

Arkansas Small Fruit Management Schedule

2018



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COVER PHOTOS: Blueberries and grapes – Scott Bauer, USDA Agricultural Research Service, www.forestryimages.org
Strawberries – Gerald Holmes, California Polytechnic State University at San Luis Obispo, www.bugwood.org
Blackberries – Chris Evans, University of Georgia, www.forestryimages.org

Arkansas Small Fruit Management Schedule – 2018

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Information for this publication was taken from the University of Arkansas System Division of Agriculture, Cooperative Extension Service's **MP44, Recommended Chemicals for Weed and Brush Control**; **MP144, Insecticide Recommendations for Arkansas**; and **MP154, Arkansas Plant Disease Control Products Guide** (<http://www.uaex.edu>); and also from the **Midwest Fruit Pest Management Guide** (http://www.ag.purdue.edu/hla/Hort/Pages/sfg_sprayguide.aspx).

Disclaimer

The information in this publication was current as of JANUARY 1, 2018, and applies only to Arkansas. It may not be appropriate for other states or locations.

The listing of any product in this publication does not imply endorsement of that product or discrimination against any other product by the University of Arkansas System Division of Agriculture.

Every effort was made to ensure accuracy, but the user of any crop protection product must read and follow the most current label for any product. For further assistance and information, contact the local Cooperative Extension Service office.

Warning

Many crop protection products may be poisonous, especially in concentrated form. The United States Environmental Protection Agency has established a Poison Control System throughout the United States. Each Center can determine the toxic compounds in commercial products, respond to calls from physicians or individuals and provide supportive or antidotal treatment.

THE POISON CONTROL CENTER FOR ARKANSAS IS:

Arkansas Poison & Drug Information Center
College of Pharmacy, University of Arkansas for Medical Sciences
4301 W. Markham, Mail Slot 522-2
Little Rock, AR 72205

POISON CONTROL HOTLINE – TOLL-FREE PHONE NUMBER

1-800-376-4766

PESTICIDE SPILLS – OFFICE OF EMERGENCY SERVICES

1-800-322-4012

GRAPES – Commercial Growers

See also *Weed Control recommendations at the end of Grapes (Commercial) section.*

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Dormant	November-February February-March	<ul style="list-style-type: none"> Take soil samples. Prune to reduce overwintering inoculum for pests. Flag vines that have live grape scale. Set out new plants. Spray lime sulfur. Determine weed management programs. Look for loose trunk bark, peel back and look for Grape Scale (GS). Flag vines that have live scale. 	<ul style="list-style-type: none"> Eutypa (E) Black Rot (BR) Phomopsis (P) Anthracnose (A) Grape Scale (GS) Powdery Mildew (PM) 	<ul style="list-style-type: none"> (A), (E), (BR), (P), Lime Sulfur (hard to find), Nu-Cop 50DF (PM), Sulforix (GS), See Bud Swell for scale oil spray or Prebloom to Bloom for timing Grape Scale crawler sprays.
Bud Swell – Bud Break	March March-April	<ul style="list-style-type: none"> Apply preemergent herbicides. Fertilize. Check 100 buds on top wire in each of several vineyard locations for damage by Climbing Cutworms (CC) or Grape Flea Beetle (GFB) (historically the same sites year after year). Spray insecticide if there are more than 1% of buds damaged. Repeat as needed. Apply 2% superior oil to flagged Grape Scale (GS)-infested vines to smother overwintered scale. On 1 April, set out three Grape Berry Moth (GBM) pheromone traps on trees in woods adjacent to vineyard (overwintering site for GBM) 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. Begin to accumulate degree-days (DD) above 47°F after first consistent trap catch and spray insecticide to perimeter vines after pea-size at 500-700 DD (see Postbloom). Entrust and Deliver are recommended against Climbing Cutworms (CC) and approved for organic production. 	<ul style="list-style-type: none"> Powdery Mildew (PM), (BR) Grape Flea Beetle (GFB) Climbing Cutworm (CC) Grape Berry Moth (GBM) Grape Scale (GS) 	<ul style="list-style-type: none"> (PM), (BR), Inspire Super, Sulforix, Torino (Do not make more than 2 applications per year. Begin at first sign of disease.) (GFB), (CC), Sevin XLR, Danitol 2.4EC, Delegate, OMRI approved for organic = Deliver, Entrust (GBM), Monitor Pheromone Traps (GS), Superior Oil

GRAPES – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
3- to 6-Inch Shoot Growth		<ul style="list-style-type: none"> • Start disease management program. • Apply herbicides for weed control. • Irrigate if necessary. • Admire Pro and Alias are surface/soil applications that should be followed by 0.15 inch of rain or overhead irrigation. Maximum Admire Pro allowed per season is 14 fl oz. If there is a history of Grape Phylloxera (GP) leaf galling, use Admire Pro as a soil application at this time. Apply when roots become active because these systemic chemicals need several weeks to reach the leaves. 	<ul style="list-style-type: none"> • Black Rot (BR) • Powdery Mildew (PM) • Phomopsis (P) • Angular Leaf Scorch (ALS) • Downy Mildew (DM) • Dead Arm (DA) • Phytophthora Root Rot (PRR) • Pythium (Py) • Mealy Bug (MB) • Leafhopper (LH) • Grape Phylloxera (GP) 	<ul style="list-style-type: none"> • (PM), (BR), Abound 2.08FL, Sovran 50WG, Flint 50WG (not Concord types), Rally 40WSP, Rubigan, Procure 50WS, Tebuzol 45DF, Adament 50WG, Pristine, Quintec, Gavel 75DF, Quadris Top, Revus Top, Inspire Super, Sulforix, Torino (Do not make more than 2 applications per year. Begin at first sign of disease.) • (P), (ALS), (DM), (BR), (DA), Captan 50WP, Mancozeb 75DF, Ziram 76DF, Abound 2.08FL, Sovran 50WG, Flint 50WG (not Concord types), Pristine, Aliette, Scala, Rovral, Gavel 75DF, Reason 500SC (30 day PHI), Quadris Top, Revus (DM only), Revus Top, Presidio (DM only), Inspire Super • (DM), (PM), (PRR), (Py), Fosphite • (DM), (PM), (P), (BR), Topguard • (MB), (LH), (GP), Admire Pro, Alias 2F, Movento, Sivanto 200SL
10- to 12-Inch Shoot Growth		<ul style="list-style-type: none"> • Continue disease management strategy if applicable. • Train new plants. • Irrigate if necessary. • Wrap double sticky tape around Grape Scale (GS)-infested vines. Check tapes for presence of yellow GS crawlers. Apply Lorsban Advanced to vines no later than Prebloom. Only one application allowed per season. This is usually just before scale crawlers become active. 	<ul style="list-style-type: none"> • Black Rot (BR) • Powdery Mildew (PM) • Phomopsis (P) • Downy Mildew (DM) • Dead Arm (DA) • Grape Scale Crawlers (GS) • Phytophthora Root Rot (PRR) • Pythium (Py) 	<ul style="list-style-type: none"> • (BR), (DM), (PM), (P), (DA), Same as for 3- to 6-Inch Shoot Growth • (GS), Lorsban Advanced • (DM), (PM), (PRR), (Py), Fosphite • (DM), (PM), (P), (BR), Topguard

GRAPES – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Immediate Prebloom		<ul style="list-style-type: none"> Continue disease management strategy if applicable. Check clusters for Rose Chafer (RC) feeding during or after bloom. Spray if significant cluster damage noted. 1st generation, check underside of leaves for presence of Grape Leafhopper (LH) nymphs. Treatment threshold is 20 nymphs per leaf. Check Grape Scale (GS)-infested canes for presence of yellow crawlers on double sticky tape wrapped around infested canes. On Grape Phylloxera (GP)-susceptible cultivars (especially Norton, Cayuga White, Chambourcin, Cynthiana/Norton, Reliance, Rougeon, Seibel, Seyval, Vidal), look for galls on 1st to 5th developed leaves, open galls and look for crawlers. Time foliar spray to susceptible cultivars once crawlers appear in May or mid-June. Must have crawlers to justify spray. Check disease management protocol to determine whether protectant application is needed. Irrigate if necessary. 	<ul style="list-style-type: none"> Downy Mildew (DM) Powdery Mildew (PM) Phomopsis (P) Dead Arm (DA) Rose Chafer (RC) Grape Leafhopper (LH) Grape Phylloxera (GP) (leaf form) Grape Scale (GS) Phytophthora Root Rot (PRR) Pythium (Py) Black Rot (BR) 	<ul style="list-style-type: none"> (DM), (PM), (P), (DA), (BR), Same as for 10- to 12-Inch Shoot Growth (RC), (LH), Danitol 2.4EC, Assail 30SG, Imidan 70WP, PyGanic, Sevin XLR, Surround WP (GP), Admire Pro, Danitol 2.4EC, Movento, Assail (GS), Lorsban Advanced (DM), (PM), (PRR), (Py), Fosphite (PM), Torino (Do not make more than 2 applications per year. Begin at first sign of disease.) (DM), (PM), (P), (BR), Topguard EQ
Bloom	May	<ul style="list-style-type: none"> Row-middle management herbicides. Continue disease management strategy if applicable. Train new plants. Irrigate if necessary. Grape Berry Moth (GBM) larvae usually hatch and feed on perimeter grape clusters from mid-May to early June or from 400-500 DD since GBM biofix in April. Begin weekly inspection of 100-200 clusters in perimeter and second row for new berry moth larvae tunneling under berry skin. Spray perimeter vines in May to early June if greater than 1% of clusters damaged by Grape Berry Moth. Intrepid is an insect growth regulator that provides control of GBM if first applied just before initiation of GBM hatch (200-300 DD) and reapplied 10 days later. 	<ul style="list-style-type: none"> Black Rot (BR) Powdery Mildew (PM) Phomopsis (P) Downy Mildew (DM) Botrytis Bunch Rot (BBR) Dead Arm (DA) Grape Scale Crawlers (GS) Grape Berry Moth (GBM) Phytophthora Root Rot (PRR) Pythium (Py) 	<ul style="list-style-type: none"> (DM), (PM), (P), Same as for 10- to 12-Inch Shoot Growth (BBR), (DA), Rovral 50WP, Vanguard 75WG, Elevate 50WG, Topguard EQ, Botran 75W, Pristine, Gavel 75DF (BR), Same as for 3- to 6-Inch Shoot Growth, except for Mancozeb 75DF (66 day PHI) (GS), See Immediate Prebloom (GBM), Intrepid 2F (DM), (PM), (PRR), (Py), Fosphite (PM), Torino (Do not make more than 2 applications per year. Begin at first sign of disease.)

GRAPES – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Postbloom	May-early June	<ul style="list-style-type: none"> • Continue disease management strategy if applicable. • Scout perimeter of vineyards for Grape Rootworm (GR) – usually lower leaves have small holes (rarely cause economic damage) – and for Rose Chafer (RC) feeding on clusters at bloom or shortly after. • Remove leaves around cluster (of tight cluster cultivars) to open up the cluster for aeration and for Botrytis bunch rot (BBR) management. • Irrigate if necessary. • Apply insecticide to Grape Phylloxera (GP)-susceptible cultivars (Cynthiana/Norton, Chambourcin, Cayuga White, Reliance, Rougeon, Seibel, Seyval, Vidal, Vidal Blanc and Vignoles) in May against crawlers when you first see a rash-like appearance on expanding terminal leaves (new leaf galls forming). These GP crawlers mature and produce additional generations of crawlers and more leaf galls in June and July. By August, many leaves die due to 100 or more galls per leaf and defoliate vines. For Admire Pro to be effective against GP, it must be applied to soil around vines in April to move systemically up the trunk into leaves. 	<ul style="list-style-type: none"> • Black Rot (BR) • Powdery Mildew (PM) • Phomopsis (P) • Downy Mildew (DM) • Botrytis Bunch Rot (BBR) • Grape Phylloxera (GP) • Dead Arm (DA) • Grape Rootworm (GR) • Rose Chafer (RC) • Phytophthora Root Rot (PRR) • Pythium (Py) 	<ul style="list-style-type: none"> • (DM), (PM), (P), (BBR), (DA), Same for 10- to 12-Inch Shoot Growth • (BR), Same as for Bloom • (GR), Danitol 2.4EC, Imidan 70W • (GP), Admire Pro, Danitol 2.4EC, Movento, Assail • (RC), See Immediate Prebloom • (DM), (PM), (PRR), (Py), Fosphite • (PM), Torino (Do not make more than 2 applications per year. Begin at first sign of disease.)
Shatter		<ul style="list-style-type: none"> • Continue disease management strategy if applicable. • Leafhoppers (LH): 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. Leafhoppers are usually not a problem in Arkansas. • Grape Curculio (GC): The legless larvae that feed in berries from mid-June into July. 	<ul style="list-style-type: none"> • Rose Chafer (RC) • Grape Curculio (GC) • Leafroller (LR) • Leafhopper (LH) • Grape Mealy Bug (MB) • Grape Rootworm (GR) • Grape Berry Moth larvae (GBM) • Phytophthora Root Rot (PRR) • Pythium (Py) • Powdery Mildew (PM) • Downy Mildew (DM) 	<ul style="list-style-type: none"> • (RC), (GC), (JB), (LR), (LH), (MB), (GR), Actara, Altacor, Assail 30SG, Avaunt, Brigade 2EC, Brigadier, Danitol 2.4EC, Delegate, Imidan 70W, Movento, Sevin XLR, OMRI approved for organic = Deliver, Entrust, Surround WP (reapply to retain whitewash) • (GBM), (LR), Intrepid 2F, OMRI approved for organic = Bt (Deliver, Javelin), Entrust • (DM), (PM), (PRR), (Py), Fosphite • (PM), Torino (Do not make more than 2 applications per year. Begin at first sign of disease.) • (DM), Alude

GRAPES – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Pea-Size Berries <i>(cont.)</i>	Late June	<ul style="list-style-type: none"> Continue disease management strategy if applicable. Remove leaves for Botrytis Bunch Rot (BBR) management. Take leaf petiole sample for micronutrient analysis. Irrigate if necessary. Train new plants. Irrigate if necessary. 	<ul style="list-style-type: none"> Black Rot (BR) – can stop BR control when berries (fruit) change color Powdery Mildew (PM) Downy Mildew (DM) Dead Arm (DA) Botrytis Bunch Rot (BBR) Leafhopper (LH) Grape Berry Moth (GBM) Japanese Beetle (JB) Mites (M) Grape Root Borer (GRB) Green June Beetle (GJB) Phytophthora Root Rot (PRR) Pythium (Py) 	<ul style="list-style-type: none"> (BR), (PM), (DM), (BBR), (LH), (DA), Same as Postbloom (GBM), See Shatter (JB), (GJB), (LH), Sevin XLR, Danitol 2.4EC, Mustang Maxx (M), See 10- to 12-Inch Growth (GRB), Lorsban Advanced (DM), (PM), (PRR), (Py), Fosphite (PM), Torino (Do not make more than 2 applications per year. Begin at first sign of disease. Do not apply within 3 days of harvest.)
Veraison	July-Harvest	<ul style="list-style-type: none"> Continue disease management if applicable. Train new plants. Take leaf petiole sample for micronutrient analysis. Irrigate if necessary. Check for foliar damage by Japanese Beetle (JB). 1 July to harvest (>2200 DD), the 3rd and 4th generations of Grape Berry Moth (GBM) enter berries. Make weekly checks of 300 clusters in perimeter row for larvae and tunneling damage. Spray whole vineyard with insecticide if you see larvae in berries (>1% damage). Grape Leafhopper (LH) – Check underside of leaves for presence of 2nd-generation nymphs. Treatment threshold is 15 to 20 nymphs per leaf. Late June through August, check for Japanese Beetle (JB) feeding on upper canopy. Apply Surround WP to whitewash plants. Reapply if rain diminishes whitewash appearance. Whitewash will significantly reduce foliar and fruit feeding damage by Japanese Beetle (JB). White film is hard to get off early-maturing table grapes, Surround WP is OMRI approved for organic production. Check ripening fruit for Green June Beetle (GJB) feeding. 	<ul style="list-style-type: none"> Black Rot (BR) – can stop BR control when berries (fruit) change color Powdery Mildew (PM) Downy Mildew (DM) Dead Arm (DA) Botrytis Bunch Rot (BBR) Leafhopper (LH) Grape Berry Moth (GBM) Japanese Beetle (JB) Mites (M) Grape Root Borer (GRB) Green June Beetle (GJB) Phytophthora Root Rot (PRR) Pythium (Py) 	<ul style="list-style-type: none"> (BR), (PM), (DM), (BBR), (LH), (DA), Same as Pea-Size Berries (GBM), See Shatter or Pea Size (JB), (GJB), Assail, Actara, Avaunt, Sevin XLR, Danitol 2.4EC, Imidan, Brigade, Brigadier, Mustang Maxx, OMRI approved for organic = Aza-Direct, Neemix (LH), See Shatter (M), See 10- to 12-Inch Growth (GRB), Lorsban Advanced (JB), OMRI approved for organic = Surround WP (reapply to retain whitewash) (DM), (PM), (PRR), (Py), Fosphite

GRAPES – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Postharvest	September- November	<ul style="list-style-type: none"> • Map percent weed cover and species present under and between rows. • Evaluate disease and insect management programs. • Train new plants. • Irrigate if necessary. 		
	December- January	<ul style="list-style-type: none"> • Prune. • Build trellis. • Winterize equipment. 		

GRAPES – Commercial Growers – Weed Control

Crop, Situation and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
GRAPES – Preemergence				
diuron @ 2 lb or 1 lb ai/A	Annual weeds and some perennials.	Karmex DF 2.5 lb/A (1.25 lb/A after second year on sandy soils) Up to 5 lb/A per application but no more than 10 lb/A per year on soils with 2% or more organic matter. Diuron (80% formulations) Follow label. 1.5 to 2 lb/A	Preemergence and early postemergence. Early spring before weeds emerge and fall applications after harvest.	Apply in 4-ft band centered under the trellis to soil free of trash and weeds. Use lower rate on sandy soils. Do not use on one- and two-year-old plantings. May be tank mixed with Surflan. Read about soil limitations on herbicide label.
flumioxazin @ 0.19 to 0.38 lb ai/A	Annual broadleaf and grass weeds.	Chateau 6 to 12 oz/A	Preemergence and early postemergence (use 0.25% v/v surfactant), dormant applications preferred or use shielded sprayer.	Apply as a directed spray to dormant vines or use a shielded sprayer after flowering. Do not apply to vines established less than 2 years unless they are trellised to 3 feet or protected from spray contact by nonporous wraps, grow tubes or waxed containers. Use the 6 oz/A rate on soils with high sand and gravel content. Do not apply within 60 days of harvest. No more than 24 fl oz/A per year to be applied.
pendimethalin @ 3 to 6 lb ai/A	Annual broadleaf and grass weeds.	Prowl H₂O 3.2 to 6.3 qt/A	Preemergence. Apply to weed-free soil from harvest to spring.	Use on bearing and nonbearing plantings. Allow soil to settle around vines before applying to new transplants. Do not apply overtop vines with leaves, buds or fruit. Do not apply within 90 days of harvest. Incorporate with irrigation or rainfall within 7 days. Do not exceed 6.3 quarts/A per year.
oxyfluorfen @ 1.25 to 2 lb ai/A	Annual broadleaf and grass weeds.	Goal 2XL 5 to 8 pt/A	Use only on dormant grapes for preemergence or early postemergence control of certain weeds.	Direct spray to base of plant. Avoid contact with green bark. Do not apply after buds begin to swell or when foliage or fruit is present. Do not apply to grapes established less than 3 years unless vines are on a trellis wire at least 3 ft above the ground. Add 0.25% v/v surfactant for post-emergence control. Use no more than 6 pints/A per year in broadcast applications and no more than 8 pints/A per year in banded applications.
oryzalin @ 2 to 6 lb ai/A	Annual grasses and small-seeded broadleaf weeds.	Surflan AS 2 to 6 qt/A Use low rate for short-term (4 months) weed control and high rate for 6 to 8 months weed control.	Preemergence. Apply to weed-free soil. Mix any weed residues or trash thoroughly into soil before application.	Sprayer must have thorough agitation and avoid spray drift to foliage. See label for further details. Surflan may be tank mixed with Karmex or Princep as recommended individually to broaden spectrum of control. See label for details. Irrigation or rainfall of ½ to 1 inch needed for activation. Sequential applications on 2½-month intervals. Apply no more than 12 quarts/A per year.
norflurazon @ 1 to 4 lb ai/A	Annual grasses and small-seeded broadleaf weeds.	Solicam DF 1.25 to 5 lb/A Use low rate on sandy soils.	Preemergence. Apply to weed-free soil. Fall to early spring within 3 months after bud break.	Use caution on sandy or gravelly soils. Vines must be established for 2 years. Do not use on nursery stock. Application of SOLICAM may result in temporary bleaching or chlorosis of the leaves from which the plant will recover. Whitening will occur if applied 3 months after bud break. Read label for application rates based on soil type. Low rates for coarse-textured soils (sandy). Higher rates for fine-textured soils (clay). Do not exceed the maximum rate per year for the soil type. Do not apply within 60 days of harvest.

GRAPES – Commercial Growers – Weed Control (continued)

Crop, Situation and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
GRAPES – Preemergence (cont.)				
rimsulfuron @ .03 to .06 lb ai/A	Some broadleaves and grasses. Sedge suppression.	Matrix FNV 2 to 4 oz/A	Preemergence. Some postemergence activity (add surfactant). When needed up to 14 days before harvest.	Broadcast a single application of 4 oz/A to the base of the vines or split two banded applications of 2 oz/A each on a 30-day minimum interval. Use on vines established at least one year. Rainfall of ½ inch within 2 weeks of application or irrigation should be provided. Do not apply within 14 days of harvest.
simazine @ 2 to 4 lb ai/A	Annual grasses and broadleaves.	Princep 4L 2 to 4 qt/A	Preemergence. Early spring application recommended.	Apply to soil under trellis between harvest and early spring before weeds emerge. May be tank mixed with Roundup or Gramoxone. Maximum of one application per year. Plants must be established at least 3 years before treatment.
indaziflan @ 0.045 to 0.065 lb ai/A	Annual grasses and broadleaf weeds.	Alion 1.67E 3.5 to 5 fluid oz/A	Preemergence. Apply to weed-free soil.	Applied to a dry soil surface followed by 48 hours without irrigation or rain, and then followed by adequate moisture from rain or an irrigation event within 21 days and prior to weed germination. Vines need to be 5 years old and exhibiting normal growth and good vigor.
sulfentrazone @ 0.25 to 0.375 lb ai/A	Annual and perennial grasses, broadleaves and sedges.	Zeus XC 8 to 12 fluid oz/A	Preemergence. One treatment with max of 12 fl oz/A per year. If banded treatment (50% or less) is used, 2 applications may be applied with max of 12 fl oz/A. Minimum of 60 days between applications. Do not apply after bud break except with a hooded or shielded sprayer.	Use only ground equipment to apply, not air blast sprayer, or by air application, or by mechanically pressurized handgun. Avoid contact with green bark and foliage or severe injury or plant death may occur. Improved weed management, tank mixing Zeus XC with a burndown herbicide like Aim, glyphosate, paraquat or glufosinate but not limited to them. Do not mix with other herbicides containing sulfentrazone. Best results are obtained when soils are moist at application and spray is allowed to dry on weed foliage and rainfall or irrigation of ½ inch occurs within 2 weeks of application. Apply to 3-year or older plants. PHI = 3 days
GRAPES – Postemergence				
clethodim @ 0.09 to 0.125 lb ai/A	Annual and perennial grasses.	Select 2EC 6 to 8 fluid oz/A	Postemergence to grasses.	Use on nonbearing crops only. Do not apply within one year of harvest. Effective for annual bluegrass control. Perennial grasses will require more than one application on 14- to 21-day intervals. Add a nonionic surfactant at 0.25% v/v.
paraquat @ 0.63 to 1.0 lb ai/A paraquat @ 0.325 to 0.675 lb ai/A	Annual weeds and foliage of perennials.	Gramoxone Inteon 2.5 to 4 pt/A Paraquat (43.8% formulations) Follow label. 1.3 to 2.7 pt/A	Postemergence throughout the growing season as required to contain weeds. Use in the spring and fall as a burndown when applying preemergence herbicides.	Directed spray to weed foliage, avoiding green stems and desirable foliage. Make no more than 5 applications per year. Use low rates on small annual weeds and higher rates on large annual and perennial weeds. Use at least 10 gal/A of carrier volume. Use a nonionic surfactant (0.125% v/v) or crop oil concentrate (1% v/v). Treat when sucker growth is no more than 8 inches long.
glufosinate @ 0.8 to 1.5 lb ai/A	Annual and perennial weeds.	Rely 280 2.34 lb ai/gal 48 to 82 fl oz/A	Postemergence as required to contain weeds. Use in the spring and fall as a burndown when applying preemergence herbicides.	Directed spray to weed foliage, avoiding green stem and foliage of grapes. Use low rate on small weeds. Use high rate on large or dense weeds. Avoid drift onto the vines. Shielded applications are recommended. Repeat application is needed to control regrowth. Do not exceed 246 fl oz/A of Rely 280 per year, or no more than 3 applications of 82 fl oz/A. Do not apply within 14 days of harvest.

GRAPES – Commercial Growers – Weed Control (continued)

Crop, Situation and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
GRAPES – Postemergence (cont.)				
sethoxydim @ 0.2 to 0.5 lb ai/A	Annual and perennial grasses including johnsongrass and bermudagrass.	Poast 1 to 2.5 pt/A	Postemergence to grasses. Use low rate on annual grasses up to 6 inches tall; high rate on annual grasses up to 12 inches tall and perennial grasses.	Do not apply within 50 days of harvest. Apply as a directed spray using 5 to 20 gal water/acre and 40 to 60 psi pressure. Ammonium sulfate may be added at 2.5 lbs per acre. Use a nonphytotoxic crop oil concentrate (1 quart/acre). Broadleaf weeds and nutsedge(s) will not be controlled by Poast. Maximum dose is 5 pints/A per year.
glyphosate @ 0.5 to 4.25 lb ai/A	Annual and perennial weeds.	Roundup Ultra and Glyphosate (41% formulations) Follow label. 1 pt to 5 qt/A	Postemergence. Apply to actively growing weeds. Consult label for correct rate depending on weed species.	Direct to base and avoid contact with green bark and foliage or severe injury or plant death may occur. See label for other methods such as wiper, banded and shielded applications. Do not apply within 14 days of harvest. Use no more than 10.6 quarts/A per year.
fluazifop @ 0.19 to 0.38 lb ai/A	Annual and perennial grasses including johnsongrass and bermudagrass.	Fusilade DX 12 to 24 fluid oz/A	Postemergence. Make application to johnsongrass – 12 to 18 inches tall; bermudagrass – 3 inches tall or with 4- to 6-inch runners; annual grasses – 2 to 8 inches tall. Broadleaf weeds and nutsedge(s) will not be controlled by Fusilade.	Do not apply within 50 days of harvest. Apply as a directed spray using 25 gal of carrier volume per acre. Always use a crop oil concentrate (0.5% to 1% v/v) or a nonionic surfactant (0.25% to 0.5% v/v). Apply no more than 72 oz/A per year. Use 14-day intervals for sequential applications.
carfentrazone @ 0.016 to 0.031 lb ai/A	Annual broadleaves.	Aim 2EC 1 to 2 fluid oz/A	Postemergence. Apply any time during the season alone or mix with other herbicides for broader weed control.	Always use a crop oil concentrate (0.5% to 1% v/v) or a nonionic surfactant (0.25% to 0.5% v/v). Apply no more than 2 oz/A per year. Use 14-day intervals for sequential applications. Apply as direct spray or hooded spray treatment. Avoid contact with green bark and foliage or severe injury or plant death may occur. Sucker management: Apply to green suckers and not allow spray to contact desirable fruit, foliage or green tissue.
carfentrazone @ 0.02 to 0.04 lb ai/A sulfentrazone @ 0.19 to 0.37 lb ai/A	Annual and perennial grasses, broadleaves and sedges.	Zeus Prime/XC 7.7 to 15.2 fluid oz/A	Postemergence. Two treatments may be applied but max of 15.2 fl oz/acre per year. Minimum of 60 days between applications. Do not apply after bud break except with a hooded or shielded sprayer.	Use only ground equipment to apply, not air blast sprayer, or by air application, or by mechanically pressurized handgun. Avoid contact with green bark and foliage or severe injury or plant death may occur. Best results are obtained when soils are moist at application and spray is allowed to dry on weed foliage and rainfall or irrigation of ½ inch occurs within 2 weeks of application. Apply to 2-year or older plants. PHI = 3 days

BLUEBERRIES – Commercial Growers

See also Weed Control recommendations at the end of Blueberries (Commercial) section.

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Dormant	January-February	<ul style="list-style-type: none"> Prune to reduce overwintering inoculum for pests listed here, and check for presence of scale. Mulch. Equipment maintenance. Determine weed management programs; apply preemergent. Start disease management. Take soil samples/fertilize. During dormant pruning, clip off Bagworms (BW) on plants and adjacent juniper/cedar trees. Destroy these bags so larvae do not hatch next June and disperse to and defoliate adjacent blueberry plants. 	<ul style="list-style-type: none"> Phomopsis (P) Bacterial Blight (BB) Mummyberry (MB) Stem Canker (SC) Scale (S) Phytophthora Root Rot (PRR) 	<ul style="list-style-type: none"> (P), (MB), (SC), Lime Sulfur, Sulfurix (BB), Bordeaux, copper oxychloride (S), Apply Dormant Oil if scale present. (PRR), Ridomil Gold SL, Phosphorous Acid (Fosphite, for example), Aliette 80WDG, Alude
Bud Swell – Bud Break	Mid-Late March	<ul style="list-style-type: none"> Set out new plants. Start disease management program. Apply prebloom insecticides to control virus vectors. Check 100 buds at top of plants in each of several locations for damage by Climbing Cutworms (CC) (historically the same sites year after year). Spray insecticide if there is more than 2% of buds damaged. Repeat as needed. Monitor for Eastern Tent Caterpillars (ETC) in wild cherry trees adjacent to planting. Remove nest and destroy caterpillars before they disperse to bordering blueberry plants and feed on buds and blooms. Apply herbicides. Irrigate if necessary. Fertilize. 	<ul style="list-style-type: none"> Mummyberry (MB) Phytophthora Root Rot (PRR) Stem Canker (SC) Stem Blight (SB) Alternaria Leaf Spot/Fruit Rot (AL/FR) Phomopsis (P) Powdery Mildew (PM) Climbing Cutworm (CC) Eastern Tent Caterpillar (ETC) Pythium (Py) Fusarium (Fu) Rhizoctonia (Rh) Septoria Leaf Spot (Sep) Valdensinia Leaf Spot (V) Anthracoise (A) Botrytis (B) Botryosphaeria Canker (BC) Rust (R) 	<ul style="list-style-type: none"> (MB), (SC), (SB), (AL/FR), (P), (PM), Captan 50WP, Ziram 76DF, CaptEstate 68WDG, Abound 2.08FL, Cabrio 20EG, Pristine, Indar 75WSP, Switch 62.5WG. Abound, Tilt, Cabrio and Pristine are strobilurin fungicides – do not use more than 4 per season combined and no more than 2 sequential sprays before changing to a different type of fungicide to prevent resistance. (PRR), Ridomil Gold SL, Aliette 80WDG, Alude, Fosphite (CC), (ETC), Asana XL, Assail, Avaunt, Bt (Deliver or Dipel DF), Danitol, Delegate, Entrust, Intrepid, Imidan 70W, Lannate LV, Malathion, Sevin XLR (Py), (Fu), (Rh), (PRR), (PM), Fosphite (MB), (Sep), (AL/FR), (A), (B), (LR), Inspire Super (PM), Torino, Do not make more than 2 applications per year.

BLUEBERRIES – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Bloom – Postbloom	Late April	<ul style="list-style-type: none"> Apply fungicides if needed. Insect management (avoid spraying insecticides during bloom to avoid killing bees). Set out Cherry Fruitworm and Cranberry Fruitworm (FW) pheromone traps and check for moths weekly. Second fertilization late April-early May. Place bee hives when 10% blossoms are open. Cultivate or mow middles. Irrigate as needed. 	<ul style="list-style-type: none"> Secondary Mummyberry Infection (MB) Anthraco nose (A) Botrytis (B) Stem Canker (SC) Stem Blight (SB) Alternaria Leaf Spot/Fruit Rot (AL/FR) Phomopsis (P) Powdery Mildew (PM) Phytophthora Root Rot (PRR) Pythium (Py) Fusarium (Fu) Rhizoctonia (Rh) Septoria Leaf Spot (Sep) Valdensinia Leaf Spot (V) Botryosphaeria Canker (BC) Rust (R) 	<ul style="list-style-type: none"> (MB), (A), (SC), (SB), (AL/FR), (P), (PM), Abound 2.08FL, Cabrio 20EG, Captan 50WP, CaptEvote 65WDG, Pristine 38WG, Tilt, Ziram 76DF (B), CaptEvote 65WDG, Elevate 50WG, Switch 62.5WG (PRR), Ridomil Gold SL, Aliette 80WDG (PC), Brigade, Danitol, Imidan, Malathion, Surround WP (Py), (Fu), (Rh), (PRR), Fosphite (MB), (Sep), (AL/FR), (PM), (A), (LR), (B), Inspire Super (PM), Torino, Do not make more than 2 applications per year. Do not apply within 3 days of harvest. (PRR), Ridomil Gold SL, Aliette 80WDG, Alude, Fosphite
Fruit Development	May	<ul style="list-style-type: none"> Cultivate or mow middles. Irrigate as needed. Check for Plum Curculio (PC) damaged fruit on perimeter plants. Once traps catch Fruitworm moths (FW), check berries weekly for signs of Fruitworm larvae entering fruit. Install bird netting. Apply fungicides if weather is conducive for disease. Fertilize. Submit leaf petiole/tissue for nutritional analysis. Intrepid needs to be applied at first sign of larvae; whereas Asana repels bees, do not apply within 7 days of pollination. 	<ul style="list-style-type: none"> Anthraco nose (A) Botrytis (B) Cherry or Cranberry Fruitworm (FW) Plum Curculio (PC) Pythium (Py) Fusarium (Fu) Rhizoctonia (Rh) Phytophthora Root Rot (PRR) Septoria Leaf Spot (Sep) Valdensinia Leaf Spot (V) Anthraco nose (A) Powdery Mildew (PM) 	<ul style="list-style-type: none"> (A), (B), Same as Postbloom (FW), Asana XL, Assail, Avaunt, Bt (Deliver or Dipel DF), Danitol, Delegate, Entrust, Intrepid, Imidan 70W, Lannate LV, Malathion, Sevin XLR, OMRI = Entrust, Deliver or Dipel (PC), Brigade, Danitol, Imidan, Malathion (Py), (Fu), (Rh), (PRR), (PM), Fosphite (Sep), (V), (AL/FR), (A), (B), Proline (PM), Torino, Do not make more than 2 applications per year. Do not apply within 3 days of harvest. (PRR), Ridomil Gold SL, Alude, Fosphite

BLUEBERRIES – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Ripening to Harvest	Late May for Highbush June for Southern Highbush July for Rabbiteye	<ul style="list-style-type: none"> Harvest. Irrigate. Mow middles. Fertilize. Late June and July, check for Japanese Beetle (JB) and Green June Beetle (GJB) feeding on leaves or fruit. Install bird netting or bird-repelling devices. The first or second week of June, check planting for newly hatched Bagworms (BW) and either remove them by hand or by spray. Spotted Wing Drosophila (SWD) is a new invasive insect pest in Arkansas since 2013. The SWD larvae feed inside and damage ripening soft-skinned fruit, especially blackberry, blueberry, raspberry and strawberry. See the online Spotted Wing Drosophila site at http://www.ipm.msu.edu/swd.htm or the Arkansas SWD fact sheet FSA7079 at http://www.uaex.edu/publications/PDF/FSA-7079.pdf 	<ul style="list-style-type: none"> Anthraco nose (A) Stem Canker (SC) Stem Blight (SB) Spotted Wing Drosophila (SWD) Japanese Beetle (JB) Green June Beetle (GJB) Bagworms (BW) Pythium (Py) Fusarium (Fu) Rhizoctonia (Rh) Phytophthora Root Rot (PRR) Powdery Mildew (PM) 	<ul style="list-style-type: none"> (A), (SC), (SB), Same as Fruit Development (SWD), Danitol 2.4EC, Delegate, Imidan, Malathion, Mustang Maxx, OMRI approved for organic = Entrust, PyGanic (JB), Actara, Admire Pro, Asana, Assail, Danitol 2.4EC, Imidan, Mustang, Mustang Maxx, Neemix, Sevin XLR, OMRI approved for organic = PyGanic, Aza-Direct (BW), OMRI approved for organic = Deliver, Entrust (Py), (Fu), (Rh), (PRR), (PM), Fosphite (PRR), Ridomil Gold SL, Alude, Fosphite
Postharvest	August-October	<ul style="list-style-type: none"> Cultivate to control weeds. Irrigate as needed. Remove bird netting. After harvest, apply Surround WP to whitewash plants. Reapply if rain diminishes whitewash appearance. Whitewash reduces foliar damage by Japanese Beetle (JB). 	<ul style="list-style-type: none"> Stem Canker (SC) Stem Blight (SB) Japanese Beetle (JB) 	<ul style="list-style-type: none"> (SC), (SB), Captan 50WP (JB), OMRI approved for organic = Surround WP
Dormant	September-December	<ul style="list-style-type: none"> Equipment maintenance. Mulch plants. 		

BLUEBERRIES – Commercial Growers – *Weed Control*

Crop, Situation and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
BLUEBERRIES – Preemergence				
simazine @ 2 to 4 lb ai/A	Annual grassy and broadleaf weeds.	Princep 4L 2 to 4 qt/A	Preemergence. Apply in spring before bud break and in fall after harvest.	Split applications of 2 quarts/A in the fall and another 2 quarts/A in the spring are more effective in controlling weeds. On plants established less than 6 months, use ½ of the recommended rate. Do not apply when fruit is present.
terbacil @ 1.6 to 2.4 lb ai/A	Annuals and some perennials.	Sinbar WDG 2 to 3 lb/A	Preemergence. Apply in spring or after harvest in fall.	Apply only to plants established one year or more. Be aware of soil texture and level of soil organic matter content when selecting application rate. Consult the label. Do not use on sandy or gravelly soils or soils with less than 1% organic matter. Avoid contact with crop foliage. Plant back restriction of one year.
oryzalin @ 2 to 6 lb ai/A	Annual grasses and small-seeded broadleaf weeds.	Surflan AS 2 to 6 qt/A	Preemergence. Apply to weed-free soil. Mix any weed residues or trash thoroughly into soil before application.	This treatment may be used on first-year plants. Do not apply Surflan to lowbush blueberries. Irrigation or rainfall of ½ to 1 inch needed for activation. Sequential applications on 2½-month intervals. Apply no more than 12 quarts/A per year.
diuron @ 1.2 to 1.6 lb ai/A	Annual broadleaf and grass weeds.	Karmex DF 1.5 to 2 lb/A Diuron (80% formulations) Follow label. 1.5 to 2 lb/A	Preemergence or early postemergence. Apply in early spring, then again after harvest.	Use only in fields that have been established for one year. Apply as a band treatment at base of the bushes. Add surfactant for improved control of emerged weeds. Use caution on sandy, gravelly soils with low organic matter. Apply 1.5 to 2 lbs per acre in the spring and repeat treatment after harvest in the fall. For each 25 gallons of spray, add surfactant to the spray mixture to improve control of small, emerged weeds.
flumioxazin @ 0.19 to 0.38 lb ai/A	Annual grasses and broadleaves.	Chateau 51WDG 6 to 12 oz/A	Preemergence or early postemergence (with 0.25% v/v surfactant).	Highbush blueberries only. Banded applications. Do not contact foliage with spray. Do not apply to bushes less than two years old. Do not apply after bud break through harvest. Caution should be used with treated soil that may be blown as dust while mowing and settle on desirable plant foliage. Read all cautions. No more than 12 fl oz/A per year.
halosulfuron @ 0.023 to 0.047 lb ai/A	Annual broadleaf and nutsedge.	Sandea 75DG 0.5 to 1 oz/A	Preemergence and postemergence.	Avoid contact with blueberry foliage or temporary chlorosis may result.
sulfentrazone @ 0.25 to 0.375 lb ai/A	Annual and perennial grasses, broadleaves and sedges.	Zeus XC 8 to 12 fluid oz/A	Preemergence. One treatment with max of 12 fl oz/A per year. If banded treatment (50% or less) is used, 2 applications may be applied with max of 12 fl oz/A. Minimum of 60 days between applications. Do not apply after bud break except with a hooded or shielded sprayer.	Use only ground equipment to apply, not air blast sprayer, or by air application, or by mechanically pressurized handgun. Avoid contact with green bark and foliage or severe injury or plant death may occur. Improved weed management, tank mixing Zeus XC with a burndown herbicide like Aim, glyphosate, paraquat or glufosinate but not limited to them. Do not mix with other herbicides containing sulfentrazone. Best results are obtained when soils are moist at application and spray is allowed to dry on weed foliage and rainfall or irrigation of ½ inch occurs within 2 weeks of application. Apply to 3-year or older plants. PHI = 3 days

BLUEBERRIES – Commercial Growers – Weed Control (continued)

Crop, Situation and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
BLUEBERRIES – Preemergence (cont.)				
indaziflam @ 0.045 to 0.09 lb ai/A	Annual grasses and broadleaf weeds. Also controls bermudagrass.	Alion 1.67E 3.5 to 7 fluid oz/A	Preemergence. Apply to weed-free soil, before budbreak.	For highbush blueberry only. For plantings at least one year old. To control bermudagrass, apply when dormant. Can tank mix with other preemergence herbicides to broaden spectrum of control and also with non-selective herbicides for burndown of emerged weeds. Do not apply more than a total of 7 fl oz product/A (0.09 lb ai/A) per year on soils containing <1% organic matter content, or 10 fl oz product/A (0.13 lb ai/A) on soils containing ≥1% organic matter in a 12-month period when used in any highbush blueberry planting.
BLUEBERRIES – Postemergence				
sethoxydim @ 0.2 to 0.5 lb ai/A	Annual and perennial grasses.	Poast 1 to 2.5 pt/A	Postemergence to grasses. Use low rate on annual grasses up to 6 inches tall; high rate on annual grasses up to 12 inches tall and perennial grasses.	Do not apply within 30 days of harvest. Apply as a directed spray using 5 to 20 gal water/acre and 40 to 60 psi pressure. Ammonium sulfate may be added at 2.5 lbs per acre. Use a nonphytotoxic crop oil concentrate (1 qt/acre). Broadleaf weeds and nutsedge(s) will not be controlled by Poast. Maximum dose is 5 pints/A per year.
clethodim @ 0.09 to 0.125 lb ai/A	Annual and perennial grasses.	Select 2EC 6 to 8 fluid oz/A	Postemergence to grasses.	NONBEARING ONLY. Do not apply within 1 year of harvest. Effective for annual bluegrass control. Perennial grasses will require more than one application on 14- to 21-day intervals. Add a nonionic surfactant at 0.25% v/v.
fluazifop @ 0.19 to 0.38 lb ai/A	Annual and perennial grasses including johnsongrass and bermudagrass.	Fusilade DX 12 to 24 fluid oz/A	Postemergence. Make application to johnsongrass – 12 to 18 inches tall; bermudagrass – 3 inches tall or with 4- to 6-inch runners; annual grasses – 2 to 8 inches tall. Broadleaf weeds and nutsedge(s) will not be controlled by Fusilade.	Apply only to crop that will not be harvested for one year. Apply as a directed spray using 25 gal of carrier volume per acre. Always use a crop oil concentrate (0.5% to 1% v/v) or a nonionic surfactant (0.25% to 0.5% v/v). Apply no more than 72 oz/A per year. Use 14-day intervals for sequential applications.
paraquat @ 0.5 to 1 lb ai/A paraquat @ 0.325 to 0.675 lb ai/A	Annual weeds and foliage of perennials.	Gramoxone Inteon 2 to 4 pt/A Paraquat (43.8% formulations) Follow label. 1.3 to 2.7 pt/A	Postemergence throughout the growing season as required to contain weeds. Use in the spring and fall as a burndown when applying preemergence herbicides.	Directed spray to weed foliage, avoiding green stems and desirable foliage. Make no more than 5 applications per year. Use low rates on small annual weeds and higher rates on large annual and perennial weeds. Use at least 50 gal/A of carrier volume. Use a nonionic surfactant (0.125% v/v) or crop oil concentrate (1% v/v).

BLUEBERRIES – Commercial Growers – Weed Control (continued)

Crop, Situation and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
BLUEBERRIES – Postemergence (cont.)				
glyphosate @ 0.5 to 4.25 lb ai/A	Annual and perennial weeds.	Roundup Ultra and Glyphosate (41% formulations) Follow label. 1 pt to 5 qt/A	Postemergence. Apply to actively growing weeds. Consult label for correct rate depending on weed species.	Avoid contact with green bark and foliage or severe injury or plant death may occur. Methods such as wiper and shielded applications are recommended. Do not apply within 14 days of harvest. Use no more than 10.6 quarts/A per year.
carfentrazone @ 0.016 to 0.031 lb ai/A	Annual broadleaves.	Aim 2EC 1 to 2 fluid oz/A	Postemergence. Apply any time during the season alone or mix with other herbicides for broader weed control.	Always use a crop oil concentrate (0.5% to 1% v/v) or a nonionic surfactant (0.25% to 0.5% v/v). Apply no more than 2 oz/A per year. Use 14-day intervals for sequential applications. Apply as direct spray or hooded spray treatment. Avoid contact with green bark and foliage or severe injury or plant death may occur. Sucker management: Apply to green suckers and not allow spray to contact desirable fruit, foliage or green tissue.
carfentrazone @ 0.02 to 0.04 lb ai/A sulfentrazone @ 0.19 to 0.37 lb ai/A	Annual and perennial grasses, broadleaves and sedges.	Zeus Prime/XC 7.7 to 15.2 fluid oz/A	Postemergence. Two treatments may be applied but max of 15.2 fl oz/A per year. Minimum of 60 days between applications. Do not apply after bud break except with a hooded or shielded sprayer.	Use only ground equipment to apply, not air blast sprayer, or by air application, or by mechanically pressurized handgun. Avoid contact with green bark and foliage or severe injury or plant death may occur. Best results are obtained when soils are moist at application and spray is allowed to dry on weed foliage and rainfall or irrigation of ½ inch occurs within 2 weeks of application. Apply to 2-year or older plants. PHI = 3 days
glufosinate @ 0.88 to 1.50 lb ai/A	Annual and perennial weeds.	Rely 280 2.34 lb ai/gal 48 to 82 fl oz	Postemergence. Apply to actively growing weeds.	Avoid contact with green bark and foliage or severe injury or plant death may occur. Methods such as wiper and shielded applications are recommended. Do not apply within 14 days of harvest. Use no more than 164 fl oz/A per year.

STRAWBERRIES – Plasticulture – Commercial Growers

See also Weed Control recommendations at the end of Strawberries (Commercial) section.

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Dormant	January	<ul style="list-style-type: none"> Irrigate if necessary. 		
	February	<ul style="list-style-type: none"> Remove dead leaves before new growth from crowns. Roll back row covers if used. Hook up drip irrigation. 		
Prebloom	March	<ul style="list-style-type: none"> Burn down cover crop. Monitor for disease. Check weekly and treat if you find Spider Mites (M) and Aphids (Ap) on underside of bronzed leaves. At first bloom, check 100 flowers for severed stems from Strawberry Clipper (SC) or tap flowers over a paper plate and look for very small (½ inch long) SC adults with a narrow snout. In perennial strawberry plantings, overwintering Strawberry Rootworm (SRW) adults emerge in early spring and cause shot holes in leaves. If adults present, apply an insecticide to prevent larval damage to strawberry roots. Rootworm is not a problem in annual plantings. Minimize road dust to prevent Spider Mite buildup. 	<ul style="list-style-type: none"> Anthraxnose (A) Powdery Mildew (PM) Botrytis Blossom Blight/ Fruit Rot (BB/FR)* Cyclamen Mite (CM) Aphid (Ap) Strawberry Clipper (SC) Strawberry Rootworm (SRW) Spider Mites (M) Pythium (Py) Fusarium (Fu) Rhizoctonia (Rh) Phytophthora Root Rot (PRR) 	<ul style="list-style-type: none"> (A), (PM), Cabrio 20EG, Pristine, Abound, Tilt, Flint, Inspire Super, Luna Sensation (BB/FR), (PM), Fontelis, Topguard, Luna Sensation (SC), Sevin, Brigade WSB, Danitol 2.4EC, Lorsban 4E (CM), Portal (Ap), (SC), (TPB), Malathion, Sevin, OMRI approved for organic = PyGanic, Safer Insecticidal Soap (SRW), OMRI approved for organic = PyGanic (M), Agri-Mek 0.15EC, Abba 0.15EC, Acramite 50WS, Kanemite 15SC, Nealta 1.67SC, Oberon 2SC, Portal, OMRI approved for organic = JMS Stylet Oil (Py), (Fu), (Rh), (PRR), (PM), Fosphite (PM), Torino, Do not make more than 2 applications per year. Begin at first sign of disease. Do not apply within 3 days of harvest. (PRR), Alude, Fosphite, Ridomil Gold SL, Aliette WDG
Bloom	Late March-April	<ul style="list-style-type: none"> Fertilize with first nitrogen injection. Put overhead irrigation in place in case of low temperatures. Submit leaf/petiole tissue for nutrient analysis every 1-2 weeks. Monitor for disease. 	<ul style="list-style-type: none"> Botrytis Blossom Blight/ Fruit Rot (BB/FR)* Leaf Spot (LS) Scorch (Sch) Blight (BL) Leather Rot (LR) 	<ul style="list-style-type: none"> (BB/FR), (LS), (Sch), (BL), Captan 50WP, Switch 62.5WG, Scala, Rovral, Tilt, Flint, Luna Sensation (BB/FR), Thiram 65WP, Elevate 50WG, Fontelis, Inspire Super, Topguard (LR), Aliette 50WDG, Ridomil Gold EC
(continued)	(continued)	(continued)	(continued)	(continued)

STRAWBERRIES – Plasticulture – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Bloom <i>(cont.)</i>	Late March-April <i>(cont.)</i>	<i>(cont.)</i> <ul style="list-style-type: none"> Insect management (avoid spraying insecticides during bloom to avoid killing bees). Check weekly for Tarnished Plant Bug (TPB) adults and nymphs feeding on the developing fruit during and after bloom. Feeding causes small, seedy strawberries that fail to mature (button berries). Sample for Thrips (T) when first blossom begins to open. Threshold is 2-10 thrips per blossom. Not reported to cause yield loss. 	<i>(cont.)</i> <ul style="list-style-type: none"> Tarnished Plant Bug (TPB) Mites (M) Thrips (T) Pythium (Py) Fusarium (Fu) Rhizoctonia (Rh) Phytophthora Root Rot (PRR) Powdery Mildew (PM) 	<i>(cont.)</i> <ul style="list-style-type: none"> (TPB), (S), Athena, Sevin XLR, Assail 30SG, Brigade, Danitol 2.4EC, Beleaf 50SG, Rimon (M), See Prebloom (T), Assail, Sivanto 200SL, Radiant, OMRI approved for organic = Entrust (Py), (Fu), (Rh), (PRR), (PM), Fosphite (PM), Torino, Do not make more than 2 applications per year. Begin at first sign of disease. Do not apply within 3 days of harvest. (PRR), Alude, Fosphite, Ridomil Gold SL, Aliette WDG
Harvest begins	April	<ul style="list-style-type: none"> Irrigate as needed. Scout for insects, mite and foliar diseases. Submit leaf/petiole tissue for nutrient analysis every 1-2 weeks. Spotted Wing Drosophila (SWD) is a new invasive insect pest that has been detected in ripening and ripe 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 online Spotted Wing Drosophila site at http://www.ipm.msu.edu/swd.htm or the Arkansas SWD fact sheet FSA7079 at http://www.uaex.edu/publications/PDF/FSA-7079.pdf 	<ul style="list-style-type: none"> Botrytis Fruit Rot (BFR)* Spotted Wing Drosophila (SWD) Pythium (Py) Fusarium (Fu) Rhizoctonia (Rh) Phytophthora Root Rot (PRR) 	<ul style="list-style-type: none"> (BFR), Elevate 50WG, Topsin M 70WSB, Inspire Super, Topguard EQ, Luna Sensation (SWD), Danitol 2.4EC, Malathion, OMRI approved for organic = Entrust, PyGanic (Py), (Fu), (Rh), (PRR), (PM), Fosphite
Harvest	May	<ul style="list-style-type: none"> Harvest. Irrigate as needed. Sap Beetles (SapB) attack ripe, damaged and overripe fruit. Before fruit ripen, place outside the planting a bait bucket filled with fermenting plant juices (stale beer, molasses-water-yeast mixture, vinegar or any overripe fruit). This fermenting solution attracts and traps SapB alerting grower to presence of SapB. Keep planting free of damaged and overripe fruit. If strawberry rows were in grass before planting, there may be White Grub (WG) larvae in soil that will feed on strawberry roots and kill plants. 	<ul style="list-style-type: none"> Sap Beetles (SapB) White Grubs (WG) 	<ul style="list-style-type: none"> (SapB), Bait Buckets (WG), Admire Pro

(continued)

STRAWBERRIES – Plasticulture – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Harvest <i>(cont.)</i>	June	<ul style="list-style-type: none"> Destroy plants when harvest ends (Roundup). Incorporate lime when existing beds are broken down. Begin soil preparations for rotation crop such as cucurbits or pumpkins. 		
	July	<ul style="list-style-type: none"> Begin soil preparations for strawberries at different site. Take soil samples for incorporating fertilizer. 		
	August	<ul style="list-style-type: none"> Have fumigants delivered. 		<ul style="list-style-type: none"> Fumigation is now pretty much a commercial option only (have to hire it done) due to EPA regulations.
	September	<ul style="list-style-type: none"> Fertilize with N-P-K. Prepare raised beds. Fumigate. Lay irrigation drip lines. Lay plastic. Overseed with cover crop such as wheat. Transplant new plants (depends on latitude). 		
	October	<ul style="list-style-type: none"> Transplant new plants. Monitor for disease. Irrigate. Check underside of bronzed leaves for Spider Mites (M) and Aphids (Ap). 	<ul style="list-style-type: none"> Leaf Spot (LS) Scorch (Sch) Blight (BL) Leather Rot (LR) Red Stele (RS) Spider Mites (M) Aphid (Ap) Pythium (Py) Fusarium (Fu) Rhizoctonia (Rh) Phytophthora Root Rot (PRR) 	<ul style="list-style-type: none"> (LS), (Sch), (BL), Captan 50WP, Thiram 65WP, Topsin M 70WSB, Luna Sensation, Inspire Super (LR), (RS), Ridomil Gold SL, Alette (M), (Ap), See Prebloom (Py), (Fu), (Rh), (PRR), (PM), Fosphite (PRR), Alude, Fosphite, Ridomil Gold SL, Alette WDG
	Late November-December	<ul style="list-style-type: none"> Lay row covering if used. Irrigate. Remove runners as needed starting 6 weeks after transplanting to create 8-inch diameter plants by mid-December. 		

*Botrytis gray mold has a high potential to develop resistance, and recent data suggest a high percentage of strains are resistant to several important fungicides. To help combat resistant strains from developing: (1) Limit the number of times fungicides of the same class are applied in one year. (2) Tank-mix a broad-spectrum fungicide such as captan or Thiram with Topsin-M (a benzimidazole fungicide) as Topsin-M does not have Botrytis activity due to resistance, but is helpful for several early season foliar diseases if present. (3) Resistance profiles vary from farm to farm and fungicides may have to be varied.

STRAWBERRIES – Commercial Growers – Weed Control

Crop, Situation and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
STRAWBERRIES – Plasticulture – Preemergence				
napropamide @ 4 lb ai/A	Annual grasses and small-seeded broadleaf weeds.	Devrinol 50DF 8 lb/A	Preemergence. Apply to weed-free soil.	Apply as a banded preemergence treatment to the middles between plastic before weed emergence. Tank mixture with paraquat will provide control of emerged weeds. Rainfall or irrigation within 24 hours after application is needed for optimum control. Do not apply from bloom through harvest. Do not exceed 8 lb/A per crop cycle.
oxyfluorfen @ 0.25 to 0.5 lb ai/A	Annual broadleaf weeds including Carolina geranium and cutleaf evening primrose and a few annual grasses.	Goal 2XL 1 to 2 pt/A	Preemergence fallow bed application, at least 30 days before transplanting.	Apply to the surface of preformed beds at least 30 days before transplanting to control many broadleaf weeds that may emerge in the hole made for the crop. Incorporation is not needed but may reduce crop injury. Applying plastic immediately after the herbicide application will result in better weed control.
flumioxazin @ 0.1 lb ai/A	Annual broadleaves and grasses.	Chateau 51WDG 3 oz/A	Preemergence and early postemergence (with 0.25% v/v surfactant).	Apply as banded application to rows a minimum of 30 days before laying plastic and transplanting. One banded application may be made to middles using shielded sprayers after transplanting but before fruit set. Do not contact strawberry foliage. Apply no more than 3 fl oz/A per year.
acifluorfen @ 0.375 lb ai/A	Annual grasses and broadleaves.	Ultra Blazer Up to 1.5 pt/A	Preemergence.	Apply as banded application to rows before laying plastic. One banded application may be made to middles using shielded sprayers after transplanting. Do not contact strawberry foliage.
DCPA @ 6 to 9 lb ai/A	Annual grasses and some small-seeded broadleaves.	Dacthal 75W 8 to 12 lb/A	Preemergence, at least 30 days before transplanting.	Apply to middles as a banded treatment between plastic before weed emergence.
clopyralid @ 0.125 to 0.25 lb ai/A	Broadleaf weeds, especially clovers, vetch, curly dock, horsenettle.	Stinger 3SL 0.3 to 0.67 pt/A	Postemergence, over the top.	Section 24C label. Apply in the spring to 30 days before harvest. Do not exceed two applications per year or ½ pt/A. Do not use surfactant. May cause crop injury under certain conditions.

STRAWBERRIES – Commercial Growers – Weed Control (continued)

Crop, Situation and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
STRAWBERRIES – Plasticulture – Postemergence				
clethodim @ 0.09 to 0.125 lb ai/A	Annual and perennial grasses.	Select 2EC 6 to 8 fluid oz/A	Postemergence to grasses.	Do not apply within 4 days of harvest. Do not apply more than 8 oz per acre per application. Effective for annual bluegrass control. Add a crop oil concentrate at 1% v/v. Make repeat applications on a minimum 14-day interval.
paraquat @ 0.5 lb ai/A paraquat @ 0.325 to 0.675 lb ai/A	Annual weeds and foliage of perennials.	Gramoxone Inteon 2 pt/A Paraquat (43.8% formulations) Follow label. 1.3 pt/A	Postemergence.	Apply as a banded treatment using shields to the middles between plastic to kill emerged weeds. Add a nonionic surfactant at a rate of 16 to 32 oz/100 gal or 1 gal approved crop oil concentrate per 100 gal spray solution. Do not apply within 21 days of harvest. Use 20 gallons of spray volume per acre. Make no more than three applications per year. Do not graze livestock in treated area.
glyphosate @ 0.5 to 4.25 lb ai/A	Annual and perennial weeds.	Roundup Ultra and Glyphosate (41% formulations) Follow label. 1 pt to 5 qt/A	Postemergence. Apply to actively growing weeds. Consult label for correct rate depending on weed species.	Use as a hooded or shielded spray in row middles. Wiper applications may be made over the top to tall weeds. To avoid severe injury or plant death, do not let the spray contact any part of the strawberry plant. Do not apply within 14 days of harvest. Use no more than 5.3 quarts/A per year.
sethoxydim @ 0.2 to 0.5 lb ai/A	Annual and perennial grasses.	Poast 1 to 2.5 pt/A	Postemergence to grasses. Use low rate on annual grasses up to 6 inches tall; high rate on annual grasses up to 12 inches tall and perennial grasses.	Do not apply within 7 days of harvest. Apply as a band to row middles or directed spray using 5 to 20 gal water/acre and 40 to 60 psi pressure. Ammonium sulfate may be added at 2.5 lbs per acre. Use a nonphytotoxic crop oil concentrate (1 qt/acre). Broadleaf weeds and nutsedge(s) will not be controlled by Poast. Maximum dose is 2.5 pints/A per year.

BLACKBERRIES / RASPBERRIES – Commercial Growers

Notes about Primocane Blackberries:

Plants in the genus *Rubus*, which includes blackberries and red raspberries, have a perennial root system with biennial canes. Primocanes, or first-season canes, are usually vegetative. Floricanes, or second-season canes, are the same canes that then become reproductive and produce fruit the following season. **Primocane-fruiting types are capable of fruiting on both primocanes and floricanes.** Plant growth can be manipulated by growers to achieve long-term increases in production of quality fruit. Pruning and trellising affect plant growth rate, fruit quantity and size, soluble solids (sugars), disease susceptibility, ease of harvest, and spraying efficiency. Most growers sacrifice the early summer second-year crop in favor of a smaller but higher quality late summer/early fall primocane crop.

The smaller yield of a single late summer primocane crop is offset by the ease of management. To prune primocane-fruiting blackberries for a single late season crop, the canes need only be cut to the ground in early spring. New canes will grow each year and fruit in late summer, the canes will be cut early the following spring, and the cycle continues. It is important to cut old canes as close to the ground as possible so that buds will break from below the soil surface. Fruiting laterals may form and become entry sites for insects and disease pathogens if canes are not cut low enough. All canes that are cut from the planting should be removed from the area and destroyed. Moreover, the primocane crop can be delayed by mowing the young primocanes a second time when they are approximately 1 foot tall (late April?). Pinching the primocanes (removing the growing tip) in July to stimulate growth of laterals will also delay fruiting. This is sometimes done to delay harvest until after the intense heat of July.

See also Weed Control recommendations at the end of Blackberries/Raspberries (Commercial) section.

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Dormant	January-February	<ul style="list-style-type: none"> • Soil sample. • Prune to reduce overwintering inoculum for pests listed here. • If less than 5% of canes have Rednecked Cane Borer (RNCB) galls, cut those galled canes off at the ground and burn galls. If more than 5% galled canes, apply spray after dark during adult emergence in May (see petal fall). • Contact herbicides. 	<ul style="list-style-type: none"> • Cane and Leaf Rust (R) • Anthracnose (A) • Rednecked Cane Borer (RNCB) 	<ul style="list-style-type: none"> • (R), (A), Lime Sulfur (hard to find), Sulfurix, Drexel Captan 50WP, Pristine • (RNCB), Prune out galls if less than 5% of canes have RNCB-produced galls.
Bud Swell – Bud Break	March	<ul style="list-style-type: none"> • No Crown Gall control registered for blackberries in Arkansas. Plant new plants. • Start disease management at green tip when ¼-inch green tissue has developed. • Preemergent weed/grass control. • Fertilize 2 weeks after planting (20-30 lb actual nitrogen per acre). • By late March (or late October and early November), apply insecticide as a soil drench directed at the crown of plants to control overwintering Raspberry Cane Borer (RCB) larvae under bark at the base of canes. 	<ul style="list-style-type: none"> • Anthracnose (A) • Cane and Leaf Rust (R) • Raspberry Crown Borer (RCB) • Pythium (Py) • Fusarium (Fu) • Rhizoctonia (Rh) • Phytophthora Root Rot (PRR) • Downy Mildew (DM) • Powdery Mildew (PM) 	<ul style="list-style-type: none"> • (A), (R), Bordeaux, copper-based products, Drexel Captan 50WP, Pristine, Tilt • (RCB), Brigade, Altacor applied in 50 to 100 gal solution to base of canes • (Py), (Fu), (Rh), (PRR), (PM), (DM), Fosphite

BLACKBERRIES / RASPBERRIES – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
6-Inch Shoot Growth before blooms open		<ul style="list-style-type: none"> • Continue disease management. • Remove and destroy any plants showing Orange Rust (OR). • Irrigate if necessary. • Mow or cultivate middles. • Check twice weekly 100 flowers in several sites for severed stems from feeding Strawberry Clipper (SC) or tap flowers over a paper plate and look for very small SC weevil adults with a narrow snout. • Look for Tarnished Plant Bugs (TPB) in flowers. Not proven that Thrips cause damage. 	<ul style="list-style-type: none"> • Orange Rust (OR) • Leaf and Cane Rust (R) • Powdery Mildew (PM) • Anthracnose (A) • Septoria Leaf Spot (SLS) • Phytophthora Root Rot (PRR) • Pythium (Py) • Fusarium (Fu) • Rhizoctonia (Rh) • Downy Mildew (DM) • Tarnished Plant Bug (TPB) • Strawberry Clipper (SC) 	<ul style="list-style-type: none"> • (OR), (R), (PM), (A), (SLS), Rally 40WSP, Cabrio EG, Pristine WG, Rovral 50WP, Drexel Captan 50W, Cabrio 20EG, Pristine, Elevate 50WG, Switch 62.5WG, Tilt, Inspire Super • (PRR), Ridomil Gold SL, Aliette WDG, Fosphite • (Py), (Fu), (Rh), (PRR), (PM), (DM), Fosphite • (TPB), (SC), Actara, Assail, Malathion, Sevin XLR, OMRI approved for organic = Aza-Direct
Prebloom when flower buds show white		<ul style="list-style-type: none"> • At first bloom, check twice weekly 100 flowers in several sites for severed stems from feeding Strawberry Clipper (SC) or tap flowers over a paper plate and look for very small Strawberry Clipper (SC) weevils with a narrow snout. Also look for Gall Midges (BGM) (rare) and Tarnished Plant Bugs (TPB) in flowers. Not proven that Thrips cause damage. • Mow or cultivate middles. • Continue disease management. • Irrigate if necessary. 	<ul style="list-style-type: none"> • Anthracnose (A) • Cane Blight (CB) • Leaf Spot (LS) • Cane and Leaf Rust (R) • Orange Rust (OR) • Yellow Rust (YR) • Blackberry Gall Midge (BGM) • Tarnished Plant Bug (TPB) • Strawberry Clipper (SC) • Pythium (Py) • Fusarium (Fu) • Rhizoctonia (Rh) • Phytophthora Root Rot (PRR) • Downy Mildew (DM) • Powdery Mildew (PM) • Leaf Roller (LR) 	<ul style="list-style-type: none"> • (A), (CB), (LS), (R), (OR), (YR), Same as for 6-Inch Shoots • (Py), (Fu), (Rh), (PRR), (PM), (DM), Fosphite • (BGM), (TPB), (SC), Actara, Assail, Malathion, Sevin XLR, OMRI approved for organic = Aza-Direct • (LR), Asana XL, Brigade, Bt, Confirm 2F, Danitol 2.4EC, Delegate 25WG, Intrepid 2F, Mustang Maxx, Sevin, OMRI approved for organic = Aza-Direct, Neemix, Entrust, PyGanic, Surround WP

BLACKBERRIES / RASPBERRIES – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Early Bloom (5%-10%)	Late March-April	<ul style="list-style-type: none"> • Continue disease management. • Irrigate if necessary. • Mow or cultivate middles. 	<ul style="list-style-type: none"> • Cane and Leaf Rust (R) • Orange Rust (OR) • Yellow Rust (YR) • Botrytis Gray Mold (B) • Rosette (Double Blossom) (DB) • Anthracnose (A) • Spur Blight (SpB) • Pythium (Py) • Fusarium (Fu) • Rhizoctonia (Rh) • Phytophthora Root Rot (PRR) • Downy Mildew (DM) • Powdery Mildew (PM) 	<ul style="list-style-type: none"> • (R), (OR), (YR), (A), Same as Prebloom • (B), (SpB), Rovral WDG, Rovral 4L, Elevate 50WDG, Switch 62.5WG, Drexel Captan 50WP, Cabrio 20EG, Abound • (DB), Abound FL, Pristine WG, Switch 62.5WG, Bordeaux • (Py), (Fu), (Rh), (PRR), (PM), (DM), Fosphite
Full Bloom	April	<ul style="list-style-type: none"> • Continue disease management. • Irrigate if necessary. • Mow or cultivate middles. 	<ul style="list-style-type: none"> • Powdery Mildew (PM) 	<ul style="list-style-type: none"> • (PM), Same as 6-Inch Shoot

BLACKBERRIES / RASPBERRIES – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Petal Fall		<ul style="list-style-type: none"> • Continue disease management. • From late April to harvest, Stink Bugs (SB) begin feeding on fruit as well as Tarnished Plant Bugs (TPB) and Rednecked Cane Borer (RNCB) will lay eggs until early June. • Irrigate if necessary. • Mow or cultivate middles. • If more than 5% galled canes, apply spray after dusk to lower 18 inches of cane (no spray on flowers to conserve pollinators) during RNCB adult emergence in May to kill adults and larvae during hatch. – New Pest – • Broad Mite (BM): 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 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, immature white 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. 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 adults. 	<ul style="list-style-type: none"> • Cane and Leaf Rust (R) • Orange Rust (OR) • Yellow Rust (YR) • Botrytis Gray Mold (B) • Rosette (Double Blossom) (DB) • Anthracnose (A) • Powdery Mildew (PM) • Spur Blight (SpB) • Tarnished Plant Bug (TPB) • Rednecked Cane Borer (RNCB) • Stink Bug (SB) • Pythium (Py) • Fusarium (Fu) • Rhizoctonia (Rh) • Phytophthora Root Rot (PRR) • Downy Mildew (DM) • Broad Mites (BM) 	<ul style="list-style-type: none"> • (R), (OR), (YR), (B), (DB), (A), (PM), (SpB), Same as Prebloom and Bloom • (SB), Actara, Brigade, Danitol, Sevin XLR • (RNCB), Admire Pro, Aza-Direct, Couraze, OMRI approved for organic = Aza-Direct • (TPB), see Prebloom • (Py), (Fu), (Rh), (PRR), (PM), (DM), Fosphite • (BM), AgriMek® SC rate of 3-5 fl oz/A. AgriMek® SC must be mixed with a nonionic surfactant activator type wetting, spreading and/or penetrating spray adjuvant at 0.1-0.5% v/v.

BLACKBERRIES / RASPBERRIES – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Preharvest		<ul style="list-style-type: none"> • Continue disease management. • Sap Beetles (SapB) attack ripe, damaged and overripe fruit. Before fruit ripen, place outside the planting a bait bucket filled with fermenting plant juices (stale beer, molasses-water-yeast mixture, vinegar or any overripe fruit). This fermenting solution attracts and traps SapB alerting grower to presence of SapB. Keep planting free of damaged and overripe fruit. • Check for Stink Bugs (SB) and Sap Beetles (SapB) on fruit. • Check underside of bronzed lower leaves for Spider Mites (M). • Irrigate if necessary. • Mow or cultivate middles. 	<ul style="list-style-type: none"> • Cane and Leaf Rust (R) • Orange Rust (OR) • Yellow Rust (YR) • Botrytis Gray Mold (B) • Rosette (Double Blossom) (DB) • Anthracnose (A) • Powdery Mildew (PM) • Sap Beetle (SapB) • Stink Bug (SB) • Spider Mites (M) • Pythium (Py) • Fusarium (Fu) • Rhizoctonia (Rh) • Phytophthora Root Rot (PRR) • Downy Mildew (DM) 	<ul style="list-style-type: none"> • (R), (OR), (YR), (B), (DB), (A), (PM), Same as Petal Fall • (SapB), Assail, Bifenthrin, Danitol, Rimon, OMRI approved for organic = to repel with Azatin, Neemix or attract and kill with bait buckets • (M), Savey 50DF, Bifenthrin 2EC, Brigade 2EC, Fanfare, Kanemite 15SC, Savey, Acramite, JMS Stylet Oil, M-Pede, Zeal, OMRI approved for organic = Aza-Direct • (SB), Admire Pro, OMRI approved for organic = Aza-Direct, PyGanic 1.4EC • (Py), (Fu), (Rh), (PRR), (PM), (DM), Fosphite
Fruit Ripening and Harvest	May-early July	<ul style="list-style-type: none"> • Continue disease management. • Irrigate if necessary. • Mow or cultivate middles. • From 1 to last July, watch for Green June Beetles (GJB) attacking berries. • Spotted Wing Drosophila (SWD) larvae feed inside and damage ripening soft-skinned fruit, especially blackberry, blueberry, raspberry and strawberry. See the online Spotted Wing Drosophila site at http://www.ipm.msu.edu/swd.htm or the Arkansas SWD fact sheet FSA7079 at http://www.uaex.edu/publications/PDF/FSA-7079.pdf 	<ul style="list-style-type: none"> • Cane and Leaf Rust (R) • Orange Rust (OR) • Yellow Rust (YR) • Botrytis Gray Mold (B) • Rosette (Double Blossom) (DB) • Anthracnose (A) • Powdery Mildew (PM) • Cane Blight (CB) • Spur Blight (SpB) • Japanese Beetle (JB) • Green June Beetle (GJB) • Spotted Wing Drosophila (SWD) • Pythium (Py) • Fusarium (Fu) • Rhizoctonia (Rh) • Phytophthora Root Rot (PRR) • Downy Mildew (DM) 	<ul style="list-style-type: none"> • (R), (OR), (YR), (B), (DB), (A), (PM), (CB), (SpB), Same as Preharvest • (JB), Sevin XLR • (SWD), Asana, Brigade, Danitol 2.4EC, Delegate, Malathion, Mustang Maxx, OMRI approved for organic = Entrust, PyGanic • (Py), (Fu), (Rh), (PRR), (PM), (DM), Fosphite

BLACKBERRIES / RASPBERRIES – Commercial Growers (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Commercial
Postharvest	August-September	<ul style="list-style-type: none"> Continue disease management. Irrigate if necessary. Mow or cultivate middles. Build trellis if used. After harvest, you can use Surround WP (kaolin particle film) to whitewash foliage to prevent foliar damage by Japanese Beetles (JB). 	<ul style="list-style-type: none"> Leaf Spot (LS) Orange Cane Blotch (OCB) Japanese Beetle (JB) Pythium (Py) Fusarium (Fu) Rhizoctonia (Rh) Phytophthora Root Rot (PRR) Downy Mildew (DM) 	<ul style="list-style-type: none"> (LS), Drexel Captan 50W, Cabrio EG (OCB), Copper-based products (JB), Sevin XLR, OMRI approved for organic = Surround WP (Py), (Fu), (Rh), (PRR), (PM), (DM), Fosphite
	October-December	<ul style="list-style-type: none"> Prune out second-year canes and weak or diseased one-year canes. During mid-summer, check for dying canes, prune off at ground and look for tunnel in base where there may be a white Raspberry Crown Borer (RCB) larva. If RCB-infested canes are found, then in late October to early November direct a soil drench of insecticide at the base of each blackberry plant. Most of RCB larvae hatch by late October and overwinter under bark at base of blackberry cane just below the soil surface. Equipment maintenance. Winterize irrigation equipment. Take soil sample for nematode screen. 	<ul style="list-style-type: none"> Raspberry Crown Borer (RCB) 	<ul style="list-style-type: none"> (RCB), Brigade, Altacor

BLACKBERRIES / RASPBERRIES – Commercial Growers – Weed Control

Crop, Situation and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
BLACKBERRIES – Preemergence				
simazine @ 1 to 2 lb ai/A @ 2 to 4 lb ai/A	Annual grass and broadleaf weeds.	Princep 4L 1 to 2 qt/A 2 to 4 qt/A	Preemergence. Apply in spring before bud break and in fall after harvest.	Use the low range for new plantings (<6 months); the higher range for established plants. Split application, half in the fall and half in the spring. Do not apply when fruits are present.
terbacil @ 0.8 to 1.6 lb ai/A	Annuals and some perennials.	Sinbar 80WDG 1 to 2 lb/A	Preemergence. Apply in spring or after harvest in fall.	Apply only to plants established one year or more. Be aware of soil texture and level of soil organic matter content when selecting application rate. Consult the label. Do not use on sandy or gravelly soils or soils with less than 1% organic matter. Avoid contact with crop foliage. Do not apply within 70 days of harvest.
oryzalin @ 2 to 6 lb ai/A	Annual grasses and small-seeded broadleaf weeds.	Surflan AS 2 to 6 qt/A	Preemergence. Apply to weed-free soil. Mix any weed residues or trash thoroughly into soil before application.	This treatment may be used on first-year plants. Irrigation or rainfall of ½ to 1 inch needed for activation. Sequential applications on 2½-month intervals. Apply no more than 12 quarts/A per year.
diuron @ 1.2 to 1.6 lb ai/A	Annual broadleaf and grass weeds.	Karmex 80DF 1.5 to 2 lb/A Diuron (80% formulations) Follow label. 1.5 to 2 lb/A	Preemergence or early postemergence. Apply in early spring, then again after harvest.	Use only on plants established for one year. Apply as a band at the base of canes. Add a surfactant for improved control of emerged weeds. Use low rate on sandy, gravelly soils with low organic matter. May cause injury.
napropamide @ 4 lb ai/A	Annual grasses and small-seeded broadleaf weeds	Devrinol 50DF 8 lb/A	Preemergence. Apply to a weed-free surface or tank mix with a postemergence herbicide.	Can be used on new plantings after soil has settled around transplants. Must be incorporated with irrigation or rainfall within 24 hrs. Do not exceed 8 lb/A per year.
dichlobenil @ 2 to 4 lb ai/A or @ 4 to 6 lb ai/A	Annual grasses and broadleaf weeds	Casoron CS 1.4 to 2.8 gal/A Casoron 4G 100 lb/A	Preemergence. Early winter and no later than mid-February.	Apply to established plants (>1 year). Shallow incorporation or irrigation of ½ to 1 inch recommended. Apply to bearing or non-bearing plants.

BLACKBERRIES / RASPBERRIES – Commercial Growers – Weed Control (continued)

Crop, Situation and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
BLACKBERRIES – Preemergence (cont.)				
isoxaben @ 0.5 to 1 lb ai/A	Annual broadleaf weeds.	Gallery 75DF 0.66 to 1.33 lb/A	Preemergence. Sequential application throughout the year.	Non-bearing plants only. Apply to blackberry that will not be harvested for one year. Make sequential applications no sooner than 60 days apart and no more than 4 lb/A per year.
isoxaben + trifluralin @ 2.5 to 5 lb/A	Annual grasses and broadleaf weeds.	Snapshot 2.5TG 100 to 200 lb/A	Preemergence. Sequential application throughout the year.	Apply to crops that will not be harvested for one year. Irrigation or rainfall of ½ to 1 inch needed within 3 days of application. Make applications no sooner than 60 days apart. No more than 600 lb/A per year.
mesotrione @ 0.1 to 0.2 lb/A	Annual broadleaf weeds.	Callisto 3 to 6 fl oz/A	Preemergence. Before blooming.	Established plants only. Callisto has some postemergence activity. Add 1% v/v crop oil concentrate to improve efficacy on emerged weeds. No more than 2 applications at 2 fl oz, 14 days apart per season. May cause bleaching.
norflurazon @ 2 to 4 lb/A	Annual grasses, small-seeded broadleaves and some seedling perennials.	Solicam 80DF 2.5 to 5 lb/A	Preemergence, when plants are dormant.	Use on established plants (>18 months). Limit to one application per year. Do not apply within 60 days of harvest. Use higher rates on higher clay soil. May cause some bleaching or yellowing.
sulfentrazone @ 0.25 to 0.375 lb ai/A	Annual and perennial grasses, broadleaves and sedges.	Zeus XC 4 lb ai/gal 8 to 12 fluid oz/A	Preemergence. One treatment with max of 12 fl oz/A per year. If banded treatment (50% or less) is used, 2 applications may be made with max of 12 fl oz/A. Minimum of 60 days between applications. Do not apply after bud break except with a hooded or shielded sprayer.	Apply to established plants 3 years or older. Avoid contact with green bark and foliage or severe injury may occur. For improved weed control, tank mix with a burndown herbicide like Aim, glyphosate, or paraquat, or other foliar herbicide. Do not mix with other herbicides containing sulfentrazone. Best results are obtained when soils are moist at application and spray is allowed to dry on weed foliage and rainfall or irrigation of ½ inch occurs within 2 weeks of application. PHI = 3 days
indaziflam @ 0.045 to 0.09 lb ai/A	Annual grasses and broadleaf weeds. Also controls bermudagrass.	Alion 1.67E 3.5 to 7 fluid oz/A	Preemergence. Apply to weed-free soil before budbreak in the spring, or when dormant in late fall.	For plantings at least 1-year old. To control bermudagrass, apply when bermuda is dormant. Can tank mix with other preemergence herbicides to broaden spectrum of control and also with non-selective herbicides for burndown of emerged weeds. Do not apply more than a total of 7 fl oz product/A (0.09 lb ai/A) per year on soils containing <1% organic matter content.

BLACKBERRIES / RASPBERRIES – Commercial Growers – Weed Control (continued)

Crop, Situation and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
BLACKBERRIES – Postemergence				
sethoxydim @ 0.2 to 0.5 lb ai/A	Annual and perennial grasses.	Poast 1.5EC 1 to 2.5 pt/A	Postemergence to grasses. Use low rate on annual grasses up to 6 inches tall; high rate on annual grasses up to 12 inches tall and perennial grasses.	Do not apply within 45 days of harvest. Apply as a directed spray using 15 to 20 gal water/acre and 40 to 60 psi pressure. Use a nonphytotoxic crop oil concentrate (1 qt/acre). Broadleaf weeds and nutsedge(s) will not be controlled by Poast. Maximum dose is 5 pints/A per year.
clethodim @ 0.09 to 0.25 lb ai/A	Annual and perennial grasses.	Select 2EC 6 to 16 fluid oz/A	Postemergence to grasses.	NONBEARING ONLY. Do not apply within 1 year of harvest. Effective for annual bluegrass control. Perennial grasses will require more than one application on 14- to 21-day intervals. Add a nonionic surfactant at 0.25% v/v.
fluazifop @ 0.19 to 0.38 lb ai/A	Annual and perennial grasses including johnson-grass and bermudagrass.	Fusilade DX 2EC 12 to 24 fluid oz/A	Postemergence. Apply to johnsongrass – 12 to 18 inches tall; bermudagrass – 3 inches tall or with 4- to 6-inch runners; annual grasses – 2 to 8 inches tall.	NONBEARING ONLY. Do not apply within one year of harvest. Apply as a directed spray using 25 gal of water per acre. Use a crop oil concentrate (0.5% to 1% v/v) or a nonionic surfactant (0.25% to 0.5% v/v). Apply no more than 72 oz/A per year. Use 14-day intervals for sequential applications.
paraquat @ 0.5 to 1 lb ai/A paraquat @ 0.325 to 0.675 lb ai/A	Annual weeds and foliage of perennials.	Gramoxone Inteon 2 to 4 pt/A Paraquat (43.8% formulations) Follow label. 1.3 to 2.7 pt/A	Postemergence throughout the growing season as required to contain weeds. Use in the spring and fall as a burndown when applying preemergence herbicides.	Directed spray to weed foliage, avoiding green stems and desirable foliage. Make no more than 5 applications per year. Use low rates on small annual weeds and higher rates on large annual and perennial weeds. Use at least 20 gal/A of carrier volume. Use a nonionic surfactant (0.125% v/v) or crop oil concentrate (1% v/v).
glyphosate @ 1 to 2 lb ai/A	Annual and perennial weeds.	Roundup Ultra and Glyphosate (41% formulations) Follow label.	Postemergence. Apply to actively growing weeds. Consult label for correct rate depending on weed species.	Avoid contact with green bark and foliage or severe injury or plant death may occur. Shielded applications are recommended. Do not apply within 14 days of harvest. Do not exceed 10.6 quarts/A per year.
carfentrazone @ 0.016 to 0.031 lb ai/A	Annual broadleaves.	Aim 2EC 1 to 2 fluid oz/A	Postemergence. Apply any time during the season alone or mix with other herbicides for broader weed control.	Always use a crop oil concentrate (0.5% to 1% v/v) or a nonionic surfactant (0.25% to 0.5% v/v). Apply no more than 2 oz/A per year. Use 14-day intervals for sequential applications. Apply as direct spray or hooded spray treatment. Avoid contact with green bark and foliage or severe injury or plant death may occur. Do not apply within 15 days of harvest. Primocane management: Apply to primocanes about 6 inches tall.

BLACKBERRIES / RASPBERRIES – Commercial Growers – Weed Control (continued)

Crop, Situation and Active Chemical Per Broadcast Acre	Weeds Controlled	Formulated Material Per Broadcast Acre	Time of Application	Method of Application and Precautions
BLACKBERRIES – Postemergence (cont.)				
carfentrazone @ 0.02 to 0.04 lb ai/A sulfentrazone @ 0.19 to 0.37 lb ai/A	Annual and perennial grasses, broadleaves and sedges.	Zeus Prime/XC 7.7 to 15.2 fluid oz/A	Postemergence. Do not apply after bud break except with a hooded or shielded sprayer.	Apply to established plants (3 years). Avoid contact with green bark and foliage or severe injury or plant death may occur. Best results are obtained when soils are moist at application and spray is allowed to dry on weed foliage and rainfall or irrigation of ½ inch occurs within 2 weeks of application. Two applications may be made, at 60-day intervals, but not to exceed 15.2 fl oz/A per year. PHI = 3 days
halosulfuron @ 0.04 to 0.06 lb ai/A	Sedge and broadleaf control; should be mixed with other herbicides to enhance grass activity.	Sandea 75DF 0.75 to 1.3 oz/A	Postemergence when nutsedge has 3 to 4 leaves. Has some residual activity.	Apply to established plants (>1 year). Do not apply more than 2 oz/A per year, and sequential applications should not be made more than 45 days apart. Can be tank mixed with paraquat or glyphosate, or other compatible postemergence herbicide.

GRAPES – Homeowners

See also Weed Control recommendations in Home Fruit Weed Control section.

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Homeowners
Dormant	November-February February-March	<ul style="list-style-type: none"> Take soil samples. Prune to reduce overwintering inoculum for pests. Set out new plants. Spray lime sulfur. 	<ul style="list-style-type: none"> Stem Canker (SC) Fruit Rot (FR) Leaf Spot (LS) Powdery Mildew (PM) 	<ul style="list-style-type: none"> (SC), (FR), (LS), Lime Sulfur (hard to find) (PM), Sulfurix
Bud Swell – Bud Break	March March-April	<ul style="list-style-type: none"> Apply preemergent herbicides. Fertilize. Check 100 buds on top of wire in each of several vineyard locations for damage by Climbing Cutworms (CC) or Grape Flea Beetle (GFB) (historically the same sites year after year). Spray insecticide if there are more than 2% of buds damaged. Repeat as needed. Apply 2% superior oil to infested vines to control Grape Scale (GS). 	<ul style="list-style-type: none"> Grape Flea Beetle (GFB) Climbing Cutworm (CC) Grape Scale (GS) 	<ul style="list-style-type: none"> (GFB), (CC), (GS), Sevin, Superior Oil, Pyrethrins, OMRI approved for organic = Safer Insecticidal Soap, PyGanic, M-Pede (CC), Dipel Dust, Thuricide
3- to 6-Inch Shoot Growth		<ul style="list-style-type: none"> Start disease management program. Irrigate if necessary. 	<ul style="list-style-type: none"> Stem Canker (SC) Fruit Rot (FR) Leaf Spot (LS) Powdery Mildew (PM) Downy Mildew (DM) 	<ul style="list-style-type: none"> (SC), (FR), (LS), (PM), High-Yield Captan 50W, Hi-Yield Copper Fungicide, Monterey Liqui-Cop, Bonide Copper Liquid, Bonide Concentrated Fruit Tree Spray, Bonide Tomato and Vegetable 3 in 1, Immunox Multipurpose Fungicide for Gardens Spray Concentrate (DM), Bonide Mancozeb Flowable with Zinc Concentrate (Do not apply once fruit sets or within 66 days of harvest.)
10- to 12-Inch Shoot Growth		<ul style="list-style-type: none"> Continue previously started disease management strategies. Train new plants. Irrigate if necessary. 	<ul style="list-style-type: none"> Stem Canker (SC) Fruit Rot (FR) Leaf Spot (LS) Powdery Mildew (PM) 	<ul style="list-style-type: none"> (SC), (FR), (LS), (PM), (DM), Same for 3- to 6-Inch Shoot Growth
Immediate Prebloom		<ul style="list-style-type: none"> Continue disease management/insect control. Irrigate if necessary. Check vines for presence of Rose Chafer (RC), Grape Scale (GS) crawlers or Grape Flea Beetle (GFB). 	<ul style="list-style-type: none"> Powdery Mildew (PM) Stem Canker (SC) Leaf Spot (LS) Rose Chafer (RC) Grape Scale (GS) Grape Flea Beetle (GFB) 	<ul style="list-style-type: none"> (SC), (PM), (LS), (DM), Same as for 10- to 12-Inch Shoot Growth. (RC), (GS), (GFB), Sevin, Pyrethrins, Safer Insecticidal Soap

GRAPES – Homeowners (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Homeowners
Bloom	May	<ul style="list-style-type: none"> Continue previously started disease management strategies. Train new plants. Irrigate if necessary. 	<ul style="list-style-type: none"> Stem Canker (SC) Fruit Rot (FR) Leaf Spot (LS) Powdery Mildew (PM) 	<ul style="list-style-type: none"> (SC), (PM), (FR), (LS), Same as for 10- to 12-Inch Shoot Growth
Postbloom	May-June	<ul style="list-style-type: none"> Continue disease management/insect control. Irrigate if necessary. Check underside of white-stippled leaves for presence of Leafhoppers (LH), or leaves for leaf rolling by Leafrollers (LR) or clusters in perimeter for feeding by light brown-colored Rose Chafer (RC) adults. 	<ul style="list-style-type: none"> Stem Canker (SC) Fruit Rot (FR) Leaf Spot (LS) Powdery Mildew (PM) Leafhopper (LH) Leafroller (LR) Rose Chafer (RC) 	<ul style="list-style-type: none"> (SC), (PM), (LS), (FR), Same as for 10- to 12-Inch Shoot Growth (LH), (LR), (RC), Sevin, Pyrethrins
Pea-Size Berries	June	<ul style="list-style-type: none"> Comb vines. Train new plants. Monitor Grape Berry Moth (GBM) tunneling in berries (purplish discolor of skin). Continue disease management. Irrigate if necessary. 	<ul style="list-style-type: none"> Stem Canker (SC) Fruit Rot (FR) Leaf Spot (LS) Powdery Mildew (PM) Grape Berry Moth (GBM) 	<ul style="list-style-type: none"> (SC), (PM), (FR), (LS), Same as for Postbloom (GBM), Sevin, Pyrethrins
	July	<ul style="list-style-type: none"> Continue disease and insect management, if applicable. Train new plants. Irrigate if necessary. Late June into July, check leaves or clusters for Japanese Beetle (JB) or clusters for Grape Berry Moth (GBM) and Green June Beetles (GJB). After harvest, apply Surround WP to whitewash plants. Reapply if rain diminishes whitewash appearance. Whitewash reduces foliar and fruit feeding damage by Japanese Beetle (JB). 	<ul style="list-style-type: none"> Stem Canker (SC) Fruit Rot (FR) Leaf Spot (LS) Powdery Mildew (PM) Leafhopper (LH) Japanese Beetle (JB) Green June Beetle (GJB) Grape Berry Moth (GBM) 	<ul style="list-style-type: none"> (SC), (PM), (LS), (FR), (LH), Same as Pea-Size Berries (JB), (GJB), Sevin, OMRI approved for organic = Surround WP (GBM), Sevin, Pyrethrins, OMRI approved for organic = Deliver, Dipel, PyGanic
Harvest	July-August	<ul style="list-style-type: none"> Train new plants. Irrigate if necessary. 		
	September-November			
	December-January	<ul style="list-style-type: none"> Prune. Build trellis. Winterize equipment. 		

BLUEBERRIES – Homeowners

See also Weed Control recommendations in Home Fruit Weed Control section.

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Homeowners
Dormant	January-February	<ul style="list-style-type: none"> Prune to reduce overwintering inoculum or numbers for disease or pests listed here. Mulch. Start disease management. Take soil samples/fertilize. 	<ul style="list-style-type: none"> Bacterial Blight (BB) Mummyberry (MB) Stem Canker (SC) Scale (S) 	<ul style="list-style-type: none"> (MB), (SC), Lime Sulfur, Sulforix (BB), Bordeaux (S), Dormant Oil
Bud Swell – Bud Break	Mid-late March	<ul style="list-style-type: none"> Set out new plants. Start disease management program and check for damaged buds from Climbing Cutworms (CC). Irrigate if necessary. Fertilize. 	<ul style="list-style-type: none"> Mummyberry (MB) Stem Canker (SC) Stem Blight (SB) Climbing Cutworm (CC) 	<ul style="list-style-type: none"> (MB), (SC), (SB), Captan 50WP, Tomato and Vegetable 3 in 1 (MB), Monterey Fruit Tree, Vegetable and Ornamental Fungicide (Do not apply after bloom as phototoxicity to fruit may occur.) (CC), Sevin, Malathion, OMRI approved for organic = Deliver, Dipel, PyGanic
Bloom – Postbloom	Late April	<ul style="list-style-type: none"> Apply fungicides if needed. Insect management (avoid spraying insecticides during bloom to avoid killing bees). Second fertilization late April-early May. Place bee hives when 10% blossoms are open. Cultivate or mow middles. Irrigate as needed. Best to hand remove Eastern Tent Caterpillars (ETC) and silk nests from crotch of adjacent wild cherry and plum trees to prevent caterpillar movement to and feeding on blueberries. 	<ul style="list-style-type: none"> Secondary Mummyberry Infection (MB) Fruit Rot (FR) Stem Canker (SC) Stem Blight (SB) Leaf Spot (LS) 	<ul style="list-style-type: none"> (MB), (SC), (SB), (FR), (LS), Captan 50WP
Fruit Development	May	<ul style="list-style-type: none"> Cultivate or mow middles. Irrigate as needed. Once traps catch Fruitworm moths (FW), check berries weekly for signs of Fruitworm larvae entering fruit (holes or brown frass). Install bird netting. Apply fungicides if weather is conducive for disease. Fertilize. Submit leaf petiole/tissue for nutritional analysis. 	<ul style="list-style-type: none"> Leaf Spot (LS) Fruit Rot (FR) Fruitworm (FW) 	<ul style="list-style-type: none"> (LS), (FR), Same as Postbloom (FW), Sevin, Malathion, OMRI approved for organic = Deliver, Dipel, PyGanic

BLUEBERRIES – Homeowners (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Homeowners
Fruit Ripening to Harvest	Late May for Highbush June for Southern Highbush July for Rabbiteye	<ul style="list-style-type: none"> Harvest. Irrigate. Mow middles. Fertilize. Late June and July, check for Japanese Beetle (JB) and Green June Beetle (GJB) feeding on leaves or fruit. Spotted Wing Drosophila (SWD) is a new invasive insect pest in Arkansas since 2013. The SWD larvae feed inside and damage ripening soft-skinned fruit, especially blackberry, blueberry, raspberry and strawberry. See the online Spotted Wing Drosophila site at http://www.ipm.msu.edu/swd.htm or the Arkansas SWD fact sheet FSA7079 at http://www.uaex.edu/publications/PDF/FSA-7079.pdf 	<ul style="list-style-type: none"> Leaf Spot (LS) Stem Canker (SC) Stem Blight (SB) Japanese Beetle (JB) Green June Beetle (GJB) Spotted Wing Drosophila (SWD) 	<ul style="list-style-type: none"> (LS), (SC), (SB), Same as Fruit Development (JB), (GJB), Malathion, Sevin (JB), OMRI approved for organic = Surround WP (SWD), Danitol 2.4EC, Delegate, Malathion, Mustang Maxx, OMRI approved for organic = Entrust, PyGanic
Postharvest	August-October	<ul style="list-style-type: none"> Cultivate to control weeds. Irrigate as needed. Remove bird netting. After harvest, apply Surround WP to whitewash plants. Reapply if rain diminishes whitewash appearance. Whitewash reduces foliar feeding damage by Japanese Beetle (JB). 	<ul style="list-style-type: none"> Stem Canker (SC) Stem Blight (SB) Japanese Beetle (JB) 	<ul style="list-style-type: none"> (SC), (SB), Captan (JB), OMRI approved for organic = Surround WP
Dormant	September-December	<ul style="list-style-type: none"> Equipment maintenance. Mulch plants. 		

STRAWBERRIES – Homeowners

See also Weed Control recommendations in Home Fruit Weed Control section.

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Homeowners
Dormant	January	<ul style="list-style-type: none"> Take soil samples. 		
	February	<ul style="list-style-type: none"> Work up bed/fertilize. Order new plants. 		
Bud Break – Prebloom	March	<ul style="list-style-type: none"> Set out new plants. Apply preemergent herbicides. Apply straw 2-3 inches deep. Start disease management program. Irrigate if necessary. Check for severed flower stems by Strawberry Clipper (SC) or for Tarnished Plant Bugs (TPB) on flowers or fruit or underside of bronzed leaves for Spider Mites (M) or white-stippled leaves for Aphids (Ap). 	<ul style="list-style-type: none"> Strawberry Clipper (SC) Tarnished Plant Bug (TPB) Spider Mites (M) Aphids (Ap) Leaf Spot (LS) Powdery Mildew (PM) Botrytis Blossom/Fruit Rot (BB/R) 	<ul style="list-style-type: none"> (Ap), (SC), (TPB), Malathion, Sevin, Pyrethrins, OMRI approved for organic = Safer Insecticidal Soap (M), Kelthane, OMRI approved for organic = Safer Insecticidal Soap (LS), (PM), Captan Fruit and Ornamental, Tomato and Vegetable 3 in 1, Immunox Multipurpose Fungicide for Gardens Spray Concentrate (BB/R), Bonide Fruit Tree Spray
Bloom	March-April	<ul style="list-style-type: none"> Frost protect new blooms on established plants with sprinklers when night temperatures get below freezing. Pinch blooms off new plants. Start disease management program. Irrigate if necessary. Insect management (avoid spraying insecticides during bloom to avoid killing bees). 	<ul style="list-style-type: none"> Botrytis Blossom Blight/Fruit Rot (BB/R) Leaf Spot (LS) Leather Rot (LR) 	<ul style="list-style-type: none"> (BB), (LS), Captan Fruit and Ornamental, Fruit Tree Spray, Tomato and Vegetable 3 in 1, Immunox Multipurpose Fungicide for Gardens Spray Concentrate (LR), Aliette 50WG
Postbloom after petal fall		<ul style="list-style-type: none"> Check for leaves rolled by Leafroller (LR) or check underside of leaves for Spider Mites (M) or Aphids (Ap). Continue disease management. Irrigate if necessary. Weed control. 	<ul style="list-style-type: none"> Leafroller (LR) Aphids (Ap) Stink Bug (SB) Spider Mites (M) Anthracnose (A) Botrytis Blossom Blight/Fruit Rot (BB/R) Leaf Spot (LS) Leather Rot (LR) 	<ul style="list-style-type: none"> (LR), (S), (SB), (M), (LB), Same as Prebloom (A), (BB/R), (LS), (LR), Same as Prebloom

STRAWBERRIES – Homeowners (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Homeowners
Fruit Ripening to Harvest	May-early June	<ul style="list-style-type: none"> Irrigate if necessary. Weed control. Spotted Wing Drosophila (SWD) larvae feed inside and damage ripening soft-skinned fruit, especially blackberry, blueberry, raspberry and strawberry. See the online Spotted Wing Drosophila site at http://www.ipm.msu.edu/swd.htm or the Arkansas SWD fact sheet FSA7079 at http://www.uaex.edu/publications/PDF/FSA7079.pdf 	<ul style="list-style-type: none"> Botrytis (B) Spotted Wing Drosophila (SWD) 	<ul style="list-style-type: none"> (B), Same as Postbloom (SWD), Danitol 2.4EC, Malathion, OMRI approved for organic = Entrust, PyGanic
Postharvest	June	<ul style="list-style-type: none"> Remove runners and plants that have grown outside a 12-inch band in the row. Apply top-dress nitrogen. Irrigate if necessary. Weed control. 	<ul style="list-style-type: none"> Leaf Spot (LS) Leather Rot (LR) 	<ul style="list-style-type: none"> (LS), (LR), Same as Harvest
	July-September	<ul style="list-style-type: none"> Irrigate if necessary. Weed control. 		
Dormant	November-December	<ul style="list-style-type: none"> Maintain equipment. 		

BLACKBERRIES / RASPBERRIES – Homeowners

See also Weed Control recommendations in Home Fruit Weed Control section.

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Homeowners
Dormant	January-February	<ul style="list-style-type: none"> Prune to reduce overwintering inoculum for diseases, and prune out galled canes for Rednecked Cane Borer (RNCB). Spray lime/sulfur for listed pests. Plant new plants. Determine weed management programs. Fertilize according to soil test. 	<ul style="list-style-type: none"> Cane and Leaf Rust (C&LR) Leaf Cane Spot (LCS) 	<ul style="list-style-type: none"> (C&LR), (LCS), Lime Sulfur, Sulforix
Bud Swell – Bud Break	March	<ul style="list-style-type: none"> Apply preemergent herbicides. Disease management program. 	<ul style="list-style-type: none"> Leaf Cane Spot (LCS) 	<ul style="list-style-type: none"> (LCS), Captan, Bonide Tomato and Vegetable 3 in 1, Immunox Multipurpose Fungicide for Gardens Spray Concentrate
Bloom	April	<ul style="list-style-type: none"> Look for unopened flower buds with severed stems by Strawberry Clipper (SC). Disease management program. Insect management (avoid spraying insecticides during bloom to avoid killing bees). Mow middles. Walk planting weekly from late April into June and weekly apply JMS Stylet Oil to canes as long as you detect Rednecked Cane Borer adults (RNCB). 	<ul style="list-style-type: none"> Leaf Cane Spot (LCS) Strawberry Clipper (SC) Rednecked Cane Borer (RNCB) 	<ul style="list-style-type: none"> (LCS), Captan, Bonide Tomato and Vegetable 3 in 1, Immunox Multipurpose Fungicide for Gardens Spray Concentrate (SC), Sevin (RNCB), OMRI approved for organic = JMS Stylet Oil
Fruit Set	Late April	<ul style="list-style-type: none"> Irrigate. Weed management. Mow middles. Fertilize. 	<ul style="list-style-type: none"> Stinkbug (SB) 	<ul style="list-style-type: none"> (SB), OMRI approved for organic = Aza-Direct, PyGanic

BLACKBERRIES / RASPBERRIES – Homeowners (continued)

Growth Stage	Date	IPM Practices Implemented	Pests Present	Control – Homeowners
Fruit Ripening to Harvest	May-Mid-July	<ul style="list-style-type: none"> • Irrigate. • Mow middles. • Late June and July, check for Stink Bug (SB), Japanese Beetle (JB) and Green June Beetle (GJB) feeding on leaves or fruit. • Spotted Wing Drosophila (SWD) larvae feed inside and damage ripening soft-skinned fruit, especially blackberry, blueberry, raspberry and strawberry. See the online Spotted Wing Drosophila site at http://www.ipm.msu.edu/swd.htm or the Arkansas SWD fact sheet FSA7079 at http://www.uaex.edu/publications/PDF/FSA7079.pdf 	<ul style="list-style-type: none"> • Stinkbug (SB) • Green June Beetle (GJB) • Spotted Wing Drosophila (SWD) • Japanese Beetle (JB) 	<ul style="list-style-type: none"> • (SB), Same as Fruit Set • (JB), (GJB), Sevin, Malathion • (SWD), Brigade, Danitol 2.4EC, Delegate, Malathion, Mustang Maxx, OMRI approved for organic = Entrust, PyGanic
Postharvest	Late June-August	<ul style="list-style-type: none"> • Prune laterals on this season's primocanes to 4 feet. • After harvest, apply Surround WP to whitewash plants. Reapply if rain diminishes whitewash appearance. Whitewash reduces foliar feeding damage by Japanese Beetle (JB). 	<ul style="list-style-type: none"> • Japanese Beetle (JB) 	<ul style="list-style-type: none"> • (JB), OMRI approved for organic = Surround WP
	September-December	<ul style="list-style-type: none"> • Prune out second-year canes and weak or diseased one-year canes. • Equipment maintenance. • Winterize irrigation equipment. • Build trellis if used. • In early October, check for Raspberry Crown Borer (RCB) eggs on underside of terminal leaves. If present, purchase and apply nematodes in mid-October as a soil drench around canes, and keep soil moist for 2 weeks to allow nematodes to find, enter and kill RCB larvae on cane base (may kill more than 60%). 	<ul style="list-style-type: none"> • Raspberry Crown Borer (RCB) 	<ul style="list-style-type: none"> • (RCB), OMRI approved for organic = Purchase pathogenic nematodes, <i>Steinernema carpocapsae</i>, from biological control supply house. Be sure to keep soil moist for a couple weeks after applying to base of plants.

HOME FRUIT – *Weed Control*

Many home gardeners have fruit plantings that are too large to hand weed and too small to use heavy equipment in. Hand pulling and mulching can be used to control weeds in many cases. In addition, herbicides can be used to supplement the above cultural practices to make controlling weeds easier and faster. For small areas, several chemical manufacturers (e.g., Ortho, Scott, Southern States, Security and others) sell a variety of herbicides in small quantities that are ideal for this job. These chemicals are formulated to make them more convenient and easier for the homeowner to use. For larger areas, several products can be purchased over the counter at farm chemical retail stores. For all-purpose weed knockdown, use glyphosate, the active ingredient in Roundup®. There are many variations of this herbicide available. These knockdown materials (postemergence) will kill many emerged weeds already growing. Glyphosate is a non-selective herbicide and will kill desirable plants as well as weeds. Keep the spray directed only to the green weed foliage and do not contact green stems or foliage of the desired crop or serious injury or crop death may occur.

To control germinating seedlings, several preemergence herbicides are available. General use recommendations are given below, but consult the label on each product for specific directions before application.

Strawberries

Weed control is difficult since newly set strawberries are sensitive to many of the herbicides. Dacthal (DCPA) is the only herbicide which can be applied to clean soil after planting strawberries. Use 4 ounces by weight of Dacthal 75% wettable powder in one gallon of water to spray 1,000 square feet. Up to three applications can be made per year with at least one-month intervals. Dacthal will be effective for 4 to 8 weeks. Poast can be used for control of emerged annual and perennial grasses at any time except during harvest and during the 30-day period before harvest begins.

Small Fruits

For small fruit (raspberries, blackberries, blueberries and grapes) and orchard fruit (apples, pears, peaches, plums and nuts), a weed-free strip around the base of each plant is desirable. Mowing a grass or natural weed strip between crop plants and applying a preemergence herbicide and/or a 3-inch thick mulch layer under the crop plants is the ideal method of managing weeds in your home fruit planting. Following are general suggestions for using weed control chemicals in fruit plantings. Read the information on the container for more detailed directions.

Preemergence Herbicides

These materials are used to prevent weed germination. They must be applied as a directed spray to the base of the crop plant. Contact of the spray with the lower stems or leaves of these plants, however, will not damage them. Mixing these herbicides into the soil surface is often suggested to increase effectiveness. Watering with an inch or more of water can often be used as a substitute for incorporation around established plants.

- Princep (simazine) is available as a wettable powder (90WP) and a liquid (4L) and can be used on many established woody plants. Do not apply to plants less than 3 years old. It is best applied either in early spring or after harvest to weed-free soil.
- Surflan (oryzalin) is available as a liquid (4AS). Apply 2 to 4 quarts evenly over 1 acre in at least 20 gallons water or put 1½ to 3 tablespoons of 4AS in 1 gallon water and spray evenly over 1,000 square feet. Surflan can be applied safely after transplanting on many woody-stemmed crops. It is best applied either in early spring or after harvest to weed-free soil.

Postemergence Herbicides

These materials are used to eliminate existing weeds. Remember to keep these materials off crop plants or damage will result.

- Roundup or Ortho Kleenup (glyphosate) – This material is most effective on small annuals and perennials in the middle of the summer. Roundup is a slow-acting material which will completely kill the plants, including the roots of perennials. It will take 10 to 14 days for the plants to die. Since the concentration of active ingredient in these products varies, follow the mixing directions on the container. Do not use these materials during bloom or harvest periods.

Printed by University of Arkansas Cooperative Extension Service Printing Services.

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MP467-PD-1-2018RV