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 in orchard interior at eye level 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	Superior oil **plus one of the following:**	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. **DO NOT use Captan within 2 weeks or Sulfur within 30 days before or after an oil application. Apply Supracide before any blossoms open.**	
San Jose Scale Aphid Eggs	Supracide 2E (**R**)	1.5-0.5-4 pt 3-12 pt	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.	See text
Spotted Tentiform Leafminer	Esteem 35WP	3-5 oz		45
TIGHT CLUSTER TO PINK				
Rosy Apple Aphid	Asana XL (**R**)	4.8-14.5 fl oz	Time of application is critical in achieving control.	21
	Assail 30SC	2.1-3.4 fl oz		7
	Assail 70WP	1.1-1.7 oz	Use prebloom and post bloom spray timings recommended by State Extension Services	7
	Beleaf 50SG	2-2.8 oz	Weekly from tight cluster to late May, check five fruit clusters in interior of each of 20 susceptible trees	21
	Danitol 2.4EC (**R**)	10.7-21.3 oz	(look at Ida Red or Golden Delicious) for rosy apple aphids inside curled leaves.	14
	Permethrin	4-10 fl oz	Do not apply after petal fall	See text
	Sivanto 200 SL	7-10.5 fl oz	**Caution:** In some blocks, rosy apple aphid was resistant to Ambush and Asana.	14
	Vydate L (**R**)	4-8 pt	**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.	14
Tarnished Plant Bugs and Stink Bugs	Asana XL (**R**)	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 (**R**)	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	Beleaf is for plant bugs, not stink bugs.	21
	Besiege (**R**)	6-12 fl oz		21
	Danitol 2.4 EC (**R**)	10.7-21.3 fl oz	Avoid applications when honey bees are actively foraging by applying during the early morning or evening hours.	14
	Mustang Maxx 0.8 EC (**R**)	1.28-4 fl oz	Pounce for Tarnished Plant Bug only. Do not apply after petal fall.	14
	Pounce 25 WP (**R**)	6.4-16 oz		See text
	Proaxis 0.5 EC (**R**)	2.6-5.1 fl oz		21
	Warrior II (**R**)	1.28-2.56 fl oz		21
Spotted Tentiform Leafminer	**Same as GREEN TIP TO ½" GREEN or**		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 eVo	1.3-2.2 oz		5
	Altacor 35 WDG	2.5-4.0 oz		5
	Assail 30SG	2.5 oz		7
	Assail 30SC	2.1 fl oz		7
	Esteem 35WP	3-5 oz		45
	Intrepid 2F	8-12 fl oz	First generation: Apply at pink to petal fall. Second, third generation: Apply at early egg hatch for each generation.	14
	Shenzi 700WG	1.3-2.2 oz		5
	Trinalor	2.5-4.5 oz		5
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.			

APPLE/PEAR SPRAY SCHEDULE—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
BY APRIL 1 Initiate Scouting Programs for Plum Curculio Codling Moth San Jose Scale crawlers	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. 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**. 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**.			
BLOOM		**SAVE THE BEES! DO NOT SPRAY INSECTICIDES/MITICIDES DURING BLOOM.**		
PETAL FALL	Oil	0.5%-1%	DO NOT use oil if temperature exceeds 90ºF.	
European Red Mite	Acramite 50 WS	0.75-1 lb		7
Twospotted Spider Mite	Agri-Mek 0.7 SC (**R**)	2.25-4.25 oz		28
	Haisello 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	Savey is most effective if applied after petal fall or first cover.	7
	Nexter 75 WP	6.6-10.67 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	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 Leafrollers Oriental Fruit Moth	Avaunt 30 WDG Imidan 70 W	5-6 oz 2.1-5.3 lb	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. 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. After petal fall, look for plum curculio feeding damage on fruit, especially along orchard perimeter adjacent to woods (overwintering site). Peak hatch of redbanded leafroller usually coincides with petal fall. Control at this time helps prevent late-season problems. If plum curculio pressure has been severe and Imidan is applied to control it, use 5.3 lb per acre.	14 7
Leafrollers	Products listed above for three species combined **or**			
	Altacor 35 WDG	2.5-4.5 oz		5
	Altacor eVo	1.3-2.2 oz		5
	Confirm 2 F	20 fl oz	The use of a spreader-sticker to maximize uniform coverage and distribution of the spray material is recommended.	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 (**R**)	3.2-4.8 oz	It is recommended that application be made in combination with a Horticultural spray oil (not a dormant oil) or a nonionic surfactant as directed by the product manufacturer.	14
	Rimon 0.83 EC	20-50 fl oz		14
	Shenzi 700 WG	1.3-2.2 oz		5
	Trinalor	2.5-4.5 oz		5
Plum Curculio	Products listed above for three species combined **or**			
	Actara 25W	4.5-5.5 oz	Make application immediately following petal fall. Additional applications of a different insecticide may be necessary if pest pressure continues. Highly toxic to bees.	35
	Assail 30SC	6.7 fl oz		7
	Assail 30SG	8 oz		7
	Belay	6 fl oz	For best performance, use with an effective adjuvant.	7
	Exirel	13.5-20.5 fl oz		3
	Surround WP (OMRI*)	25-50 lb	Apply at higher rates (8.2 to 11 fl oz/A) for best results.	0
	Verdepryn 100SL	5.5-11 fl oz	Make application immediately following petal fall.	7
	Voliam Flexi	6-7 oz		35

APPLE/PEAR SPRAY SCHEDULE—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
PETAL FALL				
Oriental Fruit Moth	Products listed above for three species combined			
	or			
	Altacor 35 WDG	2.5-4.5 oz		5
	Altacor eVo	1.3-2.2 oz		5
	Assail 30SC	4.2-6.7 fl oz		7
	Assail 30SG	5-8 oz		7
	Belay	6 fl oz		7
	Besiege (**R**)	6-12 fl oz		21
	Delegate 25 WG	4.5-7.0 oz		7
	Entrust 2 SC (OMRI)	6-10 fl oz	Closely follow regional spray recommendations for oriental fruit moth treatments based upon biofix dates and pheromone trap catches. Oriental fruit moth larvae must be controlled before they penetrate the fruit.	7
	Exirel	10-17 fl oz		3
	Intrepid 2 F	12-16 fl oz		14
	Rimon 0.83 EC	20-40 fl oz		14
	Shenzi 700 WG	1.3- 2.2 oz		5
	Trinalor	2.5-4.5 oz		5
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	2-2.75 fl oz	**Spray threshold** = 1 or more white apple leafhopper nymphs per leaf. Leafhoppers are usually below this spray threshold in Arkansas.	14
	Admire Pro	1.4-2.8 fl oz	Admire Pro is a foliar application.	7
	Agri-Mek	2.25-4.25 fl oz	Apply when thresholds are reached in a minimum volume of 40 gal/A.	28
	Assail 30SC	2.1-3.4 fl oz		7
	Assail 30SG	2.5-4.0 oz		7
	Closer 2 SC	1.5-2.75 fl oz		7
	Danitol 2.4EC (**R**)	10.6-21.3 fl oz		14
	Exirel	8.5-17 fl oz		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**		If an insecticide is not applied for rosy apple aphid at pink or if live aphids are still present, an insecticide should be applied.	
	Beleaf 50 SG	2-2.8 oz		21
	Closer 2 SC	1.5-2.75 fl oz		7
	Esteem 35 WP	3-5 oz		45
	Movento 2 SC	6-9 fl oz		7
	Azera (OMRI)	2-3.5 pt	Not labeled for woolly apple aphid.	0
FIRST COVER				
Codling Moth Oriental Fruit Moth	Imidan or Assail as listed at **PETAL FALL** for plum curculio		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).	
	or			
	Altacor eVo	1.3-2.2 oz	For Oriental fruit moth, spray for each generation at 400-700 DD (late April), 1300-1700 DD (late May,	5
	Altacor 35 WDG	2.5-4.5 oz	after 2300 DD (late June) and every 10 to 14 days thereafter if you continue to see new fruit damage	5
	Confirm 2F	20 fl oz	(red ring with frass).	14
	Delegate 25 WG	4.5-7 oz		7
	Exirel	8.5-17 fl oz	Use 8.5 – 10 fl oz for low pressure infestations.	3
	Intrepid 2F	12-16 fl oz	Use 16 fl oz for codling moth.	14
	Rimon 0.83 EC	20-40 fl oz		14
	Shenzi 700WG	1.3 - 2.2 oz		5
	Trinalor	2.5-4.5 oz		5
	Verdepryn 100SL	5.5-11 fl oz	Use the higher rates of 8.2 to 11 fl oz for heavy infestations.	7

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
FIRST COVER (cont.)				
Codling Moth larvae	Carpovirusine (OMRI)	6.8-13.5 fl oz	**Use in non-chlorinated water.** Apply one of the codling moth granulosis virus formulation	1
	Cyd-X HP (OMRI)	0.5-3 fl oz	(Carpovirusine, Cyd-X HP, Madex or Virosoft) sprays only in orchards with low to moderate populations of	0
	Madex (OMRI)	0.5-3 fl oz	codling moth. Time virus application against newly hatched codling moth larvae. Repeat sprays at interval	0
	Virosoft CP4	2.0-3.2 fl oz	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
Oriental Fruit Moth and Leafroller larvae	Biobit HP (OMRI)	0.5-2.0 lb	Apply weekly as necessary during hatch period.	0
	Deliver (OMRI*)	0.5-2.0 lb	**Resistance management:** Alternate Entrust sprays with applications of *Bt* formulations against Oriental fruit moth or leafrollers.	0
San Jose Scale crawlers	Admire Pro 4.6 F	2.8 fl oz	Admire Pro is a foliar application.	7
	Assail 30SC	6.7 fl oz		7
	Assail 30SG	8 oz	Spray foliage when you see scale crawlers on several double-sticky tapes wrapped around scale-infested	7
	Centaur 70 WDG	34.5 oz	branches. By 300 DD since first catch of San Jose scale males on pheromone traps, wrap sticky tape	14
	Esteem 35W	4-5 oz	traps on limbs and check twice weekly for crawlers.	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	
Oriental Fruit Moth and	SpinTor 2SC	6-10 fl oz	insecticide: SpinTor or Entrust or *Bt* or virus.	7
Codling Moth	Entrust 2 SC (OMRI*)	6-10 fl oz	SpinTor may only be used if the requirements of 205.206(e) are met, which require the use of preventive, mechanical, physical, and other pest, weed, and disease management practices.	7
Oriental Fruit Moth	Biobit HP (OMRI*)	0.5-2.0 lb	**In conventional orchards**, SpinTor will control Oriental fruit moth, codling moth and leafrollers as will	0
	Deliver (OMRI*)	0.5-2.0 lb	other compounds listed in **FIRST COVER**. **In organic blocks**, from August to harvest, rotate weekly applications of Entrust with *Bt* formulations (Biobit, Deliver or Javelin) to control Oriental fruit moth or granulosis virus (Cyd-X, Virosoft and Virusine) to control codling moth.	0
Codling Moth	Cyd-X HP (OMRI*)	1-5.3 fl oz		0
	Virosoft CP4 (OMRI*)	2-3.2 fl oz		0
	Carpovirusine (OMRI*)	6.8-13.5 fl oz		1
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 *(June to July)*. **Spray threshold** = four mines per leaf of spotted tentiform leafminer larvae *(August)*.	
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.	

APPLE/PEAR SPRAY SCHEDULE—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
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.	21
	Beleaf 50 SG	2-2.8 fl oz	Apply Admire Pro by chemigation into the root zone.	21
	Diazinon AG 600 (**R**)	12.75 fl oz/100 gal	DO NOT apply Admire Pro pre-bloom or during bloom when bees are foraging.	21
	Movento 2 SC	6-9 fl oz		7
European Red Mite Twospotted Spider Mite	Same as **PETAL FALL** or Vydate L (**R**)		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	Assail 30SC	4.2-6.7 fl oz	DO NOT make more than two applications of Assail per season and use a 14-day interval spray.	7
Green June Beetle	Assail 30SG	5-8 oz	DO NOT exceed 5.3 oz Assail per season.	7
	Danitol 2.4 EC (**R**)	16-21.3 fl oz		14
	Imidan 70 WP	2.1-5.3 lb		7
	Mustang Maxx 0.8 EC (**R**)	1.28-4 fl oz	May only be used if the requirements of 205.206(e) are met, which require the use of preventive,	14
	Azera	2-3.5 pt	mechanical, physical, and other pest, weed, and disease management practices.	0
	Proaxis 0.5 EC (**R**)	2.5-5.1 fl oz		21
	Surround WP (OMRI)	25-50 lb		0
	Sevin XLR (4 EC)	1.5-3.0 qt	DO NOT exceed 16 fl oz (0.5 lb ai) Sevin per acre per season.	3
	Warrior II (**R**)	1.28-2.56 fl oz	DO NOT use on Comice Pears and other known sensitive pear varieties.	21
	Neemix 4.5 (OMRI*)	4-16 fl oz		0
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	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.	
	S-methoprene + hydramethylnon (Extinguish Plus)	3-5 Tbsp/mound 1.0-1.5 lb/acre	Mound-to-mound treatment rate. Broadcast rate. This product is an IGR plus a toxicant.	

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

Conventional Agriculture Suppliers	Address/Online URL	Phone and Fax
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
Gempler'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.iscatech.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
Marbleseed Upper Midwest Organic Resource Directory (list of organic pest control suppliers)	P.O. Box 339, Spring Valley, WI 54767 Online: www.marbleseed.org/about	Ph: 888-906-6737 (toll free)
Organic Resources (Suppliers of Pest Management)	Dr. Kathleen Delate, Depts. of Agronomy/Horticulture, 106 Horticulture Hall Iowa State University, Ames, IA 50011 Online: https://www.agron.iastate.edu/extension/	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: https://www.novasource.com/en/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

BLACKBERRY/RASPBERRY INSECT CONTROL—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
LATE OCTOBER/EARLY NOVEMBER OR LATE MARCH (DORMANT)				
Raspberry Crown Borer	Altacor 35WDG	3-4.5 oz	Apply Brigade, Hero, Altacor, or Trinalor 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. Apply Hero as a soil drench to crown of plant with 200 gallons water per acre. Time the application of Altacor when 1/2 inch of rainfall is forecast or move into plant root zone with 1/2 inch/acre of irrigation water.	3
	Altacor eVo	1.5-2.2 fl oz		3
	Brigade 2 EC (**R**)	6.4 fl oz		3
	Brigade WSB (**R**)	16 oz		3
	Hero (**R**)	10.3 fl oz		3
	Trinalor	3.5-4.5 oz		1
DELAYED DORMANT				
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.	
PREBLOOM				
Strawberry Clipper	Actara 25W (not rated)	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. Treatment is not often necessary.	3
	Aza-Direct (OMRI*)	1-3.5 pt	As a foliar spray or soil drench. See label.	0
	Danitol 2.4 EC (**R**)	10.7 -16 fl oz	Applications of Sevin and pyrethroids can cause mite flare-ups.	3
	Sevin 4F	1-2 qt		7
	Delegate WG	3-6 oz		1
Spider Mites	Acramite 50WS	0.75-1 lb	Minimize road dust to prevent spider mite buildup.	1
	Agri-Mek SC	1.75-3.5 fl oz		7
	Aza-Direct (OMRI*)	3.5 pt		4 hours
	Portal	2 pt		1
	Savey 50DF	4-6 oz		3
	Zeal	2-3 ozt		0
EARLY BLOOM THROUGH BLOOM			**SAVE THE BEES!! DO NOT APPLY INSECTICIDES DURING BLOOM!!**	
POST-BLOOM TO HARVEST				
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
			Days of residual activity:	
Spotted-Wing Drosophila**	Danitol 2.4EC (**R**)	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	1
	Verdepryn	8.2-11 fl oz	5 days	1
	Malathion 8F	2-4 pt	7 days	1
	Mustang Maxx (**R**)	4 fl 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 Arkansas SWD fact sheet: **https://www.uaex.uada.edu/publications/PDF/FSA-7079.pdf.** Begin monitoring for adult spotted-wing drosophila (**SWD**) in green fruit stage. Consider starting the (**SWD**) spray schedule when adults are first caught. Normal spray schedules should start 10 days prior to the first picking regardless of adult (SWD) trap catch. See the fact sheet 'Monitoring Spotted-Wing Drosophila in Arkansas' **https://www.uaex.uada.edu/publications/pdf/FSA7088.pdf** for more information. Fruit monitoring using a salt water drench can be an effective tool for determining whether spotted-wing drosophila (**SWD**) control efforts are effective. See the fact sheet 'Monitoring Spotted-Wing Drosophila in Arkansas' linked above.

BLACKBERRY/RASPBERRY INSECT CONTROL—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
POST-BLOOM TO HARVEST (cont.)				
Stink Bugs	Actara 25W	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
	Azera (OMRI*)	2-3.5 pt		0
	Bifenthrin 2 EC (**R**)	6.4 fl oz		3
	Brigade 2 EC (**R**)	6.4 fl oz		3
	Danitol 2.4 EC (**R**)	10 2/3 oz - 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.	1
	Agri-Mek SC	1.75-3.5 fl oz		7
	Bifenthrin 2 EC (**R**)	6.4 fl oz		3
	Brigade 2 EC (**R**)	6.4 fl oz		3
	Danitol 2.4 EC (**R**)	16 fl oz		3
	Kanemite 15 SC	31 fl oz		1
	Portal	2 pt		1
	Savey DF	4-6 oz	DO NOT make more than 1 application of Savey per year.	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 90ºF.	0
Leafrollers	Deliver (OMRI*)	2 lb	Deliver is a formulation of *Bacillus thuringiensis* var. *kurstaki* (Bt). This is approved for organic production. **Leafrollers are usually NOT a problem in caneberries.**	0
Japanese Beetle Green June Beetle	Assail 30SC	3.8-4.5 fl 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.	1
	Assail 30SG	4.5-5.3 oz		1
	Assail 70WP	1.9-2.3 oz		1
	Danitol 2.4 EC (**R**)	10 2/3-16 fl oz		3
	Sevin 4F	2 qt		7
	Malathion 5EC	1.25-2.5 lb		1
	Malathion 8F EC	1-4 pt		1
	Pyganic 1.4 (OMRI*)	16-64 fl oz		0
	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 for complete insect control.	
Sap Beetles	Assail 30SC Assail 30SG	3.8-4.5 fl oz 4.5-5.3 oz	**Sanitation:** Strawberry sap beetles are best controlled by timely and complete ("clean") picking of over-ripe and damaged berries. Keep berries off the ground.	1 1
			Bait buckets can be used to detect and reduce local population of sap beetles: Fill a small, screened 4 oz specimen cup with over-ripe berries (your culls). Place cup of berries inside a 1 quart deli cup trap that has a lid with several 1/5-inch holes. Then add a beetle drowning mixture of 9 parts apple cider vinegar and 1 part ethanol. These traps may prove useful for intercepting dispersing beetles from woods to plantings of ripening berries, reduce beetle numbers in the harvested berries and aid in timing insecticide application. Empty beetles from bait buckets on a daily basis.	

BLACKBERRY/RASPBERRY INSECT CONTROL—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
POST-BLOOM TO HARVEST (cont.)				
Broad Mites***	Agri-Mek SC (**R**) Magister SC Portal	3.5 fl oz 32-36 fl oz 2 pt	A maximum of two applications of Agri-mek SC, one application of Magister SC, and two applications of Portal are allowable each year. Prioritize Portal during harvest, as it has a 1-day PHI. When populations persist after a single application, rotate to a different product to help prevent resistance. **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.** By late May, begin weekly scouting 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. **Apply miticide only if/when** you detect new terminal leaf damage and leaflet samples average between one to five active broad mites per leaflet.	7 7 1

***Broad Mites:** 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 floricane-fruiting blackberry cultivars. These mite-infested floricane blocks appear to have delayed bud break and low vigor in spring. Broad mites can be found on terminal floricane leaves from April until after mid-summer harvest when floricanes are usually removed.

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.			
	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

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
BUD SWELL				
Scale	Apply dormant oil if scale present			
Climbing Cutworm Bagworms	Sevin XLR	1 1/2-2 qt	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
		FRUIT FEEDING INSECT PESTS OF BLUEBERRY ARE RARE IN ARKANSAS.		
PETAL FALL			Scout berries for signs of worm feeding before using insecticides.	
Cherry Fruitworm	Asana XL (**R**)	4.8-9.6 fl oz	Asana repels bees; do not apply within 7 days of pollination.	14
Cranberry Fruitworm	Assail 30SC	3.8-4.5 fl oz		1
Eastern Tent Caterpillar	Assail 30SG	4.5-5.3 oz	Apply insecticide against **cherry fruitworm** at petal fall and 10 days later.	1
Leafroller (usually not a	Avaunt	3.5-6 oz	Apply insecticide against **cranberry fruitworm** 10 days and 20 days after petal fall.	7
problem)	Confirm 2F	16 fl oz		14
	Danitol 2.4 (**R**)	10 2/3-16 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 (**R**)	4 fl oz		1
	Rimon 0.83EC	20-30 fl oz	Rimon is for cranberry fruitworm control.	8
	Sevin XLR	1.5-2 qt		7
	Success	4-6 fl oz		3
	Entrust 2SC (OMRI*)	4-6 fl oz		1
	Deliver (OMRI*)	2 lb		0
	Verdepryn	8.2-11 fl oz		1
	Altacor	3-4.5 fl oz		1
	Altacor eVo	1.5-2.2 oz		1
	Shenzi 700 WG	1.5-2.2 oz		1
	Trinalor	3.5-4.5 oz		1
FIRST AND SECOND COVER				
Fruitworms			See **PETAL FALL**	
Plum Curculio	Brigade (**R**, WSB)	5.3-16 oz	**In the last couple of years, plum curculio adults and larvae were observed causing damage in**	1
	Danitol (**R**)	10.6-16 oz	**blueberry fruit.**	3
	Imidan 70W	1.3 lb		3
	Malathion 8	1.5-2.5 pt		1
	Surround (OMRI*)	25-50 lb		0
	Altacor	3-4.5 fl oz		1
Bagworms	Deliver (OMRI*)	2 lb	During the first or second week of June, check planting for newly hatched bagworms (very localized near	0
	Entrust (OMRI*)	1.25-2.0 oz	bagworm-infested junipers or other trees) and either remove by hand or spray.	3

BLUEBERRY INSECT CONTROL—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
THIRD AND ADDITIONAL COVERS				
Blueberry Maggot			**Blueberry maggot larvae and adults have not been observed in Arkansas.**	
Flatheaded Apple Tree Borer	Sevin XLR	11/2-2 qt	In late April, set out emerald ash borer purple sticky traps in vertical orientation along the wooded perim-	7
	Imidan 70W	1.3 lb	eter 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.	3
			DO NOT make more than five applications of Imidan per acre per year.	
POST-BLOOM TO HARVEST				
Leafrollers	Deliver (OMRI*)	0.25-1.5 lb	**Leafrollers are usually NOT a problem in blueberries in Arkansas.** Deliver is a formulation of *Bacillus*	0
	Entrust 2SC (OMRI*)	2 fl oz	*thuringiensis* var *kurstaki (Bt)*.	1
Japanese Beetle	Actara 25WB	4 oz	Mid-June to late July, check for foliar feeding by Japanese beetle or fruit feeding by green June beetle.	3
Green June Beetle			Spray weekly as needed with seven-day minimum interval between applications.	
	Assail 30SC	3.8-4.5 fl oz		1
	Assail 30SG	4.5-5.3 oz		1
	Malathion	1-4 pt		3
	Sevin 4F	1-2 qt		7
	Surround WP (OMRI*)	25-50 lb	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.	0
Yellownecked Caterpillars	See **PETAL FALL**		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			
			Days of residual activity:	
Spotted-Wing Drosophila**	Danitol 2.4EC (**R**)	10.6-21.33 fl oz	7 days	3
	Delegate 25WG	3-6 oz	7 days	3
	Exirel	13.5-20.5 fl oz	5 days	3
	Malathion 8EC	1-4 pt	7 days	1
	Mustang Maxx (**R**)	4 fl 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
	Imidan	1.3 lb	7 days	3
	Brigade WSB	16oz	7 days	1
	Verdepryn	8.2-11 fl oz	5 days	1
	Lannate LV	12-24 fl oz	7 days	3
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. Target applications in early Spring and late Fall to suppress populations of fire ants for fruiting season.				
	S-Methoprene	3-5 Tbsp/mound	Mound-to-mound treatment rate.	
	(Extinguish)	1.0-1.5 lb/acre	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 Arkansas SWD fact sheet: **https://www.uaex.uada.edu/publications/PDF/FSA-7079.pdf.** Begin monitoring for adult spotted-wing drosophila (**SWD**) in green fruit stage. Consider starting the (**SWD**) spray schedule when adults are first caught. Normal spray schedules should start 10 days prior to the first picking regardless of adult (SWD) trap catch. See the fact sheet 'Monitoring Spotted-Wing Drosophila in Arkansas' **https://www.uaex.uada.edu/publications/pdf/FSA7088.pdf** for more information. Fruit monitoring using a salt water drench can be an effective tool for determining whether spotted-wing drosophila (**SWD**) control efforts are effective. See the fact sheet 'Monitoring Spotted-Wing Drosophila in Arkansas' linked above.

CHERRY/PEACH/PLUM INSECT CONTROL—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
DELAYED DORMANT				
Mites	Superior oil	6.5 gal	Apply after leaves drop in the fall or before buds swell in the spring.	
San Jose Scale	Superior oil **plus**	6.4 gal		
	Assail 30SG	5.3-8 oz		7
	Esteem 35WP	4-5 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).	14
PINK				
Tarnished Plant Bug	**See PETAL FALL**			
BLOOM			**SAVE THE BEES! DO NOT APPLY INSECTICIDES DURING BLOOM.**	
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 first consistent moth emergence (late March) = **OFM biofix**. 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 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) and record first date in early to mid-April when you consistently capture SJS males on traps = **SJS biofix**. Remove scale trap in May. After specific biofix dates, begin accumulating DD (**base** 51°F for SJS) to predict crawler spray periods (hatch).			
Plum curculio dispersal	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 = **PC biofix**. After PC biofix date, begin accumulating DD to predict dispersal period by **calculating number of daily DD using base 50°F** = DD = (maximum daily temperature + minimum daily temperature) / 2 – 50.			
BY LATE MARCH				
Initiate Plum Curculio and Lesser Peachtree Borer*** Scouting Programs	Tie gray **plum curculio pyramid trap** to each of 3 or 4 perimeter orchard tree trunks adjacent to woods (overwintering site) and check twice weekly for plum curculio adults. Place **2 lesser peachtree borer pheromone traps** 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 (**base** 50°F for CM) to predict spray periods (hatch). **Calculate number of daily degree days (DD) using proper base** = DD = (maximum daily temperature + minimum daily temperature) / 2 – base.			
PETAL FALL				
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 (**R**)	2-2.4 fl oz	Use of pyrethroids (Asana, Baythroid, Mustang Maxx, Pounce, Proaxis, Renounce, Warrior) will kill mite	7
	Besiege (**R**)	6-12 fl oz	predators and cause mite outbreaks.	14
	Imidan 70W	2-4.25 lb	DO NOT use Imidan on sweet cherries. Use Imidan in blocks with scale infestations.	14
	Mustang Maxx (**R**)	1.28-4 fl oz		14
	Sevin XLR	2-3 qt		3
	Warrior (**R**)	1.28-2.56 fl oz		14
Lesser Peachtree Borer***	**REFER TO LATE MARCH AND SECTION ON BORERS.**			

CHERRY/PEACH/PLUM INSECT CONTROL—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
SHUCK SPLIT TO 7-10 DAYS AFTER				
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 eVo	1.5-2.2 oz		10
	Altacor 35 WDG	3-4.5 oz		10
	Asana XL (**R**)	4.8-14.5 fl oz		14
	Assail 30SC	4.5-6.7 fl oz		7
	Assail 30SG	5.3-8 oz		7
	Besiege (**R**)	6-12 fl oz		14
	Delegate 25 WG	6-7 oz	DO NOT use Imidan on sweet cherries. Use Imidan in blocks with scale infestations.	7
	Exirel	10-20.5 fl oz		3
	Imidan 70W	2-4.25 lb		7
	Intrepid 2 F	10-16 fl oz		7
	Rimon EC	20-40 fl oz		8
	Entrust 2SC (OMRI*)	4-8 fl oz	For best results apply 100-150 gal water per acre.	14
	Deliver (OMRI*)	0.5-2 lb		0
	Shenzi 700WG	1.5 -2.2 oz		10
	Trinalor	3-4.5 oz		10
Plum Curculio	Products listed in **PETAL FALL or**		**Plum curculio:** Apply insecticide after shuck split **if greater than 1 plum curculio adult per 4 traps per week** 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 (**R**)	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 30SC	4.5-6.7 fl oz		7
	Assail 30SG	5.3-8 oz		7
	Belay	6 fl oz		21
	Centaur 70W	34.5 oz		14
	Esteem 35 WP	4-5 oz		14
	Movento	6-9 fl oz		7
	Aza-Direct (OMRI*)	1-2 pt		0
BY MAY 1	**REFER TO SECTION ON BORERS.**			
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	**Mite spray thresholds:** 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.	3
	Agri-Mek 0.7 SC	2.25-4.25 fl oz	Apollo is most effective on eggs and newly hatched nymphs. Limit use to one Apollo application per year.	21
	Apollo 4 SC (**R**)	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-10.7oz		7
	Onager 1 EC	12-24 fl oz		7
	Zeal 72WP	2-3 fl oz		7
	Portal	2 pints	Apply using a minimum of 80 gallons of water per acre. Do not make more than 2 applications per year.	7

CHERRY/PEACH/PLUM INSECT CONTROL—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
BY MAY 1	**REFER TO SECTION ON BORERS**			
Oriental Fruit Moth	**SEE SHUCK SPLIT**			
Plum Curculio	**SEE SHUCK SPLIT**		**Plum curculio:** 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 **OFM biofix** 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 **PC biofix** in late March.	
PREHARVEST				
Oriental Fruit Moth	Assail 30SG	5.3-8 oz		7
Japanese Beetle	Admire Pro (foliar)	1.4-2.8 fl oz		7 (0 peach)
(late June to August)	Exirel	10-20.5 fl oz		3
Green June Beetle	Sevin XLR	3phi 2-3 qts	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
(July to August)	Aza-Direct (OMRI*)	1-2p		0
Spotted-Wing	Malathion	2.4 pt		7
Drosophila**	Sevin XLR (not rated)	2-3 qt		7
	Entrust (not rated)	4-8 fl oz		7
	Pyganic 5 EC (OMRI*)	4.5-17 fl oz		0

SPECIAL PROBLEM/PEST OF CHERRY AND MAYBE LATE PEACHES

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***BORERS OF TREES** – 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.

****All Chlorpyrifos products are banned on all food crops as of March 2022.** Trunk drenches or sprays with these products will no longer be a means for control of peachtree borer or lesser peachtree borer. For more information on alternatives see the SE Peach IPM guide https://secure.caes.uga.edu/extension/publications/files/pdf/B%201171_18.PDF

Lesser Peachtree Borer***	Asana XL (**R**)	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).	14
	Mustang Maxx (**R**)	1.28-4 fl oz		14
	Pounce 25 WP (**R**)	6.4-16 oz	Use only Pounce, Ambush or Warrior on plums.	14
	Warrior (**R**)	2.56-5.12 fl oz		14
Peachtree Borer***	Asana XL (**R**)	4.8-14.5 fl oz		14
	Besiege (**R**)	6-12 fl oz		14
	Warrior II (**R**)	1.28-2.5 fl oz		14

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
GRANULATE AMBROSIA BEETLE – The granulate ambrosia beetle *Xylosandrus crassiusculus* (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 (*Ambrosiella* spp.) which is used as their food source. In addition, they can introduce or create entry points for pathogenic fungi such as *Fusarium* 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 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.				
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.				
Non-Bearing Trees	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.	
	S-methoprene + hydramethylnon (Extinguish Plus)	3-5 Tbsp/mound 1.0-1.5 lb/acre	Mound-to-mound treatment rate. Broadcast rate. This product is an IGR plus a toxicant.	

GRAPE INSECT CONTROL—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
DORMANT				
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 **BUD SWELL** about scale oil spray and **PREBLOOM TO BLOOM** for timing grape scale crawler spray.			
BUD SWELL				
Grape Scale	Superior oil (70 sec viscosity)	4 gal	Spray trunk and cordons of scale-infested vines by bud swell.	0
Flea Beetle Climbing Cutworm	Altacor 35 WDG (not rated) Altacor eVo Baythroid XL (**R**) Danitol 2.4EC (**R**) Delegate 25 WG Sevin XLR Shenzi 700WG Success Entrust 2SC (OMRI*) Deliver (OMRI*) Trinalor	3-4.5 oz 1.1-2.2 oz 2.4-3.2 fl oz 5 1/3-10 2/3 fl oz 3-5 oz 1-2 qt 1.0-2.2 oz 4-8 fl oz 4-6 fl oz 0.5-1 lb 2.15-4.5 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. Altacor, Altacor eVo, Shenzi 700WG, and Trinalor will control climbing cutworm.	14 14 3 21 7 7 14 7 3 0 14
BUD BREAK				
Flea Beetle Climbing Cutworm	**See BUD SWELL SPRAY**			
BY APRIL 1				
Initiate grape berry moth scouting program	Place **3 grape berry moth pheromone traps** 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) = **GBM biofix**. Be sure to keep trap bottoms clean and replace lures monthly or every two months for long-life lures. After GBM biofix date, begin **calculating number of daily degree days (DD) using base 47°F** = DD = (maximum daily temperature + minimum daily temperature) / 2 – 47.			
PREBLOOM TO BLOOM				
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.			
Flea Beetle Larvae	**See BUD SWELL**		Check for presence of flea beetle larvae on leaves any time between 4 to 10 inches of shoot growth and bloom.	
Rose Chafer	Assail 30SC Assail 30SG Assail 70 WP Danitol 2.4 EC (**R**) Imidan 70W Sevin XLR	2.1-4.5 fl oz 2.5-5.3 oz 1.1-2.3 oz 10 2/3 -21.3 floz 1 1/2-2 1/8 lb 1-2 qt	Check for rose chafer on clusters during and after bloom.	3 3 3 21 14 7

GRAPE INSECT CONTROL—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
BY MAY 15			Move grape berry moth pheromone traps into the vineyard interior.	
Grape Berry Moth (eggs)	Intrepid 2F **See SHATTER for other formulations**	8-16 fl oz	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, Chardonel, 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 **BUD BREAK**).	30
	Assail 30SC	2.1-4.5 fl oz		3
	Assail 30SG	2.5-5.3 oz		3
	Danitol 2.4EC (**R**)	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 (**R**)	1.75-3.5 fl oz **plus** 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	**Phytotoxicity:** 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	**Phytotoxicity:** M-Pede should not be applied to *Vitis vinifera* or *Calmeria* 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
	Portal	2 pints	Do not make more than 2 applications per year.	14
Leafhopper	**See SHATTER**			
	Assail 30SC	2.1-4.5 fl oz		3
	Assail 30SG	2.5-5.3 oz	DO NOT make more than two applications per season at 14-day interval.	3
SHATTER				
Grape Berry Moth (newly hatched) Leafrollers	Deliver (OMRI*)	2 lb	**Grape berry moth:** Spray if greater than 1% of clusters in perimeter vines are damaged by grape berry moth.	0

GRAPE INSECT CONTROL—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
SHATTER (cont.)				
Rose Chafer Grape Curculio Japanese Beetle Leafrollers Leafhoppers Grape Mealy Bug	Actara WG	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
	Admire Pro	1.0-1.4 fl oz	Admire Pro used as a foliar spray against sucking insects: leafhoppers and grape mealy bugs. **Grape curculio** (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.	0
	Altacor 35 WDG	2-4.5 oz	**Leafhopper:** 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
	Altacor eVo	1.1-2.2 oz		14
	Assail 30SC	2.1-4.5 fl oz		3
	Assail 30SG	2.5-5.3 oz		3
	Assail 70WP	1.1-2.3 oz	Altacor, Altacor eVo, Shenzi 700WG, and Trinalor will control grape berry moth, leafroller species and high rates will control Japanese beetle.	3
	Avaunt DG	5-6 oz		7
	Brigade 2 EC (**R**)	3.2-6.4 oz		30
	Danitol 2.4 EC (**R**)	10.6-21.3 fl oz		21
	Entrust 2SC	4-8 fl oz		3
	Imidan 70W	1 1/3-2 1/8 lb		14
	Intrepid 2F	8-16 fl oz		30
	Sevin XLR	1-2 qt		7
	Sivanto 200 SL	7-10.5 fl oz	Sivanto is applied to foliage. See label for species controlled.	0
	Shenzi 700WG	1.0-2.2 oz		14
	Trinalor	2.15-4.5 oz		14
FIRST COVER TO VERASION				
Grape Berry Moth	**See SHATTER**		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 Leafhopper Grape Mealybug	Assail 30SC	2.1-4.5 fl 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.	3
	Assail 30SG	2.5-5.3 oz		3
	Movento	6-8 fl oz	Use of Induce® adjuvant only with Movento is prohibited once fruit are present due to adverse plant compatibility.	7
	Sevin XLR	1-2 qt		7
VERASION TO HARVEST				
	See SHATTER			
Grape Berry Moth			Spray whole vineyard if greater than 1% of clusters damaged by grape berry moth.	
Japanese Beetle	**See SHATTER**		Continue weekly monitoring for insect pests. Apply insecticides as needed.	
Leafhopper	Danitol 2.4 EC (**R**)	10.67-21.33 fl oz	**Japanese Beetle:** 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 (**R**)	4.0 fl oz		1

GRAPE INSECT CONTROL—COMMERCIAL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
VERASION TO HARVEST				
Grape Berry Moth	Sevin XLR	2 qt		7
Japanese Beetle Leafhopper	Surround WP (OMRI*)	25-50 lbs	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
Multicolored Asian Lady Beetle**	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	1.75-5.25 fl oz (foliar)	NOTE: Regardless of application method, do not apply more than a total of 21.25 fl oz/A of SCORPION 35 SL INSECTICIDE (0.540 lb ai) per acre per season.	1
	Venom 70SG	1-3 oz		1
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			**All Chlorpyrifos containing products are banned for use on all food crops as of March 2022.** Soil drenches or sprays with these products will no longer be a means for control of Grape Root Borer. See the SE grape IPM guide for information about alternatives https://smallfruits.org/files/2021/02/2021-Bunch-Grape-Spray-Guide.pdf.	35
	Cultural Control		**Cultural tactic:** 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 **blackberry and raspberry, blueberry** and **strawberry** 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
PINK TO ½" GREEN					
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			
BLOOM			**SAVE THE BEES!! DO NOT APPLY INSECTICIDES DURING BLOOM.**		
PETAL FALL (90% of petals have fallen)					
Plum Curculio San Jose Scale Codling Moth	Fruit Tree Spray mix: Sevin + Malathion + Captan **or**	4.5-7.5 Tbsp	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.	Apples, Pear, Stone fruits	14 0
	Surround (OMRI**)	0.75-1.5 lb	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.		
Codling Moth (newly hatched larvae on apple or pear)	Virus formulations 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	 1 0 0
Oriental Fruit Moth (newly hatched larvae)	Entrust 2SC (OMRI**) Formulations of *Bt* bacteria Biobit HP (OMRI**) Deliver (OMRI**)	1-1.5 tsp 0.5-1 Tbsp 0.5-2 Tbsp	**Oriental fruit moth and leafrollers:** 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
FIRST COVER (10-14 days after PETAL FALL)					
Plum Curculio Codling Moth	Fruit Tree Spray mix: Sevin + Malathion + Captan **or** 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
SECOND COVER (10-14 days after FIRST COVER)					
Plum Curculio Codling Moth San Jose Scale	Fruit Tree Spray mix: Sevin + Malathion + Captan **or**	 4.5-7.5 Tbsp	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
	M-Pede (OMRI**) **or**	5 Tbsp			0
	JMS Stylet Oil (OMRI**) **or**	7.6 Tbsp			0
	Surround (OMRI**) **or**	0.75-1.5 lb			0
	Japanese Fruit Bags (OMRI**)				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
THIRD COVER (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	**All July,** 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			7
Spotted-Wing Drosophila* **	Greenlight Conquest Conc.	6 oz	**Monitor:** Set up monitoring traps a couple weeks before harvest begins (see online information listed below). **Cultural tactic:** 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.	Blackberry, Blueberry, Cherry, Raspberry, Strawberry	1
	Malathion	9 Tbsp	**Sprays:** 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.		3
	Sevin	9 Tbsp			7
	Pyganic (OMRI)	6-12 Tbsp			0
	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 Arkansas SWD fact sheet: **https://www.uaex.uada.edu/publications/PDF/FSA-7079.pdf.** Begin monitoring for adult spotted-wing drosophila (**SWD**) in green fruit stage. Consider starting the (**SWD**) spray schedule when adults are first caught. Normal spray schedules should start 10 days prior to the first picking regardless of adult (SWD) trap catch. See the fact sheet 'Monitoring Spotted-Wing Drosophila in Arkansas' **https://www.uaex.uada.edu/publications/pdf/FSA7088.pdf** for more information. Fruit monitoring using a salt water drench can be an effective tool for determining whether spotted-wing drosophila (**SWD**) control efforts are effective. See the fact sheet 'Monitoring Spotted-Wing Drosophila in Arkansas' linked above.

Organic Agriculture Suppliers	Address/Online URL	Phone and Fax
Marbleseed (best list of organic suppliers)	P.O. Box 339, Spring Valley, WI 54767 Online: https://www.marbleseed.org/about	Ph: 888-906-6737 (toll free)
Organic Agriculture Resources list	Dr. Kathleen Delate, Depts. of Agronomy/Horticulture, 106 Horticulture Hall Iowa State University, Ames, IA 50011 Online: https://www.agron.iastate.edu/extension/	Ph: 515-294-7069 Fax: 515-294-0730
AgBio, Inc. (flathead apple tree borer trap, insect traps and lures, Pyganic)	9915 Raleigh Street, Westminster, CO 80031 Online: http://www.agbio-inc.com	Ph: 303-469-9221 Fax: 303-469-9598
Ag Resource, Inc. (irrigation and production supplies, soil amendments, pest controls, equipment)	35268 State Highway 34, Detroit Lakes, MN 56501 Online: http://www.agresourceincmn.com/	Ph: 218-847-9351 Ph: 800-288-6650
NovaSource (Surround Crop Protectant)	2255 N. 44th Street, Suite 300, Phoenix, AZ 85008-3279 Online: https://www.novasource.com/en/products/surround	Ph: 800-525-2803
Gardens Alive (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: 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, 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: http://www.groworganic.com	Ph: 888-784-1722 Ph: 530-272-4769
Rincon-Vitova Insectaries, Inc. (distributors of beneficial insects for controlling pests biologically)	P.O. Box 1555, Ventura, CA 93002 Online: www.rinconvitova.com	Ph: 805 643-5407 Ph: 800-248-2847 Fax: 805-643-6287
Seven Springs Farm (Pest Controls: Copper, Bt-Javelin, Neemix, Pyganic, Entrust, M-Pede, Surround Crop Protectant)	426 Jerry Lane NE – Check, VA 24072 Online: http://www.7springsfarm.com	Ph: 540-651-3228 Ph: 800-540-9181
Orchard Valley Supply (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: https://orchardvalleysupply.com/	Ph: 1-888-755-0098 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 https://pecan.agpestmonitor.org/ipmtoolbox/.

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
Obscure Scale	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.	
Phylloxera	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
	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)	1.3-2.6 fl oz		7
	Province II (**R**)	1.28-2.56 oz		14
Pecan Nut Casebearer	Assail 30SC	3.4-6.7 fl 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 **https://pecan.agpestmonitor.org/pecan-nut-casebearer-risk-map/**	14
	Belay SC	3-6 fl oz		21
	Dimilin 2L	8-16 oz		28
	Intrepid 2 F	4-8 oz		7
	Mustang Maxx (**R**)	3.2-4.0 fl oz		7
	Warrior (**R**)	1.28-2.56 fl oz		14
	Entrust (OMRI*)	4-10 fl oz		1
	Belt	3-4 fl oz		14
	Altacor 35 WDG	2-4.5 oz		10
	Altacor eVo	1.1-2.2 oz		10
	Delegate	4.5-7 oz		1
	Confirm 2F	8-16 fl oz		14
	Shenzi 700WG	1.0-2.2 oz		10
	Trinalor	2.15-4.5 oz		10
	Vantacor	1.2-2.5 fl oz		10
Spittle Bug	Trimax Pro	1.3-2.6 fl oz		7
Yellow or Black Pecan Aphids	Assail 30SC	3.4-6.7 fl 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
	Assail 30SG	2.5-9.6 oz		14
	Belay SC	3-6 fl 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	4.4-10.7 oz		7
	Warrior (**R**)	1.28-2.56 fl oz		14
	Closer 2SC	1.5-2.75 fl oz		7
Pecan Weevil	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
	Assail 30SC	4.5-8.1 fl oz		14
	Imidan 70 WP	2-3 1/8 lb		14
	Mustang Maxx (**R**)	3.2-4.0 oz		7
	Sevin	2-5 qts		14
	Warrior (**R**)	2.56-5.12 oz		14
	Brigade (**R**, WSB)	12.8-32 oz		21
	Province (**R**)	2.56-5.12 fl oz		14
	Grizzly Z (**R**)	2.56-5.12 fl oz		14
	Lambda-CY EC (**R**)	2.56-5.12 fl oz		14
	Hero (**R**)	10.3 oz		21

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 https://pecan.agpestmonitor.org/ipmtoolbox/.

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
Stink Bugs	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**)	1.28-2.56 fl oz		14
Leaffooted Bugs	Same as **Stink Bug**			
	Brigade (**R**, 2EC)	3.2-12.8 fl oz		21
	Bifinthrin	3.2-12.8 fl oz		21
	Fanfare (**R**)	3.2-12.8 fl oz		21
	Sniper (**R**)	3.2-12.8 fl oz		21
	Endigo ZC (**R**)	5-6 fl oz		14
	Girzzly Z (**R**)	2.56-5.12 fl oz		14
	Silencer (**R**)	2.56-5.12 fl oz		14
Hickory Shuckworm	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.	7
	Entrust (OMRI*)	1.25-2.5 oz		1
	Confirm 2F	8-16 fl oz		14
	Intrepid Edge	4.0-6.4 fl oz		7
	Assail 30SC	4.5-8.1 fl oz		14
	Altacar	2.0-4.5 fl oz		10
	Altacor eVo	1.1-2.2 oz		10
	Belt	3-4 fl oz		14
	Shenzi 700WG	1.0-2.2 oz		10
	Trinalor	2.15-4.5 oz		10
	Vantacor	1.2-2.5 fl oz		10
Mites	Acramite 50WS	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
	Evidor 2SC	14-18 oz		7
	Portal	2 pt		14
	Zeal	2-3 oz		28
Fall Webworm Walnut Caterpillar	Intrepid 2 F	4-8 oz		7
	Sevin	2-5 qts	Sevin may cause mite problems to increase.	14
	Dipel (OMRI*)	0.5-2.0 lb		0
	Entrust (OMRI*)	4-10 fl oz	Entrust is for fall webworm only.	1
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.				
Non-Bearing Trees	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.	
	S-methoprene + hydramethylnon (Extinguish Plus)	3-5 Tbsp/mound 1.0-1.5 lb/acre	Mound-to-mound treatment rate. This is an IGR and a toxicant. 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
PREBLOOM				
Strawberry Clipper	Brigade WSB (**R**)	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 (**R**)	16-21.3fl oz		2
	Sevin 4F	1-2 qt		7
Tarnished Plant Bug	Admire Pro	1.3 fl oz	Admire Pro as a foliar spray of spittlebug.	7
	Assail 30SG	4-6.9 oz	Do not make more than 2 applications per calendar year.	1
	Rimon 0.83 EC	9-12 fl oz	Apply when adults are observed in the field and just prior to egg hatch. Optimum control will be achieved with the 12 fl. ozs./A rate.	1
	Transform WG	1.5-2.25 oz		1
Spittlebug	Assail 30SG	4-6.9 oz	DO NOT apply Assail more than twice per season.	1
	Beleaf 50 SG	2.8 oz		0
	Brigade WSB (**R**)	6.4-32 oz		0
	Danitol 2.4EC (**R**)	10.67 fl 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	1.5 -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 (**R**)	3.5 fl oz		3
	Danitol 2.4EC (**R**)	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	6 oz		3
	Zeal 72 WSP	2-3 oz		1
	JMS Stylet Oil (OMRI*)	1-2 gal	JMS Stylet-oil is approved for organic production.	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	Agri-Mek 0.7 SC	3.5 fl oz	Suppression only and apply in sufficient water to obtain good coverage onto the crown of the plant.	3
	Portal 0.4 EC	2 pt	Portal is restricted to 2 applications of no more than 4 pints per crop cycle.	1
EARLY BLOOM THROUGH BLOOM			**SAVE THE BEES!! DO NOT APPLY INSECTICIDES DURING BLOOM.**	
POST-BLOOM TO HARVEST				
Aphids	Actara WG	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 *Bacillus thuringiensis* var. *kurstaki* (Bt) formulation.	1
	Entrust 2SC (OMRI*)	4-6 fl oz		1
	Radiant SC	6-10 fl oz		1
	Coragen 1.67 SC	3.5-7.5 fl oz		1

STRAWBERRY INSECT CONTROL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
Spotted-Wing Drosophila**			Days of residual activity:	
	Brigade WSB (**R**)	5.3-16 oz		0
	Danitol 2.4EC (**R**)	16 fl oz	7 days	3
	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	7 days	1
	Pyganic 1.4 (OMRI*)	16-64 fl oz	0-2 days	0
Flower Thrips	Entrust 2SC (OMRI*)	4-6 fl oz		1
	Radiant SC	6-10 fl oz		1
POST-HARVEST				
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	3.5-7.5 fl oz		1
	Platinum	5-12 oz		50
	Sevin 4F	1-2 qt		7
	Shenzi 400SC	1.7-3.8 fl oz	See label for remarks.	1
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.				
	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 Arkansas SWD fact sheet: __https://www.uaex.uada.edu/publications/PDF/FSA-7079.pdf.__ Begin monitoring for adult spotted-wing drosophila (SWD**) in green fruit stage. Consider starting the (**SWD**) spray schedule when adults are first caught. Normal spray schedules should start 10 days prior to the first picking regardless of adult (SWD) trap catch. See the fact sheet 'Monitoring Spotted-Wing Drosophila in Arkansas' __https://www.uaex.uada.edu/publications/pdf/FSA7088.pdf__ for more information. Fruit monitoring using a salt water drench can be an effective tool for determining whether spotted-wing drosophila (**SWD**) control efforts are effective. See the fact sheet 'Monitoring Spotted-Wing Drosophila in Arkansas' linked above.

HEMP INSECT CONTROL

Insect	Material and Formulation	Amount to Use/Acre	Remarks/Precautions	Days to Harvest
Caterpillar Pests	AzaMax 1.2%	42 oz		0
	Chrysogen	1-2.4 oz	Controls cabbage looper and soybean looper only.	0
	Crymax WDG	0.5-2 lbs		0
	Gemstar LC	4-10 oz	Controls corn earworm and tobacco budworm only.	0