

Sweet Cherry Programs

Major Diseases

Bacterial canker or gummosis

Bacterial canker or gummosis (*Pseudomonas syringae*) is a serious disease of cherry in the Pacific Northwest. It is particularly damaging to young trees and can result in replanting issues if un-managed. Spread of the pathogen is favored by cool, moist weather. Optimum timing for control of bacterial gummosis is in late winter before trees break of dormancy, spring frost, and wet weather occur. In the Fall, apply most materials before autumn rains or after October 1.

Brown rot

Brown rot is a serious disease of stone fruit when wet conditions occur in the orchard. The disease is caused by the fungus *Monilinia fructicola* although other species (i.e. *M. laxa* and *M. fructigena*) have been reported in other regions. There are both floral and fruit phases of the disease. Brown rot is explosive and highly favored by rain events during bloom (blossom infection) and immediately prior to harvest (fruit infection). Many fungicide materials are effective on both brown rot and powdery mildew. Use the products list on the Bloom table for brown rot, as they are effective, and mildew sprays are not recommended at this stage of tree growth. Neither iprodione nor fenbuconazole are first-rate powdery mildew materials. Always follow fungicide resistance management guidelines. Current resistance management guidelines are available at <https://www.frac.info>

Cherry Powdery Mildew

Powdery mildew, caused by the fungus *Podosphaera clandestina*, is one of the most serious disease of cherries in the Pacific Northwest. The fungus attacks both foliage and (less commonly) fruit. Most cultivars are susceptible to the disease but it is particularly severe on the cultivar 'Sweetheart'. Management of the foliar phase is important because spores that infect fruit are produced on infected leaves. The fungus survives winter as chasmothecia (the sexual fruiting body); epidemics are initiated in spring when moisture results in ascospore release from the overwintering propagules. Ascospore release requires free moisture at 50F or greater. Ascospores serve as primary inoculum and give rise to powdery mildew colonies that continually produce millions of asexual spores (conidia). Conidia serve to spread and intensify the epidemic on both foliage and fruit. The disease is favored by moderate temperatures and high humidity. Management of powdery mildew in sweet cherries involves intensive and expensive fungicide application programs. Resistance to Group 3 (DMI) and Group 11 (QoI) fungicides has been documented in the cherry powdery mildew pathosystem. Current resistance management guidelines are available at <https://www.frac.info>

Coryneum blight (shothole)

Coryneum blight or shothole, caused by *Wilsonomyces carpophilus*, is a fungal disease of minor importance in the Pacific Northwest. The fungus overwinters in twig cankers. Spores are produced on canker surfaces during early spring rains (or over-the-canopy irrigation) and are splashed to foliage and fruit where they germinate, infect, and cause small lesions. The lesions are small and circular. Necrotic lesion centers may drop giving heavily infected leaves a "shothole" appearance. The disease is managed using fungicide programs early in the growing season.

Major Insects

Leafrollers (Pandemis, Obliquebanded)

Pre-bloom applications of pesticides can be effective and will also conserve natural enemies for leafroller and biological control agents of other pests, such as aphids. If treatments for leafrollers were applied at pink and/or bloom, sampling to determine the density of surviving leafrollers should be completed prior to deciding to apply additional controls at this timing. Most products listed act primarily as stomach poisons versus direct contact to residues, therefore, complete coverage is very important to achieve maximal control. Repeating an application of any product should be based on the leafroller population surviving previous treatments. Use the leafroller models on the WSU Decision Aid System (<https://decisionaid.systems>) for the optimum timing. Additional Details

Shothole borer

Good sanitation (removing large wood prunings and woodpiles from the orchard) is the best management tactic. Insecticides are only effective against adults. Beetles begin flying in late April and are active through May. The second generation flight begins in late July or early August. Yellow sticky traps placed on orchard borders will detect adult beetle activity. Spraying the border trees (rows) with high water volumes will protect the remainder of the orchard in many situations where external sources are the primary problem. Additional Details

Spotted-wing drosophila

Spotted-wing drosophila (SWD) is one of the newer invasive species from Asia, first detected in the continental US in 2008, and achieving pest status in eastern Washington in 2010. Among the tree fruits, only cherries are considered to be vulnerable to attack preharvest, although like any drosophilid, SWD will use injured or rotting fruit of any type to complete development. SWD can be controlled by several groups of insecticides, and rotation among MOAs is important for resistance management. Monitoring tools are available, and should be used to gain a general idea of pest pressure in a given year. Experience since 2010 indicates that cold winters, especially those with sudden and extreme cold snaps, will decimate overwintering populations, and result in low pressure the following growing season, with little need for spray coverage. Conversely, mild winters and early springs have preceded extremely high pest pressure, necessitating a full season spray program. Additional Details

Twospotted spider mite

Twospotted spider mite (TSM) is the most common spider mite pest of pear, although it has a very broad host range and will also feed on other tree fruits. Unlike apple,

some pear cultivars (especially Anjou) have a very low threshold for mite damage, and controls must be applied at lower populations. Like all spider mites, TSM is an induced pest that will be controlled by natural enemies (especially predatory mites) if no disruptive sprays are applied. TSM can also feed on a number of broadleaf weeds, and reservoirs of both pest and predator can build up on the orchard floor. Mowing and herbicide applications beneath the tree may have unintended consequences for population in the tree canopy. Additional Details

Western cherry fruit fly

Western cherry fruit fly is the key direct pest of cherries, and quarantine regulations create a zero tolerance for this pest. Adult flies lay eggs in the fruit, and the larvae feed and develop inside the fruit until they are ready to pupate. A baited yellow sticky trap can be used for monitoring adult emergence of the single generation per year, and a degree-day model is available. Females have a 7-10 day pre-oviposition period, so sprays (either canopy or bait sprays) can start about a week after first fly detection or when the model predicts emergence. Fly emergence continues after harvest, so post-harvest clean up sprays will help prevent future problems, especially if unharvested fruit remains in the orchard. Many of the materials that kill western cherry fruit fly are also effective on spotted-wing drosophila; the neonicotinyls are a notable exception Additional Details

White apple leafhopper

Adults fly from late May until frost. Monitor nymphs on the underside of leaves. Egg parasitoid *Anagrus spp.* attacks overwintering and summer eggs. Only control this indirect pest when necessary. Carbaryl, if used for apple thinning, is also a very effective leafhopper material but the canopy spray technique may not provide adequate coverage for leafhopper control. Additional Details

Spray Schedule

Dormant

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Bacterial canker or gummosis	fixed copper Basic Copper 53	See Label	24 h	0 d	M1	NR	
	copper hydroxide Kocide 3000	See Label	48 h	0 d	M1	NR	

Efficacy numbers denote the relative efficacy of a pesticide against a given pest on a 1 to 4 scale with 1 being low and 4 high efficacy. This information is based primarily on research conducted with WSU researchers in Washington.

Delayed dormant

Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Black cherry aphid	petroleum oil- dormant petroleum oil- dormant	1-1.5 % v/v	12 h	none listed		NR	Organic
Cutworms	indoxacarb Avaunt 30DG	6 oz	12 h	14 d	22A	4	
	chlorpyrifos Lorsban Advanced	See label	4 d	none listed	1B	4	
European red mite	clofentezine Apollo 4SC	4-8 fl oz	12 h	21 d	10A	NR	
	petroleum oil- dormant petroleum oil- dormant	1-1.5 % v/v	12 h	none listed		3-4	Organic
	hexythiazox Savey 50DF	4-6 oz	12 h	28 d	10A	NR	
San Jose scale & Lecanium scale	chlorpyrifos + petroleum oil- dormant Lorsban Advanced + petroleum oil- dormant	4 pt 1-1.5 % v/v	4 d	none listed	1B	NR	
	petroleum oil- dormant petroleum oil- dormant	6 gal	12 h	none listed		NR	Organic

Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Twospotted spider mite	fenbutatin oxide Vendex 50WP	1-2 lb	48 h	14 d	12B	NR	

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Prebloom

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Coryneum blight (shothole)	azoxystrobin Abound 2.08F	11-15 fl oz	4 h	0 d	11	NR	Abound is extremely phytotoxic to certain apple varieties. See Application Directions, Resistance Management, and Attention information on label. Do not apply more than 2.88 quarts product per acre per season.
	penthiopyrad Fontelis	14-20 fl oz	12 h	0 d	7	NR	
	trifloxystrobin Gem 25W	6-8 oz	12 h	1 d	11	NR	
	copper hydroxide Kocide 3000	See Label	48 h	0 d	M1	NR	
	pyraclostrobin + boscalid Pristine	10.5-14.5 oz	12 h	0 d	11,7	NR	
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.
	ziram + copper hydroxide Ziram Granuflo 76WDG + Kocide 3000	See Label See Label	48 h	14 d	M3	NR	
Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Black cherry aphid	diazinon Diazinon 50W	4 lb	4 d	21 d	1B	NR	
Cutworms	indoxacarb Avaunt 30DG	6 oz	12 h	14 d	22A	4	

Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Leafrollers (Pandemis)	Bacillus thuringiensis subsp. kurstaki DiPel DF	See label	4 h	0 d	11B2	3	Bts are stomach poisons so complete coverage is very important for control. Two or three applications are usually required. Apply when forecasts predict a warm weather pattern for 3 or more days. This spray timing is too early to control obliquebanded leafroller. Organic
	spinosad Entrust SC	4-8 fl oz	4 h	7 d	5	NR	Organic
	spinosad Success 2F	4-8 fl oz	4 h	see note	5	NR	

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Bloom

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Brown rot	sulfur, dry flowable sulfur, dry flowable	See Label	24 h	none listed	M2	NR	
	fluopyram + trifloxystrobin Luna Sensation	5-5.6 fl oz	12 h	1 d	7, 11	NR	
	triflumizole Procure 480SC	10-16 fl oz	12 h	1 d	3	NR	Do not apply more than 96 fl oz of Procure 480SC per acre per season.
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.
	metconazole Quash 50WDG	2.5-3.5 oz	12 h	14 d	3	NR	
	myclobutanil Rally 40WSP	5 oz	24 h	0 d	3	NR	Place into solution before adding oil. Make a second application at petal fall if disease-conducive weather occurs.
	tebuconazole + sulfur Unicorn DF	2-3 lb	5 d	0 d	3, M2	NR	
Cherry Powdery Mildew	azoxystrobin Abound 2.08F	11-15 fl oz	4 h	0 d	11	NR	Abound is extremely phytotoxic to certain apple varieties. See Application Directions, Resistance Management, and Attention information on label. Do not apply more than 2.88 quarts product per acre per season.

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	pyraclostrobin Cabrio 20EG	9.5 oz	12 h	0 d	11	NR	Resistance to Group 11 (QoI) fungicides has been documented in the cherry powdery mildew pathosystem.
	penthiopyrad Fontelis	14-20 fl oz	12 h	0 d	7	NR	
	trifloxystrobin Gem 25W	4-8 oz	12 h	1 d	11	NR	
	difenoconazole Inspire	7 fl oz	12 h	0 d	3	NR	
	potassium bicarbonate Kaligreen	See Label	4 h	1 d	NC	NR	Organic
	fluopyram + trifloxystrobin Luna Sensation	5-5.6 fl oz	12 h	1 d	7, 11	NR	
	fluxapyroxad + pyraclostrobin Merivon	4-6.7 fl oz	12 h	0 d	7, 11	NR	
	polyoxin D zinc salt OSO 5%SC	13 fl oz	4 h	0 d	19	NR	Apply every 7-10 days.
	polyoxin D zinc salt Ph-D	6.2 oz	4 h	0 d	19	NR	Apply every 7-10 days.
	triflumizole Procure 480SC	8-16 fl oz	12 h	1 d	3	NR	Do not apply more than 96 fl oz of Procure 480SC per acre per season.
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.
	metconazole Quash 50WDG	3.5-4 oz	12 h	14 d	3	NR	
	quinoxifen Quintec 2.08L	7 fl oz	12 h	7 d	13	NR	
	myclobutanil Rally 40WSP	5 oz	24 h	0 d	3	NR	Place into solution before adding oil. Make a second application at petal fall if disease-conducive weather occurs.
	flutriafol Topguard	6-8 fl oz	12 h	7 d	3	NR	
	petroleum oil, summer petroleum oil, summer	1-2 % v/v	4 h	0 d		Good	Do not apply to oil-sensitive varieties. Do not spray wet foliage. Do not spray when freezing temperatures are anticipated within 48 hours of an oil application, above 90°F (32°C) or when plants are under heat or moisture stress. Do not apply between pit hardening and harvest. Organic

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	tebuconazole + sulfur Unicorn DF	2-3 lb	5 d	0 d	3, M2	NR	
	metrafenone Vivando	15.4 fl oz	12 h	7 d	U8	NR	Max 2 applications per year (30.8 fl oz). Do not apply with petroleum oils. Do not exceed 2 sequential applications.
Coryneum blight (shothole)	azoxystrobin Abound 2.08F	11-15 fl oz	4 h	0 d	11	NR	Abound is extremely phytotoxic to certain apple varieties. See Application Directions, Resistance Management, and Attention information on label. Do not apply more than 2.88 quarts product per acre per season.
	penthiopyrad Fontelis	14-20 fl oz	12 h	0 d	7	NR	
	pyraclostrobin + boscalid Pristine	10.5-14.5 oz	12 h	0 d	11,7	NR	
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.

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Petal fall

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Brown rot	azoxystrobin Abound 2.08F	12-15.5 fl oz	4 h	0 d	11	NR	Abound is extremely phytotoxic to certain apple varieties. See Application Directions, Resistance Management, and Attention information on the label.
	pyraclostrobin Cabrio 20EG	9.5 oz	12 h	0 d	11	NR	
	captan Captan 50WP	4 lb	24 h	0 d	M4	NR	Do not apply Captan if oil will be used at any time for mildew control.
	penthiopyrad Fontelis	14-20 fl oz	12 h	0 d	7	NR	
	sulfur, dry flowable sulfur, dry flowable	See Label	24 h	none listed	M2	NR	
	fluopyram + trifloxystrobin Luna Sensation	5-5.6 fl oz	12 h	1 d	7, 11	NR	

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	pyraclostrobin + boscalid Pristine	10.5-14.5 oz	12 h	0 d	11,7	NR	
	triflumizole Procure 480SC	10-16 fl oz	12 h	1 d	3	NR	Do not apply more than 96 fl. oz. per acre per season.
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.
	metconazole Quash 50WDG	2.5-3.5 oz	12 h	14 d	3	NR	
	myclobutanil Rally 40WSP	5 oz	24 h	0 d	3	NR	
	tebuconazole + sulfur Unicorn DF	2-3 lb	5 d	0 d	3, M2	NR	
Cherry Powdery Mildew	azoxystrobin Abound 2.08F	11-15 fl oz	4 h	0 d	11	NR	Abound is extremely phytotoxic to certain apple varieties. See Application Directions, Resistance Management, and Attention information on the label.
	penthiopyrad Fontelis	14-20 fl oz	12 h	0 d	7	NR	
	difenoconazole Inspire	See Label	12 h	0 d	3	NR	
	potassium bicarbonate Kaligreen	See Label	4 h	1 d	NC	NR	Organic
	fluopyram + trifloxystrobin Luna Sensation	5-5.6 fl oz	12 h	1 d	7, 11	NR	
	fluxapyroxad + pyraclostrobin Merivon	4-6.7 fl oz	12 h	0 d	7, 11	NR	
	polyoxin D zinc salt OSO 5%SC	13 fl oz	4 h	0 d	19	NR	Apply every 7-10 days.
	polyoxin D zinc salt Ph-D	6.2 oz	4 h	0 d	19	NR	Apply every 7-10 days.
	pyraclostrobin + boscalid Pristine	10.5-14.5 oz	12 h	0 d	11,7	NR	
	triflumizole Procure 480SC	8-16 fl oz	12 h	1 d	3	NR	Do not apply more than 96 fl. oz. per acre per season.

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.
	metconazole Quash 50WDG	4 oz	12 h	14 d	3	NR	
	quinoxyfen Quintec 2.08L	7 fl oz	12 h	7 d	13	NR	
	flutriafol Topguard	6-8 fl oz	12 h	7 d	3	NR	
	petroleum oil, summer petroleum oil, summer	1-2 % v/v	4 h	0 d		Good	Do not apply to oil-sensitive varieties. Do not spray wet foliage. Do not spray when freezing temperatures are anticipated within 48 hours of an oil application, above 90°F (32°C) or when plants are under heat or moisture stress. Do not apply between pit hardening and harvest. Organic
	tebuconazole + sulfur Unicorn DF	2-3 lb	5 d	0 d	3, M2	NR	
	metrafenone Vivando	15.4 fl oz	12 h	7 d	U8	NR	Do not exceed 2 applications per year (30.8 fl oz.). Do not apply with petroleum oils. Do not exceed 2 sequential applications.
Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Fruittree leafroller	chlorantraniliprole Altacor 35WDG	4.5 oz	4 h	10 d	28	NR	
	flubendiamide Belt 4SC	4 fl oz	12 h	7 d	28	NR	
	spinetoram Delegate 25WG	4.5-7 oz	4 h	7 d	5	NR	
Leafrollers (Pandemis, Obliquebanded)	chlorantraniliprole Altacor 35WDG	4.5 oz	4 h	10 d	28	4	
	flubendiamide Belt 4SC	4 fl oz	12 h	7 d	28	4	
	spinetoram Delegate 25WG	4.5-7 oz	4 h	7 d	5	4	
	Bacillus thuringiensis subsp. kurstaki DiPel DF	See Label	4 h	0 d	11B2	3	Apply when warm weather is predicted for 3 or more days. Two or three applications per pest generation may be required to achieve adequate control. Organic

Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	spinosad Entrust SC	4-8 fl oz	4 h	7 d	5	NR	Organic
	methoxyfenozide Intrepid 2F	8-16 fl oz	4 h	7 d	18A	3	Some leafroller populations have developed resistance to Intrepid and its use could result in reduced levels of control.
	spinosad Success 2F	4-8 fl oz	4 h	see note	5	3-4	Some leafroller populations have developed resistance to spinosad products and repeated use of these products during the growing season could result in reduced levels of control.

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Shuck fall

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Brown rot	azoxystrobin Abound 2.08F	12-15.5 fl oz	4 h	0 d	11	NR	Abound is extremely phytotoxic to certain apple varieties. See Application Directions, Resistance Management, and Attention information on the label.
	pyraclostrobin Cabrio 20EG	9.5 oz	12 h	0 d	11	NR	
	captan Captan 50WP	4 lb	24 h	0 d	M4	NR	Do not use Captan if using oil for mildew control.
	penthiopyrad Fontelis	14-20 fl oz	12 h	0 d	7	NR	
	sulfur, dry flowable sulfur, dry flowable	See Label	24 h	none listed	M2	NR	Do not apply within 14 days of an oil application.
	fluopyram + trifloxystrobin Luna Sensation	5-5.6 fl oz	12 h	1 d	7, 11	NR	
	pyraclostrobin + boscalid Pristine	10.5-14.5 oz	12 h	0 d	11,7	NR	
	triflumizole Procure 480SC	10-16 fl oz	12 h	1 d	3	NR	Do not apply more than 96 fl. oz. of PROCURE 480SC per acre per season.
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	metconazole Quash 50WDG	2.5-3.5 oz	12 h	14 d	3	NR	
	myclobutanil Rally 40WSP	5 oz	24 h	0 d	3	NR	Place into solution before adding oil.
	tebuconazole + sulfur Unicorn DF	2-3 lb	5 d	0 d	3, M2	NR	
Cherry Powdery Mildew	azoxystrobin Abound 2.08F	11-15.5 fl oz	4 h	0 d	11	NR	Abound is extremely phytotoxic to certain apple varieties. See Application Directions, Resistance Management, and Attention information on label.
	pyraclostrobin Cabrio 20EG	9.5 oz	12 h	0 d	11	NR	Resistance to Group 11 (QoI) fungicides has been documented in the cherry powdery mildew pathosystem.
	penthiopyrad Fontelis	14-20 fl oz	12 h	0 d	7	NR	
	flutianil Gatten Fungicide	See Label	12 h	3 d	U13	NR	Maximum Application Rate: 8.0 fl oz product/A (0.0264 lb ai/A). DO NOT apply more than 4 applications per year. DO NOT exceed a maximum of 0.16 lb ai per acre per year. DO NOT apply within 3 days of harvest.
	difenoconazole Inspire	7 fl oz	12 h	0 d	3	NR	
	potassium bicarbonate Kaligreen	See Label	4 h	1 d	NC	NR	Organic
	sulfur, dry flowable sulfur, dry flowable	See Label	24 h	none listed	M2	NR	Do not apply within 14 days of an oil application.
	fluopyram + trifloxystrobin Luna Sensation	5-5.6 fl oz	12 h	1 d	7, 11	NR	
	polyoxin D zinc salt OSO 5%SC	13 fl oz	4 h	0 d	19	NR	Apply every 7-10 days.
	polyoxin D zinc salt Ph-D	6.2 oz	4 h	0 d	19	NR	Apply every 7-10 days.
	pyraclostrobin + boscalid Pristine	10.5-14.5 oz	12 h	0 d	11,7	NR	
	triflumizole Procure 480SC	16 fl oz	12 h	1 d	3	NR	
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	metconazole Quash 50WDG	3.5-4 oz	12 h	14 d	3	NR	
	quinoxyfen Quintec 2.08L	7 fl oz	12 h	7 d	13	NR	
	myclobutanil Rally 40WSP	5 oz	24 h	0 d	3	NR	Place into solution before adding oil.
	cyflufenamid Torino	4-8 fl oz	4 h	6 d	U6	4	Do not make more than two (2) applications per year. Do not apply more than once every seven (7) days. Do not exceed a total of 0.106 lbs. active ingredient (16.0 oz. of product) per acre per calendar year. Do not apply within six (6) days of harvest; (PHI = 6 days)
	petroleum oil, summer petroleum oil, summer	1-2 % v/v	4 h	0 d		Good	Do not apply to oil-sensitive varieties. Do not spray wet foliage. Do not spray when freezing temperatures are anticipated within 48 hours of an oil application, above 90°F (32°C) or when plants are under heat or moisture stress. Do not apply between pit hardening and harvest. Organic
	tebuconazole + sulfur Unicorn DF	2-3 lb	5 d	0 d	3, M2	NR	
Coryneum blight (shothole)	azoxystrobin Abound 2.08F	11-15 fl oz	4 h	0 d	11	NR	Abound is extremely phytotoxic to certain apple varieties. See Application Directions, Resistance Management, and Attention information on label. Do not apply more than 2.88 quarts product per acre per season.
	captan Captan 50WP	4 lb	24 h	0 d	M4	NR	Do not use Captan if using oil for mildew control.
	fluxapyroxad + pyraclostrobin Merivon	4-6.7 fl oz	12 h	0 d	7, 11	NR	
	pyraclostrobin + boscalid Pristine	10.5-14.5 oz	12 h	0 d	11,7	NR	
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.
Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Black cherry aphid	imidacloprid Admire Pro 4.6L	1.4-2.8 fl oz	12 h	7 d	4A	NR	
	acetamiprid Assail 70WP	2.3 oz	12 h	7 d	4A	NR	

Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Leafrollers (Pandemis, Obliquebanded)	chlorantraniliprole Altacor 35WDG	3-4.5 oz	4 h	10 d	28	4	
	spinetoram Delegate 25WG	4.5-7 oz	4 h	7 d	5	4	
	Bacillus thuringiensis subsp. kurstaki DiPel DF	See Label	4 h	0 d	11B2	3	Two or three applications are usually required. Apply when forecasts predict a warm weather pattern for 3 or more days. Organic
	spinosad Entrust SC	4-8 fl oz	4 h	7 d	5	NR	Organic
	pyriproxyfen Esteem 35WP	4-5 oz	12 h	14 d	7C	4	Time pyriproxyfen to coincide with the presence of the last larval stage but before pupae are present.
	methoxyfenozide Intrepid 2F	8-16 fl oz	4 h	7 d	18A	3	
	spinosad Success 2F	4-8 fl oz	4 h	see note	5	3-4	Some leafroller populations have developed resistance to spinosad products and repeated use of these products during the growing season could result in reduced levels of control.
White apple leafhopper	carbaryl Sevin 4F	1-2 pt	12 h	3 d	1A	4	

Efficacy numbers denote the relative efficacy of a pesticide against a given pest on a 1 to 4 scale with 1 being low and 4 high efficacy. This information is based primarily on research conducted with WSU researchers in Washington.

Late spring and summer

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Brown rot	captan Captan 50WP	4 lb	24 h	0 d	M4	NR	
	penthiopyrad Fontelis	14-20 fl oz	12 h	0 d	7	NR	
	sulfur, dry flowable sulfur, dry flowable	See Label	24 h	none listed	M2	NR	See label—Potential Fruit and Leaf Injury
	fluopyram + trifloxystrobin Luna Sensation	5-5.6 fl oz	12 h	1 d	7, 11	NR	

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	pyraclostrobin + boscalid Pristine	10.5-14.5 oz	12 h	0 d	11,7	NR	
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.
	metconazole Quash 50WDG	2.5-3.5 oz	12 h	14 d	3	NR	
	tebuconazole + sulfur Unicorn DF	2-3 lb	5 d	0 d	3, M2	NR	
Cherry Powdery Mildew	azoxystrobin Abound 2.08F	11-15 fl oz	4 h	0 d	11	NR	Abound is extremely phytotoxic to certain apple varieties. See Application Directions, Resistance Management, and Attention information on label.
	pyraclostrobin Cabrio 20EG	9.5 oz	12 h	0 d	11	NR	Resistance to Group 11 (QoI) fungicides has been documented in the cherry powdery mildew pathosystem.
	penthiopyrad Fontelis	14-20 fl oz	12 h	0 d	7	NR	
	flutianil Gatten Fungicide	See Label	12 h	3 d	U13	NR	Maximum Application Rate: 8.0 fl oz product/A (0.0264 lb ai/A). DO NOT apply more than 4 applications per year. DO NOT exceed a maximum of 0.16 lb ai per acre per year. DO NOT apply within 3 days of harvest.
	difenoconazole Inspire	See Label	12 h	0 d	3	NR	
	potassium bicarbonate Kaligreen	See Label	4 h	1 d	NC	NR	Organic
	sulfur, dry flowable sulfur, dry flowable	See Label	24 h	none listed	M2	NR	See label—Potential Fruit and Leaf Injury
	fluopyram + trifloxystrobin Luna Sensation	5-5.6 fl oz	12 h	1 d	7, 11	NR	
	fluxapyroxad + pyraclostrobin Merivon	4-6.7 fl oz	12 h	0 d	7, 11	NR	
	polyoxin D zinc salt OSO 5%SC	13 fl oz	4 h	0 d	19	NR	Apply every 7–10 days.
	polyoxin D zinc salt Ph-D	6.2 oz	4 h	0 d	19	NR	Apply every 7–10 days.
	pyraclostrobin + boscalid Pristine	10.5-14.5 oz	12 h	0 d	11,7	NR	

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	triflumizole Procure 480SC	16 fl oz	12 h	1 d	3	NR	
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.
	metconazole Quash 50WDG	3.5-4 oz	12 h	14 d	3	NR	
	quinoxyfen Quintec 2.08L	7 fl oz	12 h	7 d	13	NR	
	myclobutanil Rally 40WSP	5 oz	24 h	0 d	3	NR	Place into solution before adding oil.
	cyflufenamid Torino	4-8 fl oz	4 h	6 d	U6	4	Do not make more than two (2) applications per year. Do not apply more than once every seven (7) days. Do not exceed a total of 0.106 lbs. active ingredient (16.0 oz. of product) per acre per calendar year. Do not apply within six (6) days of harvest; (PHI = 6 days)
	petroleum oil, summer petroleum oil, summer	1-2 % v/v	4 h	0 d		Good	Do not apply to oil-sensitive varieties. Do not spray wet foliage. Do not spray when freezing temperatures are anticipated within 48 hours of an oil application, above 90°F (32°C) or when plants are under heat or moisture stress. Do not apply between pit hardening and harvest. Organic
	tebuconazole + sulfur Unicorn DF	2-3 lb	5 d	0 d	3, M2	NR	
	metrafenone Vivando	15.4 fl oz	12 h	7 d	U8	NR	Max 2 applications per year (30.8 fl oz.). Do not apply with petroleum oils. Do not exceed 2 sequential applications.
Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Cherry rust mite	fenbutatin oxide Vendex 50WP	1-2 lb	48 h	14 d	12B	NR	
Leafrollers (Pandemis, Obliquebanded)	chlorantraniliprole Altacor 35WDG	3-4.5 oz	4 h	10 d	28	4	
	flubendiamide Belt 4SC	4 fl oz	12 h	7 d	28	4	
	spinetoram Delegate 25WG	4.5-7 oz	4 h	7 d	5	4	

Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	Bacillus thuringiensis subsp. kurstaki DiPel DF	See Label	4 h	0 d	11B2	3	Two or three applications are usually required to achieve acceptable control of high populations. Organic
	spinosad Entrust SC	4-8 fl oz	4 h	7 d	5	NR	There is a Washington 24(c) label for Entrust that allows a shorter preharvest interval, but has more restrictions on rates and timing. See label. Organic
	pyriproxyfen Esteem 35WP	4-5 oz	12 h	14 d	7C	4	Time pyriproxyfen to coincide with the presence of the last larvae stage but before pupae appear. Timing for leafrollers should also provide control of scale.
	methoxyfenozide Intrepid 2F	8-16 fl oz	4 h	7 d	18A	3	Some leafroller populations have developed resistance to Intrepid and its use could result in reduced levels of control.
	spinosad Success 2F	4-8 fl oz	4 h	see note	5	3-4	Some leafroller populations have developed resistance to spinosad products and repeated use of these products during the growing season could result in reduced levels of control.
Peachtree Borer	Peach Tree Borer pheromone Isomate-P	See Label	none listed	none listed		NR	
Pear slug	chlorantraniliprole Altacor 35WDG	4.5 oz	4 h	10 d	28	NR	
	spinetoram Delegate 25WG	4.6 oz	4 h	7 d	5	NR	
	spinosad Success 2F	4 fl oz	4 h	see note	5	NR	Some leafroller populations have developed resistance to spinosad products and repeated use of these products during the growing season could result in reduced levels of control.
	lambda-cyhalothrin Warrior II	1.5 fl oz	24 h	14 d	3	NR	Pyrethroids are broadly toxic to predatory mites, and repeated use of such products may cause mite flare-ups.
San Jose scale & Lecanium scale	pyriproxyfen Esteem 35WP	4-5 oz	12 h	14 d	7C	NR	Time pyriproxyfen to coincide with the presence of the last larvae stage but before pupae appear. Timing for leafrollers should also provide control of scale.
Shothole borer	esfenvalerate esfenvalerate	14.5 fl oz	12 h	14 d	3A	4	
Spider mites	bifenazate Acramite 50WS	1 lb	12 h	3 d	un	4	
	spirodiclofen Envidor 2SC	18 fl oz	12 h	7 d	23	3-4	
	hexythiazox Onager 1EC	12-24 fl oz	12 h	7 d	10A	NR	

Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	fenbutatin oxide Vendex 50WP	1-2 lb	48 h	14 d	12B	NR	Apply sprays in early May.
	etoxazole Zeal Miticide1 72WSP	3 oz	12 h	7 d	10B	3-4	
Spotted-wing drosophila	spinetoram Delegate 25WG	7 oz	4 h	7 d	5	NR	
	spinosad Entrust SC	8 fl oz	4 h	7 d	5	NR	There is a Washington 24(c) label for Entrust that allows a shorter preharvest interval, but has more restrictions on rates and timing. See label. Organic
	malathion Malathion ULV	16 fl oz	12 h	1 d	1B	NR	Apply malathion ULV by air only (ULV is NOT mixed with any water) (see text--Aerial Application). Malathion Aquamul 8 applied by ground may cause leaf injury. Activity against spotted-wing drosophila is only a few days.
	spinosad Success 2F	8 fl oz	4 h	see note	5	NR	Some leafroller populations have developed resistance to spinosad products and repeated use of these products during the growing season could result in reduced levels of control.
	lambda-cyhalothrin Warrior II	2.56 fl oz	24 h	14 d	3	NR	Pyrethroids are broadly toxic to predatory mites, and repeated use of such products may cause mite flare-ups.
Western cherry fruit fly	imidacloprid Admire Pro 4.6L	1.4-2.1 fl oz	12 h	7 d	4A	NR	
	acetamiprid Assail 70WP	2.3-3.4 fl oz	12 h	7 d	4A	NR	
	spinetoram Delegate 25WG	4-4.5 oz	4 h	7 d	5	NR	
	spinosad Entrust SC	4.8-6 fl oz	4 h	7 d	5	NR	There is a Washington 24(c) label for Entrust that allows a shorter preharvest interval but has more restrictions on rates and timing. See label. Organic
	spinosad GF-120 0.02% Bait	20 fl oz	4 h	0 d	5	NR	This is a spinosad formulation registered specifically for management of Tephritid fruit flies. This product has not proven sufficiently effective for the control of spotted wing drosophila. Monitor carefully for SWD if you use this bait. Apply to alternate rows with special auxiliary applicator; dilute with no more than 3 quarts of water per acre. Re-apply after rain. For application method, see label. Organic

Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	malathion Malathion ULV	16 fl oz	12 h	1 d	1B	NR	Apply malathion ULV by air only (ULV is NOT mixed with any water) (see text--Aerial Application). Malathion Aquamul 8 applied by ground may cause leaf injury. Activity against spotted-wing drosophila is only a few days.
	carbaryl Sevin XLR Plus	4 pt	12 h	3 d	1A	NR	WARNING: multiple applications of carbaryl may cause mite problems.
	spinosad Success 2F	4-6 fl oz	4 h	see note	5	NR	Some leafroller populations have developed resistance to spinosad products and repeated use of these products during the growing season could result in reduced levels of control.

Efficacy numbers denote the relative efficacy of a pesticide against a given pest on a 1 to 4 scale with 1 being low and 4 high efficacy. This information is based primarily on research conducted with WSU researchers in Washington.

Preharvest and harvest

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Brown rot	pyraclostrobin Cabrio 20EG	9.5 oz	12 h	0 d	11	NR	
	penthiopyrad Fontelis	14-20 fl oz	12 h	0 d	7	NR	
	sulfur, dry flowable sulfur, dry flowable	See Label	24 h	none listed	M2	NR	See label—Potential Fruit and Leaf Injury
	fluopyram + trifloxystrobin Luna Sensation	5-5.6 fl oz	12 h	1 d	7, 11	NR	
	pyraclostrobin + boscalid Pristine	10.5-14.5 oz	12 h	0 d	11,7	NR	
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.
	metconazole Quash 50WDG	2.5-3.5 oz	12 h	14 d	3	NR	
	tebuconazole + sulfur Unicorn DF	2-3 lb	5 d	0 d	3, M2	NR	
Cherry Powdery Mildew	azoxystrobin Abound 2.08F	11-15 fl oz	4 h	0 d	11	NR	Azoxystrobin is extremely toxic to certain apple varieties. See label for further information.

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
	pyraclostrobin Cabrio 20EG	9.5 oz	12 h	0 d	11	NR	Resistance to Group 11 (QoI) fungicides has been documented in the cherry powdery mildew pathosystem.
	penthiopyrad Fontelis	14-20 fl oz	12 h	0 d	7	NR	
	difenoconazole Inspire	See Label	12 h	0 d	3	NR	
	potassium bicarbonate Kaligreen	See Label	4 h	1 d	NC	NR	Organic
	sulfur, dry flowable sulfur, dry flowable	See Label	24 h	none listed	M2	NR	See label—Potential Fruit and Leaf Injury
	fluopyram + trifloxystrobin Luna Sensation	5-5.6 fl oz	12 h	1 d	7, 11	NR	
	fluxapyroxad + pyraclostrobin Merivon	4-6.7 fl oz	12 h	0 d	7, 11	NR	
	polyoxin D zinc salt OSO 5%SC	13 fl oz	4 h	0 d	19	NR	Apply every 7–10 days.
	polyoxin D zinc salt Ph-D	6.2 oz	4 h	0 d	19	NR	Apply every 7–10 days.
	pyraclostrobin + boscalid Pristine	10.5-14.5 oz	12 h	0 d	11,7	NR	
	triflumizole Procure 480SC	16 fl oz	12 h	1 d	3	NR	
	azoxystrobin + difenoconazole Quadris Top	12-14 fl oz	12 h	0 d	11, 3	NR	The azoxystrobin component of Quadris Top is extremely toxic to certain apple varieties. See label for further information.
	metconazole Quash 50WDG	3.5-4 oz	12 h	14 d	3	NR	
	quinoxifen Quintec 2.08L	7 fl oz	12 h	7 d	13	NR	
	myclobutanil Rally 40WSP	5 oz	24 h	0 d	3	NR	Place into solution before adding oil. See remarks in shuck fall section.
	tebuconazole + sulfur Unicorn DF	2-3 lb	5 d	0 d	3, M2	NR	
metrafenone Vivando	15.4 fl oz	12 h	7 d	U8	NR	Max 2 applications per year (30.8 fl oz.). Do not apply with petroleum oils. Do not exceed 2 sequential applications.	

Insect	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Spotted-wing drosophila	spinetoram Delegate 25WG	7 oz	4 h	7 d	5	NR	
	spinosad Entrust SC	8 fl oz	4 h	7 d	5	NR	There is a Washington 24(c) label for Entrust that allows a shorter preharvest interval but has more restrictions on rate and timing. See label. Organic
	malathion Malathion ULV	16 fl oz	12 h	1 d	1B	NR	Apply malathion by air only, ULV, not mixed with water. See text—Aerial Application. Activity against spotted-wing drosophila is only a few days.
	spinosad Success 2F	8 fl oz	4 h	see note	5	NR	
	lambda-cyhalothrin Warrior II	2.56 fl oz	24 h	14 d	3	NR	Pyrethroids are broadly toxic to predatory mites, and repeated use of such products may cause mite flare-ups.
Western cherry fruit fly	imidacloprid Admire Pro 4.6L	1.4-2.8 fl oz	12 h	7 d	4A	NR	
	spinetoram Delegate 25WG	4-4.5 oz	4 h	7 d	5	NR	
	spinosad Entrust SC	4-6 fl oz	4 h	7 d	5	NR	There is a Washington 24(c) label for Entrust that allows a shorter preharvest interval but has more restrictions on rate and timing. See label. Organic
	spinosad GF-120 0.02% Bait	20 fl oz	4 h	0 d	5	NR	This is a spinosad formulation registered specifically for management of Tephritid fruit flies. This product has not proven sufficiently effective for the control of spotted wing drosophila. Monitor carefully for SWD if you use this bait. Apply to alternate rows with special auxiliary applicator; dilute with no more than 3 quarts of water per acre. Re-apply after rain. Organic
	malathion Malathion ULV	16 fl oz	12 h	1 d	1B	NR	Apply malathion by air only, ULV, not mixed with water. See text—Aerial Application.
	carbaryl Sevin 4F	4 pt	12 h	3 d	1A	NR	Carbaryl may cause mite flare-ups, especially with multiple applications.
	spinosad Success 2F	4-6 fl oz	4 h	see note	5	NR	

Efficacy numbers denote the relative efficacy of a pesticide against a given pest on a 1 to 4 scale with 1 being low and 4 high efficacy. This information is based primarily on research conducted with WSU researchers in Washington.

Fall

Disease	Chemical	Rate per Acre	REI	PHI	MOA	Eff.	Notes
Bacterial canker or gummosis	fixed copper Basic Copper 53	See Label	24 h	0 d	M1	NR	
	copper hydroxide Kocide 3000	See Label	48 h	0 d	M1	NR	

Efficacy numbers denote the relative efficacy of a pesticide against a given pest on a 1 to 4 scale with 1 being low and 4 high efficacy. This information is based primarily on research conducted with WSU researchers in Washington.
