

Survey of Winter Damage in Okanagan and Similkameen Vineyards

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The low temperatures experienced in late December 2008 and early January 2009 in the southern interior of British Columbia presented a unique opportunity to study the winter hardiness of commonly grown *V. vinifera* wine grape varieties. The rare combination of near-lethal threshold temperatures, an established temperature-monitoring network, and a large number of variety blocks within the monitored area created a rich source of data for the study.

The study made use of temperature data collected at 47 sites in 40 vineyards in the Okanagan and Similkameen valleys. Winter damage was assessed in 400 vineyard blocks which were all within 250 m of each temperature monitoring station. Rate of winter damage to buds was determined by dissecting buds collected from spur pruned vines at all sites in February and March 2009. Winter damage was further assessed by visiting each block three or four times in the spring to record percent bud break and the numbers of clusters per shoot prior to shoot thinning, and the numbers of clusters per shoot and per vine post-shoot thinning. There has been no evidence of shoot collapse due to winter damaged cordons and trunks.

December 20, 2008 was the coldest day of the winter with minimum temperatures ranging from -18.5 to -26.8°C. Both Okanagan and Osoyoos lakes had a moderating effect on low temperatures. Large variations in minimum temperatures within short distances were experienced during the periods of calm, with extreme minimum temperatures occurring in frost pockets, valley bottoms and elevated plateaus. A comparison of two sites, one with and the other without a wind machine demonstrated that during periods of calm the wind machine effectively raised ambient temperatures by 3 to 4°C.

Of the dozen varieties commonly grown in the Okanagan and Similkameen Valleys, examinations of grape bud mortality indicated that Pinot noir, Gewurztraminer and Chardonnay are varieties least affected by cold temperatures under our growing conditions. Merlot, Sauvignon blanc and Shiraz, on the other hand, suffered bud damage exceeding 25%. Merlot and Shiraz also had the lowest bud break percentage. Numbers of clusters per shoot varied with bud damage for some varieties. Sauvignon blanc had better than expected fruitfulness at 1.4 clusters per shoot, while both Pinot gris and Pinot blanc were less fruitful, averaging 1.1 clusters per shoot. Overall, Petit Verdot, with high percentage bud break, shoot fruitfulness and total number of clusters per vine, was the most winter hardy. Riesling, Gewurztraminer, Chardonnay, Cabernet Sauvignon and Pinot noir were also tolerant of cold temperatures. Shiraz demonstrated to be the least tolerant of cold temperatures, followed closely by Merlot, Pinot blanc and Pinot gris.

For Merlot, temperatures lower than -22°C reduced bud break and shoots per vine by 35%, reduced clusters per vine by 46% and decreased the average fruitfulness of shoots arising from the trunk or cordons when compared to vines exposed to temperatures not lower than -18.5 to -20.0°C. A comparison of spur and cane pruned vines found the

higher bud damage rates of spur pruned vines were more than compensated for by the greater number of buds per spur pruned vine after pruning.

All of the data collected for the study has not yet been fully analyzed. A final report will be available in December 2009.