

Comparative Susceptibility of Plants Native to the Appalachian Range of the United States to Inoculation With *Phytophthora ramorum*¹

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Abstract

Phytophthora ramorum, cause of sudden oak death of trees or ramorum blight of other plant species, has many hosts. Some geographic regions, such as the Appalachian range of the eastern United States, are considered high risk of becoming infested with the pathogen because known susceptible plants occur there and climatic characteristics appear favorable for infections by this pathogen. We collected foliage of a range of plant species native to Appalachia in Kentucky during two summer seasons, and inoculated the foliage in Oregon with *P. ramorum* to determine relative susceptibility. Some genera, species, and cultivars within species were highly susceptible, while others were moderately susceptible or not susceptible. These results provide a basis for regional surveyors to select target hosts and to generate survey and management practices for nursery and forest areas.

Key words: Appalachia, *Phytophthora ramorum*, sudden oak death, ramorum blight.

Introduction

The discovery of sudden oak death or ramorum blight, caused by the pathogen *Phytophthora ramorum*, on a wide range of trees, shrubs, and ornamental plants in U. S. nurseries, landscapes, and natural ecosystems, has resulted in quarantine regulation of the pathogen to prevent geographic dissemination. However, geographic distribution of the pathogen has occurred, both nationally and internationally, putting new regions and plant ecosystems at risk.

Plants native to the Appalachian range of the eastern U.S. are especially at risk due to the favorable environmental conditions for the disease. Based on the known host list, native and horticultural varieties of rhododendrons, viburnums, mountain laurel, maples and other plants growing in central Appalachia could become infected with *P. ramorum*. Eastern U.S. regions are currently being surveyed in an attempt to detect introductions from other regions, especially in areas surrounding nurseries where disease has been found. However, the relative susceptibility of many of the over-story, mid-story, and under-story plants in those areas is unknown, making field inspections extremely difficult due to the high diversity of plant species therein.

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Some knowledge of the relative susceptibility of eastern native plant species would be extremely useful to inspectors, and could be a basis for management strategies for the nurseries and for eastern forests to reduce the risk of establishment of *P. ramorum*. Thus, our objective was to determine the relative susceptibility to inoculation with *P. ramorum* of a sampling of several important, representative plant species found in the Appalachian range.

Methods

We collected foliage of a range of plant species native to Appalachia in Kentucky and inoculated with *P. ramorum* to determine their relative susceptibility. Leaves were needle-wounded on the upper surface and inoculated with sporangia of a North American A2 mating type, isolate N10 (Linderman and others 2006). After 14 days incubation at 20°C in moist boxes, lesions caused by inoculation, compared to the uninoculated control, were measured using digital photos and ASSESS software (Lamari 2002).

Results and Discussion

Quantitative estimates of lesion sizes (percent of total leaf area with lesions resulting from inoculation) indicated considerable variation in susceptibility to *P. ramorum*. Some species were highly susceptible, while others were moderately susceptible or not susceptible (figs. 1 to 3). Results on understory and mid- to overstory plants indicate the high susceptibility of plants such as black cherry, black walnut, green ash, and the low susceptibility of plants such as some red maples, hickory, sweetgum, and others. While there was considerable variation in reaction to inoculation between plant species, that variation could easily have been due to the time of plant tissue collection, variation in edaphic and other environmental conditions, and even age of plants. These results provide a basis for regional surveyors to select target hosts and to generate survey and management practices for nursery and forest areas.

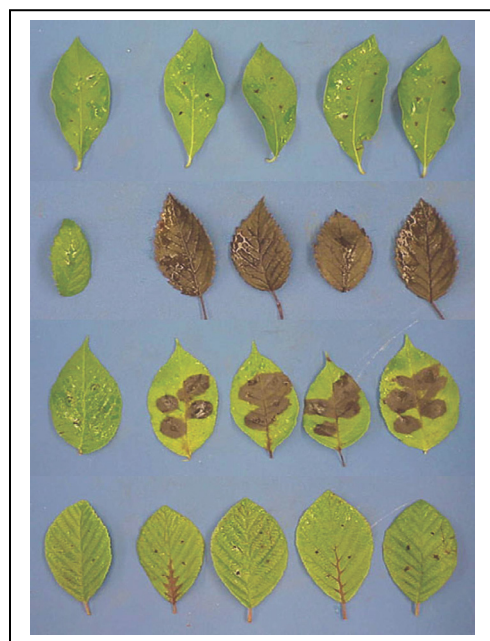


Fig. 1—Lesions on mid- and over-story plants inoculated with *P. ramorum* N10 sporangia. Top to bottom: spice bush, prairie rose, bladdernut, and alder.

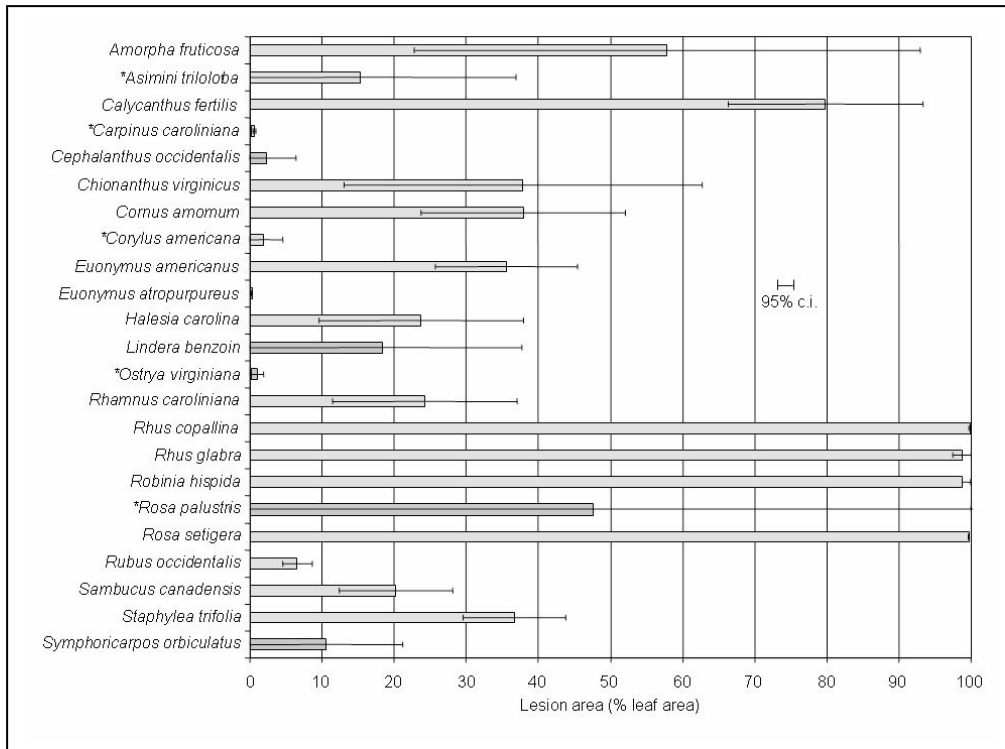


Fig. 2—Lesion areas of understory plants inoculated with *P. ramorum* N10 sporangia.

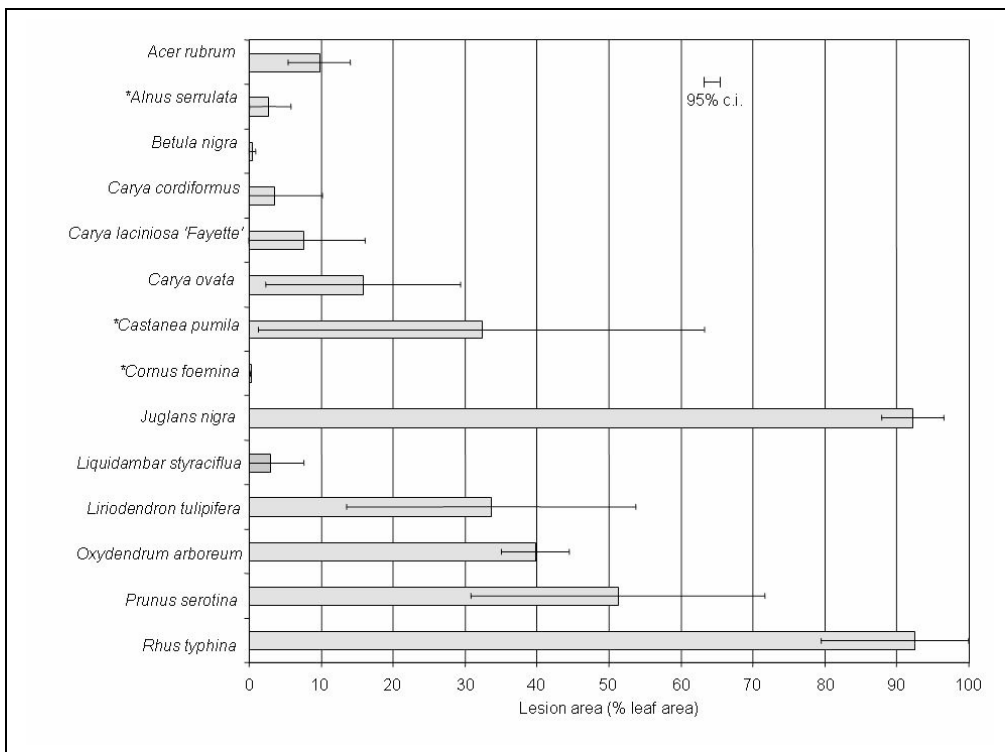


Fig.—3. Lesion areas of mid- and over-story plants inoculated with *P. ramorum* N10 sporangia.

Literature Cited

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