

**Evaluating ornamentals as physical barriers between blocks of plants susceptible to *Phytophthora ramorum*, 2007-2008.**

*Phytophthora ramorum* causes foliar lesions and stem dieback on a number of ornamental plants. Because of the potential for spread with the movement of nursery stock, best management practices to restrict spread of the pathogen are being assessed for use by growers in affected regions. Ten taxa of ornamentals that grow under similar environmental conditions as Camellia were evaluated for suitability as living barriers between blocks of susceptible Camellia cultivars in order to reduce pathogen spread from block to block. Rooted cuttings were inoculated in summer 2007 and spring 2008 with an isolate (5-C containing the same single nucleotide polymorphism profile as known isolates of US clonal lineage NA1 typically found in California forests and nurseries) which was originally recovered from *C. sasanqua* 'Bonanza' in California in 2003. A sporangial solution was prepared by placing approximately month-old mycelial plugs from V-8 agar into a sterile soil extract solution and after 48 hr decanting the sporangia. Plants were inoculated by inverting foliage and branch tips into the sporangial solution (approximately 2000 sporangia mL<sup>-1</sup>). The plants were inoculated in batches of approximately 12 plants, with individuals of each species included in at least 3 separate batches. Each batch included Rhododendron 'Cunningham's White' as a positive control. Inoculated plants were placed in a dew chamber at 20°C for 4 days under continuous darkness. Upon removal, plants were rated for defoliation, tip blight, number of diseased leaves and area of lesion for each leaf. From this, the proportion of symptomatic leaves, the diseased area on symptomatic leaves, (roughly corresponding to average lesion size) and the amount of infected tissue averaged over the total number of leaves on the plant were determined. All of these measurements, taken together, represent overall susceptibility. Data were log-transformed and analyzed by General Linear Models using SAS.

Almost all plants tested showed disease symptoms to some degree. *Diervilla*, a native species, was severely affected by *P. ramorum*. *Nandina* not only developed lesions on leaflets, but on petioles, which often broke into segments after infection, leading to a high degree of defoliation despite the relatively low degree of leaflet infection. Berries as well as foliage on *Ilex x meserveae* and *Aronia* became infected. Only one species showed no evidence of foliar symptoms: *Buxus microphylla* var. *koreana* × *B. sempervirens* 'Green Mountain'. This plant was previously tested for below-ground susceptibility; *P. ramorum* could not be recovered from roots one month after inoculation. Buxus is an evergreen tolerating shade and moist conditions, and therefore could serve as a companion to *Camellia* or other susceptible plants in containerized nursery culture.

Plant	Plants inoc. <sup>z</sup>	Infected plants (%) <sup>y</sup>	Defoliation (%)	Symptomatic leaves (%) <sup>x, t</sup>	Diseased area/ leaf (%) <sup>w, t</sup>	Diseased area/ total leaves (%) <sup>v, t</sup>	Tip infection (%) <sup>u</sup>
<i>Aronia melanocarpa</i>							
'Viking' .....	12	91.7	1.5	29.93 cde	14.48 bcdef	6.73 cdef	0.00
<i>Berberis thunbergii</i> 'Aurea' ..	16	100.0	7.3	20.69 cde	19.97abcd	4.77 cde	13.24
<i>Buxus</i> 'Green Mountain' .....	11	0.0	0.0	0.00	0.00	0.00	0.00
<i>Clethra alnifolia</i> .....	11	54.6	2.0	7.33	8.05 def	1.33 ef	0.00
<i>Diervilla lonicera</i> .....	11	100.0	23.1	80.71ab	51.93abc	43.02ab	42.50
<i>Ilex x meserveae</i>							
'Blue Princess' .....	10	100.0	30.5	40.89 bcd	20.30abcde	8.34 bcde	3.45
<i>Ilex verticillata</i>							
'After Glow' .....	19	63.2	0.9	7.43	6.07	0.66	4.56
<i>Itea virginica</i>							
'Henry's Garnet' .....	12	16.6	0.0	0.61	2.92	0.11	0.00
<i>Mahonia repens</i> .....	9	100.0	3.0	42.70 bcd	5.63 cdef	3.76 cdef	5.56
<i>Nandina domestica</i>							
'Harbour Dwarf' .....	10	100.0	20.8	13.15 de	16.81abcde	2.17 cdef	10.00
Rhododendron							
'Cunningham's White' .....	24	100.0	0.0	60.27abc	40.41abc	26.78abc	33.75

<sup>z</sup> Total number of plants inoculated.

<sup>y</sup> Percentage of infected plants.

<sup>x</sup> Percentage of total leaves (in the case of *Mahonia* and *Nandina*, leaflets) showing visible symptoms divided by total leaves (or leaflets) on the plant at time of inoculation. This included symptomatic leaves that had dropped.

<sup>w</sup> Percent area of lesion for each diseased leaf or leaflet divided by the total number of diseased leaves to give an indication of average lesion size.

<sup>v</sup> Percent diseased tissue averaged over all leaves per plant.

<sup>u</sup> Percent diseased branch tips or terminal buds.

<sup>t</sup> Values followed by the same letter did not differ significantly at  $P=0.05$  as determined by Tukey's Studentized Range test. Values followed by no letters came from plants with little disease and were excluded from data sets in order to get a normal distribution of data.