

## 11.4 Notes on Scald Control

### 11.4.1 Materials

All DPA (diphenylamine) formulations are suspensions and become weaker with use. Replenishment with full-strength material does not replace the DPA removed by the apples. Test kits are available to determine concentrations of make-up material. Do not exceed 30 bins or 750 bushels/100 gal of made-up DPA; empty the reservoir tank and start again with fresh material.

Cartons containing apples that have been treated postharvest with DPA and fungicide must be so labeled.

1-Methylcyclopropene (SmartFresh) reduces or prevents storage scald in most varieties of apple when applied within one week of harvest. SmartFresh does not prevent scald in Cortland. For application, fruit are held in an airtight room or other container while a fumigant is released from a premeasured amount inside a generator system that mixes the material with water. Fruit must remain in the seal room for 24 hours. After treatment, vent the room. Fruit may be treated at ambient or chilled temperatures.

### 11.4.2 Application Equipment

Bins of apples are sometimes dipped into a tank containing postharvest preservatives, but more often the bins are moved by conveyors, rollers, or truck bed under a cascade of the preservatives. The bins should be moved slowly under the cascade, with 35-40 gal of preservatives being delivered into each bin. The pump should be sized to deliver 35-40 gal of preservatives/bin at the desired rate of bin movement under the cascade. If stacked bins are moved under the cascade, the top bins should receive 35-40 gal and side nozzles should be positioned to deliver additional

gallonage to the lower bins, even though drainage holes are provided in the bin floors. Application equipment is commercially available, but operators usually fabricate their applicators to meet the needs of their own operation. Dirty truckloads should be rinsed with clean water before treatment to minimize the accumulation of dirt in the reservoir tank.

### 11.4.3 Variety Requirements

Materials and concentrations for the major apple varieties in New England are listed in Table 11.4.1.

Important: DPA retards chlorophyll loss in Golden Delicious and, therefore, should not be used unless the apples have developed full yellow color at harvest.

The very low susceptibility of Empire, Honeycrisp and Gala to scald indicates that they can be safely stored without any preservative treatment. However, if preservative treatment is demanded, then use 1000 ppm DPA in the drench solution.

**Table 11.4.1. Recommended diphenylamine concentrations for varieties subject to scald.**

Variety	Diphenylamine (ppm)
Baldwin	1000-1500
Braeburn	1000
Cortland	2000
Delicious	1000-1500
Empire, Golden Delicious, Idared, Jonagold, McIntosh	1000
Mutsu	2000
Rome, Stayman	1500

## 11.5 Apple Spray Table

**Table 11.5.1. Pesticide Spray Table – Apples.**

*Refer to back of book for key to abbreviations and footnotes.*

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Dormant</b>						
Fire blight	Copper compounds Copper hydroxide (Champ, Champion, Kocide, others) or Copper oxychloride (COCS, others) or Basic copper sulfate (Basicop, Blue Shield, Cuprofix, Ultra Disperss, others)					See labels for rates and restrictions
<b>Silver Tip</b>						
Apple scab inoculum reduction	Feed grade urea (46% N) ground spray	44 lb	44 lb/A (apply 100 gal./A)	0	0	[2.1]

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Silver Tip (continued)</b>						
<b>Crown rot (collar rot)</b>	Ridomil Gold 4EC	0.5 pt/100 gal (drench)	2 qt/A (spray)	12	see com- ments	[7.2]
	OR Aliette 80WP	.5-1 gal	2.5-5/A	12	14	[7.3]
<b>European red mite, European fruit lecanium</b>	(§) oil	2-3 gal/100 gal		12	0	[20.2]
<b>Green Tip</b>						
<b>Apple Scab</b>	Copper compounds (see Fire blight at dormant)	See labels for rates and restrictions				
	Captan 50WP	1-2 lb/100 gal	4-8 lb/A	24	0	[2.1, 2.2]
	or Captan 80 WDG	.65-1.25 lb/100 gal	2.5-5 lb/A	24	0	
	or Captec or Captan 4L	0.5-1 qt/100 gal	2-4 qt/A			
	OR Dithane/Manzate/ Penncozeb 75DF or 80WP	1-2 lb/100 gal	3-6 lb/A	24	77	[1.3, 2.2]
	or Manzate/Dithane/ Penncozeb Flowables or Polyram 80DF	0.8-1.6 qt/100 gal	2.4-4.8 qt/A	24	77	[1.3, 2.2]
	OR Vanguard 75WG		3-5 oz/A	12	72	
	OR Scala 600SC		7-10 fl oz/A	12	72	
	OR Syllit FL		2 pt/A	48	7	
	plus:					
	Captan 50 WP	1 lb/100 gal		24 (E)	0	
	or Captan 80 WDG	.65-1.25 lb/100 gal	2.5-5 lb/A	24	0	
	or Captec or Captan 4L	1 pt/100 gal	3-4 lb/A	24	0	
	or Dithane/Manzate/ Penncozeb 75DF, 80WP	1 lb/100 gal	2.5 lb/A	24	0	
	or (§) sulfur	5 lb/100 gal	10-20 lb/A	24		
<b>Fire blight</b>	Bordeaux mixture, 8-8- 10 (copper sulfate) (spray lime) plus (oil)	8 lb/100 gal 8 lb/100 gal 1 qt/100 gal		24	BL	[8.4]
	OR Champ Flowable	1-2 qt/100 gal	2.75-5.25 qt/A	24	HIG	
	or Champ Dry Prill		5.5-10.5 lb/A	24	HIG	
	or Champ WP		8-16 lb/A	24	HIG	
	or §Champ WG		8-16 lb/A	24	HIG	
	OR C-O-C-S WDG	2-4 lb/100 gal		24	HIG	
	OR Cuprofix MZ Disperss or Cuprofix Ultra 40 Disperss		4-7 lb/A 5-7.5 lb/A	48 48	HIG HIG	

Table continued on next page.

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Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Green Tip (continued)</b>						
<b>Fire blight</b> (continued)	OR Kocide 3000 or other (\$)copper products	1.11-2.3 lb/100 gal see comments	3.5-7.0 lb/A	48	HIG	
<b>European red mite</b>	(\$)oil	2 gal/100 gal		12	0	[20.3]
<b>Rosy apple aphid</b>	Beleaf 50SG	see label	2.0-2.8 oz/A	12	21	[27.2]
	OR *Lorsban 4EC or Lorsban 75WG	1 pt/100 gal 0.3-0.67 lb/100 gal	see label see label	96 96	PB PB	
	OR *Supracide 25WP or *Supracide 2EC	1-2 lb/100 gal 1-2 pt/100 gal	4-12 lb/A 3-12 pt/A	(E) 12	PB 35	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>Half-Inch Green</b>						
<b>Apple scab</b>	Same materials as Green Tip spray					[2.3]
<b>Dogwood borer, American plum borer</b>	*Lorsban 4EC or Lorsban 75WG or *Lorsban Advanced 3.8L	1.5 qt/100 gal/A 2 lb/100 gal/A 1.5-4 pt/100 gal/A	Trunk spray Trunk spray Trunk spray	96 96 96	28 28 28	[17.1]
<b>European red mite</b>	(\$)oil	2 gal/100 gal	see label	12	0	[20.4]
<b>Redbanded leafroller</b>	Imidan 70W	.75-1 lb/100 gal	2.13-5.33 lb/A	96	7	[27.1]
	The following pre-mix product is also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, its use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.					
	Tourismo		12-17 floz	12	12	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>Rosy apple aphid</b>	Refer to Green Tip					
	OR Esteem 35WP	see label	3-5 oz/A	12	45	[27.2]
<b>San Jose scale</b>	*Centaur 0.7WDG	see label	34.5-46 oz/A	12	14	
	OR Esteem 35WP plus oil	4-5 oz/A 2 gal/100 gal		12 12	45 0	
	OR *Lorsban 4EC or Lorsban 75WG	1 pt/100 gal 0.3-0.67 lb/100 gal	see label see label	96	PB	[28.3]
	OR (\$)oil	2 gal/100 gal	see label	12	0	
	OR *Supracide 25WP or *Supracide 2EC	0.5 lb/100 gal 1-2 pt/100 gal	4-12 lb/A 3-12 pt/A	72	PB	
<b>Tight cluster</b>						
<b>Apple Scab</b>	Captan 50WP or Captan 80WDG or Captec or Captan 4L	1-2 lb/100 gal 0.65-1.25 lb/100 gal 0.5-1 qt/ 100gal	8 lb/A 5 lb/A	24 24 24	0 0 0	

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Pest	Product	Amt/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Amt/A			
<b>Tight cluster (continued)</b>						
<b>Apple Scab</b> (continued)	OR Dithane/Manzate/ Penncozeb 75DF or 80WP	1-2 lb/100 gal	3-6 lb/A	24	77	[1.3], [2.2]
	or Manzate/Dithane/ Penncozeb Flowables or Polyram 80DF	0.8-1.6 qt/100 gal 1-2 lb/100 gal	2.4-4.8 qt/A	24	77	[1.3], [2.2]
	OR Flint 50WG	0.67-0.8 oz/100 gal	2-2.5 oz/A	12	14	[2.4],[2.14]
	OR Sovran 50WG	1.0-1.6 oz/100 gal	3.2-6.4 oz/A	12	30	[2.4], [2.14]
	OR Cabrio EG	4 oz/100 gal	12 oz/A	12	0	[2.4],[2.14]
	OR Rally 40WSP		5-8 oz/A	24	14	[2.5],[2.13]
	or Vintage SC	2-4 fl oz/100 gal	6-12 fl oz/A	24	30	
	or Procure 50WS	3-5 oz/100 gal		12	14	
	or Topguard		13 fl oz/A	12	14	[2.13]
	or Inspire Super		8 oz/A	12	72	
	or Indar 2F		6-8 fl oz/A	12	14	
	or Tebuzol 45DF	2 oz/100 gal	4-8 oz/A	120	75	
	plus:					
	Captan 50WP	1 lb/100 gal		24 (E)	0	
	or Captan 80WDG	0.65-1.25 lb/100 gal	2.5 lb/A			
	or Captec or Captan 4L	1 pt/100 gal				
	or Manzate/ Penncozeb 75DF, 80WP	1 lb/100 gal	2.5 lb/A	24	77	
	or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A	24	77	
	OR Fontelis 1.67 SC	5.3-6.7 fl oz/100 gal	16-20 fl oz/A	12	28	
	or Luna Tranquility 500SC	3.7-5.3 fl oz/100 gal	11.2-16 fl oz/A	12	72	
	or Luna Sensation 500SC	3.3-1.9 fl oz/100 gal	4-5.8 fl oz/A	12	14	
	or Merivon 4.17SC		4-5.5 fl oz/A	12	0	
	plus:					
	Captan 50WP	1 lb/100 gal		24 (E)	0	
	or Captan 80WDG	0.65-1.25 lb/100 gal	2.5 lb/A			
	or Captec or Captan 4L	1 pt/100 gal				
	or Manzate/ Penncozeb 75DF, 80WP	1 lb/100 gal	2.5 lb/A	24	77	
	or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A	24	77	
	OR Syllit FL		2pt/A	48	7	
	plus:					
	Captan 50WP	1 lb/100 gal		24 (E)	0	
	or Captan 80WDG	0.65-1.25 lb/100 gal	2.5 lb/A			
	or Captec or Captan 4L	1 pt/100 gal				
	or Manzate/Penncozeb/ 75DF, 80WP	1 lb/100 gal	3.0lb/A	24	BL, 77(A)	
	or Polyram 80DF	1 lb/100 gal	3 lb/A	24	BL, 77(A)	
	OR (§) sulfur	5 lb/100 gal	10-20 lb/A	24		

Table continued on next page.

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<b>Tight cluster (continued)</b>						
<b>Powdery mildew</b>	Topsin M 70WP, WDG	4-6 oz/100 gal	0.75-1 lb/A	48	1	[2.12]
	OR Thiophanate-methyl 85WDG	.2-.3 lb/100 gal	.6-.8 lb/A	48	1	[2.12]
	OR §JMS Stylet-Oil	1-2% solution		12	0	[9.3]
	OR Rally 40WSP		5-10 oz/A	24	14	
	OR Procure 50WS	3-5 oz/100 gal		12	14	
	OR Topguard		12 fl oz/A	12	14	
	OR Indar 2F		6-8 fl oz/A	12	14	
	OR Inspire Super		8.5-12 fl oz/A	12	14	
	OR Vintage SC	3 fl oz/100 gal		24	30	
	OR Fontelis 1.67 SC	5.3-6.7 fl oz/100 gal	16-20 fl oz/A	12	28	
	or Luna Tranquility 500SC	3.7-5.3 fl oz/100 gal	11.2-16 fl oz/A	12	72	
	or Luna Sensation 500SC	3.3-1.9 fl oz/100 gal	4-5.8 fl oz/A	12	14	
	or Merivon 4.17SC		4-5.5 fl oz/A	12	0	
	<i>plus:</i> Captan 50WP	1 lb/100 gal		24 (E)	0	
	or Captan 80WDG	0.65-1.25 lb/100 gal	2.5 lb/A			
	or Captec or Captan 4L	1 pt/100 gal				
	or Manzate/ Penncozeb 75DF, 80WP	1 lb/100 gal	2.5 lb/A	24	77	
or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A	24	77		
OR (§)Sulfur, many other products; see label			24	0		
OR Flint 50WG	0.67-0.8 oz/100 gal	2-2.5 oz/A	12	14		
OR Sovran 50WG	1.0-1.6 oz/100 gal	4-6.4 oz/A	12	30		
OR Tebuzol 45DF	2 oz/100 gal	4-8 oz/A	120	75		
<b>Dogwood borer, American plum borer</b>	*Lorsban 4EC	1.5 qt/100 gal/A	Trunk spray	96	28	[17.1]
	or Lorsban 75WG	2 lb/100 gal/A	Trunk spray	96	28	
	or *Lorsban Advanced 3.8L	1.5-4 pt/100 gal/A	Trunk spray	96	28	
<b>European red mite</b>	Apollo 4SC	1-2 fl oz/100 gal	4-8 fl oz/A	12	45	[20.5]
	OR (§)oil	1 gal/100 gal	see label	12		[20.6]
	OR Envidor 2SC		16-18 fl oz/A	12	7	[20.5]
	OR Onager 1EC	see label	12-24 fl oz/A	12	28	[20.5]
	OR Savey 50DF	see label	3 oz/A	12	28	[20.5]
	OR Zeal 72WS	see label	2-3 oz/A	12	14	[20.5]
<b>Rosy apple aphid</b>	Refer to Green Tip					[27.2]
	OR Beleaf 50SG	see label	2.0-2.8 oz/A	12	21	
<b>San Jose scale</b>	Refer to Half-Inch Green					[28.3]

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<b>Tight cluster (continued)</b>						
<b>Tarnished plant bug</b>	*Ambush 25WP	see label	6.4–25 oz/A	12	PF	
	OR *Asana XL 0.66EC	2–5.8 fl oz/100 gal	5–14.5 fl oz/A	12	21	
	OR Avaunt 30 WDG	Fixed rate per acre	5–6 oz/A	12	14	
	OR *Baythroid XL 1L	Fixed rate per acre	2.0–2.4 fl oz/A	12	7	
	OR Beleaf 50SG	see label	2.0–2.8 oz/A	12	21	
	OR *Danitol 2.4EC	Fixed rate per acre	10.7–16 fl oz/A	24	14	
	OR *Pounce 25WP	see label	6.4–25.6 oz/A	12	PF	
	OR *Proaxis 0.5CS	see label	2.6–5.1 fl oz/A	24	21	
	OR *Voliam Xpress EC	see label	6–12 fl oz/A	24	21	
	OR *Warrior II 2.08CS	Fixed rate per acre	1.3–2.5 fl oz/A	24	21	
<b>Pink</b>						
<b>Apple rust diseases</b>	Dithane/Manzate/ Penncozeb 75DF or 80WP	1-2 lb/100 gal	3-6 lb/A	24	77	[1.3],[ 2.2]
	or Manzate/Dithane/ Penncozeb Flowables		2.4-4.8 qt/A	24	77	[1.3], [2.2]
	or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A			
	OR Ferbam Granuflo	1-1.5 lb/100 gal	4-6 lb/A	24	7	
	OR Rally 40WSP		5-8 oz/A	24	14	
	OR Indar 2F		6-8 fl oz/A	12	14	
	OR Topguard		12 fl oz/A	12	14	
	OR Inspire Super MP		8.5-12 fl oz/A	12	14	
	OR Procure 50WS	3-5 oz/100 gal		24	14	
	OR Vintage SC	3 fl oz/100 gal		24	30	
	OR Fontelis 1.67 SC	5.3-6.7 fl oz/100 gal	16-20 fl oz/A	12	28	
	or Luna Tranquility 500SC	3.7-5.3 fl oz/100 gal	11.2-16 fl oz/A	12	72	
	or Luna Sensation 500SC	3.3-1.9 fl oz/100 gal	4-5.8 fl oz/A	12	14	
	or Merivon 4.17SC		4-5.5 fl oz/A	12	0	
	plus: Captan 50WP	1 lb/100 gal		24 (E)	0	
	or Captan 80WDG	0.65-1.25 lb/100 gal	2.5 lb/A			
or Captec or Captan 4L	1 pt/100 gal					
or Manzate/ Penncozeb 75DF, 80WP	1 lb/100 gal	2.5 lb/A	24	77		
or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A	24	77		
<b>Apple scab</b>	Captan 50WP	1-2 lb/100 gal	4-8 lb/A	24	0	[2.6], [2.7]
	or Captan 80 WDG	0.65-1.25 lb/100 gal	2.5-5 lb/A	24	0	
	or Captec or Captan 4L	0.5- 1 qt/100 gal		24	0	
	OR Dithane/Manzate/ Penncozeb 75DF or 80WP	1-2 lb/100 gal	3-6 lb/A	24	77	[1.3], [2.2]

Table continued on next page.

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<b>Pest</b>	<b>Product</b>	<b>Amt/100 gal. dilute</b> see Chapter 4 to estimate dilute gals./A	<b>Amt/A</b>	<b>REI</b> (hrs)	<b>PHI</b> (days)	<b>Comments</b> (see text)
<b>Pink (continued)</b>						
<b>Apple scab</b> (continued)	or Manzate/Dithane/ Penncozeb Flowables	0.8-1.6 qt/100 gal	2.4-4.8 qt/A	24	77	[1.3], [2.2]
	or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A	24	77	
	<i>OR</i> Sovran 50WG	1.0-1.6 oz/100 gal	3.2-6.4 oz/A	12	30	[2.4], [2.14]
	<i>OR</i> Cabrio EG	4 oz/100 gal	12 oz/A	12	0	[2.4], [2.14]
	<i>OR</i> Flint 50WG	0.67-0.8 oz/100 gal	2-2.5 oz/A	12	14	[2.4], [2.14]
	<i>OR</i> Rally 40WSP		5-8 oz/A	24	14	[2.5],[2.13]
	or Vintage SC	2-4 fl oz/100 gal	6-12 fl oz/A	24	30	
	or Procure 50WS	3-5 oz/100 gal		12	14	
	or Topguard		13 fl oz/A	12	14	[2.13]
	or Inspire Super		8 oz/A	12	72	
	or Indar 2F		6-8 fl oz/A	12	14	
	or Tebuzol 45DF	2 oz/100 gal	4-8 oz/A	120	75	
	<i>plus:</i>					
	Captan 50WP	1 lb/100 gal		24 (E)	0	
	or Captan 80WDG	0.65-1.25 lb/100 gal	2.5 lb/A			
	or Captec or Captan 4L	1 pt/100 gal				
	or Manzate/ Penncozeb 75DF, 80WP	1 lb/100 gal	2.5 lb/A	24	77	
	or Manzate/Dithane/ Penncozeb Flowables		2.4 qt/A	24	77	[1.3], [2.2]
	or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A	24	77	
	<i>OR</i> Fontelis 1.67 SC	5.3-6.7 fl oz/100 gal	16-20 fl oz/A	12	28	
	or Luna Tranquility 500SC	3.7-5.3 fl oz/100 gal	11.2-16 fl oz/A	12	72	
	or Luna Sensation 500SC	3.3-1.9 fl oz/100 gal	4-5.8 fl oz/A	12	14	
	or Merivon 4.17SC		4-5.5 fl oz/A	12	0	
	<i>plus:</i>					
	Captan 50WP	1 lb/100 gal		24 (E)	0	
	or Captan 80WDG	0.65-1.25 lb/100 gal	2.5 lb/A			
	or Captec or Captan 4L	1 pt/100 gal				
	or Manzate/ Penncozeb 75DF, 80WP	1 lb/100 gal	2.5 lb/A	24	77	
	or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A	24	77	
	<i>OR</i> (§) sulfur	5 lb/100 gal	10-20 lb/A	24		
<b>Black rot (frog- eye leafspot and fruit infections)</b>	See comments					[4.2]
<b>Blister spot</b>	Aliette 80WDG	0.5-1.0 lb/100 gal	2.5-5 lb/A	12	14	[5.1]
<b>Powdery mildew</b>	Same materials as Tight Cluster spray					[9.5]

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Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Pink (continued)</b>						
Dogwood borer,	*Lorsban 4EC	1.5 qt/100 gal/A	Trunk spray	96	28	[17.1]
American plum borer,	OR *Lorsban 75WG	2 lb/100 gal/A	Trunk spray	96	28	
Roundheaded apple tree borer	OR *Lorsban Advanced 3.8L	1.5-4 pt/100 gal/A	Trunk spray	96	28	
European red mite	Envidor, Savey, Onager or Apollo, same as Tight Cluster					[20.7]
	OR *Vydate 2L	1-2 pt/100 gal	2-8 pt/A	48	14	
	OR Zeal 72WS	see label	2-3 oz/A	12	14	[20.7]
Mullein plant bug	OR *Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8-14.5 fl oz/A	12	21	
	OR Assail 30SG	Fixed rate per acre	4 -8 oz/A	12	7	
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
	OR *Warrior II 2.08CS	Fixed rate per acre	1.28-2.56 fl oz/A	24	21	
Oriental fruit moth	Pheromone mating disruption: Checkmate OFM-F or Isomate-M 100 or §Checkmate CM-OFM Duel or §Isomate-CM/OFM TT	see label	1.32-2.93 fl oz/A 100 ties/A 150-200 dispensers/A 200 ties/A 0	0 0 0 0	0 0 0 0	[14.2]
Rosy apple aphid	Assail 30SG	Fixed rate per acre	2.5-4.0 oz/A	12	7	
	OR Beleaf 50SG	see label	2.0-2.8 oz/A	12	21	
	OR Calypso 4F	0.5-1.0 fl oz/100gal	2-4 fl oz/A	12	30	
	OR Esteem 35WP	see label	3-5 oz/A	12	45	
	OR *Lannate 2.4L	0.75 pt/100 gal	1.5-3 pt/A	72	14	
	or *Lannate 90SP	0.25 lb/100 gal	0.5-1.0 lb/A			
	OR *Lorsban 4EC	1pt/100 gal	see label		PB	
	or Lorsban 75WG	0.3-0.67 lb/100 gal	see label			
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	OR *Thionex 50WP	.75 lb/100 gal	4 lb/A	20 days	21	
	or *Thionex 3EC	0.5 qt/100 gal	2.67 qt/A	7 days	21	
	OR *Vydate 2L	1-2 pt/100 gal	2-8 pt/A	48	14	
	OR *Warrior II 2.08CS	Fixed rate per acre	1.3-2.5 fl oz/A	24	21	
Spotted tentiform leafminer,	OR Altacor 35WDG	see label	2.5-4.0 oz/A	4	5	
Apple blotch leafminer	OR *Ambush 25WP	see label	6.4-25.6 oz/A	12	PF	
	OR *Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8-14.5 fl oz/A	12	21	
	OR Assail 30SG	Fixed rate per acre	2.5 oz/A	12	7	
	OR Avaunt 30WDG	Fixed rate per acre	5-6 oz/A	12	14	
	OR §Aza-Direct 1.2L	see label	16-32 fl oz/A	4	0	
	OR Azatin XL 0.27EC	see label	10-16 fl oz/A	4	0	
	OR *Baythroid XL 1L	Fixed rate per acre	2.0-2.4 fl oz/A	12	7	

Table continued on next page.



**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)	
<b>Pink (continued)</b>							
Spotted tentiform leafminer, Apple blotch leafminer (continued)	OR Belt 4SC	see label	3-5 fl oz/A	12	14		
	OR Calypso 4F	0.5-1.0 fl oz/100 gal	2-4 fl oz/A	12	30		
	OR *Danitol 2.4EC	Fixed rate per acre	10.6-16 fl oz/A	24	4		
	OR Delegate 25WG	Fixed rate per acre	4.5-7.0 oz/A	4	7		
	OR §Neemix 4.5L	see label	4-7 fl oz/A	12	0		
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21		
	OR *Proclaim 5SG	0.8-1.2 oz/100 gal	3.2-4.8 oz/A	12 or 48 (E)	14		
	OR Pyrenone 0.5EC	see label	12 fl oz/A	12	1		
	The following pre-mix product is also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, its use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.						
		Tourismo		12-17 fl oz	12	14	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21		
	OR *Vydate 2L	1 pt/100 gal	2-4 pt/A	48	14		
	OR *Warrior II 2.08CS	Fixed rate per acre	1.28-2.56 fl oz/A	24	21		
<b>Tarnished plant bug</b>	Refer to Tight cluster					[30.1]	
<b>Bloom</b>							
<b>Apple rusts</b>	Refer to Pink spray for materials and comments						
<b>Apple scab</b>	Same materials and rates as Pink spray						
<b>Black rot</b>	Captan, Sovran, Flint, Topsin M, Thiophanate-methyl	Same rates as for scab, mildew and rusts				[4.2]	
<b>Blister spot</b>	Aliette 80WDG	0.5-1.0 lb/100 gal	2.5-5 lb/A	12	14	[5.1]	
<b>Blossom end rot</b>	Captan, Sovran, Flint, Scala, Vanguard, Topsin M, Thiophanate-methyl	Same rates as for scab, mildew and rusts				[6.2]	
<b>Fire blight (blossom blight phase)</b>	§Agrimycin 17WP, Streptrol 17WP, or Firewall 17WP	8 oz/100 gal	24oz/A	12	50	[8.3], [8.10]	
	OR §Agrimycin 17WP, Streptrol 17WP, or Firewall 17WP	8 oz/100 gal	24oz/A	12	50	[8.3], [8.10]	
	<i>plus</i> Glycerine						
	<i>either</i> (CP or USP grade) or Regulaid	2 qt/100 gal of finished spray (do not concentrate)					
		1 pt/100 gal of finished spray (do not concentrate)					
	OR Mycoshield	1.0 lb/100 gal		12	60	[8.9]	

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

<b>Pest</b>	<b>Product</b>	<b>Amt/100 gal. dilute</b> see Chapter 4 to estimate dilute gals./A	<b>Amt/A</b>	<b>REI</b> (hrs)	<b>PHI</b> (days)	<b>Comments</b> (see text)
<b>Bloom (continued)</b>						
<b>Fire blight</b> (blossom blight phase) (continued)	OR Bloomtime Biological FD					150g/A
	OR Mycoshield		1.0 lb/100 gal			
	OR Fireline	12 oz/100 gal		12	60	[8.9]
	OR Serenade MAX	2-3 lb/A		4	0	[8.7]
<b>Fire blight</b> (shoot blight)	Apogee 27.5DF	4.5-9 oz		12	45	[8.6]
<b>Powdery mildew</b>	Same as Tight Cluster sprays					[9.2], [9.3]
<b>Codling moth,</b> <b>Oriental fruit</b> <b>moth, Lesser</b> <b>appleworm</b>	Checkmate OFM-F		1.32-2.93 fl oz/A	0	0	[14.2]
	OR Isomate-M 100		100 ties/A	0	0	
	OR Checkmate CM-F		2.4-4.8 fl oz/A	4	0	
	OR §Isomate-C TT		200 ties/A	0	0	
	OR §Checkmate CM-OFM Duel		150-200 dispensers/A	0	0	
	OR §Isomate-CM/OFM TT		200 ties/A	0	0	
<b>Mullein plant</b> <b>bug</b>	Assail 30SG	Fixed rate per acre	4 -8 oz/A	12	7	[23.4]
	OR Calypso 4F	0.5-1.0 fl oz/100gal	2-4 fl oz/A	12	30	
<b>Obliquebanded</b> <b>leafroller</b>	§Agree WG 3.8WS	see label	1-2 lb/A	4	0	[24.1]
	OR §Biobit HP	see label	0.5-2 lb/A	4	0	
	OR §Dipel 10.3DF	see label	0.5-2 lb/A	4	0	
	OR Intrepid 2F	see label	8-16 oz/A	4	14	
	OR §Javelin WG	0.13-1 lb/100 gal	0.5-4.0 lb/A	4	0	
<b>Petal Fall</b>						
<b>Apple rusts</b>	Refer to Pink sprays for materials and comments					[4.2]
<b>Apple scab</b>	Captan 50WP	1-2 lb/100 gal	8 lb/A	24(E)	0	[2.7]
	or Captan 80WP	0.65-1.25 lb/100 gal	5 lb/A	24	0	
	or Captec or Captan 4L	0.5- 1 qt/100 gal		24	0	
	OR Dithane/Manzate/ Penncozeb 75DF or 80WP	1-2 lb/100 gal	3-6 lb/A	24	77	[1.3], [2.2]
	or Manzate/Dithane/ Penncozeb Flowables		2.4-4.8 qt/A	24	77	[1.3], [2.2]
	or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A			
	OR Flint 50WG	0.67-0.8 oz/100 gal		12	14	[2.4], [2.14]
	OR Sovran 50WG	1.0-1.6 oz/100 gal		12	30	[2.4], [2.14]
	OR Cabrio EG	4 oz/100 gal	12 oz/A	12	0	[2.4], [2.14]
	OR Rally 40WSP		5-8 oz/A	24	14	[2.5],[2.13]
	or Vintage SC	2-4 fl oz/100 gal	6-12 fl oz/A	24	30	
	or Procure 50WS	3-5 oz/100 gal		12	14	
or Topguard		13 fl oz/A	12	14	[2.13]	

Table continued on next page.

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

<b>Pest</b>	<b>Product</b>	<b>Amt/100 gal. dilute</b> see Chapter 4 to estimate dilute gals./A	<b>Amt/A</b>	<b>REI</b> (hrs)	<b>PHI</b> (days)	<b>Comments</b> (see text)	
<b>Petal Fall (continued)</b>							
<b>Apple scab</b> (continued)	<i>OR</i>	or Inspire Super	8 oz/A	12	72		
		or Tebuzol 45DF	2 oz/100 gal	4-8 oz/A	120	75	
		<i>plus:</i>					
		Captan 50WP	1 lb/100 gal		24 (E)	0	
		or Captan 80WDG	0.65-1.25 lb/100 gal	2.5 lb/A			
		or Captec or Captan 4L	1 pt/100 gal				
		or Manzate/ Penncozeb 75DF, 80WP	1 lb/100 gal	2.5 lb/A	24	77	
		or Manzate/Dithane/ Penncozeb Flowables		2.4 qt/A	24	77	[1.3], [2.2]
		or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A	24	77	
		<i>OR</i>	Fontelis 1.67 SC	5.3-6.7 fl oz/100 gal	16-20 fl oz/A	12	28
			or Luna Tranquility 500SC	3.7-5.3 fl oz/100 gal	11.2-16 fl oz/A	12	72
			or Luna Sensation 500SC	3.3-1.9 fl oz/100 gal	4-5.8 fl oz/A	12	14
			or Merivon 4.17SC		4-5.5 fl oz/A	12	0
		<i>plus:</i>					
		Captan 50WP	1 lb/100 gal		24 (E)	0	
		or Captan 80WDG	0.65-1.25 lb/100 gal	2.5 lb/A			
		or Captec or Captan 4L	1 pt/100 gal				
		or Manzate/ Penncozeb 75DF, 80WP	1 lb/100 gal	2.5 lb/A	24	77	
		or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A	24	77	
	<i>OR</i>	(§) sulfur	5 lb/100 gal	10-20 lb/A	24		
<b>Black rot</b>	Captan, Sovran, Flint, Topsin M, Thiophanate-methyl	Same rates as for scab, mildew and rusts					
<b>Blossom end rot</b>	Captan, Sovran, Flint, Scala, Vanguard, Topsin M, Thiophanate-methyl	Same rates as for scab, mildew and rusts					[6.2]
<b>Fire blight</b> ( <b>Blossom blight</b> )	§Agrimycin 17WP, Streptrol 17WP, or Firewall 17WP	8 oz/100 gal	24oz/A	12	50	[8.3], [8.10]	
	<i>OR</i>	§Agrimycin 17WP, Streptrol 17WP, or Firewall 17WP	8 oz/100 gal	24oz/A	12	50	[8.3], [8.10]
	<i>plus</i>						
	Glycerine						
	<i>either</i> (CP or USP grade)	2 qt/100 gal of finished spray (do not concentrate)					
	or Regulaid	1 pt/100 gal of finished spray (do not concentrate)					

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)	
<b>Petal Fall (continued)</b>							
Fire blight (Shoot blight)	Apogee 27.5D	6-12 oz		12	45	[8.6]	
Powdery mildew	Same as Tight Cluster sprays					[9.2], [9.3]	
Codling moth, Lesser appleworm, Oriental fruit moth	*Altacor 35WDG	see label	2.5-4.5 oz/A	4	5	[14.1],[14.3]	
	OR Assail 30SG	see label	4-8 oz/A	12	7		
	OR Avaunt 30WDG	see label	5-6 oz/A	12	14		
	OR *Baythroid XL 1L	see label	2-2.4 fl oz/A	12	7		
	OR *Belt 4SC	see label	3-5 fl oz/A	12	14		
	OR §Biobit XL 2.1FC	see label	1.5-5.5 pt/A	4	0		
	OR *Calypto 4F	1-2 fl oz/100 gal	4-8 fl oz/A	12	30		
	OR §Carpovirusine 0.99SC	0.5-1 pt/100 gal	0.25-0.4 qt/A	4	0		
	OR §Cyd-X 0.06SC	see label	1-6 fl oz/A	4	0		
	OR §Deliver 18WG	see label	0.5-2 lb/A	4	0		
	OR Delegate 25WG	see label	4.5-7 oz/A	4	7		
	OR §Dipel 10.3DF	see label	0.5-2 lb/A	4	0		
	OR §Entrust 80WP	0.67-1 oz/100 gal	2-3 oz/A	4	7		
	OR *Imidan 70WS	0.75-1 lb/100 gal	2.13-5.75 lb/A	96	7		
	OR *Imidan 70WS	0.75-1 lb/100 gal	2.13-5.75 lb/A	96	7		
	OR *Intrepid 2F	see label	12-16 fl oz/A	4	14		
	OR *Lannate 2.4LV	1.5 pt/100 gal	1.5-3 pt/A	72	14		
	OR or *Lannate 90SP	0.25 lb/100 gal	0.5-1 lb/A				
	OR §Neemix 4.5L	see label	7-16 fl oz/A	12	0		
	OR Pheromone mating disruption:						[14.2]
		§Checkmate OFM-F	see label	1.32-2.93 fl oz/A	0	0	
		or §Isomate-M 100		100 ties/A	0	0	
	or §Checkmate CM-F	see label	2.4-4.8 fl oz/A	4	0		
	or §Checkmate CM- OFM Duel		150-200 dispensers/A	0	0		
	or §Isomate-CM/OFM TT		200 ties/A	0	0		
	or §Checkmate Puffer CM-OFM		1-2 units/A	0	0		
OR *Proclaim 5SG	1.2 oz/100 gal	4.8 oz/A	12/48 (E)	14			
OR *Rimon 0.83EC	see label	20-40 fl oz/A	12	14			
OR Sevin XLR Plus, 4F	see label	1-3 qt/A	12	3			
OR or Sevin 80S	see label	1.25-3.75 lb/A					
OR Turismo		15-17 floz					
OR §Virosoft CP4	see label	2-3.2 fl oz/A	4	0			

Table continued on next page.

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Petal Fall (continued)</b>						
<b>Codling moth, Lesser appleworm, Oriental fruit moth (continued)</b>	The following pre-mix products are also labeled for use against these pests; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species present are appropriately matched to the combination of active ingredients and modes of action contained in the product.					
	*Endigo ZC	see label	5-6 fl oz/A	24	35	
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR *Voliam Flexi WDG	see label	4-7 oz/A	12	35	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>Comstock Mealybug</b>	Assail 30SG	Fixed rate per acre	4-8 oz/A	12	7	[15.2]
	OR *Centaur 0.7WDG	See label	34.5 oz/A	12	14	
	OR Movento 240SC	see label	6-9 fl oz/A	24	7	
	OR Portal 0.4EC	see label	2 pt/A	12	14	
	The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species present are appropriately matched to the combination of active ingredients and modes of action contained in the product.					
	*Agri-Flex SC	1.5-2.0 fl oz/100 gal	5.5-8.5 fl oz/A	12	35	
	<i>plus</i> Horticultural spray oil	1 qt/100 gal	1 gal/A			
	OR *Voliam Flexi WDG	see label	6-7 oz/A	12	35	
<b>Dogwood borer, American plum borer</b>	*Lorsban 4EC	1.5 qt/100 gal/A	Trunk spray	96	28	[17.1]
	or Lorsban 75WG	2 lb/100 gal/A	Trunk spray	96	28	
	or *Lorsban Advanced 3.8L	1.5-4 pt/100 gal/A	Trunk spray	96	28	
	The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.					
<b>European apple sawfly</b>	Imidan same as for codling moth at this time					[18.1]
	OR Actara 25WDG		4.5-5.5 oz/A	12	35	[18.2]
	OR Altacor 35WDG		2.5-4.5 oz/A	4	5	
	OR Assail 30SG	Fixed rate per acre	5-8 oz/A	12	7	
	OR Avaunt 30WDG	Fixed rate per acre	5-6 oz/A	12	14	
	OR *Baythroid XL 1L	Fixed rate per acre	2.4-2.8 fl oz/A	12	7	
	OR Calypso 4F	1-2 fl oz/100 gal		12	30	
	OR *Lannate 2.4L#	1.5 pt/100 gal		72	14	
	The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.					
		OR *Agri-Flex SC	1.5-2.0 fl oz/100 gal	5.5-8.5 fl oz/A	12	35
	<i>plus</i> Horticultural spray oil	1 qt/100 gal	1 gal/A			
	OR *Endigo ZC	see label	5-6 fl oz/A	24	35	
	OR *Voliam Flexi WDG	see label	6-7 oz/A	12	35	

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Petal Fall (continued)</b>						
<b>European red mite</b>	Acramite 50WS	see label	0.75-1.0 lb/A	12	7	[20.9]
	OR *Agri-Mek 0.15EC	2.5-5 oz/100 gal	10-20 fl oz/A	12	28	[20.8]
	OR Apollo 4SC	1-2 oz/100 gal	480 fl oz/A	12	45	
	OR Envidor 2SC		16-18 fl oz/A	12	7	[20.9]
	OR Kanemite 15SC	see label	31 fl oz/A	12	14	[20.9]
	OR Nexter 75 WS	see label	4.4-5.2 oz/A	12	25	[20.9]
	OR Omni Supreme	0.5-2 gal/100gal	see label	12	0	[20.10]
	OR Onager 1EC	see label	12-24 fl oz/A	12	28	
	OR Portal 0.4EC	see label	1-2 pt/A	12	14	
	OR §PureSpray Green	1 qt-1.5 gal/100 gal	see label	12	0	[20.10]
	OR Savey 50DF	see label	3-6 oz/A	12	28	
	OR §JMS Stylet-Oil	0.5-2 gal/100 gal	see label	12	0	[20.10]
	OR *Vendex 50WP	4-8 oz/100 gal	1-2 lb/A	48	14	
	OR Zeal 72WS	see label	2-3 oz/A	12	14	[20.9]
The following pre-mix product is also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, its use should be reserved for situations when multiple pest species present are appropriately matched to the combination of active ingredients and modes of action contained in the product.						
	*Agri-Flex SC	1.5-2.0 fl oz/100 gal	5.5-8.5 fl oz/A	12	35	[15.4]
	plus Horticultural spray oil	1 qt/100 gal	1 gal/A			
<b>Green fruitworms</b>	Altacor 35WDG	see label	2.5-4.0 oz/A	4	5	[21.1]
	OR *Ambush 25WP	see label	6.4-25.6 oz/A	12	PF	
	OR *Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8- 14.5 fl oz/A	12	28	
	OR *Baythroid XL 1L	Fixed rate per acre	1.4-2.0 fl oz/A	12	7	
	OR Belt 4SC	see label	3-5 oz/A	12	14	
	OR *Danitol 2.4EC	Fixed rate per acre	16 fl oz/A	24	14	
	OR *Lannate 2.4L	0.75 pt/100 gal	1.5-3.0 pt/A	72	14	
	or *Lannate 90SP	0.25 lb/100 gal	0.5-1.0 lb/A			
	OR *Pounce 25WP	see label	6.4-25.6 oz/A	12	PF	
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	OR *Proclaim 5SG	0.8-1.2 oz/100 gal	3.2-4.8 oz/A	12 or 48 (E)	14	
	OR *Thionex 50WP	.75 lb/100 gal	4 lb/A	20 days	21	
	or *Thionex 3EC	0.5 qt	2.67 qt/A	7 days	21	
	OR Turismo		15-17 floz	12	14	
OR *Warrior II 2.08CS	Fixed rate per acre	1.28-2.56 fl oz/A	24	21		
The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.						

Table continued on next page.

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

<b>Pest</b>	<b>Product</b>	<b>Amt/100 gal. dilute</b> see Chapter 4 to estimate dilute gals./A	<b>Amt/A</b>	<b>REI</b> (hrs)	<b>PHI</b> (days)	<b>Comments</b> (see text)
<b>Petal Fall (continued)</b>						
<b>Green fruitworms</b> (continued)	*Endigo ZC	see label	5-6 fl oz/A	24	35	
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR *Voliam Flexi WDG	see label	4-7 oz/A	12	35	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>Mullein plant bug</b>	Actara 25WDG	see label	4.5-5.5 oz/A	12	35	[23.3]
	OR Assail 30SG	Fixed rate per acre	4 -8 oz/A	12	7	
	OR Calypso 4F	0.5-1.0 fl oz/100gal	2-4 fl oz/A	12	30	
The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.						
	*Voliam Flexi WDG	see label	4-7 oz/A	12	35	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>Obliquebanded leafroller</b>	§Agree WG 3.8WS	see label	1-2 lb/A	4	0	[24.2]
	OR Altacor 35WDG	see label	2.5-4.5 oz/A	4	5	
	OR *Ambush 25WP	see label	6.4-25.6 oz/A	12	PF	
	OR *Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8-14.5 fl oz/A	12	21	
	OR *Baythroid XL 1L	Fixed rate per acre	2.4-2.8 fl oz/A	12	7	
	OR Belt 4SC	see label	3-5 oz/A	12	14	
	OR §Biobit HP	see label	0.5-2 lb/A	4	0	
	OR *Danitol 2.4EC	Fixed rate per acre	16 fl oz/A	24	14	
	OR Delegate 25WG	Fixed rate per acre	4.5-7.0 oz/A	4	7	
	OR §Deliver 18WG	see label	0.5-2 lb/A	4	0	
	OR §Dipel 10.3DF	see label	0.5-2 lb/A	4	0	
	OR §Entrust 80WP or §Entrust 2SC	0.67-1 oz/100 gal see label	2-3 oz/A 6-10 fl oz/A	4	7	
	OR Intrepid 2F	see label	12-16 fl oz/A	4	14	
	OR §Javelin WG	0.13-1 lb/100 gal	0.5-4.0 lb/A	4	0	
	OR *Lannate 2.4LV or *Lannate 90SP	0.75 pt/100 gal 0.25 lb/100 gal	3.0 pt/A 1.0 lb/A	72 72	14 14	
	OR *Pounce 25WP	see label	6.4-25.6 oz/A	12	14	
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	OR *Proclaim 5SG	0.8-1.2 oz/100 gal	3.2-4.8 oz/A	12 or 48 (E)	14	
	OR *Rimon 0.83EC	see label	20-40 fl oz/A	12	14	
	OR SpinTor 2SC	Fixed rate per acre	6-10 fl oz/A	4	7	
OR Turismo		15-17 floz	12	14		
OR *Warrior II 2.08CS	Fixed rate per acre	1.3-2.5 fl oz/A	24	21		

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Petal Fall (continued)</b>						
<b>Obliquebanded leafroller</b> (continued)	The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.					
	*Endigo ZC	see label	5-6 fl oz/A	24	35	
	OR *Voliam Flexi WDG	see label	4-7 oz/A	12	35	[24.4]
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>Oystershell scale</b>	*Centaur 0.7WDG		34.5 oz/A	12	14	
	OR *Sevin 80WS, 80S	see label	1.88-3.75 lb/A	12	1	[24.1]
	or Sevin XLR Plus 4F	0.5 to 1.5 pt/100 gal	1.5-3 qt/A	12	3	
<b>Plum curculio</b>	Actara 25WDG	see label	4.5–5.5 oz/A	12	35	[25.1],
	OR Avaunt 30WDG	Fixed rate per acre	5–6 oz/A	12	14	[25.3]
	OR Calypso 4F	1-2 fl oz/100 gal	4–8 fl oz/A	12	30	
	OR Imidan 70W	0.75-1 lb/100 gal	2.1–5.3 lb/A	96 for workers; 14 Days public	7	
	OR *Leverage 360 1L	0.6-0.7 fl oz/100 gal	2.4–2.8 fl oz/A	12	7	
	OR *Voliam Xpress EC	Fixed rate per acre	6–12 oz/A	24	21	
	<i>Insecticide options with at least a “Fair” efficacy rating against Plum curculio</i>					
	*Asana XL 0.66EC	2-5.8 fl oz/100 gal	5–14.5 fl oz/A	12	21	
	OR Assail 30SG	Fixed rate per acre	4–8 oz/A	12	7	
	OR *Battalion 0.2L	Fixed rate per acre	7–14 fl oz/A	12	21	
	OR *Battalion 1.5 C	Fixed rate per acre	0.9–1.9 fl oz/A	12	21	
	OR *Baythroid XL 1L	Fixed rate per acre	2.4–2.8 fl oz/A	12	7	
	OR *Danitol 2.4EC	Fixed rate per acre	16 fl oz/A	24	14	
	OR Delegate 25WG	Fixed rate per acre	6–7 oz/A	4	7	
	OR *Endigo ZC	Fixed rate per acre	5–6 fl oz/A	24	35	
	OR *Lannate 2.4LV	0.75 pt/100 gal	3 pt/A	72	14	
	OR *Lannate 90SP	0.25 lb/100 gal	1 lb/A	72	14	
	OR *Pounce 25W	1.6-4 oz/100 gal	6.4–16 oz/A	12	PF	
	OR *Proaxis 0.5CS	see label	2.6–5.1 fl oz/A	24	21	
	OR Sevin XLR Plus, 4F	0.75–1.5 pt/100 gal	1–3 qt/A	12	3	
	OR Sevin 80S	0.45–0.9 lb/100 gal	1.9–3.75 lb/A	12	3	
	OR §Surround 95WP	25-50 lbs./100 gal	25–50 lb/A	4	0	[25.2]
	OR *Warrior 1CS	Fixed rate per acre	2.5–5.1 fl oz/A	24	21	
	OR *Warrior II 2CS	Fixed rate per acre	1.3–2.5 fl oz/A	24	21	
The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.						

Table continued on next page.



**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

<b>Pest</b>	<b>Product</b>	<b>Amt/100 gal. dilute</b> see Chapter 4 to estimate dilute gals./A	<b>Amt/A</b>	<b>REI</b> (hrs)	<b>PHI</b> (days)	<b>Comments</b> (see text)
<b>Petal Fall (continued)</b>						
<b>Plum curculio</b> (continued)	*Agri-Flex SC	1.5-2.0 fl oz/100 gal	5.5-8.5 fl oz/A	12	35	
	<i>plus</i> Horticultural spray oil	1 qt/100 gal	1 gal/A			
	OR *Voliam Flexi WDG	see label	6-7 oz/A	12	35	
<b>Redbanded leafroller</b>	§Agree WG 3.8WS	see label	1-2 lb/A	4	0	[27.2]
	OR Altacor 35WDG	see label	2.5-4.5 oz/A	4	5	
	OR *Baythroid XL 1L	Fixed rate per acre	2.4-2.8 fl oz/A	12	7	
	OR §Biobit HP	see label	0.5-2 lb/A	4	0	
	OR Belt 4SC	see label	3-5 oz/A	12	14	
	OR Delegate 25WG	Fixed rate per acre	4.5-7.0 oz/A	4	7	
	OR §Deliver 18WG	see label	0.5-2 lb/A	4	0	
	OR §Dipel 10.3DF	see label	0.5-2 lb/A	4	0	
	OR Imidan 70W	0.75-1 lb/100 gal	2.13-5.33 lb/A	96 for workers 14 days public	7	
	OR §Javelin WG	0.13-1 lb/100 gal	0.5-4.0 lb/A	4	0	
	OR *Lannate 2.4L	0.75 pt/100 gal	1.5-3.0 pt/A	72	14	
	OR *Lannate 90SP	0.25 lb/100 gal	0.5-1.0 lb/A			
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR *Proclaim 5SG	0.8-1.2 oz/100 gal	3.2-4.8 oz/A	12 or 48(E)	14	
	OR *Rimon 0.83EC	see label	20-40 fl oz/A	12	14	
OR Tourismo		15-17 floz	12	14		
The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.						
	*Endigo ZC	see label	5-6 fl oz/A	24	35	
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>Rosy apple aphid</b>	*Admire Pro 4.6SC	see label	2.8 fl oz/A	12	7	[28.4]
	OR Assail 30SG	Fixed rate per acre	2.5-4 oz/A	12	7	[27.4]
	OR Beleaf 50SG	see label	2.0-2.8 oz/A	12	21	
	OR Calypso 4F	0.5-1.0 fl oz/100gal	2-4 fl oz/A	12	30	
	OR *Lannate 2.4L	0.75 pt/100 gal	1.5-3.0 pt/A	72	14	
	or *Lannate 90SP	0.25 lb/100 gal	0.5-1.0 lb/A			
	OR Movento 240SC	see label	6-9 fl oz/A	24	7	
	OR *Thionex 50WP	.75 lb/100 gal	4 lb/A	20 days	21	
or *Thionex 3EC	0.5 qt/100 gal	2.67 qt/A	7 days	21		

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Petal Fall (continued)</b>						
<b>Rosy apple aphid</b> (continued)	The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.					
		*Leverage 360	see label	2.4-2.8 fl oz/A	12	7
	OR	*Voliam Flexi WDG	see label	6-7 oz/A	12	35
	OR	*Voliam Xpress EC	see label	6-12 fl oz/A	24	21
<b>San Jose Scale</b>	Movento 240 SC	see label	6-9 fl oz/A	24	7	[29.4]
<b>Spotted tentiform leafminer, Apple blotch leafminer</b>	Actara 25WDG	see label	4.5-5.5 oz/A	2	35	[29.2]
	OR	*Admire Pro 4.6SC	see label	2.8 fl oz/A	12	7
	OR	*Agri-Mek 0.15EC	2.5-5 oz/100 gal	10-20 fl oz/A	12	28
	OR	Altacor 35WDG	see label	2.5-4.0 oz/A	4	5
	OR	*Ambush 25WP	see label	6.4-25.6 oz/A	12	PF
	OR	*Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8-14.5 fl oz/A	12	21
	OR	Assail 30SG	Fixed rate per acre	2.5 oz/A	12	7
	OR	Avaunt 30WDG	Fixed rate per acre	5-6 fl oz/A	12	14
	OR	Actara 25WDG	see label	4.5-5.5 oz/A	2	35
	OR	Admire Pro	see label	2.8 oz/A	12	7
	OR	Altacor 35WDG	see label	2.5-4 oz/A	4	5
	OR	Assail 30SG	see label	2.5 oz/A	12	7
	OR	§Aza-Direct 1.2L	see label	16-24 fl oz/A	4	0
	OR	*Baythroid XL 1L	Fixed rate per acre	2.0-2.4 fl oz/A	12	7
	OR	Belt 4SC	see label	3-5 fl oz/A	12	14
	OR	Calypso 4F	0.5-1.0 fl oz/100gal	2-4 fl oz/A	12	30
	OR	*Danitol 2.4EC	Fixed rate per acre	10.7-16 fl oz/A	24	14
	OR	Delegate 25WG	Fixed rate per acre	4.5-7.0 oz/A	4	7
	OR	*Lannate 2.4L#	0.75 pt/100 gal	1.5-3.0 pt/A	72	14
	OR	§Entrust 80WP or §Entrust 2SC or *Lannate 90SP	0.67-1 oz/100 gal see label 0.25 lb/100 gal	2-3 oz/A 6-10 fl oz/A 0.5-1.0 lb/A	4	7
	OR	§Neemix 4.5L	see label	4-7 fl oz/A	12	0
	OR	*Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21
	OR	*Proclaim 5SG	0.8-1.2 oz/100 gal	3.2-4.8 oz/A	12 or 48 (E)	14
OR	*Rimon 0.83EC	see label	20-40 fl oz/A	12	14	
OR	Tourismo		12-17 floz	12	14	
OR	*Warrior II 2CS	Fixed rate per acre	1.3-2.5 fl oz/A	24	21	
The following pre-mix products are also labeled for use against these pests; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.						

Table continued on next page.

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Petal Fall (continued)</b>						
<b>Spotted tentiform leafminer, Apple blotch leafminer (continued)</b>	OR *Agri-Flex SC	1.5-2.0 fl oz/100 gal	5.5-8.5 fl oz/A	12	35	
	<i>plus</i> Horticultural spray oil	1 qt/100 gal	1 gal/A			
	OR *Endigo ZC	see label	5-6 fl oz/A	24	35	
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR *Voliam Flexi WDG	see label	4-7 oz/A	12	35	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>Tarnished plant bug</b>	*Ambush 25WP	see label	6.4-25.6 oz/A	12	PF	
	OR *Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8-14.5 fl oz/A	12	21	
	OR *Baythroid XL 1L	Fixed rate per acre	2.0 -2.4 fl oz/A	12	7	
	OR Beleaf 50SG	see label	2.0-2.8 oz	12	21	
	OR *Danitol 2.4EC	Fixed rate per acre	10.7-16 fl oz/A	24	14	
	OR Endigo ZC	Fixed rate per acre	5–6 oz/A	24	35	
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR *Pounce 25WP	see label	6.4-25.6 oz/A	12	PF	
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
	OR *Warrior II 2.08CS	Fixed rate per acre	1.28-2.56 fl oz/A	24	21	
<b>White apple leafhopper, Rose leafhopper, Potato leafhopper</b>	Actara 25WDG	see label	2-2.75 oz/A	12	14	[32.1]
	OR Admire Pro 4.6SC	see label	2.8 fl oz/A	12	7	
	OR *Agri-Mek 0.15EC	2.5-5 fl oz/100 gal	10-20 fl oz/A	12	28	
	OR *Ambush 25WP	see label	6.4-25.6 oz/A	12	PF	
	OR *Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8-14.5 fl oz/A	12	28	
	OR Assail 30SG	Fixed rate per acre	2.5-4 oz/A	12	7	
	OR Avaunt 30WDG	Fixed rate per acre	5-6 oz/A	12	14	
	OR §Aza-Direct 1.2L	see label	16-24 fl oz/A	4	0	
	OR *Baythroid XL 1L	Fixed rate per acre	1.4 -2.0 fl oz/A	12	7	
	OR Calypso 4F	0.5-1.0 fl oz/100gal	2-4 fl oz/A	12	30	
	OR *Centaur 0.7WDG	see label	34.5 oz/A	12	14	
	OR *Danitol 2.4EC	Fixed rate per acre	10.67-16 fl oz/A	24	14	
	OR *Lannate 90SP	0.25 lb/100 gal	0.5-1.0 lb/A			
	OR §Neemix 4.5L	see label	7-16 fl oz/A	12	0	
	OR Portal 0.4L	1 pt/100 gal	2 pt/A	12	14	
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	OR Sevin 80S	1.5 lb/100 gal	0.63-0.88 lb/A	12	3	
	or Sevin XLR Plus, 4F	0.25-0.75 pt/100 gal	0.5-1.5 qt/A			
	OR *Thionex 50WP	.75 lb/100 gal	4 lb/A	20 days	21	
	or *Thionex 3EC	0.5 qt/100 gal	2.67 qt/A	7 days	21	
	OR *Warrior II 2.08CS	Fixed rate per acre	1.28-2.56 fl oz/A	24	21	

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Petal Fall (continued)</b>						
<b>White apple leafhopper,</b> <b>Rose leafhopper,</b> <b>Potato leafhopper (continued)</b>	The following pre-mix products are also labeled for use against these pests; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.					
	*Agri-Flex SC	1.5-2.0 fl oz/100 gal	5.5-8.5 fl oz/A	12	35	
	<i>plus</i> Horticultural spray oil	1 qt/100 gal	1 gal/A			
	OR *Endigo ZC	see label	5-6 fl oz/A	24	35	
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR *Voliam Flexi WDG	see label	4-7 oz/A	12	35	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
	OR *Vydate 2L	1 pt/100 gal	2-4 pt/A	48	14	
<b>Additional Summer Sprays</b>						
<b>Apple rust diseases</b>	Refer to Pink sprays for materials and comments					
<b>Apple scab</b>	Captan 50WP	1-2 lb/100 gal	4-8 lb/A	24	0	[2.91]
	or Captan 80 WDG	0.65-1.25 lb/100 gal	2.5-5 lb/A	24	0	
	or Captec or Captan 4L	0.5- 1 qt/100 gal		24	0	
	OR Dithane/Manzate/ Penncozeb 75DF	1 lb/100 gal	3 lb/A	24	77	[2.10]
	or Manzate/Dithane/ Penncozeb Flowables	see label	2.4 qt/A	24	77	
	or Polyram DF	1 lb/100 gal	3 lb/A	24	77	
	OR Flint 50WG	0.67-0.8 oz/100 gal		12	14	[2.4, 2.14]
	OR Sovran 50WG	1.0-1.6 oz/100 gal	4-6 oz/A	12	30	[2.4, 2.14]
	OR Cabrio EG		12 oz/A	12	0	[2.14]
	OR Topsin M 70WP	4-6 oz/100 gal	0.75-1 lb/A	48	1	[2.12]
	or Thiophanate-methyl 85WDG	.2-.3 lb/100 gal	.6-.8 lb/A	48	1	
	<i>plus:</i> Captan 50WP	1 lb/100 gal	4 lb/A	24(E)	0	
	or Captan 80WP	5/8 lb/100 gal	2.5 lb/A			
	or Captec or Captan 4L	1 pt/100 gal	2 qt/A			
	or Dithane/Manzate/ Penncozeb 75DF	1 lb/100 gal	3 lb/A	24	77	[2.2]
	or Manzate/Dithane/ Penncozeb Flowables	see label	2.4 qt/A	24	77	[1.3, 2.2]
	or Polyram DF	1 lb/100 gal	3 lb/A	24	77	[2.2]
	OR Rally 40WSP		5-8 oz/A	24	14	[2.5],[2.13]
	or Vintage SC	2-4 fl oz/100 gal	6-12 fl oz/A	24	30	
	or Procure 50WS	3-5 oz/100 gal		12	14	
	or Topguard		13 fl oz/A	12	14	[2.13]
	or Inspire Super		8 oz/A	12	72	

Table continued on next page.

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

<b>Pest</b>	<b>Product</b>	<b>Amt/100 gal. dilute</b> see Chapter 4 to estimate dilute gals./A	<b>Amt/A</b>	<b>REI</b> (hrs)	<b>PHI</b> (days)	<b>Comments</b> (see text)
<b>Additional Summer Sprays (continued)</b>						
<b>Apple scab</b> (continued)	or Tebuzol 45DF	2 oz/100 gal	4-8 oz/A	120	75	
	<i>plus:</i>					
	or Captec or Captan 4L	1 pt/100 gal				
	or Manzate/ Penncozeb 75DF, 80WP	1 lb/100 gal	2.5 lb/A	24	77	
	or Manzate/Dithane/ Penncozeb Flowables		2.4 qt/A	24	77	[1.3], [2.2]
	or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A	24	77	
	<i>OR</i> Fontelis 1.67 SC	5.3-6.7 fl oz/100 gal	16-20 fl oz/A	12	28	
	or Luna Tranquility 500SC	3.7-5.3 fl oz/100 gal	11.2-16 fl oz/A	12	72	
	or Luna Sensation 500SC	3.3-1.9 fl oz/100 gal	4-5.8 fl oz/A	12	14	
	or Merivon 4.17SC		4-5.5 fl oz/A	12	0	
	<i>plus:</i>					
	Captan 50WP	1 lb/100 gal		24 (E)	0	
	or Captan 80WDG	0.65-1.25 lb/100 gal	2.5 lb/A			
	or Captec or Captan 4L	1 pt/100 gal				
	or Manzate/ Penncozeb 75DF, 80WP	1 lb/100 gal	2.5 lb/A	24	77	
or Polyram 80DF	1-2 lb/100 gal	3-6 lb/A	24	77		
<i>OR</i> (§) sulfur	5 lb/100 gal	10-20 lb/A	24			
<b>Bitter Rot</b>	Captan 50WP	1 lb/100 gal	4 lb/A	24 (E)	0	[3.1]
	or Captan 80WDG	5/8 lb/100 gal	2.5 lb/A	24	0	
	or Captan 4L	1 pt/100 gal		24	0	
<b>Black rot, White rot</b>	Cabrio EG		12 oz/A	12	0	
	<i>OR</i> Captan 50WP	1-2 lb/100 gal		24 (E)	0	[4.3]
	or Captan 80WP	0.65-1.25 lb/100 gal				
	or Captec or Captan 4L	0.5-1 qt/100 gal				
	<i>OR</i> Flint 50WG	0.5 oz/100 gal	1.5 oz/A	12	14	[2.14]
	<i>OR</i> Sovran 50WG	1.0-1.6 oz/100 gal	4-6.4 oz/A	12	30	[2.14]
	<i>OR</i> Pristine 38WP		14.5-18.5 oz/A	12	0	
	<i>OR</i> Topsin M 70WP	4-6oz/100 gal	0.75-1 lb/A	48	1	[10.3], [10.4]
	<i>plus:</i>					
	Captan 50WP	1 lb/100 gal	4 lb/A	24(E)	0	
	or Captan 80WP	5/8 lb/100 gal	2.5 lb/A			
	or Captec or Captan 4L	1 pt/100 gal	2 qt/A			
or Dithane/Manzate/ Penncozeb 75DF	1 lb/100 gal	3 lb/A	24	77		
or Manzate/Dithane/ Penncozeb Flowables	see label	2.4 qt/A	24	77		
or Polyram DF	1 lb/100 gal	3 lb/A	24	77		

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

<b>Pest</b>	<b>Product</b>	<b>Amt/100 gal. dilute</b> see Chapter 4 to estimate dilute gals./A	<b>Amt/A</b>	<b>REI</b> (hrs)	<b>PHI</b> (days)	<b>Comments</b> (see text)
<b>Additional Summer Sprays (continued)</b>						
<b>Blister spot</b>	Aliette 80WDGor Polyram DF	0.5-1 lb/100 gal1 lb/100 gal	3 lb/A	12/24	14/77	[5.1]
<b>Fire blight</b> (Shoot blight)	Apogee 27.5DF	6-12 oz/100 gal		12	45	
(Shoot blight, after hailstorm ONLY)	OR Agri-Mycin 17WP, or Firewall 17WP	0.5 lb/100 gal	24-48 oz/A	12	50	
<b>Powdery mildew</b>	Indar 2F		6-8 fl oz/A	12	14	
	OR Inspire Super MP		8.5-12 fl oz/A	12	14	
	OR JMS Stylet-Oil	1-2% solution		12	0	[9.3]
	OR Rally 40WSP		5-8 oz/A	24	14	[2.11]
	OR *Procure 50WS	3-5 oz/100 gal		12	14	
	OR Vintage SC	3 fl oz/100 gal		24	30	
<b>Sooty blotch and Flyspeck</b>	Cabrio EG		12 oz/A	12	0	
	OR Indar 2F		6-8 fl oz/A	12	14	
	OR Topsin M 70WP, WDG or Thiophanate-methyl 85WDG	4-6 oz/100 gal .2-.3 lb/100 gal	0.75-1 lb/A .6-.8 lb/A	48	1	[10.1], [10.2]
	<i>plus:</i> Captan 50WP or Captan 80WDG or Captan 4L or Manzate/ Penncozeb 75DF or 80WP or Manzate/Dithane/ Penncozeb Flowable or Polyram 80DF	1 lb/100 gal 5/8 lb/100 gal 1 pt/100 gal 1 lb/100 gal see label 1 lb/100 gal	4 lb/A 2.5 lb/A 24 (E) 24 24 3 lb/A 2.4 qt/A 3 lb/A	24 24 24 24 24 24 24	0 0 0 77 77 77	[2.8]
	OR Flint 50WG	0.67-0.8 oz/100 gal	2-2.5 oz/A	12	14	
	OR Pristine 38WP		14.5-18.5/A	12	0	
	OR Sovran 50WG	1.0-1.6 oz/100 gal	4-6.4 oz/A	12	30	[2.14]
	OR Ziram 76DF, 76WDG	1 lb/100 gal		48	14	
	OR Ziram 76DF, 76WDG	1 lb/100 gal		48	14	[10.5]
	<i>Plus:</i> Sulfur 95WP	2 lb/100 gal		24		
<b>Apple aphid, Spirea aphid</b>	*Admire Pro 4.6SC	see label	2.8 fl oz/A	12	7	[11.1]
	OR *Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8- 14.5 fl oz/A	12	28	[11.1]
	OR Assail 30SG	Fixed rate per acre	2.5-4.0 oz/A	12	7	
	OR §Aza-Direct 1.2L	see label	16-24 fl oz/A	4	0	
	OR Beleaf 50SG	see label	2.0-2.8 oz/A	12	21	
	OR Calypso 4F	0.5-1.0 fl oz/100gal	2-4 fl oz/A	12	30	
	OR *Danitol 2.4EC	Fixed rate per acre	16 fl oz/A	24	14	
	OR *Lannate 2.4L	0.75 pt/100 gal	1.5-3.0 pt/A	72	14	

Table continued on next page.

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Additional Summer Sprays (continued)</b>						
Apple aphid,	or *Lannate 90SP	0.25 lb/100 gal	0.5-1.0 lb/A			
Spirea aphid (continued)	OR Movento 240SC	see label	6-9 fl oz/A	24	7	
	OR §M-Pede 49L	2 gal/100 gal	see label	12	0	
	OR §Neemix 4.5L	see label	5-7 fl oz/A	12	0	
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	OR Pyrenone 0.5EC	see label	12 fl oz/A	12	1	
	OR *Thionex 50WP	.75 lb/100 gal	4 lb/A	20 days	21	
	or *Thionex 3EC	0.5 qt/100 gal	2.67 qt/A	7 days	21	
	OR *Vydate 2L	1-2 pt/100 gal	2-8 pt/A	48	14	
	OR *Warrior II 2.08CS	Fixed rate per acre	1.28-2.56 fl oz/A	24	21	
The following pre-mix products are also labeled for use against these pests; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.						
	*Agri-Flex SC	1.5-2.0 fl oz/ 100 gal	5.5-8.5 fl oz/A	12	35	
	plus Horticultural spray oil	1 qt/100 gal	1 gal/A			
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR *Voliam Flexi WDG	see label	6-7 oz/A	12	35	
	plus Horticultural spray oil	1 qt/100 gal	1 gal/A			
Apple maggot	*Asana XL	2–5.8 fl oz	4.8–14.5 oz./A	12	21	[12.1]
	OR Assail 30SG	Fixed rate per acre	8 oz/A	12	7	
	OR *Baythroid XL 1L	Fixed rate per acre	2.4–2.8 fl oz/A	12	7	
	OR Calypso 4F	1–2 fl oz	4–8 fl oz/A	12	30	
	OR *Danitol 2.4EC	Fixed rate per acre	16 fl oz/A	24	14	
	OR Endigo ZC	Fixed rate per acre	5–6 fl oz/A	24	35	
	OR Imidan 70W	0.75–1 lb/100 gal	2.1–5.3 lb/A	96 for workers; 14 days public	7	
	OR §Surround 95WP	25–50 lb/100 gal	25–50 lb/A	4	0	[12.2]
	OR *Warrior 1CS	Fixed rate per acre	2.5–5.1 fl oz/A	24	21	
	OR *Warrior II 2CS	Fixed rate per acre	1.3–2.5 fl oz/A	24	21	
<i>Insecticide options below have at least a “Fair” efficacy rating for Apple maggot</i>						
	Altacor 35WDG	see label	2.5–4.5 oz/A	4	5	
	OR Avaunt 30WDG	Fixed rate per acre	5–6 oz/A	12	14	[12.2]
	OR *Battalion 0.2L	Fixed rate per acre	7–14 fl oz/A	12	21	
	OR *Battalion 1.5 C	Fixed rate per acre	0.9–1.9 fl oz/A	12	21	
	OR Delegate 25WG	Fixed rate per acre	6–7 oz/A	4	7	

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Additional Summer Sprays (continued)</b>						
<b>Apple maggot</b> (continued)	OR §Entrust 80WP	0.67–1 oz/100 gal	2–3 oz/A	4	7	
	OR GF-120 Requires splatter droplet applicator	10–20 oz/A	4	0?		
	OR *Lannate 2.4L	0.75 pt/100 gal	1.5–3 pt/A	72	14	
	OR Sevin XLR Plus, 4F	0.75–1.5 pt/100 gal	1–3 qt/A	12	3	
	OR Sevin 80S	0.45–0.9 lb/100 gal	1.88–3.75 lb/A	12	3	
	OR §Surround 95WP	25–50 lb/100 gal	25–50 lb/A	4	0	[12.2]
The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.						
	*Endigo ZC	see label	5-6 fl oz/A	24	35	
	OR *Voliam Xpress EC	Fixed rate per acre	6–12 fl oz/A	24	21	
<b>Apple rust mite</b>	Nexter 75WS	see label	5.2–10.7 oz/A	12	25	[13.2]
	OR Portal 0.4EC	see label	2 pt/A	12	14	
<b>Codling moth</b>	Altacor 35WDG	see label	2.5–4.5 oz/A	4	5	[14.1], [14.3]
	OR Assail 30SG	Fixed rate per acre	4–8 oz/A	12	7	
	OR Belt 4SC	see label	3–5 fl oz/A	12	14	
	OR Calypso 4F	1–2 fl oz/100 gal	4–8 fl oz/A	12	30	
	OR §Carpovirusine 0.99SC	see label	6.8-13.5 fl oz/A	4	0	[14.3]
	OR §Cyd-X 0.06SC	see label	1–6 fl oz/A	4	0	[14.3]
	OR Delegate 25WG	Fixed rate per acre	4.5–7.0 oz/A	4	7	
	OR *Guthion 50WS	0.5 lb/100 gal	2–3 lb/A	14 days(E)	14/21	
	OR Imidan 70W	0.75 lb/100 gal	2.13–5.33 lb/A	96 for workers 14 Days public	7	
	OR *Lannate 2.4L	1.5 pt/100 gal	1.5–3.0 pt/A	72	14	
	OR *Lannate 90SP	0.25 lb/100 gal	0.5–1.0 lb/A			
	OR *Leverage 360	see label	2.4–2.8 fl oz/A	12	7	
	OR *Rimon 0.83EC	See label	20–40 fl oz/A	12	14	
OR *Voliam Xpress EC	Fixed rate per acre	6–12 fl oz/A	24	21		
<i>Insecticide options below have at least a “Fair” efficacy rating for Codling moth</i>						
	OR *Asana XL 0.66EC	2–5.8 fl oz/100 gal	4.8–14.5 fl oz/A	12	21	
	OR Avaunt 30WDG	Fixed rate per acre	5–6 oz/A	12	14	
	OR §Aza-Direct 1.2L	see label	16-24 fl oz/A	4	0	
	OR *Battalion 0.2L	Fixed rate per acre	7–14 fl oz/A	12	21	
	OR *Battalion 1.5 C	Fixed rate per acre	0.9–1.9 fl oz/A	12	21	
	OR *Baythroid XL 1L	Fixed rate per acre	2.0–2.4 fl oz/A	12	7	

Table continued on next page.



**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)	
<b>Additional Summer Sprays (continued)</b>							
<b>Codling moth</b> (continued)	OR Belay (with suppl. Label)	1.5 – 3 fl oz/100 gal	6 – 12 fl oz/A	12	7		
	OR §Biobit HP	see label	0.5-2 lb/A	4	0		
	OR *Danitol 2.4EC	Fixed rate per acre	16–21.3 fl oz/A	24	14		
	OR §Deliver 18WG	see label	0.5–2 lb/A	4	0		
	OR §Dipel 10.3DF	see label	0.5–2 lb/A	4	0		
	OR §Entrust 80WP	0.67–1 oz/100 gal	2–3 oz/A	4	7		
	OR Esteem 35WP	Fixed rate per acre	4–5 oz/A	24	45		
	OR Intrepid 2F	see label	12–16 fl oz/A	4	14		
	OR §Neemix 4.5L	see label	7–16 fl oz/A	12	0		
	OR Mating disruption:					[14.2]	
		Checkmate CM-F or §Isomate-C TT	Fixed rate per acre	2.4-4.8 fl oz/A 200 ties/A	4 0	0 0	
		or §Checkmate CM- OFM Duel	150–200 ties/A	0	0		
		or §Isomate-CM/OFM TT		200 ties/A	0	0	
		OR *Mustang Max	0.33–1 oz/100 gal	1.28–4 oz/A	12	14	
		OR *Proclaim 5SG	0.8–1.2 oz/100 gal	3.2–4.8 oz/A	12 or 48 (E)	14	
		OR Sevin XLR Plus, 4F	0.5–1.5 pt/100 gal	1–3 qt/A	12	3	
		OR Sevin 80S	0.3–0.9 lb/100 gal	1.25–3.75 lb/A	12	3	
		OR §Surround 95WP	25–50 lb/100 gal.	25–50 lb/A	4	0	[12.2]
		OR Turismo	Fixed rate per acre	15–17 fl oz/A	12	14	
		OR *Warrior 1CS	Fixed rate per acre	2.6-5.1 fl oz/A	24	21	
	OR *Warrior II 2.08CS	Fixed rate per acre	1.3-2.5 fl oz/A	24	21		
The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.							
	*Endigo ZC	see label	5-6 fl oz/A	24	35		
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7		
	OR *Voliam Flexi WDG	see label	4-7 oz/A	12	35		
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21		
<b>Comstock mealybug</b>	Assail 30SG	Fixed rate per acre	4-8 oz/A	12	7	[15.3]	
	OR *Centaur 0.7WDG	See label	34.5 oz/A	12	14		
	OR Movento	see label	6-9 fl oz/A	24	7		
	OR Portal 0.4EC	see label	2 pt/A	12	14		
The following pre-mix product is also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, its use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.							

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Additional Summer Sprays (continued)</b>						
<b>Comstock mealybug</b> (continued)	*Agri-Flex SC	1.5-2.0 fl oz/	5.5-8.5 fl oz/A	12	35	
	plus: Horticultural spray oil	1 qt/100 gal	1 gal/A			
<b>Cutworms</b>	§Biobit HP	see label	0.5-2 lb/A	4	0	[16.2]
	OR §Dipel 10.3DF	see label	0.5-2 lb/A	4	0	
	OR *Lannate 2.4L#	0.75 pt/100 gal	1.5-3.0 pt/A	72	14	
<b>Dogwood borer, American plum borer</b>	Assail 30SG	Fixed rate per acre	8 oz/A	12	7	[17.1]
	OR *Lorsban 4EC	1.5 qt/100 gal/A	Trunk spray	96	28	
	or Lorsban 75WG	2 lb/100 gal/A	Trunk spray	96	28	
	or *Lorsban Advanced 3.8L	1.5-4 pt/100 gal/A	Trunk spray	96	28	
<b>European corn borer</b>	§Dipel 10.3DF	see label	0.5-2 lb/A	4	0	[19.2]
	OR *Lannate 2.4L	0.75 pt/100 gal	1.5-3.0 pt/A	72	14	
<b>European red mite, Twospotted spider mite</b>	Acramite 50WS	see label	0.75-1.0 lb/A	12	7	[20.11]
	OR *Agri-Mek 0.15EC	2.5-5 oz/100 gal	10-20 fl oz/A	12	28	[20.8]
	OR Apollo 4SC	1-2 fl oz/100 gal	4-8 fl oz/A	12	45	[20.11]
	OR Envidor 2SC		16-18 fl oz/A	12	7	[20.11]
	OR Kanemite 15SC	see label	31 fl oz/A	12	14	[20.11]
	OR Nexter 75 WS	see label	4.4-5.2 oz/A	12	25	[20.11]
	OR Omni Supreme	0.5-2 gal/100 gal	see label	12	0	[20.10]
	OR Onager 1EC	see label	12-24 fl oz/A	12	28	[20.11]
	OR Portal 0.4EC	see label	1-2 pt/A	12	14	[20.11]
	OR Savey 50DF	see label	3-6 oz/A	12	28	
	OR §Stylet-Oil	0.5-2 gal/100 gal	see label	12	0	[20.10]
	OR *Vendex 50WP	4-8 oz/100 gal	1-2 lb/A	48	14	
	OR Zeal 72WS	see label	2-3 oz/A	12	14	[20.11]
<b>Japanese beetle</b>	Assail 30SG	Fixed rate per acre	5-8 oz/A	12	7	
	OR Calypso 4F	1-2 fl oz/100 gal	4-8 fl oz/A	12	30	
	OR Sevin XLR Plus, 4F	0.75-1.5 pt/100 gal	1.5-3.0 qt/A	12	3	
	or Sevin 80S, 80WS	see label	1.88-3.75 lb/A	12	3	
	The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.					
	*Endigo ZC	see label	5-6 fl oz/A	24	35	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>Obliquebanded leafroller</b>	§Agree WG 3.8WS	see label	1-2 lb/A	4	0	
	OR Altacor 35WDG	see label	2.5-4.5 oz/A	4	5	
	OR *Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8-14.5 fl oz/A	12	21	
	OR *Baythroid XL 1L	Fixed rate per acre	2.4-2.8 fl oz/A	12	7	

Table continued on next page.

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Additional Summer Sprays (continued)</b>						
<b>Obliquebanded leafroller</b> (continued)	OR Belt 4SC	see label	3-5 fl oz/A	12	14	
	OR §Biobit HP	see label	0.5-2 lb/A	4	0	
	OR *Danitol 2.4EC	Fixed rate per acre	16 fl oz/A	24	14	
	OR Delegate 25WG	Fixed rate per acre	4.5-7.0 oz/A	4	7	
	OR §Deliver 18WG	see label	0.5-2 lb/A	4	0	
	OR §Dipel 10.3DF	see label	0.5-2 lb/A	4	0	
	OR §Entrust 80WP	0.67-1 oz/100 gal	2-3 oz/A	4	7	
	OR Intrepid 2F	see label	12-16 fl oz/A	4	14	
	OR §Javelin WG	0.13-1 lb/100 gal	0.5-4.0 lb/A	4	0	
	OR *Lannate 2.4L	0.75 pt/100 gal	1.5-3.0 pt/A	72	14	
	OR or *Lannate 90SP	0.25 lb/100 gal	0.5-1.0 lb/A			
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	12	
	OR *Proclaim 5SG	0.8-1.2 oz/100 gal	3.2-4.8 oz/A	12 or 48 (E)	14	
	OR *Rimon 0.83EC	see label	20-40 fl oz/A	12	14	
	OR SpinTor 2SC	Fixed rate per acre	6-10 fl oz/A	4	7	
	OR Tourismo		15-17 floz	12	14	
OR *Warrior II 2.08CS	Fixed rate per acre	1.28-2.56 fl oz/A	24	21		
The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.						
	*Endigo ZC	see label	5-6 fl oz/A	24	35	
	OR *Voliam Flexi WDG	see label	4-7 oz/A	12	35	[24.4]
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>Oriental fruit moth, Lesser apple worm</b>	Altacor 35WDG	See label	.5-4.5 oz/A	4	5	[14.4]
	OR *Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8-14.5 fl oz/A	12	21	
	OR Assail 30SG	Fixed rate per acre	5-8 oz/A	12	7	
	OR Avaunt 30WDG	Fixed rate per acre	5-6 oz/A	12	14	
	OR *Baythroid XL 1L	Fixed rate per acre	2.0-2.4 fl oz/A	12	7	
	OR Belt 4SC	see label	3-5 fl oz/A	12	14	
	OR Calypso 4F	1-2 fl oz/100 gal	4-8 fl oz/A	12	30	
	OR Delegate 25WG	Fixed rate per acre	4.5-7.0 oz/A	4	7	
	OR Imidan 70W	0.75-1 lb/100 gal	2.13-5.33 lb/A	96 for workers 14 days public	7	
	OR Intrepid 2F	see label	12-16 fl oz/A	4	14	
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR *Rimon 0.83EC	see label	20-40 fl oz/A	12	14	

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)	
<b>Additional Summer Sprays (continued)</b>							
<b>Oriental fruit moth, Lesser apple worm (continued)</b>	OR	Tourismo	15-17 fl oz	12	14		
	OR	*Warrior II 2.08CS	Fixed rate per acre	1.28-2.56 fl oz/A	24	21	
	OR	(§)Pheromone disruption: Checkmate OFM-F or Isomate-M 100 or §Checkmate CM-OFM Duel or §Isomate-CM/OFM TT	see label	1.32-2.93 fl oz/A 100 ties/acre 150-200 dispensers/A 200 ties/A	0 0 0 0	0 0 0 0	
	The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.						
			*Endigo ZC	see label	5-6 fl oz/A	24	35
	OR	*Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR	*Voliam Flexi WDG	see label	4-7 oz/A	12	35	
	OR	*Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>Redbanded leafroller</b>		§Aagree WG 3.8WS	see label	1-2 lb/A	4	0	
	OR	Altacor 35WDG	see label	2.5-4.5 oz/A	4	5	
	OR	*Baythroid XL 1L	Fixed rate per acre	2.4-2.8 fl oz/A	12	7	
	OR	Belt 4SC	see label	3-5 fl oz/A	12	14	
	OR	§Biobit HP	see label	0.5-2 lb/A	4	0	
	OR	Delegate 25WG	Fixed rate per acre	4.5-7.0 oz/A	4	7	
	OR	§Deliver 18WG	see label	0.5-2 lb/A	4	0	
	OR	§Dipel 10.3DF	see label	0.5-2 lb/A	4	0	
	OR	Imidan 70W	0.75-1 lb/100 gal	2.13-5.33 lb/A	96 for workers 14 days public	7	
	OR	§Javelin WG	0.13-1 lb/100 gal	0.5-4.0 lb/A	4	0	
	OR	*Lannate 2.4L or *Lannate 90SP	0.75 pt/100 gal 0.25 lb/100 gal	1.5-3.0 pt/A 0.5-1.0 lb/A	72	14	
	OR	*Proclaim 5SG	0.8-1.2 oz/100 gal	3.2-4.8 oz/A	12 or 48(E)	14	
	OR	*Rimon 0.83EC	see label	20-40 fl oz/A	12	14	
	OR	Tourismo		15-17 fl oz	12	14	
	The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.						
		*Endigo ZC	see label	5-6 fl oz/A	24	35	

Table continued on next page.

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

<b>Pest</b>	<b>Product</b>	<b>Amt/100 gal. dilute</b> see Chapter 4 to estimate dilute gals./A	<b>Amt/A</b>	<b>REI</b> (hrs)	<b>PHI</b> (days)	<b>Comments</b> (see text)
<b>Additional Summer Sprays (continued)</b>						
<b>Redbanded leafroller</b> (continued)	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>San Jose scale</b>	Assail 30SG	Fixed rate per acre	8 oz/A	12	7	[28.4]
	OR Admire Pro	see label	2.8 fl oz/A	12	7	
	OR *Centaur 0.7WDG	see label	34.5 oz/A	12	14	
	OR *Diazinon 50WP	1 lb/100 gal	see label	96	21	
	OR Endigo ZC	Fixed rate per acre	5-6 fl oz/A	24	35	
	OR Esteem 35WP	see label	4-5 oz/A	24	45	
	OR *Guthion 50WS	8-10 oz/100 gal	2-3 lb/A	14 days (E)	14/21	
	OR Imidan 70W	0.75-1 lb/100 gal	2.13-5.33 lb/A	96 for workers 14 days public	7	
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR Movento 240SC	see label	6-9 fl oz/A	24	7	
OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21		
<b>Spotted tentiform leafminer, Apple blotch leafminer</b>	Actara 25WDG	see label	4.5-5.5 oz/A	12	35	[29.3]
	OR Admire Pro 4.6SC	see label	2.8 fl oz/A	12	7	
	OR Altacor 35WDG	see label	2.5-4.0 oz/A	4	5	
	OR *Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8-14.5 fl oz/A	12	28	
	OR Assail 30SG	Fixed rate per acre	2.5 oz/A	12	7	
	OR §Aza-Direct 1.2L	see label	16-24 fl oz/A	4	0	
	OR *Baythroid XL 1L	Fixed rate per acre	2.0-2.4 fl oz/A	12	7	
	OR Belt 4SC	see label	3-5 oz/A	12	14	
	OR Calypso 4F	0.5-1 fl oz/100 gal	2-4 fl oz/A	12	30	
	OR *Danitol 2.4EC	Fixed rate per acre	10.7-16 fl oz/A	24	14	
	OR Delegate 25WG	Fixed rate per acre	4.5-7.0 oz/A	4	7	
	OR *Lannate 2.4L#	0.75 pt/100 gal	1.5-3.0 pt/A	72	14	
	OR *Lannate 90SP	0.25 lb/100 gal	0.5-1.0 lb/A			
	OR §Neemix 4.5L	see label	4-7 fl oz/A	12	0	
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	OR *Proclaim 5SG	0.8-1.2 oz/100 gal	3.2-4.8 oz/A	12 or 48 (E)	14	
	OR *Rimon 0.83EC	see label	20-40 fl oz/A	12	14	
OR Turismo		12-17 floz	12	14		
OR *Vydate 2L#	0.5-1 pt/100 gal	1-2 pt/A	48	14		
OR *Warrior II 2.08CS	Fixed rate per acre	1.28-2.56 fl oz/A	24	21		

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Additional Summer Sprays (continued)</b>						
<b>Spotted tentiform leafminer, Apple blotch leafminer (continued)</b>	The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.					
	*Agri-Flex SC	1.5-2.0 fl oz/100 gal	5.5-8.5 fl oz/A	12	35	
	<i>plus:</i>					
	Horticultural spray oil	1 qt/100 gal	1 gal/A			
	OR *Endigo ZC	see label	5-6 fl oz/A	24	35	
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
OR *Voliam Flexi WDG	see label	4-7 oz/A	12	35		
OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21		
<b>Spotted wing Drosophila</b>	Delegate 25 WG	see label	4.5-7 oz/A	4	7	
	OR Entrust 80WP or Entrust 2SC	see label	1.5-3 oz/A 6-10 fl oz	4	7	
	OR Imidan 70W	.75-1 lb/100 gal	2.13-5.75 lb/A	96 for workers 14 days public	7	
<b>Stinkbugs, including Brown marmorated stinkbug</b>	OR Actara 25WDG	see label	4.5-5.5 oz/A	12	35	
	OR Asana XL	2-5.8 fl oz/100 gal	4.8-14.5 fl oz/A	12	21	
	OR Baythroid XL	see label	2-2.4 fl oz/A	12	7	
	OR Danitol 2.4EC	see label	10.7-21.3 fl oz/A	24	14	
	OR Lannate 2.4LV	see label	2.25 pt/A	96	14	
	OR Lannate 90SP	see label	.75 lb/A	96	14	
	OR Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	OR Surround 95WP	see label	25-50lb/A	4	0	
	OR Vydate 2L	see label	1.5-3 pt/A	48	14	
	OR Warrior 1CS	see label	2.6-5.1 fl oz/A	24	21	
	OR Warrior II 2.08CS	see label	1.28-2.56 fl oz/A	24	21	
The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.						
	*Endigo ZC	see label	5-6 fl oz/A	24	35	
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
<b>Variegated leafroller, Sparganothis fruitworm</b>	§Biobit HP	see label	0.5-2 lb/A	4	0	[31.1]
	OR §Deliver 18WG	see label	0.5-2 lb/A	4	0	
	OR §Dipel 10.3DF	see label	0.5-2 lb/A	4	0	
	OR §Javelin WG	0.13-1 lb/100 gal	0.5-4.0 lb/A	4	0	

Table continued on next page.

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Additional Summer Sprays (continued)</b>						
Variegated leafroller, Sparganothis fruitworm (continued)	OR *Lannate 2.4L	0.75 pt/100 gal	1.5-3.0 pt/A	72	14	
	or *Lannate 90SP	0.25 lb/100 gal	0.5-1.0 lb/A			
	OR Tourismo		12-17 floz	12	14	
	The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.					
	*Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
OR *Voliam Xpress EC	see label		6-12 fl oz/A	24	21	
White apple leafhopper, Rose leafhopper, Potato leafhopper	Actara 25WDG	see label	2-2.75 oz/A	12	14	[33.1]
	OR *Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8-14.5 fl oz/A	12	28	
	OR Admire Pro	see label	1.4-2.8 fl oz/A	12	7	[33.2]
	OR Assail 30SG	Fixed rate per acre	2.5-4.0 oz/A	12	7	
	OR Avaunt 30WDG	Fixed rate per acre	5-6 oz/A	12	14	
	OR §Aza-Direct 1.2L	see label	16-24 fl oz/A	4	0	
	OR *Baythroid XL 1L	Fixed rate per acre	1.4-2.0 fl oz/A	12	7	
	OR Calypso 4F	0.5-1 fl oz/100 gal	2-4 fl oz/A	12	30	
	OR *Centaur 0.7WDG	see label	34.5 oz/A	12	14	
	OR *Danitol 2.4EC	Fixed rate per acre	10.7-16 fl oz/A	24	14	
	OR *Lannate 2.4L#	0.75 pt/100 gal	1.5-3.0 pt/A	72	14	
	or *Lannate 90SP	0.25 lb/100 gal	0.5-1.0 lb/A			
	OR §Neemix 4.5L	see label	7-16 fl oz/A	12	0	
	OR Portal 0.4L	1 pt/100 gal	2 pt/A	12	14	
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	OR Sevin 80S	see label	0.63-1.88 lb/A	12	3	
	or Sevin XLR Plus 4F	0.25-0.75 pt/100 gal	0.5-1.5 qt/A	12	3	
	OR Sherpa	2 oz/100 gal		12	7	
	OR *Thionex 50WP	.75 lb/100 gal	4 lb/A	20 days	21	
	or *Thionex 3EC	0.5 qt/100 gal	2.67 qt/A	7 days	21	
	OR *Vydate 2L#	1-2 pt/100 gal		48	14	
	OR *Warrior II 2.08CS	Fixed rate per acre	1.28-2.56 fl oz/A	24	21	
	The following pre-mix products are also labeled for use against this pest; however, for best effectiveness and insecticide resistance management, their use should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.					
	*Agri-Flex SC	1.5-2.0 fl oz/100 gal	5.5-8.5 fl oz/A	12	35	
	plus: Horticultural spray oil	1 qt/100 gal	1 gal/A			
OR	*Endigo ZC	see label	5-6 fl oz/A	24	35	
OR	*Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
OR	*Voliam Flexi WDG	see label	4-7 oz/A	12	35	
OR	*Voliam Xpress EC	see label	6-12 fl oz/A	24	21	

**Table 11.5.1. Pesticide Spray Table – Apples.**

Refer to back of book for key to abbreviations and footnotes.

Pest	Product	Amt/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Amt/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Additional Summer Sprays (continued)</b>						
Woolly apple aphid	Assail 30SG	Fixed rate per acre	2.5-4.0 oz/A	12	7	[33.1]
	OR Admire Pro 4.6SC	see label	7-10.5 fl oz/A	12	7	
	OR Beleaf 50SG	see label	2.0-2.8 oz/A	12	21	
	OR *Diazinon 50WP	1 lb/100 gal	see label	96	21	
	OR Movento 240SC	see label	6-9 fl oz/A	24	7	
	OR *Thionex 50WP or *Thionex 3EC	.75 lb/100 gal 0.5 qt/100 gal	4 lb/A 2.67 qt/A	20 days 7 days	21 21	
<b>Postharvest</b>						
Crown rot (collar rot)	Ridomil Gold 4EC	see comments		12	See com- ments	[7.2]
<b>Control of Storage Disorders</b>						
Storage rots	Mertect 340F	1 pt/100 gal				[34.1]
	<i>plus</i>					
	Captan 50WP	2.5 lb/100 gal				
	or Captan 80WP	1.6 lb/100 gal				
	or Captec or Captan 4L	1.25 qt/100 gal				
OR Penbotec	16-32 fl oz/100 gal					
OR Scholar 50WP	8-16 fl oz/100					[34.1]
Storage scald	No Scald DPA-EC-283	2.5-5 pt/100 gal				[35.1]
	OR SmartFresh	Rate depends room size				
Senescent break-down (McIntosh)	Dowflake Process Grade	25 lb/100 gal				[36.1]

## 11.6 Growth Regulator Use in Apples

### 11.6.1 Chemical Thinning

Fruit thinning is a management practice that reduces yield in the current season but results in increased fruit size and also increased return bloom and yield in the next season. Large fruit size is best obtained with consistent cropload reductions each year through chemical thinning. The use of growth regulating chemicals to thin apple trees is not an exact science and each grower must weigh and evaluate the many factors that affect chemical thinning response in deciding on a thinning program. Although the recommendations in this section are based on research and experience, growers are cautioned that their success with chemical thinning depends on many factors, and they should use these recommendations only as a guide.

### 11.6.2 Weather Factors That Affect Thinning Response

**Frost.** Frost before application of thinners can greatly increase the amount of thinning obtained from chemical

thinners. Frost at bloom can damage fruitlets and reduce seed set, which can result in increased natural drop and greater chemical thinning response. Frost can also damage spur leaves, resulting in greater chemical uptake and reduced photosynthesis, thus greater thinning response. Wherever flowers and leaves have been damaged by frost, extreme caution should be used with chemical thinners. Typically, lower rates would be used in such cases.

**Sunlight Levels before Application.** The amount of sunlight for the 3-5 days preceding application of chemical thinners has an important effect on chemical uptake and response. Intense cloudy weather before application of thinners can result in increased chemical uptake and greater thinning response, due to greater succulence of the leaves and thinner wax-covered cuticle. This results in increased uptake of thinners thus greater chemical thinning response. Growers may want to reduce the rate of thinner used, if intense cloudy weather precedes application.