

# Thwarting *Phytophthora ramorum*: A Proposed Disease Cycle With Mitigation Measures<sup>1</sup>

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## Abstract

*Phytophthora ramorum* has become increasingly disruptive to the movement of nursery stock since it was described in 2001. Risk and mitigation assessments for *P. ramorum* have been done or are underway by APHIS. Because of the impact of this pathogen on forests and the nursery industry, accelerated research efforts are underway. Capturing new information in a graphic format was desirable. The lack of a single mitigation measure to effectively eliminate *P. ramorum* from nursery stock suggested the value of a diagram highlighting points in the disease cycle where mitigations may be effective. For each point, potential mitigation measures are listed. The diagram was compiled from scientific sources including published papers and proceedings of science panels. The proposed disease cycle originally had four phases: foliar hosts, canker hosts, soil/potting medium and dormancy phases. The multicyclic foliar and dieback hosts were linked with the monocyclic potential of canker hosts. The recent reports of the inoculation with infested potting media and persistence of the pathogen in potting media prompted the inclusion of the soil/potting medium phase. The potential survival of chlamydospores and mycelia are included in the dormancy phase. The four phases are color coded and linked by reproduction and survival of the pathogen. The proposed disease cycle is being presented in a variety of scientific forums to elicit feedback. The disease cycle and mitigation diagram was presented at the 2004 Ornamental Workshop hosted by North Carolina State University. Additions to the diagram following that interaction included sexual reproduction and the biological requirements to transition from one phase to the next. The proposed cycle (*fig. 1*) and mitigation measures are presented in an interactive poster format to prompt discussion.

*Key words:* *Phytophthora ramorum*, risk assessment, mitigation assessment

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**Proposed disease cycle for *Phytophthora ramorum*. Potential points for mitigation measures are indicated with pruning shears.**

