# VineAlert: Grapevine management and monitoring system for cold hardiness and injury

**Cool Climate Oenology & Viticulture Institute**
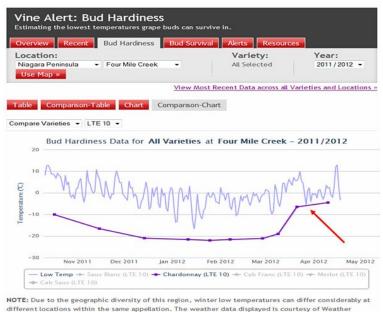
**Brock University**

## Introduction to the Innovation

Cold injury is one of the greatest threats to the Canadian grape and wine industry. Growing grapes in southern Ontario is a difficult task due to our fluctuating climate and cold winters where low temperatures can cause vine damage and affect the viability of grapevine buds. Monitoring grapevine bud hardiness throughout the dormant period is an effective tool to assist grape growers in managing winter injury and helping them determine when cold mitigation practices should be used. Vine cold hardiness changes throughout the dormant period and varies according to variety, site conditions, and management practices. It is important that bud sampling and testing be done throughout the entire dormant season (Oct. – April) in order to track the vine's cold hardiness through the acclimation, maximum hardiness, and deacclimation periods. This ever-changing bud hardiness data can be helpful in determining when wind machine use or other freeze avoidance methods are warranted to protect the vines from winter injury.

## Results to date

Our research follows grapevine cold hardiness throughout the entire dormant period from October through to April to allow us to understand factors that impact hardiness (crop level, disease and water stress, grape 'hang time' on the vine). The Ontario regional bud cold hardiness monitoring program involves testing the cold hardiness of multiple varieties across designated viticultural areas (DVAs) throughout Ontario including Niagara's sub-appellations, Prince Edward County, and Lake Erie North Shore. If a cold weather event is forecasted to get colder than the measured hardiness level of the vine, VineAlert will warn the growers so they can make management decisions such as using wind machines or flying helicopters to warm up the air and protect the vines so the temperature never gets to the danger zone. VineAlert also tells growers what temperature different varieties are able to tolerate based on their regional location and stage of dormancy to further assist in these mitigation decisions.

Fig. 1. Screen shot of the VineAlert website showing Bud Hardiness data. This data is helpful in assisting grape growers reduce the impact of cold weather events and damage to grapevines. It alerts growers when they need to use cold mitigation pratices such as wind machines, therefore preventing and limiting damage to vines.

## Application of technology

All of the cold hardiness-related research has direct application to assist the grape grower community to achieve healthy, high-quality sustainable vineyards.  In 2010, the VineAlert cold hardiness database was established as a very powerful resource for those involved with grape and wine production. VineAlert presents both bud cold hardiness and temperature data in each region where the buds were sampled and features clear presentations of current, on-site data so that timely and critical information can be accessed easily. VineAlert features applicable and timely information to assist the grower in managing winter injury and allow them to use cold mitigation practices effectively. Further to this, VineAlert collects and displays sample data from DVAs across Ontario allowing for more site-specific information, which is important because of the diversity of Ontario's terroir.

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