

GROWER FIELD GUIDE, October 2008

Starting over — already!

It's the first week of October and this growing season is in harvest and rapidly winding down. I consider weed and rodent control to be protecting next year's crop so if you're through with harvest, the 2008 crop is over and you're starting again — ready or not.

The most important question I can ask this month is "How'd we do?" We're trying hard in difficult times to provide the most cost effective products and knowledge possible. If you think we fell short of that goal, call me and let me know about it. If I'm not in, please leave your name and telephone number. I always return calls.

I firmly believe you can do more to improve your fruit quality i.e.; size and color by pruning than any other operation so I will continue to stick my neck out and comment on pruning. I find that is a tough topic without a tree in front of me and a saw in hand, so be gentle in your judgment. I have included pictures of before and after for some of the basics.

This will be the last issue for this year, again focusing on post harvest sprays, weed and rodent control. Expect the next issue the first week of March 2009. I very much appreciate the comments and encouragement I've received during the year. If I missed a topic, or if more detail on a specific topic would be useful to you give me a call and I'll see what can be done for next year.

Zinc Sulfate requires acid water

Zinc Sulfate crystals will not dissolve completely in water at pH 7.5 or above. They do not dissolve very well until the pH is below 6. If you experience any white precipitate in your sprayer screens when using zinc sulfate, add or increase the amount of Tech Spray MG you are using. One to two quarts per tank is probably adequate for most surface water, well water with a high carbonate level may require more than two quarts per tank to completely alleviate a precipitation problem

Low Volume Glyphosate

When multiple generic products begin competing for a share of the market that has been developed and supplied by a reliable and high performance product questions always arise about the performance and value of the generic products. That is now happening as we offer Credit as more economic alternatives to original Roundup RT.

The basic ingredient in most generic glyphosate products is the same. Monsanto manufactures most of the technical grade glyphosate used in the United States for the formulation of generic products by other suppliers. What may be different and undetectable on the label is the amount and quality of the surfactants in the formulation. Additional surfactants are relatively inexpensive and will go a long way toward insuring reliable, consistent performance.

When Tim Smith initially demonstrated "low volume" Roundup applications, he used a 1:1 ratio of Roundup and surfactant. For every quart of Roundup in the mix there was also a quart of surfactant. He later reduced the surfactant to 1 pint for every quart of Roundup with little or no reduction in weed control.

What Tim found out however, was that the concentration of the glyphosate in the mix is very important. For average to kill weeds (annual grasses, young broad leaf weeds, etc) an adequate concentration is one quart in 20 gallons of water plus the surfactant. For difficult to kill weeds (bindweed, clovers, mature lambsquarter, mallow, etc) 1 ½ to 2 quarts of glyphosate per 20 gallons of water is needed.

Glyphosate is not active in the soil because it quickly binds to the positively charged soil particles. Some of this same action may happen in the spray tank when the water you use is not "pure". (It may look clean and clear and still be "hard" water.) You have two options; either add a deionizing compound such as ammonium sulfate (Spray Start) or additional glyphosate to compensate for the loss.

By now you're probably adding up the cost of this soup and thinking, no way! Before you quit reading, let me tell you what else Tim Smith demonstrated. You don't (probably shouldn't) have to apply large amounts per acre. Tim did his work at 20 gallons per acre. (If you remember Roundup Ultra, it is formulated to work best at 12 to 15 gallons per acre, did not work well when applied at 50 gallons per acre.) I have long advocated 20 gallons per acre and offered to help any grower calibrate to that gallonage. But I know from personal conversations with many of you that 50 gallons per acre is still a very common application rate. Using a higher rate per acre may make you feel better because it's easier to see the spray pattern and the weed look wetter, but it's costing you money. And in most cases the weeds won't be any deader after two weeks. In fact they will die slower with a low concentration, high volume application than they will when a high concentration, low volume application is used.

Weed Sprayer Calibration

Improve the consistency of your weed control and lower your costs at the same time by recalibrating your weed sprayer. We can help you with the calculations. You must be able to adjust the pressure and know how fast you are driving. Tell us what the distance is between the nozzles, how many gallons per acre you want to apply and we'll tell you what nozzles, pressure and speed to use for best results.

Container Recycling

We will accept all plastic agriculture containers including drums and shuttles, so Round'em up, Clean'em up, Bring'em in.

Northwest Ag Plastics has promised to come back after the season is over and chip everything we've got on hand, so you can still bring them in to us after that last weed spray. There is a color poster at all NWW warehouses to demonstrate what is acceptable.

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 100 gallons per acre unless otherwise noted.

If you find the information in this bulletin interesting and useful and are not on our mailing list, please call me.

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 the issue, call me and I will see that you get it. All back issues are posted on our website, www.nwwinc.com.

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Coryneum Blight

It is not necessary to wait until the leaves are off the tree to apply fall copper. The spread and germination of this disease begins with the first cool, wet weather of early fall, frequently in September. Apricots, peaches and nectarines should have been covered in early September while the weather is still normally warm and dry. The objective is to have a fungicide barrier on the twig **before** the spore arrives, carried by the early fall rains. Good coverage of the structure of the tree is important you will need 200 to 400 gallons per acre to accomplish this on large trees.

Use Nu-Cop 3L @ 1/2 to 1 gallon per acre, or Nu-Cop DF @ 8 - 12 lbs. plus Nufilm 17 @ 1 pt. per acre. Lower rates should be adequate for maintenance in clean orchards, if you had fruit or leaf symptoms this year, use the higher rate. You get more copper for less money if you use the dry formulation.

Zinc Sulfate or Zeta Zinc, Boron and some nitrogen can be added if desired as long as the temperature range is correct. See **FALL CHERRY TONIC** below.

Peach Leaf Curl

This is not usually much of a problem east of the Cascades because our weather is normally too cold or too dry for heavy infestations. After a mild and moist winter and early spring, I usually receive a number of calls early in the growing season asking what to do about Peach Leaf Curl, especially from growers with just a few trees for family use. In nearly every instance I find that a copper application had **not** been made the previous fall. Use the same timing and rates of copper as for Coryneum Blight. Be sure to add the Nufilm 17 so more of the copper will last into the spring exposure time.

Chemical defoliation, is it a good idea?

No, not in my opinion. The tree adds to its winter hardiness with the carbohydrates and other nutrients that it reclaims from the leaves as they senesce. As a grower you have been managing the nutrient level in your trees all summer to

maximize the bud strength and reserves for early season fruit growth next year, don't blow it now by removing potential nutrients prematurely.

Zinc Sulfate applied at rates higher than 10 to 12 lbs. or Zinc Sulfate followed by very warm temperatures will accelerate leaf drop by two to three weeks depending on the rate applied and the temperature shortly after application. To avoid this, wait until daytime temperatures are generally below 80 degrees, then use only the fall maintenance rate of Zinc Sulfate, or switch to Zeta Zinc @ 2 quarts to the acre and the leaf drop issue will decrease too.

Fall Cherry Tonic??

I used that title because we frequently try to combine more than one objective into a final pass through the orchard with the sprayer.

Coryneum Blight is possible in cherries but has not been a major concern in my experience. Bacterial Gummosis is the more serious concern and can cause heavy crop and tree loss if ignored. Combining a copper compound with fall nutrients in late September to early October rather than waiting until leaf drop when the weather is colder and water supplies are uncertain has been very successful.

The application timing is determined by the weather. The daily temperature needs to be cool enough to avoid premature defoliation from the Zinc Sulfate in the nutrient combination. Higher elevations can usually start in late September with the lower and warmer areas spraying by mid October. The leaves should remain green and active for about two weeks after the application to adsorb the nutrients effectively. (See chemical defoliation)

Nu-Cop 3L @ 1/2 to 1 gallon **or** Nu-Cop DF @ 8 - 12 lbs. plus Nufilm 17 @ 1 pt. per acre.

Calcium Nitrate (spray grade) @ 15 to 25 lbs. **or** Urea @ 8 to 10 lbs. per acre.

B-17 (Boric Acid) or Solubor @ 3 lbs. per acre

Zinc Sulfate @ maintenance rate of 6 to 10 lbs. per acre. **OR** Zeta Zinc @ 2 quarts per. Acre.

Tech Spray MG @ 1 to 2 quarts per 400 gallons.

Use enough gallons per acre to insure that the tree structure is thoroughly covered by the copper, don't run any more of the nutrients onto the ground than necessary. You get more copper with less money if you use the dry formulation.

Post Harvest Mildew Control

Post harvest mildew control in cherries is based on reducing the number of cleistothecia that develop and survive to produce mildew spores the following spring. If you basically walked away from your cherry block after harvest and allowed mildew to develop, reducing the amount of overwintering cleistothecia now with Lime Sulfur makes sense. If you applied oil for mildew control or mite control shortly after harvest, I don't believe you will gain enough from a fall Lime-Sulfur to be practical.

Spore counts from a single trial indicate that a fall Lime-Sulfur is as effective as a combination fall and spring Sulforix in reducing the disease pressure. **Do not combine Lime-Sulfur with the fall nutrient spray described above;** allow 7 to 10 days between applications. I would apply the nutrient first to allow for maximum absorption time. If the leaves fall soon after the Lime-Sulfur it does not matter. The rate is 2 ½ gallons per 100; wet the tree to runoff, 200 to 400 gal. per acre depending on tree size.

Post Harvest Psylla and Rust Mite Control

Any post-harvest Rust Mite or Psylla control that is planned should be applied as soon after harvest as the weather cools to below 80 degrees in the daytime. The Rust Mites are moving under the bud scales at this time of year to overwinter and will be protected until they re-emerge next spring. Organic growers should not miss the fall Lime Sulfur and oil application; it is the foundation of next year's rust mite control.

Fall control of Psylla will be of little value unless the block is isolated. Psylla adults disperse during the winter and recongregate in the pear orchards next spring, if you are not in an isolated location you will be sharing insects with your neighbor next spring. The most common materials used are Lime-Sulfur (5 – 10 gallons) and Oil, (1–2 gallon) per acre. Oregon research indicates that micronized sulfur @ 10 – 12 lbs./acre controls rust mite as well as Lime-Sulfur, no information on Psylla control.

Do not mix the fall nutrient spray with Lime Sulfur and oil, apply the Psylla control as soon after harvest as possible, then apply the nutrients 7 to 10 days later.

Delayed Dormant, now?

Maybe. If you are in a pear district that traditionally has problems getting a sprayer into the orchard by delayed dormant timing and want the benefits of Surround for early season psylla control, apply 50 pounds of **Surround** before you put your sprayer away this fall. Combine it with 2 pints of Nufilm 17 and put it on when you can blow a fair amount of leaves of the tree. You don't have to wait for all of the leaves to fall. And, it works. Dr. John Dunley has been advocating this for the past couple of years after we noticed the carry over effects of the standard spring **Surround** programs. The deer don't like chewing on it either, it may reduce winter twig browsing.

Post Harvest Foliar Nutrients for Apple and Pear

The application timing is determined by the weather. The daily temperature needs to be cool enough to avoid premature defoliation from the Zinc Sulfate in the nutrient combination, cooler areas can usually start in late September with the lower and warmer areas spraying in mid October. The leaves should remain green and active for about two weeks after the nutrient application to adsorb the nutrients effectively. (See chemical defoliation)

Zinc and Boron are elements that are in high demand by the tree early in the spring and should be stored in the tree tissue from the preceding season as much as possible; they can't be picked up readily from cold soil. Use this timing to get some Zinc into the tree. Don't plan on correcting a major deficiency with a single application; the leaves will drop before much if any of the Zinc can be adsorbed if you use high rates. You can come back in with multiple applications of Tech-Flo Zeta Zinc early next year, use the fall maintenance rate now. Boron is readily adsorbed; any lost to the ground will also easily be picked up by the roots if they are active. Nitrogen aids in the adsorption of the other elements.

Zinc Sulfate @ maintenance rates of 6 to 10 lbs. per acre.**OR** Zeta Zinc @ 2 quarts per acre.

B-17 Dry Boric Acid or (Solubor DF) @ 3 to 5 lbs. per acre

Calcium Nitrate (spray grade) @ 20 -25 lbs. (or Urea @ 6 - 10 lbs.)

Nu-Cop DF @ 4 lbs. per acre if you are in an area that is low in Copper.

Tech Spray MG @ 1 to 2 quarts per 400 gallons.

Phytophthora (Collar Rot)

Reddish bronze to purple leaf color early in the fall is frequently the first symptom of collar rot that is noticed. Early leaf coloration of a single limb on older trees is not an indication of collar rot but is more likely to be winter damage or a canker.

The disease can occur on stone fruit but is most common on apple or pear trees. Young trees (6 years or less) that uniformly turn bronze early in the fall usually have a problem in the root or crown area of the tree, either from rodent damage, collar rot or fire blight. A little shovel and knife work will quickly tell you which. Extension bulletin 1497 is available at any NWW warehouse for a description of the disease. Apple trees on MM106, M7a, M26, M9 can all be affected, especially on heavy soils that are kept wet early in the spring or in the fall after the need for heavy irrigation has past.

Ridomil Gold for ground application is best for a fall treatment. Aliette WDG is available for foliar treatments as soon as the trees have some leaf surface next spring. The rate of Ridomil is dependent on formulation, size of the tree and the method of treatment that will be used. Read the label for available options.

Pre Dormant Fertilization

The efficiency of late summer or early fall fertilization depends on the weather being warm enough to keep the trees actively transpiring. Shorter days and cooler daytime temperatures will decrease the rate of transpiration and increase the time that is required to capture the nitrogen from the soil solution. I would expect mid September to be nearly as good as late August, October is probably not much different than a dormant application. As the weather cool and the leaves become inactive, (are not transpiring much) immediate uptake will be very poor.

See the August issue for the rates and rationale for early fall fertilization.

Post harvest management

Your fall orchard management determines to a large degree your ability to control rodents, weeds and cutworms into the next season.

Close mowing after harvest hastens the decay of dropped fruit, removing a food source for mouse build up. Don't forget the fruit that has dropped into the tree row. Your mechanical brush rake will bring most of it out to where the mower can

break them up and hasten decay. Slightly damaged apples keep well under a snow cover, and could provide a lot of food for a mouse population.

When you've completed raking and mowing, your broadcast mouse bait will penetrate the short ground cover into the runway much easier and there is a lot less protection for the mouse from predators. Removal or thinning of the mature weed cover and leaf mat in the tree row by raking will give you better herbicide performance. Without broad leaf weeds to develop on cutworms will be less of a problem next year. It's worth the time and cost.

Mouse control

The short-tailed meadow mouse (*Microtus* spp.) is the name of the rodent most growers refer to as orchard mice or voles. The animal has a stout 1.5 to 2.0 oz. body covered with loose, fairly long gray to black hair, small shiny black eyes, and small fur covered ears. The hairy tail is about 1/3 of the body length.

These mice are very prolific. The female is sexually mature at four weeks, and will produce 8 to 10 litters a year with an average of six young per litter. One breeding pair can produce up to 3000 offspring in eight months, each one consuming its body weight in food daily (these critters actually put your teenager's appetite to shame!).

Orchard mice will make runways on the surface of the ground and through vegetation by repeatedly using the same routes to feed. Runways are very shallow and may range from only a few inches in length to several feet. In dense grass and weeds the runway complex will be covered, you'll have to inspect the area to see if they are present. They also will burrow into the ground; entrance holes are about 1" in diameter.

Orchard mice will only consume bait that they encounter in their runways. To be effective a broadcast application must be preceded by mowing or some other operation that will allow the bait to enter the runway system. If you are baiting by hand you waste anything that is not placed directly in a runway or burrow entrance.

For more detailed identification and monitoring information, consult Extension Service bulletin PNW 154 at any NWW warehouse.

Mouse control materials.

Zinc Phosphide bait may be applied by hand or broadcast. It will control with one feeding. The material does not weather well and should be applied during dry weather for best results. Most of the control will be obtained in the first 3 - 4 days after application. Bait shyness will reduce the effectiveness of Zinc Phosphide bait if it is used more frequently than 3-month intervals.

Rozol Paraffinized Pellets or Ramik Brown are both labeled for broadcast treatment only. These materials requires multiple feeding by the mice for control, two applications may be needed for complete control of high populations. In my opinion Rozol resists weathering the best and is a good option when heavy dew, frost or occasional showers are expected.

Rozol Ground spray is no longer available, the label has been withdrawn.

Each of these materials is labeled for post harvest only. Be sure to read the labels for proper rates and methods of application.

Gopher control

Pocket gophers are active all year but the activity is much more visible in the fall of the year as the animal works closer to the surface storing supplies for the winter. This is the best time to apply control measures because the shallower tunnels are easier to intercept with a tunnel making baiter or by probing with a hand baiter.

Which control method is best (traps, poison bait, gas pellets) will depend on the area to be treated and the population levels.

If you plan to use a tunnel-forming machine, be sure to watch the machine adjustment. If you have to run the machine slightly tilted to keep it in the ground, the bit is dull and you're wasting your time and money. The tunnel you're making will collapse quickly, covering the bait. A pronounced ridge behind the machine with occasional openings into the tunnel is almost a guarantee you're not doing it right. Not only will you fail to control the gophers, you've just created an orchard full of mouse condos wherever the tunnel has collapsed.

Extension bulletin EB 1404 includes detailed information on control measures with illustrations, types of traps, probing methods and tools, plus tunnel building machinery descriptions is available at all NWW warehouses.

Weed control

Weed control in the tree row is much more than cosmetic. There is a measurable benefit to tree growth from the reduced competition for water and nutrients. Mouse populations are lower when there is little or no weed cover for them in the tree

row. Cutworm populations apparently need broadleaf weeds for larval development, i.e., no weeds, little or no cutworms to worry about.

The most economical time to control weeds, regardless of the material that you choose, is in the fall before leaf fall or with the leaves raked away, up until the ground is frozen. This application will control the fall germinating annuals that otherwise will require treatment in the spring shortly after petal fall when you have a jillion other things demanding attention. It is always easier and cheaper to prevent a problem than to cure it. (I personally have to relearn that lesson from time to time!)

The constant factors in safe and effective weed control are calibration, uniform coverage and timely incorporation of residual materials into the soil by irrigation or rain. Many of the residual materials used will injure trees if the application rate is higher than the immobilizing ability of the soil and they are carried deep enough into the soil to contact tree roots. In other words, light soils are more risky than heavy soils. ***Application with a hand wand is dangerous because calibration cannot be controlled, not all labels allow for hand application.*** Check to be sure your nozzle style and configuration delivers a uniform pattern on the soil surface. Account for the overlap that you will have in the center of the tree row. Don't double the actual rate of applied material in this area by hanging extra nozzles or increasing nozzle size on the end of the boom.

Remove large weeds that prevent uniform spray coverage of the soil surface, the 'shadow' from existing weeds will be where your weed control will fail first next year. Do not spray over the top of a heavy leaf drop; many of the small germinating annuals will be protected from the contact materials in the mix. If a windstorm moves the leaves before the next good rain, your residual material may be gone also. The cleaner the soil surface at the time of application, the more effective the material will be. Organic matter on the soil surface will bind up some of the material before it can get into the soil. If you still have irrigation water available, incorporate the material soon after application with an irrigation of 2 – 3 hours, this will insure no weather degradation and allow the residual control material to bind close to the soil surface where it is most effective. A long irrigation set will drive the material deeper into the soil resulting in a weaker weed barrier and possible damage of young trees.

There are too many variables in crop, soil, tree size and weed population for me to dare to make a recommendation via this guide. I will attempt to list the more common materials and describe how, when and where they fit best. In all cases read the label carefully for crop and soil limitations, a material you can safely use on your apples or pears may seriously injure or even kill your stone fruit.

Tim Smith has produced an ***Orchard Weed Susceptibility Chart*** for North Central Washington that will help you decide which combination of materials will work best for you. It is available at any NWW warehouse.

Contact materials

Credit, Gly-Flo, Glyphos, Glystar, Honco, Roundup, Touchdown Hi-tech (glyphosate) is a systemic material, labeled for use on all fruit crops. It will kill or seriously injure any green plant that it contacts. Young tree trunks less than 2" in diameter must be shielded from the material. A chipboard pad stapled around the tree works well for trunk protection. Root sucker contact from a normal weed strip spray on trees that are 4" or more in diameter seems to have no effect on the tree (handgun applications are a different story). Contact with or drift onto a low branch will not materially affect the tree, but may seriously injure or even kill that limb with the damage showing up the year after the application. Glyphosate should be part of the fall weed control tank mix whenever there are perennial weeds to be controlled and the tree can tolerate the material or is protected from contact. The best control is achieved when the concentration of glyphosate is high, (one quart or more per 20 gallons of water) and the application gallonage is low, 20 gallons or less per sprayed acre. Glyphosate is not active in the soil; the material degrades quickly with soil contact.

Gramoxone Inteon is a non-systemic contact material, labeled for use on all fruit crops. It must be absorbed by green plant tissue and triggered by sunlight or bright light to damage the plant. Weed seedlings will be well-controlled, larger weeds or established perennials will be damaged but will begin to regrow in a short period of time. Young trees with soft bark (stone fruit, pears, some apples) can be severely damaged in the first year of planting, protection is recommended until the bark becomes brown and corky on the surface. Gramoxone works best when the plant is thoroughly wetted with 35 to 50 gallons per sprayed acre, with slow drying and low light conditions. This material should be part of the tank mix where the trees can't tolerate Glyphosate or all of the weeds to be controlled are at the seedling stage. There is no soil activity.

Weedar 64 (2-4,D) is labeled for use on all fruit crops. It is a systemic material effective only on broad leaf plants, i.e. Canadian thistle, bindweed, fruit trees, etc. This material remains active for a period of time on the ground and will be taken up by the tree if rain or irrigation follows the application within 4 to 6 days and leaches it into the root zone. A low (1/3) rate tank mixed with glyphosate seems to increase the effect of glyphosate on hard to control weeds such as bindweed, perennial clovers and alfalfa with less risk than Weedar 64 alone at full rate. Young trees may be severely damaged during

the summer when transpiration is rapid; there is less risk in the cooler fall weather. The most common use is for dandelion and other broad leaf weed control in the drive middles earlier in the year when these weeds are actively growing.

Residual materials

Princep (Simazine) is available in liquid (4L), wettable powder (80W), and dry flowable (Sim-Trol 90, Caliber 90). It is labeled for Apples, Pears and Sour Cherries only. This was one of the first soil residual materials to be widely used and is still quite effective on annual broad leaf weeds with limited control of annual grasses at a comparatively low cost. It is best tank mixed at a reduced rate with another material that is highly rated on grasses if they are present. Princep can leach into the root zone and damage trees when used on light soils, do not use on trees that have been in the orchard less than 12 months.

Diuron (Karmex) is available in liquid (4L) and in dry flowable (80 WDG). It is labeled on Apples and Pears that have been in the orchard for more than one year *except* not for use on full dwarf rootstocks, it may be used on Peaches that are 2 years old if used at a reduced rate and in combination with another material. This is another one of the first residual materials to be commonly used and is also quite effective against most annual broad leaf weeds with slightly more control of annual grasses and some established perennials than Princep. It is best tank mixed at a reduced rate with another material that is highly rated on annual grasses if they are present. Diuron can cause tree damage on light soils; Granny Smith is quite sensitive.

Sinbar is an 80 WP, labeled for use only on Apples and Peaches that are at least 3 years old. Do not use on sandy or gravelly soils. It is effective on the annual broad leaf weeds, has some effect on a limited number of established perennials, and does not do well on Yellow Foxtail or Witchgrass. Tank mix with other materials for control of those weeds.

Solicam DF is labeled for use on all fruit crops, but may cause damage on stone fruit, especially if the trees are young or the soil is light or gravelly. This is particularly true if it is applied by a hand held sprayer and the rate of material applied cannot be controlled. Apples and Pears are not affected at label rates. Application may be made to apples after the soil is well settled, all other tree fruits must wait until 18 months after planting. It works fairly well on annual broad leaf weeds, has the most effect on established perennials of any of the more commonly used residual materials, and has good control of annual grasses. Solicam is one of the few materials that will provide residual control of common Groundsel. It is a good tank mix material for Simazine, Diuron, Sinbar, and Surflan/Oryzalin. Rainfall or a light irrigation is needed within 4 weeks of application.

Oryzalin 4 AS (Surflan) is labeled on all fruit crops and may be applied after the first irrigation or rain has settled the soil after planting. Oryzalin controls weeds by disrupting the growth process during seed germination, it will not control any established weeds and is one of the safest effective materials that we have available for bearing trees. Oryzalin must be tank mixed with either glyphosate or Gramoxone if there are existing weeds that must be controlled. Tank mixing with Simazine, Diuron, Sinbar or Solicam at reduced rates where possible broadens the spectrum of weeds that will be controlled.

Casaron 4G is labeled on Apple, Pear and Cherry. The material is very persistent in the soil; careful calibration is needed to avoid leaf symptoms on the tree the following year. Casaron provides a broad spectrum of weed control in both annual and established perennials when used at the maximum rate. Do not apply in the fall until the soil has cooled, just before the first snowfall is perfect timing. Casaron applied on warm soil must have irrigation following immediately to be effective.

Kerb is labeled on all tree fruits and may be applied the fall after planting in the orchard. The material is degraded quickly in warm soil, apply late in the fall but before the ground freezes or incorporate with irrigation immediately after application. Kerb is most active on the lighter soils with low organic matter; trees are very tolerant of the material. It controls most grasses and some annual broad leaf weeds.

Goal is labeled on all tree fruits for control of annual broad leaf weeds, tank mix with other materials for control of grasses. Goal must be applied after harvest and before bud swell the following spring to avoid possible damage to the foliage, hardened wood is tolerant. There is no tree age limitation in the label. Goal provides good residual control of common Groundsel.

Prowl, Prowl H²O is labeled for bearing trees now and may be applied as soon as the ground has been settled. It provides pre-emergence control of most grasses and some broad leaf weeds, it will not control existing weeds, the mode of action is similar to Surflan/Oryzalin. Cultivation or tank mixes with Gramoxone or Glyphosate where appropriate must be used to control existing weed growth.

Matrix is a new product and has shown great results in the trials that Tim Smith has conducted over the past few seasons. The product is labeled on fruit nut and vine crops and has shown excellent results. It is usually mixed with glyphosate and a sterilant.

Soil Fumigation

Fumigation of orchard soils before replanting does not cost — it pays. The positive effects on fruit yield and economic returns can be measured for the life of the planting.

Treating interplant sites closer than 10 feet from the next tree may damage or kill the adjacent tree in light, warm or dry soils. Treat in the fall as soon as the soil temperature falls below 60 degrees, the tree can be removed later. Spring treatment with Methyl Bromide may delay planting 60 days or more depending on the temperature and moisture content of the soil.

Methyl Bromide is available in 175 lb. cylinders. A measuring device or a pressure regulator is needed to accurately the proper rate per tree site, however many growers count off one long second (one thousand one) with the valve open. Too much material applied at a single site may damage or kill the adjacent tree in an interplant situation. ***The cylinders must be filled differently if you want to use nitrogen pressure and a regulator, so please specify how you are going to apply the material when you order your supply.***

Nemasol (Vapam) must have irrigation water available at the time of treatment. The weed sprayer applies the material while the irrigation system is running. Enough water is applied to drive the material 2.5 to 3 feet into the soil. Trees do not have to be removed prior to treatment.

When working and leveling the ground after either treatment, do not mix soil from untreated areas with the treated planting strip.

For broadcast treatment of large acreage with either Methyl Bromide or Telone C-17, contact a custom applicator to determine what soil preparation must be done and by what date to insure treatment this fall.

More complete information and application instructions are available at all Northwest Wholesale warehouses. Read all label instructions before using.

Soil Sampling

Soil sampling can be done anytime of the year that the ground is not frozen, it is best if it is taken at about the same time of year each time that you do it. If you are planning to replant a block you shouldn't miss the opportunity to incorporate needed nutrients before you put the trees in the ground. If you are trying to diagnose a problem with tree growth you should also have the irrigation water tested and a paste extraction (your soil and your water combination). That will tell you what the tree is actually getting from the soil, not just what is there.

In existing orchards take the sample in the tree row within the drip line of the canopy, not from the drive middle. This will give you a more accurate reading of what is available to the tree.

Sample to a depth of 6" - 8", remove the top 1" - 2" of the sample to avoid contamination by lime granules, etc.

Sample different soil types or areas with different growth patterns separately, the buffering capacities of the soil may differ considerably.

Blend 2 or more sample cores per acre taken from the same soil type and depth in a clean plastic bucket. The soil lab usually wants a half a pint (one cup) of the blended sample.

Do not mix samples from various depths, i.e. a 2"- 8" sample with an 18"- 24" sample. The pH values frequently vary dramatically between soil layers; you need that information to correctly analyze your soils.

Do not sample after a recent fertilizer application.

Do not blend samples from different water management blocks, i. e. sprinkler, rill, drip, etc.

Ask for a complete soil test, which should include cation exchange capacity (CEC), pH, organic matter (OM), nitrogen, phosphates, sulfates, calcium, magnesium, potassium, sodium, exchangeable hydrogen, boron, iron, manganese, copper, zinc, aluminum, molybdenum, and base saturation point. The cost will be \$50 - \$55 per sample. Testing for Arsenic is a separate procedure and is billed extra.

We have soil sample bags and water bottles available for your convenience. Results usually come back in two to three weeks.

Quality fruit requires quality pruning

The negative fruit quality effects of poor pruning can never be totally erased by aggressive chemical thinning, growth regulator applications or foliar nutrition programs, but growers spend a lot of money every year trying. Let me describe some poor pruning practices I have observed over the years and how they can be corrected.

Large limbs are needed to support the weight of the fruit...

but the number one problem is failure to manage limb size in the tree. This is especially critical in the close-planted orchards generally farmed now. With the possible exception of the bottom lateral, no lateral should exceed 50% to 60% of the diameter of the leader that it is attached to. Likewise, no fruiting branch should exceed 50% to 60% of the diameter of the lateral it is attached to. Failure to diligently follow this rule results in large branches in the top of the tree and on the laterals. When the tree is fully leafed out in the summer the interior and bottom is badly shaded producing small, poor colored fruit.

Basic tree structure really does not vary greatly from one variety or type of fruit tree to another. Relatively large wood is needed to support crop and fruiting branches. But large diameter wood does not bear fruit and must be kept well spaced with room between leaders and laterals for the small, fruit producing wood to continuously develop. Most open center trees will do just fine with three leaders, four is OK, five leaders is usually a problem you'd better do something about.

Standard trees have a more open structure; the fruiting area extends farther away from the lateral than in spur type trees. You should generally have fewer leaders and laterals in a Golden for example, than you would in a Scarlet Spur.

When there is large diameter wood in the top of a central leader tree, it is obvious which wood should be removed because the central leader will be retained or renewed by a weaker shoot. But with multi-leader trees it is not so obvious which limb should be removed. When the inside limb is removed in the mistaken belief that it is the cause of the crowding and shade problem, the end result is a tree with very low angle leaders prone to sucker production. These low angle leaders quickly grow over the drive row and into the adjacent tree resulting in a crowded planting. Most of the fruiting area is in the shaded area below the leader. The fruiting potential (volume of space filled with fruiting wood) of this tree is also lower than it could be with a more upright leader. Keep the leaders as upright as possible by removing or benching down the outer limbs as needed and allow the light to penetrate from the outside of the tree. This is frequently referred to as a 'Steep Leader Tree'.

Let there be light

The first pruning objective is to remove any crowding leaders of a multiple leader tree. Don't worry about having some large open spaces within the tree; they will quickly fill in with fruiting wood; that is your objective.

Your second pruning objective is to remove any laterals or side branches of laterals that have become one half to two thirds of the diameter of the leader or branch they are attached to. A healthy tree with good vigor that is pruned in this way will quickly produce replacement limbs. Make all of the lateral removing cuts on a leader or the whole tree first, beginning at the top of the tree, before doing any detail pruning.

The vertical distance between laterals will vary considerably from full size to dwarf trees, but has to be adequate to allow some full sunlight to fall on the base of the next lateral down when the tree is in full leaf next July. This is 30% to 40% farther apart than you may think it should be when you are pruning in January with no leaves on the tree.

Observation of the fruit on the bottom and inside of the tree at harvest is very important. Smaller fruit with poor color development indicates a need more light at the bottom and inside of the tree.

Limit limb and lateral length

The second most common error is trying to control the length of either a lateral or fruiting branch by making a cut in one-year-old wood. Don't do it — it never works.

One-year-old wood is locally stimulated by pruning and will remain vegetative, producing one or more vigorous shoots from the buds immediately behind the cut. When first year wood is cut at the end of a limb, the vigorous regrowth will

Five Proven Pruning Principles

1. Remove large limbs from the tree (especially the top) using the 60% rule.
2. Reduce the number of leaders to four or less.
3. Increase the vertical distance between laterals; allow sunlight to reach to the leaders.
4. Control the length and angle of the laterals.
5. Renew and position the fruiting spurs.

become a serious roadblock to light penetration to the interior of the tree by mid summer. To avoid this remove the one year old portion of the limb completely, cutting into two year or older wood, or leave the new shoot in place for one year then prune it to a spur the second year. Cutting a one-year-old shoot in half will **not** control the branch length – but it will create a shading problem. (See photos below.)



Manage the end of the lateral

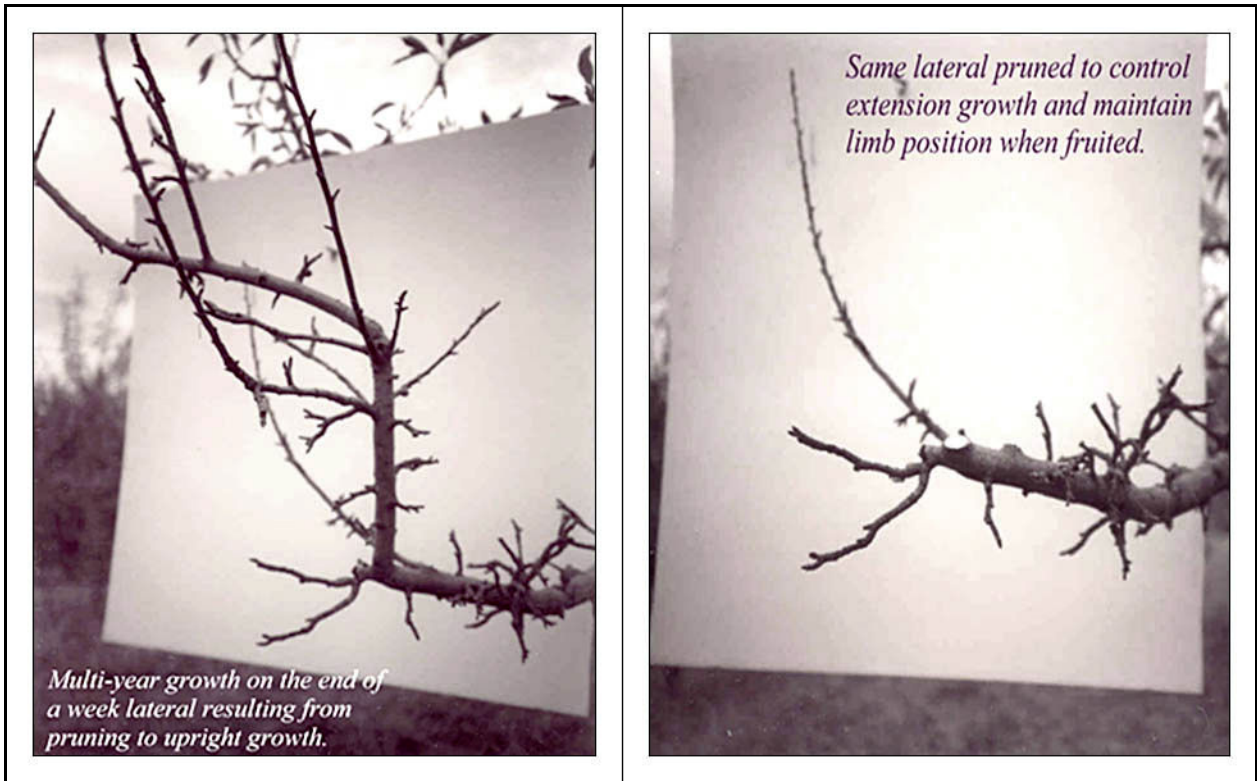
The third problem is closely related to the second, properly managing the end of the lateral, especially in central leader apples. It is not uncommon to see mature orchards where the young trees were well trained (spread) until the laterals were 4 to 5 feet long. Then the spreading stopped and the ends of the laterals were allowed to grow as they wanted.

One of two things happens. If the new wood at the end of the lateral was cut each year, elongating and stiffening it, then the end of the lateral becomes nearly vertical, essentially a new leader competing with and shading out the second whorl of the central leader. The tree is now shaped like a tulip with all of the quality fruit in the top and outside of the tree!

Or if the one-year-old wood at the end of the lateral was not cut, it soon set fruit. The lateral grows more slowly, but the weight of the fruit brings the limb down so it is nearly flat, or even arched like the back of a scared cat. Now some of your best fruit is hanging in the middle of the row, too low to drive under and too narrow to drive between the trees!

In either case, to correct the problem you have to stub or bench back into old wood to make driving room and let light into the center of the tree. Cutting correctly the first year is relatively easy because an obvious problem needs to be solved. But I have noticed the next year that the pruning crew usually leaves a vigorous semi-upright shoot at the end of the lateral. Sometimes it's even stubbed, encouraging more growth.

Three or four years later there is again a small tree growing at the end of the lateral. The fruit is hanging into the drive middle again. Usually a flush of watersprouts is growing from the upper side of the sagging lateral. The lower center of the tree is shaded out — again! Don't let this happen to you; **always prune the end of that mature lateral to a shoot that is growing down or weakly to the side.** (See photos on the next page.)



Limb renewal

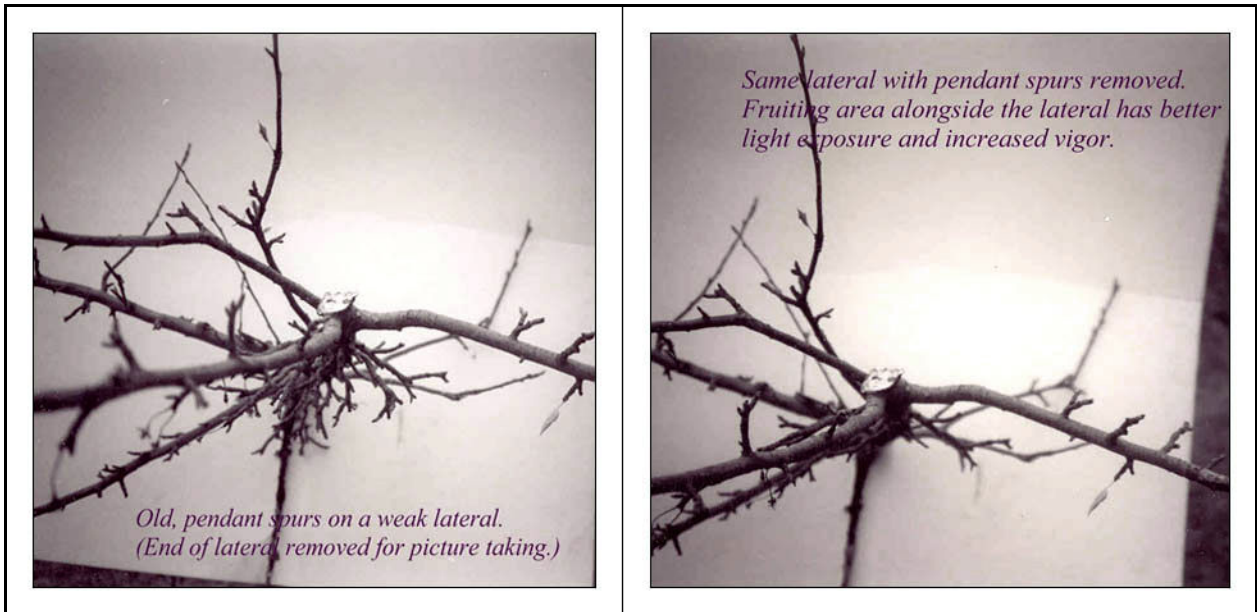
On apples and pears the fruit is produced mostly on spurs. Remove the side branches from the laterals using the same size ratio as you would removing laterals from a leader, i.e., if it is one half to two thirds of the diameter of the lateral, cut it out. Use a slightly sloping cut, flush against the limb at the top of the cut but with one half inch of stub at the bottom. Regrowth from this type of cut will frequently come from the bottom and be very useful for limb renewal. *(See photos below.)*



Spur positioning

Remove spurs or small fruiting limbs growing from the bottom 1/3 of the lateral and fruiting branches. The fruit on old, pendant spurs will be small. Remove all growth from the top 1/3 of the lateral. These shoots will grow rapidly and dominate the lateral. Also the fruit on the vertical growth will likely be scarred from growing against the limb.

Stub old spur complexes back to one or two growing points to encourage new growth. Fruit size declines on spurs after they are 4 to 5 years old. If you're curious, count the fruiting scars. I've found spurs as old as 10 years on spur type trees. Semi-spur and standard varieties have the same pattern; the only difference is that the bourse shoot is 4 to 6 inches long on standard varieties instead of 1/2 inch as on spur trees.



If you have a pruning problem and want a demonstration in your orchard call a Northwest Wholesale fieldman.