

## Senescent Breakdown (Mcintosh)

### • Pesticide Application Notes

[36.1] The addition of calcium chloride to the postharvest scald and storage rot treatment is effective in reducing McIntosh breakdown. Only calcium chloride that meets Food Chemical Codex specifications can be used in postharvest treatment of apples. Calcium treatment will be of little benefit to apples harvested after the projected optimum harvest date. Fruit injury from calcium chloride has been found to be associated with iron in the solution. Coat steel tanks or use plastic tanks and piping to minimize this problem.

## 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.

### 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 to scald indicates that it 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	Rate/100 gal. dilute see Chapter 4 to estimate dilute gals./A	Rate/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Silver Tip</b>						
<b>Apple scab inoculum reduction</b>	Urea fertilizer ground spray		40 lb/A	0	0	[2.1]
<b>Crown rot (collar rot)</b>	Ridomil Gold 4EC	0.5 pt/100 gal (drench)	2 qt/A (spray)	12	see comments	[7.2]
	OR Aliette 80WP	see comments		12	14	[7.3]
<b>European red mite, European fruit lecanium</b>	(S) oil	2-3 gal/100 gal		12	0	[20.2]

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Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Green Tip</b>						
Apple Scab	Captan 50WP	1-2 lb/100 gal	8 lb/A	24	0	[2.1, 2.2]
	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	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		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 Vanguard 75WG		3-5 oz/A	12	72	
OR Scala 600SC		7-10 fl oz/A	12	72		
Fire blight	Bordeaux mixture, 8-8-10 (copper sulfate)	8 lb/100 gal		24	BL	[8.4]
	(spray lime)	8 lb/100 gal				
	plus (§oil)	1 qt/100 gal				
	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	24	HIG	
			5-7.5 lb/A	12	HIG	
			6-12 lb/A	24	HIG	
OR Kocide 2000 or other (§)copper products	see comments					
European red mite	(§)oil	2 gal/100 gal		12	0	[20.3]
Rosy apple aphid	Beleaf 50SG	see label	2.0-2.8 oz/A	12	21	[27.2]
	OR *Lorsban 4EC	1 pt/100 gal	see label	96	PB	
	or Lorsban 75WG	0.3-0.67 lb/100 gal	see label	96	PB	
	OR *Supracide 25WP	1-2 lb/100 gal	4-12 lb/A	(E)	PB	
	or *Supracide 2EC	1-2 pt/100 gal	3-12 pt/A	12	35	
OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21		
<b>Half-Inch Green</b>						
Apple scab	Same materials as Green Tip spray					[2.3]
OR Flint 50WG		0.67-0.8 oz/100 gal	2-2.5 oz/A	12	14	[2.4], [2.14]
OR Sovran 50WG		1.1-2.1 oz/100 gal	3.2-6.4 oz/A	12	30	
Dogwood borer, American plum borer	*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	

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		see Chapter 4 to estimate dilute gals./A	Rate/A				
<b>Half-Inch Green (continued)</b>							
European red mite	(§)oil	2 gal/100 gal	see label	12	0	[20.4]	
Redbanded leafroller	*Guthion 50WS	0.5 lb/100 gal	2-3 lb/A	14-44 days (E)	14-21	[26.1]	
	OR Imidan 70WP	.75 lb/100 gal	2.13-5.33 lb/A	72	7		
Rosy apple aphid	Refer to Green Tip						
	OR Esteem 35WP	see label	3-5 oz/A	12	45	[27.2]	
San Jose scale	*Centaur 0.7WDG	see label	34.5 oz/A	12	14	[28.3]	
	OR Esteem 35WP	4-5 oz/A		12	45		
		plus oil	2 gal/100 gal		12		0
	OR *Lorsban 4EC	1 pt/100 gal	see label	96	PB		
		or Lorsban 75WG	0.3-0.67 lb/100 gal	see label			
	OR (§)oil	2 gal/100 gal	see label	12	0		
	OR *Supracide 25WP	0.5 lb/100 gal	4-12 lb/A	72	PB		
	or *Supracide 2EC	1-2 pt/100 gal	3-12 pt/A				
<b>Tight Cluster</b>							
Apple Scab	Adament 50WG		4-5 oz/A	120	75		
	OR Captan 50WP	1-2 lb/100 gal	8 lb/A	24	0		
		or Captan 80WP	0.65-1.25 lb/100 gal	5 lb/A	24	0	
		or Captec or Captan 4L	0.5-1 qt/ 100gal		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				
	OR Flint 50WG	0.67-0.8 oz/100 gal	2-2.5 oz/A	12	14	[2.4],[2.14]	
	OR Indar 2F		6-8 fl oz/A	12	14		
	OR Inspire Super MP	1.3 fl oz/A Inspire Super + 1.3 oz/A Vanguard	4 fl oz/A Inspire Super + 4 fl oz/A Vanguard	12	72		
	OR Sovran 50WG	1.0-1.6 oz/100 gal	3.2-6.4 oz/A	12	30	[2.4], [2.14]	
	OR Rally 40WSP	1.25-2 oz/100 gal		24	14	[2.5],[2.13]	
		or Vintage SC	3 fl oz/100 gal		24	30	
		or *Procure 50WS	3-5 oz/100 gal		12	14	
	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		

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		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Tight Cluster (continued)</b>						
Apple Scab (continued)	OR Tebuzol 45DF	2 oz/100 gal	4-8 oz/A	120	75	
Powdery mildew	Adament 50WG		4-5 oz/A	120	75	
	OR 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	1.25-2 oz/100 gal		24	14	
	OR *Procure 50WS	3-5 oz/100 gal		12	14	
	OR Indar 2F		6-8 fl oz/A	12	14	
	OR Inspire Super MP		4 fl oz/A Inspire Super + 4 fl oz/A Vanguard/	12	72	
	OR Vintage SC	3 fl oz/100 gal		24	30	
	OR Sulfur 95WP or Sulfur 6F or §Microthiol Disperss	2 lb/100 gal 2 pt/100 gal	10-20 lb/A	24	0	
	or (§)Sulfur, many other products; see label					
	OR Bayleton/Triadimefon 50DF	1-2 oz/100 gal		12	45	[9.4]
	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		
Dogwood borer, American plum borer	*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	
European red mite	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 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]
Rosy apple aphid	Refer to Green Tip					[27.2]
	OR Beleaf 50SG	see label	2.0-2.8 oz/A	12	21	
San Jose scale	Refer to Half-Inch Green					[28.3]
Tarnished plant bug	*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 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	

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		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Tight Cluster (continued)</b>						
<b>Tarnished plant bug (continued)</b>	OR Beleaf 50SG	see label	2.0-2.8 oz/A	12	21	
	OR *Danitol 2.4EC	Fixed rate per acre	10.67-16 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	1.28-2.56 fl oz/A	24	21	
<b>Pink</b>						
<b>Apple rusts</b>	Adament 50WG		4-5 oz/A	120	75	[1.3]
	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 Ferbam 76WDG	1-1.5 lb/100 gal	4-6 lb/A	24	7	
	OR Rally 40WSP	1.25-2 oz/100 gal	5-8 oz/A	24	14	
	OR Indar 2F		6-8 fl oz/A	12	14	
	OR Inspire Super MP		4 fl oz/A Inspire Super + 4 oz/A Vanguard/	12	72	
	OR *Procure 50WS	3-5 oz/100 gal		24	14	
	OR Vintage SC	3 fl oz/100 gal		24	30	
OR Bayleton/Triadimefon 50DF	1-2 oz/100 gal		12	45		
<b>Apple scab</b>	Adament 50WG		4-5 oz/A	120	75	
	OR 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 Sovran 50WG	1.0-1.6 oz/100 gal	3.2-6.4 oz/A	12	30	[2.4], [2.14]
	OR Flint 50WG	0.67-0.8 oz/100 gal	2-2.5 oz/A	12	14	[2.4], [2.14]
	OR Inspire Super MP	1.3 fl oz/A Inspire Super + 1.3 oz/A Vanguard	4 fl oz/A Inspire Super + 4 fl oz/A Vanguard/	12	72	
	OR Tebuzol 45DF	2 oz/100 gal	4-8 oz/A	120	75	
	OR Topsin M 70WP	2-3 oz/100 gal	0.75-1 lb/A	48	1	[2.12]
	<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			

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<b>Pink (continued)</b>						
<b>Apple scab (continued)</b>	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]
	<i>OR</i> Rally 40WSP	1.25-2 oz/100 gal	5-8 oz/A	24	14	[2.5],[2.13]
	or Vintage SC	3-4 fl oz/100 gal	6-12 fl oz/A	24	30	
	or *Procure 50WS	3-5 oz/100 gal	8-16 oz/A	12	14	
	or *Procure 480SC		8-16 fl oz/A			
	<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, 80WP, 80DF	1 lb/100 gal	3 lb/A	24	77	[2.2]
or Manzate/Dithane/ Penncozeb Flowables		2.4 qt/A	24	77	[1.3], [2.2]	
or Polyram 80DF	1 lb/100 gal	3 lb/A	24	77	[2.2]	
<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]
<b>Dogwood borer, American plum borer, Roundheaded apple tree borer</b>	*Lorsban 4EC	1.5 qt/100 gal/A	Trunk spray	96	28	[17.1]
	<i>OR</i> *Lorsban 75WG	2 lb/100 gal/A	Trunk spray	96	28	
	<i>OR</i> *Lorsban Advanced 3.8L	1.5-4 pt/100 gal/A	Trunk spray	96	28	
<b>European red mite</b>	Savey, Onager or Apollo, same as Tight Cluster					[20.7]
	<i>OR</i> *Vydate 2L	1-2 pt/100 gal	2-8 pt/A	48	14	
	<i>OR</i> Zeal 72WS	see label	2-3 oz/A	12	14	[20.7]
<b>Mullein plant bug</b>	Actara 25WDG	see label	4.5 oz/A	12	35	[22.3]
	<i>OR</i> *Asana XL 0.66EC	2-5.8 fl oz/100 gal	4.8-14.5 fl oz/A	12	21	
	<i>OR</i> Assail 30SG	Fixed rate per acre	4 -8 oz/A	12	7	
	<i>OR</i> *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	<i>OR</i> *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
	<i>OR</i> *Warrior II 2.08CS	Fixed rate per acre	1.28-2.56 fl oz/A	24	21	

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		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Pink (continued)</b>						
Oriental fruit moth	(§)Pheromone mating disruption: Checkmate OFM-F	see label	1.32-2.93 fl oz/A	0	0	[14.2]
	or Isomate-M 100		100 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	
Rosy apple aphid	Actara 25WDG	see label	4.5 oz/A	12	35	[28.3]
	OR 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	1 lb/100 gal	5 lb/A	20 days	21	
	or *Thionex 3EC	0.67 qt/100 gal	3.3 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, Apple blotch leafminer	Actara 25WDG	see label	4.5 oz/A	12	35	[29.1]
	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 oz/A	12	14	
	OR §Aza-Direct 1.2L	see label	11.5-42 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	
	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	10.67-16 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	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	

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<b>Pink (continued)</b>						
<b>Spotted tentiform leafminer, Apple blotch leafminer (continued)</b>	OR *Vydate 2L	1 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	
<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>	§Agri-Mycin 17WP	0.5 lb/100 gal		12	50	[8.3]
	or Firewall 17WP	4-8 oz/ 100 gal	2-4 lb/A	12	50	
	or Ag Streptomycin	4-8 oz/ 100 gal	2-4 lb/A	12	50	
	OR §Agri-Mycin 17WP or Streptrol 17WP or Firewall 17WP <i>plus</i> Glycerine <i>either</i> (CP or USP grade) or Regulaid	0.25 lb/100 gal		12	50	
	OR Serenade ASO	2-6 qt/A		4	0	[8.7]
<b>Fire blight (shoot blight)</b>	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, Oriental fruit moth, Lesser 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 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	



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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Bloom (continued)</b>						
<b>Obliquebanded leafroller</b>	§Agree WG 3.8WS	see label	1-2 lb/A	4	0	[24.1]
	OR §Biobit XL 2.1FC	see label	1.5-5.5 pt/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 7.5WDG	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>	Adament 50WG		4-5 oz/A	120	75	
	OR 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 Indar 2F		6-8 fl oz/A	12	14	
	OR Inspire Super MP	1.3 fl oz/A Inspire Super + 1.3 oz/A Vanguard	4 fl oz/A Inspire Super + 4 fl oz/A Vanguard/	12	72	
	OR Sovran 50WG	1.0-1.6 oz/100 gal		12	30	[2.4], [2.14]
	OR Topsin M 70WP, WDG	4-6 oz/100 gal	0.75-1 lb/A	48	1	[2.12]
	<i>plus:</i>					
	Captan 50WP	1 lb/100 gal	8 lb/A	24(E)	0	
	or Captan 80WDG	5/8 lb/100 gal	5 lb/A	24		
or Captec or Captan 4L	1 pt/100 gal		24			
or Dithane/Manzate/ Penncozeb 75DF	1 lb/100 gal	3 lb/A	24	77	[2.2]	
or Manzate/Dithane/ Penncozeb Flowables		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	1.25-2 oz/100 gal		24	14	[2.5], [2.13]	
or Vintage SC	3 fl oz/100 gal		24	30		
or *Procure 50WS	3-5 oz/100 gal		12	14		
<i>plus:</i>						
Captan 50WP	1 lb/100 gal	8 lb/A	24(E)	0		
or Captan 80WDG	5/8 lb/100 gal	5 lb/A	24			
or Captec or Captan 4L	1 pt/100 gal		24			
or Dithane/Manzate/ Penncozeb 75DF	1 lb/100 gal	3 lb/A	24	77	[2.2]	

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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Petal Fall (continued)</b>						
Apple scab (continued)	or Manzate/Dithane/ Penncozeb Flowables		2.4 qt/A	24	77	[1.3], [2.2]
	or Polyram DF	1 lb/100 gal	3 lb/A	24	77	[2.2]
Black rot	Captan, Sovran, Flint, Topsin M, Thiophanate- methyl	Same rates as for scab, mildew and rusts				
Blossom end rot	Captan, Sovran, Flint, Scala, Vanguard, Topsin M, Thiophanate-methyl	Same rates as for scab, mildew and rusts				
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	[14.2]
	OR Assail 30SG	Fixed rate per acre	4-8 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 §Biobit XL 2.1FC	see label	1.5-5.5 pt/A	4	0	
	OR Calypso 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	Fixed rate per acre	4.5-7.0 oz/A	4	7	
	OR §Dipel 10.3DF	see label	0.5-2 lb/A	4	0	
	OR *Guthion 50WS	0.5 lb/100 gal	2-3 lb/A	14 days (E)	14	
	OR Imidan 70WS	0.75 lb/100 gal	2.13-5.33 lb/A	72	7	
	OR Intrepid 2F	see label	12-16 fl oz/A	4	14	
	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 2.7SE	see label	3.6-4.4 fl oz/A	12	7	
	OR *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR §Neemix 4.5L	see label	7-16 fl oz/A	12	0	
	OR (§)Pheromone mating disruption:					
	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 §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	

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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Petal Fall (continued)</b>						
<b>Codling moth, Lesser appleworm, Oriental fruit moth (continued)</b>	or Checkmate Puffer CM- OFM		1-2 units/A	0	0	
	OR Proclaim 5SG	1.2 oz/100 gal	4.8 oz/A	12 or 48 (E)	14	
	OR *Rimon 0.83EC	see label	20-40 fl oz/A	12	14	
	OR Sevin XLR Plus, 4F or Sevin 80S	0.5-1.5 pt/100 gal see label	1-3 qt/A 1.25-3.75 lb/A	12	3	
<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	
<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 apple sawfly</b>	*Guthion, Imidan, or Lorsban 75WG, 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	
<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 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 §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]
<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	

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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Petal Fall (continued)</b>						
<b>Green fruitworms (continued)</b>	OR *Baythroid XL 1L	Fixed rate per acre	1.4-2.0 fl oz/A	12	7	
	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 *Leverage 2.7SE	see label	3.0-3.6 fl oz/A	12	7	
	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 *Proclaim 5SG	0.8-1.2 oz/100 gal	3.2-4.8 oz/A	12 or 48 (E)	14	
	OR *Thionex 50WP	1 lb/100 gal	5 lb/A	20 days	21	
	OR *Thionex 3EC	0.67 qt	3.3 qt/A	7 days	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>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	
<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 §Biobit XL 2.1FC	see label	1.5-5.5 pt/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 7.5WDG	0.13-1 lb/100 gal	0.5-4.0 lb/A	4	0	
	OR *Lannate 2.4LV	0.75 pt/100 gal	3.0 pt/A	72	14	
	OR *Lannate 90SP	0.25 lb/100 gal	1.0 lb/A	72	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	

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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Petal Fall (continued)</b>						
<b>Obliquebanded leafroller</b> (continued)	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>Oystershell scale</b>	*Centaur 0.7WDG		34.5 oz/A	12	14	
	OR *Guthion Solupak	0.5 lb/100 gal	2-3 lb/A		14	
	OR *Sevin 80WS, 80S or Sevin XLR Plus 4F	see label 0.5 to 1.5 pt/100 gal	1.88-3.75 lb/A 1.5-3 qt/A	12 12	1 3	[24.1]
<b>Plum curculio</b> A second and possibly third plum curculio spray may be needed at 1 <sup>st</sup> and 2 <sup>nd</sup> Cover.	Actara 25WDG	see label	4.5-5.5 oz/A	12	35	[25.1], [25.3]
	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 Battalion 0.2L	1.7-3.5 fl oz/100 gal	7-14.1 fl oz/A	12	21	
	OR Battalion 1.5 C	0.23-0.47 fl oz/100 gal	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 Calypso 4F	1-2 fl oz/100 gal	4-8 fl oz/A	12	30	
	OR *Danitol 2.4EC	Fixed rate per acre	16 fl oz/A	24	14	
	OR *Guthion Solupak	0.5-0.75 lb/100 gal	2-3 lb/A	14 <b>DAYS.</b>	14 days for ≤2 lb/A; 21 for >2 lb/A	
	OR Imidan 70W	0.75-1 lb/100 gal	2.1-5.3 lb/A	72 hours for WPS workers; 14 <b>DAYS</b> for PYO & public	7	
	OR *Leverage 360 1L	0.6-0.7 fl oz/100 gal	2.4-2.8 fl oz/A	12	7	
	OR *Leverage 2.7SE	1.1-1.2 fl oz/100 gal	4.4-5.1 fl oz/A	12	7	
	OR *Pounce 25W (or equivalent dose of other permethrin product)	1.6-4 oz/100 gal	6.4-16 oz/A	12	Not after petal fall	
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	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 with at least a “Fair” efficacy rating for Plum curculio –</i>						
	Assail 30SG	Fixed rate per acre	4-8 oz/A	12	7	
	OR Delegate 25WG	Fixed rate per acre	6-7 oz/A	4	7	
	OR Diazion 50WSB (pest is not on label)	1 lb/100 gal	3-4 lb/A	4 days	21	
	OR *Lannate 2.4LV	0.75 pt/100 gal	3 pt/A	72	14	

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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)	
		see Chapter 4 to estimate dilute gals./A	Rate/A				
<b>Petal Fall (continued)</b>							
<b>Plum curculio</b> (continued)	OR *Lannate 90SP	0.25 lb/100 gal	1 lb/A	72	14	[25.2]	
	OR Sevin 80S	see label	1.8-3.7 lb/A	12	3		
	OR §Surround 95WP	25-50 lbs./100 gal	25-50 lb/A	4	0		
	OR *Voliam Flexi WDG		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 XL 2.1FC	see label	1.5-5.5 pt/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 *Guthion 50WS	0.5 lb/100 gal	2-3 lb/A	14	14		
					days(E)		
	OR Imidan 70WS	0.75-1 lb/100 gal	2.13-5.33 lb/A	72	7		
	OR §Javelin 7.5WDG	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 2.7SE	see label	4.4-5.1 fl oz/A	12	7		
	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	14			
			48(E)				
OR *Rimon 0.83EC	see label	20-40 fl oz/A	12	14			
OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21			
<b>Rosy apple aphid</b>	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 *Leverage 2.7SE	see label	4.4-5.1 fl oz/A	12	7		
	OR Movento 240SC	see label	6-9 fl oz/A	24	7		
	OR Provado 1.6F	2 oz/100 gal	4-8 fl oz/A	12	7		
	OR *Thionex 50WP	1 lb/100 gal	5 lb/A	20 days	21		
	or *Thionex 3EC	0.67 qt/100 gal	3.3 qt/A	7 days	21		
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	2	35	[29.2]	
	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		

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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Petal Fall (continued)</b>						
Spotted tentiform leafminer, Apple blotch leafminer	OR Avaunt 30WDG	Fixed rate per acre	5-6 fl oz/A	12	14	
	OR §Aza-Direct 1.2L	see label	12.5-42 fl oz/A	4	0	
	OR *Baythroid XL 1L	Fixed rate per acre	2.0-2.4 fl oz/A	12	7	
	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	10.67-16 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 or *Lannate 90SP	0.25 lb/100 gal	0.5-1.0 lb/A			
	OR *Leverage 2.7SE	see label	3.6-4.4 fl oz/A	12	7	
	OR or *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR §Neemix 4.5L	see label	7-16 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 Provado 1.6F	2 oz/100 gal	4-8 fl oz/A	12	7	
	OR *Rimon 0.83EC	see label	20-40 fl oz/A	12	14	
OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21		
OR *Warrior II 2CS	Fixed rate per acre	1.28-2.56 fl oz/A	24	21		
Tarnished plant bug	*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	10.67-16 fl oz/A	24	14	
	OR *Leverage 2.7SE	see label	3.6-4.4 fl oz/A	12	7	
	OR 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		
White apple leafhopper, Rose leafhopper, Potato leafhopper	Actara 25WDG	see label	2-2.75 oz/A	12	14	[32.1]
	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	12.5-42 fl oz/A	4	0	
	OR *Baythroid XL 1L	Fixed rate per acre	1.4 -2.0 fl oz/A	12	7	

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

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

Pest	Product	Rate/100 gal. dilute see Chapter 4 to estimate dilute gals./A		Rate/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Petal Fall (continued)</b>							
White apple leafhopper,	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	
Rose leafhopper,	OR *Danitol 2.4EC	Fixed rate per acre		10.67-16 fl oz/A	24	14	
Potato leafhopper	OR *Lannate 90SP	0.25 lb/100 gal		0.5-1.0 lb/A			
	OR *Leverage 2.7SE	see label		3.0-3.6 fl oz/A	12	7	
	OR or *Leverage 360	see label		2.4-2.8 fl oz/A	12	7	
	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 Provado 1.6F	2 oz/100 gal		4-8 fl oz/A	12	7	
	OR Sevin 80S	1.5 lb/100 gal		0.63-0.88 lb/A	12	3	
	OR or Sevin XLR Plus, 4F	0.25-0.75 pt/100 gal		0.5-1.5 qt/A			
	OR *Thionex 50WP	1 lb/100 gal		5 lb/A	20 days	21	
OR or *Thionex 3EC	0.67 qt/100 gal		3.3 qt/A	7 days	21		
OR *Voliam Xpress EC	see label		6-12 fl oz/A	24	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		
<b>Additional Summer Sprays</b>							
Apple rust diseases	Refer to Pink sprays for materials and comments						
Apple scab	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 or Manzate/Dithane/ Penncozeb Flowables	see label		2.4 qt/A	24	77	
	OR 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 Indar 2F			6-8 fl oz/A	12	14	
	OR Inspire Super MP	1.3 fl oz/A Inspire Super + 1.3 oz/A Vanguard		4 fl oz/A Inspire Super + 4 oz/A Vanguard	12	72	
	OR Sovran 50WG	1.0-1.6 oz/100 gal		4-6 oz/A	12	30	[2.4, 2.14]
OR Pristine 38WP			14.5-18.5 oz/A	12	0		
OR Topsin M 70WP	4-6 oz/100 gal		0.75-1 lb/A	48	1	[2.12]	
OR or Thiophanate-methyl 85WDG	.2-3 lb/100 gal		.6-.8 lb/A	48	1		
plus:							



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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Additional Summer Sprays (continued)</b>						
Apple scab (continued)	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	1.25-2 oz/100 gal	5-8 oz/A	24	14	[2.5],[2.13]
	or Vintage SC	3-4 fl oz/100 gal	6-12 fl oz/A	24	30	
	or *Procure 50WS		8-16 oz/A	12	14	
	or *Procure 480SC		8-16 fl oz/A			
	plus:					
	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, 80WP, 80DF	1 lb/100 gal	3 lb/A	24	77	[2.2]	
or Manzate/Dithane/ Penncozeb Flowables		2.4 qt/A	24	77	[1.3], [2.2]	
or Polyram 80DF	1 lb/100 gal	3 lb/A	24	77	[2.2]	
Bitter Rot	Adament 50WG		6 oz/A	120	75	
	OR 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	
Black rot, White rot	Adament 50WG		6 oz/A	120	75	
	OR Cabrio EG		12 oz/A	12	0	
	OR 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				
	OR Flint 50WG	0.5 oz/100 gal	1.5 oz/A	12	14	[2.14]
	OR Sovran 50WG	1.0-1.6 oz/100 gal	4-6.4 oz/A	12	30	[2.14]
	OR Pristine 38WP		14.5-18.5 oz/A	12	0	
	OR Topsin M 70WP	4-6oz/100 gal	0.75-1 lb/A	48	1	[10.3], [10.4]
	plus:					
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		

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

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

Pest	Product	Rate/100 gal. dilute see Chapter 4 to estimate dilute gals./A		Rate/A	REI (hrs)	PHI (days)	Comments (see text)
<b>Additional Summer Sprays (continued)</b>							
<b>Black rot, White rot (continued)</b>	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	
<b>Blister spot</b>	Aliette 80WDG	0.5-1 lb/100 gal			12	14	[5.1]
<b>Fire blight (Shoot blight) (Shoot blight, after hailstorm ONLY)</b>	Apogee 27.5DF	6-12 oz			12	45	[8.6]
	OR §Agrimycin 17WP	0.5 lb			12	50	[8.5]
<b>Powdery mildew</b>	Adament 50WG			4-5 oz/A	120	75	
	OR Bayleton/Triadimefon 50DF	1-2 oz/100 gal			12	45	[9.4]
	OR Indar 2F			6-8 fl oz/A	12	14	
	OR Inspire Super MP	1.3 fl oz/A Inspire Super + 1.3 oz/A Vanguard	4 fl oz/A Inspire Super + 4 oz/A Vanguard		12	72	
	OR §JMS Stylet-Oil	1-2% solution			12	0	[9.3]
	OR Rally 40WSP	1.25-2 oz/100 gal			24	14	[2.11]
	OR *Procure 50WS	3-5 oz/100 gal			12	14	
	OR Vintage SC	3 fl oz/100 gal			24	30	
	OR Sovran 50WG	1.0-1.6 oz/100 gal			12	30	[2.14]
	OR Sulfur 95WP or § Microthiol Disperss	2 lb/100 gal		10-20 lb/A	24	0	
<b>Sooty blotch and Flyspeck</b>	Adament 50WG			4-5 oz/A	120	75	
	OR 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	1 lb/100 gal 5/8 lb/100 gal 1 pt/100 gal	4 lb/A 2.5 lb/A		24 (E) 24	0 0	
	or Manzate/ Penncozeb 75DF or 80WP	1 lb/100 gal		3 lb/A	24	77	[2.8]
	or Manzate/Dithane/ Penncozeb Flowable or Polyram 80DF	see label	2.4 qt/A		24	77	
	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	

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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Additional Summer Sprays (continued)</b>						
Sooty blotch and Flyspeck (continued)	OR Ziram 76DF, 76WDG	1 lb/100 gal		48	14	[10.5]
	plus Sulfur 95WP	2 lb/100 gal		24		
Apple aphid, Spirea aphid	*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	12.5-42 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	
	or *Lannate 90SP	0.25 lb/100 gal	0.5-1.0 lb/A			
	OR *Leverage 2.7SE	see label	4.4-5.1 fl oz/A	12	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 §M-Pede 49L	2 gal/100 gal	see label	12	0	
	OR §Neemix 4.5L	see label	7-16 fl oz/A	12	0	
	OR *Proaxis 0.5CS	see label	2.6-5.1 fl oz/A	24	21	
	OR Provado 1.6F	2 oz/100 gal	4-8 fl oz/A	12	7	
	OR Pyrenone 0.5EC	see label	12 fl oz/A	12	1	
	OR *Thionex 50WP	1 lb/100 gal	5 lb/A	20 days	21	
	or *Thionex 3EC	0.67 qt/100 gal	3.3 qt/A	7 days	21	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	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		
Apple maggot	*Asana XL	2-5.8 fl oz/100 gal	4.8-14.5 oz./A	12	21	[12.1]
	OR Assail 30SG	Fixed rate per acre	8 oz/A	12	7	
	OR Battalion 0.2L	1.7-3.5 fl oz/100 gal	7-14.1 fl oz/A	12	21	
	OR Battalion 1.5 C	0.23-0.47 fl oz/100 gal	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 Calypso 4F	1-2 fl oz/100 gal	4-8 fl oz/A	12	30	
	OR *Danitol 2.4EC	Fixed rate per acre	16 fl oz/A	24	14	
	OR Diazion 50WSB (pest is not on label)	1 lb/100 gal	3-4 lb/A	4 DAYS	21	
	OR *Guthion Solupak	0.5-0.75 lb/100 gal	2-3 lb/A	14 <b>DAYS</b>	14 for ≤2 lb/A; 21 for >2 lb/A	

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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Additional Summer Sprays (continued)</b>						
Apple maggot (continued)	OR Imidan 70W	0.75-1 lb/100 gal	2.1-5.3 lb/A	72 for WPS workers; 14 <b>DAYS</b> for PYO & public	7	
	OR *Leverage 360 1L	0.6-0.7 fl oz/100 gal	2.4-2.8 fl oz/A	12	7	
	OR *Leverage 2.7SE	1-1.3 fl oz/100 gal	4.4-5.1 fl oz/A	12	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 with at least a “Fair” efficacy rating for Apple maggot –</i>						
	Avaunt 30WDG	Fixed rate per acre	5-6 oz/A	12	14	[12.2]
	OR Altacor 35WDG	see label	2.5-4.5 oz/A	4	5	
	OR Delegate 25WG	Fixed rate per acre	6-7 oz/A	4	7	
	OR §Entrust	0.7-1 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 SpinTor 2SC (pest is not on label)	Fixed rate per acre	6-10 fl oz/A	4	7	
Apple rust mite	Nexter 75WS	see label	5.2-10.7 oz/A	12	25	[13.2]
	OR Portal 0.4EC	see label	1-2 pt/A	12	14	
Codling moth	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 Avaunt 30WDG	Fixed rate per acre	5-6 oz/A	12	14	
	OR §Aza-Direct 1.2L	see label	12.5-42 fl oz/A	4	0	
	OR *Baythroid XL 1L	Fixed rate per acre	2.0-2.4 fl oz/A	12	7	
	OR §Biobit XL 2.1 FC	see label	1.5-5.5 pt/A	4	0	
	OR Calypso 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 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 *Guthion 50WS	0.5 lb/100 gal	2-3 lb/A	14 days(E)	14	
	OR Imidan 70WS	0.75 lb/100 gal	2.13-5.33 lb/A	72	7	
	OR Intrepid 2F	see label	12-16 fl oz/A	4	14	

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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Additional Summer Sprays (continued)</b>						
Codling moth (continued)	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 2.7SE	see label	3.6-4.4 fl oz/A	12	7	
	or *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	OR §Neemix 4.5L	see label	7-16 fl oz/A	12	0	
	OR (§)Pheromone disruption: Checkmate CM-F	see label	2.4-4.8 fl oz/A	4	0	[14.2]
	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	
	OR *Rimon 0.83EC	See label	20-40 fl oz/A	12	14	
OR Sevin XLR Plus, 4F	0.5-1.5 pt/100 gal	1-3 qt/A	12	3		
or Sevin 80S	see label	1.25-3.75 lb/A				
OR SpinTor 2SC	Fixed rate per acre	6-10 fl oz/A	4	7		
OR §Surround 95WP	25-50 lb/100 gal.	25-50 lb/A	4	0	[12.2]	
OR *Voliam Xpress EC	See label	6-12 fl oz/A	24	21		
Comstock mealybug	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	
Cutworms	§Biobit XL 2.1FC	see label	1.5-5.5 pt/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	
Dogwood borer, American plum borer	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	
European corn borer	§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	
European red mite, Twospotted spider mite	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 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]

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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Additional Summer Sprays (continued)</b>						
Japanese beetle	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	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
Obliquebanded leafroller	§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 *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 §Biobit XL 2.1FC	see label	1.5-5.5 pt/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 7.5WDG	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 *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 *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, Lesser apple worm	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 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 *Guthion 50WS	0.5 lb/100 gal	2-3 lb/A	14 days (E)	14	
	OR Imidan 70WS	0.75-1 lb/100 gal	2.13-5.33 lb/A	72	7	
	OR Intrepid 2F	see label	12-16 fl oz/A	4	14	
	OR *Leverage 2.7SE	see label	3.6-4.4 fl oz/A	12	7	
	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	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Additional Summer Sprays (continued)</b>						
<b>Oriental fruit moth, Lesser apple worm</b>	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	
	OR (§)Pheromone disruption: Checkmate OFM-F	see label	1.32-2.93 fl oz/A	0	0	
	or Isomate-M 100		100 ties/acre			
	or §Checkmate CM-OFM Duel		150-200 dispensers/A	0	0	
	or §Isomate-CM/OFM TT		200 ties/A	0	0	
<b>Redbanded 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 *Baythroid XL 1L	Fixed rate per acre	2.4-2.8 fl oz/A	12	7	
	OR §Biobit XL 2.1FC	see label	1.5-5.5 pt/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 *Guthion 50WS	0.5 lb/100 gal	2-3 lb/A	14 days (E)	14	
	OR Imidan 70WS	0.75-1 lb/100 gal	2.13-5.33 lb/A	72	7	
	OR §Javelin 7.5WDG	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 2.7SE	see label	4.4-5.1 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 *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 *Centaur 0.7WDG	See label	34.5 oz/A	12	14	
	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	
	OR Imidan 70WS	0.75-1 lb/100 gal	2.13-5.33 lb/A	72	7	
	OR *Leverage 2.7SE	see label	4.4-5.1 fl oz/A	12	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 Provado 1.6F	2 oz/100 gal	4-8 fl oz/A	12	7	
	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	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Additional Summer Sprays (continued)</b>						
Spotted tentiform leafminer, Apple blotch leafminer	Actara 25WDG	see label	4.5-5.5 oz/A	12	35	[29.3]
	OR *Agri-Mek 0.15EC	2.5-5 fl oz/100 gal	10-20 fl oz/A	12	28	
	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	12.5-42 fl oz/A	4	0	
	OR *Baythroid XL 1L	Fixed rate per acre	2.0-2.4 fl oz/A	12	7	
	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# 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 *Leverage 2.7SE or *Leverage 360	see label see label	3.6-4.4 fl oz/A 2.4-2.8 fl oz/A	12 12	7 7	
	OR §Neemix 4.5L	see label	7-16 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 Provado 1.6F	2 oz/100 gal	4-8 fl oz/A	12	7	
	OR *Rimon 0.83EC	see label	20-40 fl oz/A	12	14	
	OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	21	
	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	
Variegated leafroller, Sparganothis fruitworm	§Biobit XL 2.1FC	see label	1.5-5.5 pt/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 7.5WDG	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 *Leverage 2.7SE or *Leverage 360	see label see label	4.4-5.1 fl oz/A 2.4-2.8 fl oz/A	12 12	7 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
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	2.5-4.0 oz/A	12	7	
OR Avaunt 30WDG		Fixed rate per acre	5-6 oz/A	12	14	
OR §Aza-Direct 1.2L		see label	12.5-42 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	



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

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

Pest	Product	Rate/100 gal. dilute		REI (hrs)	PHI (days)	Comments (see text)
		see Chapter 4 to estimate dilute gals./A	Rate/A			
<b>Additional Summer Sprays (continued)</b>						
White apple leafhopper, Rose leafhopper, Potato leafhopper	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 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 2.7SE	see label	3.0-3.6 fl oz/A	12	7	
	or *Leverage 360	see label	2.4-2.8 fl oz/A	12	7	
	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 Provado 1.6F	0.5-2 oz/100 gal	4-8 fl oz/A	12	7	[33.2]
	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 *Thionex 50WP	1 lb/100 gal	5 lb/A	96	21	
	OR Sherpa	2 oz/100 gal		12	7	
	OR *Thionex 50WP	1 lb/100 gal		20 days	21	
	or *Thionex 3EC	0.67 qt/100 gal		7 days	21	
OR *Voliam Xpress EC	see label	6-12 fl oz/A	24	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		
Woolly apple aphid	Assail 30SG	Fixed rate per acre	2.5-4.0 oz/A	12	7	[33.1]
	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	1 lb/100 gal	5 lb/A	20 days	21	
or *Thionex 3EC	0.67 qt/100 gal	3.3 qt/A	7 days	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]

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

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

Pest	Product	Rate/100 gal.	REI (hrs)	PHI (days)	Comments (see text)
		dilute see Chapter 4 to estimate dilute gals./A			
<b>Control of Storage Disorders (continued)</b>					
Storage scald	No Scald DPA-EC-283	2.5-5 pt/100 gal			[35.1]
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

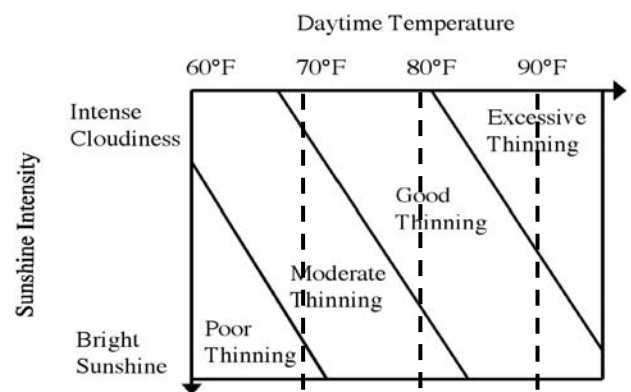
**Frost.** Frost before application of thinners can greatly increase the amount of thinning obtained from chemical thinners. Frost at bloom can damage fruitlets and reduce seed set, which can result in increased natural drop and greater chemical thinning response. Frost can also damage spur leaves, resulting 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.

**Temperature at Time of Application.** The uptake of chemical thinners is greater at higher temperatures than at lower temperatures. The optimum is between 70-80° F.

Above 80° F, uptake is substantially greater than below 80° F. The time of day applications are made appears to be unimportant. Applications made in the morning or evening when it is cool have a longer drying time on the leaf, resulting in a slow but sustained uptake of chemical, while at higher temperatures during mid-day, drying times are shorter, resulting in a short but rapid uptake of chemical. Thus, the total amount of chemical taken into the plant appears to be very similar regardless of the time of day. Recent research results also indicate that similar thinning is achieved regardless of the time of day applications are made.

**Weather After Application.** Temperature and sunlight levels for the 5-day period after application of thinners are the predominant weather factors affecting chemical thinning response. The interaction of temperature and sunlight with the chemical thinner creates stress in the tree, which is necessary to make some fruit drop off. Warmer temperatures increase thinning response, while greater light levels decrease thinning response (Fig. 11.6.1).



**Figure 11.6.1. The interaction of temperature and sunlight intensity on thinner action.**

Night temperatures are also an important factor to consider. Warm night temperatures (>60° F) give greater thinning response. With high night temperatures, fruits use up the carbohydrates that were produced during the day at a fast rate, resulting in a deficit of resources for fruit growth and