



## GROWER FIELD GUIDE, July 2011

July is here and we are off and going. I hope all of you have had a good spring and have been able to keep up. We have been able to get most of our sprays on this spring and most orchards that I have looked at look good. The weather continues to be moving along slow and we still haven't seen many days of warm temps. There are still people thinning apples while I am writing this. I don't know when I have seen the spring so far behind. With all that said, we are looking good rolling into cherry harvest for 2011. There will be some cherries picked this week in the earliest areas of the state and the general push looks to be post July 4<sup>th</sup> this year. Keep pushing through and don't slow down.

Many of you have called with questions about SWD in cherries. As of the time I am writing this there has only been one fly found in Canada. That could change by the time this goes to press and is mailed out, but the numbers are not what we expected so far.

Food safety seems to be a buzz with many growers. We are working here at Northwest Wholesale to help in any way that we can. We are participating in food safety programs for the packing facilities with the supplies that we furnish to the warehouses in NCW. I know that some of the procedures are new and seem foreign but I am sure we will work through the process.

Many of you are trying to clean out your spray sheds to comply with these new rules. That is a good thing. Some of the sheds I have visited this year could use the cleaning! Michael McCormick, with the State Department of Agriculture, has been working to help with the disposal of unwanted chemicals. His budget was basically shot down for 2011 but he continues to work with growers to help with this problem. He has been taking product and bagging it for a later disposal hoping for a bigger budget in 2012. He is a good source for you guys to contact with these disposal questions and problems. He will do everything he can to help. His contact information is: (509)961-4605 or mmccormick@agr.wa.gov

I am giving you his information because we are starting to receive more and more containers in our recycling program with product still in the containers. We **cannot** take these. Please don't bring containers into NWW for recycling with product still in them. This program is designed to help growers and I don't want to discontinue it because of added costs to Northwest Wholesale.

I have freely and shamelessly copied and adapted information from various Research and Extension personnel and publications plus the experiences of the Fieldstaff at Northwest Wholesale for the information presented in this Grower Field Guide. Any errors in presenting that information are entirely mine; please notify me of any errors so that they will not be repeated.

**All material usage information supplied in this bulletin is believed to be in compliance with current labels. It is the responsibility of the grower to insure that use of any material is in compliance with the label on the product in his possession! All material rates in this bulletin are based on dilute applications at 400 gallons per acre unless otherwise noted.**

All of the monitoring aids mentioned in this bulletin and research information on most of the insects and diseases mentioned are available through any Northwest Wholesale warehouse.

I occasionally refer to articles in back issues. If you do not have that issue they are all posted on the NWW website, or check for it at the nearest NWW warehouse. If they don't have it they can get it for you.

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### Zon Gun Repair

Big Steve in the warehouse in Wenatchee continues to repair the Zon guns you guys bring in. I think that he hasn't been stumped yet, but don't quote me. He has found robin eggs, dog food and who knows what else in guns coming from storage. The main message is that he can and will repair them if you contact him and bring them into Wenatchee.

### Container Recycling

OK, the last few years I threatened you that the container recycling program was going to be removed if we weren't able to clean up the containers from the condition that we were getting them in. You responded well. The containers have been much better and I thank you for that. Northwest Ag Plastics hasn't had any problems that I am aware of for a few years. I am going to leave the picture of the wrong way to bring containers in just as a reminder. I hope this program is helpful and keeps going in the future. Please continue to handle the containers properly and we should be able to continue to provide this service for many years to come. **This is where I should insert not to bring in containers with product still in them!**

This picture will give you some idea of possible problems. The biggest single problem is residue left inside the container. This can happen even after rinsing if the jug is not set upside down to drain completely and that last little bit of liquid is allowed to dry inside the jug. Some containers looked like no rinsing was even attempted. The outside of some containers looked like they had been rolled in oil then "breaded" with dirt, kind of like your wife does with chicken and bread crumbs. There were five gallon buckets with the bails and lids still attached. The metal and plastic gaskets have to be removed before they are chippable, even when they are well cleaned. A few containers had the booklet labels still attached, a few had a quarter to half of the sealing foil still attached, a few otherwise clean jugs had the lids in place. The chipper operator doesn't remove lids or foil — he simply rejects the jug.



When you open a container with a foil seal, take it all off right then. Not only will you be done with it quickly, but also pouring and measuring the material will be easier and cleaner with less dribble. Rinse the container inside and out into the spray tank when you use the last of the material. If the material is

going to be used for a long period of time and heavy residue tends to dribble down and dry on the outside, rinse that off into the tank after each use. Not only will the container be recyclable when its finally empty, it will be much nicer for you to handle when you use it next. Don't put the lid back on an empty container. Allow it to drain completely and dry while upside down, either in a collection bin or on a shovel handle etc; to prevent interior residue. Strip off any plastic sleeves or multi-page labels, single page labels glued directly to the container are OK. I know NuFilm and Vapor Gard jugs are bears to clean, but left upside down in the sun they will drain to an acceptable level in a fairly short time. Collecting drainage from several jugs into a single jug could be enough to treat another acre, saving you some money in the process. Everybody has some 5-gallon buckets around, has anyone tried immersing a newly empty NuFilm jug in a 5-gallon bucket of water while spraying one tank? Will it soak clean in that length of time? If you want to bring in 5-gallon buckets, the lid has to be off and the metal bail removed. The lid has to have the gasket and any metal around the bung removed, it might be easier to place that in your garbage bin. (Triple rinsed containers are no longer hazardous waste; they are considered solid waste and can be legally disposed of as garbage but we'd like to chip and recycle as many as possible.) Store the drained, dry containers upside down or under cover. Dust from road traffic getting inside along with water from sprinklers will look like residue to the chipper operator and cause rejection.

If you're generating lots of empty jugs and need to store them briefly, here's an easy way to do it. After you've rinsed them and removed all of the excess labeling (plastic sleeve and booklets, etc; glued on paper label is OK.) put them upside down in an old apple bin. They will drain clean and stay dry and clean even if you have to leave them in the orchard under the sprinklers for a while. Bring the bin of jugs in when its full. I've also seen the jugs strung on twine like fish on a stringer. Works for us as long as you have drained them properly and kept them clean and dry.

### Leaf sampling

July is the month to begin planning for routine leaf sampling. The samples are normally taken between mid July and mid August. The accepted method is to use fully developed leaves from the current years extension growth that is positioned at a 30° - 70° angle. I have noticed a trend to apply foliar nutrients longer into the season than the first codling moth cover, which has been a common cut off date. This raises a question in my mind of possible contamination from mid summer applications of nutrients, especially if they contain Zinc, Copper, or Iron. Dithane or Ziram applied for fruit finish or perennial canker will also give a false reading if included in the sample.

To reduce the possibility of contamination, take the uppermost fully expanded leaf on the extension growth if the last nutrient or fungicide application was 30 days or more previous. Be sure to note on the submission form to the lab what materials have been applied, this will alert them to possible contamination if some of the elements test unusually high. The potential of sample contamination will be high from trees that have received several foliar nutrient sprays and are not growing well.

**Baby trees**

Don't forget those baby trees you paid good money to buy and plant in the last two or three years. Turn your back for a couple of weeks to thin apples or harvest cherries and those three inch weeds will suddenly be a foot or more high, robbing moisture and nutrients plus blocking the sprinklers. Weeds can get in the way of a mini-sprinkler system almost overnight.

One situation that is frequently mismanaged is individual replacement plantings in blocks of older trees. Weed control applied to the older trees is often avoided at the new planting site for fear of damaging the young tree, then the follow up weed control that was planned just for the young trees doesn't get done because...(you fill in the reasons). By mid July the weeds are as high as the new tree. Compounding the problem, the irrigation schedule is usually based on the needs of the older trees instead of the newly planted tree. Its much smaller root system dries out more quickly than older established trees, especially when the weeds at the base of the young tree that you didn't kill are sucking moisture from the ground hard and fast. A young tree that is water stressed at mid summer in its first or second leaf is a prime candidate for runting out if not dying, especially if it is on one of the smaller rootstocks. Water, weed and feed — in that order.

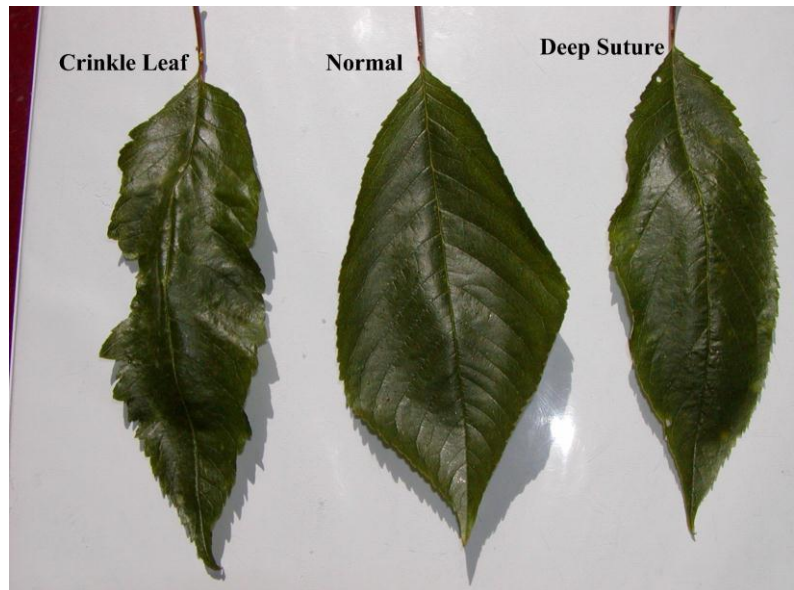
Continue to monitor and control mildew on susceptible young trees until growth terminates and the leaves become too mature to easily infect. You are not only protecting this year's growth but also the amount of overwintering spores that you will have to contend with next spring.

Mid July is not too late for a *light* (1 - 2 oz.) application of calcium nitrate, 1/4 - 1/2 oz. of actual nitrogen per tree. Apply just before irrigation.

Oh, and if that block of baby trees just happens to be cherries second leaf or older, I want to give you something else to think about. Pay attention to the size and shape of the leaves. Do the trees in the block all look alike, or is there an occasional tree that somehow just looks different? It's nice, healthy green, growing well (or fairly well) but it just looks different somehow. I bring this up because I've walked some young cherry blocks recently and found a couple of these trees in most of them.

Yes, it could be a seedling that slipped past the nursery's inspection, which occasionally happens. But in that case the leaves will be regular and uniform. It's more likely that you have discovered a bud that has mutated to **SWEET CHERRY CRINKLE LEAF** or **DEEP SUTURE**. When the bud the nursery used to grow the tree happens to mutate, it

affects the whole tree. It's heartbreaking to spend five or six years growing a healthy looking cherry tree, only to discover you can't sell the fruit. The sooner you can sort them out the less it will cost you.



If the leaves on the affected portion of the tree are noticeably narrower than normal, but with regular, normal looking margins, you've probably discovered **DEEP SUTURE**. All of the fruit produced from the affected part of the tree will have a deeply creased suture that will be culled at the warehouse. The fruit is more distorted some years than others. If most of a young tree is affected it will probably be easiest to replace it. It can be grafted with stock from a healthy tree however. In larger trees the affected limb or limbs may be pruned out.

If the leaves are long and narrow with jagged, irregular margins you've probably discovered **SWEET CHERRY CRINKLE LEAF**. Fruit from this disorder will be smaller than normal, somewhat pointed, frequently with a raised suture and attached to the stem at an odd angle. This may also be grafted with healthy stock or pruned out if only a small portion of the tree is affected

If you're not sure what you've found, at least mark the tree and ask a fieldman to look at it before you spend another three or four years growing a tree that can't produce good fruit! Vigorously growing young trees frequently have a few leaves that are misshapen, don't worry about that. If a tree has either one of these disorders, nearly every leaf on a limb or the entire tree will be affected.

Mature orchards should also be inspected at least once per season. These two disorders don't spread, but more of it can develop each year as buds continue to mutate. Misshapen leaves are a lot easier to spot during a walking inspection than misshapen fruit so the ideal time to do this is about the time you apply your GA. The leaves normally are not yet distorted by mildew and the fruit is large enough to confirm any leaf symptoms found. Carefully pruning out all of the affected wood each year while the leaves are still on the tree so you can see where to cut will keep your orchard clean and fruit cullage to a minimum.

Producing cherry blocks may also become infected with a number of viruses that are transmitted by insects or pollen as the trees age, you should become familiar with them and inspect your trees at least once per year. The **FIELD GUIDE TO SWEET CHERRY DISEASES OF WASHINGTON** has colored pictures of most of the common cherry maladies. It is available from extension and well worth the price.

## APPLES

### Still time for COPOCAL.

Early district Gala may be up against the wire, you need about 60 days preharvest to get the best results. Anything later than Jonagold will still respond if you act now. You don't need to wait for the results of your leaf sample, I haven't found a block yet that did not require at least one gallon of COPOCAL per acre. Take the leaf sample now and then put on the initial application. Or call a Northwest fieldman to take it for you; it's slightly different than the technique you're familiar with.

See the June GROWER FIELD GUIDE for more complete details about copper for increased color.

### Calcium chloride — Dr. Jekyll and Mr. Hyde?

July is the month when the neat, preplanned spray program falls apart as unexpected or multiple pests show up in the orchard at inconvenient times. The single constant is to include calcium in the tank whenever possible. But which calcium?

The need for foliar calcium has been researched and re-researched for years. There is absolutely no doubt that you grow firmer, better storing fruit when you apply calcium. The most commonly used form of calcium is an industrial byproduct, calcium chloride. It consists of 33% calcium and 67% chloride, essentially a non-nutrient that can be damaging to both tree and fruit. Aren't you usually concerned about how much calcium chloride your fruit will tolerate without damage? Especially early in the season when the fruit is tender and again in mid summer when it is very hot.

Calcium chloride does provide calcium to the fruit and is very inexpensive to purchase, but is it cost effective — even when you manage carefully and avoid obvious damage?

Consider these comparisons. In 2000 D'Anjou pears were sprayed twice with a four-pound application of calcium chloride and compared with a single 6-¼ pound application of MIRACALsp. The sample fruitlets were harvested about two weeks later and peeled to remove surface contamination. The MIRACALsp treated fruit had 14% more calcium in the flesh even though less total calcium had been applied.

That same year a Fuji block was split, one half treated with calcium chloride, the other with the same rate of MIRACALsp. The warehouse packing the fruit diverted thousands of bins of Fuji to the processor that year because of dark and decaying lenticles;

but there was NO lenticle damage or darkening in the half of the orchard that was treated with MIRACALsp. An inexpensive product that doesn't do the job, or damages your fruit is no bargain!

If you want to attract the shopper's attention with a smooth, clean fruit finish; you can't risk damaging your fruit's finish by causing lenticle damage or other surface blemishes with your calcium nutrition program.

### Weed Control

This month is also generally the last time you can spray the weeds in producing blocks before the limbs come down to meet the weeds growing up. This is especially important if you have a micro sprinkler system that needs a fairly clean weed strip to irrigate effectively. Irrigation management during July and August will have a definite affect on fruit size and quality (sunburn, bitterpit).

The patent has expired on Roundup; there are many new brands of glyphosate on the market this year. We don't see any difference in performance in any of the materials we have observed. With all glyphosate materials it is important to use some form of ammonium sulfate (Spray Start) to neutralize the magnesium and calcium ions in the water. If you don't those ions will neutralize some of the active ingredient and lower the effectiveness of your application.

Glyphosate also performs better if you add surfactant to the tank, up to 2 quarts in 100 gallons. Continue to use the ammonium sulfate.

### Codling Moth

A cool wet spring followed by a cooling trend could make the first generation this year very long. The first generation has been finishing up with a strong flight in recent years, just when you would expect the numbers to be down. If you've only applied two covers to the first generation and don't plan to apply a third be sure your traps are in place and serviced so you don't get a nasty surprise!

If you have not monitored the first generation in conventional orchards, I encourage you to do so with the second generation. The second generation will be flying before the first generation hatch is complete so those traps should be out two weeks after your last first generation cover. In light pressure areas you may be able to reduce coverage of the second generation. At the least you will be able to time your cover to maximum flight activity.

If you are not using some method of monitoring Codling Moth population and development you will need to continue spraying on a 2 ½ to 3-week interval. *Remember that you are limited to 3 pounds of Azinphos Methyl (Guthion) per year on apples, 3 pounds per year on pears!* Assail, Calypso, Rimon, and Imidan are alternative products for codling moth control. Delegate and Altacor are new options now too! See Psylla in pear section for more information.

Mating disruption orchards should be monitoring on a constant basis. The need for spraying should be determined by either visible damage or trap catch. This technique was explained in the March GROWER FIELD GUIDE.

### Leaf Roller

For the past few seasons I've had the good fortune to get season long control of leaf roller with a 16 ounce **Intrepid** applied at petal fall. This is targeted at both codling moth and leaf roller. If this has not been part of your program you should consider it for next year. I will still be monitoring for leaf roller as described below. I don't depend on traps for population density as we can do with codling moth. Unlike the female Leafroller the male will move long distances in response to a pheromone lure. The catch in your trap could be from any one of your neighbors. Keep looking for the first larva to begin showing up on the back of terminal leaves in the upper center of the trees.

It is very time consuming to search for newly hatched Leafroller larva in the center of the tree. My method is to walk slowly along the row looking at the upper terminals against a bright sky. Any thin spot in the leaf caused by the feeding of the young larva will be very easy to see, down to match head size. You need to carry a pole pruner or some other means of getting some of the terminals down where you can examine them as there are other conditions and insects that will tatter or make holes in the terminal leaves. A Leafroller larva will have a shelter of webbing built against one of the major veins of the leaf before it is large enough to roll the leaf. When you find these it is time to begin your control program.

Don't overlook possible leaf roller populations in your newly planted or grafted trees. They often come with the young trees or scion wood in the overwintering stage. This puts them out of sync with the rest of your orchard and they could be missed.

### Leafminer

I haven't heard anybody talking about leafminer problems for several seasons now, but if you have mines in your orchard the next generation will be emerging in July. If you can't find 30% to 40% parasitized mines in this generation and the population seems high, you should consider curbing them by reducing the eggs laid for the following generation.

To monitor for emergence, sharply tap an occasional limb as you walk through the orchard. The dislodged adults will quickly flutter off in all directions, landing quietly. This is in contrast to any adult leafhopper that might be present; they will zip to the next leaf and land noisily, sounding like small pellets.

As the population of adult leafminers increase, begin to open some mines to determine the percentage of *Pnigalio* wasp present. A pair of tweezers works well for this. The *Pnigalio* larva is white to cream colored and spindle shaped. It feeds on the exterior of the leafminer larva and is easy to see with a hand lens. The pupa begins a very light gray and darkens to a shiny black, it is 1/2 to 2/3 of the size of the leafminer larva. If you open flat mines and find discolored or very lethargic leafminer larva that is a pretty good indication that the adult *Pnigalio* wasp is active in the orchard.

If you can find *Pnigalio* larva but less than the 30% or more needed for quick control of the next generation, I recommend that you target your control to the adult leafminer. As soon as you can find eggs being laid on the back of the youngest 5 or 6 leaves of the terminal growth, apply **mineral spray oil** at 1 gallon per acre. This will kill the adult leafminer contacted, stopping egg lay for a while and allow the *Pnigalio* larva to survive. The next generation of leafminer will be smaller and later with a much higher percentage of *Pnigalio* wasps available to attack it.

If you control summer Leafroller with **Success** that will reduce the leafminer by controlling most of the sap feeding stage plus the oil included will greatly reduce the adult leafminer population. In many instances no additional control is needed if you have any predator population at all.

### Spider mites

If European Red Mites are going to be a problem for you this year, you should be able to find several mites per leaf by now. There may be visible bronzing of the leaves if the population is high. Check for predator populations (see the June issue for predator descriptions) and monitor on a regular basis until you know which way the population is moving.

McDaniel or Twospotted mites prefer hot weather and could increase in numbers suddenly if the weather becomes real summer like. Look for bronzing or webbing in the center of the tree, especially if you mowed down a heavy cover crop about 10 days ago. McDaniel or Twospotted mites are more easily controlled by predators than European Red Mites, i.e. a lower predator ratio is needed.

There are no absolute numbers to decide by, the call is more experience than science in my judgment. Be sure to consider the quantity of eggs of both mite and predator when you are deciding whether to spray or not.

One or more applications of a light summer mineral spray oil @ 1 percent will suppress mites by suffocating the eggs and young nymph, helping the predators to become established. Full coverage is important when using oil, most orchards will require 200 gallons per acre or more. Calcium Chloride may be included up to 3 lbs. per 100 gallons. *MIRACAL.sp* is not affected by oil or temperature and may be included at any rate desired.

**Acramite, Envidor, Agrimek, FujiMite, Vendex and Zeal** are available if immediate control is needed. Apply **Acramite** @ 1/2 to 1 lb. per acre, **Envidor** @ 18 oz. Per acre, **Agrimek** at 10 – 12 oz. per acre, **FujiMite** at 2 pints per acre, **Vendex** at 2 lbs. per acre, **Zeal** at 3 oz. per acre. Any of these may be combined with a full rate of **Calcium Chloride**. Be sure to check the preharvest intervals for the material you choose.

### Grape Mealybug in Apples

Very little research has been done on the second generation of mealybug in apples; I could not find any published articles in my files. The insect biology supplement to the 1992 WSU Spray Guide noted that there might be a complete second generation on apples beginning in early to mid July.

If you have a population in your orchard you probably know about it from previous fruit damage or the presence of the cottony overwintering egg masses. Begin to monitor the suckers originating from spray-sheltered areas of the tree in late June and early

July to time the emergence of the crawlers and direct the sprays against this stage. It seems that you can only kill what is contacted by the spray, you will probably need two applications 10 - 14 days apart to control this second generation. The larger, wax covered stages are not controllable.

**Assail** applied with summer oil will control mealybug along with aphid and codling moth if the timing is correct. Do not use stickers such as Nufilm when applying Assail, the material may be held on the surface of the plant and degraded rapidly. Silicone spreaders may also reduce the effectiveness of Assail by increasing the potential for runoff.

### Stink Bug

There are several species of this insect, two species (conspense and conchuala) have been found to cause the most damage in apples and pears. Overwintering adults generally feed on mullein plants early in the spring, moving onto bitterbrush to lay their eggs for the summer generation. (This is already done for this year, happened mostly in late May to mid June.) Adult stinkbugs have been found in the orchards in the spring, it is not known if they cause damage at that time or not. Researchers have told me that they cannot successfully propagate in the orchard, so they will either move out or die.

Late in the summer the new adults return to the mullein at the orchard borders, from there moving into the orchard to feed on the maturing fruit. Timing has varied from year to year; we don't know the development thresholds for this insect yet.

The orchards most at risk are near or bordered by natural areas that grow mullein and bitterbrush. The visible damage will resemble bitterpit except that it will be located mostly on the top half of the fruit; bitterpit is usually on the bottom half. The sunken area is green to brown, not brown to black and the corky tissue under the injury is light colored. The stinkbug damage in the orchard is generally concentrated in the border rows, rather than scattered across the block.

If you are at risk or have been damaged in the past, there are traps available to help you time the movement into the orchard. They should be placed in the crotch of a tree near the exposed border. The trap should make good contact with the bark on the tree to allow the stinkbug to have easy access to the baited trap. The stinkbug can crawl out of the trap if given enough time so check the traps frequently. A catch of 3 per week is considered light, 10 per week indicates probable damage and control measures should be used.

**Carzol SP may not be used post bloom any more!** We may have to learn how to use Asana, Warrior or Danitol for preharvest stinkbug control.

A few growers have placed stinkbug lures in the mullein and bitterbrush on the orchard border to congregate the insect there and then spray them before they move into the orchard. Research has shown stinkbugs to be most active at night, moving away from the lure to sheltered areas during the day. I expect spraying before sunrise would be more affective than during the day.

### Apple Scab

Like most disease problems, prevention is easier and usually cheaper than 'catch up' control. Apple Scab is a numbers game; serious infections do not explode from zero in one year. A light, unnoticed infection one year followed by favorable disease conditions the next year is necessary to increase to a crop damaging level. The value of close inspection of the fruit at harvest time and a good cull analysis from the packinghouse for prevention of this type of problem cannot be over emphasized.

If you are clean (leaves and fruit) in early July you've got it made. If you have some fruit lesions but nothing visible on the leaves you shouldn't see much increase in the disease, but you must protect the fruit against storage scab beginning in mid August. If you have active lesions on the leaves (olive gray and fuzzy under a hand lens) you should control them with one of the following options.

Options #1 – **Inspire Super**, from Syngenta or **Sovran**, from BASF are both from a newer class of compounds. There are both very effective on Apple Scab;

Option #2 - **Rally 40W** @ 5 oz. per acre, applied **twice**, 7 days between applications.

Option #3 – **Flint** @ 2.5 oz. per acre applied **twice**, 7 days between applications. Drying conditions should be good.

If you have overhead irrigation, use alternating sets across the orchard to avoid the extended wetting period on the overlap. If you are using overhead cooling, keep the wet period to the minimum needed to protect the fruit from sunburn.

If you have Apple Scab in the orchard now, you will have to protect against storage scab this fall. Apply **Ziram 76 DF** @ 8 lbs. per acre in mid August and again in early September. The pre harvest interval is 14 days for Ziram. Ziram, Mira-cal, Calcium Chloride and K-Salt are compatible.

### Bitterpit

Bitterpit is frequently a problem when fruit is large or when trees are growing vigorously and have less than a full crop. If the weather turns hot in July and August, the moisture stress will increase the possibility of bitterpit development. Avoid applications of potassium fertilizers on light cropping trees unless tissue or soil analyses show a deficit. High potassium levels in the fruit will increase the amount of bitterpit. **Calcium is one of the best materials you can use at this time of year to avoid bitterpit.** Add it to every spray that you are able, 6 to 8 lbs. per acre if you are spraying concentrate. If oil is in the mixture do not use Calcium Chloride. Drying conditions should be good, avoid application during and immediately preceding temperatures 90° or above.

**Do not include any metallic nutrient or fungicide materials with Calcium Chloride unless you are instructed to.**

**MIRACAL**sp or **INCA** do not have these limitations.

### Sunburn

Experience tells me that most growers don't worry very much about sunburn until after that first really hot day. However, to get the maximum benefit from an anti-transpirant material such as **Vapor Gard, or Raynox** they should be applied before the first damage occurs. Dr. Schrader has established a threshold of 85 degrees for the initiation of heat damage in apples. The mechanism of protection employed by an anti transpirant is to reduce the moisture loss from the leaves of the tree. If the tree can maintain adequate moisture in the fruit, sunburn is reduced.

As the tree adds foliage and the fruit expands during the growing season, coverage should be renewed or supplemented at 3 to 4 week intervals. Gala and Red Delicious have maximum protection from an early July plus an early August application. Fuji benefit from a third application in early September to prevent the fruit from becoming 'buckskin' colored under Indian summer weather. Gala growers have reported reduced stem end cracking with the use of **Vapor Gard.**

For varieties such as Gala that require multiple pickings, background color development is easily visible through multiple **Vapor Gard, or Raynox** treatments as compared to the **Surround** treatment described below.

Apply one gallon per acre per application of **Vapor Gard** in enough water to thoroughly wet all of the foliage on the tree with a minimum of runoff. **Vapor Gard** cannot be tank mixed with pesticides, the best practice is to apply the Vapor Gard first, then the pesticide.

The first application of **Surround WP** should not be more than 50 pounds per acre in 100 gallons. Adding ½ to 1 ounce of Silwet will increase the spreading. Apply subsequent applications at 25 pounds per acre in 100 gallons. You should make the second application 7 to 10 days later to quickly build a uniform and durable film. Subsequent applications may be applied at two to three week intervals as needed to maintain a fairly uniform film. Coverage must be maintained on the exposed side of the fruit, reapply if wind or rain has mostly removed that cover. Robin Matson, the Engelhard representative reports that Kinetic did not work as well as Silwet, it caused the **Surround WP** to run and collect on the low points of the fruit which will increase the risk of uneven color development.

You may need to change the configuration of your sprayer boom. Material that is blown higher than the tree is too dry to stick well when it settles, turn off nozzles that aren't directed toward the tree. Also material that is blown through the tree will be too dry to stick properly when it contacts the next tree row over. If you have a very strong fan or open tree structure in the orchard you may need to slow down your fan speed so more of the material sticks where it hits.

**Raynox**, a carnauba wax based translucent material, was used commercially for the last few years, many growers reported satisfaction with the results. **Raynox** is applied at 2 ½ gallons per acre in 50 to 100 gallons of water, three applications per season.

A program that looked very good in trials the last few seasons consisted of applying **Vapor Gard** before the first heat wave (about July 1<sup>st</sup>) followed by 25 lbs of **Surround** in seven to ten days. Two additional Surround applications were made before harvest to keep the fruit adequately covered. This treatment resulted in less sunburn than either Vapor Gard or Surround used separately. The **Surround** over **Vapor Gard** was removed more easily during the packing operation than Surround used alone.

## APRICOT

### Shothole Borer

When harvest is over the season is over, right??

That depends. Any weak trees in your orchard are bait for Shothole Borer beetles, and as long as the beetles are in the vicinity they will probably want to taste a few of your healthy trees also. Chemical control of Shothole Borer is frustrating because of the continuing influx to the weak or dead trees and the sheltered feeding habit of the beetle. Your best defense is to remove any weak and dead trees as soon after harvest as possible. Stack them away from the orchard (they are still attracting beetles, hopefully away from the healthy trees in the orchard) and be sure they are burned before next March to destroy the overwintering larva. *Thorough sanitation, all infected wood removed, all prunings, removed trees including the stumps and exposed roots burned or shredded, no salvaged firewood is the most effective control measure available. As with codling moth, everybody has to do their part or control will not be possible.*

If you notice leaves yellowing and dropping on one or more limbs of an otherwise healthy tree, look closely for a small (1/4 to 3/8" long), dark colored beetle moving around on the bark and 1/16" entrance holes in the area around bud scars or the base of lateral limbs. A small number of entrance holes can cause leaf drop on a fairly large limb and they are hard to find on rough, dark bark. Sometimes a tendril of sap will be oozing out making them much easier to find.

When you find attacking Shothole beetles in the orchard, treat immediately with Diazinon 50WP, or Thiodan 50WP (**you are limited to 6 lbs. per year of Thiodan**). Be sure to consult the labels about closed cab restrictions. Continue to monitor on a weekly basis and repeat the control as necessary. The Shothole beetle is active until early October.

## CHERRY

### Clean up spray

To reduce the overwintering population of Cherry Fruit Fly apply ½ pint of **Dimethoate 4EC** per 100 gallons of water in a dilute spray (trees fully wet and dripping easily) 7 days after final harvest. Concentrate applications will increase the risk of leaf drop. For best results the application must be made before the fruit hardens or drops (no more than 2 days of post harvest catch up sleep allowed, sorry about that). If you harvest your pollinators for freezer you should spray the harvested portion of the orchard separate if possible, otherwise keep the entire orchard protected until the freezer cherries are harvested. If you don't protect the harvested trees until the freezer harvest is over you are too late, any maggots that might be in the harvested trees are already matured and in the ground. I know of an instance where this has happened and the grower wondered where the flies in the traps came from the next year. Don't delay your clean up spray, props, boxes etc; can be picked up later.

**Provado** may also be used for clean-up sprays. Tim Smith has used this successfully for the past few years with no problems. Provado with oil will cause less leaf drop on your trees. Use 6 to 8 oz./acre.

Do not use more than 4 pints per acre per year of Dimethoate 400. Dimethoate has been combined with 1% oil on all major cherry varieties after harvest year with no problems of leaf burn. Adding oil makes this a very effective spray for mites and mildew control also as noted below.

### Mites post harvest

An application of 1-% summer oil will suppress mites. One application right after harvest normally does a very good job. If the mite population is heavy two applications may be needed. Apply sprays at a minimum of 200 gallons per acre in full size trees, 10 to 14 days apart.

This will also reduce the amount of overwintering cherry mildew by preventing the formation of cleistothecia. Cleistothecia are formed from late June through early October, mostly in July and August.

### Mildew post harvest.

If you want to lower the amount of overwintering mildew spores, there are two programs available to you, both have been effective in research when spores were counted. I prefer the post harvest oil treatments because you can visibly see the mildew destroyed before the cleistothecia are formed rather than trying to destroy this very durable overwintering stage later, but I will present both methods.

**Mineral Spray oil @ 1%**, 100 - 200 gallons per acre will kill the mildew that it contacts. If done soon enough after harvest this will reduce the numbers of cleistothecia formed, reducing the amount of overwintering spores. Coverage is the key. Drive

slowly enough to let your sprayer fan completely displace all of the air in the center of the tree with the spray mist; there are a lot of mildew colonies in there. Driving speed in a full sized orchard should be 1 to 1 ½ mph. Don't apply oil within 10 days if micronized sulfur, 14 days for wettable sulfur.

If you miss the oil timing and cleistothecia (those little black pepper spots you can see in the mildew colonies) are already present in high numbers, **Sulforix** @ 2 gallons per acre, applied full dilute (400 gpa) just prior to leaf drop in the fall will destroy over 90% of the cleistothecia that it contacts. Coverage is the key for both of these materials. No contact — no kill.

My opinion is that a single, thorough cover of oil immediately post harvest will stop the mildew for the rest of the summer in well pruned orchards. If you miss this one or the mildew does continue to develop in the center of large, dense trees, Sulforix late in the season can be used for additional control.

### Shothole Borer

The growing and preharvest season sprays keep them under control; we usually don't notice them until late July or mid August depending on the district. Chemical control is difficult and frustrating, there is continuous movement into the orchard and the limited surface feeding renders control from chemical residual ineffective. *See APRICOT, Shothole for monitoring and control methods.*

### PEACH/NECTARINE

Continue to monitor for mites, especially if you use Asana post bloom. Acramite is available for mite control in peach and nectarine at up to 1 lb per acre. **Vendex** requires a 14-day preharvest interval. With different varieties of fruit ripening the rest of the season, timing of a spray could be difficult.

Summer oil should work as well here as in apples and cherries for mite control without any preharvest interval to worry about. This will work for mildew control on the foliage as well. Remember to keep oil and sulfur 10 to 14 days apart.

Mildew shouldn't be much of a threat except for on the most susceptible varieties; Coryneum Blight worries should be over until the early September copper sprays.

### Peach Twig Borer

The first generation has come and gone with very heavy flights in the Wenatchee area. If you used pheromone traps on the first generation and caught anything, replace the bottom and watch for a second flight. There are two flights per year. If you know what the total Codling Moth degree-days since March 1 for your area are, subtract 405 from that total to determine what the approximate PTB degree-days are.

If you are working from the degree-days since Codling Moth biofix, subtract 205 to arrive at the same stage.

For a single spray on the second generation, apply at 20% of the egg hatch as indicated by the model. **Imidan 70W** or **Success** have 14 day PHI on peaches and nectarines, **Intrepid** has a 7 day PHI. If you had damage at apricot harvest or trapped a heavy flight, I doubt you will get by with a single cover for second generation. Watch the material preharvest intervals closely if you are in that situation.

### PEARS

The month of July is a real coin flipper for pear growers. You have to decide which pest (Psylla, Mealybug, Mites, Leaf roller, or Codling moth) will control your application timing, or decide to apply different materials at short intervals if you have multiple pests. Many growers report a better fruit finish and some size increase on their Bartletts if Alpha **DF** @ 10 to 15 lbs. per acre is applied about 4 weeks before harvest in place of Calcium Chloride. (see Calcium chloride — Dr. Jekyl and Mr. Hyde?)

### Codling moth

If you have not monitored the first generation with traps, I encourage you to do so with the second generation. The traps should be out by now. In light pressure areas you may be able to skip a cover. At the least you will be able to time your cover to flight activity if other pest threats are not serious. Pears seem to be either more attractive or more susceptible to second generation of Codling Moth than they are to the first. **AzinphosMethyl is limited to 3 pounds per year. (IN PEARS)** Use oil with **Assail** or **Calypso** to help with spider mite suppression.

### Psylla

The second generation began to show up in some locations in Wenatchee in early June. Control timing should be as soon as you see the first honeydew from Psylla feeding; the younger instars will be most easily controlled regardless of the material you decide to use.

**Delegate** @ 7 oz. per acre. This will control psylla and codling moth. The preharvest interval is 7 days.

**Actara** @ 5 ½ oz. per acre. This will control mealybug as well as psylla. Combining with oil should improve control as it does with Provado, a chemically similar material. Do not combine with a sticker. The season limit is 8 oz. per acre. The preharvest interval is 35 days.

**Agrimek** @ 20 oz. per acre plus one gallon of mineral spray oil is an option, the leaves are hardened off now so there will be very little systemic action. The preharvest interval is 28 days.

**Assail** @ 3.4 oz. per acre. This will control codling moth and mealybug as well as psylla. Combining with oil should improve control as it does with Provado, a chemically similar material. Do not combine with a sticker or silicone spreader. The season limit is 13.5 oz. per acre. The preharvest interval is 7 days.

**Calpyso** @ 8 oz. per acre. This will control codling moth and mealybug as well as psylla. Combining with oil should improve control as it does with Provado and Assail, chemically similar materials. The season limit is 16 oz.; the preharvest interval is 30 days.

**Ecozin** @ 10 oz. or **Neemix** @ 8 oz. plus oil at 10 to 14 day intervals has proven effective when applied dilute. If you are looking closely you will notice the nymph are malformed, the honeydew is streaked or flecked with white particles and there is less honeydew than normal. Each succeeding generation seems to be weaker when treated with Azadirachtrin materials. Do not treat Comice or Comice related varieties, Flemish or Easter varieties without prior testing for leaf damage.

**FujiMite** @ 2 pints per acre, will control Psylla and spider mites. Control of two-spotted mite is rated better than Pyramite. This is a contact material only; coverage must be thorough. The addition of oil is not required. The preharvest interval is 14 days.

**Pasada** @ 10 ounces per acre plus 1 gallon of mineral spray oil should control young Psylla nymph, plus provides some mealybug control, the PHI is only 7 days verses 28 days for Agrimek. You will need two applications about 10 days apart to cover the bulk of the psylla egg hatch.

Honeydew deposits that are beginning to run or mark fruit may be slowed down with heavy applications of wettable powders such as Diatomaceous Earth, **Alpha DF** or **Surround**. Removal or thinning out of the honeydew is frequently accomplished with low cost detergents (no bleach, perfumes or whiteners), at ¾ to 1 lb. per 100 gallons, 400 gallons or more per acre. Some organic or soft program pear growers are reporting good result controlling honeydew deposits and the first and second Psylla instars with **M-Pede** and **Superior oil**, both at 1 qt. per 100 gallons, also at full dilute.

### Spider Mites

**Agrimek**, **Pyramite**, **Vendex** all have had control problems in some locations. The Vendex rate has also been reduced to 2 pounds pre acre from 3 pounds, which will lower the performance even more. The **Acramite** use rate is ¾ to 1 pound per acre; the preharvest interval is 7 days. **FujiMite** is used at 2 pints per acre; the preharvest interval is 14 days. **Zeal** is used at 3 ounces per acre; the preharvest interval is 28 days.