

Introduction

Grape growers in cold climates have several challenges to overcome. Cold injury to grapevines is a significant problem, especially at the northern limit of viticulture, where extensive damage to bud and cane tissues can result in severe economic losses. Winter protection methods were developed for cultivars with lower cold hardiness (tender, semi-hardy) in cold regions (1). Methods such as wind machines, insulation with snow, mulch or soil, and geotextiles are employed to reduce winter injury (1-3). However, these methods need to be adapted to specific regions and cultivars. Presently, geotextiles are used by Québec producers with varied application methods and techniques. Little information on best use and end results for grapevines is available.

This project aims to acquire specific knowledge on the installation height of geotextiles to optimize winter protection.

Methods

Geotextiles were installed in fall 2019,-2020 and 2020-2021 and several parameters were measured during the 2020 and 2021 growing seasons. Two geotextile installation treatments were evaluated: height of the fruiting wire for installation and insulation of the mid row posts (Fig. 1). The trials were carried out on three grape cultivars in four vineyards.

Fruiting wire	<ul style="list-style-type: none"> • 8" • 12" • 16" 	Parameters	<ul style="list-style-type: none"> • Cold hardiness after geotextile removal • Bud survival • Phenological stages (BBCH system) • Yields (cluster weight, nb clusters, yield/vine, berry weight, berry chemistry) • Hardening • Climatic conditions and snow cover
Insulation around post	<ul style="list-style-type: none"> • Padding (F) • No padding (SF) 		
Varieties	<ul style="list-style-type: none"> • Chardonnay • Pinot noir • Vidal 		



Figure 1: A) Geotextile cover after installation in November before first snow. B) Snow cover on the geotextile in the middle of the winter.

Results and discussion

Air temperature under the geotextile was affected by the installation's height (Fig. 2). Nonetheless, the difference was less than 0.5°C, which likely did not significantly affect the vine. The temperature under the geotextile was affected by the temperature of the site and the snow cover. The insulation around posts did not impact the temperatures under the geotextile.

The fruit wire's height and the covers' insulation did not affect the physiology of the vines or the yields (Fig. 3, 4). Bud survival and yields were not affected by geotextile trials but were different between sites and grape cultivars.

This project is part of a large global project on the installation and use of geotextile under northeastern conditions of Canada. Several other projects are also currently underway at CRAM to assess several parameters (e.g. types of geotextile and their timing of installation and removal, timing and severity of pruning) which will help to optimize geotextile practices under the climatic conditions of Quebec, Canada.

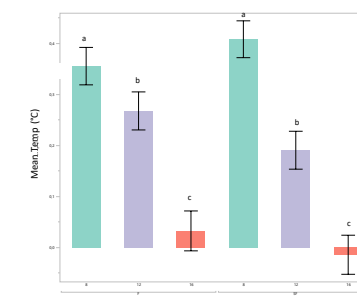
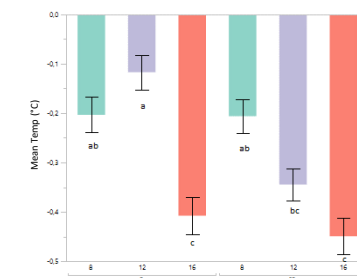


Figure 2: Effects of installation height (8", 12", 16") and insulation (F, SF) on temperature under the geotextile during A) 2019-2020, and B) 2020-2021.

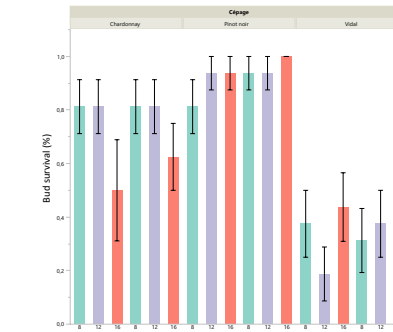
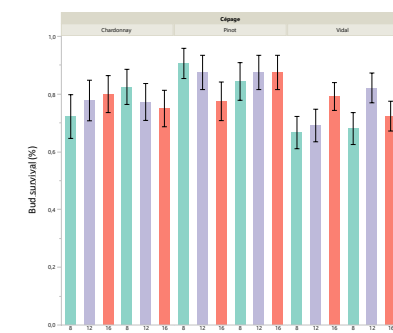


Figure 3: Effects of the installation height and insulation treatments for three varieties on bud survival in A) 2019-2020 and B) 2020-2021.

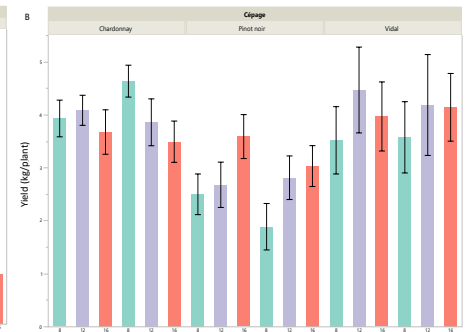
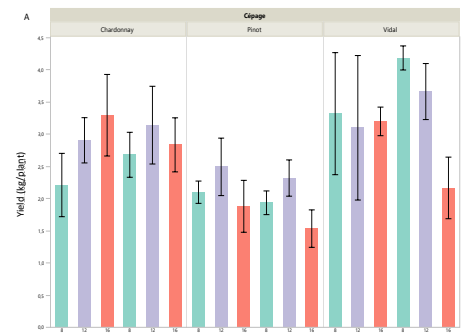


Figure 4: Effects of the installation height and insulation treatments for three varieties on yield in A) 2019-2020 and B) 2020-2021.

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References

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