

ANALYSIS OF JAPANESE OAK WILT SPREAD USING AERIAL PHOTOGRAPHY AND GIS

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Abstract

Japanese oak wilt (JOW) is an apparently exotic disease complex that has caused increasing levels of mass tree mortality in Japanese forests. The disease complex consists of the ambrosia beetle, *Platypus quercivorus* (Murayama) and the Ascomycete fungus *Raffaelea quercivorus* that coexist in a symbiotic relationship. The ambrosia beetle carries the fungus to uninfected host oak trees where it colonizes sapwood, causing necrosis, which restricts water conductance and ultimately leads to the death of host oak trees. We analyzed historical spread of JOW both at the regional scale and at the stand level. There were considerable differences in the patterns of spread observed at the regional vs. stand level. At the regional level, spread was more uniform and clearly separated four distinct foci. In contrast, spread at the stand level was much less uniform. It is also interesting that the rate of spread observed at the local scale (151 - 238 m / year) was substantially less than rates of spread observed at the regional scale (1805 - 5599 m /year). This difference is most likely a result of the fact that at the local scale, spread rates reflect both the gradual expansion around foci and to a limited extent (limited by the spatial extent of the study area) the formation of new colonies.