



## Honeycrisp and iron chlorosis (Leaf Zonal Chlorosis)

Posted by [Kent Eddy](#)

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If you have any Honeycrisp trees you probably are familiar with the yellowing, mottling, and curling of the leaves in early summer. This is a physiological condition specific to Honeycrisp. I have read that the complex is not caused by disease, insects, or nutrient deficiency and usually does not affect the tree's growth or productivity. I find it hard to believe it is not detrimental to photosynthesis.

I have noticed it more prevalent on dwarf trees (M7 & G30) than on semi-dwarf (M106, MM111) and more on young than old trees (although my oldest is only 12 years).

I was wondering if anyone have tried any foliar sprays that help?

Here is an example on one of my trees:

[\[www.youtube.com\]](http://www.youtube.com)

I found one possible solution (which begs many more questions) here:

[\[www.goodfruit.com\]](http://www.goodfruit.com)

-Kent Eddy

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### Adjust crop load to avert chlorosis in Honeycrisp

Apr 15, 2006

Chlorosis of leaves on Honeycrisp trees appears to be related to light cropping, Dr. Lailiang Cheng, horticulturist at Cornell University, New York, reported at the International Fruit Tree Association's annual conference.

Cheng said ensuring regular cropping might be a way to prevent the disorder.

Generally, leaves on the outer part of the canopy begin to turn yellow in late June or early July as shoot growth slows down or stops. The discoloration starts on the edges of the leaves and spreads to the rest of the leaves. Although most Honeycrisp trees show symptoms, the disorder tends to be worse on trees with a light crop than on heavily cropped trees, Cheng said.

Carbohydrates

It appears that the export of carbohydrates from the leaves is partially blocked, leading to an excessive accumulation of carbon in the leaves and a decrease in photosynthesis. Cheng said this is in the genetic makeup of Honeycrisp.

Photosynthesis is a process in which green leaves use sunlight to convert carbon dioxide from the air and water taken up from the soil into carbohydrates.

When Cheng compared chlorotic leaves with normal leaves, he found much higher levels of carbohydrates and starch in the chlorotic leaves. In normal leaves, starch breaks down at night into glucose and maltose, which are converted to sucrose for export to the sink tissues—fruit, shoot tips, and roots. In the chlorotic leaves, there was no difference between the carbohydrate levels at dusk and at predawn, suggesting that the flow of carbon from chlorotic leaves was inhibited.

In chlorotic leaves, the activities of enzymes that are key players in carbohydrate metabolism were much lower than in normal leaves. When leaves accumulate excessive carbohydrates and starch, they send a chemical signal to the entire tree that the carbon supply is sufficient and no more needs to be made, and this inhibits photosynthesis. A reduction in chlorophyll in the leaves decreases light absorption when photosynthetic activity is reduced. Cheng said this is a protective mechanism.

Managing the problem

Cheng said it's important to maintain a large concentration gradient between the source leaves and the sink tissues in order to maintain the movement of carbohydrates. Using a slightly more vigorous rootstock, such as the more vigorous clones of Malling 9, or M.26, or Geneva 925, might help, he said.

Crop load plays a key role in the overall sink strength of the tree, he added. A moderate level of crop load should help reduce chlorosis, but on Honeycrisp, a moderate crop load can result in biennial bearing, and chlorosis is worse in the off years. The challenge, therefore, is how to achieve consistent cropping from year to year.

Recommendations for New York are to use ammonium thiosulfate (ATS) at bloom, followed by NAA (naphthalene acetic acid) and Sevin (carbaryl). This should be followed by a program to enhance return bloom.

“Doing thinning alone is not enough to ensure good return bloom,” Cheng stressed.

He recommends three, weekly applications of NAA at five parts per million, starting five to six weeks after bloom.

With a moderate crop load every year, chlorosis would be a relatively minor problem, he said. “It’s most severe when the trees don’t have any fruit. You can see the whole foliage turn to yellow during the season, and brown later in the season.”

Asked about the role of water, Cheng said if the trees are not suffering from water stress, it should not be a factor in chlorosis.

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