

APPLE/PEAR SPRAY SCHEDULE—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
BY MARCH 15 Initiate Oriental Fruit Moth and San Jose Scale Scouting Program	Place 2 or 3 Oriental fruit moth pheromone traps in orchard interior and check twice weekly to record date of first consistent moth emergence (late March) = OFM biofix date . Be sure to keep trap bottoms clean and replace lures monthly or every two months for long life lures. After OFM biofix date, begin calculating number of daily degree days (DD) using base 45°F = DD = (maximum daily temperature + minimum daily temperature) / 2 – 45. Place 2 or 3 San Jose scale pheromone traps in orchard interior in tops of trees known to have a live SJS infestation (conspicuous red spots on apples last year). Record first date from mid-March to mid-April when you capture SJS males on traps = SJS biofix date.			
GREEN TIP TO ½" GREEN San Jose Scale European Red Mite Eggs Aphid Eggs	Superior oil plus one of the following: Lorsban Advanced Supracide 2E	2% 0.5-4 pt 3-12 pt	Where San Jose scale is a main target of oil sprays, the best timing is at green tip, but delaying oil application until half-inch green will give better control of mites. DO NOT use Captan within 2 weeks or Sulfur within 30 days before or after an oil application. Apply Supracide before any blossoms open. For rates less than 2 pt Supracide per 100 gal, tank mix with an oil. Use Esteem with Superior spray oil at recommended rate at half-inch green to control scale and rosy apple aphid.	45 See text
Spotted Tentiform Leafminer	Esteem 35WP	3-5 oz		45
TIGHT CLUSTER TO PINK				
Rosy Apple Aphid	Assail 70WP Beleaf 50SG Lorsban Advanced Sivanto 200 SL Vydate 2 L	2.5-4 oz 2-2.8 fl oz 1.5-4 pt 7-10.5 fl oz 4-8 pt	Weekly from tight cluster to late May, check five fruit clusters in interior of each of 20 susceptible trees (look at Ida Red or Golden Delicious) for rosy apple aphids inside curled leaves. Post-bloom application of Lorsban to apples is prohibited. Caution: In some blocks, rosy apple aphid was resistant to Ambush and Asana. Caution: Use of pyrethroids (Ambush, Asana, Baythroid, Danitol, Decis, Pounce, Proaxis and Warrior) may kill natural enemies triggering outbreaks of woolly apple aphid, mites, San Jose scale and Comstock mealybug.	7 21 45 14 14
Tarnished Plant Bugs and Stink Bugs	Ambush Asana XL 0.66 EC Avaunt 30 WDG Baythroid XL 1 EC Beleaf 50 SG Besiege Danitol 2.4 EC Mustang Maxx 0.8 EC Pounce 25 WP Proaxis 0.5 EC Warrior	6.4-25.6 oz 4.8-14.5 fl oz 5-6 oz 2-2.4 fl oz 2-2.8 fl oz 6-12 fl oz 10.7-21.3 fl oz 1.28-4 fl oz 6.4-16 oz 2.6-5.1 fl oz 1.28-2.56 fl oz	Ambush and Pounce are not to be applied after petal fall. Avaunt is for tarnished plant bug only. Keeping the orchard groundcover free of flowering broadleaf weeds will also lessen the bug population and keep pollinators in the fruit trees.	See text 21 14 7 21 14 14 14 See text 21 2
Spotted Tentiform Leafminer	Same as GREEN TIP TO ½" GREEN or Altacor 35 WDG Assail 30SG Esteem 35WP Intrepid 2F	2.5-4.0 oz 2.5 oz 3-5 oz 8-12 fl oz	The need for insecticide against leafminer at this time is questionable, because the number of mines rarely exceeds threshold level of one per leaf.	5 7 45 14
Plum Curculio dispersal	Plum curculio (PC) adults disperse from overwintering sites in adjacent woods into the orchard and begin feeding on and egg laying in fruit between 100-400 degree-days (DD) accumulated after temperatures exceed 70°F for two days in late March = PC biofix date . After PC biofix date, begin daily accumulation of DD to predict the dispersal period by calculating number of daily DD using base 50°F = DD = (maximum daily temperature + minimum daily temperature) / 2 – 50.			

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BY APRIL 1	Tie a gray plum curculio pyramid trap to each of 4 perimeter apple tree trunks adjacent to woods (PC overwintering site) and check twice weekly for plum curculio adults. The spray threshold is one PC adult per trap per week.			
Initiate Scouting Programs for Plum Curculio	Place 2 or 3 codling moth pheromone traps in upper third of tree canopy in orchard interior and check twice weekly to record first consistent moth emergence in early to mid-April = CM biofix date .			
Codling Moth	After appropriate biofix dates, begin accumulating DD (base 50°F for CM and PC and base 51°F for SJS) to predict spray periods (hatch) by calculating number of daily DD using proper base = DD = (maximum daily temperature + minimum daily temperature) / 2 – base .			
San Jose Scale crawlers				
BLOOM	SAVE THE BEES!			
	DO NOT SPRAY INSECTICIDES/MITICIDES DURING BLOOM.			
PETAL FALL	Oil	0.5%-1%	DO NOT use oil if temperature exceeds 90°F.	
European Red Mite	Acramite 50 WS	0.75-1 lb		7
Twospotted Spider Mite	Agri-Mek 0.7 SC	1 fl oz		28
	Apollo 4 SC	4-8 fl oz		45
	Envidor 2 SC	16-18 fl oz	Spray threshold: Apply when mites exceed threshold of 2.5 mites per leaf.	7
	Kanemite 15 SC	21-31 fl oz	Caution: DO NOT use Captan or Sulfur within two weeks of the oil application.	14
	Nealta	13.7 fl oz	Apollo and Savey are most effective if applied after petal fall or first cover.	7
	Nexter 75 WP	4.4-5.2 oz	Use low rate of Nexter for European red mite or high rate for twospotted mite.	25
	Onager 1 EC	12-24 fl oz	Use low rate of Acramite for twospotted mite or high rate for European red mite.	28
	Portal	1-2 pt	Agri-Mek is most effective if applied before leaves harden off.	14
	Savey 50 DF	3-6 oz		28
	Zeal 72 WP	2-3 oz		14
Plum Curculio	Avaunt 30 WDG	5-6 oz	Peak hatch of redbanded leafroller usually coincides with petal fall. Control at this time helps	14
Leafrollers	Imidan 70 W	2.1-5.3 lb	prevent late-season problems. If plum curculio pressure has been severe and Imidan is applied to control it, use 5.3 lb per acre.	7
Oriental Fruit Moth				
Leafrollers	Products listed above for three species combined		Spray trees as plum curculio adults move into orchard between 100-400 DD accumulated after second day in late March when temperatures exceed 70°F.	
	or		Adult moths and plum curculio enter the orchards from late March to late April. Cool weather during this time may extend plum curculio adult feeding and egg laying of both species into early May.	5
	Altacor 35 WDG	2.5-4.5 oz	After petal fall, look for plum curculio feeding damage on fruit, especially along orchard perimeter adjacent to woods (overwintering site).	14
	Confirm 2 F	20 fl oz		7
	Delegate 25 WG	4.5-7.0 oz		7
	Entrust 2 SC	4-10 fl oz		7
	Exirel	8.5-17 fl oz		3
	Intrepid 2 F	8-16 fl oz		14
	Proclaim 5 SG	3.2-4.8 oz		14
	Rimon 0.83 EC	20-50 fl oz		14
Plum Curculio	Products listed above for three species combined			
	or			
	Actara 25W	4.5-5.5 oz		35
	Assail 30 SG	5-8 oz		7
	Belay 2.13 SC	6 fl oz		7
	Exirel	8.5-17 fl oz		3
	Surround WP (OMRI*)	25-50 lb		0

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PETAL FALL				
Oriental Fruit Moth	Products listed above for three species combined or Altacor 35 WDG Assail 30 SG Belay 2.13 SC Besiege Delegate 25 WG Entrust 2 SC Exirel Intrepid 2 F Rimon 0.83 EC	2.5-4.5 oz 5-8 oz 6-12 fl oz 6-12 fl oz 4.5-7.0 oz 6-10 fl oz 8.5-17 fl oz 12-16 fl oz 20-40 fl oz		5 7 7 14 7 7 3 14 14
Stink Bugs Tarnished Plant Bug	See TIGHT CLUSTER TO PINK		Randomly inspect 100 fruit for feeding punctures by either stink bugs or tarnished plant bugs.	
White Apple Leafhopper	Actara 25W Admire Pro Assail 30 SG Closer 2 SC Danitol 2.4EC Exirel	4.5-5.5 oz 2.8 fl oz 2.5-4.0 oz 1.5-2.75 fl oz 10.6-21.3 fl oz 8.5-17 fl oz	Spray threshold = 1 or more white apple leafhopper nymphs per leaf. Leafhoppers are usually below this spray threshold in Arkansas. Admire Pro is a foliar application.	35 7 7 7 14 3
Spotted Tentiform Leafminer (larvae)	See TIGHT CLUSTER TO PINK		The need for insecticide against spotted tentiform leafminer is questionable, because the number of mines in Arkansas rarely exceeds the spray threshold level of two mines per leaf.	
Aphid	See TIGHT CLUSTER TO PINK or Beleaf 50 SG Closer 2 SC Esteem 35 WP Movento 2 SC Azera	2-2.8 oz 1.5-2.75 fl oz 3-5 oz 6-9 fl oz 2-3.5 pt	If an insecticide is not applied for rosy apple aphid at pink or if live aphids are still present, an insecticide should be applied. Not labeled for woolly apple aphid.	21 7 45 7 0
FIRST COVER				
Codling Moth Oriental Fruit Moth	Imidan, Assail or Calypso as listed at PETAL FALL for plum curculio or Altacor 35 WDG Confirm 2F Delegate 25 WG Exirel Intrepid 2F Rimon 0.83 EC	2.5-4.5 oz 20 fl oz 4.5-7 fl oz 8.5-17 fl oz 12-16 fl oz 20-40 fl oz	Time applications of Intrepid or Rimon before Oriental fruit moth egg hatch at 200-400 DD or for codling moth between 50-100 DD following biofix. Repeat applications in 14- to 17-day intervals. For codling moth larvae, spray for each generation starting at 250 DD (May), 1250 DD (June) and 2250 DD (late July). For Oriental fruit moth, spray for each generation at 400-700 DD (late April), 1300-1700 DD (late May, after 2300 DD (late June) and every 10 to 14 days thereafter if you continue to see new fruit damage (red ring with frass).	5 7 7 3 14 14

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Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
FIRST COVER (cont.)				
Codling Moth larvae	Carpovirusine	6.8-13.5 fl oz	Use in non-chlorinated water. Apply one of the codling moth granulosis virus formulation (Carpovirusine, Cyd-X HP, Madex or Virosoft) sprays only in orchards with low to moderate populations of codling moth. Time virus application against newly hatched codling moth larvae. Repeat sprays at interval of 7-9 days during codling moth hatch periods. After application, you may see stings and frass on fruit skins but rarely see live larvae in fruit. Note: Refrigerate virus formulations until used. Resistance management: Alternate Entrust sprays with applications of granulosis virus against codling moth.	0
	Cyd-X HP	0.5-3 fl oz		0
	Madex	0.5-3 fl oz		0
	Virosoft CP4	3.2 fl oz		0
Oriental Fruit Moth and Leafroller larvae	Biobit HP	0.5-1.0 lb	Apply weekly as necessary during hatch period.	0
	Deliver (OMRI*)	0.5-2.0 lb	Resistance management: Alternate Entrust sprays with applications of <i>Bt</i> formulations against Oriental fruit moth or leafrollers.	0
San Jose Scale crawlers	Admire Pro 4.6 F	2.8 fl oz	Spray foliage when you see scale crawlers on several double-sticky tapes wrapped around scale-infested branches. By 300 DD since first catch of San Jose scale males on pheromone traps, wrap sticky tape traps on limbs and check twice weekly for crawlers.	7
	Assail 30 SG	8 oz		7
	Centaur 70 WDG	34.5 oz		14
	Esteem 35W	4-5 oz		45
	Movento 2 SC	6-9 fl oz		7
	Sivanto 200 SL	10.5-14 fl oz		14
SECOND COVER AND SUMMER COVER SPRAYS				
San Jose Scale	See FIRST COVER			
Plum Curculio	See PETAL FALL			
	Plum curculio sprays are justified when you detect new fruit feeding damage in perimeter trees after 1200 DD (usually in early June) has accumulated since the PC biofix in late March.			
Spray in Mid-August	Beginning in early August, weekly monitoring fruit weekly for new surface stings and frass, apply insecticide: SpinTor or Entrust or <i>Bt</i> or virus.			
Oriental Fruit Moth and Codling Moth	SpinTor 2SC	6-10 fl oz	In conventional orchards, SpinTor will control Oriental fruit moth, codling moth and leafrollers as will other compounds listed in FIRST COVER .	7
	Entrust 2 SC (OMR*1)	1.5-3 oz		7
Oriental Fruit Moth	Biobit HP (OMRI*)	0.5-1.0 lb	In organic blocks, from August to harvest, rotate weekly applications of Entrust with <i>Bt</i> formulations (Biobit, Deliver or Javelin) to control Oriental fruit moth or granulosis virus (Cyd-X, Virosoft and Virusine) to control codling moth.	0
	Deliver (OMRI*)	0.5-2.0 lb		0
Codling Moth	Cyd-X HP (OMRI*)	1-6 fl oz		0
	Virosoft CP4 (OMRI*)	1.3 fl oz		0
	Carpovirusine (OMRI*)	6.8-13.5 fl oz		0
White Apple Leafhopper	See PETAL FALL			
	Leafhoppers generally are not a problem in Arkansas. Spray threshold = one or more nymphs per leaf in late July to early August. Treatment at this time will eliminate the need to treat for adults immediately before harvest.			
Spotted Tentiform Leafminer	See PETAL FALL			
	Spray threshold = two mines per leaf of spotted tentiform leafminer larvae (<i>June to July</i>). Spray threshold = four mines per leaf of spotted tentiform leafminer larvae (<i>August</i>).			
Green Apple Aphid	See PETAL FALL			
	Spray threshold = 50% terminals infested with aphids. Control is most important on young trees and dwarf plantings. Admire Pro is a foliar spray for this aphid.			

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SECOND COVER AND SUMMER COVER SPRAYS				
Spray in Mid-August				
Woolly Apple Aphid	Admire Pro 4.6 F	7-10.5 fl oz	Aboveground infestations of woolly apple aphid are of greatest concern for younger trees. Apply Admire Pro by chemigation into the root zone. DO NOT apply Admire Pro pre-bloom or during bloom when bees are foraging.	21
	Beleaf 50 SG	2-2.8 fl oz		21
	Diazinon AG 600	12.75 fl oz/100 gal		21
	Movento 2 SC	6-9 fl oz		7
European Red Mite Twospotted Spider Mite	Same as PETAL FALL or Vydate L	2-4 pt	Agri-Mek is not as effective once leaves harden off. Vydate can cause fruit thinning if used within 30 days of bloom.	14
	Japanese Beetle Green June Beetle	Assail 30 SG Danitol 2.4 EC Imidan 70 WP Mustang Maxx 0.8 EC Azera Proaxis 0.5 EC Surround WP Sevin XLR (4 EC) Warrior Neemix 4.5 (OMRI*)	5-8 oz 16-21.3 fl oz 2.1-5.3 lb 1.28-4 fl oz 2-3.5 pt 2.5-5.1 fl oz 25-50 lb 1.5-3.0 qt 1.28-2.56 fl oz 7-16 fl oz	DO NOT make more than two applications of Assail per season and use a 14-day interval spray. DO NOT exceed 5.3 oz Assail per season. DO NOT exceed 16 fl oz (0.5 lb ai) Sevin per acre per season.
RED IMPORTED FIRE ANTS (ALL FIRE ANT BAITS) – Apply when ants are active and soil temperature is above 60°F. DO NOT treat if rain is anticipated within 6 hours.				
Bearing Apples	Pyriproxyfen (Esteem)	2-4 Tbsp/mound 1.5-2.0 lb/acre	Mound-to-mound treatment rate. Broadcast rate.	
	S-Methoprene (Extinguish)	3-5 Tbsp/mound 1-1.5 lb/acre	Mound-to-mound treatment rate. Broadcast rate. This product is an insect growth regulator (IGR). Apply 3 to 4 weeks prior to harvest date of production.	
Non-Bearing Apples	Fenoxycarb (Award)	1-3 Tbsp/mound 1-1.5 lb/acre	Mound-to-mound treatment rate. Broadcast rate. This product is an IGR.	
	Hydramethylnon (Amdro Pro)	2-5 Tbsp/mound 1-1.5 lb/acre	Mound-to-mound treatment rate. Broadcast rate.	
	Pyridine (Distance)	1-4 Tbsp/mound 1-1.5 lb/acre	Mound-to-mound treatment rate. Broadcast rate.	
	S-Methoprene (Extinguish)	3-5 Tbsp/mound 1.0-1.5 lb/acre	Mound-to-mound treatment rate. Broadcast rate. This product is an IGR.	

*OMRI = Organic Materials Review Institute lists compounds approved for organic production.

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Conventional Agriculture Suppliers	Address/Online URL	Phone and Fax
Midwest Tree Fruit Pest Management Handbook (Appendix B: Sources of Pest Management Suppliers)	Online: http://www2.ca.uky.edu/agc/pubs/id/id93/app.htm	
AlphaScents (traps and lures)	Online: http://www.alphascents.com	Ph: 503-342-8611 Fax: 314-271-7297
Forestry Suppliers, Inc. (sprayers, hand lens, weather stations, thermometers, waterproof notebooks, stake flags)	205 West Rankin Street, P.O. Box 8397 Jackson, MS 39284-8397 Online: http://www.forestry-suppliers.com	Ph: 800-647-5368 Fax: 800-543-4203
Great Lakes IPM, Inc. (hand lens, traps, lures, codling moth virus, mating disruption, max/min thermometers, soil probes, refractometers)	10220 East Church Road, Vestaburg, MI 48891 Online: http://www.greatlakesipm.com	Ph: 989-268-5693 Ph: 800-235-0285 Fax: 989-268-5311
Gemplers's (hand lens, mating disruption dispensers, traps, lures, weather stations, thermometers, pH meters, refractometers, fruit hardness meters)	P.O. Box 270, Mt. Horeb, WI 53572 Online: http://www.gemplers.com	Ph: 800-382-8473 Fax: 800-551-1128
ISCA Technologies, Inc. (traps, lures, mating disruption)	1230 W. Spring Street, P.O. Box 5266, Riverside, CA 92507 Online: http://www.iscotech.com/	Ph: 951-686-5008 Fax: 815-346-1722
QC Supply (traps, bait stations, insect control)	P.O. Box 581, 574 Road 11, Schuyler, NE 68661-0581 Online: http://www.qcsupply.com	Ph: 800-433-6340 Fax: 402-352-8825
DoMyOwnPestControl (some organic products)	4260 Communications Drive, Norcross, GA 30093 Online: http://www.domyownpestcontrol.com	Ph: 866-581-7378 Fax: 770-779-5398

Organic Agriculture Resources List	Address/Online URL	Phone and Fax
Midwest Organic and Sustainable Education Services (MOSES) Upper Midwest Organic Resource Directory (list of organic pest control suppliers)	P.O. Box 339, Spring Valley, WI 54767 Online: www.mosesorganic.org	Ph: 715-778-5775 Fax: 715-778-5773
Organic Resources (Suppliers of Pest Management)	Dr. Kathleen Delate, Depts. of Agronomy/Horticulture, 106 Horticulture Hall Iowa State University, Ames, IA 50011 Online: http://extension.agron.iastate.edu/organicag/	Ph: 515-294-7069 Fax: 515-294-0730

Organic Agriculture Suppliers	Address/Online URL	Phone and Fax
AgBio, Inc. (insect traps, lures, flathead borer trap, organic pesticides)	9915 Raleigh Street, Westminster, CO 80031 Online: http://www.agbio-inc.com	Ph: 303-469-9221 Fax: 303-469-9598
NovaSource (Surround Crop Protectant)	2255 N. 44th Street, Suite 300, Phoenix, AZ 85008-3279 Online: http://novasource.com/home/products/surround/	Ph: 800-525-2803
Gardens Alive (beneficial insects, soil amendments, cover crops, traps, pest controls: Surround Crop Protectant)	5100 Schenley Place, Lawrenceburg, IN 47025 Online: http://www.gardensalive.com	Ph: 513-354-1482 Ph: 513-354-1483 Fax 513-354-1484
Peaceful Valley Farm and Garden Supply, Inc. (organic farming supplies, CM trap, seeds, plants, soil amendments, pest control: JMS Stylet oil, Isomate CTT, Dipel, Entrust, Pyganic, Surround Kaolin clay, M-Pede Insecticidal Soap, and parasitic nematodes)	P.O. Box 2209, 125 Clydesdale Court, Grass Valley, CA 95945 Online: http://www.groworganic.com	Ph: 888-784-1722
Planet Natural (trap and lures, organic pesticides, beneficial insects)	1612 Gold Avenue, Bozeman, MT 59715 Online: http://www.planetnatural.com	Ph: 800-289-6656 Fax: 406-587-0223
Rincon-Vitova Insectaries, Inc. (beneficial insects)	P.O. Box 1555, Ventura, CA 93002-1555 Online: http://www.rinconvitova.com	Ph: 800-248-2847 Fax: 805-643-6267
Seven Springs Farm (Pest Controls: Copper, Bt-Javelin, Dipel, Neemix, Pyganic, Entrust, M-Pede, Surround Crop Protectant)	426 Jerry Lane, Check, VA 24072 Online: http://www.7springsfarm.com	Ph: 800-540-9181