

# 18 Appendices

## 18.1 Pesticide Data

**Table 18.1.1 Common names, product names, formulations, and days-to-harvest for pesticides used on tree fruits.**

Common Names/ Products Formulations	DAYS TO HARVEST (A)					
	<i>Apples</i>	<i>Apricots</i>	<i>Cherries</i>	<i>Peaches</i>	<i>Pears</i>	<i>Plums</i>
<b><i>Insecticides and Acaricides</i></b>						
<i>*abamectin</i>						
<i>*Agri-Mek, *Temprano 0.15EC</i>	28	—	—	—	28	21
<i>*Abba 0.15EC</i>	28	—	—	—	28	21
<i>acequinocyl</i>						
<i>Kanemite 15SC</i>	14	—	—	—	14	—
<i>acetamiprid</i>						
<i>Assail 30SG</i>	7	7	7	7	7	7
<i>§azadirachtin</i>						
<i>Neemix 4.5L, Aza-Direct 1.2L, Azatin XL 0.27EC</i>	0	0	0	0	0	0
<i>*azinphos-methyl</i>						
<i>*Guthion 50WS</i>	14(A)	—	15	—	14	—
<i>bifentate</i>						
<i>Acramite 50WS</i>	7	—	—	3	7	3
<i>*bifenthrin</i>						
<i>*Bifenture 2EC, *Brigade 10WS, 2 EC</i>	—	—	—	—	14	—
<i>*Fanfare 2EC</i>	—	—	—	—	14	—
<i>§Bt (Bacillus thuringiensis)</i>						
<i>Deliver 18WG</i>	0	0	0	0	0	0
<i>Dipel 10.3 DF</i>	0	0	0	0	0	0
<i>Biobit 2.IFC</i>	0	0	0	0	0	0
<i>Javelin 7.5WDG</i>	0	0	0	0	0	0
<i>Agree 3.8 WS</i>	0	—	—	0	0	0
<i>carbaryl</i>						
<i>Sevin 4F, 4EC, 80S</i>	3	3	3	3	3	3
<i>chlorantraniliprole</i>						
<i>Altacor 35WDG</i>	14	10	10	10	14	10
<i>§granulosis virus</i>						
<i>Carpovirusine 0.99SC</i>	0	—	—	—	0	—
<i>Cyd-X 0.06SC</i>	0	—	—	—	0	0
<i>chlorpyrifos</i>						
<i>Lorsban 50WS</i>	PB/28(A)	—	14(C)	—	—	—
<i>*Lorsban 4EC</i>	PB/28(A)	—	21	14	PB	PB
<i>Lorsban 75WG</i>	PF/28(A)	—	14 or 21(C)	PB	PB	PB
<i>clofentezine</i>						
<i>Apollo 4SC</i>	45	21	21	21	21	—
<i>*cyfluthrin</i>						
<i>*Baythroid XL 1E, 2EC, *Leverage 2.7SE</i>	7	7	7	7	7	7
<i>*diazinon</i>						
<i>*Diazinon 50WP, AG600</i>	21/PF(A)	21	21	21	21	21
<i>dimethoate</i>						
<i>Dimethoate 400, 4EC</i>	—	—	—	—	28	—

**Table 18.1.1 Common names, product names, formulations, and days-to-harvest for pesticides used on tree fruits.**

Common Names/ Products Formulations	DAYS TO HARVEST (A)					
	Apples	Apricots	Cherries	Peaches	Pears	Plums
<b>Insecticides and Acaricides (continued)</b>						
*emamectin benzoate *Proclaim 5SG	14	—	—	—	14	—
*endosulfan *Thionex 50WP	21	21/30	21	21/30	7	7
*Thionex 3EC	21	21/30	21	21/30	7	7
*esfenvalerate *Asana XL 0.66EC	21	14	14	14	28	14
etoxazole Zeal 72WS	14	NB	7	NB	14	NB
*fenbutatin-oxide, hexakis *Vendex 50WP	14	—	14	14	14	14
*fenpropathrin *Danito1 2.4EC	14	—	—	—	14	—
fenpyroximate Portal 0.4EC	14	—	—	—	14	—
flonicamid Beleaf 50SG	21	14	14	14	21	14
formetanate hydrochloride Carzol92SP	PF	—	—	PF	PF	—
*gamma-cyhalothrin *Proaxis 0.5CS	21	14	14	14	21	14
hexythiazox Savey 50DF, Onager 1EC	28	28	28	28	28	28
imidacloprid Provado 1.6F, *Leverage 2.7SE	7 7	0 7	7 7	0 7	7 7	7 7
indoxacarb Avaunt 30 WDG	14	14	14	14	28	14
§kaolin Surround 95WP	0	0	0	0	0	0
*lambda-cyhalothrin *Lambda-Cy 1CS, *Taiga-Z 1CS, *Warrior 1CS, *Warrior II 2.08CS	21	14	14	14	21	14
malathion Malathion 57EC, 5EC	—	7	3	7	—	—
*methidathion *Supracide 2EC, 25WP	PB	PB	PB	PB	PB	PB
*methomyl *Lannate 2.4L, 90SP	14	—	—	4	7	—
methoxyfenozide Intrepid 2F	14	—	—	—	14	—
*oxamyl *Vydate 2L	14	—	—	—	14	—
*permethrin *Ambush 25WP, *Perm-Up 3.2EC, *Pounce 3.2EC, 25WP	PF PF	— —	3 3	14 14	PB PB	— —

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Common Names/ Products Formulations	DAYS TO HARVEST (A)					
	<i>Apples</i>	<i>Apricots</i>	<i>Cherries</i>	<i>Peaches</i>	<i>Pears</i>	<i>Plums</i>
<b><i>Insecticides and Acaricides (continued)</i></b>						
phosmet						
Imidan 70WP, 70WS	7	14	7 (C)	14	7	7
§pyrethrin/rotenone						
PyGanic 1.4 EC	0	0	0	0	0	0
Pyrenone 6.0% EC	0	0	0	0	0	0
pyridaben						
Nexter 75WS	25	PH	PH	7	7	7
pyriproxyfen						
Esteem 35WP	45	14	14	14	45	14
rynaxypyr (see chlorantraniliprole)						
spinetoram						
Delegate 25WG	7	14	7	14	7	7
spinosad						
SpinTor 2SC, Entrust 80WP	7	14	7	14	7	7
spirotetramat						
Movento 240SC	7	7	7	7	7	7
thiacloprid						
Calypso 4F	30	—	—	—	30	—
thiamethoxam						
Actara 25WDG	35	—	—	—	35	—
<b><i>Fungicides and Bactericides</i></b>						
azoxystrobin						
Abound 2.08F	—	0	0	0	—	0
<i>Bacillus subtilis</i>						
Serenade ASO	0	0	0	0	0	0
captan						
Captan 50WP, 80WDG, Captec, 4L	0	0	0	0	—	0
chlorothalonil						
Bravo Weather Stik, Ultrex Echo 720, 90DF, Chloronil 720, Concorde, Equus, Applause DF, 720	—	SS	SS,PH	SS	—	SS
copper hydroxide						
Kocide 2000, 4.5LF, 101, DF Champ Formula-2, NuCop 50DF	HIG	BL	BL,PH (C)	21	BL	BL
copper oxychloride sulfate						
C-O-C-S WDG	GT	PF	PF,PH (C)	BL,PF	BL	BK,PF
copper sulfate						
Cuprofix Ultra Disperss 40DF, Basicop	2C	BL	BL, PH	SS	BL	BL
cyprodinil						
Vanguard WG	72	BL	BL(C)	BL	72	BL
DCNA						
Botran 75WP	—	10	10(D)	10	—	BL
difenoconazole						
Inspire Super MP	72	-	-	-	72	-

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Common Names/ Products Formulations	DAYS TO HARVEST (A)					
	Apples	Apricots	Cherries	Peaches	Pears	Plums
<b>Fungicides and Bactericides (continued)</b>						
dodine Syllit 65WP, FL	7	—	0, PH	15	—	—
fenarimol Rubigan EC	30	—	0	—	30	—
fenbuconazole Indar 2F	14	0	0, PH	0	—	—
fenhexamid Elevate 50WDG	—	0	0	0	0	0
ferbam Ferbam Granuflo	7	—	0	21	7	—
fosetyl-Al Aliette WDG	14	(B)	(B)	(B)	14	(B)
hydrogen dioxide OxiDate	0	0	0	0	0	0
iprodione Rovral 50WP, 4 Flowable, Iprodione 4L, AG	—	PF	PF	PF	—	PF
kresoxim-methyl Sovran 50WG	30	—	—	—	30	—
lime sulfur Allpro Lime Sulfur, Miller Lime Sulfur Solution Sulforix Lime Sulfur	0	—	0	0	0	0
mancozeb Manzate 75DF, Flowable Penncozeb 75DF, 80WP	BL,77(A)	—	—	—	BL,77(A)	—
mancozeb + copper hydroxide ManKocide	BL	—	—	—	BL	—
maneb Manex	77	—	—	—	—	—
mefanoxam Ridomil Gold 4EC	GT, PH	GT	GT	GT	—	GT
metiram Polyram 80WP	BL,77(A)	—	—	—	—	—
myclobutanil Rally 40WSP	14	0	0	0	—	0
oxytetracycline Mycoshield 17WP, Flameout 17WP	60	—	—	21	60	—
<i>Pantoea agglomerans</i> strain E325 Bloomtime Biological FD	PF	—	—	—	PF	—
phosphite products Agri-fos Fungi-Phite Phostrol Topaz	0	0	0	0	0	0
prohexadione calcium Apogee 27.5DF	45	—	—	—	—	—

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	<i>Apples</i>	<i>Apricots</i>	<i>Cherries</i>	<i>Peaches</i>	<i>Pears</i>	<i>Plums</i>
<b>Fungicides and Bactericides(continued)</b>						
propiconazole Orbit 41.8EC	—	0	0	0	—	0
pyraclostrobin + boscolid Pristine 38WDG	0	0	0	0	0	0
pyrimethanil Scala	72	2	—	2	72	2
streptomycin Agri-mycin 17WP Firewall 17WP Streptrol 17WP Agricultural streptomycin 17WP	50	—	—	—	30	—
sulfur Kumulus DF Microthiol Disperss Wettable sulfur Thiolux Jet	PH	—	0	0	PH	0
tebuconazole Elite 45WSP Tebuzol 45DF	— 75	— 0	0 0	0 0	— 75	— 0
tebuconazole + trifloxystrobin Adament 50WG	75	1	1	1	75	1
thiophanate-methyl Topsin M WSB, 70WDG, 70WP Topsin 4.5L T-methyl 70W WSB	(A) (A) 1	1 1 1	1 1 1	1 1 1	1 — 1	1 1 1
thiram Thiram Granuflo	—	—	—	7	—	—
triadimefon Triadimefon 50DF Bayleton	45	—	—	—	45	—
trifloxystrobin Flint, Gem 500 SC	14 —	— 1	— 1	— 1	14 —	— 1
triflumizole *Procure 50WS	14	—	1	—	14	—
Ziram Ziram 76DF	14	30	14	14	14	—

**Key:**

- BL** Do not apply beyond bloom.  
**GT** Do not apply beyond green tip.  
**HIG** Do not apply beyond 1/2-in green.  
**PB** Prebloom applications only.  
**PF** Do not apply beyond petal fall.  
**PH** Postharvest applications allowed.  
**SS** Do not apply beyond shuck split.  
**2C** Do not apply after 2d cover spray.  
**(A)** If more than one value is given, depends on rate, method and/or number of applications; check label.  
**(B)** Nonbearing trees only.  
**(C)** Tart cherries only.  
**(D)** Sweet cherries only

— Not registered for use on crop.

\* Restricted-use pesticide; may be purchased and used only by certified applicators, or used by someone under the supervision of a certified applicator.

**Table 18.1.2. HERBICIDES - Common names, product names, formulations, pre-harvest intervals, restricted entry intervals, and personal protective equipment (PPE) for herbicides available for tree fruit crops.**

<b>Common Name (group)</b>		<b>EPA Reg. Number</b>		<b>Pre-Harvest Interval (days)</b>	<b>REI (hrs)</b>	<b>Applicator PPE</b>	<b>Early Entry PPE</b>
<b>Product Name</b>	<b>Formulation</b>		<b>Crops</b>				
<b>2,4-D (4)</b>							
2,4-D Amine 4	3.8 lb AI/gal	1381-103	Pome/Stone fruits	14/40	48	bdghij	bdghj
Amine 4	3.8 lb AI/gal	34704-120	Pome/Stone fruits	14/40	48	abch	bchk
Formula 40	3.67 lb AI/gal	228-357	Stone fruits	40	48	abchi	bchk
Unison	1.74 lb AI/gal	5905-542	Pome/Stone fruits	14/40	48	acfhi	cfhk
Weedar 64	3.8 lb AI/gal	71368-1	Pome/Stone fruits	14/40	48	dfghij	dfghj
<b>bromacil (5)</b>							
*Hyvar X	80WP	352-287	Non-crop sites only	NA	until dry	acfo	cfk
*Hyvar X-L	2 lb AI/gal	352-346	Non-crop sites only	NA	until dry	acf	NA
<b>carfentrazone-ethyl (14)</b>							
Aim EC	2 lb AI/gal	279-3241	Pome/Stone fruits	3	12	abc	bck
Aim EW	1.9 lb AI/gal	279-3242	Pome/Stone fruits	3	12	abc	bck
<b>clethodim (?)</b>							
Select	2EC	59639-3	All	365	24	acfh	cdefh
<b>clopyralid (?)</b>							
Stinger	3 lb AI/gal	62719-73	Stone fruits	30	12	acfh	cfhk
<b>dichlobenil (?)</b>							
Casoron 4G	4G	400-168	Apple, pear, cherry	Follow label	12	Acf	cfk
<b>diuron (7)</b>							
Direx 4L	4 lb AI/gal	1812-257	Pome fruits/Peach	Follow label/20	12	afcl	cfk
Direx 80DF	80DF	1812-362	Pome fruits/Peach	Follow label/90	12	acf	cfk
Diuron 4L (Drexel)	4lb AI/gal	19713-36	Pome fruits/Peach	Follow label/90	12	acf	cfk
Diuron 4L (Agrisolutions)	4lb AI/gal	9779-329	Pome fruits/Peach	Follow label/90	12	acfh	cfhk
Diuron 4L (MANA)	4lb AI/gal	66222-54	Pome fruits/Peach	Follow label/90	12	acfl	cfk
Diuron 80DF (MANA)	80DF	66222-51	Pome fruits/Peach	Follow label/90	12	acfl	cfk
Diuron 80DF (Agrisolutions)	80DF	9779-318	Pome fruits/Peach	Follow label/90	12	ac	bck
Diuron 80WDG	80WDG	34704-648	Pome fruits/Peach	Follow label/90	12	acf	cfk
Karmex DF	80DF	352-692	Pome fruits/Peach	Follow label/20	12	abf	cfk
Karmex XP	80% AI	352-692	Pome fruits/Peach	Follow label/90	12	acfil	cfk
<b>fluazifop-p-butyl (1)</b>							
Fusilade DX	2lb AI/gal	100-1070	Pome/Stone fruits	365/14	12	acfhi	cfk
<b>flumioxazin (14)</b>							
Chateau WDG	51WDG	59639-119	All crops	60	12	acf	cfk
<b>glufosinate-ammonium</b>							
Rely 200	1.67 lb AI/gal	264-660	Apple	14	12	acfh	cfhk
<b>glyphosate (9)</b>							
Cornerstone	4 lb AI/gal	524-445-1381	Pome/Stone fruits	1/17	12	ac	bck
Credit (etc.)	4 lb AI/gal	71368-20	All	1/17	4	ac	defc
Gly-4 Plus	4lb AI/gal	42750-61-72693	Pome/Stone fruits	1/17	4	ach	bchk
Roundup Original	4 lb AI/gal	524-445	Pome/Stone fruits	1/17	12	ach	cfhk
Roundup Original Max	5.5 lb AI/gal	524-539	Pome/Stone fruits	1/17	4	acf	cfk
Roundup Ultradry	64.9% AI	524-504	Pome/Stone fruits	1/17	4	ac	cfk
Roundup Weathermax	5.5 lb AI/gal	524-537	Pome/Stone fruits	1/17	4	acf	cfk

**Table 18.1.2. HERBICIDES - Common names, product names, formulations, pre-harvest intervals, restricted entry intervals, and personal protective equipment (PPE) for herbicides available for tree fruit crops.**

<b>Common Name (group)</b>	<b>Product Name</b>	<b>Formulation</b>	<b>EPA Reg. Number</b>	<b>Crops</b>	<b>Pre-Harvest Interval (days)</b>	<b>REI (hrs)</b>	<b>Applicator PPE</b>	<b>Early Entry PPE</b>
<b>glyphosate (9) (continued)</b>								
	Touchdown HiTech	5 lb AI/gal	100-1182	Pome/Stone fruits	1/17	12	ac	cfk
	Touchdown IQ	3 lb AI/gal	100-1117	Pome/Stone fruits	1/17	12	ac	cfk
	Touchdown Total	4.17 lb AI/gal	100-1169	Pome/Stone fruits	1/17	12	acf	cfk
<b>glyphosate &amp; 2,4-D (9, 4)</b>								
	Recoil	1.6 & 1 lb AI/gal	71368-35	Pome/Stone fruits	14/40	12	dfghi	fgkh
<b>isoxaben (?)</b>								
	Gallery	75DF	62719-145	All	365	12	a, c	debc
<b>Lemongrass oil</b>								
	GreenMatch EX		NA	All crops	0	0	afh	NA
<b>napropamide (?)</b>								
	Devrinol 50DF	50DF	70506-36	All crops	35	12	acf	cfk
<b>norflurazon (?)</b>								
	Solicam DF	80DF	100-849	All crops	60	12	abc	bck
<b>oryzalin (3)</b>								
	Oryzalin 4 A.S.	4 lb AI/gal	72167-17-73220	All crops	-	24	acfi	cfk
	Surflan Dry Flowable	85% AI	70506-46	All crops	-	24	acf	cfk
	Surflan A.S. (UPI)	4 lb AI/gal	70506-43	All crops	-	24	acfi	cfk
<b>oxyfluorfen (14)</b>								
	Galigan 2E	2 lb AI/gal	66222-28	All crops	Follow label	24	dfghij	dfghj
	Goal 2XL	2 lb AI/gal	62719-424	All crops	Follow label	24	efghij	efghj
<b>*paraquat (22)</b>								
	*Gramoxone INTEON	2 lb AI/gal	100-1217	All	Follow label	12	acfhino	cfhk
	*Gramoxone MAX	3 lb AI/gal	100-1074	Pome fruits	Follow label	12	acfhino	cfhk
	*Gramoxone MAX	3 lb AI/gal	100-1074	Cherry, plum, apricot	28	12	acfhino	cfhk
	*Gramoxone MAX	3 lb AI/gal	100-1074	Peach	14	12	acfhino	cfhk
<b>pendimethalin (3)</b>								
	Prowl 3.3 EC	3.3 lb AI/gal	241-337	All crops	NB, 365	24	acf	cfk
	Prowl H <sub>2</sub> O	3.8 lb AI/gal	241-418	All crops	60	24	acf	cfk
<b>rimsulfuron (2)</b>								
	Matrix FNV	25% DF	352-671	All	7 pome/14 stone	4	fch	kfch
	Pruvin (MANA)	25% DF	66222-184	All	7 pome/14 stone	4	fch	kfch
<b>*pronamide (?)</b>								
	*Kerb 50W	50WP	62719-397	Pome/Stone fruits	Follow label	24	bdgij	bdgj
<b>saflufenacil</b>								
	Treevix TM		7969-276	Pome fruits	365	12	fch	kfch
<b>sethoxydim (?)</b>								
	Poast	1.5EC	7969-58	Pome fruits	14	12	dfghij	dfghj
	Poast	1.5EC	7969-58	Cherry, peach, apricot	25	12	dfghij	dfghj
	Poast	1.5EC	7969-58	Plum	365	12	dfghij	dfghj

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<b>Common Name (group)</b>		<b>EPA Reg. Number</b>	<b>Crops</b>	<b>Pre-Harvest Interval (days)</b>	<b>REI (hrs)</b>	<b>Applicator PPE</b>	<b>Early Entry PPE</b>
<b>simazine (5)</b>							
Princep Caliber 90	90WDG	100-603	Pome, peach/ cherry, plum	-	12	acf	cfk
Princep 4L	4 lb AI/gal	100-526	Pome, peach/ cherry, plum	-	12	acf	cfk
Simazine 4L (Drexel)	4 lb AI/gal	19713-60	Pome, cherry, peach, plum	-	12	acf	cfk
Simazine 90DF (Drexel)	90WDG	19713-252	Pome, cherry, peach, plum	-	12	acf	cfk
Sim-Trol 90DF	90DF	35915-12- 60063	Pome, cherry, peach, plum	-	12	abc	bck
Sim-Trol 4L	4 lb AI/gal	35915-11- 60063	Pome, cherry, peach, plum	-	12	acf	cfk
<b>terbacil (?)</b>							
Sinbar	80 WP	352-317	Apple, peach	60	12	acf	cfk
Sinbar	80 WP	352-317	Nonbearing fruit trees	NB, 365	12	acf	cfk

**Key:**

\* Restricted-use pesticide; may be purchased and used only by certified applicators, or used by someone under the supervision of a certified applicator.

- Pre-Harvest Interval information not listed on label except if tank mixed with other materials.

Pome fruits = apple, pear

Stone fruits = cherry, peach, apricot, plum

NB = Nonbearing

REI = Restricted entry interval

**PPE = Personal protective equipment**

a Long-sleeved shirt & long pants

b Waterproof gloves

c Shoes plus socks

d Coveralls over short-sleeved shirt & short pants

e Coveralls over long-sleeved shirt & long pants

f Chemical-resistant gloves; refer to label for specifics

g Chemical-resistant footwear & socks

h Protective eyewear

i Chemical-resistant apron when cleaning equipment, mixing or loading

j Chemical-resistant headgear for overhead exposure

k Coveralls

l Dust/mist filtering respirator (MSHA/NIOSH approval no. prefix TX-21C)

m Respirator with either an organic vapor-removing cartridge with a pre-filter approved for pesticides (MSHA/NIOSH approval no. prefix TC-3) or a canister for pesticides (MSHA/NIOSH approval no. prefix TC-14G)

n Face shield for mixing and loading

o Dust/mist filtering respirator (NIOSH approved) with any N, R, P or HE filter



**Table 18.1.3. Common names, product names, formulations, and days-to-harvest for growth regulators.**

<b>Common Name/ Product Name</b>	<b>Formulation</b>	<b>EPA Reg. No.</b>	<b>Crop</b>	<b>Preharvest Interval</b>
Amid-Thin W naphthalene-acetamide	8.4 WP	5481-426	Apple, pear	—
Apogee prohexadione calcium	27.5% DF	7969-188	Apple	45 days
Ethrel ethephon	2 lb/gal	264-267	Apple, cherries	7 days
Exilis Plus cytokinin	2.0% liquid	62097-9	Apple	86 days
Fruitone N naphthalene-acetic acid	3.1%	5481-427	Apple, pear	2 days
Maxcel cytokinin	1.9%	73049-407	Apple	86 days
Novagib gibberellin	1.0% liquid	62097-7	Apple	—
Perlan cytokinin+gibberellin	1.8% + 1.8% liquid	62097-6	Apple	—
Pro-Gibb gibberellic acid	4% liquid	73049-15	cherries	0 days
Pro-Gibb Plus 2X gibberellic acid	20% SP	73049-16	Sweet cherry	0 days
Pro-Vide gibberellin	2% liquid	73049-3	Apple	—
Pro-Vide gibberellin	10% SG	73049-409	Apple	—
Promalin cytokinin+gibberellin	1.8% + 1.8% liquid	73049-41	Apple, pear, sweet cherry	—
Retain AVG	15% SP	73049-45	Apple, pear	7 days
RiteSize cytokinin+gibberellin	1.8% + 0.18% liquid	55146-86	Apple	—
RiteWay cytokinin	1.9% liquid	71368-60	Apple	86 days
Tre-Hold RTU naphthalene-acetic acid	1.15%	5481-452	Apple, pear, nectarine	—
Typy cytokinin+gibberellin	1.8% + 1.8% liquid	55146-78	Apple	—

— Preharvest interval information not provided on label.

## 18.2 EPA numbers and worker protection standard re-entry and personal protective equipment (PPE) guidelines.

**Worker Notification:** Under most circumstances, worker employers must make sure that workers are notified about areas where pesticide applications are taking place or where restricted-entry intervals are in effect. Some pesticide labels require you to notify workers BOTH orally AND with signs posted at entrances to the treated area. Unless the pesticide labeling requires both types of notification, notify workers EITHER orally OR by the posting of warning signs at entrances to treated areas. You must inform workers which method of notification is being used. For details on notification requirements both for these products and those not represented below, refer to the product label and the Worker Protection Standard, 40 CFR part 170.

**Table 18.2.1 Insecticides and acaricides**

Product	EPA Reg. No.	Common Name	REI (hrs)	Applicator PPE	Early Entry PPE
*Abba 0.1EC	66222-139	abamectin	12	dfghij	dfghj
Acramite 50WS	400-503	bifenazate	12	ac	cfk
Actara	100-938	thiamethoxam	12	acf	cfk
§Agree WG	70051-47	Bt	4	abcp	bck
*Agri-Mek 0.15EC	100-898	abamectin	12	dfghij	dfghj
Altacor 35WDG	352-730	chlorantraniliprole, rynaxypyr	4	ac	ac
Apollo 4SC	66222-47	clofentezine	12	acf	cfk
*Asana XL 0.66EC	352-515	esfenvalerate	12	acfh	cfhk
Assail 30SG	8033-36-70506	acetamiprid	12	abcj	bck
Avaunt 30WDG	352-597	indoxacarb	12	abc	beg
§Aza-Direct 1.2L	71908-1-10163	azadirachtin	4	abc	bck
§Azatin XL 0.27EC	70051-27-59807	azadirachtin	4	acfh	cfhk
*Battalion 0.2EC	264-1007-66330	deltamethrin	12	dfghij	dfghj
*Baythroid XL 1EC	264-840	beta-cyfluthrin	12	acfh	cfhk
Beleaf 50SG	71512-10-279	flonicamid	12	abc	bck
Belt SC	264-1025	flubendiamide	12	acf	cfk
*Bifenture EC	70506-57	bifenthrin	12	acfh	cfk
§Biobit XL 2.1FC	73049-46	Bt	4	abc	bck
*Brigade 10WS	279-3108	bifenthrin	12	abc	bck
*Brigade 2EC	279-3313	bifenthrin	12	acf	cfk
Calypso 4F	264-806	thiacloprid	12	acf	cfk
§Carpovirusine 0.99SC	66330-55	granulosis virus	4	acfhlo	achf
Centaur WDG	71711-21	buprofezin	12	abc	beg
§Checkmate CM-F 14.3S	56336-37	pheromone	4	abcj	bcd
§Checkmate CM-OFM Duel	56336-49	pheromone	0	b	-
§Checkmate OFM-F 24.6S	56336-24	pheromone	0	abc	-
§Cyd-X 0.06SC	70051-44	granulosis virus	4	ac	bck
*Danitol 2.4EC	59639-35	fenpropathrin	24	acfh	cfhk
Delegate 25WG	62719-541	spinetoram	4	ac	cfk
§Deliver 18WG	70051-69	Bt	4	abc	bck
*Diazinon 50W	66222-10	diazinon	96	abc	bcjk
Dimethoate 4EC	5905-493	dimethoate	48	fghjk	fghjk
Dimethoate 400	34704-207	dimethoate	10 days	acfil	efgj
§Dipel DF	73049-39	Bt	4	abcp	bck
§Entrust 80WP	62719-282	spinosad	4	ac	bck
Envidor 2SC	264-831	spirodiclofen	12	abc	abc
Esteem 35WP	59639-115	pyriproxyfen	12	ac	bce
*Fanfare 2EC	66222-99	bifenthrin	12	acfh	cfk
§GF-120	62719-498	spinosad	4	ac	bck

**Table 18.2.1 Insecticides and acaricides**

<b>Product</b>	<b>EPA Reg. No.</b>	<b>Common Name</b>	<b>REI (hrs)</b>	<b>Applicator PPE</b>	<b>Early Entry PPE</b>
*Guthion 50WS	66222-162	azinphos-methyl	14-15 days(E)	efghijm	efghj
Imidan 70WP, 70WS	10163-169	phosmet	72	abcjl	bcjk
Intrepid 2F	62719-442	methoxyfenozide	4	abc	beg
§Isomate-C TT	53575-25	pheromone	0	b	—
§Isomate-CM/OFM TT	53575-30	pheromone	0	b	—
§Isomate LPTB	53575-23	pheromone	0	b	—
§Isomate-M 100	53575-19	pheromone	0	b	—
§Javelin 7.5WDG	70051-66	Bt	4	abcp	bck
Kanemite 15SC	66330-38	acequinocyl	12	acf	cfk
Kelthane 50WSP	62719-414	dicofol	48	bcehijl	bchk
§Kumulus 80DF	51036-352	sulfur	24	abfh	bchk
*Lambda-Cy 1EC	70506-121	lambda-cyhalothrin	24	acfh	acf
*Lannate 90SP	352-342	methomyl	48-96(E)	acfhilq	cfhk
*Lannate LV 2.4L	352-384	methomyl	48-96(E)	acfhilq	cfhk
*Leverage 2.7SE	264-770	imidacloprid/cyfluthrin	12	dfghi	fgkh
*Lorsban 4EC	62719-220	chlorpyrifos	96	dfgijlq	dfgj
Lorsban 50WS	62719-221	chlorpyrifos	96	dfgijlq	dfgj
Lorsban 75WG	62719-301	chlorpyrifos	96	dfgijlq	dfgj
Malathion 57EC	34704-108	malathion	12	acfh	cfhk
Malathion 5EC	19713-217	malathion	12	acf	cfk
Movento 240SC	264-1050	spirotetramat	24	acfh	acfh
§M-Pede 49L	53219-6	insecticidal soap	12	ac	bck
Nexter 75WS	7969-106	pyridaben	12	abchjl	bchjkl
Onager 1EC	10163-277	hexythiazox	12	abc	abc
Portal 0.4EC	71711-19	fenpyroximate	12	acfhj	dfghij
*Pounce 25 WP	279-3051	permethrin	12	abc	bck
*Proaxis 0.5CS	74921-3-34704	gamma-cyhalothrin	24	acfh	cfk
*Proclaim 5SG	100-904	emamectin benzoate	12 or 48 (E)	acef	cfhk
Provado 1.6F	264-763	imidacloprid	12	acf	cfk
§PyGanic 1.4EC	1021-1771	pyrethrins	12	acf	cfk
§Pyrenone	432-1033	Pyrethrins/PBO	12	acf	cfk
Rimon 0.83EC	66222-35-400	novaluron	12	acfh	cefh
Savey 50DF	10163-250	hexythiazox	12	abc	abc
Sevin 80S	264-316	carbaryl	12	abcj	bcjk
Sevin XLR Plus	264-333	carbaryl	12	acfj	cfjk
Sevin 4F	264-349	carbaryl.	12	acfj	cfjk
Sherpa	34704-983	imidacloprid	12	acf	cfk
SpinTor 2SC	62719-294	Spinosad	4	ac	cfk
*Supracide 2EC	10163-236	methidathion	72	acfhil	cfhk
*Supracide 25W	10163-244	methidathion	72	abclq	bck
§Surround WP	70060-14	kaolin	4	aclo	ac
*Taiga Z 1CS	100-1112-1381	lambda-cyhalothrin	24	acfh	cfk
*Temprano 0.15EC	67760-71-400	abamectin	12	acfh	dfgh
*Thionex 3EC	66222-63	endosulfan	48	efghijm	efghj

**Table 18.2.1 Insecticides and acaricides**

Product	EPA Reg. No.	Common Name	REI (hrs)	Applicator PPE	Early Entry PPE
*Thionex 50W	66222-62	endosulfan	4 days	bcdhijm	bcjk
§Trilogy	70051-2	neem extract	4	acf	cfk
*Vendex 50WP	1812-413	hexakis	48	dfghijq	cfhk
Voliam flexi	100-1319	thiamethoxam/ chlorantraniliprole	12	acf	cfk
*Vydate 2L	352-372	oxamyl	48	dfghijm	dfghj
*Warrior II 2.08CS	100-1295	lambda-cyhalothrin	24	acfh	cfk
Zeal 72WS	59639-138	etoxazole	12	acf	acf

**Table 18.2.2 Fungicides and bactericides**

Product	EPA Reg. No.	Common Name	REI (hrs)	Applicator PPE	Early Entry PPE
Abound 2.08F	100-1098	azoxystrobin	4	acf	cfk
Adament 50WG	264-1052	trifloxystrobin	24	acf	cfk
Ag Streptomycin	66222-121	streptomycin	12	acfo	efgo
Agri-mycin 17WP	55146-96	streptomycin	12	acf	efg
Agri-fos	71962-1	phosphite	4	abch	bcdh
Aliette WDG	264-516	fosetyl-Al	12	abch	bchk
Allpro Lime Sulfur	769-558	lime sulfur	48	efghijl	efghj
Apogee 27.5%	7969-188	prohexadione calcium	12	acf	cfk
Applause 720	50534-188	chlorothalonil	12	acfh	cfhk
Bac-Master	55146-80-5481	streptomycin	12	abcl	fchk
Bayleton 50DF	264-737-5481	triadimefon	12	acfj	cfk
Botran 75W	10163-189	dichloronitroaniline	12	ac	bck
Bravo Weather Stik	50534-188-100	chlorothalonil	12	acf	cfhk
Bravo Ultrex	50534-201-100	chlorothalonil	12	dfghijl	dfghj
Captan 50WP	66330-234	captan	24(E)	achilo	cfhk
Captan 80WDG	66222-58-66330	captan	24(E)	acfhio	cfhk
Captec 4L	66330-239	captan	24(E)	acfi	cfhk
§Champ Formula-2 4.6F	55146-64	copper hydroxide	24(E)	acfh	cfhk
Chloronil 720	50534-188-100	chlorothalonil	12	acf	cfhk
C-O-C-S WDG	34704-326	copper oxychloride & basic copper sulfate	24	acfh	cfhk
Concorde	72167-24-1812	chlorothalonil	12	acfh	cfhk
§Cuprofix Ultra 40 Disperss	70506-201	basic copper sulfate	12	ac	cfk
Dithane Rainshield DF	62719-402	mancozeb	24	acf	cfk
Dithane F-45 Rainshield	62719-396	mancozeb	24	cefhi	cef
Dithane M45	62719-387	mancozeb	24	cefhi	cef
Echo 720	60063-7	chlorothalonil	12(E)	acfhm	cfhk
Echo 90DF	60063-10	chlorothalonil	12(E)	acfhm	bchk
Elevate 50WDG	66330-35	fenhexamid	12	acf	cfk
Elite 45WP	264-749	tebuconazole	12	acfh	acfh
Equus 500ZN	72167-27-66222	chlorothalonil	12	acfh	cfhk
Ferbam Granuflo	45728-7	ferbam	24	acfhjl	cfhjk
Firewall 17WP	80990-4-82695	streptomycin	12	acfq	cfe
Flameout 17WP	80990-1-82695	oxytetracycline HCl	12	acfhq	cef
Flint	264-777	trifloxystrobin	12	acf	cfk

**Table 18.2.2 Fungicides and bactericides**

<b>Product</b>	<b>EPA Reg. No.</b>	<b>Common Name</b>	<b>REI (hrs)</b>	<b>Applicator PPE</b>	<b>Early Entry PPE</b>
Fungi-Phite	83472-1	phosphite	4	abch	bchk
GEM 500 SC	264-826	trifloxystrobin	12	acf	cfk
Indar 2F	62719-416	enbuconazole	12	acfj	cfk
Inspire Super MP	100-1262	difenoconazole	12	acfh	cfhk
Iprodione 4L AG	51036-340	iprodione	24	acefjl	cef
JMS Stylet Oil	65564-1	Paraffinic oil	4	acf	cfk
§Kocide 2000	1812-358	copper hydroxide	24(E)	acfh	cfhk
§Kocide 4.5LF	1812-303	copper hydroxide	24(E)	acfh	cfhk
§Kocide 101	1812-288	copper hydroxide	24(E)	acfh	cfhk
§Kocide DF	1812-334	copper hydroxide	24(E)	acfh	cfhk
§Kumulus DF	51036-352	sulfur	24	acfh	cfhk
*Manzate 75DF	1812-414-352	mancozeb	24	cefhi	cef
Manzate Flowable	1812-416	mancozeb	24	cefhi	bceh
ManKocide	1812-360	mancozeb + copper hydroxide	24	cefhi	cefh
Mertect 340-F	100-889	thiabendazole	12	ac	cfk
§Microthiol MZ Disperss	4581-373-82695	sulfur	24	abc	bchk
§Miller Lime Sulfur	66196-2-72	lime sulfur	48	efghijl	efghj
Mycoshield 17WP	55146-97	oxytetracycline HCl	12	acfh	cfhk
NuCop 50DF	45002-4	copper hydroxide	24	acfh	cfhk
Orbit 41.8EC	100-702	propiconazole	12	acfh	cfhk
OxiDate	70299-2	hydrogen dioxide	1	eg	bck
Penbotec 400SC	43813-32-64864	pyrimethanil	psthvst	acf	—
Penncozeb 75DF	4581-370-82695	mancozeb	24	cefhi	cef
Penncozeb 4FL	4581-358-82695	mancozeb	24	cefhi	cef
Phostrol	55146-83	phosphite	4	acfh	cfhk
Polyram 80DF	7969-105-34704	metiram	24	cefhi	cef
Pristine 38WDG	7969-199	pyraclostrobin/boscalid	12	acf	cfk
*Procure 50WS	400-431	triflumazole	12	acf	cfk
Quash	59639-147	metconazole	12	acf	cfk
Quintec	62719-375	quinoxifen	12	acf	cfk
Rally 40WSP	62719-410	myclobutanil	24	acfh	cfhk
Ridomil Gold EC	100-801	mefanoxam	48	acf	cfk
Rovral 50WP	264-453	iprodione	24	efgjil	cfk
Rovral 4 Flowable	264-482	iprodione	24	acf	cfk
Rubigan EC	10163-273	fenarimol	12	dfghij	dfghj
Scala	264-788	pyrimethanil	12	acf	ack
Scholar	100-969	fludioxonil	psthvst	acf	—
Scholar SC	100-1242	fludioxonil	psthvst	acf	—
Serenade ASO	69592-12	<i>Bacillus subtilis</i>	4	abco	abc
Sovran 50WDG	7969-154	kresoxim-methyl	12	acf	cfk
Streptrol	55146-80	streptomycin	4	acfl	cef
Sulforix Lime Sulfur	66196-3-72	lime sulfur	48	efghijl	efghj
Syllit FL	55260-6	dodine	48	acfhij	efghj
T-methyl 70W WSB	66330-301	thiophanate-methyl	48(E)	acf	efgj
Tebuzol 45DF	70506-113	tebuconazole	(E)	acfh	acfh
§Thiolux Jet	100-1138	sulfur	24	acfh	efg
Thiophanate Methyl 85WDG	72167-10-66222	thiophanate-methyl	12(E)	acf	cfk
Thiram Granuflo	45728-21	thiram	24	acfj	acfj

**Table 18.2.2 Fungicides and bactericides**

Product	EPA Reg. No.	Common Name	REI (hrs)	Applicator PPE	Early Entry PPE
Topaz	68573-2-1381	phosphite	4	acfh	cef
Topsin M 70WDG	73545-18-82695	thiophanate-methyl	12(E)	acf	cfk
Topsin M 70WP	73545-11-82695	thiophanate-methyl	12(E)	acf	cfk
Topsin M WSB	73545-16-70506	thiophanate-methyl	48	acf	efgj
Triadimefon 50DF	264-737-45728	triadimefon	12	acfjo	cfjk
§Trilogy	70051-2	neem extract	4	acf	cfk
Vanguard WG	100-828	cyprodinil	12	acf	cfk
Wettable sulfur	5905-289	sulfur	24	acf	cfk
Ziram 76DF	4581-140-82695	ziram	48	abchl	bchh

**Table 18.2.3 Growth Regulators**

Product	EPA Reg. No.	Common Name	REI (hrs)	Applicator PPE	Early Entry PPE
Amid-Thin W	5481-426	NAD	48	abc	bck
Apogee	7969-188	prohexadione Ca	12	afc	cfk
Ethrel	264-267	ethephon	48	acfh	efghj
Exilis Plus	62097-9-82917	BA	12	acfhi	abch
Fruitone N	5481-427	NAA	48	acf	bck
Maxcel	73049-407	BA	12	acf	cfk
Novagib	62097-7-82917	GA <sub>4+7</sub>	4	acfhij	abch
Perlan	62097-6-82917	GA <sub>4+7</sub> + BA	4	acfhi	abch
§Pro-Gibb 4%	73049-15	GA <sub>3</sub>	12	acfh	cfhk
§Pro-Gibb Plus 2X	73049-16	GA <sub>3</sub>	4	abc	bck
Pro-Vide PGR	73049-3	GA <sub>4+7</sub>	12	acfh	cfhk
Pro-Vide 10 SG	73049-409	GA <sub>4+7</sub>	12	acfh	cfhk
Promalin	73049-41	GA <sub>4+7</sub> + BA	4	abch	bck
ReTain	73049-45	AVG	12	abc	bck
RiteSize	55146-86	BA + GA <sub>4+7</sub>	12	ach	bchk
RiteWay	71368-60	BA	12	acfh	cfhk
Tre-Hold RTU	5481-452	NAA	12	acfh	cfhk
Typrus	55146-85	GA <sub>4+7</sub>	24	acfh	cdfh
Typy	55146-78	BA + GA <sub>4+7</sub>	24	dfghim	abch

**Key:**

a	Long-sleeved shirt & long pants	n	Face shield for mixing and loading
b	Waterproof gloves	o	Dust/mist filtering respirator (NIOSH approved) with any N, R, P or HE filter
c	Shoes plus socks	p	Dust/mist filtering respirator meeting NIOSH standards of at least N-95, R-95, and P-95
d	Coveralls over short-sleeved shirt & short pants	q	NIOSH approved respirator with any R, P, or HE filter
e	Coveralls over long-sleeved shirt & long pants	PPE	Personal protective equipment
f	Chemical-resistant gloves; refer to label for specifics	REI	Re-entry interval
g	Chemical-resistant footwear & socks	(E)	Refer to label for details of restricted entry interval
h	Protective eyewear	psthvst	Post-harvest use only
i	Chemical-resistant apron when cleaning equipment, mixing or loading	§	Potentially acceptable in certified organic programs
j	Chemical-resistant headgear for overhead exposure	*	Restricted-use pesticide; may be purchased and used only by certified applicators, or used by someone under the supervision of a certified applicator.
k	Coveralls		
l	Dust/mist filtering respirator (MSHA/NIOSH approval no. prefix TC-21C)		
m	Respirator with either an organic vapor-removing cartridge with a pre-filter approved for pesticides (MSHA/NIOSH approval no. prefix TC-3) or a canister for pesticides (MSHA/NIOSH approval no. prefix TC-14G)		

## 18.4 Spray Mixture Compatibility

### Notes

This information is offered only as a general guide, and does not apply to pesticidal efficacy of mixtures. Read the label for specific crops or situations. Compatibilities indicated may be changed by certain adjuvants, different formulations, combinations of more than 2 materials, and environmental factors such as temperature and humidity.

- When potential compatibility is indicated, mini-mum agitation should be provided in all cases.
- Designations apply to at least one formulation of specified products. In cases where compatibility differs among formulations, the most conservative designation has been given. Defer to respective labels in all cases.
- Unless otherwise noted on the label, use soon after mixing, preferably in systems with continuous agitation.
- Physical compatibility: Although there may be no chemical incompatibility between the active ingredients of 2 given pesticides, some formulations of these products may not be physically compatible. This is particularly true when mixing at high concentrations and when mixing wettable powders with emulsifiable concentrates. It is recommended that a small batch of a proposed mixture be prepared before making tank combinations, to check for unacceptable physical reactions.

### Directions

- Each product is assigned its own number, which appears to the left of the product name along the left-hand side of the chart.
- The product numbers (but not their names) are also listed along the top of the chart.
- To find the symbol representing our best information about compatibility of two products, find one product's number along the side and the other along the top, and trace the perpendicular lines to intersect in the table body.
- The compatibility values, which are highlighted in alternate rows and columns for ease in counting, are defined in the Key at the bottom. Also note the following footnotes:
  - §Bt products include Agree, Biobit, Deliver, Dipel, and Javelin, among others.
  - §Fixed copper products include C-O-C-S, Kocide, Champ, Cuprofix Disperss, and Tenn-Cop, among others.
- The “Mancozeb/+rams” category includes Dithane, Manzate, Penncozeb, as well as Thiram and Ziram.
- The “Pyrethroids” category refers primarily to Ambush and Pounce (permethrin).
- “Sterol Inhibitors” includes Rubigan, Nova, Indar, Orbit, Procure, and Elite.

### Suggested Mixing Sequence

Always mix different spray materials in the following order, starting with:

- water soluble bags (WS)<sup>7</sup>
- water dispersible granules and dry flowables (WDG, DF)
- wettable powders (WP)
- liquid flowables (L, F, FC)
- sprayable concentrates (S, SC, LC)
- emulsifiable concentrates (EC)
- surfactants, oils, and adjuvants Do not add oils, surfactants, or emulsifiable concentrates prior to dry formulations, or lumping may occur.

**Table 18.1.5. Spray Mixture Compatibility  
(Courtesy of The Pennsylvania State University)**

PRODUCT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1 Acramite	-	1	1	1	1	1	1	1	1	4	1	1	1	4	1	1	1	1	1	1	4	4	1
2 Actara	1	-	1	1	1	1	1	1	1	4	1	1	1	4	1	1	1	1	1	1	4	4	1
3 Apollo	1	1	-	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	4	4	1
4 *Asana	1	1	1	-	1	1	1	1	1	4	1	1	1	4	1	1	1	1	1	1	4	4	1
5 Assail	1	1	1	1	-	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	4	4	1
6 *AgriMek	1	1	1	1	1	-	1	1	1	4	1	1	1	4	1	1	1	1	1	1	4	4	1
7 Avaunt	1	1	1	1	1	1	-	1	1	4	1	1	1	4	1	1	1	1	1	1	4	4	1
8 *azinphosmethyl	1	1	1	1	1	1	1	-	1	4	1	1	1	4	1	1	1	1	1	1	1	1	1
9 §Bt	1	1	1	1	1	1	1	1	-	3	1	1	1	1	1	1	3	1	1	1	3	1	1
10 §Bordeaux mixture	4	4	4	4	4	4	4	4	3	-	3	1	3	1	1	4	3	3	3	4	2	1	4
11 captan	1	1	1	1	1	1	1	1	1	3	-	1	1	1	1	1	1	1	5	1	1	4	1
12 carbaryl	1	1	1	1	1	1	1	1	1	3	1	-	1	1	1	1	1	4	1	1	1	1	1
13 Carzol	1	1	1	1	1	1	1	1	1	3	1	1	-	1	1	1	1	4	1	1	1	4	1
14 chlorothalonil	4	4	1	4	1	4	4	4	1	1	1	1	1	-	1	1	1	1	4	4	5	4	1
15 chlorpyrifos	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1
16 *Danitol	1	1	1	1	1	1	1	1	1	4	1	1	1	4	1	-	1	1	1	1	4	4	1
17 *diazinon	1	1	1	1	1	1	1	1	3	3	1	1	1	4	1	1	-	1	1	1	1	2	1
18 dimethoate	1	1	1	1	1	1	1	1	1	3	1	1	4	1	1	1	1	-	1	1	2	4	1
19 *endosulfan	1	1	1	1	1	1	1	1	1	3	5	4	1	4	1	1	1	1	-	1	1	1	1
20 Esteem	1	1	1	1	1	1	1	1	1	4	1	1	1	4	1	1	1	1	1	-	4	4	1
21 ferbam	4	4	4	4	4	4	4	1	1	2	1	1	1	5	1	4	1	2	1	4	-	1	1
22 §fixed copper	4	4	4	4	4	4	4	1	1	1	4	1	4	4	1	4	2	4	1	4	1	-	4
23 Imidan	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	4	-
24 Intrepid	1	1	1	1	1	1	1	1	1	4	1	1	1	4	1	1	1	4	1	1	4	4	1
25 Kelthane	1	1	1	1	1	1	1	1	1	4	1	1	1	4	1	1	1	4	1	1	4	4	1
26 *Lannate	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	4	1	4	1	1
27 lime	4	4	4	4	4	4	4	3	1	1	3	3	3	1	1	4	4	3	3	4	2	1	3
28 malathion	1	1	4	1	4	1	1	1	1	3	5	1	4	1	1	1	1	1	1	1	1	1	1
29 mancozeb/+rams	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1
30 Nexter	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1
31 §oil	1	1	1	1	1	1	1	5	4	1	3	4	1	1	1	1	1	4	4	1	1	4	6
32 Provado	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1
33 *pyrethroids	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	4	4	1
34 Rovral	4	4	4	4	4	4	1	1	1	1	1	1	1	4	1	1	1	1	4	1	1	1	1
35 Savey	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	4	4	1
36 Spintor	1	1	1	1	1	1	1	1	1	4	1	1	1	4	1	1	1	1	1	1	4	4	1
37 sterol inhibitors	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
38 §sulfur	1	1	1	1	1	1	5	1	3	1	6	1	1	1	1	1	1	1	1	1	1	1	1
39 *Supracide	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4
40 §Surround	1	1	1	1	1	1	1	1	1	3	1	1	1	4	1	1	1	1	1	1	4	4	1
41 Syllit	1	1	1	1	1	1	1	5	1	3	1	1	1	4	4	1	1	1	5	1	1	4	1
42 Topsin	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	3	1
43 *Vendex	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	4	1	1	1	4	1
44 *Vydate	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
45 *Warrior	1	1	1	1	1	1	1	1	4	1	1	1	1	4	1	1	1	1	1	1	1	1	4

**KEY:**

- 1 = Potentially compatible, if used as directed
- 2 = Decomposes on standing, residual action reduced
- 3 = Not compatible or causes general injury
- 4 = CAUTION: Compatibility not clear, or questionable or not known
- 5 = Use wettable powder forms
- 6 = May cause injury; refer to comments in "Fruit Crop Protectants" or crop's "General Pest Management Considerations"



**Table 18.1.5. Spray Mixture Compatibility (continued)**  
(Courtesy of The Pennsylvania State University)

	PRODUCT	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
1	Acramite	1	1	1	4	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1
2	Actara	1	1	1	4	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1
3	Apollo	1	1	1	4	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1
4	*Asana	1	1	1	4	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1
5	Assail	1	1	1	4	4	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1
6	*AgriMek	1	1	1	4	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1
7	Avaunt	1	1	1	4	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1
8	*azinphosmethyl	1	1	1	3	1	1	1	5	1	1	1	1	1	1	5	1	1	5	1	1	1	1
9	§Bt	1	b	1	1	1	1	4	1	1	1	1	1	1	3	1	1	1	1	1	1	1	4
10	§Bordeaux mixture	4	1	3	1	3	1	1	1	3	3	1	4	4	1	1	1	3	3	3	3	1	1
11	captan	1	4	1	3	5	1	1	3	1	1	1	1	1	1	6	1	1	1	1	1	1	1
12	carbaryl	1	1	1	3	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	Carzol	1	1	1	3	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	chlorothalonil	4	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	4	4	1	1	1	4
15	chlorpyrifos	1	4	1	1	1	1	1	1	1	4	1	1	1	1	1	1	4	1	1	1	1	1
16	*Danitol	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	*diazinon	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18	dimethoate	4	4	1	3	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	4	1	1
19	*endosulfan	1	1	4	3	1	1	4	4	1	1	1	1	1	1	1	1	5	1	1	1	1	1
20	Esteem	1	1	1	4	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1
21	ferbam	4	1	4	2	1	1	1	1	4	1	4	4	1	1	1	4	1	1	1	1	1	4
22	§fixed copper	4	4	1	1	1	1	1	4	4	1	4	4	1	1	1	4	4	3	4	1	4	4
23	Imidan	1	1	1	3	1	1	1	6	1	1	1	1	1	1	4	1	1	1	1	1	1	1
24	Intrepid	-	1	1	4	1	1	1	4	1	1	1	1	1	4	1	1	1	1	1	1	1	1
25	Kelthane	1	-	1	2	4	1	1	4	1	1	4	1	1	1	4	4	1	1	1	1	1	1
26	*Lannate	1	1	-	3	4	4	1	4	1	4	1	1	1	1	4	1	1	4	1	1	1	1
27	lime	4	2	3	-	3	1	1	1	3	3	1	4	4	1	1	1	4	3	3	4	1	4
28	malathion	1	4	4	3	-	5	1	1	1	1	4	1	1	1	1	1	1	1	1	6	1	1
29	mancozeb/+rams	1	1	4	1	5	-	1	4	1	4	1	1	1	1	1	1	1	1	1	1	1	1
30	Nexter	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
31	§oil	4	4	4	1	1	4	1	-	4	1	1	4	1	1	3	1	1	1	1	1	1	1
32	Provado	1	1	1	3	1	1	1	4	-	1	1	1	1	1	1	1	1	1	1	1	1	1
33	*pyrethroids	1	1	4	3	1	4	1	1	1	-	1	1	1	1	4	1	1	4	1	1	4	1
34	Rovral	1	4	1	1	1	1	1	1	1	-	4	4	1	1	1	4	1	1	1	1	4	4
35	Savey	1	1	1	4	4	1	1	1	1	4	-	1	1	1	1	1	1	1	1	1	1	1
36	Spintor	1	1	1	4	1	1	1	4	1	1	4	1	-	1	4	1	1	1	1	1	1	1
37	sterol inhibitors	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	3	1	1	1	1	1
38	§sulfur	4	4	4	1	1	1	1	3	1	4	1	1	4	1	-	1	1	6	1	1	1	1
39	*Supracide	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	-	4	1	1	1	1	1
40	§Surround	1	1	1	4	1	1	1	1	1	1	4	1	1	3	1	4	-	1	1	1	1	1
41	Syllit	1	1	4	3	1	1	1	1	1	4	1	1	1	1	6	1	1	-	1	1	1	1
42	Topsin	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1
43	*Vendex	1	1	1	4	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	4	1
44	*Vydate	1	1	1	1	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	4	-	1
45	*Warrior	4	1	1	4	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	-

**KEY:**

1 = Potentially compatible, if used as directed

2 = Decomposes on standing, residual action reduced

3 = Not compatible or causes general injury

4 = CAUTION: Compatibility not clear, or questionable or not known

5 = Use wettable powder forms

6 = May cause injury; refer to comments in "Fruit Crop Protectants" or crop's "General Pest Management Considerations"

## 18.4. Tree Fruit Reference Materials.

Univ. Massachusetts Fact Sheets Online at: <http://www.umass.edu/fruitadvisor/factsheets/factsheets.html>

F-101R	Controlling Growth of Apple Trees
F-114R	Limb Positioning
F-116R	Maintaining a Balance Between the Top and Bottom of Apple Trees
F-118R	Thinning Apples Chemically
F-119R	Foliar Calcium Sprays for Apples
F-124	Nutrient Recommendations for Apples
F-126	Prebloom Nutrient Application for Apple Trees
F-127R	Apogee – A New Growth Retardant for Apples
F-128	Expansion of the Apple Harvest Season
F-129A	Late-season “Rescue” Thinning with Ethephon
F-130	Apple Tree Pruning and Training (English & Spanish)
F-131	Enhancing Return Bloom on Apple with Plant Growth Regulators
F-133	An Annual Fireblight Management Program Predicting Delicious Storage Scald
F-200	Peach Leaf Curl Block-specific Spray Calibration Worksheet Dogwood Borer in Dwarf Apples

### Univ. Maine Publications

Orchard Fruit Pest Management - applicator training manual	<a href="http://pmo.umext.maine.edu/apple/OrchardFruitPAT.pdf">http://pmo.umext.maine.edu/apple/OrchardFruitPAT.pdf</a>
Planting and Early Care of Fruit Trees	<a href="http://www.umext.maine.edu/onlinepubs/htmpubs/2411.htm">http://www.umext.maine.edu/onlinepubs/htmpubs/2411.htm</a>
Renovating Old Apple Trees	<a href="http://www.umext.maine.edu/onlinepubs/htmpubs/2409.htm">http://www.umext.maine.edu/onlinepubs/htmpubs/2409.htm</a>

### Univ. Vermont Fact Sheets

Online at: [orchard.uvm.edu/](http://orchard.uvm.edu/)

IPM 'Quick' Summary for Monitoring Apple Arthropod Pests
IPM Checklist for Vermont
Key Arthropods and Diseases Affecting Apples: A Synopsis
Apple Orchard Information for Beginners

### Newsletters & Periodicals

Healthy Fruit Newsletter (UMass)	Online at: <a href="http://www.umass.edu/fruitadvisor/healthy_fruit/">http://www.umass.edu/fruitadvisor/healthy_fruit/</a>
Fruit Notes (UMass)	Online at: <a href="http://www.umass.edu/fruitadvisor/fruitnotes/FruitNotes.htm">http://www.umass.edu/fruitadvisor/fruitnotes/FruitNotes.htm</a>
Apple Pest Report Newsletter (UMaine_)	Online at: <a href="http://pmo.umext.maine.edu/apple/AppPestReport.html">http://pmo.umext.maine.edu/apple/AppPestReport.html</a>
Apple IPM News (UVM)	Online at: <a href="http://orchard.uvm.edu/uvmapple/pest/">http://orchard.uvm.edu/uvmapple/pest/</a>

### Websites

- Pesticide labels and MSDS sheets for most registered pesticides: <http://www.cdms.net/manuf/manuf.asp> [NOTE: The labels at this site may or may not contain state-specific restrictions.]
- Up-to-date listing of maximum residue levels for countries that import U.S. fruits: <http://www.mrlatabase.com>
- Rhode Island Apple IPM: <http://www.uri.edu/research/ipm>
- Rhode Island Fruit Growers website: <http://www.rifruitgrowers.org>
- Rhode Island product registration: <http://state.ceris.purdue.edu/htm/ri.htm>
- UMaine Apple IPM: <http://pmo.umext.maine.edu/apple/> Links to fact sheets, apple pest report newsletter, and updated weather-driven pest phenology models of use to commercial and hobbyist apple growers in Maine.
- Maine State Pomological Society <http://www.maineapples.org/> Apple lore, orchard locations in Maine.
- PRONewEngland: <http://pronewengland.org/> Links to university, government, private sector pest management contacts, state pesticide registrations, fact sheets, and other online pest management information for the six New England states.
- UMass Fruit Advisor: <http://www.umass.edu/fruitadvisor/> Provides resources for commercial tree- and small-fruit growers, including access to archives of *Healthy Fruit*, *Berry Notes*, and *Fruit Notes*, various fact sheets, videos, and other useful information for fruit growers.
- UConn IPM: <http://www.hort.uconn.edu/ipm> Provides timely information on fruit pests and other fruit topics including meeting announcements and the online version of Crop Talk, a newsletter for commercial fruit and vegetable growers.
- Univ. Vermont's OrganicA: <http://www.uvm.edu/organica/> A resource for organic apple production in New England.
- Univ. Vermont's Apple Program: <http://orchard.uvm.edu/> A website for commercial apple growers in Vermont.

**Cornell Tree Fruit IPM Fact Sheets**Online at: [www.nysipm.cornell.edu/factsheets/treefruit/](http://www.nysipm.cornell.edu/factsheets/treefruit/)

A series of fact sheets developed for insect and disease pests of tree-fruit crops. These outline the biology, monitoring, and management of various pests and include color photographs to aid in identification.

**Insect IPM Fact Sheets**

102GFSTF-I1	Pear Psylla. 1978.
102GFSTF-I2	Codling Moth. 1996.
102GFSTF-I3	Plum Curculio. 1980.
102GFSTF-I4	Green Fruitworm. 1980.
102GFSTF-I5	Obliquebanded Leafroller. 1980.
102GFSTF-I6	Peachtree Borer. 1980.
102GFSTF-I8	Apple Maggot. 1991.
102GFSTF-I9	Spotted Tentiform Leafminer. 1980.
102GFSTF-I10	European Red Mite. 1980.
102GFSTF-I11	Rosy Apple Aphid. 1980.
102GFSTF-I12	San Jose Scale. 1980.
102GFSTF-I13	White Apple Leafhopper. 1980.
102GFSTF-I14	Dogwood Borer. 1985.
102GFSTF-I15	Cherry Fruit Fly & Black Cherry Fruit Fly. 1988.
102GFSTF-I16	Woolly Apple Aphid. 1988.
102GFSTF-I17	Oriental Fruit Moth. 1988.
102GFSTF-I18	Beneficial Insects. 1989.
102GFSTF-I19	Redbanded Leafroller. 1989.
102GFSTF-I20	European Apple Sawfly. 1991.
102GFSTF-I21	Tarnished Plant Bug. 1991.
102GFSTF-I22	Comstock Mealybug. 1991.
102GFSTF-I23	Predatory Mites. 1995.
102GFSTF-I24	American Plum Borer. 1997.
102GFSTF-I25	Phytophagous Mirid Bugs. 1998.
102GFSTF-I26	Apple-Boring Beetles. 1999.

**Disease IPM Fact Sheets**

102GFSTF-D3	Fire Blight. 1994.
102GFSTF-D4	Powdery Mildew of Apple. 2004.
102GFSTF-D5	Cedar Apple Rust. 1981.
102GFSTF-D6	Black Knot of Plum. 1992.
102GFSTF-D7	Phytophthora Root and Crown Rots. 1992.
102GFSTF-D8	Cherry Leaf Spot. 1993.
102GFSTF-D9	Apple Scab. 1993.
102GFSTF-D10	Brown Rot of Stone Fruits. 1993.
102GFSTF-D11	Sooty Blotch and Flyspeck. 1994.
102GFSTF-D12	Perennial Canker. 1995.

**Mammal IPM Fact Sheets**

102GFSTF-M1	Meadow Vole and Pine Vole. 1988.
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**Cornell Extension Bulletins**

IB 219	Orchard Nutrition Management. 1991. <a href="http://hdl.handle.net/1813/3305">hdl.handle.net/1813/3305</a>
IB 221	Predicting Harvest Date for Apples. 1992. <a href="http://hdl.handle.net/1813/3299">hdl.handle.net/1813/3299</a>
IPM207	Apple IPM. 1999. <a href="http://nysipm.cornell.edu/publications/apple_man">nysipm.cornell.edu/publications/apple_man</a>

**Cornell's Scaffolds Newsletter**Online at: <http://www.nysaes.cornell.edu/ent/scaffolds/>**Cornell Food and Life Sciences Bulletins**Online at: <http://www.nysaes.cornell.edu/pubs/fls/>

FLS 50	Green Fruitworms. 1974.
FLS 58	Growth Stages in Fruit Trees - From Dormant to Fruit Set. 1976.
FLS 92	Biology and Control of Cytospora Fungi in Peach Plantings. 1982.
FLS 95	Blister Spot of Apple. 1982.
FLS 108	Diagnostic Keys for Diseases of Apple, Peach and Cherry. 1984.
FLS 116	Chemical Thinning of Apples. 1986.
FLS 117	Peach and Nectarine Varieties in New York State. 1986.
FLS 118	Preventing Decomposition of Agricultural Chemicals by Alkaline Hydrolysis in the Spray Tank. 1986.
FLS 123	Basing European Red Mite Control Decisions on a Census of Mites Can Save Control Costs. 1988.
FLS 124	Insects Associated with Apple in the Mid-Atlantic States. 1988.
FLS 127	Sweet and Tart Cherry Varieties: Descriptions and Cultural Recommendations. 1989.
FLS 128	Effects of Ground Cover Manipulations on Pest and Predator Mite Populations on Apple in Eastern NY. 1989.
FLS 142	Fruit Pest Events and Phenological Development According to Accumulated Heat Units. 1993.
FLS 143	Sampling Second Generation Spotted Tentiform Leafminer. 1993.
FLS 158	New York Integrated Fruit Production Protocol for Apples. 2006.

**NRAES Publications**

Available from NRAES, Natural Resource, Agriculture and Engineering Service, Cooperative Extension, P.O. Box 4557, Ithaca, NY 14852-4557, Tel: 607-255-7654 FAX: 607-254-8770

NRAES-37	Orchard Spraying: Getting Results. 1993.
NRAES-38	Hydraulic nozzles for boom sprayers. 1994.
NRAES-78	On-Farm Agrichemical Handling Facilities. 1995.
NRAES-169	Tree Fruit Field Guide to Insect, Mite and Disease Pests and Natural Enemies of Eastern North Amer. 2006.

## 18.5 Diagnostic and Analytical Services

### To submit samples for insect or disease diagnosis or plant identification, contact:

UConn Home & Garden Education Center  
Ratcliffe Hicks Building , Room 4  
1380 Storrs Rd., Unit 4115  
Storrs, CT 06269-4115  
(860)486-6271 or toll-free 1-877-486-6271  
[www.ladybug.uconn.edu](http://www.ladybug.uconn.edu)

Plant Disease Information Office  
The Connecticut Agricultural Experiment Station  
123 Huntington Street, P.O. Box 1106  
New Haven, CT 06504  
(203) 974-8601  
[www.ct.gov/caes/pdio](http://www.ct.gov/caes/pdio)

UMaine Insect & Plant Disease Diagnostic Laboratory  
University of Maine Cooperative Extension  
Pest Management Office  
491 College Avenue  
Orono, ME 04473  
Insect Inquiries: 207-581-2963  
Disease Inquiries: 207-581-3883  
<http://pmo.umext.maine.edu/ipddl/ipddl.htm>

UMass Extension Plant Diagnostics Laboratory  
160 Holdsworth Way  
Holdsworth Natural Resources Center  
University of Massachusetts  
Amherst, MA 01003  
413-545-3208  
<http://www.umass.edu/agland/diagnostics/>

UNH Arthropod Identification Center  
G28 Spaulding Hall  
University of New Hampshire  
38 College Road  
Durham, NH 03824  
603-862-3200  
<http://extension.unh.edu/Agric/AGPDTS/ArthroID.htm>

UNH Plant Diagnostic Laboratory  
G37 Spaulding Hall  
University of New Hampshire  
38 College Road  
Durham, NH 03824  
603-862-3841  
<http://extension.unh.edu/Agric/AGPDTS/PlantH.htm>

URI Plant Clinic  
3 East Alumni Ave.  
Cooperative Extension Education Center  
Kingston, RI 02881  
401-874-2900  
<http://www.uri.edu/ce/ceec/plantclinic.html>

### To submit soil or leaf tissue nutrient analysis samples, contact:

Connecticut Agricultural Experiment Station  
Slate Laboratory  
P.O. Box 1106  
New Haven, CT 06504  
203-974-8521  
<http://www.caes.state.ct.us/Soiloffice/soiltesting.htm>

UConn Soil Nutrient Analysis Laboratory  
6 Sherman Place, U-102  
University of Connecticut  
Storrs, CT 06269-5102  
860-486-4274  
<http://www.soiltest.uconn.edu>

UMaine Analytical Laboratory  
Maine Soil Testing Service  
5722 Deering Hall  
University of Maine  
Orono, ME 04469-5722  
207-581-3591 or 207-581-2945  
<http://anlab.umesci.maine.edu/>

UMass Soil & Tissue Testing Laboratory  
West Experiment Station  
682 North Pleasant Street  
University of Massachusetts  
Amherst, MA 01003  
413-545-2311  
<http://www.umass.edu/soiltest/>

UNH Cooperative Extension Soil Testing Program  
G28A Spaulding Life Science Center  
38 College Road  
University of New Hampshire  
Durham, NH 03824  
603-862-3200  
<http://extension.unh.edu/Agric/AGPDTS/SoilTest.htm>

UVM Agricultural & Environmental Testing Laboratory  
209 Hills Building  
University of Vermont  
Burlington, VT 05405  
802-656-3030  
[http://www.uvm.edu/pss/ag\\_testing/](http://www.uvm.edu/pss/ag_testing/)

## 18.6 Extension Faculty and Staff

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## 18.7 Abbreviations and Symbols Used in this Publication

### Formulations

a.e.	acid equivalent
A	acre
AI	active ingredient
AS	aqueous solution
CS	capsule suspension
D	dust
DF	dry flowable
DG	dispersible granule
E, EW	emulsion, emulsifiable
EC	emulsifiable concentrate
E.U.P.	Experimental Use Permit
F, FL	flowable
FC	flowable concentrate
FM	flowable microencapsulated
G	granular
L	liquid
LC	liquid concentrate
P	pellets
PHI	preharvest interval
S	sprayable
SC	suspension concentrate
SG	soluble granule
SP	soluble powder
SS	soluble salt
ULV	ultralow volume
W	wettable
WBC	water-based concentrate
WDG, WG	water dispersible granules
WS	water soluble packets
WP	wettable powder

### PHI (Pre-Harvest Interval) and REI (Restricted Entry Interval) Abbreviations

BL	Do not apply beyond bloom
DD	Delayed dormant application
GT	Do not apply beyond green tip
HIG	Do not apply beyond 1/2-in. green
PB	Prebloom applications only
PF	Do not apply beyond petal fall
PH	Postharvest applications allowed
SS	Do not apply beyond shuck split
2C	Do not apply after 2d cover spray
(A)	Depends on rate, method or number of applications; refer to label for more details
(B)	Nonbearing trees only
(C)	Tart cherries only
(D)	Restricted entry interval: 96 hr (peaches), 72 hr (apples), 48 hr (pears)
(E)	Refer to label for details of restricted entry interval
(F)	Sweet cherries only
(G)	Refer to label for details on timing of application

### Product-Specific Symbols

*	restricted-use pesticide; may be purchased and used only by certified applicators, or used by someone under the supervision of a certified applicator.
#	2(ee) recommendation based on an efficacy statement
##	2(ee) recommendation based on quantitative efficacy data
§	potentially acceptable in certified organic programs