

# Phenology-Dependent Effects of Foliar Injury and Herbivory on the Growth and Photosynthetic Capacity of Nonbearing *Vitis labrusca* (Linnaeus) var. Niagara

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The response of potted fruitless *Vitis labrusca* (L.) var. Niagara grapevines to early and late season mechanical and insect defoliation was recorded. Twenty percent of the leaf area was removed with a hole puncher to simulate insect injury early and/or late in the season. Measurements of growth, single-leaf photosynthesis, and whole-vine photosynthesis indicated a higher tolerance to foliar injury late in the season than early in the season. Because defoliation was made on a percentage basis, the results were due to the stage of vine development at the time of damage rather than to the amount of leaf area injured. In a second experiment, measurements of vines injured early in the season by the rose chafer, *Macrodactylus subspinosus* (F.), and late in the season by the Japanese beetle, *Popillia japonica* (N.), indicated qualitatively similar impacts of beetle feeding on growth parameters compared to vines injured mechanically. Feeding injury by the Japanese beetle had a negative impact on whole-vine carbon assimilation not observed in mechanically injured vines. A final experiment comparing the effect of mechanical and beetle injury early and late in the season on single leaves indicated no significant differences between rose chafer and mechanical injury early in the season. However, 17 days after injury, leaves injured late in the season by the Japanese beetle had lower carbon assimilation rates than mechanically injured leaves. This response was detected on both injured and uninjured sections of injured leaves.

**Key words:** Tolerance, photosynthesis, Japanese beetle, rose chafer

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