

Impact of White Pine Blister Rust on Resistant and Previously Immune Cultivated *Ribes* and Neighboring Eastern White Pine (*Pinus strobus*) in New Hampshire, USA

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White pine blister rust (WPBR; causal agent: *Cronartium ribicola*) has been a threat to both forest resources and agricultural commodities since its introduction to North America in the early 1900s. Eastern white pine (*Pinus strobus*) is the most economically important timber species in New Hampshire (USA). From 1917 to 1970 *Ribes* throughout the State was eradicated to protect the timber industry. After the lifting of the Federal Quarantine Act (USDA Bureau of Entomology and Plant Quarantine Federal Domestic Plant Quarantine number 63 [1938]) restricting *Ribes* and the more recent availability of immune and resistant *Ribes* cultivars, several States in the Northeast amended their restrictions to allow planting of selected *Ribes* cultivars. In New Hampshire, 19 WPBR-resistant or immune *Ribes* cultivars were available for planting. In 2011, WPBR was reported for the first time on immune black currant (*Ribes nigrum* cv. Titania) in Connecticut. The objectives of this study were to evaluate the impact of WPBR on cultivated resistant and immune *Ribes* cultivars and neighboring white pines.

To accomplish our objectives, 42 sites with cultivated *Ribes* were surveyed in late July through September 2013. At each site, incidence and severity were assessed on up to five plants per *Ribes* cultivar. Heavily infected leaves of each cultivar were collected for polymerase chain reaction (PCR) analyses conducted at Cornell University. The same methods were used to assess WPBR incidence and severity of wild *Ribes* found in the vicinity. Samples from immune black currants

infected with WPBR from New Hampshire were used to inoculate immune *Ribes* cultivars from the Canadian Clonal Genebank in Harrow, Ontario. In addition, the following data were collected for the 12 nearest eastern white pines within 300 m of cultivated *Ribes*: WPBR incidence, diameter at breast height (1.37 m above the ground), distance, and cardinal direction from cultivated *Ribes*.

Two hundred and fifty-five plants of 19 *Ribes* cultivars and 445 white pines were evaluated. ‘Titania’ was the most frequently planted *Ribes* cultivar. Incidence of WPBR ranged from 0 to 60 percent and from 0 to 100 percent for immune and resistant *Ribes* cultivars, respectively. As expected, mean WPBR severity on resistant *Ribes* was limited to less than 6 percent of leaf area whereas WPBR severity on previously immune *Ribes* was greater, 14 percent of leaf area. All infected *Ribes* cultivars were PCR-positive for *C. ribicola*. Samples from New Hampshire successfully infected immune *Ribes* cultivars from the Canadian Clonal Genebank. It was more likely to find infected pines neighboring infected immune black currants (probability = 0.18) than neighboring infected resistant *Ribes* (0.09), or WPBR-free *Ribes* (0.02). Results from this study led to the removal of the previously immune black currant cultivars ‘Consort,’ ‘Coronet,’ ‘Crusader,’ and ‘Titania’ from the New Hampshire approved list for planting. The breakdown of WPBR immunity poses a threat to the white pine resource and to cultivated *Ribes* production.

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