

# Minimal Spray Strategy for Frosted Apple Trees

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After the early morning frost of Saturday, May 6<sup>th</sup>, many apples in the northwest region were affected. Based on some preliminary observations, we have found most apples in 'cherry sites' fared pretty well, although some trees in those 'good fruit sites' picked up some damage. After growers determine the damage on their farms, if they find their trees suffered a lot of frost damage, they may want to opt for a minimal management program. This program is designed to keep the trees healthy for next year, but also to reduce input costs on acreage with no expected returns.

For those growers with crop insurance, the guidelines of your policy commonly state that you have to maintain the trees in a normal fashion in order to qualify for claim payments. With reduced or no crop on the tree, several insects and diseases may be ruled out of your spray programs (thankfully!).

**Fire Blight** - Fire blight is still an issue for a lot of the region, especially with this recent wet weather, and the big question is whether we can still become infected from fire blight with so many dead blossoms. There has been little work done on this topic, but we know that dead pistils on frosted blossoms cannot support a population of *Erwinia amylovora*, the causal agent of fire blight; hence, the more dead blossoms there are in the orchard, the lower the potential of fire blight infection. We are in essence reducing our fire blight inoculum in the orchard by eliminating the number of viable fire blight infection areas (flower pistils). Although most growers fear the worst, ie. 100% destruction, we cannot assume all flowers in the orchard are dead. Therefore, we must continue to monitor and potentially spray for fire blight because we may have some viable flowers still in the block. We especially cannot assume we have a total wipe out in blocks with susceptible varieties. In addition, trauma blight situations still may occur with high winds and hail, and these events can still cause devastation to orchards. Trauma blight situations should still be managed with applications of streptomycin, Mycoshield, Serenade, or copper. Streptomycin is the best material to use and will give the best management of fire blight in a post-trauma blight situation where resistance is not an issue. Mycoshield, Serenade, and copper applications should be made ahead of a trauma blight situation, and this option is not always the most economical choice as growers attempt to stay one step ahead of the weather forecast, which we all know is virtually impossible.

**Apple Scab** - As for all blocks, those with and without a crop, apple scab is best controlled if growers stayed ahead of primary scab. The best method to control scab blocks with little crop would be to control these initial scab lesions before growers reduce or eliminate fungicide applications from the block. If blocks have scab in them now, these blocks could defoliate early and have reduced winter hardiness and a high potential inoculum level for 2007. As we are still in primary scab, growers should not cut back on fungicides at this time. If an orchard makes it through primary scab this season **without infection**, we could reduce and potentially eliminate all other fungicide applications for the season.

**Powdery Mildew (PM)** - Just as with apple scab, powdery mildew left uncontrolled can lead to reduced vigor and winter hardiness. Again, as with apple scab, most commercial blocks have had some mildewcides in their programs already this year, so mildew will not probably be a concern in most blocks with no crop. If you have a mildew problem now, treat it soon in order to reduce the inoculum potential for the 2007 season.

**Plum Curculio (PC)** - If there is no crop, there is no reason to spray for PC (or for other fruit feeders like apple maggot). However, growers should keep in mind that PC are good fliers, and if one block has no apples, those buggers can move from the no-apple block to an orchard with fruit in a short amount of time. Growers should be keeping an eye for PC in the orchard as well as on their neighbors' crops to determine if PC may be migrating from one orchard to another. Under light fruit load

conditions, plum curculio will compete heavily for the fruit that is present. If the remaining fruit are left unprotected, these weevils can oviposit many times in one fruit, and ultimately may result in a much higher percent damage level per fruit than normal. The good news is that most of this fruit will drop, but the larvae that emerge could be the source of next year's "resident" population. Next season, growers will need to account for the difference in managing a resident population versus the predominant situation of controlling immigrants moving in from outside wild hosts. The other factor to consider is the amount of frost damage you have, and this issue remains true for other fruit insect pests: the fewer fruits per block, the less food insects will have to consume. Growers should know in the next few weeks how many fruits are left in their blocks, and this information can be considered for fruit insect pest control strategy.

**Potato leafhopper (PLH)** - PLH is normally controlled when broad-spectrum insecticide programs are used to control primary pests like plum curculio, codling moth, and oriental fruit moth. If growers reduce or eliminate insecticides for these key pests because of little or no crop, PLH should not be ignored. The PLH first arrives in late May with southerly-based weather fronts. Those adults lay eggs, which hatch and begin feeding on the phloem of foliage and shoot tips of actively growing terminals in mid-June. Populations vary greatly year to year. PLH often reach high populations by early July. The resulting damage appears as necrotic cupped-leaf margins and can stunt growth significantly. Apple growers should check for potato leafhopper during weekly orchard monitoring beginning in early June. Look for curled leaves and shoots that are not growing as vigorously as they should. Check the undersides of leaves for nymphs and adults. As leafhoppers are easily disturbed, and move off the leaf, it is important to do assessments in the field. Turn the leaf over slowly when monitoring to assess how many leafhoppers are on the lower leaf surface. In apples, one or two nymphs per leaf can cause leaf curling if they are allowed to feed for a prolonged period of time (four to seven days). Control will be particularly important in young blocks that still have space to fill.

**Obliquebanded leafroller (OBLR)** - The OBLR is largely a foliage feeder, but can do significant damage to fruit. Fruit damage from the summer generation of OBLR is often related to when terminal growth slows or buds set, forcing larvae from the preferable young foliage to fruit. Fruit damage is also common under conditions of heavy fruit set where full clusters and adjacent foliage prevent adequate penetration of targeted insecticides. Light fruit-load conditions like this year should reduce the risk of OBLR damage compared to normal years.

**Codling Moth (CM)** - No control is required in blocks with no fruit. If growers have a few fruits on the trees - perhaps as few as 10 or 20 fruits on a dwarf tree - codling moth will easily infest these fruits in their first generation if you eliminate cover sprays for CM. Eliminating early sprays can lead to very high CM numbers and increases the potential damage for the 2007 season. Growers should also be aware of CM moving in from an orchard with little fruit to a neighboring orchard with fruit. This movement can happen with the first generation but will be more of a concern for second generation CM. If growers have orchards **with** a crop, they should be conscious of any nearby orchards that may be on a reduced insecticide program because of no crop. If a neighboring block has no crop, the CM that are residents in those apple trees will most likely move to nearby blocks with fruit to lay their eggs. If a neighboring block has a few fruits and the first generation CM is not controlled, then the second generation CM will most likely move to neighboring blocks to look for more favorable egg-laying sites. Older orchards generally have higher resident populations than younger blocks.

**Oriental Fruit Moth (OFM)** - OFM larvae bore into new growing terminals and cause the terminals to look ragged and flagged over. This injury is most apparent in first generation OFM, but second generation will appear as the fruit sizes and become more desirable to OFM. Populations of OFM are generally very low in NW Michigan, so reducing or eliminating spray for other pests will not likely lead to an OFM problem. However, if OFM is present, then a light fruit set will likely increase the incidence of terminal flagging during the second-generation OFM egg hatch period (July). Also, if insecticide cover sprays are eliminated from apple blocks, OFM and some other insects may build in number, likely increasing pest pressure the following year.

**Apple Maggot (AM)** -- As this insect pest can be found on other trees outside of commercial apple blocks, ie. hawthorns, crabapples, and abandoned blocks, they move into a block to infest fruit. If no

fruit is present then there is no need for an insecticide, in which case the adult will seek egg laying sites elsewhere. There is evidence of AM building up in orchards that remain unsprayed, so we may potentially increase AM in blocks that have some fruit but do not have insecticides. However, in a year with little fruit, there will be few oviposition sites (apples) in which AM will lay their eggs. So, if a grower plans to harvest a block with a light crop, keep in mind that the apples that do remain will be a haven for many AM larvae. Again, growers should monitor their apple crop in order to make the decision to spray for AM.

**European Red Mites (ERM)** and **Two-spotted Spider Mites (TSSM)** - Left uncontrolled, ERM's and TSSM's can reduce photosynthesis and overwintering carbohydrate reserves. These reserves provide the tree with its winter hardiness, as well as help set the next year's crop. They can cause severe bronzing, but if this occurs in a year without a crop, the damage will not be as severe, due to the lack of competition for the carbohydrates from fruits. In other words, the tree can tolerate more mites. Plus, if certain broad-spectrum insecticides are left out of an orchard system (for codling moth, for example), then mite predators will have a chance to build their populations to help curb the ERM. This season may be one to save some money by eliminating a miticide spray!

**\*\*Some growers may find they have to spray more than these general rules of thumb while other growers may not need as many applications. One important thing growers can do to reduce the number of chemical applications is to diligently monitor for insects and diseases throughout the season. This scouting could be the difference between spraying and not spraying based on the pests in the field.**

#### ***Other concerns:***

#### **Benefits of Beneficials**

One possible benefit of reducing broad-spectrum insecticide sprays would be a potential increase in biological control organisms such as beneficial insects. By eliminating the number of insecticide applications could be helpful for the future of an orchard system.

#### **Return Bloom for 2007**

Next year will most likely have a tremendous return bloom. With little crop, the vegetative growth should be at a maximum for 2006, which will lead to extra pruning for the dormant season. A strong dormant pruning program will help regulate the 2007 crop. Apogee applications will help reduce terminal growth and could reduce pruning costs by as much as 30%. Apogee applications are not inexpensive, and a grower should weigh the costs of the applications against the costs of dormant pruning. Also, Apogee is best timed when the king bloom is starting to drop petals, so you may be out of the window for good growth control with Apogee for this current season.

#### **Eliminating fruit**

If you have a small crop, you might want to consider eliminating fruit completely from the trees. You can limit the infestation from the apple insects like codling moth and apple maggot, by eliminating the fruits on the trees. Chemical fruit removal may be done with high labeled rates of spray thinners, such as NAA and Sevin XLR plus a spray oil. The best program would be to make two applications. If weather is warm (favorable for thinning), the first chemical thinners should be applied as soon as the flower petals are 80% fallen (not too soon in bloom or you can harm pollinators). A second application, 10 to 14 days later, may be needed to remove more fruit. Even with two applications of chemical thinners, there may be some fruit remaining that may need to be removed by hand. If only one application is planned, then suggest applying when the first period of warm weather occurs after petal fall. Suggested fruit removal program:

15-20 PPM NAA (6-8 oz. NAA in 100 gallons of water) PLUS 1 quart Sevin XLR plus 1 quart spray oil/100 gal..

#### **Large Fruits**

Fruit size will most likely be large on trees with a light to moderate crop set. Large fruits have some potential inherent problems such as bitter pit, water core, and cracking, which can cause storage and

marketing problems. Calcium sprays can help and might be justified in certain higher value varieties that commonly have problems such as bitter pit.

### **Scarred Fruits**

There may be a lot of surface damage on apples this year due to the cold weather during bloom. Growers should evaluate crop quality - if it is poor, eliminating the fruit and using a reduced spray schedule should be considered.

### **Nutrition**

Trees with little to no crop do not need as much nitrogen. If a split application was planned, the second application should be reduced or eliminated. If no apples will be harvested, apply only foliar nutrients where a known deficiency exists. For example, if N was applied to the soil prior to the freeze, then there should be no need for foliar N this season. As noted above, if a light crop will be harvested, then foliar calcium will be especially important on bitter pit susceptible varieties.

### **In Conclusion**

Be sure of your crop situation before you decide to eliminate cover sprays entirely from an apple block. Apple fruit set can fool the eye sometimes, especially now that the foliage is growing so rapidly. One week may look like a total loss and the next week, the fruit will start to show up more readily. Also, if you have crop insurance, be sure to check with your insurance representative of the details that they may require of your pest management program so that you are not disqualified in any way.