Hyphal growth of *Raffaelea quercivora* within both seedlings and sterilized woods

Masato Torii, Yosuke Matsuda and Shi-ichiro Ito
Graduate School of Bioresources, Mie University, JAPAN

Japanese oak wilt, caused by a pathogenic fungus *Raffaelea quercivora*, has become obvious since 1980's. Wilting symptoms were suggested resulting from the spread of non-conductive sapwood with the hyphal growth in transverse sections. Differences in susceptibility to the fungus among Fagaceae species were supposed to be attributable to vessel arrangements; ring-porous species appeared to be more susceptible than radial-porous ones. However, previous studies demonstrated that the number of dead seedlings after the fungal inoculation differed significantly among the ring-porous species that is non-native oak species. The objective of this study was to clarify the hyphal growth of *R. quercivora* within sterilized woods eliminating active defense responses by host tissues. In July 2010, a *R. quercivora* strain was inoculated to seedlings of three non-native species; *Quercus coccinea*, *Q. palustris*, and *Q. rubra*, and two Japanese species; a higher susceptible *Q. crispula* and a lower susceptible *Q. glauca*. *Quercus glauca* has a radial-porous structure and the other four species have a ring-porous structure. All the seedlings were harvested at 2 weeks after the inoculation, and were soaked in a 1% (w/v) acid fuchsin solution. Non-conductive areas in transverse sections not stained with the solution were estimated. The same fungal strain was also inoculated into a piece of gamma-sterilized woods in each tree species. The inoculated woods were incubated at 25°C for 36h. Transverse sections with a 20μm thick were made at inoculation points, and were stained with Fluorescein-conjugated WGA to facilitate hyphal distributions. We measured the longest vertical distances between observed hyphae and inoculation points as hyphal lengths under a fluorescence microscope. Although non-conductive areas of *Q. crispula* and *Q. coccinea* were significantly wider than those of the other species, hyphal lengths detected at the seedlings were positively correlated with non-conductive areas. Moreover, hyphal lengths detected at the woods differed significantly among ring-porous species. These results indicate that the vessel arrangement does not necessarily affect the hyphal growth of *R. quercivora* as well as the host susceptibility.

Corresponding Author:
Masato TORII
Laboratory of Forest Pathology and Mycology,
Graduate School of Bioresources, Mie University,
Kurimamachiyamachi 1577, Tsu, Mie 514-8507, JAPAN
e-mail: 511D101@m.mie-u.ac.jp