



# Orchard Outlook Newsletter

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## This Issue Contains:

- Fire Blight Field Meeting
- Dormant Pruning
- Soil and Leaf Tissue Reports
- Fire Blight Information Sheet

The technical information contained in this Orchard Outlook publication is the result of the combined professional opinions of employees of AFHRC and AgraPoint.

## Fire Blight Field Meeting

**AgraPoint will hold a Fire Blight Field Meeting on March 8<sup>th</sup> at 1:30 pm** at Dave Power's orchards in Medford to assist producers with the identification of fire blight cankers in apple trees and to demonstrate the proper procedure for their removal. This will be one in a series of field meetings to assist growers with the clean up of last year's fire blight infection and to prevent its spread this growing season.

## Dormant pruning

January's mild temperatures and lack of snow cover prompted several inquiries about the safety of pruning at this time of year. There is always a risk associated with early winter pruning; to minimize this risk advisory staff will recommend that dormant pruning should not start until late February or early March. Having said this, if growers can manage the risk then there is no reason why they should not take advantage of the fine weather to get any early start on the pruning season.

Pruning in November and December before the trees have hardened off will delay the onset of dormancy. The trunk and crotches of main limbs are the last portions of the tree to harden, thus cambium (bark) injury can occur as a result of early pruning. As fruit trees progress into winter they continue to harden off and by early January freezing damage to the cambium is no longer a major concern. By mid-winter, freezing damage to the wood (xylem) is more typical of winter injury. This is what happened in 1993 when temperatures around -30°C caused considerable wood damage which can still be seen as black heart in the trunks and limbs of trees. The concern when it comes to pruning in January and February is injury from extreme low temperatures to the wood and bark around the pruning cuts. This injury can lead to limb die back and formation of cankers. With some precautions growers can reduce the risk of this happening by using the following guidelines:

- 1) start by pruning on mature trees of hardy cultivars such as McIntosh and Cortland
- 2) prune trees that only require a light pruning, avoid renovation type pruning (lots of large cuts) until later in the season

- 3) avoid pruning before and during extreme lows, watch the forecast to avoid pruning prior to forecasted extreme lows (-20°C and lower)
- 4) avoid pruning during extreme swings in the temperature ie. +10 to -20°C.

In some ways I would prefer to see growers taking a bit of risk and pruning in January rather than pruning after bloom which will weaken trees and have a negative impact on yields.

### Soil and Leaf Tissue Reports

A snowy winter day, such as that which is occurring as I write this article, is a good time to review your 2005 leaf tissue and soil reports. The information contained within these reports combined with 2005 field and harvest observations and your 2006 pruning program will allow you to develop an orchard fertility program for 2006. Start by comparing the result for each orchard block with the desired nutrient ranges for apples and identify those nutrients that are deficient or in excess.

#### Desired Apple Tissue Ranges

N%	P%	K%	Ca%	Mg%	B ppm	Fe ppm	Mn ppm	Cu ppm	Zn ppm
1.9 to 2.2	0.15 to 0.26	1.2 to 1.6	1.0 to 1.6	0.20 to 0.28	20 to 40	25 to 200	20 to 200	7 to 12	15 to 40

#### Desired Soil Nutrient Ranges

pH	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Ca	Mg
5.5 to 6.5	472 to 650	381 to 490	2,001 to 3,351	336 to 446

The soil test indicates the nutrient levels within the top 15-20 cm of the soil profile where the majority of the nutrient uptakes occurs. There are however a number of factors that will influence nutrient uptake by the roots thus the soil report doesn't provide the true nutrient status of the orchard. A soil report may indicate a surplus or deficiency but this may not translate to a deficiency within the tree. The leaf tissue report indicates the nutrient status of the tree for a given period of the year and is more accurate for determining fertilizer requirement than the soil report.

When reviewing a soil report the key things that you should be paying attention to are the soil pH and the ratio of calcium to magnesium. The soil pH is important because it influences the availability of nutrients in the soil for uptake by the roots. Although the desired pH range for fruit trees in Nova Scotia is 5.5 to 6.5 I would advise growers to apply lime once the soil pH drops below 6.0. Liming has the following benefits: It reduces the availability of aluminum and manganese which can be at toxic levels when the pH drops below 5.0. Bark necrosis (measles) on young trees is a good indicator of aluminum and magnesium toxicity. This can be observed in new orchard plantings where growers failed to lime low pH soil prior to planting. Poor tree growth often goes hand in hand with this toxicity symptom. Liming orchards to raise or maintain the pH has several other benefits. Liming increases the availability of phosphorus in soil for plant uptake. It could be more practical to raise the soil pH than to apply phosphate fertilizer to correct

a phosphorus deficiency. Lime material will supply calcium while dolomitic lime supplies magnesium as well. The soil report will indicate which type of agricultural limestone should be applied. To maximize calcium uptake growers should aim for a calcium to magnesium ratio of 10 to 1 in the soil. Calcitic limestone should be used when the ratio is less than this. Avoid high to excessive levels of magnesium in the soil because it interferes with calcium uptake. In the past dolomitic lime was the main source of agricultural lime in Nova Scotia thus many orchards have mid to high levels of magnesium in the soil. In most cases growers should be using calcitic lime except in orchards where the magnesium levels are low or the trees are showing signs of a magnesium deficiency. Lime promotes increased activity of soil micro-organisms which can result in faster decomposition of added organic matter and increased availability of organic nitrogen, sulfur and phosphorus to plants. Liming improves the soil structure by stabilizing soil aggregates, thus reducing erosion. Lime can reduce your fertilizer cost by increasing the fertilizer efficiency. The overall fertilizer efficiency at a pH of 6.0 is 80% (nitrogen 89%, phosphorus 52% and potash 100%) while at 5.0 it is only 46% (nitrogen 53%, phosphorus 34% and potash 52%). Given all things are equal a grower would have to apply almost twice as much fertilizer to a field with a pH of 5.0 to obtain the same plant response as a field with a pH of 6.0.

Annual orchard fertilizer application should be based on the tissue analysis. When comparing your tissue analysis report to the desired range pay particular attention to the nitrogen levels. The weather conditions during late summer and the fall are often blamed for the lack of fruit colour when the real problem may be related to high levels of nitrogen. One would expect to see slightly higher nitrogen levels for young apple trees, hard apples (Red Delicious) and processing apples. One should not be concerned about nitrogen levels of 2.4 to 2.6 for young nonbearing trees where vegetative growth is being promoted. For young bearing trees the level should be slightly higher than mature trees because vegetative growth still needs to be promoted, however this added vigor will come at the expense of fruit quality. Fruit colour, firmness and storage life may be negatively impacted by high nitrogen levels. Not only does high nitrogen delay red colour development, it can prevent the development of yellow colour in green and bicolour cultivars. I would hazard a guess that some of the variation in fruit colour of Honeycrisp from tree to tree is more related to nitrogen level than genetic make-up. Growers who want to optimize fruit colour, size, quality and storage life of red cultivars such as McIntosh and Cortland should be aiming for a nitrogen level of around 2.0%. If the nitrogen level is above 2.2% you should be asking yourself:

Was colour a problem in this block?

Is there more than 8 to 10 inches of terminal growth on the tree?

Is storage life a problem?

Answering yes to any of these would add further proof that nitrogen levels are too high. A nitrogen level of 2.0 to 2.2% is a good target for bicolour cultivars, such as Jonagold, Gala and Honeycrisp. Levels of 2.5 to 2.7% nitrogen are suitable for the processing cultivar Spy. Just keep in mind that high nitrogen and big fruit will lead to fruit calcium disorders. Some growers may be allowing the nitrogen to run on the high side hoping to obtain larger fruit however this should be accomplished through crop load management and pruning.

Phosphorus deficiencies in the field are seldom observed and in most cases tissue levels are within the desired range. A low soil phosphorus level often does not translate into a low tissue level. One has to question the economics of applying phosphorus in established orchards. Phosphorus applied to the soil surface in a bearing orchard is more often than not tied up in the soil before the roots have a chance to pick it up. The time to raise the soil phosphorus level is prior to planting. Spending your money on limestone in many cases would have a better pay back on increasing phosphorus levels in mature fruit trees than on a phosphorus fertilizer. As stated above, raising the soil pH to 6.5 will increase the availability of phosphorus.

Potassium levels from time to time can be below the desired level with foliar and fruit deficiency symptoms being observed in the orchard. Periodic applications of potassium are required to maintain the desired range. The Cornell Cooperative extension bulletin 219 states that fruit size and colour are correlated positively with the level of potassium in leaves and that levels in the range of 1.5 to 1.8 % must be sustained to achieve optimum production, fruit size and colour for the cultivars McIntosh and Empire. High N-K ratios usually indicate that potassium supply is inadequate, while low ratios indicate that nitrogen is too low or potassium too high. As the nitrogen level increases so should potassium. It is suggested that a ratio of 1.0-1.25:1 (N:K) be maintained for cultivars such as McIntosh. Growers have two options for adjusting the tissue levels of these nutrients to obtain this balance. Apply potassium which will help if the soil levels are low or reduce nitrogen application where nitrogen levels are high.

In Nova Scotia foliar calcium levels more often than not are below the desired range of 1.0-1.6%. Foliar calcium levels below the desired range however don't necessarily translate into fruit disorders such as bitter pit because of the mode of action of calcium in the soil, tree and fruit. In the case of low calcium levels check the soil pH to determine if lime can be used to improve calcium levels. Also check the foliar nitrogen and potassium levels, as high levels of these nutrients can be contributing to the low calcium level. Low tissue levels of calcium should serve as a warning for the need to apply foliar applications of calcium to cultivars such as Spy, Jonagold, Honeycrisp and Gravenstein which are prone to fruit calcium disorders.

The two micro nutrients that need to be monitored are boron and zinc. Boron deficiency in the fruit is not that common in Nova Scotia but occasionally I do see it. Boron disorders are more likely to show up during a dry growing season and on soils with a coarse texture. In the fruit, boron deficiency appears as corky dry tissue around the seed cavity, premature ripening and preharvest drop. Fruit set can be reduced because of poor pollen germination and pollen tube growth. Many growers apply foliar applications during bloom to ensure that there is an adequate level of boron for fruit set. When orchard blocks have a high level of foliar boron (30-40 ppm) one would question the need to apply a foliar spray of boron during pink. Foliar boron would be more appropriate when tissue levels are at the bottom end of the desired range (25 ppm and lower). The addition of boron with the spring fertilizer application is recommended when boron levels are below 20 ppm. Zinc plays a role in pollination and influences calcium metabolism thus its levels should be maintained within the desired range of 15-40 ppm. I can honestly say that I have never detected a zinc deficiency in Nova Scotia orchards. Zinc deficiency symptoms can be quite subtle and difficult to pick up. For example, is the blind wood of Cortland due to lack of zinc or just a characteristic of the cultivar? If foliar zinc levels are below 15 then foliar applications of zinc prior to bloom would be warranted.

AgraPoint does offer a fee based fertilizer consulting service should you wish assistance in developing a fertilizer program for 2006.

### **Fire Blight Information Sheet**

The brochure 'Integrated Management of Fire Blight on Apple and Pear in Canada' is now available from Bill Craig at AgraPoint, Cavendish AgriServices, Scotian Gold, or Helen at the NS Fruit Growers' office. It is also available in French.

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