



FIGURE 12.1.1
GROWTH STAGES
IN PEAR

1. Dormant
2. Swollen bud
3. Bud burst
4. Green cluster
5. White bud
6. Bloom
7. Petal fall
8. Fruit set

12 Pears

12.1 Insecticides and Fungicides for Pears

See Sections 12.2 and 12.3 for comments related to this table.

Table 12.1.1. Pesticide Spray Table – Pears

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

Pest	IRAC/ FRAC Code	Product	Rate(s)	REI (hrs)	PHI (days)	Efficacy	Comments (see text)
Dormant							
Pseudomonas spur blight (Fire blight)		Bordeaux mixture, 8-8-100 (copper sulfate) (spray lime)	8 lb/100 gal 8 lb/100 gal	24	BL		[2.3]
		<i>plus:</i> oil	1 qt/100 gal				
		C-O-C-S	12-15.6 lbs/A	48	–		
		Kocide 3000 or other coppers	5.25-7.0 lb/A see comments and labels	48	HIG		
Pear psylla, European red mite		oil	3 gal/100 gal	12	0		[12.1]
Pearleaf blister mite		oil <i>plus:</i>	1-1.5 gal/100 gal	12	0		[14.1]
	1B	*Diazinon 50WP	1 lb/100 gal	96	21	high	
San Jose scale	4A	Assail 30SG	8 oz/A	12	7	moderate	[20.1]
	16	Centaur 0.7WDG	34.5-46.0 oz/A	12	14	high	
	7C	Esteem 35WP	4-5 oz/A	12	45	high	
	1B	*Lorsban Advanced 3.76EC	1.5-4 pt/A	96	PB	high	
	1B	Lorsban 75WG	2-2.67 lb/A	96	PB	high	
Swollen Bud							
Pear Midge	–	Aza-Direct 1.2L	11.5-42 fl oz/A	4	0	moderate	[11.1]
	3A	PyGanic 1.4EC	16-64 fl oz/A	12	0	moderate	
Pear psylla	4A	Actara 25WDG	5.5 oz/A	12	35	high	[12.2]
	3A	*Ambush 25WP	12.8-25.6 oz/A	12	PB	moderate	[12.2]
	3A	*Asana XL 0.66EC	7.3-12.8 fl oz/100 gal or 9.6-19.12 fl oz/A	12	28	moderate	[12.2]
	4A	Assail 30SG	4-8 oz/A	12	7	moderate	
	4A	Calypso 4F	1-2 fl oz/100 gal or 4-8 fl oz/A	12	30	high	
	16	Centaur 0.7WDG	34.5-46 oz/A	12	14	high	
	3A	*Danitol 2.4EC	16-21.3 fl oz/A	24	14	moderate	[12.2]
	5	Delegate 25WG	4.5-7 oz/A	4	7	high	[12.2]
	7C	Esteem 35WP	4-5 oz/A	12	45	high	[12.2]
	–	M-Pede 49L	2 gal/100 gal	12	0	moderate	[12.3]
	–	oil	1-2 gal/100 gal	12	0	high	[12.4]
	21A	Portal 0.4 EC	2 pt/Acre	12	14		
	3A	*Pounce 25WP	12.8-25.6 oz/A	12	PB	moderate	[12.2]
–	Surround 95WP	50 lb/A	4	0	moderate	[12.6]	
3A	*Warrior II 2.08 CS	1.28-2.56 fl oz/A	24	21	moderate	[12.2]	

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

Pest	IRAC/ FRAC Code	Product	Rate(s)	REI (hrs)	PHI (days)	Efficacy	Comments (see text)
Green Cluster							
Fabraea leaf spot	Same materials as recommended for pear scab						[1.2]
Pear scab		Topsin M WSB, 70WP	0.25 lb/100 gal or 1 lb/A	48	1		[3.2]
		or Thiophanate-methyl 85WDG	.2 lb/100 gal or .8 lb/A	48	1		
		or Inspire Super	8.5-12 fl oz/A	12	14		
		<i>plus:</i> Manzate Max/Penncozeb 75DF	1 lb/100 gal or 3 lb/A	24	BL, 77 (A)		[3.3]
		Manzate Max/ Penncozeb 75DF	2 lb/100 gal or 6 lb/A	24	BL, 77 (A)		[3.3]
		Topsin M WSB, 70WP	0.25 lb/100 gal or 1 lb/A	48	1		[3.2]
		Fontelis	16-20 fl oz/A	28	12		[3.7]
		Merivon	4-5.5 fl oz/acre				
Pear Midge	–	Aza-Direct 1.2L	11.5-42 fl oz/A	4	0	moderate	[11.1]
	3A	PyGanic 1.4EC	16-64 fl oz/A	12	0	moderate	
Tarnished plant bug,	3A	*Baythroid XL 1EC	2-2.4 fl oz/A	12	7	high	[19.1]
Pear plant bug	9C	Beleaf 50SG	2-2.8 oz/A	12	21	high	
	3A	*Brigade 10WSB or *Brigade 2EC	6.4-32 oz/A 2.6-12.8 fl oz/A	12	14	high	
	3A	*Danitol 2.4EC	16-21.3 fl oz/A	24	14	high	
	3A	*Warrior II 2.08 CS	1.28-2.56 fl oz/A	24	21	high	
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.							
	3A/6	*Gladiator EC	3.5-4.75 fl oz/100 gal or 14-19 fl oz/A	12	28	high	
	3A/4A	*Leverage 360	2.4-2.8 fl oz/A	12	7	high	
	3A/28	*Voliam Xpress	6-12 fl oz/A	24	21	high	
White Bud							
Fabraea leaf spot	See Green Cluster sprays						
Pear scab	Choose from materials listed under Green Cluster						
		Flint 50WG	0.67-0.8 oz/100 gal or 2-2.5 fl oz/A	12	14		[3.4]
		Sovran 50WG	1.0-1.6 oz/100 gal or 3.2-6.4 oz/A	12	30		
		Fontelis	16-20 fl oz/A	28	12		[3.7]
Pear psylla	See Swollen Bud sprays						[12.2],[12.4]
Bloom							
Fire blight		Agrimycin 17WP, Streptrol 17WP, or Firewall 17WP	8 oz/100 gal or 24oz/A	12	30		[2.1], [2.8]
		Agrimycin 17WP, Streptrol 17WP, or Firewall 17WP	8 oz/100 gal or 24oz/A	12	30		[2.1], [2.8]
		<i>plus:</i>					

Table 12.1.1. Pesticide Spray Table – Pears

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Pest	IRAC/ FRAC Code	Product	Rate(s)	REI (hrs)	PHI (days)	Efficacy	Comments (see text)
Bloom (continued)							
Fire blight (continued)		Glycerine (CP or USP grade) or Regulaid	2 qt/100 gal 1 pt/100 gal				
		Mycoshield	1.0 lb/100 gal	12	60		[2.6]
		Serenade ASO	2-6 qt/A	4	0		[2.7]
		Bloomtime Biological FE	.33 lb/A	4	PF		[2.5]
Pear scab, Fabrea leaf spot	Choose from materials listed previously						
Petal Fall							
Pear scab, Fabrea leaf spot	Choose from materials listed previously						
		Manzate Max/ Penncozeb 75DF	1 lb/100 gal or 3 lb/A	24	BL, 77(A)		[3.3]
		Pristine 38WG	14.5-18.5 oz/A	12	0		
		Ziram 76DF	24-32 oz/100 gal	48	14		
Fire blight		Agrimycin 17WP, Streptrol 17WP, or Firewall 17WP	8 oz/100 gal or 24oz/A	12	30		[2.1], [2.8]
		Agrimycin 17WP, Streptrol 17WP, or Firewall 17WP <i>plus:</i> Glycerine (CP or USP grade) or Regulaid	8 oz/100 gal or 24oz/A 2 qt/100 gal 1 pt/100 gal	12	30		[2.1], [2.8]
Aphids, including Spirea aphid	4A	Admire Pro 4.6SC	2.8 fl oz/A	12	7	high	
	4A	Assail 30SG	2.5-4 oz/A	12	7	high	
	–	Aza-Direct 1.2L	11.5-42 fl oz/A	4	0	moderate	
	9C	Beleaf 50SG	2-2.8 oz/A	12	21	high	
	4A	Calypso 4F	1-2 fl oz/100 gal or 4-8 fl oz/A	12	30	high	[5.1]
	1B	*Dimethoate 4EC	0.5-1 pt/100 gal or 1-2 qt/A	240 (10 days)	28	moderate	
	–	M-pede 49L	1- 2 gal/100gal	12	0	moderate	[5.2]
	23	Movento 240SC	6-9 fl oz/A	24	7	high	[5.1]
	–	Neemix 4.5L	5-7 fl oz/A	4	0	moderate	
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.							
4A/6	*Agri-Flex SC		1.5-2.0 fl oz/100 gal or 5.5-8.5 fl oz/A	12	35	high	[5.1]
	<i>plus:</i> Horticultural spray oil		1 qt/100 gal or 1 gal/A				
3A/6	*Gladiator EC		3.5-4.75 fl oz/100 gal or 14-19 fl oz/A	12	28	high	
3A/4A	*Leverage 360		2.4-2.8 fl oz/A	12	7	high	

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Pest	IRAC/ FRAC Code	Product	Rate(s)	REI (hrs)	PHI (days)	Efficacy	Comments (see text)
Petal Fall (continued)							
Codling moth		Pheromone disruption: Checkmate CM-F	2.4-4.8 fl oz/A	4	0		[6.2]
Comstock mealybug	4A	Admire Pro 4.6SC	7 fl oz/A	12	7	high	[7.1]
	4A	Actara 25WDG	4.5-5.5 oz/A	12	35	high	[7.3]
	4A	Assail 30SG	4-4.8 oz/A	12	7	high	
	4A	Calypso 4F	1-2 fl oz/100 gal or 4-8 fl oz/A	12	30	high	
	16	Centaur 0.7WDG	34.5-46 oz/A	12	14	high	
	1B	*Diazinon 50WP	1 lb/100 gal	96	21	high	
	23	Movento 240SC	6-9 fl oz/A	24	7	high	
	21A	Portal 0.4EC	2 pt/A	12	14	high	
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.							
	4A/6	*Agri-Flex SC	1.5-2.0 fl oz/100 gal or 5.5-8.5 fl oz/A	12	35	high	[7.3]
		<i>plus:</i> Horticultural spray oil	1 qt/100 gal or 1 gal/A				
	4A/28	Voliam Flexi WDG	7 oz/A	12	35	high	
Green fruitworms	28	Altacor 35WDG	2.5-4 oz/A	4	5	high	[9.1]
	3A	*Asana XL 0.66EC	2-5.8 fl oz/100 gal or 4.8-14.5 fl oz/A	12	28	high	
	3A	*Baythroid XL 1EC	1.4-2 fl oz/A	12	7	high	
	28	Belt 4SC	3-5 fl oz/A	12	14	high	
	1A	*Lannate 2.4LV	0.75 pt/100 gal or 1.5-3 pt/A	48	7	high	
	1A	or *Lannate 90SP	0.5-1 lb/A			high	
	6	*Proclaim 5SG	0.8-1.2 oz/100 gal or 3.2-4.8 oz/A	12 or 48 (E)	14	high	
	3A	*Warrior II 2.08 CS	1.28-2.56 fl oz/A	24	21	high	[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.							
	3A/4A	*Endigo ZC	5-6 fl oz/A	24	35	high	
	3A/6	*Gladiator EC	3.5-4.75 fl oz/100 gal or 14-19 fl oz/A	12	28	high	
	3A/4A	*Leverage 360	2.4-2.8 fl oz/A	12	7	high	
	28/16	Tourismo	12-17 fl oz/acre	12	14	high	
	4A/28	Voliam Flexi WDG	4-7 oz/A	12	35	high	
	3A/28	*Voliam Xpress	6-12 fl oz/A	24	21	high	
Pear psylla	4A	Actara 25WDG	5.5 oz/A	12	35	high	[12.5]
	4A	Admire Pro 4.6SC	7 fl oz/A	12	7	moderate	
	6	*Agri-Mek 8SC	0.5-1 fl oz/100 gal or 2.25-4.25 fl oz/A	12	28	high	[12.5]

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Pest	IRAC/ FRAC Code	Product	Rate(s)	REI (hrs)	PHI (days)	Efficacy	Comments (see text)
Petal Fall (continued)							
Pear psylla (continued)	3A	*Asana XL 0.66EC	2-5.8 fl oz/100 gal or 4.8-14.5 fl oz/A	12	28	moderate	
	4A	Assail 30SG	4-8 oz/A	12	7	moderate	
	4A	Calypso 4F	1-2 fl oz/100 gal or 4-8 fl oz/A	12	30	high	[12.5]
	16	Centaur 0.7WDG	34.5-46 oz/A	12	14	high	
	3A	*Danitol 2.4EC	16-21.3 fl oz/A	24	14	moderate	
	5	Delegate 25WG	4.5-7 oz/A	4	7	high	[12.5]
	7C	Esteem 35WP	4-5 oz/A	12	45	high	[12.5]
	–	M-Pede 49L	2 gal/100 gal	12	0	moderate	[12.3]
	23	Movento 240SC	6-9 fl oz/A	24	7	high	[12.5]
	21	Portal 0.4EC	2 pt/A	12	14	high	[12.5]
	21	Nexter 75WS	6.6-10.67 oz/A	12	7	moderate	[12.5]
	–	Surround 95WP	50 lb/A	4	0	moderate	
	3A	*Warrior II 2.08 CS	1.28-2.56 fl oz/A	24	21	moderate	[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.							
	4A/6	*Agri-Flex SC	1.5-2.0 fl oz/100 gal or 5.5-8.5 fl oz/A	12	35	high	[12.5]
		<i>plus:</i> Horticultural spray oil	1 qt/100 gal or 1 gal/A				
	3A/6	*Gladiator EC	3.5-4.75 fl oz/100 gal or 14-19 fl oz/A	12	28	high	
	4A/28	Voliam Flexi WDG	7 oz/A	12	35	high	
Pear rust mite	6	*Agri-Mek 8SC	0.5-1 fl oz/100 gal or 2.25-4.25 fl oz/A	12	28	high	[13.1], [8.1]
	21	Nexter 75WS	5.2-10.67 oz/A	12	7	moderate	
	21	Portal 0.4EC	2 pt/A	12	14	high	
	12B	*Vendex 50WP	6-8 oz/100 gal or 1- 2 lb/A	48	14	moderate	
	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.						
	4A/6	*Agri-Flex SC	1.5-2.0 fl oz/100 gal or 5.5-8.5 fl oz/A	12	35	high	[13.1]
		<i>plus:</i> Horticultural spray oil	1 qt/100 gal or 1 gal/A				
Plum curculio	4A	Actara 25WDG	4.5-5.5 oz/A	12	35	high	[15.1]
	3A	*Asana XL 0.66EC	2-5.8 fl oz/100 gal or 4.8-14.5 fl oz/A	12	28	moderate	
	3A	*Baythroid XL 1EC	2.4-2.8 fl oz/A	12	7	moderate	
	3A	*Brigade 10WSB or *Brigade 2EC	6.4-32 oz/A 2.6-12.8 fl oz/A	12	14	moderate	

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Pest	IRAC/ FRAC Code	Product	Rate(s)	REI (hrs)	PHI (days)	Efficacy	Comments (see text)
Petal Fall (continued)							
Plum curculio (continued)	4A	Calypso 4F	1-2 fl oz/100 gal or 4-8 fl oz/A	12	30	high	
	1B	Imidan 70W	0.75-1 lb/100 gal or 2.13-5.75 lb/A	7 days	7	high	
	–	Surround 95WP	50 lb/A	4	0	moderate	[12.6]
	3A	*Warrior II 2.08 CS	1.28-2.56 fl oz/A	24	21	moderate	
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.							
	4A/6	*Agri-Flex SC	1.5-2.0 fl oz/100 gal or 5.5-8.5 fl oz/A	12	35	high	[15.1]
		<i>plus:</i> Horticultural spray oil	1 qt/100 gal or 1 gal/A				
	3A/6	*Gladiator EC	3.5-4.75 fl oz/100 gal or 14-19 fl oz/A	12	28	moderate	
	3A/4A	*Leverage 360	2.4-2.8 fl oz/A	12	7	high	
	4A/28	Voliam Flexi WDG	6-7 oz/A	12	35	high	
	3A/28	*Voliam Xpress	6-12 fl oz/A	24	21	moderate	
Obliquebanded leafroller	11A	Agree WG 3.8WS	1-2 lb/A	4	0	high	[10.1]
	28	Altacor 35WDG	2.5-4.5 oz/A	4	5	high	
	28	Belt 4SC	3-5 fl oz/A	12	14	high	
	5	Delegate 25WG	4.5-7 oz/A	4	7	high	
	11A	Deliver 18WG	0.5-2 lb/A	4	0	high	
	11A	Dipel 10.3DF	0.5-2 lb/A	4	0	high	
	5	Entrust 80WP	0.67-1 oz/100 gal or 2-3 oz/A	4	7	high	
	5	or Entrust 2SC	6-10 fl oz/A				
	18A	Intrepid 2F	8-16 fl oz/A	4	14	high	
	11A	Javelin 7.5 WDG	0.5-4 lb/A	4	0	high	
	1A	*Lannate 2.4LV	0.75 pt/100 gal or 1.5-3 pt/A	48	7	moderate	
	1A	or *Lannate 90SP	0.25 lb/100 gal or 0.5-1 lb/A				
	6	*Proclaim 5SG	0.8-1.2 oz/100 gal or 3.2-4.8 oz/A	12/48 (E)	14	high	
	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.						
	3A/4A	*Endigo ZC	5-6 fl oz/A	24	35	moderate	[10.3]
	3A/6	*Gladiator EC	3.5-4.75 fl oz/100 gal or 14-19 fl oz/A	12	28	moderate	
	4A/28	Voliam Flexi WDG	4-7 oz/A	12	35	high	
	3A/28	*Voliam Xpress	6-12 fl oz/A	24	21	high	

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Pest	IRAC/ FRAC Code	Product	Rate(s)	REI (hrs)	PHI (days)	Efficacy	Comments (see text)
Additional Summer Sprays							
Fire blight (ONLY after a hailstorm)		Agrimycin 17WP, Streptrol 17WP, or Firewall 17WP	0.5 lb/100 gal or 24- 48 oz/A	12	30		[2.4]
Pear scab, Fabraea leaf spot, Sooty blotch, Black rot	See Petal Fall sprays						
Codling moth	28	Altacor 35WDG	2.5-4.5 oz/A	4	5	high	[6.1]
	4A	Assail 30SG	4-8 oz/A	12	7	high	
	22	Avaunt 30WDG	5-6 oz/A	12	28	moderate	
	3A	*Baythroid XL 1EC	2-2.4 fl oz/A	12	7	moderate	
	28	Belt 4SC	3-5 fl oz/A	12	14	high	
	4A	Calypso 4F	1-2 fl oz/100 gal or 4-8 fl oz/A	12	30	high	
	–	Carpovirusine 0.99SC	0.5-1 pt/100 gal	4	0	moderate	
	–	Cyd-X 0.06SC	1-6 floz/A	4	0	moderate	
	3A	*Danitol 2.4EC	16-21.3 fl oz/A	24	14	moderate	
	5	Delegate 25WG	4.5-7 oz/A	4	7	high	
	11A	Deliver 18WG	0.5-2 lb/A	4	0	moderate	
	11A	Dipel 10.3DF	0.5-2 lb/A	4	0	moderate	
	5	Entrust 80WP	0.67-1 oz/100 gal or 2-3 oz/A	4	7	moderate	
	5	or Entrust 2SC	6-10 fl oz/A			moderate	
	1B	Imidan 70W	0.75-1 lb/100 gal or 2.13-5.75 lb/A	7 days	7	high	
	11A	Javelin 7.5WDG	0.5-4 lb/A	4	0	moderate	
	–	Pheromone disruption: Checkmate CM-F	2.4-4.8 fl oz/A	4	0	moderate	[6.2]
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.							
	3A/4A	*Endigo ZC	5-6 fl oz/A	24	35	moderate	[6.1]
	3A/6	*Gladiator EC	3.5-4.75 fl oz/100 gal or 14-19 fl oz/A	12	28	moderate	
	3A/4A	*Leverage 360	2.4-2.8 fl oz/A	12	7	high	
	28/16	Tourismo	12-17 fl oz/acre	12	14	high	
	4A/28	Voliam Flexi WDG	4-7 oz/A	12	35	high	
	3A/28	*Voliam Xpress	6-12 fl oz/A	24	21	high	
Comstock mealybug	4A	Actara 25WDG	4.5-5.5 oz/A	12	35	high	[7.2],[7.3]
	4A	Admire Pro 4.6SC	7.0 fl oz/A	12	7	high	
	4A	Assail 30SG	4-8 oz/A	12	7	high	
	4A	Calypso 4F	1-2 fl oz/100 gal or 4-8 fl oz/A	12	30	high	
	16	Centaur 0.7WDG	34.5-46 oz/A	12	14	high	
	1B	*Diazinon 50WP	1 lb/100 gal	96	21	high	
	23	Movento 240SC	6-9 fl oz/A	24	7	high	
	21A	Portal 0.4EC	2 pt/A	12	14	high	

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Additional Summer Sprays (continued)							
Comstock mealy bug (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.						
	4A/6	*Agri-Flex SC	1.5-2.0 fl oz/100 gal or 5.5-8.5 fl oz/A	12	35	high	[7.3]
		<i>plus:</i> Horticultural spray oil	1 qt/100 gal or 1 gal/A				
	4A/28	Voliam Flexi WDG	7 oz/A	12	35	high	
European red mite, Twospotted spider mite, Pear rust mite	6	*Agri-Mek 8SC	0.5-1 fl oz/100 gal or 2.25-4.25 fl oz/A	12	28	high/mod (ERM/ TSSM)	[8.1],[13.1]
	10A	Apollo 4SC	4-8 oz/A	12	21	high/poor	
	3A	*Brigade 10WSB or *Brigade 2EC	12.8-32 oz/A 5.12-12.8 fl oz/A	12	14	moderate	
	23	Envidor 2 SC	16-18 fl oz/acre	12	7	high	
	20B	Kanemite 15SC	21-31 fl oz/A	12	14	high	
	21	Nexter 75WS	4.4-10.67 oz/A	12	7	high/mod	
	10A	Onager 1EC	12-24 fl oz/A	12	28	high/poor	
	21	Portal 0.4EC	2 pt/A	12	14	high	
	10A	Savey 50DF	3-6 oz/A	12	28	high/poor	
	12B	*Vendex 50WP	6-8 oz/100 gal or 1- 2 lb/A	48	14	moderate	
	10B	Zeal 72WS	2-3 oz/A	12	14	high	
The following pre-mix product is also labeled for use against these pests; 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.							
	4A/6	*Agri-Flex SC	1.5-2.0 fl oz/100 gal or 5.5-8.5 fl oz/A	12	35	high/ moderate	[8.1]
		<i>plus:</i> Horticultural spray oil	1 qt/100 gal or 1 gal/A				
	3A/6	*Gladiator EC	4.75 fl oz/100 gal or 19 fl oz/A	12	28	high/poor	
Obliquebanded leafroller	11A	Agree WG 3.8WS	1-2 lb/A	4	0	high	[10.2]
	28	Altacor 35WDG	2.5-4.5 oz/A	4	5	high	
	3A	*Baythroid XL 1EC	2.4-2.8 fl oz/A	12	7	moderate	
	28	Belt 4SC	3-5 fl oz/A	12	14	high	
	5	Delegate 25WG	4.5-7 oz/A	4	7	high	
	11A	Deliver 18WG	0.5-2 lb/A	4	0	high	
	11A	Dipel 10.3DF	0.5-2 lb/A	4	0	high	
	5	Entrust 80WP	0.67-1 oz/100 gal or 2-3 oz/A	4	7	high	
	5	or Entrust 2SC	6-10 fl oz/A			high	
	18A	Intrepid 2F	8-16 fl oz/A	4	14	high	
11A	Javelin 7.5WDG	0.5-4 lb/A	4	0	high		

Table 12.1.1. Pesticide Spray Table – Pears

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

Pest	IRAC/ FRAC Code	Product	Rate(s)	REI (hrs)	PHI (days)	Efficacy	Comments (see text)
Additional Summer Sprays (continued)							
Obliquebanded leafroller (continued)	1B	*Lannate 2.4LV	0.75 pt/100 gal or 1.5-3 pt/A	48	7	moderate	
	1B	or *Lannate 90SP	0.25 lb/100 gal or 0.5-1 lb/A			moderate	
	6	*Proclaim 5SG	0.8-1.2 oz/100 gal or 3.2-4.8 oz/A	12 or 48 (E)	14	high	
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.							
	3A/4A	*Endigo ZC	5-6 fl oz/A	24	35	moderate	[10.3]
	3A/6	*Gladiator EC	3.5-4.75 fl oz/100 gal or 14-19 fl oz/A	12	28	moderate	
	3A/4A	*Leverage 360	2.4-2.8 fl oz/A	12	7	moderate	
	4A/28	Voliam Flexi WDG	4-7 oz/A	12	35	high	
	3A/28	*Voliam Xpress	6-12 fl oz/A	24	21	high	
Pear psylla	Choose from materials listed under Petal Fall, except for Esteem						[12.5]
Pearleaf blister mite	1A	Sevin XLR Plus, 4F	1.5-3 qt/A	12	3	high	[14.2]
	1A	or Sevin 80S	1.88-3.75 lb/A			high	
Redbanded leafroller	11A	Agree WG 3.8WS	1-2 lb/A	4	0	high	[16.1]
	28	Altacor 35WDG	2.5-4.5 oz/A	4	5	high	
	3A	*Baythroid XL 1EC	2.4-2.8 fl oz/A	12	7	high	
	28	Belt 4SC	3-5 fl oz/A	12	14	high	
	5	Delegate 25WG	4.5-7 oz/A	4	7	high	
	11A	Deliver 18WG	0.5-2 lb/A	4	0	high	
	11A	Dipel 10.3DF	0.5-2 lb/A	4	0	high	
	1B	Imidan 70W	0.75-1 lb/100 gal or 2.13-5.75 lb/A	7 days	7	high	
	11A	Javelin 7.5WDG	0.5-4 lb/A	4	0	high	
	6	*Proclaim 5SG	0.8-1.2 oz/100 gal or 3.2-4.8 oz/A	48	14	high	
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.							
	3A/6	*Gladiator EC	3.5-4.75 fl oz/100 gal or 14-19 fl oz/A	12	28	high	
	3A/4A	*Leverage 360	2.4-2.8 fl oz/A	12	7	high	
	3A/28	*Voliam Xpress	6-12 fl oz/A	24	21	high	
San Jose scale	4A	Admire Pro 4.6SC	2.8 fl oz/A	12	7	moderate	[20.2]
	4A	Assail 30SG	8 oz/A	12	7	moderate	
	16	Centaur 0.7WDG	34.5-46 oz/A	12	14	high	
	7C	Esteem 35WP	4-5 oz/A	24	45	high	
	23	Movento 240SC	6-9 fl oz/A	24	7	high	
	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.						
	3A/4A	*Endigo ZC	5-6 fl oz/A	24	35	moderate	

Table 12.1.1. Pesticide Spray Table – Pears

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

Pest	IRAC/ FRAC Code	Product	Rate(s)	REI (hrs)	PHI (days)	Efficacy	Comments (see text)
Additional Summer Sprays (continued)							
San Jose Scale (continued)	3A/4A	*Leverage 360	2.4-2.8 fl oz/A	12	7	moderate	
	3A/28	*Voliam Xpress	6-12 fl oz/A	24	21	moderate	
Spotted wing Drosophila	5	Delegate 25WG	4.5-7 oz/A	4	7	moderate	[17.2]
	5	Entrust 80WP	1.5-3 oz/A	4	7	high	[17.2]
	5	or Entrust 2SC	4-10 fl oz/A			high	
	1B	Imidan 70W	0.75-1 lb/100 gal or 2.13-5.75 lb/A	7 days	7	moderate	
Stink bugs, including Brown marmorated stink bug	4A	Actara 25WDG	4.5-5.5 oz/A	12	35	moderate	[18.2]
	3A	*Baythroid XL 1EC	2-2.4 fl oz/A	12	7	moderate	
	3A	*Brigade 2EC	2.6-12.8 fl oz/A	12	14	high	
	3A	or *Brigade 10WSB	6.4-32 oz/A	12	14	high	
	3A	*Danitol 2.4EC	10.7-21.3 fl oz/A	24	14	moderate	[18.2]
	1A	*Lannate 2.4LV	2.25 pt/A	96	7	high	[18.2]
	1A	or *Lannate 90SP	0.75 lb/A	96	7	high	
	–	Surround 95WP	25-50 lb/A	4	0	moderate	
	1A	*Vydate 2L	1.5-3 pt/A	48	14	moderate	[18.2]
	3A	*Warrior II 2.08CS	1.28-2.56 fl oz/A	24	21	moderate	
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.							
	3A/4A	*Endigo ZC	5-6 fl oz/A	24	35	high	
	3A/6	*Gladiator EC	3.5-4.75 fl oz/100 gal or 14-19 fl oz/A	12	28	moderate	
	3A/4A	*Leverage 360	2.4-2.8 fl oz/A	12	7	moderate	
	4A/28	Voliam Flexi WDG	6-7 oz/A	12	35	moderate	
	3A/28	*Voliam Xpress	6-12 fl oz/A	24	21	moderate	

12.2 Pear Disease Notes

12.2.1 Fabraea Leaf Spot

• Biology & Cultural

[1.1] Bosc and Seckel are much more susceptible than Bartlett.

• Pesticide Application Notes

[1.2] It is important to prevent the establishment of early primary infections. Sprays should start at green cluster if the year is wet and disease was prevalent last year; otherwise, wait until white bud. Continue sprays at 10- to 14-day intervals through 1st or 2nd cover. In orchards with high inoculum, apply a mancozeb spray at 7-day intervals after petal fall until reaching either the 77-day PHI or the limit on the number of sprays per season. A 3-wk summer spray schedule will normally maintain control if early infections have been prevented. Summer applications of Sovran or Flint to control scab or sooty blotch will also control Fabraea leaf spot. Pear psylla can facilitate the spread of leafspot during summer, so controlling psylla is

important in high-pressure orchards. Using summer oils to suppress pear psylla may also suppress spread of Fabraea leaf spot during late summer.

12.2.2 Fire Blight

• Biology & Cultural

[2.1] Fire blight is an even more serious disease on pears than it is on apples. In general, the control strategies recommended for apples apply equally to pears. Bartlett, Bosc, Clapps Favorite, and Gorham are all extremely susceptible varieties. D'Anjou is slightly less susceptible, but comparable to the most highly susceptible apple variety; Seckel is considered moderately susceptible. Refer to the discussion of this disease in the "General Pest Management Considerations for Apples" section. For more details on optimizing streptomycin blossom blight sprays, see footnote 8.3 in the apple section

[2.2] The best program for reducing summer spread of fire blight is good psylla control.

Refer to the reference materials list at the end of this publication for a Fact Sheet containing more details on the biology and management of this pest.

• Pesticide Application Notes

[2.3] While specifically labeled for control of pseudomonas blight, a copper spray also will assist with control of fire blight. However, it will not eliminate the need for streptomycin at bloom. It is effective in reducing the population of overwintering fire blight bacteria, and is a useful component in an overall fire blight control program. Thorough coverage of the entire tree is necessary for maximum effectiveness, so high-gallonage sprays are preferred. Leaf burning may occur if applied beyond bud burst, especially under slow drying conditions. The oil should be added at a rate of 1 qt per 100 gal of actual spray solution in the tank (i.e., do not concentrate the oil). If using Bordeaux mix, prepare as described in the “Fungicides” section of “Characteristics of Crop Protectants.” Add the oil after adding lime, but before making up to volume. The 1 qt of oil is added to increase the efficiency of the copper compounds and is not sufficient for good psylla control. A separate oil application can be made for psylla, or 3 gal of oil can be used with the copper sprays. Several other commercial copper formulations in addition to those listed are labeled for this use on pears. Although they have not been tested, research on other crops suggests that most copper formulations should give comparable rates of control at comparable rates of metallic copper.

[2.4] Streptomycin is not recommended for routine summer use, but is strongly recommended for use within 24 hr after the start of a hailstorm.

[2.5] Bloomtime Biological is labeled for blossom blight control in pears. This biopesticide is consistently less effective than streptomycin, but may be a viable option in orchards with low levels of fire blight inoculum and during environmental conditions indicative of a low risk of infection. Currently, this product has not been evaluated on pears in New England. However, in NY apple orchards, this product has been shown to provide up to 50% control when applied during bloom compared to streptomycin.

[2.6] Mycoshield is registered for fire blight and can be included in the management program for blossom blight. This antibiotic is consistently less effective than streptomycin, but may be viable option as a resistant management tool when used in rotation with streptomycin. Use primarily in orchards with low levels of fire blight inoculum. Research conducted in New York suggests that this product may only provide up to 50% control when applied during bloom compared to streptomycin.

[2.7] Serenade can be integrated into a fire blight control program, but it has been consistently less effective than streptomycin. Therefore, Serenade should be used only in rotational programs with streptomycin and not as the sole bactericide for fire blight management. Research at Geneva suggests that streptomycin should be the first product applied during bloom, particularly when conditions are very favorable for the development of fire blight. Serenade should be applied 24 hr after the infection event.

• Pesticide Resistance

[2.8] The recommended action plan for fire blight management in New England is as follows:

1. All fire blight cankers should be removed during winter pruning.
2. Copper applications should be made at green tip.
3. Extension warnings of fire blight infection periods should be heeded, and recommended materials sprayed promptly.
4. Prohexadione-Calcium (Apogee) sprays should be used at high rate, applied at 2-3 inches shoot growth.
5. Fire blight strikes should be pruned out promptly and destroyed.
6. If severe blossom blight occurs contact CCE for SR Ea testing.

In all regions of New England the following action plan is recommended for newly planted orchards:

1. If possible, plant varieties grafted on fire blight-resistant rootstocks.
2. Trees should be carefully examined for fire blight infections before planting. Infected trees should be discarded. Samples should be submitted for strep-resistance testing.
3. Immediately after planting a copper spray should be applied. Wait until to the soil has settled to avoid phytotoxicity issues.
4. Planting should be scouted at 7-day intervals for fire blight strikes until June 30. Infected tree should be removed. Plantings also need to be scouted 7-10 days after hail or severe summer storms and at the end of the season (mid-September). The NEWA/NRCC disease forecasting models for fire blight (newa.nrcc.cornell.edu/newaModel/apple_disease) can assist by providing an estimate of symptom emergence following a storm or other trauma event.
5. If possible, remove flowers before they open. Since most new plantings have many blossoms the first year, and many orchards are high density (i.e. 1000-2000 trees per acre), blossom removal may not be possible. If practiced, the blossoms should be removed before there is a high risk of FB infection.
6. Apply copper, tank mix of streptomycin and oxytetracycline at the full label rate for each during any remaining bloom based on blossom blight predictions. The NEWA/NRCC disease forecasting models for fire blight (newa.nrcc.cornell.edu/newaModel/apple_disease) will run nearly until August, and have an adjustable bloom date to account asynchronous or late bloom in new plantings.
7. Trees should receive a second copper spray at a stage equivalent to bloom. 48 hours REI before blossom removal.

8. Samples of any infections seen after planting should be submitted for streptomycin resistance testing.

12.2.3 Pear Scab

• Biology & Cultural

[3.1] Seckels are very susceptible to scab; Bosc and D'Anjou, somewhat less so; Bartlett is relatively resistant.

• Pesticide Application Notes

[3.2] If scab developed the previous year, sprays should begin at green cluster and continue at 7- to 10-day intervals through 2nd cover. In blocks with little history of scab, applications from white bud through 1st cover should provide sufficient protection. Additional cover sprays will be necessary if scab becomes established and the season remains wet. Use of Topsin M and Thiophanate-methyl should be limited during the early season if substantial use is anticipated later in the season for control of sooty blotch and *Fabraea* leaf spot. Note: Topsin M has a 48 hour REI. Thiophanate-methyl has a 3-day (76 hr) REI.

[3.3] Mancozeb fungicides are more effective than ferbam or ziram. It is labeled for use on pears in one of two different ways: (i) at a rate of 1.5-2 lb/100 gal (maximum 6 lb/A, no more than 24 lb/A per year), not to be applied after bloom; OR (ii) at a reduced rate of 3 lb/A (maximum 21 lb/A per year), which may be applied to within 77 days of harvest.

The latter program is particularly valuable where *Fabraea* leaf spot and sooty blotch must be controlled in the early summer. It is illegal to combine or integrate the two treatment regimes or to use any mancozeb sprays after bloom if any of the earlier sprays were applied at more than 3 lb/A of formulated product.

[3.4] Sovran and Flint are excellent protectants, and will be most reliable when used in this manner. They have 48-72 hr post infection activity against pear scab. They significantly reduce spore production from the lesions that develop when the fungicides are applied several days after the start of an infection period. They are not registered for control of *Fabraea* leaf spot but they control leaf spot when applied during the summer. They provide good control of black rot on apples, but they are not registered for control of this disease on pears and experience with control of black rot on pears is lacking. The strobilurins are prone to resistance development, and it appears that resistance to one member of this class of materials confers resistance to other products in the class (cross-resistance). The primary strategies for reducing the resistance risk are to: (i) rotate these materials with unrelated fungicides; and (ii) limit the number of seasonal applications of a strobilurin (e.g., three per year).

[3.6] The risk of primary scab is greatly reduced after 1st or 2nd cover. Where scab has been well controlled and there is no history of leafspot problems, it is possible to extend fungicide spray intervals to 14-21 days after the 3rd cover has been applied. If these diseases have not been

controlled, fungicides should be applied at 10- to 14-day intervals throughout the summer, except during drought periods. Observe mancozeb restrictions detailed in [3.3].

[3.7] Fontelis has excellent protectant activity.

Fontelis is most effective against scab when applied at 7-10-day intervals to control primary and secondary scab. Fontelis also has fairly good activity against powdery mildew. There have been reports of phytotoxicity with tank mixes of Fontelis and captan applied from petal fall to 2nd cover. Hence, tank mixes of Fontelis and captan should be avoided during this timeframe.

12.2.4 Sooty Blotch

• Biology & Cultural

[4.1] Sooty blotch develops gradually during periods of rain, dew, and very high humidity. The disease is favored by frequent showers, poor air circulation, and proximity to sources of inoculum such as woods and brushy hedgerows. Fungicide control programs should begin around 1st cover, depending upon weather and inoculum pressure. Pruning to improve air circulation through the canopy will reduce the total fungicide need in most years. See [3.3] above, and remark [10.1] in the General Pest Management Considerations for Apples section for additional information about sooty blotch.

12.3 Pear Insect and Mite Notes

12.3.1 Aphids, Including Spirea Aphid

• Pesticide Application Notes

[5.1] Calypso or Movento applied at petal fall will also control Comstock mealybug. Movento must be used with a spray adjuvant having spreading and penetrating properties. *Agri-Flex must be used with a horticultural spray oil (not a dormant oil). Do not exceed 0.172 lb a.i./A of thiamethoxam-containing products per acre per growing season. For best effectiveness and insecticide resistance management, the use of pre-mixes such as *Agri-Flex and *Leverage should be reserved for those situations when the pest complex to be treated is appropriately matched to the combination of active ingredients and modes of action contained in the product.

[5.2] For enhanced residual control, combine M-Pede with another recommended product.

12.3.2 Brown Marmorated Stink Bug – refer to section 12.3.15 Stink Bugs

12.3.3 Codling Moth

• Biology & Cultural

Refer to the reference materials list at the end of this publication for a Fact Sheet containing details on the biology and management of this pest.

• **Monitoring & Forecasting**

Refer to the NEWA Apple Insect Models website (newa.cornell.edu/index.php?page=apple-insects) for current information on the occurrence, development and management of this pest in your specific location.

• **Pesticide Application Notes**

[6.1] A developmental model predicts the appropriate larval treatment period for CM as 250-360 degree-days (base 50°F) after 1st adult catch for each generation, and approximately 150 DD after this same biofix date for insecticides with ovicidal activity. Use of a non-ionic surfactant is recommended with Assail. Pyrethroid insecticides applied during summer against pear psylla will control codling moth. Use Sevin at 1 lb rate. Do not exceed 0.172 lb a.i./A of thiamethoxam-containing products per acre per growing season. For best effectiveness and insecticide resistance management, the use of pre-mixes such as *Endigo, *Leverage, Voliam Flexi and *Voliam Xpress should be reserved for those situations when the pest complex to be treated is appropriately matched to the combination of active ingredients and modes of action contained in the product. Suggested action threshold: Avg. of >5 CM adults/week caught per pheromone trap once 150-360 DD (base 50°F) have accumulated since biofix.

• **Biological & Non-chemical Control**

[6.2] Better control is obtained when pheromone disruption begins with the first generation of the season; regardless, products for disruption should be applied before first flight of the generation being targeted. Residual field life of CM-F may require re-application after 14 days. Insecticide sprays or double the rate of pheromones may be needed in border rows of orchards adjacent to sources of adult immigration or in other high pressure situations.

12.3.4 Comstock Mealybug

• **Biology & Cultural**

Refer to the reference materials list at the end of this publication for a Fact Sheet containing details on the biology and management of this pest.

• **Pesticide Application Notes**

[7.1] Sprays recommended at petal fall and 7d later, against newly emerged crawlers. Research suggests that treatments against 2nd generation crawlers are more effective, but petal fall sprays may be of use in keeping populations low. Movento must be used with a spray adjuvant having spreading and penetrating properties. Actara and Calypso will also control plum curculio and pear psylla when applied at petal fall.

[7.2] Two sprays recommended for the 2nd generation, 7 days apart, against newly hatched crawlers. Begin approximately Aug. 1 in southern New England, one week later in central New England.

[7.3] Multiple applications of Actara, *Agri-Flex or Voliam Flexi in pome fruit require applicator to not exceed a total of 0.172 lbs a.i. of thiamethoxam containing

products per acre per growing season. Movento must be used with a spray adjuvant having spreading and penetrating properties. *Agri-Flex must be used with a horticultural oil (not dormant oil). Suggested action threshold: 5% calyx infestation of previous year's crop.

12.3.5 European Red Mite, Twospotted Spider Mite

• **Biology & Cultural**

Refer to the reference materials list at the end of this publication for a Fact Sheet containing details on the biology and management of this pest.

• **Pesticide Application Notes**

[8.1] Applications advised as needed in summer. Acramite and Apollo are not effective against rust mite. Kanemite limited to a maximum of 2 applications per season; Portal limited to 1 application per growing season; Kanemite not registered for pear rust mite. Savey and Acramite limited to 1 application per season. *Agri-Flex most effective from petal fall through 6 weeks past petal fall; must be applied in combination with a horticultural spray oil (not a dormant oil). Do not exceed 0.172 lb a.i./A of thiamethoxam-containing products per acre per growing season. Suggested action threshold: 6 motile forms/leaf.

12.3.6 Green Fruitworms

• **Biology & Cultural**

Refer to the reference materials list at the end of this publication for a Fact Sheet containing details on the biology and management of this pest.

• **Pesticide Application Notes**

[9.1] Growers can usually wait until petal fall to assess the need for treatment. Only 1.8 lb AI/ acre of *Lannate permitted per season. It is recommended that pyrethroids not be used more than 1-2 times per season in any orchard. For best effectiveness and insecticide resistance management, the use of pre-mixes such as *Endigo, *Leverage and *Voliam Xpress should be reserved for those situations when the pest complex to be treated is appropriately matched to the combination of active ingredients and modes of action contained in the product. Suggested action threshold: 3 larvae/tree on large trees (27-40 trees/A); 1 larva/tree at density of 140 trees/A.

12.3.7 Obliquebanded Leafroller

• **Biology & Cultural**

Refer to the reference materials list at the end of this publication for a Fact Sheet containing details on the biology and management of this pest

• **Monitoring & Forecasting**

Refer to the NEWA Apple Insect Models website (newa.cornell.edu/index.php?page=apple-insects) for

current information on the occurrence, development and management of this pest in your specific location.

• **Pesticide Application Notes**

[10.1] Spray recommended when last petals are falling. Only 1.8 lb AI/acre of *Lannate permitted per season. Will also help control Comstock mealybug. A pyrethroid applied now against pear psylla will also control obliquebanded leafroller. Suggested action threshold: 5-10% infested clusters.

[10.2] For 1st summer brood in July, begin applications approximately 360 DD [base 43°F] after 1st adult trap catch. Only 1.8 lb AI/acre in 2 applications of *Lannate permitted/season.

[10.3] Do not exceed 0.172 lb a.i./A of thiamethoxam-containing products per acre per growing season. For best effectiveness and insecticide resistance management, the use of pre-mixes such as *Endigo, *Leverage, Voliam Flexi and *Voliam Xpress should be reserved for those situations when the pest complex to be treated is appropriately matched to the combination of active ingredients and modes of action contained in the product.

12.3.8 Pear Midge

• **Pesticide Application Notes**

[11.1] Two spray applications between the swollen bud and white bud stages.

12.3.9 Pear Psylla

• **Biology & Cultural**

Refer to the reference materials list at the end of this publication for a Fact Sheet containing details on the biology and management of this pest.

• **Pesticide Application Notes**

[12.1] To inhibit egg-laying by psylla, apply oil as soon as first eggs are laid in the spring; timing is especially critical (not effective if >20% of spring oviposition has occurred). Make 2nd application in 7 days if adults are still present. If 2 sprays are anticipated, drop rate to 2 gal for both. The 3 gal rate can also help reduce overwintering populations of European red mite, pearleaf blister mite, and Comstock mealybug. Suggested action threshold for pear psylla: 1 egg in a 3-minute inspection of buds.

[12.2] Apply insecticide from swollen bud through white bud. Pear rust mite may build up with repeated pyrethroid use. Seasonal maximum for *Ambush is 0.8 lbs. a.i./acre and *Pounce is 2 lb a.i./A; for *Asana, up to 0.2 lb a.i. during the dormant to white bud stage and up to 0.225 lb a.i. between bloom and harvest (but no more than 0.375 lb total a.i./Acre per season). *Warrior provides suppression only. Esteem may be applied once prebloom at 5 oz/A, or once prebloom and once at petal fall at 4-5 oz/A. Improved activity of Delegate may be obtained by addition of an adjuvant such as horticultural mineral oil. Movento must be used with a spray adjuvant having spreading and

penetrating properties. Centaur may cause phytotoxicity in Oriental pear varieties when applied prior to petal fall. Do not exceed 0.172 lb a.i./A of thiamethoxam-containing products per acre per growing season. Suggested action threshold before white bud: 6-10% of spurs with eggs.

[12.3] M-Pede can provide suppression when used in a seasonal program. Uniform drying conditions are required to prevent droplet residue on fruit; short residual period.

[12.4] One spray of oil at 2 gal rate, or 2 sprays at 1 gal rate, recommended through tight cluster.

[12.5] Nexter is limited to a maximum of 1 application per season. Mulpile applications of Actara in pome fruit require applicator to not exceed a total of 0.172 lbs a.i. of thiamethoxam containing products per acre per growing season. Portal limited to a maximum of 1 application per growing season. Esteem may be applied once prebloom at 5 oz/A, or once prebloom and once at petal fall at 4-5 oz/A. Suggested action threshold after fruit set: Avg of 1-2 nymphs per terminal leaf. *Agri-Mek can be used anytime from petal fall to about 4 weeks afterward, but is most effective when applied before foliage begins to harden off, generally within the first 2 weeks after petal fall. *Agri-Mek must be applied with a horticultural oil (not a dormant oil). Movento must be applied with a spray adjuvant having spreading and penetrating properties. , *Agri-Flex must be mixed with a horticultural spray oil. Improved activity of Delegate may be obtained by addition of an adjuvant such as horticultural mineral oil. Actara and Calypso will also control plum curculio and Comstock mealybug when applied at petal fall. Do not exceed 0.172 lb a.i./A of thiamethoxam-containing products per acre per growing season.

[12.6] Frequent applications (7-10-day intervals) of Surround and maximal coverage (minimum of 100 gal/A) are advised in New England while there is active foliar growth.

• **Pesticide Resistance**

[12.7] Variable levels of pear psylla tolerance or resistance to pyrethroids may exist in New England, so growers should alternate use of pyrethroids with other materials to delay the development of resistance in their orchards. The preferred strategy would be to withhold their use until (and unless) needed in the summer.

12.3.10 Pear Rust Mite

• **Pesticide Application Notes**

[13.1] In blocks with a history of rust mite infestations, a preventive petal fall spray might be advisable. Nexter limited to a maximum of 1 application per season. See [8.1]. Do not exceed 0.172 lb a.i./A of thiamethoxam-containing products per acre per growing season.

12.3.11 Pearleaf Blister Mite

- **Pesticide Application Notes**

[14.1] A spray of oil plus diazinon in the spring, just before the green tissue begins to show, will benefit most control programs.

[14.2] A fall application post-harvest, when there is no danger of frost for at least 24-48 hr after the spray.

12.3.12 Plum Curculio

- **Biology & Cultural**

Refer to the reference materials list at the end of this publication for a Fact Sheet containing details on the biology and management of this pest.

- **Monitoring & Forecasting**

Refer to the NEWA Apple Insect Models website (newa.cornell.edu/index.php?page=apple-insects) for current information on the occurrence, development and management of this pest in your specific location.

- **Pesticide Application Notes**

[15.1] Sprays recommended at petal fall and 10 days later. 1st brood codling moth is also controlled by these materials; (see [6.1] for 2nd brood control). Imidan also controls fruit tree leafroller. Actara will also control pear psylla and Comstock mealybug when applied at petal fall. Do not exceed 0.172 lb a.i./A of thiamethoxam-containing products per acre per growing season. For best effectiveness and insecticide resistance management, the use of pre-mixes such as *Agri-Flex, *Leverage, Voliam Flexi or *Voliam Xpress should be reserved for those situations when the pest complex to be treated is appropriately matched to the combination of active ingredients and modes of action contained in the product.

12.3.13 Redbanded Leafroller

- **Biology & Cultural**

Refer to the reference materials list at the end of this publication for a Fact Sheet containing details on the biology and management of this pest.

- **Pesticide Application Notes**

[16.1] Two sprays, from mid-July to early August, for 2nd brood control in problem blocks; note PHI restrictions. For best effectiveness and insecticide resistance management, the use of pre-mixes such as *Leverage and *Voliam Xpress should be reserved for those situations when the pest complex to be treated is appropriately matched to the combination of active ingredients and modes of action contained in the product.

12.3.14 Spotted Wing Drosophila

- **Biology & Cultural**

[17.1] This is an exotic species of vinegar fruit fly, a group normally attracted to damaged and rotting fruit. But in contrast to endemic Drosophila fruit flies, it has a

serrated ovipositor and will lay eggs in intact ripening fruit on the tree; it is also a pest of berry fruit crops. Originally known from Japan, it has now been found in New England, as well as in nearby states such as NY, PA, NJ, and MI. Refer to the reference materials list (17.4.2, Other References) at the end of this publication for fact sheets containing details on the biology and management of this species.

- **Pesticide Application Notes**

[17.2] Apply at first signs of adult activity. If repeated applications are necessary, rotate active ingredients to avoid promoting resistance in local populations. Delegate labeled for suppression only. Entrust use requires the ser to have a copy of the appropriate 2(ee) recommendation in their possession at time of use.

12.3.15 Stink Bugs (including Brown Marmorated Stink Bug)

- **Biology & Cultural**

[18.1] A number of native stink bug species can sometimes cause fruit damage in all tree fruits under conditions that are not fully understood. Adult feeding during bloom and shuck split can cause the fruit to abort, and feeding later in the summer can cause a deep catfacing injury such as that caused by tarnished plant bug, or depressed, dimpled, corky or water-soaked areas on the skin. All tree fruits are attacked, especially peaches and apples. Other species of stink bugs are predators. Elimination of alternate host broadleaf weeds, especially legumes, in the orchard will contribute to management efforts. If control is needed, insecticides should be timed to kill immigrating adults as they appear in the orchards to prevent feeding damage and subsequent mating and egg laying.

The brown marmorated stink bug is an invasive species from Asia that was first documented in Allentown, PA in 2001. This insect has spread across a number of eastern US States, and now extends to the west coast as well. It was first documented in NY in the Hudson Valley Region in 2008. Although it can be found throughout NY in and around structures and vehicles, extensive monitoring efforts in 2011 and 2012 have resulted in very few detections in agricultural crops; however, reports of sightings have been increasing. Refer to the reference materials list (17.4.2, Other References) at the end of this publication for fact sheets containing details on the biology and management of brown marmorated stink bug.

- **Pesticide Application Notes**

[18.2] Apply at first signs of infestation; BMSB are very mobile pests, and may reinfest the treated area quickly. If repeated applications are necessary, rotate active ingredients to avoid promoting resistance in local populations. Actara, *Danitol, *Lannate, and *Vydate have FIFRA Section 2(ee) recommendations for BMSB; the labeling must be in the possession of the user at the time of pesticide application. Only 1 application of *Vydate allowed per season. For best effectiveness and insecticide

resistance management, the use of pre-mixes such as *Endigo, *Leverage and *Voliam Xpress should be reserved for those situations when the pest complex to be treated is appropriately matched to the combination of active ingredients and modes of action contained in the product.

12.3.16 Tarnished Plant Bug, Pear Plant Bug

Refer to the reference materials list at the end of this publication for a Fact Sheet containing details on the biology and management of this pest.

• Pesticide Application Notes

[19.1] Recommended spray timing is from green cluster to white bud. For best effectiveness and insecticide resistance management, the use of pre-mixes such as *Leverage or *Voliam Xpress should be reserved for those situations when the pest complex to be treated is appropriately matched to the combination of active

ingredients and modes of action contained in the product. Suggested action threshold: plant bugs – 3 bleeding sites/tree, or a cumulative catch of 7 adults by white bud stage (white sticky-board trap). See Comment [12.7].

12.3.17 San Jose Scale

Refer to the reference materials list at the end of this publication for a Fact Sheet containing details on the biology and management of this pest.

• Pesticide Application Notes

[20.1] Apply during delayed dormant against overwintering immatures; thorough coverage improves efficacy. Addition of oil to Assail, Esteem and Lorsban will improve performance.

[20.2] 2 sprays against first and peak (7-10 days later) crawler activity in both generations. Movento must be used with a spray adjuvant having spreading and penetrating properties; most effective when used at petal fall to first cover.

12.4 Growth Regulation of Pears

Table 12.4.1. Growth Regulator Uses in Pears.

<i>Timing</i>	<i>Product</i>	<i>Concentration</i>	<i>Rate of Formulated Product</i>
Chemical Thinning			
Petal Fall to 5-7 days after petal fall	Amid-Thin W (NAD)	25-50 ppm	4-8 oz / 100 gal
Labeled for use on Bartlett and Bosc. Apply between petal fall and 5-7 days after petal fall.			
7-28 days after full bloom	Fruitone-N, Fruitone-L	10-15 ppm	4-6 oz / 100 gal
Labeled for use on Bartlett, Bosc and Comice. NAA is more effective at early timings and should be applied as soon as fruit set is apparent for greatest success. Late applications may result in reduced fruit size. Do not apply when temperature is below 60°F or above 85°F. NAA will not usually adequately thin Bartlett but the addition of a surfactant will improve thinning.			
Fruit Size 8-14mm (7-28 days after full bloom)	Maxcel, RiteWay	125-200 ppm	80-128 fl oz / 100 gal
Rates of Maxcel for pears are significantly higher than for apples. We recommend 150ppm for Bartlett and 75 ppm for Bosc. Do not apply when temperature is below 60°F or above 85°F.			
Induction of Lateral Branching in Young Trees			
1-2" of Terminal Shoot Growth	Promalin, Perlan, Typy, Maxcel	125-1000 ppm (500 ppm Maxcel)	0.25-2 pt / 5 gal
Include a non-ionic surfactant and apply as a directed spray to areas where additional branching is desired. This practice is more effective in the second and third growing seasons after planting. Response on weak or low-vigor trees is usually disappointing. For nursery stock treat after trees have reached a terminal height at which lateral branching is desired.			
Preharvest Fruit-Drop Control			
1-2weeks before anticipated harvest	ReTain	132 ppm	333 g / acre or 1 pouch
Apply in sufficient water to ensure thorough but not excessive coverage. An organosilicone surfactant (12 oz/100 gal) should be used with ReTain.			
5-7 days before harvest	Fruitone-N, Fruitone-L	10-15ppm	4-6 oz (lb)/100 gal
Apply 7 days before harvest on D'Anjou, Bosc, and Bartlett. Make separate sprays to early and late maturing varieties.			

* To convert ounces (lb) to grams multiply ounces by 28.3. To convert fluid ounces to milliliters multiply fluid ounces by 29.57.