



Assessing Winter Cold Injury to Grape Buds

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Revised by Tim Martinson, 2011

Introduction

Choose buds similar to those you will save during pruning. This means choosing the lower nodes of canes, which are the better quality buds on the vine.

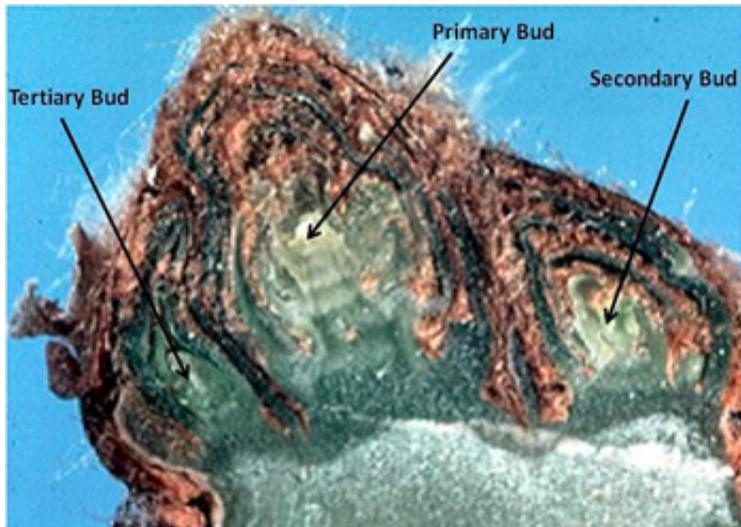
Sample based upon differences in your vineyard. This can be by variety, rootstock or based upon site and soil differences (lower vs. upper sections, better or less well drained, etc.)

Collect at least 100 nodes from each section.

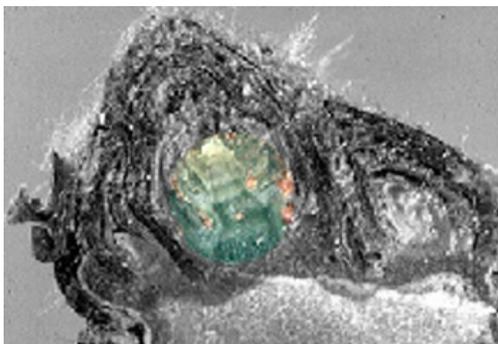
(See also video: [Evaluating Bud Injury Prior to Pruning Part 1](#))

If the freeze event was recent and the buds may not have thawed since exposure to potentially harmful temperatures, bring the canes into a warm room, keep the canes moist and wait for 24-48 hours before examining the buds. This allows damaged cells to thaw and the oxidative reactions which reveal damage to happen.

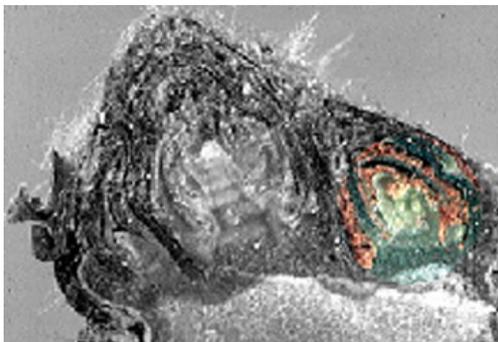
Cut the buds and record the number of live and dead primary buds. People often also record the status of secondary and tertiary buds. This is worthwhile information, but not as important as primary bud survival.



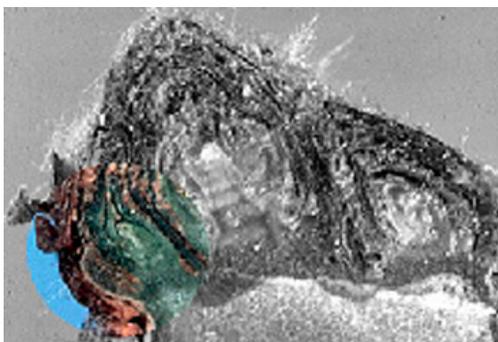
This is a longitudinal section of a grape bud –note the three growing points or buds



This is the region of the bud which should be examined to assess primary bud injury. The colored area is the compressed primary shoot for the next season.

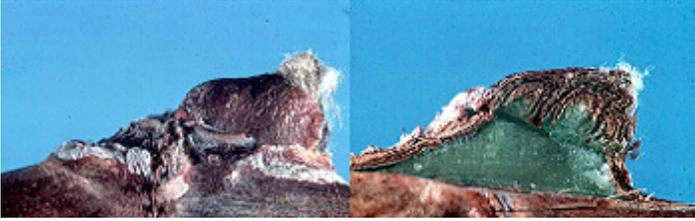


This is the region of the bud which should be examined to assess secondary bud injury; it's adjacent to the leaf scar.



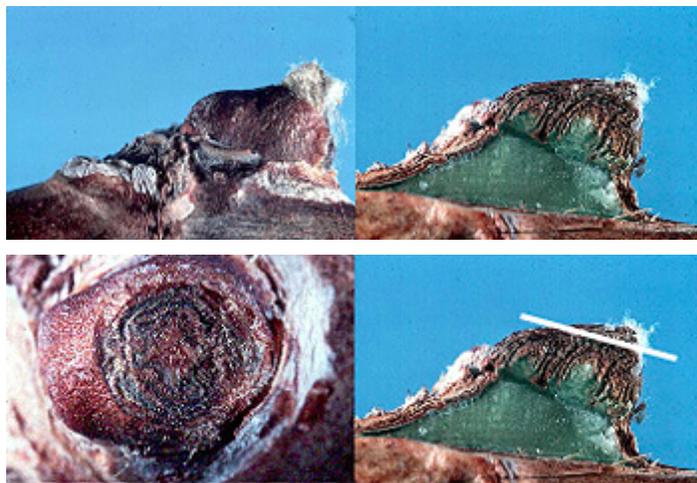
This is the region of the bud to examine to assess damage to the potential tertiary shoot.

The Examination



On the left is an intact grape bud. The leaf scar is to the left. The bulge on the left side of the bud is the secondary bud. The right hand picture shows a longitudinal view. In the series below the top view of a bud having successive horizontal slices removed is shown. The line on the right shows the approximate level of the horizontal cut.

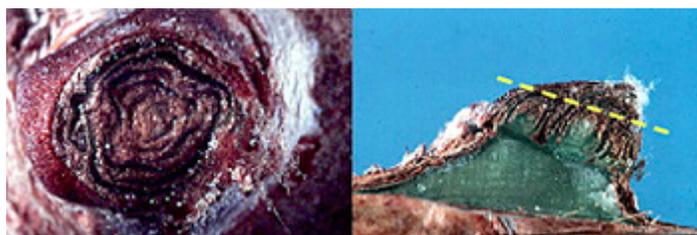
Below are a series of thumbnails showing progressive cuts



Intact bud

First cut

This is too shallow. Only the tips of the bud scales have been cut. The secondary bud is just beginning to be revealed at the lower left quadrant of the cut.



Second cut

This cut is still too shallow. The secondary bud is better defined, but only the tips of bud scales have been cut.



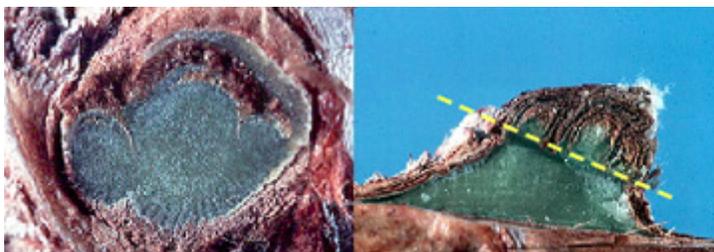
Third cut

This cut shows a live primary bud. The cut has been through what will become a shoot internode. People often worry about whether the color is bright green, olive green or sort of gray. Just so long as the bud is not blackened, it is alive. The tertiary bud can now be seen, but only bud scales of the secondary and tertiary buds have been cut.



Fourth cut

This is a good level to assess the health of the secondary and tertiary buds, but it is too deep to assess primary bud health. Once the cut moves to the base of the shoot (the bud cushion), the status cannot be assessed. Dead buds will often be found on live bud cushions.



Fifth cut

This cut is too deep. Only bud cushion is revealed. There may be dead primary, secondary and tertiary buds on top of a live bud cushion. Deep cuts may give a false sense of security.



The primary bud of this bud has died. The secondary bud is alive. The tertiary bud cannot be evaluated at this level of cut.

The above series shows why a single cut will not reveal the complete status of the buds nor even allow certainty as to the status of the primary bud. A series of shallow cuts is recommended.

Compensating for Bud Injury

If you know buds have been injured, you can retain more to compensate for the proportion of dead buds. Remember even when there is no cold damage it is not uncommon for 10% or more of the buds not to develop.

% Dead Primary Buds	Compensation
0 – 20%	Do not change normal pruning practice.
20 – 80%	Increase the number of buds retained in proportion to the injury.
>80%	Prune away only those nodes which will intrude into the space of adjacent vines or which will produce fruit so low that it hangs to the ground.

(See also video: [Evaluating Bud Injury Prior to pruning – Part 2](#))