

GROWER FIELD GUIDE, March 1998

Welcome to the first issue of Northwest Wholesale's monthly grower newsletter for 1998.

I made a decision to include as many of the active Northwest Wholesale growers on my mailing list this year as possible. If you do not want to be included, please inform me and I will remove your name. On the other side, if you know of a neighbor or friend that should be getting it and isn't, I will be very happy to add that name to the mailing list.

This year's FIELD GUIDE will be very similar to last year's, updated for material changes and with some increased emphasis on mating disruption and other softer controls as more of our older materials are removed from the market place. We have also developed an Organic program that each of the fieldmen have. I don't have space to cover that those programs in this FIELD GUIDE in detail, if you want a copy of the complete programs as it is currently written I will furnish you with one.

Your input regarding the problems you are experiencing and the value of this newsletter to you are invited.

Information Sources

I have freely 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 bulletin. Any errors in presenting that information to you are entirely mine, I would appreciate being notified of any errors so that they will not be perpetuated.

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

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Mating disruption for Codling Moth

Rational

The majority of the chemicals commonly used for control of insect pests in apple and pear orchards are being reviewed under the provisions of the Food Quality Control Act. Many, if not most of them will be lost to agricultural use over the next 2 to 3 years. Fruit growers must learn new pest control techniques within this 2 to 3 year window while 'rescue' materials are still available in the event of a management failure. The immediate economic considerations to the individual grower are being overruled by the political needs of the consuming public concerned about the safety of the food supply and their overall exposure to chemicals in an environment that they consider to be 'high risk'.

Elements necessary for success

Pheromone dispensers must be placed in the orchard prior to king bloom opening.

Monitoring traps (10x lures) must be in place by full bloom.

Lures in the traps must be changed at the proper intervals throughout the season.

The trap must be serviced and maintained adequately to insure moth catch.

Biofix, using standard (1x) lures, must be determined at a point outside the treated orchard to accurately time chemical control of the first generation if it is required.

Absolute chemical control of the first generation of codling moth is required in the initial year. Chemical control of the second generation may be needed if trap catch persists. The need for supplemental chemical control in subsequent years is determined by the remaining population or outside pressure.

Techniques

The pheromone dispenser must be placed high in the tree, in the upper 1/3 or higher. It must be securely attached to a portion of the tree that will not bend down with fruit load later in the year or be dislodged by wind. A three row border of the orchard should be treated at the label rate unless it is bordered by another mating disruption block. The interior may be treated at a lesser rate if the codling moth pressure is known to be low. Known high pressure locations in an orchard should be treated at the full label rate. The depth of border treated adjacent to bin storages should be double that of any other borders.

The pheromone dispensers should be placed in the orchard in as uniform a grid as possible. In orchards that have trees of uneven size, place the dispensers in the larger trees to maintain pheromone height. The pheromone is heavy and will settle and flow into the space occupied by the smaller trees. Two to four row renewal areas within older orchards have been successfully protected by placing the dispensers that would have been used in the smaller trees into the adjacent mature trees. Larger areas of bearing young trees must have the dispenser placed as high in the tree as possible, or attached to the trellising structure above the tree. Do not place the dispenser on the trellis wire, the wind will move it down the wire and destroy the uniformity of the placement.

In orchards with uniform slopes, increase the dispenser density on the upper side (1/4 - 1/3) of the slope and reduce the density on the lower side by a corresponding amount. In orchards with rolling terrain, shift some of the dispensers from the low area onto the surrounding ridges.

Monitoring traps should be placed in the orchard at the same time as the pheromone dispensers, they must be in place by full bloom. The traps must be placed as high in the tree as possible, never in the lower 1/3 of the canopy. Place the trap 5 to 6 feet away from the nearest pheromone dispenser if possible. Some sort of removable hanger should be used to ease trap service if the trap cannot be easily reached without a ladder.

Trap locations should be clearly marked with a bright, non-fading ribbon (orange and pink are best) in the tree, around the base of the tree, and at the end of the row. A trap that is very visible in May can be completely invisible by early July, or if approached from a different direction.

The traps should be properly assembled to provide the opening as it was designed. Improperly assembled or weathered traps may have the opening reduced enough to restrict entry or be so open the moth does not contact the catching surface.

The density of trapping varies with block size and uniformity. Large uniform blocks of 40 acres or more may be adequately monitored with 5 to 10 acres per trap on a uniform grid. Smaller blocks will require proportionately more traps to adequately monitor codling moth presence. Additional traps should be placed in known high pressure locations and at borders where exposure to pressure is suspected. Traps placed for border monitoring should be placed on the outside of the second row to be effective.

The initial 10x lure normally lasts 3 weeks, subsequent lures must be changed every two weeks to insure viability with warmer weather. All spent lures **MUST** be removed from the orchard to prevent false attraction points. The trap bottoms must be kept in a 'fresh' condition by stirring or replacement as the catching surface becomes dirty from dust and insect catch.

One or more standard lure traps should be placed in an untreated location with similar exposure conditions to establish biofix. This is necessary to determine the proper timing of any chemical controls that might be needed.

The traps placed for biofix should be monitored on a 1 - 2 day schedule beginning at early bloom until the first sustained catch is recorded. The traps in the orchard must be monitored on a regular weekly schedule beginning one week after biofix and continuing through the second generation of codling moth late in the summer.

Complete chemical control of the first generation should be standard operating procedure for the initial year of mating disruption. Apply the first cover at 1% egg hatch as determined by the Codling Moth Degree Day Model for that location. Reapply after rainfall, a consistent cover throughout the first generation is imperative to lower the internal codling moth pressure for the succeeding years and allow the technique to become economically successful.

After the initial year of complete control, a commonly used threshold for chemical treatment in a mating disruption block is 3 moths caught in a trap during a week for the first generation, and 2 moths caught in a trap during a week for the second generation.

Fieldmen working with mating disruption blocks should make it a priority to ask the grower or the individual responsible for the traps for the latest trap counts and trap maintenance schedule. That data should be recorded for possible later statistical use.

Sanitation

Burn all stump piles, brush piles every spring to destroy any overwintering codling moth larva. If props are no longer being used as a cultural practice, remove them from the orchard border also. Remove all uncontrolled 'wild' trees and regrowth that you are responsible for. Contact your County Pest Control Board for help with uncontrolled trees outside your property. Spray a 3 to 4 row border around any active bin storage area, do not spread bins into the orchard until immediately prior to harvest to avoid 'seeding' codling moth larva throughout the orchard.

Dormant Zinc Sulfate

Dormant Zinc Sulfate applications are a tried and true method of getting needed zinc into your fruit trees. Last year the spray was difficult to apply because of the snow delayed pruning and consequently the ability to get the orchard cleaned up and sprayable. This year it appears that the proper timing for a full dormant could be here before the orchard soil is dry enough to pull a sprayer around on. A full program of foliar zinc with Tech-flo Zeta Zinc or another similar high grade product should carry you through the season unless you have already developed a Zinc deficiency from past programs.

I have written all of the delayed dormant through post bloom sprays in this bulletin with a foliar zinc included except for Apricot, Peach and Nectarine. Many growers use this program in addition to any dormant Zinc Sulfate applications they are able to get on.

Dormant Zinc Sulfates are applied after the buds begin to swell in the spring, but before any volume of green tissue is exposed to avoid possible leaf and crop damage. It is important that the following conditions be observed. Apply at 40 degrees or higher to allow for good drying, allow time for all of the spray to be dried on the tree before the temperature drops to near freezing, and at least 5 days must elapse between Zinc Sulfate and an application of spray oil.

A note about materials. We no longer handle liquid Zinc Sulfate. It comes associated with many handling and storage problems plus it is highly corrosive to equipment. The Super Tel Zinc that we now sell is a fine, almost powdered granule that readily dissolves in cold water unlike the old style Zinc Sulfate crystals. We believe this is much easier for both of us to handle, especially in small quantities.

Apples Delayed Dormant to Petal Fall

The first spray of the season is normally Zinc Sulfate as the buds begin to swell but this year maybe not, see the Dormant Zinc article elsewhere in this bulletin. If you can apply it, use **Super Tel Zinc @ 5 - 10 pounds per 100 gallons of water, 400 gallons per acre.** This material dissolves readily in cold water. Use the lower rate if green tissue begins to show rapidly. Allow 5 days between dormant zinc and an oil application.

Delayed-Dormant (San Jose scale, European red mite, Green apple aphid, Rosy apple aphid, Pandemis leafroller, Grape mealybug, Cutworms, Mildew)

- | | |
|----------------------------|-----------------------------|
| • Volck Supreme Oil | 1 1/4 - 1 1/2 gal./100 gal. |
| • Lorsban 4E | 1-pint/100 gal. |
| or Dimethoate 2.67** | 1 pint/100 gal |
| • + Rubigan EC | 2-3 fl. oz./100 gal. |
| • + Tech-Flo Zeta Zn 22 | 1-pint/100 gal. |
| • + B-17 (Dry Boric Acid)* | 1 - 1 1/4 lbs./100 gal |
| or Liquibor | 1/2-1 pint/100 gal. |

Apply this spray at 400 gallons per acre from 1/4 inch green to 1/2 inch green stages. For the best green apple aphid control this spray should be applied before the aphid begin to hatch. If pandemis leafroller or grape mealybug are a target, Lorsban 4E should be the product of choice. Do not apply oil sprays within 5 days of zinc sulfate. Temperatures should be expected to be in mid-40's or above on days oil is applied. Shut off early enough in afternoon so last tank will have plenty of time to dry before evening. Use Rubigan in this spray on varieties highly susceptible to mildew.

* B-17 is a new material this year. It is a dry boric acid, finely ground with a surfactant added for rapid dispersal in the spray tank. It dissolves readily and is slightly acidic, reducing or removing the need for additional acidifiers to protect other materials in the tank as when borate compounds are used.

** If early season Lygus bug control is needed and Leafroller populations are not extreme, use Dimethoate 2.67 for an early delayed dormant for the Lygus and use Lorsban WP in the prebloom for the Leafroller. Leaf roller damage early in the season will not reduce the crop unless the population is extremely high. Dimethoate 400 is not labeled for pre bloom applications.

On mildew susceptible varieties or if a scab infection period occurs, additional protective sprays may be needed between bud burst and bloom. **Rubigan EC or Procure 50 WS @ 8 oz. per acre** may be used for the scab eradicator. Both will control mildew, **Ziram** or **Thiram** are good scab protectants for the next 7 to 10 days after application but will not control mildew.

Start applying **mildew** sprays on susceptible varieties (Golden, Rome, Jonathan, Granny Smith, Gala, Fuji, Braeburn, and Jonagold) at the first sign of mildew, usually at 1/2" green. Additional sprays at pink and petal fall are important in an over all mildew control program. In light mildew pressure conditions, **Microthiol sulfur** before and after bloom may be sufficient, especially if a Sterol Inhibitor such as Rubigan or Procure was used with the delayed dormant spray.

Scab infections may occur any time in the spring when there is green tissue and a wetting period occurs. If scab was present the preceding year, sprays should begin as soon as possible after an infection period, as determined by the Mills wetness chart, has occurred. Rally, Rubigan, and Procure are eradicator type sprays with "kickback" action, whereas, Lime-Sulfur, Sulforix, Ziram and Thiram are all protectant type fungicides. The safest procedure is to combine a protectant with any eradicator materials that are applied. **The Mills Chart is on page 21 of the 1998 WSU Crop Protection Guide, or you may get a copy at any Northwest warehouse.**

PRE-BLOOM (Apple scab, Apple mildew)

- Rally 40W 1 1/4 oz./100 gal.
or Rubigan EC 2-3 oz./100 gal.
or Procure 50WS 2-3 oz./100 gal.
or Lime-Sulfur Solution 2 1/2 gal./100 gal.
or Sulforix 2 qts./100 gal.
or Dithane (scab only) 1 1/2 lb./100 gal.
or Ziram 76 WDG (Scab only) 1 1/4 lb./100 gal.
or Thiram 65 (Scab only) 1 1/2 - 2 lbs./100 gal.

Rates shown are for 400 gallons per acre application.

PRE-PINK TO PINK (Pandemis leafroller, Lygus bug, Cutworms, Grape mealybug) Apply when populations warrant treatment. If you had any leafroller damage at harvest time last fall, this spray is important for control of that insect!

- 1). Lorsban 50WP 3/4 lb./100 gal.

If **Lorsban** was used in either dormant or delayed dormant, use Bt materials (Crymax or Dipel) at pink and petal fall for resistance management. **Lorsban** may russet susceptible varieties if the drying conditions are poor or applied following cool wet weather.

- 2). Guthion 50WP 3/4 lb./100 gal.
(Guthion will control grape mealybug.)
- 3). Crymax 3/8 - 1/4 lb./100 gal.
+ Nu-film 17 8 oz./100 gal.

Dipel (Abbott) 1/4 lb./100 gal.
+ Nu-film 17 8 oz./100 gal.

Rates shown are for 400 gallons per acre application.

Crymax or Dipel (Bt materials) will control pandemis leafroller with good coverage and warm night time temperatures. Daytime temperatures should be 65 degrees or higher. Control will be poor under cool or wet conditions, wait for favorable conditions or your cost and effort will be mostly wasted! Two or more applications may be needed during the pre bloom to 1/2 inch green fruit stage for good control of the first generation if leafroller or leafroller damage was easy to find the previous harvest. Nu-film 17 will help with coverage and has some sunscreen abilities. A feeding stimulant such as **Coax** or **Entice** may improve the effectiveness of the Bt material. Coax has a built-in sunscreen and sticker. Check the label for the proper rates at the gallonage you will be spraying.

PINK TO PETAL FALL (Western flower thrip, Campyloomma)

- Carzol SP 1/4 lb./100 gal.
+Sorba Spray Mg 1/4 pint/100 gal.

Rates shown are for 400 gallons per acre application.

If blossoms are open, apply at night or while bees are not working in blooms. Repeat application as needed. See separate articles for **Campyloomma** and Western Flower Thrip monitoring and control during bloom.

Apricots

Dormant to Shuck Fall

Apricots in most locations probably have the least demanding pest control program of any commercial fruit grown. In many locations Peach Twig Borer is the only pest of consequence. Once Twig Borer is established in an area just a few abandoned back yard trees it can infect a wide area, the moths are strong fliers.

Apricot trees are not frequently affected by scale insects, but if that is a concern start the control season with a semi-dilute to full dilute spray with **Volck Supreme** oil @ 1 gallon/100 gallons plus **Diazinon 50WP** @ 1 lb./100 gallons applied between stages 2 & 3 on the WSU bud development chart.

Twig Borer will not be controlled by the oil/diazinon spray, to do that apply **Thiodan 50 WP** @ 4 lbs./acre at bud stage 4. If you do not have or have not had scale in the orchard, this should be your first spray for the season.

A second Twig Borer spray will be required after bloom at bud stage 7 on the bud development chart. Use **Sniper 50W** @ 2 lbs./acre, use full dilute and increase the **Sniper** to 3 lbs. to control Grape Mealy bug if they were present the previous harvest season. If this spray is delayed to bud stage 8, some of the Twig Borer larva will have entered the twigs and will survive to develop a summer generation. I will address monitoring and control of the summer generation in a later issue.

If Grape Mealy bug are present a second application of **Sniper 50W** @ 3 lbs./acre should be made 10 to 14 days after the first. This may time well with the shuck fall spray (stage 8) applied for Perfection Spot as mentioned in the next paragraph.

Be prepared to apply **Rally 40W** @ 5 oz. or **Orbit** @ 4 oz. per acre for prevention of Perfection Spot at stage 8, i.e., just as soon as the largest fruits are mostly free of the shuck. Don't wait for the smaller fruit, they will eventually fall or be thinned off of the tree. In climates where spring rain showers are common, combine **Captan 50W** @ 5 lbs./acre for a protectant. Repeat in 14 days to cover the new growth and enlarging fruit.

Cherry

Delayed Dormant to Petal Fall

Mite problems have become more of a concern for cherry growers in the last two or three years. I know of many cherry growers that have not applied dormant or delayed dormant oil for several years to avoid possible tree injury and the resulting delay of bloom on weaker spurs. If you would like to avoid a delayed dormant oil, the following items must be taken into consideration. Otherwise use the standard materials listed on the next page.

If your mite problem was mostly European Red Mite and there is a good population of eggs on the spurs, you can get control for them with a dormant to delayed dormant application of **Apollo** @ **6 to 8 oz.** per acre. If your mite problem was McDaniel or Two Spotted mite, delayed dormant oil won't give you much control, they overwinter mostly on the orchard floor and are not up in the tree yet at the delayed dormant timing. By waiting until you can find them moving up the trunk as the buds begin to break on the back side of the leaders low in the tree, then spraying with 1 1/2 gallons of **Volck Supreme Oil** and 1 pound of **Diazinon 50 WP** per 100 gallons on the lower part of the tree where the mites are, you should get good control and avoid the risk of prolonging the bloom with oil damage.

If you have any San Jose Scale you **must** apply a delayed dormant oil, there is no other control option. The Black Cherry Aphid is generally controlled by any post bloom Guthion, Thiodan or Diazinon that you apply. Pre harvest the Black Cherry Aphid will be controlled by the first Guthion 50W applied for Cherry Fruit Fly if the weather is warm and dilute application is used.

Leaf roller is one pest of Cherry that seems to have an increasing population, mostly because early season controls have been very light or non-existent. A delayed dormant of **Lorsban 4E** @ **1/2 gallon** per acre with or without oil

applied full dilute and paying particular attention to the inside and top coverage of the tree is the foundation for any later control measures you may take.

So, do you need a delayed dormant?? If you have San Jose Scale definitely yes. If you have no scale, and want to avoid an oil application, use the methods listed above to control the mites, you should do OK.

If you apply a delayed dormant include some Zinc and Boron for early season bud growth.

DELAYED DORMANT MATERIALS

Volck Supreme Oil	4 gallons per acre
Lorsban 4E	1/2 gallon per acre
Tech-Flo Zeta Zinc	1/2 gallon per acre
B-17 (Dry Boric Acid)	4 - 6 lbs. per acre
Liquibor	1 quart per acre

Rates shown are for 400 gallons per acre application. Decide which is best for you based on the preceding discussion.

PRE BLOOM (bud stages 5 - 7, not past stage 6 if mealy bug materials are going to be applied.)

Crymax @ 1 to 1 1/2 lbs. per acre **IF** the weather is warm, i.e., 65 degrees during the day. Otherwise wait until post bloom, warm weather is essential for good performance of this material.

Diazinon 50 WP @ 4 lbs. per acre for any Grape Mealy Bug, spray before the bloom is open.

Microthiol Sulfur @ 10 - 12 lbs. /acre will protect the green tissue it is covering if there is a mildew infection period during bloom, most years it is too cool to be of much value.

Nutra-Phos Super K @ 12 lbs., Sorba Spray Mg @ 1 pint, B-17 (Dry Boric Acid) @ 4 - 6 lbs. or Liquibor @ 2 quarts, Zeta Zinc @ 2 quarts combined with 10 to 15 lbs. of spray grade **Calcium Nitrate** will help maintain the rapid cell division which is critical for large, uniform ripening fruit. There is some indication that using Calcium Nitrate in place of Urea for the nitrogen increases fruit firmness, either may be used, use Urea @ 5 to 6 lbs. per acre.

Spraying during the bloom period is essential if you are in an area that has Brown Rot conditions, i.e., rain during the blooming period. **Orbit @ 4 oz.** per acre, **Elite @ 8 oz.** per acre, or **Rally 40W @ 5 oz.** per acre are good materials. A minimum of two sprays are needed at this time for Brown Rot control, more will be needed in the fruit ripening period.

Cherry Powdery Mildew conditions, like Apple Scab and Fire blight must be monitored and projected for each individual location. You as the owner/manager are the only individual capable of consistently and reliably doing that. Don't depend on a fieldman, he or she may be 100 miles away working under very different conditions. (Note the following article for monitoring guidelines.)

1997 CHERRY MILDEW PROGRAM

Each year the researchers bring us closer to a verified Cherry Mildew model. Dr. Grove of the TFREC in Wenatchee is urging the use of the Mills Chart for Apple Scab, suggesting that a moderate infection period as defined by that chart be considered the threshold for taking preventive measures.

Dr. Grove's findings of 4 hours of wetting at 50 degrees Fahrenheit needed for spore release plus an additional 12 hours of wetting for germination falls closer to a light infection period than to a moderate infection period. **To err on the side of crop safety Northwest Wholesale is recommending you use a threshold of a light Apple Scab infection plus 10%.** I am confident that accuracy will improve as we gain experience.

Sterol Inhibitors, (SI materials) called eradicant compounds because they have the ability to kill or retard established infections. Effectiveness declines after 24 hours, very little control should be expected after 96 hours. **Orbit, Elite 45DF, Rally 40W and Rubigan EC** are the materials currently registered on cherries. Mildew resistance to Rubigan EC has been documented in some locations, base your material selection on the mildew control history of the orchard in question.

Protectants, these materials must be in place before the mildew becomes established, they have little to no effect on active mildew. **Microthiol Sulfur** (micronized sulfur) and **Sulforix** are most effective when tank mixed with Sterol Inhibitor materials, as long as the temperature is below 90 degrees to avoid leaf and fruit burn. Sulfur materials are most effective at 70 degrees or higher, pre bloom applications are not normally effective on cherry mildew.

Broad Spectrum Fungicides, these are the older materials acting against a wide range of fungi. Benlate is the only material currently being used. Use it only once per season as a resistance management strategy. Check with the fruit warehouse to determine that their marketing program will accept it.

Newer materials that may be considered this year include **AQ10**, a parasite of powdery mildew, **Stylet Oil** (mineral oil) which has shown to kill mildew colonies on contact, and **M-Pede**, a fatty acid which also kills mildew on contact.

AQ10 should be applied immediately after the first infection period and repeated in 7 to 10 days. The material must contact the germinating mildew spore, thorough coverage of all foliage is essential. Add a surfactant such as **Nu-film 17 @ 8 oz./ acre** or **Sil Wet @ 1 oz./100 gal.** If mildew is visible and can be found on more than 3% of the leaves, AQ10 will not give you adequate control. **Sulfur will kill the AQ10 parasite**, there must be 5 to 7 days between a preceding sulfur application, do not apply sulfur following AQ10 for at least 14 days.

Both **Stylet Oil** and **M-Pede** will kill existing powdery mildew on contact, but should be used early in the season (discontinue shortly after shuck fall) to avoid potential fruit marking or leaf phyto. Complete coverage is essential, but do not wet to the point of heavy runoff, that is the condition most likely to mark fruit or burn leaves.

Material use rates;

AQ10	1 oz. per acre, complete coverage essential
Benlate WP	1 1/2 - 2 lbs./acre
Elite 45 DF	6 - 8 oz. /acre
M-Pede	1 - 2 % Solution, complete coverage essential
Microthiol Sulfur	10 - 12 lbs./acre
Orbit	4 oz. /acre
Rally DF	5 oz./acre
Rubigan EC	8 - 12 oz./acre
Stylet Oil	1% solution, complete coverage essential
Sulforix	2 qts./100 gal.

Complete coverage of the foliage is very important, 100 gallons per acre has not proven successful after the trees are well leafed out.

Peach & Nectarine Dormant to Shuck Fall

Green Peach Aphid must be controlled pre bloom to avoid fruit marking and summer mite problems. Apply **Volck Supreme** oil @ 1 gal./100 gallons plus **Asana** @ 2 - 3 oz./100 gallons at bud stage 2 on the WSU bud development chart. Apply high gallonage, the spray solution must flow into the bud structure and contact those aphid that might be sheltered behind it or even inside the more advanced leaf buds. Applications delayed past bud stage 3 will result in poor aphid control and will most likely require a repeat application later in the season with probable mite problems being added to your aphid problems. **Asana** pre-bloom is also the first Twig Borer spray.

The second twig borer spray is **Thiodan 50W** @ 4 lbs./acre applied at post bloom or petal fall (bud stage 7) depending on the variety. Add **Microthiol Sulfur** @ 10 lbs./acre for Nectarines and any mildew susceptible peaches. If this spray is delayed to bud stage 8, some of the Twig Borer larva will have entered the twigs and will survive to develop a summer generation. I will address monitoring and control of the summer generation in a later issue.

Nectarines will follow the same spray schedule except they will need **Carzol SP** @ 1 lb./acre early in the bloom period to control Western Flower Thrip (see separate article for Thrip detection). When bloom is present this material must be sprayed either late in the day after the bees have left the orchard or early enough in the morning to be completely dry before the bees begin foraging.

When the shuck has fallen, Nectarines and mildew susceptible Peaches should be protected with **Rally 40W** @ 5 oz./acre.

Pears

Dormant to Petal Fall

Dormant **Zinc Sulfate** @ 20 to 40 lbs./acre on pears must be applied early, there has to be 5 days between the zinc and any oil applications. If you are planning on two oil/sulfur sprays to lessen the Psylla egg pressure on later materials, any Zinc Sulfate sprays have to be done by bud stage 1 on the WSU bud development chart. An aggressive foliar program with **Tech-Flo Zeta Zinc** or a similar material will keep you out of a zinc deficiency situation if a dormant zinc is not possible this year. (See separate article on dormant Zinc Sulfate on page 3)

To delay Psylla egg deposit and compress the first generation, apply **Volck Supreme** oil @ 4 gal/acre plus 10 - 12 lbs./acre of **Microthiol Sulfur** as soon as the first strings of 3 or more Psylla eggs are detected, usually between stages 2 & 3 on the WSU bud development chart. Use enough water to cover everything thoroughly!!

Apply a second **Volck Supreme** oil @ 2 - 4 gal/acre 7 - 10 days later, but not later than stage 3 on the bud chart. Use the lower rate if the weather has been cool. Add 10 - 12 lbs./acre of **Microthiol Sulfur**. We do not have the Insect Growth Regulator **Comply** this year to control the Psylla nymphs between cluster bud and petal, be sure to include 3 qts. of **Thiodan 3EC** to kill the adult Psylla, 2 qts. of **Lorsban 4E** for San Jose Scale, Leaf rollers and Grape Mealy bug. **B-17** (dry Boric acid) @ 4 - 6 lbs./acre, or **Liquibor** @ 2 qts./acre and **Tech-Flo Zeta Zinc** @ 2 qts./acre should be added for strong flower development.

For a single prebloom oil/sulfur, wait a little longer for the first spray, until egg chains are fairly easy to find but no later than early stage 3, then apply the second spray listed above but increase the **Volck Supreme** oil to 6 gal/acre. The drying conditions must be good in all oil applications, allow time for the spray to dry completely before the temperature begins to drop.

When this letter was being written there were no Insect Growth Regulator materials available for pre-bloom control of Psylla egg or nymph. If you have **Morestan** use it @ 4 lbs./acre for Pear Rust Mite and Mildew control, it will also destroy Psylla eggs. No Morestan?? Use **Procure 50 WS** @ 8 oz./acre for mildew control, **Carzol SP** @ 1 lb./acre if Lygus Bugs are active, it will control Pear Rust Mite also. Add **Dithane** @ 8 lbs./acre to the Procure/Carzol mix for control of the first instar of the Psylla nymph. Add **Diazinon 50W** @ 4 lbs./acre for Grape Mealy bug control. **B-17** or **Liquibor** and **Tech-Flo Zeta Zinc** should again be added for strong flower development @ 1/2 gallon each per acre.

When using **Morestan**, be very careful that there is no oil residue in the sprayer and that there has been 10 days since the last oil was sprayed on the trees. You must also be certain that the base of the separating fruit cluster is completely dry from the previous night's dew before you begin spraying. A frosty night immediately before or after applying Morestan can also result in marked fruit, be very careful of the weather conditions at this time!! Get this spray on between good cluster separation and first bloom for best results.

Petal fall timing is important for Grape Mealy Bug and Alfalfa Greening control. Use **Guthion 50W** @ 3 lbs./acre (**Imidan** or **Diazinon WP** at full rates are also acceptable) plus **Nutra Phos 24** @ 12 lbs./acre or **Nutri-Cal 8%** at 1/2

gal./acre for the calcium source. **Dithane** @ 8 lbs./acre for fruit finish may be included now, this is as late as you can use this high rate. If your Psylla pressure is light, monitor the population and plan on an **Agrimek** application 3 - 4 weeks, otherwise apply **Agrimek** @ 20 oz./acre along with 1 gal./acre of **Volck Supreme** oil or another high quality spreader as soon after bloom as possible to clean up any Psylla nymph that have developed during the bloom period. An alternative to the petal fall Agrimek would be a petal fall **Pyramite** @ 8.8 oz per acre. It is contact only, but good coverage should be relatively easy this early in the year, it also should control any adult Psylla that have survived pre-bloom applications. This would allow for a single summer use of Agrimek for both Psylla and Mites and perhaps slow the development of insect resistance to both materials.

Campylomma

The adult Campylomma are attracted to the orchards in late summer to feed on aphid, they lay eggs in the bark of the apple or pear trees to overwinter. The nymphs emerge during apple bloom and feed on the developing fruit when there is not enough soft bodied insects to satisfy them. Golden Delicious and Gala may be damaged at an average of less than 1 nymph per tray, Red Delicious seem to tolerate 4 to 5 nymph per tray.

To monitor for Campylomma you will need a dark colored catch tray, (the Psylla catch trays we sell are light on one side, dark on the other) a short section of broom handle or stiff rubber hose for a beating stick, and either a 10x or 14x magnifying glass or very good eyesight!!

Hold the catching tray about 6” below a fruiting branch, strike the branch sharply two or three times with the beating stick. If there is a lot of debris on the tray after beating the limb, turn the tray over gently, most of the debris will fall off. Do not jar the tray or the insects you are wanting to count will fall off also.

The Campylomma nymph will look like a miniature aphid, rounded abdomen, pale greenish yellow to nearly clear, antenna pointing forward, often it is moving rapidly, especially at temperatures above 65 degrees. You may also find some apple grain aphid, they will be larger, darker green with orange markings at the base of the cornicles if you use your glass, and very lethargic, most barely moving. If you knocked loose some white apple leafhopper nymph, they will be a very pale yellow to nearly clear, very slender in shape with antenna pointing to the side and curving to the rear, and a segmented abdomen under your glass. They also will move, but not as rapidly as the Campylomma nymph.

Campylomma populations are spotty, check any areas where you had aphids late in the previous summer that were not serious enough to control, boundaries of the orchard that were bordered by succulent plants or mullein early in the fall of the previous year.

Emergence of Campylomma is weather dependent, populations can appear and become damaging very rapidly. You should monitor every three to four days from prebloom to 2 weeks after petal fall. Some orchards did not detect Campylomma nymph until after petal fall last year. Controls were not applied because it was felt that the fruit was too large to be damaged, that turned out to be a mistake. Campylomma will feed on quite large fruit if there is no other food source available.

If a damaging population of Campylomma is found, control immediately using **Carzol SP** @ 1 pound per acre. The spray must be dried before bees begin foraging in the orchard.

Western Flower Thrip

Western Flower Thrip are potential problems only on Granny Smith and Nectarines, where they cause a white “Pansy Spot” on Granny Smith and serious skin damage on Nectarines. Thrip are very small, dark, slender and very active. A common shelter and food source is the dandelion, from there they can fly to the fruit blossoms.

Searching for the insect is time consuming. In the case of apples the interior flower parts must be pulled apart or removed to disturb the insect from hiding. It will run quickly to the next shelter or fly away. In the case of the nectarines the flower must be opened to expose the base of the ovary, all the while watching for the moving insect.

With either of these two crops, I would simply control the pest early in the blossom period with an application of **Carzol SP** @ 1 pound per acre. This spray would also control any potential Campylomma or Lygus bug threat. The spray must be completely dry before any bees begin to forage in the orchard.

Fire Blight

Fireblight is an incurable disease, all control efforts must be directed toward sanitation and prevention. If you had fire blight strikes last year, be certain that all over wintering cankers are removed from the orchard. Two inspection tours a week or so apart between tight cluster and first bloom is a good program. As the trees start growing active cankers will begin oozing and the bark on the lower side of the canker will become dark and wet. Make the second inspection tour going in the opposite direction from the first.

The fire blight bacteria requires warmth to multiply and will not reach dangerous levels without a few days of sunbathing type weather. After this level of danger has been reached, any free moisture (dew, brief shower, spray application, etc.) that is capable of moving the bacteria into the nectaries in the center of the flower could cause an infection. Use the "Cougar Blight" risk model developed by Tim Smith to determine your risk level and properly time your sprays. Copies of the model are available at any Northwest warehouse.

Mycoshield is the only material proven to be effective against Fireblight infection, it must be applied @ 1 lb./100 gallons, at 50 to 100 gallons per acre so that every open blossom is lightly misted either just before or as soon as possible after the rain shower or whatever caused the free moisture. If an infection gets started, Mycoshield will not stop it, application more than 24 hours after the shower probably won't do you much good. Do not apply Mycoshield when the risk level is below the proper threshold for your orchard, protection lasts for no more than three days and you will be developing resistant bacteria more rapidly than is necessary because of the repeated exposure to the control material.

Should you use Blightban to prevent the development of the fire blight bacteria?? Possibly. When applied at 10% and 90% of bloom the risk will be reduced by approximately 50%. That would be significant in high risk blocks or high risk areas of blocks. I doubt that it would be significant in low risk orchards, i.e., little or no fire blight list season.

Blightban is a living product and is stored and transported frozen, it **can not** be returned. If you want to use the product, the minimum package size is 2 acres, we will need at least 48 hours to get the product to the warehouse nearest you.

Frostgard

Frostgard increases the cold tolerance of green tissue a few degrees by reducing the numbers of bacteria on the surface of the plant. Ice forms at higher temperature in the presence of bacteria than it does when bacteria are absent. Maximum effect is about 48 hours after application. New tree growth and bacterial multiplication require retreating at about 10 days. Frostgard will also reduce fire blight bacteria at about the same percentage as Blightban, use either material for that purpose, but not both. There are some materials that Frostgard should not be mixed with. Information and labels are available at any Northwest warehouse.

Soil fumigation and spring tree planting

Tim Smith has documented several trials that prove emphatically that replanting in old orchard soils without fumigation is a foolish financial risk. This holds true also when planting must be delayed to accommodate spring fumigation.

If you have to fumigate this spring, arrange for the nursery to hold and store your trees for you, they can do a better job of that than you can. If your trees are coming from an out of state nursery and you can't delay delivery, arrange for good storage. Vacant fruit cold storage rooms are NOT good storage. The residual ethylene contained in these rooms or mixed in from adjacent active rooms will weaken or destroy the buds on your new, high priced trees. Find a facility that will keep your trees dormant or near dormant without drying them out.

Home grown nursery trees are even more difficult to handle properly when planting is delayed. They must be dug before the buds begin to swell to avoid severe transplanting shock. If they can't be replanted immediately you should arrange for proper storage for them also.

Copies of Tim Smith's fumigation guide are available at any Northwest warehouse.