

**APPLE/PEAR SPRAY SCHEDULE—COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>BY MARCH 15</b> 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) = <b>OFM biofix date</b> . Be sure to keep trap bottoms clean and replace lures monthly or every two months for long life lures. After OFM biofix date, begin <b>calculating number of daily degree days (DD) using base 45°F</b> = 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.			
<b>GREEN TIP TO ½” GREEN</b>	Superior oil <b>plus one of the following:</b>	2%	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. <b>DO NOT use Captan within 2 weeks or Sulfur within 30 days before or after an oil application. Apply Supracide before any blossoms open.</b>	
San Jose Scale	Lorsban Advanced	0.5-4 pt	For rates less than 2 pt Supracide per 100 gal, tank mix with an oil.	45
European Red Mite Eggs	Supracide 2E	3-12 pt	Use Esteem with Superior spray oil at recommended rate at half-inch green to control scale and rosy apple aphid.	See text
Aphid Eggs				
Spotted Tentiform Leafminer	Esteem 35WP	3-5 oz		45
<b>TIGHT CLUSTER TO PINK</b>				
Rosy Apple Aphid	Assail 70WP	2.5-4 oz	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.	7
	Beleaf 50SG	2-2.8 fl oz	Post-bloom application of Lorsban to apples is prohibited.	21
	Lorsban Advanced	1.5-4 pt	<b>Caution:</b> In some blocks, rosy apple aphid was resistant to Ambush and Asana.	45
	Sivanto 200 SL	7-10.5 fl oz	<b>Caution:</b> 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.	14
	Vydate 2 L	4-8 pt		14
Tarnished Plant Bugs and Stink Bugs	Ambush	6.4-25.6 oz	Ambush and Pounce are not to be applied after petal fall.	See text
	Asana XL 0.66 EC	4.8-14.5 fl oz		21
	Avaunt 30 WDG	5-6 oz	Avaunt is for tarnished plant bug only.	14
	Baythroid XL 1 EC	2-2.4 fl oz	Keeping the orchard groundcover free of flowering broadleaf weeds will also lessen the bug population and keep pollinators in the fruit trees.	7
	Beleaf 50 SG	2-2.8 fl oz		21
	Besiege	6-12 fl oz		14
	Danitol 2.4 EC	10.7-21.3 fl oz		14
	Mustang Maxx 0.8 EC	1.28-4 fl oz		14
	Pounce 25 WP	6.4-16 oz		See text
	Proaxis 0.5 EC	2.6-5.1 fl oz		21
	Warrior	1.28-2.56 fl oz		2
Spotted Tentiform Leafminer	<b>Same as GREEN TIP TO ½” GREEN or</b>		The need for insecticide against leafminer at this time is questionable, because the number of mines rarely exceeds threshold level of one per leaf.	
	Altacor 35 WDG	2.5-4.0 oz		5
	Assail 30SG	2.5 oz		7
	Esteem 35WP	3-5 oz		45
	Intrepid 2F	8-12 fl oz		14
<b>Plum Curculio dispersal</b>	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 = <b>PC biofix date</b> . After PC biofix date, begin daily accumulation of DD to predict the dispersal period by <b>calculating number of daily DD using base 50°F</b> = DD = (maximum daily temperature + minimum daily temperature) / 2 – 50.			

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<b>BY APRIL 1</b>				
Initiate Scouting Programs for Plum Curculio	Tie a gray <b>plum curculio pyramid trap</b> 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.			
Codling Moth	Place 2 or 3 <b>codling moth pheromone traps</b> in upper third of tree canopy in orchard interior and check twice weekly to record first consistent moth emergence in early to mid-April = <b>CM biofix date</b> .			
San Jose Scale crawlers	After appropriate biofix dates, begin accumulating DD ( <b>base 50°F</b> for CM and PC and <b>base 51°F</b> for SJS) to predict spray periods (hatch) by <b>calculating number of daily DD using proper base</b> = DD = (maximum daily temperature + minimum daily temperature) / 2 – <b>base</b> .			
<b>BLOOM</b>	<b>SAVE THE BEES! DO NOT SPRAY INSECTICIDES/MITICIDES DURING BLOOM.</b>			
<b>PETAL FALL</b>				
European Red Mite	Oil	0.5%-1%	DO NOT use oil if temperature exceeds 90°F.	
Twospotted Spider Mite	Acramite 50 WS	0.75-1 lb		7
	Agri-Mek 0.7 SC	1 fl oz		28
	Apollo 4 SC	4-8 fl oz		45
	Envidor 2 SC	16-18 fl oz	<b>Spray threshold:</b> Apply when mites exceed threshold of 2.5 mites per leaf.	7
	Kanemite 15 SC	21-31 fl oz	<b>Caution:</b> 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	7
Oriental Fruit Moth			control it, use 5.3 lb per acre.	
Leafrollers	Products listed above for three species combined <b>or</b>		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.	
	Altacor 35 WDG	2.5-4.5 oz	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
	Confirm 2 F	20 fl oz	After petal fall, look for plum curculio feeding damage on fruit, especially along orchard perimeter adjacent to woods (overwintering site).	14
	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 <b>or</b>			
	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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<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>PETAL FALL</b>				
Oriental Fruit Moth	Products listed above for three species combined <b>or</b> 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	<b>See TIGHT CLUSTER TO PINK</b>		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	<b>Spray threshold</b> = 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)	<b>See TIGHT CLUSTER TO PINK</b>		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	<b>See TIGHT CLUSTER TO PINK</b> <b>or</b> 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
<b>FIRST COVER</b>				
Codling Moth Oriental Fruit Moth	Imidan, Assail or Calypso as listed at <b>PETAL FALL</b> for plum curculio <b>or</b> 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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<b>FIRST COVER (cont.)</b>				
Codling Moth larvae	Carpovirusine	6.8-13.5 fl oz	<b>Use in non-chlorinated water.</b> 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. <b>Note:</b> Refrigerate virus formulations until used. <b>Resistance management:</b> 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	<b>Resistance management:</b> 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
<b>SECOND COVER AND SUMMER COVER SPRAYS</b>				
San Jose Scale	See <b>FIRST COVER</b>			
Plum Curculio	See <b>PETAL FALL</b>		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 <b>PC biofix</b> in late March.	
<b>Spray in Mid-August</b>				
Oriental Fruit Moth and Codling Moth	SpinTor 2SC	6-10 fl oz	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. <b>In conventional orchards,</b> SpinTor will control Oriental fruit moth, codling moth and leafrollers as will other compounds listed in <b>FIRST COVER</b> . <b>In organic blocks,</b> 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.	7
	Entrust 2 SC (OMR*)	1.5-3 oz		7
Oriental Fruit Moth	Biobit HP (OMRI*)	0.5-1.0 lb		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 <b>PETAL FALL</b>		<b>Leafhoppers generally are not a problem in Arkansas.</b> <b>Spray threshold</b> = 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 <b>PETAL FALL</b>		<b>Spray threshold</b> = two mines per leaf of spotted tentiform leafminer larvae ( <i>June to July</i> ). <b>Spray threshold</b> = four mines per leaf of spotted tentiform leafminer larvae ( <i>August</i> ).	
Green Apple Aphid	See <b>PETAL FALL</b>		<b>Spray threshold</b> = 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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<b>SECOND COVER AND SUMMER COVER SPRAYS</b>				
<b>Spray in Mid-August</b>				
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 <b>PETAL FALL</b> or Vydate L		Agri-Mek is not as effective once leaves harden off.	
		2-4 pt	Vydate can cause fruit thinning if used within 30 days of bloom.	14
Japanese Beetle Green June Beetle	Assail 30 SG	5-8 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.	7
	Danitol 2.4 EC	16-21.3 fl oz		14
	Imidan 70 WP	2.1-5.3 lb		7
	Mustang Maxx 0.8 EC	1.28-4 fl oz		14
	Azera	2-3.5 pt		0
	Proaxis 0.5 EC	2.5-5.1 fl oz		21
	Surround WP	25-50 lb		0
	Sevin XLR (4 EC)	1.5-3.0 qt		3
	Warrior	1.28-2.56 fl oz		21
	Neemix 4.5 (OMRI*)	7-16 fl oz		0
<b>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.</b>				
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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<b>Conventional Agriculture Suppliers</b>	<b>Address/Online URL</b>	<b>Phone and Fax</b>
<b>Midwest Tree Fruit Pest Management Handbook</b> (Appendix B: Sources of Pest Management Suppliers)	Online: <a href="http://www2.ca.uky.edu/agc/pubs/id/id93/app.htm">http://www2.ca.uky.edu/agc/pubs/id/id93/app.htm</a>	
<b>AlphaScents</b> (traps and lures)	Online: <a href="http://www.alphascents.com">http://www.alphascents.com</a>	Ph: 503-342-8611 Fax: 314-271-7297
<b>Forestry Suppliers, Inc.</b> (sprayers, hand lens, weather stations, thermometers, waterproof notebooks, stake flags)	205 West Rankin Street, P.O. Box 8397 Jackson, MS 39284-8397 Online: <a href="http://www.forestry-suppliers.com">http://www.forestry-suppliers.com</a>	Ph: 800-647-5368 Fax: 800-543-4203
<b>Great Lakes IPM, Inc.</b> (hand lens, traps, lures, codling moth virus, mating disruption, max/min thermometers, soil probes, refractometers)	10220 East Church Road, Vestaburg, MI 48891 Online: <a href="http://www.greatlakesipm.com">http://www.greatlakesipm.com</a>	Ph: 989-268-5693 Ph: 800-235-0285 Fax: 989-268-5311
<b>Gempler's</b> (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: <a href="http://www.gemplers.com">http://www.gemplers.com</a>	Ph: 800-382-8473 Fax: 800-551-1128
<b>ISCA Technologies, Inc.</b> (traps, lures, mating disruption)	1230 W. Spring Street, P.O. Box 5266, Riverside, CA 92507 Online: <a href="http://www.iscotech.com/">http://www.iscotech.com/</a>	Ph: 951-686-5008 Fax: 815-346-1722
<b>QC Supply</b> (traps, bait stations, insect control)	P.O. Box 581, 574 Road 11, Schuyler, NE 68661-0581 Online: <a href="http://www.qcsupply.com">http://www.qcsupply.com</a>	Ph: 800-433-6340 Fax: 402-352-8825
<b>DoMyOwnPestControl</b> (some organic products)	4260 Communications Drive, Norcross, GA 30093 Online: <a href="http://www.domyownpestcontrol.com">http://www.domyownpestcontrol.com</a>	Ph: 866-581-7378 Fax: 770-779-5398
<b>Organic Agriculture Resources List</b>	<b>Address/Online URL</b>	<b>Phone and Fax</b>
<b>Midwest Organic and Sustainable Education Services (MOSES) Upper Midwest Organic Resource Directory</b> (list of organic pest control suppliers)	P.O. Box 339, Spring Valley, WI 54767 Online: <a href="http://www.mosesorganic.org">www.mosesorganic.org</a>	Ph: 715-778-5775 Fax: 715-778-5773
<b>Organic Resources</b> (Suppliers of Pest Management)	Dr. Kathleen Delate, Depts. of Agronomy/Horticulture, 106 Horticulture Hall Iowa State University, Ames, IA 50011 Online: <a href="http://extension.agron.iastate.edu/organicag/">http://extension.agron.iastate.edu/organicag/</a>	Ph: 515-294-7069 Fax: 515-294-0730
<b>Organic Agriculture Suppliers</b>	<b>Address/Online URL</b>	<b>Phone and Fax</b>
<b>AgBio, Inc.</b> (insect traps, lures, flathead borer trap, organic pesticides)	9915 Raleigh Street, Westminster, CO 80031 Online: <a href="http://www.agbio-inc.com">http://www.agbio-inc.com</a>	Ph: 303-469-9221 Fax: 303-469-9598
<b>NovaSource</b> (Surround Crop Protectant)	2255 N. 44th Street, Suite 300, Phoenix, AZ 85008-3279 Online: <a href="http://novasource.com/home/products/surround/">http://novasource.com/home/products/surround/</a>	Ph: 800-525-2803
<b>Gardens Alive</b> (beneficial insects, soil amendments, cover crops, traps, pest controls: Surround Crop Protectant)	5100 Schenley Place, Lawrenceburg, IN 47025 Online: <a href="http://www.gardensalive.com">http://www.gardensalive.com</a>	Ph: 513-354-1482 Ph: 513-354-1483 Fax 513-354-1484
<b>Peaceful Valley Farm and Garden Supply, Inc.</b> (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: <a href="http://www.groworganic.com">http://www.groworganic.com</a>	Ph: 888-784-1722
<b>Planet Natural</b> (trap and lures, organic pesticides, beneficial insects)	1612 Gold Avenue, Bozeman, MT 59715 Online: <a href="http://www.planetnatural.com">http://www.planetnatural.com</a>	Ph: 800-289-6656 Fax: 406-587-0223
<b>Rincon-Vitova Insectaries, Inc.</b> (beneficial insects)	P.O. Box 1555, Ventura, CA 93002-1555 Online: <a href="http://www.rinconvitova.com">http://www.rinconvitova.com</a>	Ph: 800-248-2847 Fax: 805-643-6267
<b>Seven Springs Farm</b> (Pest Controls: Copper, Bt-Javelin, Dipel, Neemix, Pyganic, Entrust, M-Pede, Surround Crop Protectant)	426 Jerry Lane, Check, VA 24072 Online: <a href="http://www.7springsfarm.com">http://www.7springsfarm.com</a>	Ph: 800-540-9181

**BLACKBERRY/RASPBERRY INSECT CONTROL—COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>LATE OCTOBER/EARLY NOVEMBER OR LATE MARCH (DORMANT)</b>				
Raspberry Crown Borer	Altacor	3-4.5 oz	Apply Brigade or Hero after egg hatch ends from late October to early November or wait to apply in late March. Apply Brigade as a soil drench to the crown of plants in minimum of 50 gallons water per acre prior to significant rainfall event. DO NOT exceed 12.8 fl oz (0.2 lb ai) per acre per season. Apply Hero as a soil drench to crown of plant with 200 gallons water per acre	3
	Brigade 2 EC	6.4 fl oz		3
	Brigade WSB	16 oz		3
	Hero	10.3 fl oz		3
<b>DELAYED DORMANT</b>				
Rednecked Cane Borer	Cultural control		If less than 5% of fruiting canes have galls, then during winter, prune out galled fruiting canes, burn or shred these infested canes to kill overwintering larvae.	
<b>PREBLOOM</b>				
Strawberry Clipper	Actara	3 oz	When the first flower appears, begin randomly checking 100 clusters for clipped buds or tap flower clusters over a white paper plate to detect adult strawberry clipper weevils (1/10 inch long with snout). If more than 1% of buds are clipped or you find 1 adult weevil, apply insecticide and reapply at 10-day intervals as long as bud clipping or weevils occur.	3
	Sevin 4F	1-2 qt	Applications of Sevin and pyrethroids can cause mite flare-ups.	7
	Sevin 80S	1.25-2.5 lb		7
Spider Mites	Acramite	0.75-1 lb	Minimize road dust to prevent spider mite buildup.	1
	Aza-Direct	3.5 pt		4 hours
	Savey 50DF	4-6 oz		3
	Zeal	2-3 oz		0
<b>EARLY BLOOM THROUGH BLOOM</b>			<b>SAVE THE BEES!! DO NOT APPLY INSECTICIDES DURING BLOOM!!</b>	
<b>POST-BLOOM TO HARVEST</b>				
Rednecked Cane Borer	Admire Pro (4.6F)	10.5-14 fl oz	DO NOT apply prebloom, during bloom or when bees are foraging. If more than 5% fruiting canes have galls, apply Admire Pro by either chemigation into root zone or by a basal soil drenching in a minimum of 500 gallons solution per acre.	7
			<u>Days of residual activity:</u>	
Spotted Wing Drosophila**	Danitol 2.4EC	16-21.33 fl oz	7 days	3
	Delegate 25WG	3-6 oz	7 days	1
	Exirel	13.5-20.5 fl oz	5 days	3
	Malathion 8EC	1-4 pt	7 days	1
	Mustang Maxx	4 oz	5-7 days	1
	Entrust 2SC (OMRI*)	4-6 oz	3-5 days	1
	Pyganic 1.4 (OMRI*)	16-64 fl oz	0-2 days	0

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

\*\***Spotted Wing Drosophila (SWD)** is a new invasive insect pest that was detected in ripening and ripened fruit in many Midwest states, including Arkansas, in 2013. The SWD larvae feed inside and damage ripening soft-skinned fruit, especially **blackberry, blueberry, raspberry and strawberry**. See the Spotted Wing Drosophila site: [http://www.ipm.msu.edu/invasive\\_species/spotted\\_wing\\_drosophila](http://www.ipm.msu.edu/invasive_species/spotted_wing_drosophila) or the Arkansas SWD fact sheet: <https://www.uaex.edu/publications/PDF/FSA-7079.p>

**BLACKBERRY/RASPBERRY INSECT CONTROL—COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>POST-BLOOM TO HARVEST (cont.)</b>				
Stink Bugs	Actara	3 oz	DO NOT exceed 6 oz Actara per acre per season. If leaf bronzing is occurring and mites are present, apply a foliar spray of Danitol. DO NOT exceed 12.8 fl oz Brigade per acre per season.	3
	Bifenthrin 2 EC	6.4 fl oz		3
	Brigade 2 EC	6.4 fl oz		3
	Danitol 2.4 EC	16 fl oz		3
Spider Mites	Acramite 50WS	0.75-1 lb	Apply miticide if scouting detects between 1 and 5 spider mites per leaf.  DO NOT make more than 1 application of Savey per year.	1
	Bifenthrin 2 EC	6.4 fl oz		3
	Brigade 2 EC	6.4 fl oz		3
	Danitol 2.4 EC	16 fl oz		3
	Kanemite	31 fl oz		7
	Savey DF	4-6 oz		3
	Zeal	2-3 oz		0
	JMS Stylet Oil (OMRI*)	3-6 qt		0
	M-Pede (OMRI*)	2 gal/100 gal		M-Pede may cause plant injury if plants are drought stressed or temperatures exceed 90°F.
Leafrollers	Deliver (OMRI*)	0.25-1.5 lb	Deliver is a formulation of <i>Bacillus thuringiensis</i> var. <i>kurstaki</i> (Bt). This is approved for organic production. <b>Leafrollers are usually NOT a problem in caneberrries.</b>	0
Japanese Beetle Green June Beetle	Assail 30SG	4.5-5.3 oz	Mid-June to late July, check for foliage feeding by Japanese beetle or fruit feeding by green June beetle and spray weekly as needed with 7-day minimum interval between applications.  After harvest, you can suppress Japanese beetle foliar feeding by applying enough Surround to white-wash the foliage. Reapply Surround as needed to maintain white-washed appearance. Supplemental controls may be needed for complete insect control.	1
	Assail 70WP	1.9-2.3 oz		1
	Danitol 2.4 EC	10 2/3-16 fl oz		3
	Sevin 4F	1-2 qt		7
	Sevin 80S	2.5 lb		7
	Malathion 5EC	3 pt		1
	Malathion 8F	1-4 pt		1
	Pyganic 1.4 (OMRI*)	16-64 fl oz		0
	Surround WP (OMRI*)	25-50 lb		0
	Sap Beetles	Assail 30 SG		4.5-5.3 oz



**BLACKBERRY/RASPBERRY INSECT CONTROL—COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>POST-BLOOM TO HARVEST</b>				
Broad Mites***	Agri-Mek SC	3.5 fl oz	FIFRA Section 2(ee) recommendation for Agri-Mek® SC approved for use in AR, FL, IL, IN, NC, PA, SC for control of broad mites in caneberry. <b>Agri-Mek SC must be mixed with a non-ionic surfactant activator type wetting, spreading and/or penetrating spray adjuvant at 0.1-0.5% v/v.</b> <u>By late May, begin weekly scouting</u> for first damage (leaf bronzing and/or cupping) and presence of broad mites on underside of terminal leaflets, especially in primocane-fruiting cultivars. Use a 20x or 30x hand lens to see white, oval, spotted eggs and oval, white (immature) to amber adult broad mites. <b>Apply miticide only if/ when</b> you detect new terminal leaf damage and leaflet samples average between one to five active broad mites per leaflet.	7
<p>***<b>Broad Mites:</b> The broad mite damages terminal leaves, flowers and fruit on citrus, peppers, tomatoes and recently became a pest of blackberries, especially primocane-fruiting cultivars. This mite feeds by piercing the bud, leaf or flower. This feeding injects a toxin that stunts growth, curls and bronzes leaves and often kills terminal and lateral leaf and flower buds (looks like fire blight). This mite overwinters mostly in blackberry leaf litter, and to lesser extent under blackberry bud scales and in the soil. Eggs are oval and spotted (0.08 mm long), and the broad mites are oval and vary from small white immature to amber adults (0.2 mm). Primocane-fruiting blackberry cultivars usually have floricanes pruned to ground, removed and burned by bud break. This practice produces a late-summer to fall crop. From late-May through fall in Arkansas, you can find a buildup of broad mite numbers on terminal leaves of emerging primocanes. Broad mites have damaged floricanes-fruiting blackberry cultivars. These mite-infested floricanes blocks appear to have delayed bud break and low vigor in spring. Broad mites can be found on terminal floricanes leaves from April until after mid-summer harvest when floricanes are usually removed.</p>				
<b>RED IMPORTED FIRE ANTS (ALL FIRE ANT BAITS)</b> – Apply when ants are active and soil temperature is above 60 degrees F. DO NOT treat if rain is anticipated within 6 hours.				
	S-Methoprene (Extinguish)	3-5 Tbsp/mound 1.0-1.5 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.	

**BLUEBERRY INSECT CONTROL—COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>BUD SWELL</b>				
Scale	Apply dormant oil if scale present			
Climbing Cutworm	Sevin 80S	1 7/8-2 1/2 lb	During dormant pruning, clip off bagworms on plants and adjacent juniper/cedar trees. Destroy these bags so larvae do not hatch next June and disperse to and defoliate blueberry plants. At bud swell, begin checking plants daily for damaged buds or check after dusk for climbing cutworms feeding on the buds. Spray weekly as long as damage is occurring or climbing cutworms are present.	7
Bagworms	Sevin XLR	1 1/2-2 qt		7
<b>FRUIT FEEDING INSECT PESTS OF BLUEBERRY ARE RARE IN ARKANSAS.</b>				
<b>PETAL FALL</b>			Scout berries for signs of worm feeding before using insecticides.	
Cherry Fruitworm	Asana XL	4.8-9.6 fl oz	Asana repels bees; do not apply within 7 days of pollination.	14
Cranberry Fruitworm	Assail 30SG	4-6.9 oz	Apply insecticide against <b>cherry fruitworm</b> at petal fall and 10 days later.	1
Eastern Tent Caterpillar	Avaunt	3-5.6 oz	Apply insecticide against <b>cranberry fruitworm</b> 10 days and 20 days after petal fall.	7
Leafroller (usually not a problem)	Confirm 2F	16 fl oz		14
	Danitol 2.4	13-16 oz		3
	Delegate	3-6 oz		3
	Imidan 70W	1 1/3 lb		3
	Intrepid	10-16 fl oz		7
	Knack 0.83EC	16 fl oz		7
	Malathion 5EC	2 pt		1
	Mustang Maxx	4 fl oz		1
	Rimon	20-30 fl oz	Rimon is for cranberry fruitworm control.	8
	Sevin 80S	1 7/8-2 1/2 lb		7
	Sevin XLR	1.5-2 qt		7
	Success	4-6 fl oz		3
Entrust 2SC (OMRI*)	4-6 fl oz		3	
Deliver (OMRI*)	0.25-1.5 lb		0	
<b>FIRST AND SECOND COVER</b>				
Fruitworms			See <b>PETAL FALL</b>	
Plum Curculio	Brigade	5.3-16 oz	<b>In the last couple of years, plum curculio adults and larvae were observed causing damage in blueberry fruit.</b>	1
	Danitol	10.6-16 oz		3
	Imidan 70W	1.3 lb		3
	Malathion	1.5-2.5 pt		1
	Surround (OMRI*)			0
Bagworms	Deliver (OMRI*)	0.25-1.5 lb	During the first or second week of June, check planting for newly hatched bagworms (very localized near bagworm-infested junipers or other trees) and either remove by hand or spray.	0
	Entrust (OMRI*)	1.25-2.0 oz		3

**BLUEBERRY INSECT CONTROL – COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>THIRD AND ADDITIONAL COVERS</b>				
Blueberry Maggot				
<b>Blueberry maggot larvae and adults have not been observed in Arkansas.</b>				
Flatheaded Apple Tree Borer	Sevin XLR	1-2 qt	In late April, set out emerald ash borer purple sticky traps in vertical orientation along the wooded perimeter of the blueberry planting being attacked by this borer. Check purple traps weekly for adult flatheaded borers. Apply insecticide to canes at three-week intervals from first to last capture of adult borers on purple traps or adults observed on blueberry canes. DO NOT make more than five applications of Imidan per acre per year.	7
	Sevin 80S	1 1/2-2 1/2 lb		7
	Imidan 70W	1.3 lb		3
<b>POST-BLOOM TO HARVEST</b>				
Leafrollers	Deliver (OMRI*)	0.25-1.5 lb	<b>Leafrollers are usually NOT a problem in blueberries in Arkansas.</b> Deliver is a formulation of <i>Bacillus thuringiensis var kurstaki (Bt)</i> .	0
	Entrust 2SC (OMRI*)	4.6 fl oz		1
Japanese Beetle Green June Beetle	Actara 25WB	3 oz	Mid-June to late July, check for foliar feeding by Japanese beetle or fruit feeding by green June beetle. Spray weekly as needed with seven-day minimum interval between applications.	3
	Assail 30SG	4.5-5.3 oz		1
	Malathion	1-4 pt	3	
	Sevin 4F	1-2 qt	7	
	Sevin 80S	2.5 lb	7	
	Surround WP (OMRI*)	25-50 lb	0	
After harvest, you can suppress Japanese beetle foliar feeding by applying enough Surround to white-wash the foliage. Reapply Surround as needed to maintain white-washed appearance. Supplemental controls may be needed to complete insect control.				
Yellownecked Caterpillars	See <b>PETAL FALL</b>		In July and August, check twice weekly for groups of fall webworms defoliating limbs inside a web or groups of yellownecked caterpillars defoliating whole plants. Usually, these pests are localized, so hand removal and destruction of caterpillars provides adequate control.	
Fall Webworm	Fruitworm sprays			
Spotted Wing Drosophila**	Danitol 2.4EC	16-21.33 fl oz	<u>Days of residual activity:</u> 7 days	3
	Delegate 25WG	3-6 oz	7 days	1
	Exirel	13.5-20.5 fl oz	5 days	3
	Malathion 8EC	1-4 pt	7 days	1
	Mustang Maxx	4 oz	7 days	1
	Entrust 2SC (OMRI*)	4-6 oz	3-5 days	1
	Pyganic 1.4 (OMRI*)	16-64 fl oz	0-2 days	0
<b>RED IMPORTED FIRE ANTS (ALL FIRE ANT BAITS) – Apply when ants are active and soil temperature is above 60 degrees F. DO NOT treat if rain is anticipated within 6 hours.</b>				
	S-Methoprene (Extinguish)	3-5 Tbsp/mound 1.0-1.5 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.	

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

\*\***Spotted Wing Drosophila (SWD)** is a new invasive insect pest that was detected in ripening and ripened fruit in many Midwest states, including Arkansas, in 2013. The SWD larvae feed inside and damage ripening soft-skinned fruit, especially **blackberry, blueberry, raspberry and strawberry**. See the Spotted Wing Drosophila site: [http://www.ipm.msu.edu/invasive\\_species/spotted\\_wing\\_drosophila](http://www.ipm.msu.edu/invasive_species/spotted_wing_drosophila) or the Arkansas SWD fact sheet: <https://www.uaex.edu/publications/PDF/FSA-7079.p>

**CHERRY/PEACH/PLUM INSECT CONTROL – COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>DELAYED DORMANT</b>				
Mites	Superior oil	2 gal	Apply after leaves drop in the fall or before buds swell in the spring.	
San Jose Scale	Superior oil <b>plus</b> Assail 30 SG Esteem 35WP	1.5 gal 5.3-8 oz 4-6 oz	Esteem applied with oil at delayed dormant is reported to provide very good scale control. Esteem does not kill adult scale, but suppresses hatch of eggs they lay. Therefore, in season use of Esteem may not protect fruit from blemishes by scale (small red dots develop around young scale).	7 14
<b>PINK</b>				
Tarnished Plant Bug	<b>See PETAL FALL</b>			
<b>BLOOM</b>				
<b>SAVE THE BEES! DO NOT APPLY INSECTICIDES DURING BLOOM.</b>				
<b>BY MARCH 15</b>				
Initiate Oriental Fruit Moth and San Jose scale Scouting Program	Place <b>2 or 3 Oriental fruit moth pheromone traps</b> in orchard interior and check twice weekly to record first consistent moth emergence (late March) = <b>OFM biofix</b> . Keep trap bottoms clean and replace lures monthly or every two months for long-life lures. After OFM biofix date, begin <b>calculating number of daily degree days (DD) using base 45°F</b> = DD = (maximum daily temperature + minimum daily temperature) / 2 – 45.			
	Place <b>2 San Jose scale pheromone traps</b> in orchard interior in tops of trees known to have a live SJS infestation (conspicuous red spots on apples last year) and record first date in early to mid-April when you consistently capture SJS males on traps = <b>SJS biofix</b> . Remove scale trap in May. After specific biofix dates, begin accumulating DD ( <b>base 51°F</b> for SJS) to predict crawler spray periods (hatch).			
<b>Plum curculio dispersal</b>	Plum curculio adults disperse from overwintering sites in adjacent woods into orchard and begin feeding on and laying eggs in fruit between 100-400 DD accumulated after temperatures exceed 70°F for two days in late March = <b>PC biofix</b> . After PC biofix date, begin accumulating DD to predict dispersal period by <b>calculating number of daily DD using base 50°F</b> = DD = (maximum daily temperature + minimum daily temperature) / 2 – 50.			
<b>BY LATE MARCH</b>				
Initiate Plum Curculio and Lesser Peachtree Borer**** Scouting Programs	Tie gray <b>plum curculio pyramid trap</b> to each of 3 or 4 perimeter orchard tree trunks adjacent to woods (overwintering site) and check twice weekly for plum curculio adults. Place <b>2 lesser peachtree borer pheromone traps</b> in interior trees and check weekly to record moth flight beginning and peaks. Keep peachtree borer trap bottoms clean and replace lures monthly or every two months for long-life lures. After specific biofix dates, begin accumulating DD ( <b>base 50°F</b> for CM) to predict spray periods (hatch). <b>Calculate number of daily degree days (DD) using proper base</b> = DD = (maximum daily temperature + minimum daily temperature) / 2 – base.			
<b>PETAL FALL</b>				
Tarnished Plant Bug Stink Bugs	Belay	6 fl oz	Stink bug and plant bug catfacing are worse where control of flowering weeds is poorest. Keep spring flowering broadleaf weeds mowed regularly to reduce orchard attractiveness to stink bugs and tarnished plant bugs.	21
	Baythroid XL	5.5 fl oz	Use of pyrethroids (Asana, Baythroid, Mustang Maxx, Pounce, Proaxis, Renounce, Warrior) will kill mite predators and cause mite outbreaks.	7
	Besiege	6-12 fl oz		14
	Imidan 70W	2-4.25 lb	DO NOT use Imidan on sweet cherries. Use Imidan in blocks with scale infestations.	14
	Mustang Maxx	1.28-4 fl oz		14
	Sevin XLR	3 qt		3
	Warrior	2.5-5.12 fl oz		14
Lesser Peachtree Borer****	<b>REFER TO LATE MARCH AND SECTION ON BORERS.</b>			

**CHERRY/PEACH/PLUM INSECT CONTROL—COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>SHUCK SPLIT TO 7-10 DAYS AFTER</b>				
Oriental Fruit Moth	Actara 25WP	4.5-5.5 oz	Oriental fruit moth egg hatch period for each generation occurs so many DD after OFM biofix: 400-700 DD (late April), 1300-1700 DD (late May) and after 2300 DD. Belay can be applied 2 times per season against scale, stink bugs and plum curculio.	14
	Altacor	3-4.5 oz		10
	Asana XL	4.8-14.5 fl oz		14
	Assail 30 SG	2.5-8 oz		7
	Besiege	6-12 fl oz		14
	Delegate 25 WG	6-7 oz		14
	Exirel	10-20.5 fl oz		3
	Imidan 70W	2-4.25 lb	DO NOT use Imidan on sweet cherries. Use Imidan in blocks with scale infestations.	14
	Intrepid 2 F	10-16 fl oz		7
	Rimon EC	20-40 fl oz		8
	Entrust 2SC (OMRI*)	4-6 fl oz		14
	Deliver (OMRI*)	0.5-2 lb		0
Plum Curculio	Products listed in <b>PETAL FALL</b> or		<b>Plum curculio:</b> Apply insecticide after shuck split if <b>greater than 1 plum curculio adult per 4 traps per week</b> or begin sprays when you first detect fruit feeding damage in perimeter trees.	
	Apta	21-27 fl oz		14
	Avaunt 30 WG	5-6 oz		14
	Besiege	6-12 fl oz		14
	Imidan 70 WP	2.13-4.25 lb		14
San Jose Scale	Admire Pro (foliar)	1.4-2.8 fl oz	Time spray against San Jose scale crawlers. Monitor for crawlers by wrapping double-stick tape around scale-infested limbs in early May. Inspect the tape weekly for yellow crawlers. The crawler period persists 2 to 3 weeks in May. Apply crawler spray at 10-day intervals as long as crawlers are detected.	7
	Assail 30 SG	5.3-8 oz		7
	Belay	6 fl oz		21
	Centaur 70W	34.5 oz		14
	Esteem 35 WP	3-5 oz		14
	Movento	6-9 oz		7
	Aza-Direct (OMRI*)	1-2 pt		0
<b>BY MAY 1 REFER TO SECTION ON BORERS.</b>				
Initiate Peachtree Borer*** Scouting Program			Place 2 peachtree borer pheromone traps on interior trees. These traps will indicate when moth flight begins and peaks. Delay peachtree borer trunk drench spray until you consistently catch peachtree borers in traps for at least two weeks.	
European Red Mite Twospotted Spider Mite	Acramite 50 WS	0.75-1 lb	<b>Mite spray thresholds:</b> Miticide spray recommended if mites exceed 2.5 mites per leaf in May, 5 mites per leaf in June and 7.5 mites per leaf in July. Repeat spray once 10 days later if live mites still exceed threshold. Use low rate of Acramite for twospotted mite or high rate for European red mite. Acramite can only be applied once per season. Agri-Mek is most effective if applied before leaves harden off. Apollo is most effective on eggs and newly hatched nymphs. Limit use to one Apollo application per year.	3
	Agri-Mek 0.7 SC	0.5-1 fl oz		21
	Apollo 4 SC	2-8 oz		21
	Envidor 2 SC	16-18 fl oz	Use low rate of Nexter for European red mite or high rate for twospotted mite.	7
	Nexter 75 WP	4.4 oz		7
	Onager 1 EC	12-24 fl oz		7
	Zeal 72WP	2-3 fl oz		7

**CHERRY/PEACH/PLUM INSECT CONTROL – COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>BY MAY 1</b>	<b>REFER TO SECTION ON BORERS</b>			
Oriental Fruit Moth	<b>SEE SHUCK SPLIT</b>			
Plum Curculio	<b>SEE SHUCK SPLIT</b>		<b>Plum curculio:</b> Egg hatch of 2nd and 3rd generation Oriental fruit moth occurs from 1400-1700 DD (late May) and after 2300 DD have accumulated since the <b>OFM biofix</b> in mid-March. Plum curculio sprays are justified when you detect new fruit feeding damage in perimeter trees after 1200 DD (usually in early June) have accumulated since the <b>PC biofix</b> in late March.	
<b>PREHARVEST</b>				
Oriental Fruit Moth	Assail 30 SG	5.3-8 oz		7
Japanese Beetle (late June to August)	Admire Pro (foliar)	1.4-2.8 fl oz		7
	Exirel	10-20.5 fl oz		3
Green June Beetle (July to August)	Sevin XLR	2 1/8-4 1/2 lb	Sevin is suggested here since it can be used one day before harvest. Sevin and pyrethroid formulations may encourage mite outbreaks. Recommend spray against Oriental fruit moths if you averaged more than 5 mites per trap since the last spray.	7
	Aza-Direct (OMRI*)	4-8 fl oz		0
<b>Spotted Wing Drosophila**</b>	Malathion	2.4 pt		7
	Sevin XLR	2-3 qt		7
	Entrust	4-8 fl oz		7
	Pyganic 5 EC (OMRI*)	4.5-17 fl oz		0
<b>SPECIAL PROBLEM/PEST OF CHERRY AND MAYBE LATE PEACHES</b>				
*OMRI = Organic Materials Review Institute lists compounds approved for organic production.				
** <b>Spotted Wing Drosophila (SWD)</b> is a new invasive insect pest that was detected in ripening and ripened fruit in many Midwest states, including Arkansas, in 2013. The SWD larvae feed inside and damage ripening soft-skinned fruit, especially <b>blackberry, blueberry, raspberry and strawberry</b> . See the Spotted Wing Drosophila site: <a href="http://www.ipm.msu.edu/invasive_species/spotted_wing_drosophila">http://www.ipm.msu.edu/invasive_species/spotted_wing_drosophila</a> or the Arkansas SWD fact sheet: <a href="https://www.uaex.edu/publications/PDF/FSA-7079.p">https://www.uaex.edu/publications/PDF/FSA-7079.p</a>				
*** <b>BORERS OF TREES</b> – The peachtree borer and lesser peachtree borer often infest peach, apricot, cherry and plum trees. The lesser peachtree borer lays eggs on bark near scaffold wounds where larvae hatch and bore into wounds. This species appears to have two generations per year. This attack further weakens limbs. The peachtree borer lays eggs near trunk base and larva bores in trunk below the soil line. Some of the regularly applied insecticide cover sprays aid in suppressing lesser peachtree borers. However, adequate control of both pests requires a drench spray of the trunk and/or scaffold limbs. Pheromone traps are available to monitor moth emergence of both pests. Where lesser peachtree borers have been a problem, spray 7-14 days after moth emergence begins in April and repeat in June for second generation hatch.				
Lesser Peachtree Borer***	Asana XL	4.8-14.5 fl oz	Where lesser peachtree borer has been a light to moderate problem, apply insecticide once at the peak of the second moth flight (in June or July). Where lesser peachtree borer has been a moderate to heavy problem, make two applications: one 7 to 14 days after emergence of first-generation moths begins (spray mid-April to mid-May) and the second at the peak of the second generation moth flight (often in June or July). Lorsban 50W is for sour cherries only.	14
	Lorsban Advanced	1.5-4 pt	Lorsban is not labeled for use on plums.	14
	Lorsban 50 W	2-3 lb		14
	Mustang Maxx	1.28-4 oz	Use only Pounce, Ambush or Warrior on plums.	14
	Pounce 25 WP	6.4-25.6 oz		14
	Warrior	2.56-5.12 fl oz		14
Peachtree Borer***	Asana XL	4.8-14.5 fl oz		14
	Lorsban Advanced	1.5-4 pt	DO NOT exceed one application of Lorsban per year in June.	14
	Besiege	6-12 fl oz		14
	Warrior	2.56-5.1 fl oz		14

**CHERRY/PEACH/PLUM INSECT CONTROL – COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<p><b>GRANULATE AMBROSIA BEETLE</b> – The granulate ambrosia beetle <i>Xylosandrus crassiusculus</i> (Mot.) is a relatively new pest in Arkansas and can cause significant damage in nursery, landscape and orchard settings. Female beetles bore into the sapwood of stems and young trees. Though attracted to damaged, stressed or transplanted trees, the granulate ambrosia beetle also attacks seemingly healthy, thin-barked hardwoods or branches from 1.0-2.5 inches in diameter (sometimes larger). Visible symptoms include wilted foliage and strands of boring dust protruding from small holes. These insects make galleries directly into the heartwood of the tree, which they inoculate with an ambrosia fungus (<i>Ambrosiella</i> spp.) which is used as their food source. In addition, they can introduce or create entry points for pathogenic fungi such as <i>Fusarium</i> spp. Death is more likely related to these pathogenic fungi that block xylem vessels. Young infested trees often die, while more established trees may survive. Infestations can be identified by toothpick-like strands of boring dust protruding up to 1.5 inches from the host plant. The strands are produced by the female beetle as she excavates her gallery. The strands are fragile and are easily broken off by wind or rain leaving only pencil-lead sized holes. Heavily infested plants or plant parts should be removed and destroyed. Once trees are infested, the beetle cannot be killed within the plant, and fungicides are ineffective against the fungus. Protective sprays on trunks may be attempted on susceptible nearby plants. Trunk/limb sprays of a labeled insecticide containing chlorpyrifos or a pyrethroid insecticide may be effective as a preventative, but multiple applications of the pyrethroids may have to be made during the time the beetles are active. Always read and follow label directions for the insecticide used. Keep trees healthy and avoid any unnecessary tree stress (drought, injury, nutrition, etc.). Check trees frequently beginning early March and treat accordingly. Use ethyl alcohol based traps to monitor for adult beetles in the spring (see UA Extension Fact Sheet FSA-7064). Use a protective insecticide as soon as beetle activity starts.</p>				
<p><b>RED IMPORTED FIRE ANTS (ALL FIRE ANT BAITS)</b> – Apply when ants are active and soil temperature is above 60 degrees F. DO NOT treat if rain is anticipated within 6 hours.</p>				
Non-Bearing Trees	Fenoxycarb (Award)	1-3 Tbsp/mound 1.0-1.5 lb/acre	Mound-to-mound treatment rate. Broadcast rate. This is an IGR.	
	Hydramethylnon (Amdro Pro)	2-5 Tbsp/mound 1.0-1.5 lb/acre	Mound-to-mound treatment rate. Broadcast rate.	
	Pyridine (Distance)	1-4 Tbsp/mound 1.0-1.5 lb/acre	Mound-to-mound treatment rate. Broadcast rate. This is an IGR.	

**GRAPE INSECT CONTROL—COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>DORMANT</b>				
Grape Scale	Look for weakened vines with loose trunk bark, peel bark off and check for grape scale. Flag vines that have live grape scale. See <b>BUD SWELL</b> about scale oil spray and <b>PREBLOOM TO BLOOM</b> for timing grape scale crawler spray.			
<b>BUD SWELL</b>				
Grape Scale	Superior oil (70 sec viscosity)	4 gal	Spray trunk and cordons of scale-infested vines by bud swell.	0
Flea Beetle	Altacor	3-4.5 oz	During bud swell, scout at least twice weekly for feeding holes in buds, or during daylight, check for presence of bluish-black flea beetle adults on buds or inspect buds after dusk for presence of cutworms. Spray weekly as long as there is more than 1% new bud damage.	14
Climbing Cutworm	Baythroid XL	2.4-3.2 fl oz		3
	Danitol 2.4EC	5 1/3-10 2/3 fl oz		21
	Delegate 25 WG	3-5 oz		7
	Sevin XLR	2 qt		7
	Success	4-8 fl oz		7
	Entrust 2SC (OMRI*)	4-6 fl oz		7
	Deliver (OMRI*)	0.5-1 lb	0	
<b>BUD BREAK</b>				
Flea Beetle	<b>See BUD SWELL SPRAY</b>			
Climbing Cutworm				
<b>BY APRIL 1</b>				
Initiate grape berry moth scouting program	Place <b>3 grape berry moth pheromone traps</b> at eye level on perimeter trees of woods adjacent to vineyard (overwintering site of grape berry moth) and check twice weekly to record first consistent moth emergence (mid April) = <b>GBM biofix</b> . Be sure to keep trap bottoms clean and replace lures monthly or every two months for long-life lures. After GBM biofix date, begin <b>calculating number of daily degree days (DD) using base 47°F</b> = DD = (maximum daily temperature + minimum daily temperature) / 2 – 47.			
<b>PREBLOOM TO BLOOM</b>				
Honeybees	Since insects do not pollinate grapes, there is no danger to honeybees at this time unless they are working on blooming weeds in the vineyard. Mow drive row before spraying grapes to eliminate blooms on weeds in drive row.			
Grape Scale	Lorsban Advanced	1 qt	DO NOT make more than one application of Lorsban Advanced or another product containing chlorpyrifos per season. Spray Lorsban Advanced to trunk, canes and foliage by prebloom. Grape scale crawlers can be detected by wrapping double-stick tape around scale-infested limbs beginning in late April. Inspect tapes weekly for yellow crawlers or lift adult scale covers to check for crawler presence.	35
Flea Beetle Larvae	<b>See BUD SWELL</b>			
	Check for presence of flea beetle larvae on leaves any time between 4 to 10 inches of shoot growth and bloom.			
Rose Chafer	Assail 30 SG	2.5-5.3 oz	Check for rose chafer on clusters during and after bloom.	7
	Assail 70 WP	1.1 oz		7
	Danitol 2.4 EC	10 2/3 lb		21
	Imidan 70W	1 1/2-2 1/8 lb		7
	Sevin XLR	2 qt		7



**GRAPE INSECT CONTROL—COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>BY MAY 15</b> Grape Berry Moth (eggs)	Intrepid 2F  <b>See SHATTER for other formulations</b>	8-16 fl oz	Move grape berry moth pheromone traps into the vineyard interior. Grape berry moth larvae usually hatch and feed on perimeter grape clusters from mid-May to early June or from 400-800 DD since GBM biofix in April. Begin weekly inspections of 100-200 clusters in the perimeter and second row for new berry moth larvae tunneling under the berry skin (damaged berry skin appears pink to purple).  Spray the perimeter vines in May to early June, if greater than 1% clusters damaged by berry moth. Intrepid is an insect growth regulator that provides control of grape berry moth if first applied just before initiation of grape berry moth hatch (200-300 DD) and reapplied 10 days later.	30
Foliar Grape Phylloxera	Admire Pro	7-14 oz	Grape phylloxera crawlers produce second generation foliar galls in May. These crawlers mature and produce additional generations of crawlers on susceptible cultivars including Catawba, Cayuga White, Chambourcin, Chardonnay, Delaware, Norton/Cynthiana, Reliance, Vignoles and Vidal). Apply insecticide in May against grape phylloxera crawlers when you first see expanding terminal leaves on susceptible vines with a rash-like appearance (new leaf galls forming). For Admire Pro to be effective against grape phylloxera, it must be applied to soil around vines and watered in by irrigation or rain in early April to move systemically up trunk into leaves (see <b>BUD BREAK</b> ).	30
	Assail 30 SG	2.5 oz		7
	Danitol 2.4EC	10 2/3-21 1/3 fl oz		21
	Movento	6-8 oz	Use of Induce® adjuvant only with Movento is prohibited once fruit are present due to adverse plant compatibility.	7
Spider Mites	Agri-Mek 0.7 SC	1.75-3.5 fl oz <b>plus</b> nonionic surfactant	Spider mite flare-ups may occur due to road dust coating grape leaves. Apply miticide between 1 and 5 spider mites per leaf.	28
	Acramite 50WS	0.75-1.0 lb		14
	Nealta 1.67 SC	13.7 fl oz		14
	Pyramite	3.3 oz (dilute rate)		7
	Vendex 50WP	1.0-2.5 lb	Make no more than 2 applications of Vendex per season no closer than 21 days apart.	28
	JMS Stylet Oil (OMRI*)	1-2 gal	<b>Phytotoxicity:</b> DO NOT apply sulfur within 10 days of JMS Stylet Oil application, but you can repeat oil spray every 10-14 days.	0
	M-Pede (OMRI*)	2 gal/100 gal	<b>Phytotoxicity:</b> M-Pede should not be applied to <i>Vitis vinifera</i> or <i>Calmeria</i> grapes. M-Pede may cause plant injury if plants are drought stressed or temperatures exceed 90°F or burned by sulfur if applied within 3 days of sulfur application. M-Pede may alter the waxy bloom of grape and affect quality rating of table grapes.	0
Leafhopper	<b>See SHATTER</b> Assail 30 SG	2.5 oz	DO NOT make more than two applications per season at 14-day interval.	7
<b>SHATTER</b> Grape Berry Moth (newly hatched) Leafrollers	Deliver (OMRI*)	0.5-1.25 lb	<b>Grape berry moth:</b> Spray if greater than 1% of clusters in perimeter vines are damaged by grape berry moth.	0

**GRAPE INSECT CONTROL—COMMERCIAL**

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>SHATTER</b> (cont.)				
Rose Chafer	Actara	1.5-3.5 oz	Actara has a 14-day minimum interval between applications. DO NOT make more than two applications per season at 14-day interval.	5
Grape Curculio	Admire Pro	1.0-1.4 fl oz	Admire Pro used as a foliar spray against sucking insects: leafhoppers and grape mealy bugs. <b>Grape curculio</b> (the legless larvae that feed in berries from mid-June into July): These larvae have recently attacked grape blocks receiving only a perimeter spray against grape berry moth. Starting on June 15, check clusters weekly in the unsprayed vineyard interior for new berry damage by these legless larvae.	30
Japanese Beetle				
Leafrollers				
Leafhoppers				
Grape Mealy Bug				
	Altacor	2-4.5 oz	<b>Leafhopper:</b> Inspect leaves in four locations for white stippling by leafhopper. If stippled, inspect underside of 5 leaves on each of 5 vines in 4 locations for presence of leafhoppers. Spray if greater than 5 leafhopper nymphs found per leaf.	14
	Assail 30 SG	2.5-5.3 oz		7
	Assail 70WP	1.1 oz		7
	Avaunt DG	5-6 oz		7
	Brigade 2 EC	8-16 oz		30
	Danitol 2.4 EC	10.6-21.3 fl oz		21
	Entrust 2SC	4-6 fl oz		7
	Imidan 70W	1 1/3-2 1/8 lb		7
	Intrepid 2F	8-16 fl oz		30
	Sevin XLR	2 qt		7
	Sivanto 200 SL	7-14 fl oz	Sivanto is applied to foliage.	0
<b>FIRST COVER TO VERASION</b>				
Grape Berry Moth	<b>See SHATTER</b>		Spray whole vineyard if greater than 1% of clusters damaged by grape berry moth. Second- and third-generations of grape berry moth hatch in mid to late June (1330-1700 DD), and after mid-July (2300 DD) or continue weekly inspections of 100 to 200 clusters in the perimeter and second row for new grape berry moth larvae tunneling.	
Rose Chafer	Assail 30SG	2.5-5.3 oz	Leafhopper usually is not a problem in Arkansas. You can inspect underside of leaves weekly and spray if you detect more than 10 nymphs per leaf.	7
Leafhopper	Movento	6-8 fl oz	Use of Induce® adjuvant only with Movento is prohibited once fruit are present due to adverse plant compatibility.	7
Grape Mealybug	Sevin XLR	2 qt		7
<b>VERASION TO HARVEST</b>				
Grape Berry Moth	<b>See SHATTER</b>		Spray whole vineyard if greater than 1% of clusters damaged by grape berry moth.	
Japanese Beetle	<b>See SHATTER</b>		Continue weekly monitoring for insect pests. Apply insecticides as needed	
Leafhopper	Danitol 2.4 EC	10.67-21.33 fl oz	<b>Japanese Beetle:</b> This is a pest that was introduced to Northwest Arkansas in the late 1990s and became an economic pest defoliating grapes and other fruits and ornamentals by 2002. Late June and July, Japanese beetles will defoliate most of the canopy of susceptible grapes on Norton, Vidal, Vignoles, Chambourcin, Cabernet Franc and others. Weekly insecticide sprays are required to prevent foliar damage.	21
	Mustang Maxx			1

## GRAPE INSECT CONTROL—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
<b>VERASION TO HARVEST</b>				
Grape Berry Moth	Sevin XLR			7
Japanese Beetle	Surround WP (OMRI*)		Surround applied to white-washed foliage will suppress/prevent Japanese beetle defoliation but should be reapplied as often as needed to keep vines white-washed, especially after a rain. Surround is approved for organic production.	0
Leafhopper				
<b>Multicolored Asian Lady Beetle**</b>	Belay 2.13SC	2-4 fl oz	See Multicolored Asian Lady Beetle**. Scout vineyards several days before harvest to determine the abundance of multicolored Asian lady beetle. Additional insecticides (including Baythroid and Mustang Maxx) have short pre-harvest intervals, and although not labeled specifically for this pest, they have been effective in trials and vineyard use.	0/30
	Scorpion 35SL	2-5 fl oz		12 hours
	Venom 70SG	1-3 oz.		12 hours
Green June Beetle	Sevin XLR	2 qt	In July and early August, green June beetles will feed on and damage ripening fruit. Apply spray in July when first beetles enter the vineyard. Reapply as needed (weekly).	7
Grape Root Borer	Lorsban Advanced	4.5 pt/100 gal water	Use to control the pest just prior to adult emergence from the soil or new larvae entering soil. Apply Lorsban to the soil surface in a 1- to 2-foot band on either side of the vine. DO NOT allow spray to contact fruit or foliage. Make one application per season by 35 days pre-harvest or after harvest. Generic formulations of chlorpyrifos are also labeled for use against grape root borer. Application can be made with flood nozzles and at low pressure (40-60 psi).	35
	Cultural Control		<b>Cultural tactic:</b> Maintain weed-free area under vines. Use a grape root borer pheromone trap to detect first moth emergence. Use grape hoe at first catch of grape root borer moths and repeat 1 month later to pile soil to 4- to 6-inch depth and 1-foot width on both sides of trunk. Mounded soil needs to be removed by September 1. This practice will greatly suppress moth ability to emerge from the soil.	
Spotted Wing Drosophila	So far, no reports of fly larvae in grape berries		See <b>blackberry and raspberry, blueberry and strawberry</b> sections in MP144.	

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

\*\***Multicolored Asian Lady Beetle (MALB)**, a late season vineyard inhabitant, can significantly reduce wine quality. These beetles are attracted to ripening grapes as a source of sugars in late summer and fall. They may congregate, often by the hundreds or thousands, in and among grape clusters from August through October. Although they may cause direct yield loss, they more often reduce wine quality when sufficient numbers become trapped in the harvested grapes and are crushed along with the grapes at the winery. MALB secretes a defense chemical when they are stressed. This defense chemical causes wine to smell “dirty” (a musty, damp odor), masking the flavors and smells of the grapes. As few as two MALB per lug of grapes can alter wine flavor and bouquet enough to be detected. Excessive numbers of MALB in grape clusters are most common in late-ripening varieties such as Cabernet Franc, Cabernet Sauvignon, Chambourcin, Riesling, Vidal and Vignoles, but earlier grapes that are prone to cracking can also be infested. Scout vineyards several days before harvest to determine the abundance of MALB.

## HOME ORCHARD SPRAY SCHEDULE

Insect	Material and Formulation	Amount to Use in 3 Gal Sprayer*	Spray and Time of Application	Trees to Receive Application	Days to Harvest
Scales, Aphids and Spider Mites	Superior Oil	7.6 fl oz	Apply a 2% oil solution during dormant stage before buds swell in spring.	Apple, Pear, Stone fruits	0
<b>PINK TO ½" GREEN</b>					
Rosy Apple Aphid	Greenlight Conquest Conc.	6 oz	At pink, look weekly for curling leaves around the fruit clusters and for rosy apple aphids on underside of curling leaves.	Apple	1
	Malathion	9 Tbsp			3
Spider Mites	M-Pede (OMRI**)	5 Tbsp	Apply spray to underside of leaves when you see 1 or more mites per leaf.	Apple, Pear, Stone fruits	
	JMS Stylet Oil (OMRI**)	7.6 Tbsp			
<b>BLOOM</b>			<b>SAVE THE BEES!! DO NOT APPLY INSECTICIDES DURING BLOOM.</b>		
<b>PETAL FALL</b> (90% of petals have fallen)					
Plum Curculio San Jose Scale Codling Moth	Fruit Tree Spray mix: Sevin + Malathion + Captan <b>or</b> Surround (OMRI**)	4.5-7.5 Tbsp 0.75-1.5 lb	Pick up fruit drops weekly and bury them to kill plum curculio larvae inside the fruit. This practice helps lessen the plum curculio population in following years. In April and May, maintain a white-washed appearance of canopy with a spray of Surround to suppress plum curculio damage of fruit. Codling moth only attacks apple and pear.	Apples, Pear, Stone fruits	14 0
Codling Moth (newly hatched larvae on apple or pear)	<u>Virus formulations</u> Carpovirusine (OMRI**) CYD-X (OMRI**) Virosoft CP4 (OMRI**)	1-2.4 tsp 0.5-1 tsp 0.5 tsp	Apply to tree as soon as first codling moth entry hole or insect frass is seen on fruit. Apply weekly as necessary during hatch period. Keep the virus formulation refrigerated to keep the virus alive.	Apple and pear	0 0 0
Oriental Fruit Moth (newly hatched larvae)	Entrust 2SC (OMRI**) <u>Formulations of Bt bacteria</u> Biobit HP (OMRI**) Deliver (OMRI**)	1-1.5 tsp 0.5-1 Tbsp 0.5-2 Tbsp	<b>Oriental fruit moth and leafrollers:</b> Apply to tree as soon as first Oriental fruit moth entry hole or insect frass is seen on fruit. Apply weekly as necessary during hatch period.	Apples, Stone fruits	7 0 0
<b>FIRST COVER</b> (10-14 days after PETAL FALL)					
Plum Curculio Codling Moth	Fruit Tree Spray mix: Sevin + Malathion + Captan <b>or</b> Surround (OMRI**)	4.5-7.5 Tbsp 0.75-1.5 lb	Surround should be reapplied as often as needed to keep plants white-washed, especially after a rain or as new foliage emerges.	Apple, Pear, Stone fruits	14 0
<b>SECOND COVER</b> (10-14 days after FIRST COVER)					
Plum Curculio Codling Moth San Jose Scale	Fruit Tree Spray mix: Sevin + Malathion + Captan <b>or</b>  M-Pede (OMRI**) <b>or</b> JMS Stylet Oil (OMRI**) <b>or</b> Surround (OMRI**) <b>or</b> Japanese Fruit Bags (OMRI**)	4.5-7.5 Tbsp  5 Tbsp 7.6 Tbsp 0.75-1.5 lb	Mites and scale can be suppressed with M-Pede or JMS Stylet Oil when applied at 2 to 3 week intervals starting in early May. Or, place Japanese fruit bags around pome or stone fruits when they reach 1/2 inch diameter a couple weeks after petal fall. These bags will prevent disease and insect damage to pome and stone fruits. Remove outer bag 3 weeks before harvest to develop full fruit color.	Apple, Stone fruits	14  0 0 0 0

## HOME ORCHARD SPRAY SCHEDULE

Insect	Material and Formulation	Amount to Use in 3 Gal Sprayer*	Spray and Time of Application	Trees to Receive Application	Days to Harvest
<b>THIRD COVER</b> (10-14 days after SECOND COVER)					
Codling Moth Plum Curculio San Jose Scale Flatheaded Apple Tree Borer	Fruit Tree Spray mix: Sevin + Malathion + Captan or Surround (OMRI**)	4.5-7.5 Tbsp 0.75-1.5 lb	In late April, begin applying insecticide to trunks at three-week intervals to suppress flatheaded apple tree borer.	Apple, Pear, Stone fruits	14 0
Japanese Beetle	Surround (OMRI**)	0.75-1.5 lb	<b>All July</b> , maintain a white-washed appearance of canopy with spray of Surround to suppress Japanese beetle defoliation of canopy (white clay residue on fruit can be washed off). Or, apply weekly sprays of Sevin to prevent canopy defoliation (spray top third of tree).	Apples, Blackberries, Raspberries, Cherries, Grapes, Stone fruits	0
	Sevin	9 Tbsp			
<b>Spotted Wing Drosophila***</b>	Greenlight Conquest Conc.	6 oz	<b>Monitor:</b> Set up monitoring traps a couple weeks before harvest begins (see online information listed below).	Blackberry, Blueberry, Cherry, Raspberry, Strawberry	1
			<b>Cultural tactic:</b> A week before harvest begins, cover fruiting plants with fine netting (0.98 mm) such as floating row cover to exclude flies before they lay eggs on fruit.		
	Malathion	9 Tbsp	<b>Sprays:</b> If fly numbers are high and other methods are not providing adequate control, use insecticides registered for home use, such as spinosyns (Entrust), pyrethrins (Pyganic), malathion and carbaryl (Sevin) reapplied on 5- to 7-day intervals.		
	Sevin	9 Tbsp			
Pyganic	6-12 Tbsp				
	Entrust (OMRI**)	1-1.5 tsp			7

### SPECIAL PROBLEM/PEST OF BLACKBERRY, BLUEBERRY, CHERRY, RASPBERRY AND STRAWBERRY

\***Conversions:** 1 fl oz = 2 tablespoons (T); or 1 fl oz = 6 teaspoons (t)

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

\*\*\***Spotted Wing Drosophila (SWD)** is a new invasive insect pest that was detected in ripening and ripened fruit in many Midwest states, including Arkansas, in 2013. The SWD larvae feed inside and damage ripening soft-skinned fruit, especially **blackberry, blueberry, raspberry and strawberry**. See the Spotted Wing Drosophila site: [http://www.ipm.msu.edu/invasive\\_species/spotted\\_wing\\_drosophila](http://www.ipm.msu.edu/invasive_species/spotted_wing_drosophila) or the Arkansas SWD fact sheet: <https://www.uaex.edu/publications/PDF/FSA-7079.p>

## HOME ORCHARD SPRAY SCHEDULE

Organic Agriculture Suppliers	Address/Online URL	Phone and Fax
<b>Midwest Organic and Sustainable Education Service (MOSES)</b> (best list of organic suppliers)	P.O. Box 339, Spring Valley, WI 54767 Online: <a href="http://www.mosesorganic.org">www.mosesorganic.org</a>	Ph: 715-778-5775 Ph: 888-551-4769 Fax: 715-778-5773
<b>Organic Agriculture Resources list</b>	Dr. Kathleen Delate, Depts. of Agronomy/Horticulture, 106 Horticulture Hall Iowa State University, Ames, IA 50011 Online: <a href="http://extension.agron.iastate.edu/organicag/">http://extension.agron.iastate.edu/organicag/</a>	Ph: 515-294-7069 Fax: 515-294-0730
<b>AgBio, Inc.</b> (flathead apple tree borer trap, insect traps and lures, Pyganic)	9915 Raleigh Street, Westminster, CO 80031 Online: <a href="http://www.agbio-inc.com">http://www.agbio-inc.com</a>	Ph: 303-469-9221 Fax: 303-469-9598
<b>Ag Resource, Inc.</b> (irrigation and production supplies, soil amendments, pest controls, equipment)	35268 State Highway 34, Detroit Lakes, MN 56501 Online: <a href="http://www.agresourceincmn.com/">http://www.agresourceincmn.com/</a>	Ph: 218-847-9351 Ph: 800-288-6650
<b>NovaSource</b> (Surround Crop Protectant)	2255 N. 44th Street, Suite 300, Phoenix, AZ 85008-3279 Online: <a href="http://novasource.com/home/products/surround/">http://novasource.com/home/products/surround/</a>	Ph: 800-525-2803
<b>Gardens Alive</b> (beneficial insects, soil amendments, pet care, cover crops, Codling moth trap, pest controls: Oil-Away™ Supreme Insecticidal Oil, Surround at Home® Crop Protectant)	5100 Schenley Place, Lawrenceburg, IN 47025 Online: <a href="http://www.gardensalive.com">http://www.gardensalive.com</a>	Ph: 513-354-1482 Ph: 513-354-1483 Fax 513-354-1484
<b>Peaceful Valley Farm and Garden Supply, Inc.</b> (organic farming supplies, Codling moth trap, seeds, plants, soil amendments, pest control: Cyd-X, JMS Stylet oil, Dipel, Entrust, Pyganic, Surround Crop Protectant, M-Pede Insecticidal Soap)	P.O. Box 2209, 125 Clydesdale Court, Grass Valley, CA 95945 Online: <a href="http://www.groworganic.com">http://www.groworganic.com</a>	Ph: 888-784-1722 Ph: 530-272-4769
<b>Rincon-Vitova Insectaries, Inc.</b> (distributors of beneficial insects for controlling pests biologically)	P.O. Box 1555, Ventura, CA 93002 Online: <a href="http://www.rinconvitova.com">www.rinconvitova.com</a>	Ph: 805 643-5407 Ph: 800-248-2847 Fax: 805-643-6287
<b>Seven Springs Farm</b> (Pest Controls: Copper, Bt-Javelin, Neemix, Pyganic, Entrust, M-Pede, Surround Crop Protectant)	426 Jerry Lane NE – Check, VA 24072 Online: <a href="http://www.7springsfarm.com">http://www.7springsfarm.com</a>	Ph: 540-651-3228 Ph: 800-540-9181
<b>Wilson Orchard and Vineyard Supply</b> (6" x 7" green outside x red inside color coated paper bag for maturing/protecting apples. Also known as Japanese Fruit Bags. Sold in bundles of 100.)	1104 East Mead, Yakima, WA 98903 Online: <a href="http://www.wilsonirr.com">http://www.wilsonirr.com</a>	Ph: 509-453-9983 Ph: 800-232-1174 Fax: 509-453-1258

## PECAN INSECT CONTROL—COMMERCIAL

**Disclaimer:** Not all recommended formulations are listed below. Additional formulations, each with Class/Mode of Action information, can be found online on Pecan IPM PIPE where you click “Toolbox,” click “Insecticides Search,” and then search for recommended insecticides by pest name (conventional or approved for organic) at <http://pecan.ipmpipe.org/Toolbox>.

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
<b>Obscure Scale</b>	Superior oil emulsion	3 gal	Apply 1%-2% horticultural oil spray November-December and again in February. Scale populations build slowly but can reach damaging levels before becoming obvious.	
<b>Phylloxera</b>	Centric 40 WG	2.0-2.5 oz	Native trees and improved varieties vary in susceptibility to phylloxera. This insect is not highly mobile, and infestations are often limited to a few trees. Treatments should be applied to those trees previously infested and those adjacent to them. There are many generic formulations available of imidacloprid. Control must be initiated at bud break (April). A hand lens should be used to confirm that phylloxera are present. Marking infested trees that have galls in May will facilitate identification of potential treatment sites next year.	14
	Lorsban (various) (R)	2-6 pt		28
	Movento	6-9 fl oz		7
	Trimax Pro	1.3-2.6 oz		7
	Warrior (R)	1.28-2.56 fl oz		14
	Imidacloprid (various) Province (R)	1.3-2.6 oz 2.56-5.12 fl oz		7 14
<b>Pecan Nut Casebearer</b>	Belay SC	3-4 oz	Be careful using pyrethroids (IRAC 3A) because they kill natural enemies of aphids and mites resulting in outbreaks. Longer residual activity may be expected with the insect growth regulators (Confirm and Intrepid). First-generation larvae are the most damaging and generally occur in May. Timing of sprays requires monitoring adult moths in pheromone traps and following accumulated temperature models. Sprays are warranted when 2% to 4% of the clusters are infested or damaged. To see when to begin inspecting clusters in your orchard, go online on to the Pecan IPM PIPE web site on Pecan Nut Casebearer Risk Map at <a href="http://pecan.ipmpipe.org/Maps/pncRiskMap">http://pecan.ipmpipe.org/Maps/pncRiskMap</a> .	21
	Dimilin 2F	8-16 oz		28
	Intrepid 2 F	4-8 oz		14
	Mustang Maxx (R)	3.2-4.0 oz		7
	Warrior (R)	1.28-2.56 fl oz		14
	Entrust (OMRI*)	1.25-2.5 oz		1
	Belt	3-4 fl oz		14
	Altacor	2-4.5 oz		10
	Delegate	4.5-7 oz		1
Confirm	8-16 fl oz	14		
<b>Spittle Bug</b>	Trimax Pro	1.3-2.6 fl oz		7
<b>Yellow or Black Pecan Aphids</b>	Assail 30SG	2.5-9.6 oz	Black aphids are more damaging than yellow aphids because they inject a toxin between leaf veins causing an area up to 1/4 inch in diameter to turn brown and die. Treatments are recommended when there is an average of one black aphid per compound leaf or 25 yellow aphids per compound leaf. Leaf samples should be randomly collected from different trees throughout the orchard. Aphid treatment is strongly discouraged before July. Use 7 oz of Provado for black aphids. Separate applications for yellow aphids are generally not recommended.	14
	Belay SC	3-4 oz		21
	Centric 40 WG	2.5 oz		14
	Fulfill 50 WG	4 oz		14
	Movento	6-9 oz		7
	Mustang Maxx (R)	3.2-4.0 oz		7
	Nexter	5.2-10.67 oz		7
	Warrior (R)	2.56-5.12 oz		14
Closer	1.5-2.75 fl oz	7		
<b>Pecan Weevil</b>	Asana XL (R)	4.8-14.5 oz	The majority of weevils emerge from soil after a heavy rain as early as August 15, especially on sandy soils. Treatments are generally warranted in infested orchards in late August. Monitoring circle traps on trunks will detect emerging adults and aid timing of treatments. Multiple applications may be required. Pecans are most susceptible to injury from gel stage to shuck split. Sevin is best for weevils alone but is not effective against aphids, mites or stink bugs and may cause mite problems.	21
	Imidan 70 WP	3.0-3.25 lb		14
	Mustang Maxx (R)	3.2-4.0 oz		7
	Sevin	2-3 lb		14
	Warrior (R)	2.56-5.12 oz		14
	Brigade	8-32 oz		14
	Province (R)	2.56-5.12 fl oz		21
	Grizzly Z	2.56-5.12 fl oz		14
	Lambda-CY EC	2.56-5.12 fl oz		14
Hero	10.3 oz	14		

**PECAN INSECT CONTROL – COMMERCIAL**

**Disclaimer:** Not all recommended formulations are listed below. Additional formulations, each with Class/Mode of Action information, can be found online on Pecan IPM PIPE where you click “Toolbox,” click “Insecticides Search,” and then search for recommended insecticides by pest name (conventional or approved for organic) at <http://pecan.ipmpipe.org/Toolbox>.

<b>Insect</b>	<b>Material and Formulation</b>	<b>Amount to Use/Acre</b>	<b>Remarks/Precautions</b>	<b>Days to Harvest</b>
<b>Stink Bugs</b>	Imidan 70 WP	2-3 1/8 lb	Stink bugs are mobile pests that build populations on many broadleaf plants. Problems are often associated with orchards next to soybean. Some states recommend treatment when populations exceed one insect per 40 terminals. If stink bugs are present from water through dough stages, apply treatments to minimize stink bug feeding and pecan nut damage.	14
	Mustang Maxx (R)	3.2-4.0 oz		7
	Warrior (R)	2.56-5.12 oz		14
<b>Leaffooted Bugs</b>	Same as <b>Stink Bug</b>			
	Brigade	8-32 fl oz		21
	Bifenthrin	3.2-12.8 fl oz		21
	Fanfare	3.2-12.8 fl oz		21
	Sniper	3.2-12.8 fl oz		21
	Endigo ZC	5-6 fl oz		14
	Girzzly Z	2.56-5.12 fl oz		14
	Silencer	2.56-5.12 fl oz		14
<b>Hickory Shuckworm</b>	Intrepid 2 F	4-8 oz	Treatments are warranted in orchards with a history of shuckworm infestation. Multiple applications may be required. Pecans are most susceptible to hickory shuckworm after the gel stage. Sampling is very difficult, although adult moths can be monitored using commercially available pheromone traps. Once traps begin catching shuckworm moths, growers can begin weekly inspections of nuts for egg cemented to the shuck in a creamy white substance.	14
	Entrust (OMRI*)	1.25-2.5 oz		1
	Confirm 2F	8-16 fl oz		14
	Intrepid Edge	4.0-6.4 fl oz		7
	Altacar	2.0-4.5 fl oz		10
	Belt	3-4 fl oz		14
<b>Mites</b>	Acramite	12-16 oz	Mites are usually more of a problem in hot, dry periods or outbreaks occur after application of a pyrethroid or Sevin insecticides that kill the natural mite predators. Treat when leaf discoloration is noted and an average of 8 or more mites are found per compound leaf. Portal may only be applied once per season (do not apply by air).	14
	Dicofol 4E	2 qt		3
	Evidor 2SC	14-18 oz		7
	Portal	2 pt		14
	Zeal	2-3 oz		28
<b>Fall Webworm</b>	Intrepid 2 F	4-8 oz		14
<b>Walnut Caterpillar</b>	Sevin	2 1/2-6 1/4 lb	Sevin may cause mite problems to increase.	14
	Dipel (OMRI*)	1.5-2.0 lb		0
	Entrust (OMRI*)	1.25-3 oz	Entrust is for fall webworm only.	1
<b>RED IMPORTED FIRE ANTS (ALL FIRE ANT BAITS) – Apply when ants are active and soil temperature is above 60 degrees F. DO NOT treat if rain is anticipated within 6 hours.</b>				
Non-Bearing Trees	Fenoxycarb (Award)	1-3 Tbsp/mound 1.0-1.5 lb/acre	Mound-to-mound treatment rate. This is an insect growth regulator (IGR). Broadcast rate.	
	Hydramethylnon (Amdro Pro)	2-5 Tbsp/mound 1.0-1.5 lb/acre	Mound-to-mound treatment rate. This is an IGR. Broadcast rate.	
	S-Methoprene (Extinguish)	3-5 Tbsp/mound 1.0-1.5 lb/acre	Mound-to-mound treatment rate. This is an IGR. Broadcast rate.	
	Pyriproxyfen (Esteem)	2-4 Tbsp/mound 1.5-2.0 lb/acre	Mound-to-mound treatment rate. This is an IGR. Broadcast rate.	
	Pyridine (Distance)	1-4 Tbsp/mound 1.0-1.5 lb/acre	Mound-to-mound treatment rate. This is an IGR. Broadcast rate.	
	Bearing Trees	Pyriproxyfen (Esteem)	2-4 Tbsp/mound 1.5-2.0 lb/acre	Mound-to-mound treatment rate. This is an IGR. Broadcast rate.

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



## STRAWBERRY INSECT CONTROL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
<b>PREBLOOM</b>				
Strawberry Clipper	Brigade WSB	6.4-32 oz	Begin checking for clipped buds when the first flower appears. If clipped buds are found, apply insecticide and repeat spray at 10-day intervals as long as bud clipping continues.	0
	Danitol 2.4EC	10 2/3 oz		2
	Lorsban 4E	1 qt	Lorsban applications are prebloom only.	21
	Sevin 4F	1-2 qt		7
Tarnished Plant Bug Spittlebug	Admire Pro	1.3 fl oz	Admire Pro as a foliar spray of spittlebug. DO NOT apply Assail more than twice per season.	7
	Assail 30 SG	4-6.9 oz		1
	Beleaf 50 SG	2.8 oz	0	
	Brigade WSB	6.4-32 oz	0	
	Danitol 2.4EC	10.67 oz	2	
	Rimon 0.83EC	9-12 fl oz	Rimon is labeled against tarnished plant bug but not spittle bug. If spittlebugs are a problem, spray when buds first become visible and make a second application just before the first blossoms open.	1
	Sevin 4F	1-2 qt	7	
Spider Mites	Acramite 50 WS	0.75-1.0 lb	Label allows up to two applications of Acramite or Kanemite per season.	1
	Agri-Mek 0.7 SC	3.5 fl oz		3
	Danitol 2.4EC	10 2/3 oz	Apply Danitol at higher rates to control spider mites.	2
	Kanemite 15 SC	21-31 fl oz	Minimize road dust to prevent spider mite buildup.	1
	Nealta 1.67SC	13.7 fl oz		1
	Oberon 2 SC	12-16 fl oz	3	
	Portal 0.4 EC	2 pt	1	
	Savey 50 DF	4-6 oz	3	
	Zeal 72 WSP	2-3 oz	JMS Stylet-oil is approved for organic production.	1
	JMS Stylet Oil (OMRI*)	1-2 gal		0
		Predator Mites	Ask state fruit entomologist	Release predatory mites for biological control of spider mites. Predator mites can be released when prey mite levels are between 1-5 mites per leaf. In general, release 2-3 predatory mites per plant when mite populations are low.
Cyclamen Mite	Portal 0.4 EC	2 pt	Portal is restricted to 2 applications of no more than 4 pints per crop cycle.	1
<b>EARLY BLOOM THROUGH BLOOM</b>			<b>SAVE THE BEES!! DO NOT APPLY INSECTICIDES DURING BLOOM.</b>	
<b>POST-BLOOM TO HARVEST</b>				
Aphids	Actara	1.5-3.0 oz	DO NOT exceed 14 fl oz per acre per season.	3
	Admire Pro	10.5-14 fl oz		14
Leafrollers	Deliver (OMRI*)	0.25-1.5 lb	Deliver contains <i>Bacillus thuringiensis</i> var. <i>kurstaki</i> (Bt) formulation.	1
	Entrust 2SC (OMRI*)	4-6 fl oz		1
	Radiant SC	6-10 fl oz		1
	Coragen 1.67 SC	3.5-5 fl oz		4

## STRAWBERRY INSECT CONTROL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
<u>Days of residual activity:</u>				
<b>Spotted Wing Drosophila**</b>	Brigade WSB	5.3-16 oz		0
	Danitol 2.4EC	16-21.33 fl oz	7 days	2
	Malathion	1.5-2.0 pt	7 days	3
	Entrust 2SC (OMRI*)	4-6 oz	5-7 days	1
	Radiant 1SC	6-10 fl oz		1
	Pyganic 1.4 (OMRI*)	16-64 fl oz	0-2 days	0
<b>POST-HARVEST</b>				
White Grubs of Japanese Beetle	Admire Pro	7-10.5 fl oz	Admire Pro and Platinum should be a post-harvest soil surface application followed by 0.25 inch of rain or overhead irrigation. DO NOT exceed 32 fl oz per acre per season of Alias or 12 fl oz per acre per season for Platinum.	14
Adult Japanese Beetles	Alias 2 F	16-24 fl oz		14
	Coragen	3.5-5 fl oz		1
	Platinum	5-12 oz		50
	Sevin 4F	1-2 qt		7
<b>RED IMPORTED FIRE ANTS (ALL FIRE ANT BAITS)</b> – Apply when ants are active and soil temperature is above 60 degrees F. DO NOT treat if rain is anticipated within 6 hours.				
	S-Methoprene (Extinguish)	3-5 Tbsp/mound 1.0-1.5 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.	
	Pyriproxyfen (Esteem)	2-4 Tbsp/mound 1.5-2.0 lb/acre	Mound-to-mound treatment rate. Broadcast rate.	

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

\*\***Spotted Wing Drosophila (SWD)** is a new invasive insect pest that was detected in ripening and ripened fruit in many Midwest states, including Arkansas, in 2013. The SWD larvae feed inside and damage ripening soft-skinned fruit, especially **blackberry, blueberry, raspberry and strawberry**. See the Spotted Wing Drosophila site: [http://www.ipm.msu.edu/invasive\\_species/spotted\\_wing\\_drosophila](http://www.ipm.msu.edu/invasive_species/spotted_wing_drosophila) or the Arkansas SWD fact sheet: <https://www.uaex.edu/publications/PDF/FSA-7079.p>