

Identifying wild *Vitis riparia* Michx clones as a source of rootstock to mitigate vigour and acclimation/deacclimation cycles of the scion

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Abstract

Context and purpose of the study: Grapevine rootstocks have traditionally been chosen in order to manage scion vigour, soil pests and soil conditions. *Riparia* Gloire de Montpellier (RGM) has been in use since the turn of the 19th century, over 100 years and still a remarkably stable source of phylloxera (*Daktulosphæria vitifoliae* Fitch) resistance. The original source material was probably collected near the Missouri/Mississippi river confluence, a mid-continental but more southerly location in the United States. It has been hypothesized that more northerly selections of *V. riparia* Michx might improve both fall acclimation rate and depth of the scion, thus mitigating late fall frost and midwinter freeze damage. The relatively low vigour and drought sensitivity imparted to the scion may also reduce vigour further on high vigour sites with coarse soil types. However, there could also be the potential hazard of aggravating rapid de-acclimation in the spring, a common trait of northerly adapted plants where, after endo-dormancy is complete, eco-dormancy is normally maintained through consistently cold winters.

Materials and methods: Wild *V. riparia* clones (> 800) were collected in 2010-11 over an east-west transect of >600 km from Windsor to Kingston Ontario. Field selection concentrated on vine found on coarse soil sites and with large, healthy trunk diameter, proxies for longevity and stress tolerance. Fifteen were selected for further study based on late budbreak, mid-season flowering, early veraison/wood ripening/leaf senescence and high proline accumulation under greenhouse drought stress. Using Pinot noir Cl 828 as the scion, they were planted in a randomized, replicated trial (2015/16) at two sites, both on deep, coarse soils in the Norfolk Sand Plain of southwestern Ontario.

Ravaz Index (RI, yield/pruning weight ratio), fruit quality and environmental adaptability (differential thermal analysis (DTA), fall, midwinter and spring) was measured, with small, efficient vines with improved bud survival over RGM and other *riparia* derived rootstocks being the target.

The purported *V. ripari* spp *syrticola*, a selection included in the trial, and the 14 other selections are undergoing molecular investigations using high throughput sequencing (HTS) to identify similarities and differences parallel to phenological observations.

Results: Since 2019, improvements over RGM in terms of efficiency (RI) and DTA have been measured for several selections, with higher RI values and lower LT₅₀ temperatures for DTA/LT₅₀ in fall and midwinter. However, spring LT₅₀ values are inconsistent. More winter DTA data is being collected for 2022-23. HTS results are incomplete at this stage.

Key Words: *Vitis riparia*, rootstock selection, vigour control, DTA analysis