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Age-related susceptibility of grapevine leaves and berries to infection by Elsinoe ampelina.

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Introduction

Anthracnose, or bird's eye rot, is a disease of European origin caused by the fungus *Elsinoë ampelina*. While all cultivars of the genus *Vitis* are more or less susceptible to anthracnose, cultivars of the species *Vinifera* are generally highly susceptible, whereas wild species are less susceptible.

Depending on the severity of the outbreak, vines infected by *E. ampelina* will have delayed development and berry ripening. Severely infected vines will have considerably smaller yields due to fruit rot and will be less able to survive the winter.

Young leaves and berries are reported to be highly susceptible to *E. ampelina*, but the time of onset and young leaves susceptibility among cultivar variation in ontogenic resistance have remained undefined.

The objective of this study was thus to determine the window of susceptibility of leaves , flowers, and clusters to *E. ampelina*.

Fig 1. Symptoms of anthracnose on berries (top) and on young shoots (bottom0

Materials & methods

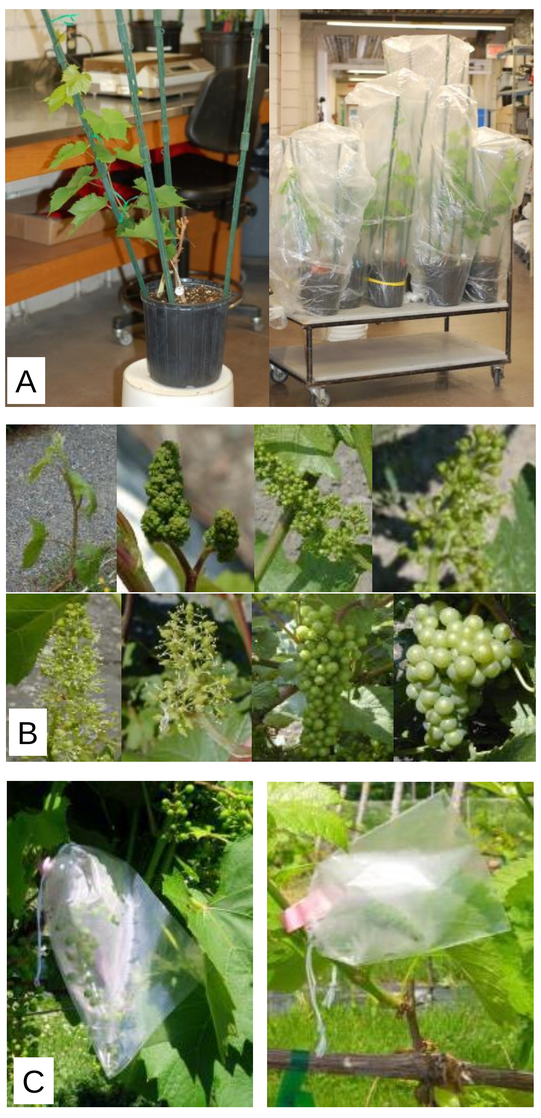
Age-related susceptibility was studied under greenhouse conditions by inoculating 1- to 19-day old leaves of the grape cultivars 'Vidal', 'Marquette' and 'Vandal-Cliche'. Following inoculation (10^6 conidia/ml), the plants were kept at 25ºC-100% RH for 24h (Fig 2A).

Anthracnose severity was assessed 7 days after inoculation by counting the number of lesions per cm^2 of leaf. The experiment was conducted three times with five replicated plants.

For each cultivar, data were scaled (0-1) by dividing each observation by the maximum observed.

Similarly, for the same cultivars, flowers/berries were inoculated under field conditions on ten occasions from flower formation until berries at reached approximately 8°Brix (Figure 2B). For each phenological stage, five inflorescences/clusters were inoculated and maintained at 100RH for 24 h. (Fig 2C).

Percent flowers/berries infected per inflorescence/cluster was assessed 7 days after field inoculations.



Results & discussion

For all cultivars, there was a significant effect of leaf and flower/berry age on anthracnose severity.

Leaves: Susceptibility was highest on one-day old leaves and diminished as the leaves aged to reach 20%, 10% and 5% of the maximum susceptibility on 4-, 6-, and 8-day old leaves (Fig. 3A). The influence of leaf age on anthracnose severity was described with an exponential decay model (R^2=0.98), Pmax = a*exp(-b*t), where t is leaf age, a is Pmax à t=0, et b is the rate of Pmax diminution based on leaf age (Fig 3B).

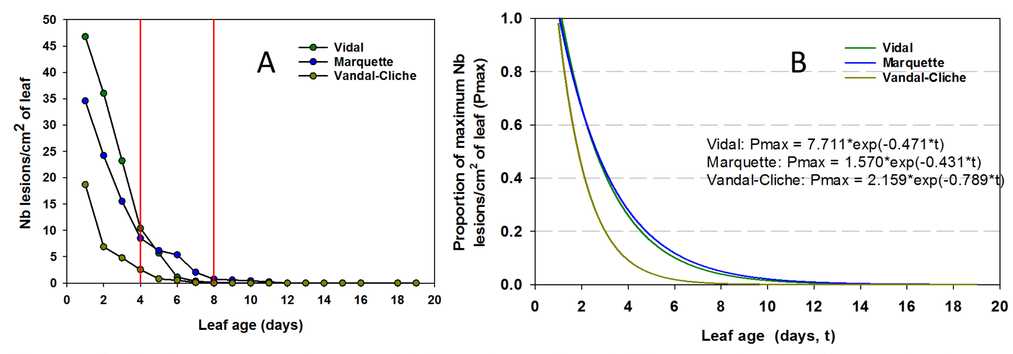


Figure 3. Anthracnose observed (A) and predicted (B) severity at different leaf ages.

Inflorescences: Susceptibility was highest at the early stage of flower formation and diminished to reach 50%, 40-20%, and 5% at the stage flowers separating (stage 17), fruit set (stage 27), and 4-6 mm berries (stage 29), respectively.

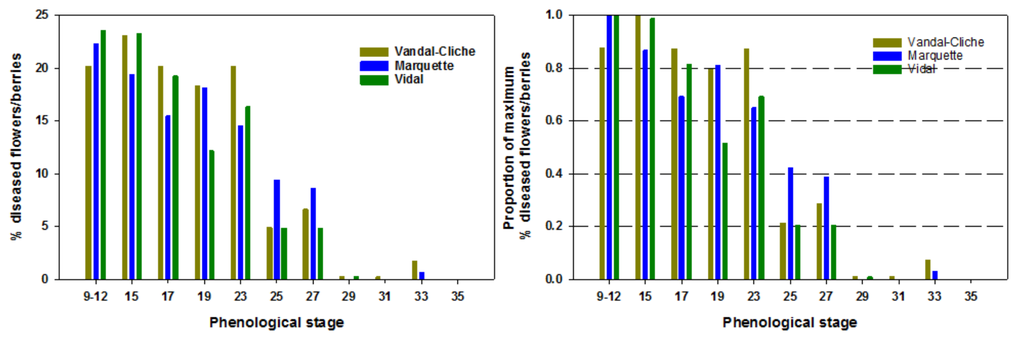


Figure 3. % diseased flowers/berries at different phenological stage.

Conclusions

These results suggest that the risks of anthracnose are high from bud-break to fruit set, and on newly emerged leaves either early in the season or following pruning.

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