

# Pruning strategies for grapevines protected by geotextiles in the winter



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## OBJECTIVES and CONTEXT

### Determine the impact of pruning strategy and timing on vine physiology and harvest parameters when using geotextile for winter protection

- Many grape-growing regions in Canada are too cold to grow *Vitis vinifera* without the use of winter protection (VineAlert 2023)
- The proportion of *V. vinifera* planted is increasing in Qu bec, where the grape growers rely heavily on the use of geotextile covers to protect the vines during the winter (CVQ 2021). At the moment, there is an important gap in the viticulture literature regarding the best practices for geotextile usage.
- Pruning decisions when using geotextiles are challenging for many reasons:
  - Time management: geotextile installation often coincides with the end of harvest and winemaking is a bigger priority;
  - Leaves on the vines: grapegrowers are worried that pruning when leaves are still on the vine will be detrimental to winter survival and reserve accumulation. Some cultivars, like Vidal, do not undergo leaf abscission until very late in the fall, shortening significantly the window for geotextile installation before the formation of a snow cover;
  - Logistic: final pruning takes longer, but unpruned or pre-pruned vines often require the canes to be tied to the wire as an additional time-consuming step.
- These challenges are compounded by the fact that there is, to our knowledge, no literature on the impact of pruning practices on vine physiology in the context of winter protection.

We therefore designed an experiment to answer the following questions:

**Is pruning when the leaves are still on the vine detrimental to winter survival and harvest parameters for the following season?**

**Is there a difference in winter survival and harvest parameters when the vine is fully pruned or pre-pruned before geotextile installation?**

## MATERIALS and METHODS

### Treatments:

- Final pruning **before leaf fall**
- Pre-pruning only **before leaf fall** – final pruning in the spring
- Final pruning **after leaf fall**
- Pre-pruning only **after leaf fall** – final pruning in the spring
- Pruning in the spring

Table 1: Breakdown of the sites and cultivars.

Site	Cultivar
Site A	Seyval and Vidal
Site B	Chardonnay, Pinot noir, Vidal
Site C	Chardonnay, Pinot noir
Site D	Seyval



**Microclimate:** temperatures and relative humidity (%) were recorded in the vineyard and under the geotextiles with HOBO sensors.

**Winter injury:** primary bud survival was determined by counting the number of breaking buds immediately after budbreak (BBCH scale stage 7)

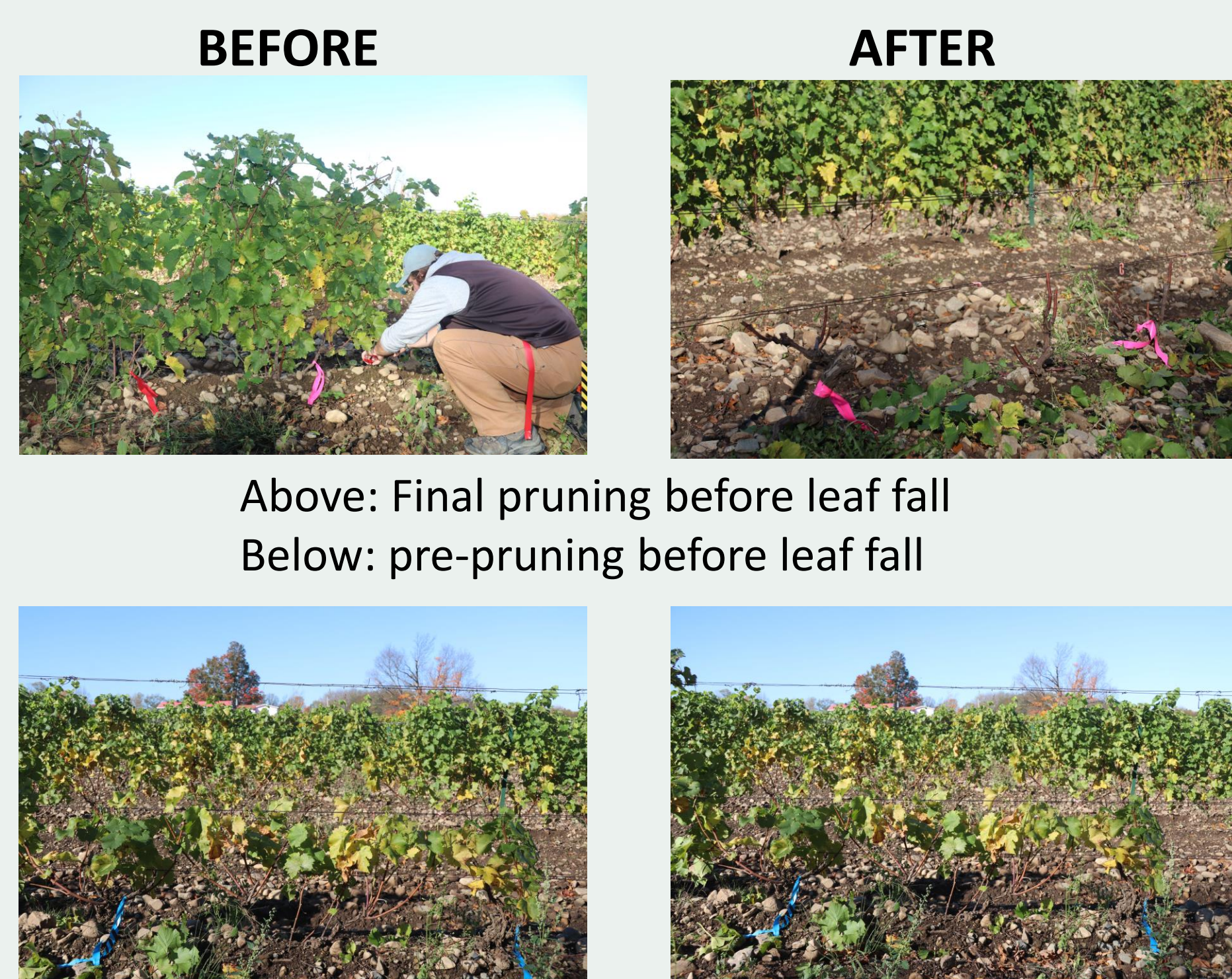
**Vine phenology:** phenological stages were determined following the extended BBCH scale (bud break: stage 7; full bloom: stage 65). Periderm formation was evaluated twice between veraison and harvest

**Yields:** yield per vine and number of clusters for the three to four middle vines in each rep were recorded immediately prior to commercial harvest

**Statistical analysis:** One-way analysis of variance (ANOVA) was used to determine the differences between treatments on yield and yield component and periderm formation. Significantly different means were separated by Tukey post-hoc test ( $p < 0.05$ ). Difference in bud survival and in phenological stages were compared using Chi-square goodness-of-fit test. All statistical evaluations were performed with XLSTAT version 2021.4.1 (Addinsoft, Paris, France).

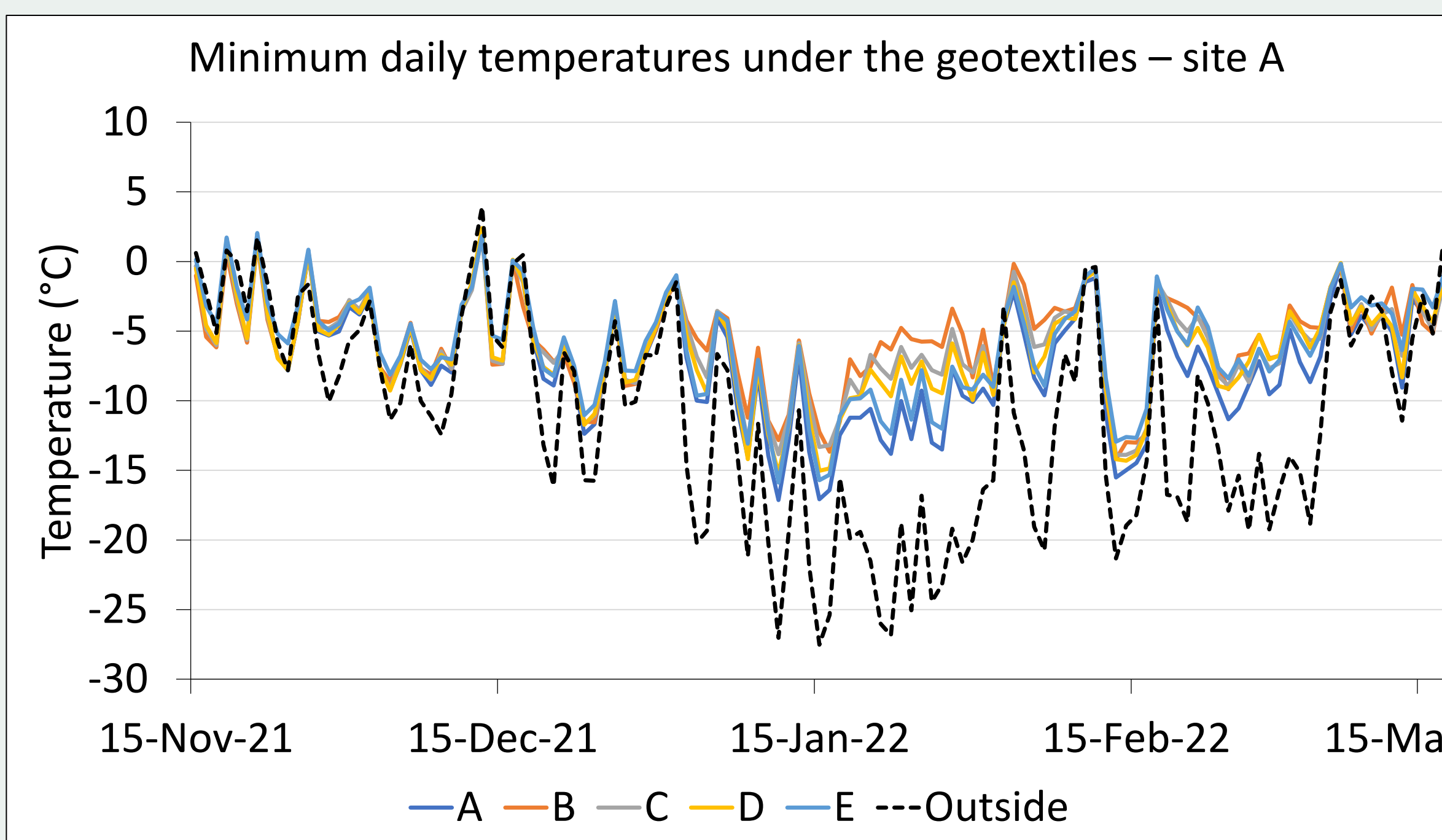
## RESULTS

TREATMENTS



Above: Final pruning before leaf fall  
Below: pre-pruning before leaf fall

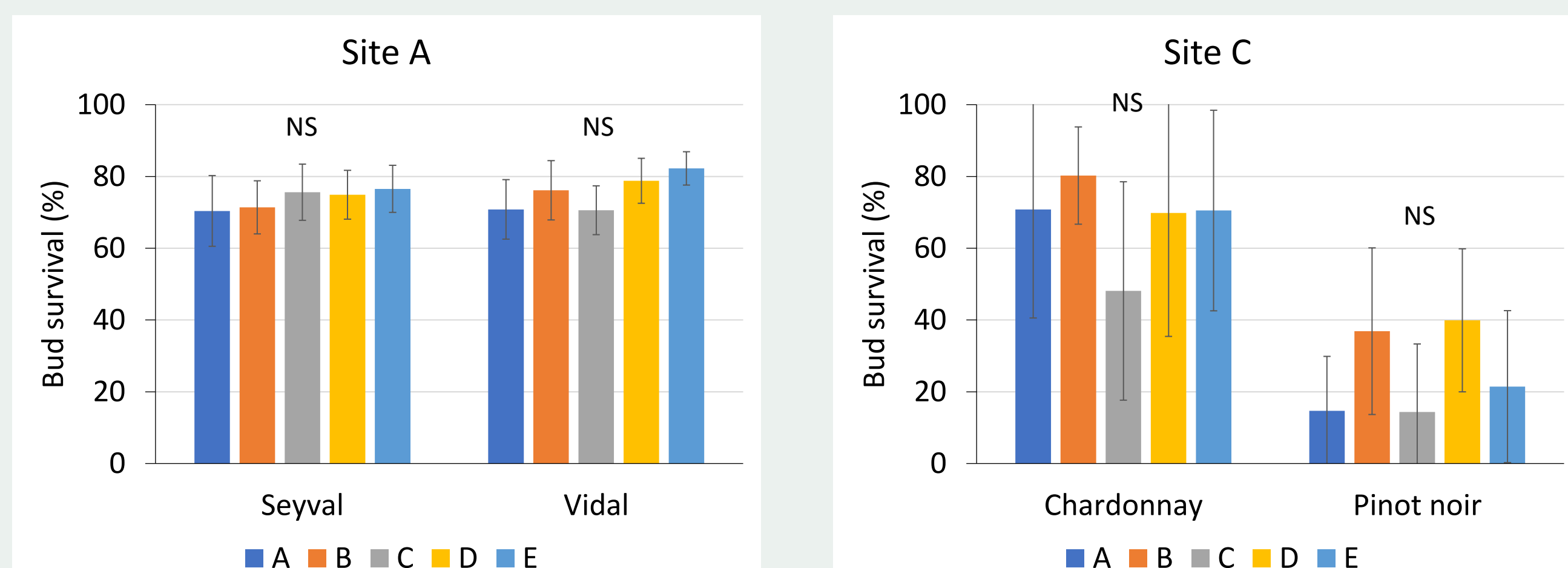
### What were the temperatures under the geotextiles?



- The geotextiles provided a protective environment for the vines, particularly in January and February.
- Small differences were observed under the geotextiles covering different treatments. The differences were not consistent among the vineyards.
- Daily minimum temperatures varied between sites, with lower temperature recorded on site C and D (data not shown).

BUD SURVIVAL

### Did the treatments impact bud survival?

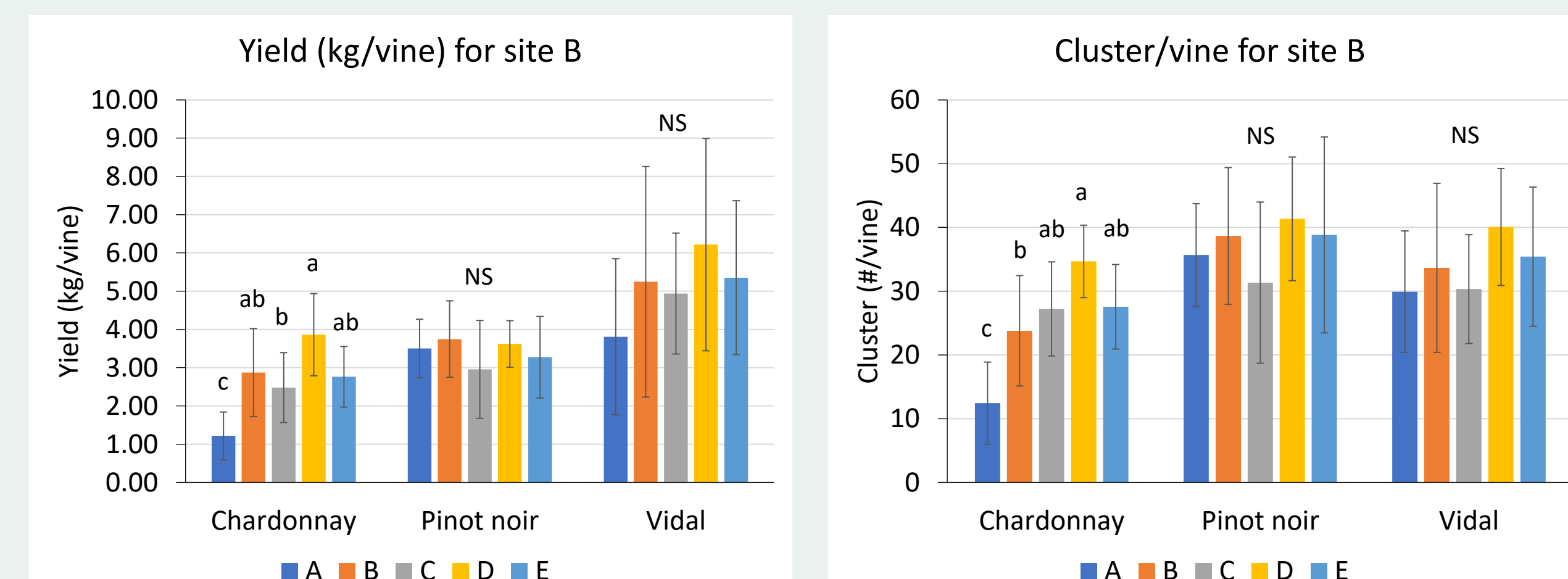


Treatments are: A: Final pruning before leaf fall, B: Pre-pruning only before leaf fall – final pruning in the spring, C: Final pruning after leaf fall, D: Pre-pruning only before leaf fall – final pruning in the spring, E: Pruning in the spring  
NS indicates no significant difference between the means. Different letters above the means indicate significant differences ( $p < .05$ )

- No significant differences were observed between the treatments, although there is a trend of better survival for the pre-pruned treatments (B and D) and the spring pruning treatments (E).
- The geotextile protection was not sufficient to completely protect the vines. Important site and cultivar differences were noted. The poor survival on site C is attributed to the absence of a snow cover above the geotextile until after very cold nights, and the fact that the Pinot noir is located in a lower part of the field.

YIELDS

### Did the treatments impact yields and yield components?



Treatments are: A: Final pruning before leaf fall, B: Pre-pruning only before leaf fall – final pruning in the spring, C: Final pruning after leaf fall, D: Pre-pruning only before leaf fall – final pruning in the spring, E: Pruning in the spring  
NS indicates no significant difference between the means. Different letters above the means indicate significant differences ( $p < .05$ )

- Yield and yield components were sometimes impacted by the treatments, with the pre-pruned treatments having higher yield per vine, likely coming from higher number of clusters per vine. When the results are not significantly different, a trend toward these results is often observed (as for Pinot noir and Vidal on site B shown above).
- This could be linked to a better primary bud survival observed for these treatments.
- Treatment A, final pruning before leaf abscission, had sometimes the lowest yield and lowest cluster number.

## CONCLUSIONS

- Pruning before geotextile installation is a logistical challenge, but it does not appear to negatively impact the vine.
- Pre-pruning might be better for bud survival and yield than full pruning before geotextile installation, but this needs to be confirmed with additional years of data collection. The impact of early removal of the leaves by pruning is still misunderstood.
- Following a cold winter with risk of high bud mortality, full pruning in the fall removes the possibility to adjust pruning practices based on bud survival rates.

## LITERATURE CITED

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