

2010 APPLE SPRAY PROGRAM

DORMANT SPRAY (Zinc)

Zinc Sulfate	20-40 pounds/acre
Tech Spray Mg*	8 ounces/100 gallons
*ph must be below 7 or product could crystallize. Always buffer water first then add Zinc.	
All rates are shown per acre except those products where concentration of material is important.	

Zinc and boron foliar applications could be very important this year to help the tree cope with any damage that might be present. If you plan to continue with additional foliar zinc applications use the lower rate now. Apply at silver tip stage. Some green tip may be showing when finishing this spray. No Zinc Sulfate should be applied past the green tip stage however, as severe foliage injury may occur. Temperatures should be expected to reach the high 40°F range or above on days zinc is applied. Be sure and shut off early enough in afternoon so that the last tank of spray will have plenty of time to dry before temperatures begin to drop.

DELAYED-DORMANT Stage 2-2½ (San Jose Scale, European Red Mite, Green Apple Aphid, Rosy Apple Aphid, Pandemis Leafroller, Grape Mealybug, Cutworms, Mildew)

Dormant Oil*	4-6 gallons/acre
Lorsban (Chlorpyrifos) 4EC**	2 quarts/acre
OR Esteem	5 ounces/acre
Rubigan EC	10 ounces/acre
OR Focus	10 ounces/acre
Flint	2.5 ounces/acre
Procure 480 SC	8-16 ounces/acre
Tech-Flo Zeta Zinc 22***	2 quarts/acre
B-17 (Boric Acid Spray)	3 pounds/acre
Kaligreen	3 pounds/acre
Inspire (2 part package)	4 ounces + 4 ounces/acre
*Lower the rate or use alternate row application in very young trees to avoid damage from over application of oil.	
**Growers spraying within a stream buffer zone may substitute Esteem from delayed-dormant to pink for San Jose Scale control in place of Lorsban.	
***Zeta Zinc may be combined with spray oil and most other pesticides. Multiple applications through pink stage using light rates will overcome a damage-induced Zinc deficiency better than a single application at the maximum rate.	

Apply this spray from ¼-inch green to ½-inch green stages. For the best Green Apple Aphid control, spray should be applied before the Aphids begin to hatch. If Pandemis Leafroller or Grape Mealybugs are a target, Lorsban (Chlorpyrifos) 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 the mid 40°F range or above on days oil is applied. Shut off early enough in the afternoon so the last tank will have plenty of time to dry before evening.

Always rotate mildew products to avoid resistance.

For complete leaf feed program on apples see the Nutrient section.

PRE-PINK TO PINK (Apple Scab*, Apple Mildew)

Strobilurin plus protectant program:

Flint OR Sovran 50WG** OR Lime-Sulfur Solution	3 ounces/acre 4-6 ounces/acre 10 gallons/acre
Dithane / Penncozeb (Scab and fruit finish) OR Vanguard (Scab only) OR Ziram 76 WDG (Scab only)	6 pounds/acre 3-5 ounces/acre 5 pounds/acre
*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 has occurred as determined by the Mills wetness chart. Rally, Rubigan and Procure are eradicant type sprays with "kickback" action, whereas Lime-Sulfur, Dithane and Ziram are all protectant type fungicides. Vanguard performs as a protectant at 3 ounces per acre, but performs as both eradicant and protectant at 5 ounces per acre. The safest procedure is to combine both protectant and eradicant materials for scab control during this time period. **Use caution around cherries with Sovran 50WG. Cherry trees can defoliate from Sovran drift.	

Other Mildew options:

Rally	5 ounces/acre
Procure 480 SC	8-16 ounces/acre
Rubigan	10 ounces/ acre
Micronized Sulfur	10-12 pounds/acre
Kaligreen	2.5 pounds/acre
Inspire (2 part package)	4 ounces + 4 ounces/acre

Apply the second Mildew spray on susceptible varieties (Golden, Rome, Jonathan, Granny Smith, Gala, Fuji, Braeburn, Jonagold, ect.) at pre-pink to pink. In light Mildew pressure conditions, Micronized Sulfur before and after bloom may be sufficient, if an SI such as Rubigan or Procure was used with the delayed-dormant spray.

This is the first opportunity to add calcium into programs.

Inca	1-2 pints/acre
Mira-cal	5 pounds/acre
Nutri-cal	2 quarts/acre

FRUIT FINISH

Mildew susceptible varieties such as Golden Delicious, Gala, Fuji, Jonagold, Braeburn, Pink Lady, Honey Crisp, etc.

(This program is in addition to any mildew controls that are planned.)

PINK

Micronized Sulfur OR Lime-Sulfur Solution OR Dithane DF* OR Pencozeb 75 DF OR Ziram 76 WDG OR Sonata** OR Alpha DF OR Rally OR Procure	10-12 pounds/acre 2.5 gallons/100 gallons 6 pounds/acre 6 pounds/acre 5 pounds/acre 2 quarts/acre 10-12 pounds/acre 5 ounces/acre 8-16 ounces/acre
*Use either the pre bloom or extended application schedule for Dithane, do not combine the two programs. **Used late pink or into early bloom this product will suppress fire blight bacteria also. All rates are shown per acre except those products where concentration of material is important.	

Rotation of modes of action is the key to successful control of mildew. Make sure that products from same class aren't used back to back. Do not apply any of the Sulfur materials in

temperatures over 80°F or when the temperature is expected to be over 85°F within three days following application.

PETAL FALL & POST PETAL FALL

Micronized Sulfur	10-12 pounds/acre
OR Micronized Sulfur*	5-6 pounds/acre
+Serenade Max*	3 pounds/acre
*A Sterile Inhibitor or a Strobilurin can be added with sulfur for better results at this timing.	

Do not apply Micronized Sulfur in temperatures over 80°F or when the temperatures are expected to exceed 85°F within three days after application. Sudden daytime temperature increases of 15–20°F a few days after application may also burn fruit and foliage even when the highs do not reach or exceed 80°F. **Watch the weather forecast!** Lower rates of sulfur tank mixed with Serenade will reduce the risk of sulfur burn with very similar fruit response. Serenade may have some benefit for fireblight control if late bloom is present on susceptible varieties.

Dithane DF*	3 pounds/acre
OR Penncozeb 75DF	6 pounds/acre
OR Ziram 76 WDG	5 pounds/acre
OR Captan 50W	6 pounds/acre
OR Alpha DF	10-12 pounds/acre
OR Provide**	10-20 ounces/acre
*Do not apply this program if Dithane was used pre-bloom at the 6 pounds per acre rate; see note under PINK. Be cautious not to mix Captan or Dithane/Penncozeb with oil.	
**Apply with 2-4 applications of 100 gallons per acre each. Do not apply more than 40 ounces of Provide per acre per season.	

Research has shown that all the alternatives listed above have improved the quality of finish on Golden Delicious and other russet sensitive varieties of apples. Choice of alternatives may be based on grower or fieldsman's personal preference of materials. **See the nutrient section for a fruit finish program based on increasing and accelerating the formation of the protective wax layer of the fruit.**

BLOSSOM SPRAY-To promote type

30-80% KING BLOOM

Promalin/Typy	1.5-2 pints/acre
Nufilm 17	8 ounces/100 gallons
Tech Spray Mg	8 ounces/100 gallons
B-17 (Boric Acid)	0.5 pound/100 gallons
All rates are shown per acre except those products where concentration of material is important.	

Apply in 100 to 200 gallons of water per acre. Better results may be expected if daytime temperatures are in the high 60°F to 70°F range when cell division is actively taking place. Warm weather two to three days after application is more important to good response than precise blossom stage timing. Apply Promalin or Typy during the early morning, late evening or at night (while temperatures are above 40°F) to ensure better absorption of the product. Rainfall within 6 hours after a Promalin application may reduce the effectiveness of the application.

In prolonged bloom situations it may be advisable to split your Promalin applications by spraying alternate rows at early bloom and then spraying the untreated middles two to three days later. This allows more bloom to be covered at optimum timing. Although Promalin has adequate surfactant formulated into the product many growers opt to add additional surfactant. Final spray solution should be buffered to pH below 8.0 for best results, it is not necessary to buffer to below 6.0. Many combinations including B-17, Liquibor, Regulaid, Sorba Mg, Tech-Flo Mg, Dithane M-45, micronized Sulfur, Sterol Inhibitors, Cal-Bor+Moly, and Bt's + Coax have been used successfully in combination with Promalin. Promalin has been tank mixed with many blossom-thinning materials. The thinning material being applied must dictate the application timing and conditions. If fast drying is required for thinning, this may result in less than optimum conditions for the Promalin.

ALTERNATE PROGRAM

Cytokin	1 pint/acre
Promalin/Typy*	1-1.5 pints/acre
Nufilm 17	8 ounces/100 gallons
Tech Spray Mg	8 ounces/100 gallons
B-17 (Boric Acid)	0.5 pound/100 gallons
*Young Red Delicious trees that normally produce less typy fruit should be treated with the full rate of Promalin PLUS Cytokin. All rates are shown per acre except those products where concentration of material is important.	

RUSSET REDUCTION

In addition to the materials that are recommended in the Fruit Finish Program (many of which may be combined with insect control applications), it is important to be properly calibrated to avoid uneven application of material to the tree. Current and forecast weather conditions must be taken into account. Frosty or near frosty conditions, prolonged rainy periods, and slow drying of spray applications make Fruit Russet a high risk. Avoid spray applications during these periods.

PINK TO PETAL FALL (Western Flower Thrip, Campyloomma, Lygus)

Carzol SP*	1 pound/acre
+Tech Spray Mg	8 ounces/100 gallons
OR Success	8 ounces/acre
+Tech Spray Mg	8 ounces/100 gallons
OR Assail	3.4 ounces/acre
*Carzol may not be used past petal fall on apples!! Carzol is also ph sensitive. Do not mix Carzol with Lime Sulfur. If blossoms are open, apply Carzol at night or while bees are not working in blooms. Repeat application as needed. Success at this timing will control Thrip but not Campyloomma. This timing is also good for Leafroller, but complicates good stewardship of the material for resistance management. See Intrepid note in the next section. All rates are shown per acre except those products where concentration of material is important.	

PETAL FALL (Bull's Eye Rot, Leafhopper, Leafroller, Aphid, Mildew)

Intrepid 2F*	16 ounces/acre
OR Rimon	32 ounces/acre
OR Proclaim	4.8 ounces/acre
Ziram 76WDG	5 pounds/acre
Provado**	4-6 ounces/acre
Assail	3.4 ounces/acre
Esteem***	5 ounces/acre
Flint****	3 ounces/acre
Inspire (2 part package)	4 ounces + 4 ounces/acre
Maxcel*****	64-96 ounces/acre
Apogee*****	18-36 ounces/acre

*Intrepid will work better at petal fall than it will later in the summer on Leafroller, timing and coverage are easier to control. Use the full rate of Intrepid for residual control of both Codling Moth eggs and later hatching Lacanobia. Success has proven to be effective during the summer on a broader range of insect pest. If mating disruption is being used, time the Intrepid or Rimon application for Codling Moth at 150–250 degree-days (late petal fall) after biofix.

**Required if Rosy Apple Aphid are present. Use 1 oz. of Silwet/100 gallons for good contact in curled leaves, unless you are using oil with neonics.

***Esteem should be used here if Oil and Chlorpyrifos wasn't used in the delayed dormant stage for scale control.

****Apply to Mildew susceptible varieties.

*****Apogee and Maxcel programs can vary from variety to variety. Check with your Northwest Wholesale, Inc. Fieldmen for best rates and timing for each variety.

Ziram may be combined with most nutrient programs and with Calcium Chloride in the August application.

Apply at petal fall on older trees, especially if overhead irrigation is used unless an Apple Scab program has been followed through the bloom period. Application must be made before the calyx closes. An additional protective spray should be made mid to late August in any block with a history of Bull's Eye Decay in the pack out.

FIRST COVER (Codling Moth*, Mildew, Rosy Apple Aphid, Mealybug)

Procure 480 SC**	8-16 ounces/acre
Provado 1.6F*** +Tech Spray Mg +Foliar nutrients as desired	6-8 ounces/ acre 8 ounces/100 gallons
Centaur	34.5 ounces/acre
<p>*See the options for Codling Moth control in CODLING MOTH section. Apply the first cover at the proper degree-day timing for the Codling Moth pressure in the orchard and the program you plan to use, i.e., 150–200 degree-days after biofix when using insect growth regulators, 350 degree-days after biofix for a two spray pesticide program on the first generation, or 550 degree-days for a single cover for very light pressure, such as a population suppression cover in a mating disruption block.</p> <p>**Mildew susceptible varieties need additional protection at this time, may require another application at second cover to protect shoot tips and reduce the amount of inoculum for the following season.</p> <p>***Needed for early season Aphid control only in high-pressure years or districts.</p> <p>Decision-Aid System will not reset to zero after Biofix.</p> <p>All rates are shown per acre except those products where concentration of material is important.</p>	

CODLING MOTH Option #1 (Codling Moth, Leafroller) First generation

CYD-X	2-6 ounces/acre
Intrepid*	16 ounces/acre
Rimon*	32 ounces/acre
Assail**	3.4 ounces/acre
AzinphosMethyl***	2-3 pounds/acre
Voliam Flexi****	4-7 ounces/acre
Delegate*****	6.5 ounces/acre
Altacor*****	4 ounces/acre
Summer Oil	1 gallon/100 gallons
<p>*Intrepid and Rimon have ovicidal activity both under and over the Codling Moth eggs. Make the first application at or just before 1% egg hatch for Codling Moth (150 to 200 degree-days past biofix). Use the degree-day model for proper timing. Intrepid at petal fall will provide good Leafroller control, plus control of Lacanobia hatching later in the season. Oil should be added with both.</p> <p>**Apply Assail at 350 degree-days. Combine with one gallon per acre of oil for Mite suppression. Assail and AzinphosMethyl may be switched if desired to better manage hand-thinning schedule.</p> <p>***Apply 10 to 14 days after Assail. REI for AzinphosMethyl is 14 days. In mating disruption blocks with low pressure this third control application may not be needed. Add 1 pint/acre of Nufilm 17 to AzinphosMethyl to prevent wash off by rain or irrigation.</p> <p>****Voliam Flexi is a good fit if Rosie Aphids or Woolly Aphids are present with Codling Moth.</p> <p>*****Delegate or Altacor shouldn't be used in more than one consecutive generation of Codling Moth to maintain resistance management. Delegate or Altacor can be used up to 3 consecutive times in the same generation.</p> <p>All rates are shown per acre except those products where concentration of material is important.</p>	

CODLING MOTH-2nd Generation

Assail	3.4 ounces/acre
AzinphosMethyl +Nufilm 17	2-3 pounds/acre 1 pint/acre
CYD-X*	2 ounces/acre
Rimon**	32 ounces/acre
Intrepid**	16 ounces/acre
CMF Sprayable Pheromone	4 ounces/acre (4 Wheeler application only)
Delegate	6.5 ounces/acre
Altacor	4 ounces/acre
Calypso	4-8 ounces/acre
*Add 1-2 ounces/acre of virus to all covers on the second generation for general Codling Moth population control. Use 4-6 ounces/acre of CYD-X if not tank mixed with another pesticide. CYD-X will not prevent all damage for the current generation, but will greatly reduce the numbers of Codling Moth in the succeeding generation.	
**Rimon and Intrepid should be used now if they weren't used first generation.	

Make the first application based on trap catch or temperature model, repeat at 10 to 14 days. You are only allowed 4 pounds per season of AzinphosMethyl. If that does not cover the entire 2nd generation Moth flight, Imidan or Assail must be used to finish the season. Mite control may be necessary at this timing. Monitor and spray as necessary. If sprayable pheromone is being used for Codling Moth control, target peak flight timings for best results. Use model for reference but always trap and monitor for best information in regards to peak timing.

CODLING MOTH-3rd Generation

Imidan 70 WSP* +Tech Spray Mg	5 pounds/acre 8 ounces/100 gallons
Assail	3.4 ounces/acre
CMF Sprayable Pheromone	4 ounces/acre
Voliam Express	12 ounces/acre
*Imidan will perform much better when buffered.	
All rates are shown per acre except those products where concentration of material is important.	

It may be necessary to treat 3rd generation for control depending on crop and length of summer.

For complete leaf feed program on apples see the Nutrient section.