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## The dynamics of *Raffaelea quercivora*, a causal agent of Japanese Oak Wilt

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**Purpose:** Japanese Oak wilt (JOW) caused by *Raffaelea quercivora* is one of the most serious forest pests in Japan. To comprehend the dynamics of *R. quercivora*, detail distribution of hyphae and construction of genets were investigated in inoculated or naturally infested oaks.

**Method:** Hyphal distribution, dysfunction of water conduction and host protective reactions were investigated in xylem of inoculated oak saplings with a fluorescent-conjugated lectin staining technique. Fungal genets were investigated on galleries and mycangia of the vector beetle with microsatellite markers.

**Results and conclusion:** Time-cause observation of inoculated saplings revealed that hyphae were confined within a relatively small area near the inoculation site. Affected area causing water occlusion and accumulation of defensive substances were limited around them. It suggests that JOW may not be induced by dysfunction of a small number of vessels but by that of many vessels, and it requires *R. quercivora* hyphae spread from many galleries bored by beetles during mass attack. While diverse genotypes of *R. quercivora* are patchy distributed in each galleries and were carried by a female beetle, which means that the beetle unloads and loads *R. quercivora* repeatedly. Because hyphae are able to extend among galleries, the mosaic pattern could be the result of invasions from other galleries. Although the teleomorph of *R. quercivora* is not found, it might maintain genetic diversity diverse without sexual reproduction. The beetle might be playing a role to maintain the genetic diversity of their symbiotic fungus.