead diseased fig trees, were suddenly (in five days) died (Fig. 4), in all cases. All diseased trees were cultivated in soils with high moisture, next to a forest. Most of the diseased old fig trees have been planted on a place, after forest clearance.

The disease can be identified by the infected base of the tree trunk, at soil level (Fig. 5). In this area, on the exterior part the infected tree base appears white, cottony mycelium and mycelia strands surrounding the trunk (Fig. 6). Infested plant tissues were discoloured. A dark coloured mycelia strands (rhizomorphs) were observed on the surface of the infected roots (Fig. 7 and 8). Infected secondary roots were covered with white or grey dark cottony mycelium. In the high moisture almost saturated soils, the dead infected roots were completely destroyed, whereas a strong fruity-alcoholic odour was present. Dry root rot was observed on the main tree roots.

The identification of the casual disease agent was based on a direct observation with a hand lens and with microscopic observation of the vegetative mycelia structures, collected and cultivated onto Petri plates from the diseased tissues. Thirty infected 10-15 years old fig trees and 20, 50 years old ones were observed. Mycelia from all cases showed the typical pear-shaped hyphae (Fig. 9) and synnemata (Fig. 10), of *R. necatrix*.

Until now *R. necatrix* has not been reported as a fig tree pathogen. In this investigation it was showed that *R. necatrix* is also a fig tree pathogen that could be a potential threat of fig trees in warm areas with high moisture soils and especially in plantation on former forests that were cleared for cultivation.

DISCUSSION

To our knowledge, this is first report of *Ficus carica* rot root diseases caused by *A. mellea* and *R. necatrix* on cv. Smyrna in Greece

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Figure 1. *A. mellea* white mycelial under the bark of infected tree



Figure 2. *A. mellea* fruiting bodies



Figure 3. On the left, 50 years old fig tree infested and declined by *Rosellinia necatrix*, compared with a healthy vigorous fig tree on the right.



Figure 4. A two-years old fig tree killed by *Rosellinia necatrix*. Leaves are remaining attached on the tree.



Figure 5. Dry rot (dark in colour) of a *Rosellinia necatrix* infected fig tree trunk base.



Figure 6. White cottony mycelium of *Rosellinia necatrix*, surrounding an infected fig tree base at the soil level.



Figure 7. White cottony mycelium and mycelium strands of *Rosellinia necatrix* on the surface of infected two years old fig tree base at the soil level.



Figure 8. White cottony mycelium of *Rosellinia necatrix*, grown in the soil surrounding the infected roots.



Figure 9. *Rosellinia necatrix* characteristic pear-shape hypha-cell.



Figure 10. Synnemata of *Rosellinia necatrix*.