



CALCIUM & APPLES

BITTER PIT MANAGEMENT IN APPLES USING COR-CLEAR

Bitter pit in apples, along with other calcium-deficiency physiological disorders, continues to result in fruit damage that, depending on variety and year, can be very costly. These disorders are reportedly due to localized calcium levels in the apple flesh.

In fact, calcium levels may be adequate in the soil according to soil nutrient analysis, but there can still be problems with localized calcium deficiencies in the apple flesh.



Apple With Bitter Pit Disorder

The Completion for Calcium

Because calcium moves with the water in the plant, bitter pit is more pronounced in dry years when less water moves through the tree—resulting in less calcium in the plant in general. In addition to the developing fruit, the vegetative growth of the leaves and the shoots also require calcium. In this competition for calcium, the developing fruit are very poor competitors when compared with the rapidly growing and developing leaves and shoots, which receive a much larger share of calcium.

Factors Contributing to Increased Calcium in the Fruit

1. Shoot Management/Proper Fertilization
2. Crop Load Management
3. Optimal Pruning
4. Careful Water Management

Excessive levels of nitrogen or light crop loads can often result in more vigorous vegetative growth, which, in turn, results in less calcium being available to the developing fruit. If shoot growth management is combined with proper fertilization, crop load, optimal pruning and good water management, the calcium content in the tree will increase, potentially making more calcium available for the fruit. ***This is one reason that foliar calcium applications with a nitrogen fertilizer may not be the most effective way to minimize bitter pit.***

Research has also shown that excessive levels of potassium and magnesium compete with calcium in the soil and result in less calcium uptake by the fruit even when calcium levels may be adequate. Growers should monitor the soil and foliar nutrient levels in their orchards so that they may be able to balance the nutrient levels in the trees to minimize nutrient imbalances.

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Application Methods

Because calcium moves slowly in the plant and moves with difficulty into the fruit, foliar sprays of calcium have been the standard method used to minimize bitter pit and cork spot in apples. Calcium sprays are more important on certain varieties, when fruit size is large, when the crop is light and in years when rain or irrigation is limited.

According to a recent article published by the Penn State College of Agricultural Science, “The effective use of calcium chloride tree sprays may be the most cost-effective, quickest cultural practice for reducing low-calcium physiological disorders in apples” (*Part I Cultural Information: Cork Spot and Bitter Pit Fruit Disorders*, Penn State College of Agricultural Science). This article addresses calcium-related fruit disorders and can be accessed online at: <http://tfpg.cas.psu.edu/part1/part13o.htm>; it is highly recommended as further reading on the subject.

COR-CLEAR™, a calcium-chloride-based nutrient, can be sprayed as late in the season as is practical. But the first cover spray should be started early. Consult your local agricultural adviser for the timing of cover sprays. Small amounts of COR-CLEAR split into several applications is more effective than fewer sprays with larger dosages.

Cover Spray Applications

In all cover sprays add 2 lb. COR-CLEAR per 100 gallons of water. Depending on the size of the trees, the spray volume per application (minimum of 8 sprays) may range between 160 gallons to 200 gallons per acre. COR-CLEAR, when applied at 40 to 50 lb. per acre, will help to minimize bitter pit. However, applying COR-Clear in this fashion may result in some slight burning of the edges of leaves which appears in the later part of the growing season. This can be greatly reduced by not spraying when the air temperature is above 85 ° F or higher.

In addition, this application may lengthen the storage life of the fruit due to the enhanced disease resistance gained as a result of the increased flesh firmness.

Post Harvest Treatment Benefits

COR-CLEAR may also be used as a post-harvest treatment to enhance calcium levels in the fruit and prolong the storage life.

Post Harvest Application

Mix 25 pounds COR-CLEAR in 1000 gallons of water for apple dip or drench solutions.