



Foliar Calcium (Ca) during Fruit Development in Grapes

Agronomics / Background

Fruit calcium level is one of the most important factors relating to fruit quality in table grape production. Calcium plays a critical structural role in the formation and stability of both cell walls and cell membranes.

High fruit Ca will give grape berries better flesh firmness, better berry adherence strength, and reduced bunch shatter. As a result, high Ca grape bunches can have better shelf life coming out of cold storage, and higher grading overall.

Sour rot and Botrytis bunch rot have been shown to be reduced with foliar applications of calcium. This is due both to stronger cell walls and membranes and reduced activity of pectin-degrading enzymes utilized by these pathogens.

Conditions Leading to Ca Deficiencies

Most soils used for grape production have adequate levels of calcium for leaf development. Ca related fruit disorders occur due to the lack of mobility of Ca within the plant. Early in fruit development, Ca will move through the transpiration stream via the xylem directly from the soil into the fruit. Excess early season vegetative vigor due to high nitrogen levels can lead to an imbalance of too much Ca going to the leaves and not enough into the bunches. Low soil moisture and/or high heat will also diminish Ca uptake from the soil.

As the vineyard approaches veraison, xylem delivery into the fruit will be cut off and only the phloem will be able to supply the fruit. Calcium is completely immobile in the phloem so from this point forward only foliar calcium applications that directly contact the fruit will be able to increase fruit Ca levels.

Desired Ca Tissue Test Values

When sampled at full bloom, Ca levels from fully expanded petioles should be between 0.4-2.5%. However, this may not be a good indicator of how much calcium actually got into the fruit where it is most needed in grape vines. Analyzing fruit calcium levels can be helpful in predicting Ca related disorders, but it varies a lot between varieties. It is much more reliable to examine past effects of cultural and fertility practices on actual fruit quality parameters like berry firmness.

Key Application Timings and Rates

Foliar calcium applications can begin as early as pea-sized berries. Early applications may be especially advantageous if conditions for soil uptake are impaired or if there is excess early season shoot growth. Most cultivars will benefit from at least 2-3 foliar applications. For varieties and/or locations more susceptible to soft fruit, or where bunches will be left on the vine longer, 6 or more sprays may be appropriate. These should be spaced out throughout the fruit sizing period in order to maintain adequate fruit Ca concentration as the berries get larger. Post-harvest benefits such as improved firmness and reduced shatter will be enhanced if applications are made proactively during berry development, rather than 1 or 2 applications post-veraison.





Information
to Grow On

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BRANDT Products

BRANDT has several foliar calcium formulations that are highly effective and provide good crop safety:

Foli-Cal[®]

BRANDT[®] Manni-Plex[®] Cal Zn

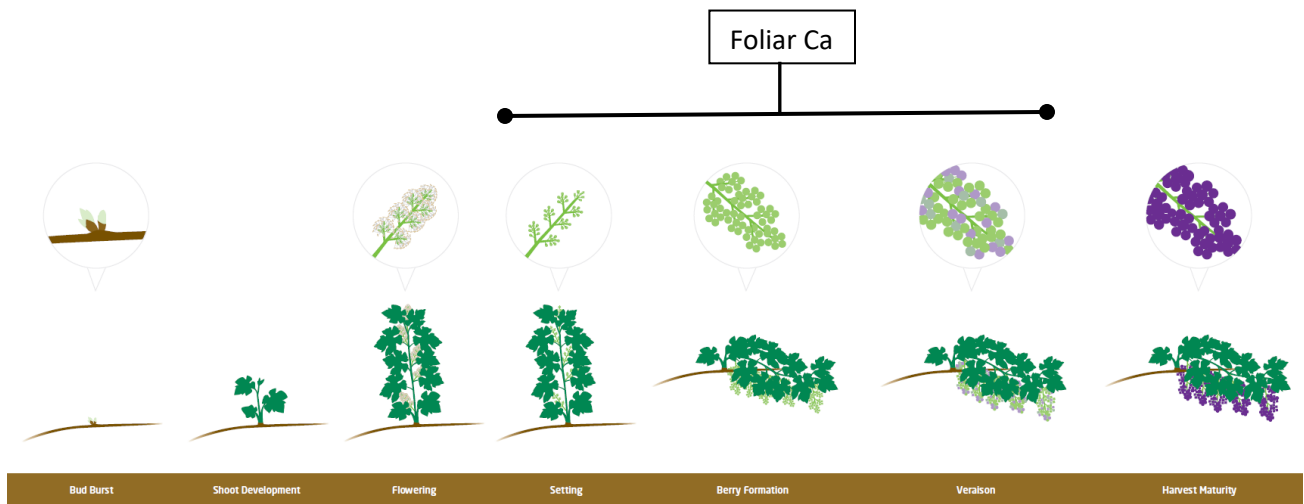
BRANDT Manni-Plex Cal Mag

BRANDT Manni-Plex Cal-B

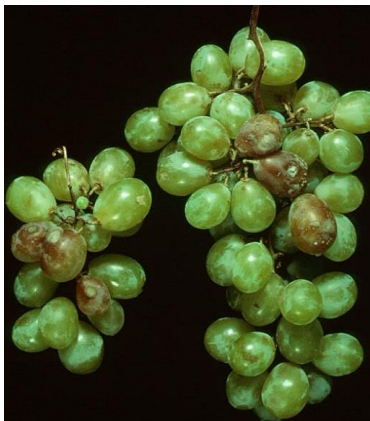
These formulations are all complexed with sugar alcohols to improve nutrient delivery.

BRANDT[®] Organiplex[®] 8% Ca is an amino acid complex and is approved for organic use.

For all these formulations, 1-2 quarts per acre per application will work well.



Nutrient Deficiency Illustrations



Post-harvest *Botrytis* infection (source University of California Postharvest Center)