



Foliar Application of Zn, Mn and Fe During Spring Leaf-Out on Stone Fruit

Agronomics / Background

During leaf expansion in stone fruit trees, there is a relatively short window for a high demand of several micronutrients critical to chlorophyll production, photosynthesis and energy production. A foliar spray of these nutrients during leaf expansion will help kick start stone fruit trees and facilitate early carbohydrate production that will be necessary to maximize the cell division stage of fruit growth after bloom.

Zinc (Zn) is essential to many processes such as cell division, protein synthesis, and auxin production which is critical for shoot expansion. Manganese (Mn) plays a critical function in the photosynthetic process and cellular respiration. Iron (Fe) is essential for chlorophyll production making it a key driver for photosynthetic efficiency. Iron is also involved in respiration and nitrogen metabolism.

Conditions Leading to Zn, Mn and Fe Deficiencies

Zinc deficiencies are common in many stone fruit orchards, while manganese and iron deficiencies are somewhat less common. For all three nutrients, deficiencies are most often associated with high soil pH levels which inhibit uptake. Water-logged soils or irrigation water high in bicarbonates will lead to iron deficiency. High soil phosphate and organic matter levels have also been shown to induce zinc deficiencies. Root uptake of Zn, Mn and Fe is an active process that will occur more readily in warmer soils. For early stone fruit varieties, shoot extension often takes place when soil temperatures are still relatively low, so micronutrient uptake is generally limited.

Deficiencies of Zn, Mn and Fe will all lead to some level of leaf chlorosis in the spring. Zinc deficiency will also be accompanied by stunted shoot growth and small, narrow leaves.

Desired Zn, Mn and Fe Tissue Test Values

The most accurate time to determine micronutrient tissue levels is June or July. This means decisions about foliar applications this spring, must be based upon the summer tissue samples from last season. Basal or mid-shoot leaves should be pulled from moderately vigorous fruiting shoots.

Zinc is considered deficient in peaches and nectarines below 15 ppm, but often 25 ppm or less will respond to foliar sprays. Manganese deficiencies occur around 20 ppm in summer leaf samples. However if your values were at 30 ppm or below, a spring foliar application may improve plant performance.

If Fe tissue levels last summer were below 60 ppm, consider including iron in your leaf-out spray. Especially if you have seen leaf chlorosis in prior seasons.

Key Application Timings and Rates

Due to the role these micronutrients play in chlorophyll production, photosynthesis and leaf expansion, vegetative expansion is a good time to make a foliar spray. This window typically starts around petal fall and should continue through April or May depending on location and variety. Young leaves tend to have less cuticular wax so foliar nutrient uptake should be very efficient at this time. Increasing energy production is especially beneficial prior to fruit thinning when the high fruit load makes carbohydrate



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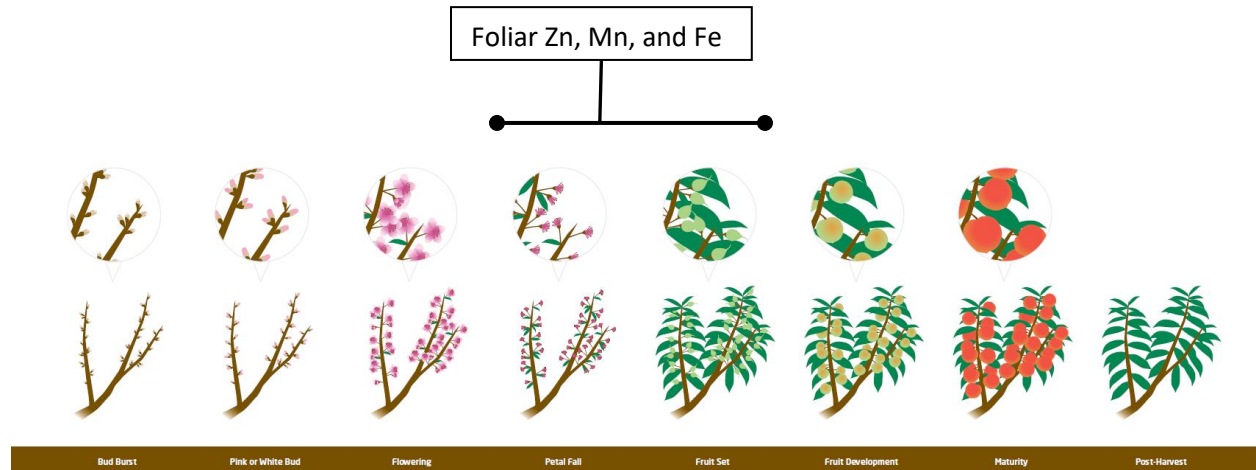
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competition high. Zinc, iron, and especially manganese, have limited phloem mobility so foliar applications that directly contact the leaves that require these nutrients is very effective.

BRANDT Products

- BRANDT[®] Manni-Plex[®] Zn
- BRANDT Manni-Plex Mn
- BRANDT Manni-Plex Fe

These products are highly effective liquid foliar nutrient formulations that fit well into leaf-out sprays. Generally rates around 1-2 quart per acre work well on most stone fruit varieties and can be tank mixed with most fungicides or insecticides that may be in the spray tank at that time.



Peach Iron deficiency (Utah State University)



Zn deficiency in peach tree (U of California)

