# P42 – Resistance variation to necrotrophic and biotrophic foliar pathogens in American hybrid grape cultivars

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## Abstract

Most Northeastern US viticulture cannot rely on the European grape species (*Vitis vinifera*) due to its lack of cold and disease resistance. The Northeastern US is a center for grape biodiversity. In parallel with this host diversity, a myriad of foliar diseases infect grapes in the Northeast. Crosses of native American grape species (e.g. *Vitis riparia*) with *V. vinifera* are cultivars with a range of cold and disease resistance that have potential for Northeastern viticulture. While we expect the American hybrids to have acquired some disease resistance from the American lineages, reports of disease resistance are inconsistent. More specifically, whether there is a relationship between resistances to necrotrophs and biotrophs is unknown. Quantifying resistances and understanding resistance interactions are essential to breeding effort and integrated pest management. We quantified how disease resistances vary across cultivars and the relationship between resistances to different pathogen types (necrotrophs and biotrophs).

In 2021, we created a collection of grape leaf necrotrophs from cultivated and wild grapes from Massachusetts. Based on sequencing, most necrotrophs belonged to the genera *Botryosphaeria*, *Colletotrichum*, *Diaporthe*, and *Didymella*.

In the laboratory, we quantified host susceptibility to necrotrophs using leaf disc assays. Pathogenicity of a subset of three necrotrophs in the genera *Colletotrichum* and *Didymella* was measured on four hybrid grape cultivars. Regardless of cultivars, *Colletotrichum* caused larger necroses than *Didymella*. Resistance to necrotrophs also varied according to cultivar, 'Vidal' was the most resistant followed by 'Frontenac', 'Riesling' and 'Noiret'.

In the field, we quantified host susceptibility to the biotroph downy mildew using the percentage of the leaf surface infected by the disease. We quantified the disease susceptibility of nine cultivars to downy mildew in our cultivar trial in Belchertown, Massachussetts in September 2021. Resistance to downy midlew varied according to cultivar, from most resistant to least resistant being as follows: 'Marquette', 'Frontenac', 'Noiret', 'Chambourcin', 'St. Croix', 'La Crescent', 'Corot Noir', 'Riesling', and 'Vidal'. Based on the four cultivars tested both in the laboratory and in the field, we did not see a correlation between resistance to necrotrophs and resistance to biotrophs.

**Keywords:** American hybrid, biotroph, Botryosphaeria, 'Chambourcin', Colletotrichum, 'Corot Noir', *Diaporthe, Didymella*, downy mildew, 'Frontenac', 'La Crescent', 'Marquette', necrotroph, 'Noiret', 'Riesling', 'St. Croix', 'Vidal'