

Crop Profile for Blackberries in Arkansas

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General Production Information

1. State Rank: NA
2. Percentage of U.S. Production: NA
3. Total acres grown: 250 (industry estimate)
4. Cash Value: \$NA
5. Production Regions: More than 85% of the acreage is in White County. The remaining acreage is scattered throughout the state.

Production Methods

Blackberries are adapted to all areas of Arkansas. Many soil types are suitable for blackberry production. However, the optimum soil pH range is 5.5 to 6.5 and good soil drainage is essential. Erect thorny or thornless cultivars are grown using a hedgerow type system with the first crop being harvested the year after the planting is established. Plants or root cuttings are planted 1 to 2 feet apart with rows spaced 6 to 8 feet apart. Blackberries are irrigated using drip irrigation. Fertilizer is applied in early spring based on previous season foliar analysis and plant growth.

Blackberries have a perennial root system and crown but have biennial canes. The life cycle of a blackberry cane is as follows: The first year, canes grow but do not produce fruit and are called primocanes. Next year, these canes produce fruit and then die. During this second year of the cycle, canes are called floricanes. New canes (primocanes) are produced each year to replace dead floricanes.

Primocanes are tipped during the growing season to encourage formation of laterals. These side laterals produce large quantities of fruit the following year. Winter pruning is done each year and consists of removal of dead floricanes, trimming of laterals on primocanes to 12 to 15 inches in length, and thinning the remaining canes to retain approximately 6 canes/foot in rows 1 to 1.5 feet wide.

Commodity Destination(s):

- Fresh Market - 95%
- Processing - 5%

Worker Activities

Blackberry plants are pruned by hand primarily during the dormant season. Primocanes are "tipped" at least twice during the growing season (July – August). This is normally done by hand although some growers utilize mechanical means to "tip" the canes.

Preemergent herbicide applications are applied in early spring, primarily with tractor mounted spray equipment. Postemergence herbicide applications are made in early summer near harvest time (May – June) and occasionally after harvest primarily with backpack sprayers although tractor mounted sprayers are occasionally used. Row middles are mowed throughout the growing season. Approximately 20% of the blackberry acres are also hand-weeded from July to September.

Insecticides and fungicides are applied from early spring up to harvest primarily with orchard blast sprayers.

Virtually all of the blackberry acres are harvested by hand.

Insect Pests

Rednecked Cane Borer

Agrilus ruficollis

This black beetle is slender, about 1/4 inch long, and has a metallic red thorax. The larvae burrow in the cane and can cause galling; one to two galls per cane. Adults are present from late May to early August. They feed along leaf edges and can be most easily found on sunny days. Females deposit whitish, scale-like eggs along the bark of new growth in May and June. After hatching, the larvae construct long, winding tunnels which spiral around the cane several times in the sapwood, turn into the hardwood, and then end in the pith. A swelling (gall) usually develops where the sapwood tunneling occurs and is apparent by August. Once the larva reaches the pith, it tunnels straight up or down through the pith. The larva is full-grown by fall, remains in the tunnel during the winter, and pupates in the spring. Adults emerge in May and early June. This insect has a one-year life cycle.

Symptoms: These borers burrow through the canes of brambles. Galls are from 1¼ to 3 inches long and occur from a few inches to 4 feet, above the ground. Galled canes are predisposed to winter injury, bloom in the spring and die before fruit mature.

Monitoring: Look for presence of adults in your planting from early May through early June. No thresholds are currently in use within the commercial industry.

Control: As a preventive measure, canes with swellings (if <5% galled) should be removed and burned during the dormant season. Elimination of wild brambles in close proximity to cultivated patches may reduce this pest. Pyrethrin EC insecticide is currently labeled for this pest.

Biological Control: No effective biological control agents are commercially available.

Raspberry crown borer

Pennisetia marginata

The raspberry crown borer can be a severe pest to blackberry plantings throughout its one to two-year life cycle. This insect is a clear-wing moth and mimics a yellowjacket in appearance. The life cycle begins with egg hatch from late August through early October. Following hatch, larvae feed at the base of new canes where they overwinter. In the spring larvae tunnel into the cambium to feed and in the summer larvae enter the crown or ascend into a cane a few inches above the soil surface. This weakens the cane so it often breaks off and the cane dies (terminal end is like a shepherds crook). Adults fly, mate and lay eggs from late August to October.

Monitoring: No thresholds are currently in use within the commercial industry. In June and July

the grower will notice lodged dead fruiting canes which will easily detach with wind or mechanical movement. Sometimes larvae are seen in the crown area when these canes detach at the soil surface.

Chemical Control: Guthion solupak is currently the only labeled insecticide for this pest.

Biological Control: No effective biological control agents are commercially available.

Cultural control: All borer attacked (appear wilted) canes and crowns (larvae present) should be removed and destroyed by late July.

Strawberry Bud Weevil (Clipper)

Anthonomus signatus

The strawberry bud weevil (SBW) is a pest of blackberry in Arkansas. Adults enter blackberry plantings after Redbud trees and strawberries have bloomed. In early to mid April, female bud weevil will lay a single egg into an unopened flower bud causing the initial damage. Following oviposition, the female severs the bud from the pedicel, causing it to hang by part of the pedicel or fall to the ground, thus preventing fruit formation. Larvae develop in the severed buds and reach maturity in 3-4 weeks. Adults emerge in June, feed on flower pollen, then enter aestivation in mid-summer. In fall, adults find resting sites and remain inactive until spring.

Monitoring: SBW should be sampled on plants by the time the first blossom opens to determine the necessity of treatment. Thresholds for blackberry are currently unavailable.

Chemical Control: Brigade, Capture, and Sevin can be applied for control of this insect.

Biological Control: No effective biological control agents are commercially available.

Cultural Control: Overwintering adults emerge early in the season from ground litter commonly found in wooded areas and migrate to strawberry and Redbud trees in late March, then move to brambles in mid April. Therefore, placement of these plants away from overwintering sites may help to reduce SBW damage. Early-fruiting varieties are more likely to suffer attack than later-fruiting varieties.

Japanese Beetles

Popillia japonica Newman

This beetle has recently become established in several areas of Arkansas. The first damage reports occurred in 2001. Adults are about ½ inch long and shiny metallic green with a series of white spots along the edge of the abdomen. Adults emerge from pupal chambers in the soil from mid-June through July. They cause direct fruit injury and can skeletonize leaves. They feed on hundreds of other kinds of plants also. Eggs are laid in the ground. After hatching, the larvae feed on roots of grasses and other plants. The winter is spent as partially grown larvae. Larval feeding on roots continues in the following spring. Pupation occurs in late May.

Symptoms: Beetle larvae are serious pests of lawns, vegetables, and nursery stock. Adult beetles chew holes in the fruit, making the fruit susceptible to infection. Beetles can cause significant leaf damage which appears as skeletonization. They are difficult to control because the beetles continue to invade plantings for extended periods.

Monitoring: No thresholds are currently in use within the commercial industry. There are commercial attraction traps available for the adult Japanese beetle. These traps have a sex attractant and a floral lure attached to a yellow funnel with a collection bag.

Control: Sevin, Malathion or Pyrellin are registered for control of Japanese beetle in Arkansas.

Green June beetle
Cotinus nitida

The green June beetle is a large ($\frac{3}{4}$ -1 inch) metallic green/bronze colored beetle. They are strong fliers, which emerge from the soil in late-June through July after a rainfall. They use an aggregation pheromone when a ripe fruit source is located which results in mass feeding. Green June beetle adults injure ripe blackberry fruit directly. This insect spends most of its life in the soil as a grub feeding on organic matter.

Monitoring: No thresholds are currently in use within the commercial industry.

Chemical Control: This beetle is difficult to control because it continues to invade fruit plantings with ripe fruit during July. Sevin can be used as a chemical control.

Biological Control: No effective biological control agents are commercially available.

Tree Cricket
Oecanthus spp.

The tree cricket is a delicate-looking, greenish-white, slender-bodied insect. It has dark antennae which are usually longer than its body. During the summer, both nymphs and adults can be found on bramble canes. In late summer, females lay eggs in the canes, leaving several small punctures very close together and arranged in rows lengthwise on the cane. There may be only a few punctures or up to 50 in a row. These rows are usually 2-3 inches long and may be anywhere on the cane, but are most common within 2 feet of the tip.

Symptoms: In late summer, adults often lay eggs in the canes, leaving long rows of punctures and greatly weakening the cane above. The cane often grows into an "S-shape" in response to tree cricket feeding.

Cultural Control: Remove and burn infested canes, and eliminate wild brambles from the immediate area.

Chemical Control: Sevin is currently registered for this pest.

Biological Control: No effective biological control agents are commercially available.

Brown and Green Stink bugs
Euschistus spp. and Acrosternum hilare

Stinkbugs are broad shield-back insects with piercing-sucking mouthparts that cause damage on drupelets of fruit and leave the fruit tasting like stink bug. Adult stinkbugs overwinter in protected areas like under rocks, bark and fencerow debris. Proper sanitation methods in your planting will help remove some of these overwintering sites. The green stinkbug is $\frac{1}{2}$ -1 inch in length. The brown stinkbug is $\frac{1}{2}$ inch in length while the dusky stinkbug is $\frac{3}{8}$ inch in length. Stinkbugs are thought to have two generations per year in Arkansas. All stinkbugs have piercing sucking mouthparts and feed on plant fluids. Stinkbugs are strong fliers. They have five immature stages before becoming adults. It takes five weeks from egg hatch to adult stage. One female will lay several hundred eggs in her lifetime.

Monitoring: No thresholds are currently in use within the commercial industry. Inspect canes

weekly for immature and adult stinkbugs, beginning in late May through harvest.

Chemical Control: No insecticide is currently labeled for this pest.

Cultural Control: Groundcover practices that eliminate seed heads and flowering broadleaf weeds in and around plantings will minimize the amount of stinkbugs found in the plantings.

Biological Control: No effective biological control agents are commercially available.

Twospotted spider mite

Tetranychus urticae

Twospotted spider mite, *Tetranychus urticae* (Koch), is a possible pest of blackberry in Arkansas. As few and one or two applications of Sevin will cause mite outbreaks. Adults are minute, eight-legged and appear to have only one body segment. They vary in color and are frequently oval and spiny. Newly hatched young have only six legs but are similar to adults in general appearance. Spider mites can complete a generation in 10-14 days depending on temperature. Mites pierce leaf cells with their mouthparts and ingests the cell contents, including the chlorophyll. This feeding causes mottled, off-color foliage, which may later appear gray or bronzed. Twospotted spider mite females may range in color from orange to green to yellow. The feeding stage is usually yellowish-green with two dark spots on each side of the body. Female adult mites are about 1/60 inch long. Males are smaller, about 1/80 inch long, with a narrower body and a pointed abdomen. Extensive webbing may be evident when two-spotted spider mites are present. The Twospotted spider mite overwinters as an adult female under loose bark or in ground debris on the orchard floor. They become active in early spring and lay round, straw-colored eggs on weeds and other ground vegetation. Severely injured leaves often fall prematurely.

Control: Savey, malathion or bifenthrin in the formulation of Capture, Brigade or Fanfare are registered for mite control in blackberry.

Biological Control: Predatory mites occur naturally in blackberries or can be purchased to augment native populations.

Eastern Flower Thrips and Western Flower thrips

Frankliniella tritici and *Frankliniella occidentalis*

Eastern flower thrips cause significant crop reduction in the eastern United States when present in high numbers from first flower bud appearance (mid April) through harvest. This species is also found in the ground cover on flowering white clover and buttercup. Thrips are 1/20" long insects with fringed wings. They are yellow to dark brown. It is hypothesized that continuous feeding by thrips leads to white drupes on 'Apache' blackberry fruit at harvest and makes fruit unmarketable. Thrips present on fruit at harvest bother consumers and contaminate harvested berries. An additional threat in Arkansas is the potential spread of impatiens necrotic spot virus (INSV) to caneberries by western flower thrips. Common symptoms of these tospoviruses include ringspots, mosaic, mottle, distorted leaf shapes, stunting or general loss of vigor. In Arkansas, eastern flower thrips ranged from 15-25 thrips/50 fruit sample.

Control: There is no economic threshold for thrips on blackberry. On citrus, it is recommended to apply insecticide, e.g., sabadilla, spinosad, or abamectin, if 10% of fruit sampled have one or more immature citrus thrips, *Scirtothrips citri*, and few predators present (less than 0.5 predators per leaf) or 20% thrips infested fruit in the presence of significant levels of beneficial mites. Malathion and pytrthrin are registered for thrips control in blackberry.

Biological Control: Many generalist predators and some parasitic wasps eat thrips. Pirate bugs in

the genus *Orius* and lacewing larvae are sold commercially for thrips control and are commonly encountered in a variety of outdoor agricultural crops where they attack mites and thrips.

Insecticides

Azinphos methyl

- Formulations: Guthion Solupak
- Target pests: Raspberry crown borer
- Average rate of most common formulations:
 - Guthion Solupak 50% (5/8-1 lb/A)
- Preharvest interval: 7 day
- Restricted entry interval: 7 day

Bifenthrin

- Formulations: Brigade WSB, Capture 2EC, Fanfare 2EC
- Target pests: Two-spotted spider mite
- Average rate of most common formulations:
 - Brigade WSB (8-16 oz/A)
 - Capture 2EC (6.4 oz/A)
 - Fanfare 2EC (6.4 oz/A)
- Preharvest interval: 3 days
- Restricted entry interval: 12 hours

Carbaryl

- Formulations: Sevin 50WP, 80WSP, 4EC
- Target pests: Japanese beetle, Green June beetle, Strawberry clipper, Tree cricket
- Average rate of most common formulations:
 - Sevin 50WP (4-8 lbs/A)
 - Sevin 80WSP (1.25 lbs/A)
 - Sevin 4EC (1-2 qt/A)
- Preharvest interval: 7 days
- Restricted entry interval: 12 hours

Hexythiazox

- Formulations: Savey 50DF
- Target pests: Two-spotted spider mite
- Average rate of most common formulation:
 - Savey 50DF (4-6 oz/A)
- Preharvest Interval: 3 days
- Restricted entry interval: 12 hours

Malathion

- Formulations: Malathion 8F, 57 EC or 5EC
- Target pests: Japanese beetle and Thrips
- Average rate of most common formulations:
 - Malathion 8F (2-4 pt/A)
 - Malathion 57EC (1.5 pt/A)
 - Malathion 5EC (1.5 pt/AI)
- Preharvest interval: 1 day
- Restricted entry interval: 12 hours

Pyrethrin

- Formulations: Pyrellin EC or Pyronyl
- Target pests: Japanese beetle, Red-necked cane borers and Thrips
- Average rate of most common formulations:
 - Pyrellin EC (1-2 pt/A)
 - Pyronyl (12 fl oz/A)
- Preharvest interval: 0 days
- Restricted entry interval: 12 hours

Insecticides Used on Blackberries

Crop	Class	Insecticide	Trade Name	% Ac. Trt. in 2002	Avg. # Applic.
Blackberry	Insecticide	Carbaryl	Sevin 50WP or 80WSP or 4EC	25	1
Blackberry	Insecticide	Hexythiazox	Savey 50DF	5	1
Blackberry	Insecticide	Malathion	Malathion 8F or 57 EC or 5EC	50	1

Diseases

Anthracnose

Elsinoe veneta (Burkholder) Jenk.

Anthracnose, commonly called "cane spot" or "gray bark," is considered an extremely serious disease. Severe yield loss may result due to defoliation, wilting of lateral shoots, death of fruiting canes, and reduction in fruit size and quality. Disease Cycle: The anthracnose fungus overwinters within infection sites that developed during the preceding spring and summer. Splashing rain spreads spores produced from overwintering infections. The spores germinate and infect young canes when they emerge in the spring. The severity of an infection period is proportional to both the temperature and the number of hours canes remain wet after rain starts. New spores are produced from new infections.

Symptoms: Anthracnose first appears on young canes as small, slightly sunken purple spots. As these spots enlarge, they become oval in shape and turn gray in the center, and develop dark

raised borders. The disease will spread throughout a planting following rainy periods, as long as succulent, susceptible tissue is available. The sites continue to sink into the woody portion of the cane, sometimes causing it to crack. Many individual infection sites (about 1/8 inch in diameter) may grow together to form large, irregularly shaped diseased regions. Many small surface infections may fuse together on primocanes during the late summer or early fall. This produces a graying of the bark, especially on the side most exposed to the sun. Such infections do not directly harm canes, but may provide spores for more serious infections of susceptible bramble types planted close by. Disease risk is greatest between bud break and the pre-harvest period since infection appears to attack mainly young, actively growing parts of the plant.

Monitoring: No thresholds are currently in use within the commercial industry.

Control: Sanitation practices of pruning and burning or removal of diseased canes before new canes emerge in the spring. Maintain good air circulation by controlling weeds and narrowing fruiting rows. Apply a delayed dormant spray of lime sulfur or copper hydroxide.

Chemical Control: Liquid lime-sulfur or Copper hydroxide can be applied at delayed dormant period. Later season applications of Kocide or Captan may be used also.

Biological Control: No effective biological control agents are commercially available.

Cultural Control: If possible, all non-cultivated brambles within the vicinity should be removed given that wild plants will also harbor the pathogen.

Fruit Rot

Botrytis cinerea Pers.:F

The fungus, *Botrytis cinerea*, causes one of the most common fruit rot diseases of brambles. Fruit rot occurs fairly often, affecting petals, flower stalks, fruit caps and fruit. Susceptibility increases as weather conditions become moist, with young blossoms and maturing fruit at the highest risk of infection. Fruit infections first appear as soft, light brown areas, eventually resulting in mummification of the fruit. Mummified fruit becomes covered with a dusty powder, through which the infection continues to be spread.

Monitoring: No thresholds are currently in use within the commercial industry.

Chemical Control: Well-timed pre-harvest fungicide sprays are important, especially if weather is relatively wet. Sprays will reduce the number of infected flower parts and the amount of young fruit infection. Rovral plus Captan may be applied.

Biological Control: No effective biological control agents are commercially available.

Cultural Control: Practices that improve air circulation reduce humidity in the canopy may be beneficial (i.e. pruning, proper site selection, etc.).

Phytophthora Root Rot

Phytophthora spp.

Phytophthora root rot is now regarded as a major cause of declining red raspberry plantings. Blackberries and black raspberries appear to be less susceptible. The disease is favored by wet soil conditions and it can often be observed in low-lying areas of land. At least eight different species of soil-borne fungi belonging to the genus *Phytophthora* have been found to induce *Phytophthora* root rot. Symptoms include prematurely yellowed or scorched leaves, stunted canes with weak lateral shoots and red-brown colored roots.

Monitoring: No thresholds are currently in use within the commercial industry.

Chemical Control: Aliette is registered for control of this fungus. The label recommends begin sprays in the spring after bud break and continue with up to maximum 4 sprays per season, has a 60 day pre-harvest cutoff.

Biological Control: No effective biological control agents are commercially available.

Cultural Control: Good soil drainage and proper cultivar selection are necessary for controlling Phytophthora root rot.

Powdery Mildew

Sphaerotheca macularis (Wallr.:Fr.) Lind

Disease Cycle: The fungus overwinters within infected buds near the tips of heavily infected canes. Shoots that emerge from these buds the following spring are infected, and spores produced are distributed by air currents to spread the disease. Repeat cycles of infection can continue throughout the summer. Unlike most fungal diseases, powdery mildew infections do not require periods of wetness in which to develop. However, they are more likely to become severe during humid weather conditions.

Symptoms: Infected leaves are covered with a white powdery growth, usually on their undersides, and may curl upwards. Some cultivars simply develop light green blotches on the leaf surfaces. Infected shoots may be long and spindly and have dwarfed leaves.

Monitoring: No thresholds are currently in use within the commercial industry.

Control: Maintain good air circulation around the planting and remove late-developing primocanes that may be infected. Fungicidal control is generally not effective or practical. Nova is registered for control of powdery mildew.

Biological Control: No effective biological control agents are commercially available.

Rosette (Double blossom)

Cercospora rubi (G.Wint.) Plakidas

This *Cercospora* fungus causes rosette. It is a serious disease of blackberry in the southern regions. The cultivars, Navaho and Arapaho appear to have resistance/tolerance to this fungus.

Monitoring: No thresholds are currently in use within the commercial industry.

Control: Chemical control of this disease under conditions of heavy pressure has not been highly successful.

Cultural Control: One possible cultural practice for an infected site is to mow the planting down before flowering to eliminate spore release and infection of emerging primocanes. Though sacrificing one year of production, the practice may provide short-term control.

Biological Control: No effective biological control agents are commercially available.

Orange Rust

Arthuriomyces peckianus (E.Howe) Cummins & Y. Hiratsuka

Orange rust fungus causes a systemic infection of blackberries that lasts throughout the lifetime of

the plant. Low temperatures and high humidity favor orange rust formation. Orange spore pustules, from which the disease gets its name, mature and break open in June or July, spreading spores to other plants by the wind. The fungus enters the plant through the leaves and grows internally through the canes, crowns, and roots which greatly reduces plant productivity.

Monitoring: No thresholds are currently in use within the commercial industry.

Chemical Control: Nova is registered for control of Orange rust. There are two periods for control in this disease cycle. The first period is during the spring when aeciospores (bright orange spores) are being produced. Sprays at this time would control "localized" leaf infections, teliospores would not be produced later in the growing season. The timing for these sprays would be from just before the aeciospores are released in the spring (generally early to mid May) until the infected leaves die and dry up, and spores are no longer present (mid June through mid July). It is important to not that as temperatures get above 77° F aeciospore germination is very slow, and disease development greatly reduced. In short, during the hot days of summer, infections should not be occurring. The second period is during late summer or fall as temperatures decrease and the threat of "systemic" (teliospore) infections occurs. Even if complete control of early season aeciospore infections is achieved, some teliospores could still be blown into the planting from infected wild hosts. Nova applied on a 10-14 day schedule during these periods should be beneficial for control. In wet weather the shorter interval should be used. Nova may be applied when disease first appears, and repeated at 10-14 day intervals.

Biological Control: No effective biological control agents are commercially available.

Cultural Control: It is important to scout plantings early in the season. If spindly emerging canes with fluorescent orange rust lesions are found on the underside of leaves, then the entire plant should be uprooted, placed in a plastic bag, removed and destroyed. Other possible sources of inoculum should also be removed.

Fire Blight

Erwinia amylovora (Burrill 1882)

This disease gives the appearance for fire scorched plant parts. This necrosis can affect all plant parts. This is a bacterial infection, which can follow spring hailstorms. The Arapaho cultivar has shown symptoms of this disease. This bacterium penetrates the host tissue at wounds or, in the presence of moisture, at natural openings of the plant. Upon multiplication, this pathogen can advance rapidly through the plant tissue killing plant cells as it advances.

Cultural control: Removal of old canes from the planting will remove some of the source inoculum.

Monitoring: No thresholds are currently in use within the commercial industry.

Chemical Control: Agri-mycin and Streptomycin are registered for control of fire blight.

Biological Control: No effective biological control agents are commercially available.

Fungicides

Fosetyl AL

- Formulations: Aliette 80 WDG

- Target pests: phytophthora root rot
- Average rate of most common formulation:
 - Aliette 80 WDG (5 lb/A)
- Preharvest interval: 14 days
- Restricted entry interval: 12 hours

Copper hydroxide

- Formulations: Blue Shield 50WP, Kocide 50WP
- Target pests: anthracnose, spur blight, cane blight
- Average rate of most common formulation:
 - Blue Shield 50WP, Kocide 50WP (4 lbs/A)
- Preharvest interval: NA
- Restricted entry interval: 48 hours

Iprodione

- Formulations: Rovral 50WP
- Target pests: botrytis fruit rot (gray mold)
- Average rate of most common formulation:
 - Rovral 50WP (1-2 lbs/A)
- Preharvest interval: 0 days
- Restricted entry interval: 12 hours

Lime sulfur

- Formulations: Orthorix, Miller Lime Sulfur
- Target pests: anthracnose, cane blight
- Average rate of most common formulation:
 - liquid lime sulfur (20 gal/A)
- Preharvest interval: Dormant
- Restricted entry interval: 48 hours

Myclobutanil

- Formulations: Nova 40WP
- Target diseases: Powdery mildew, Orange rust
- Average rate of applications:
 - Nova 40WP (1.25-2 oz/A)
- Preharvest interval: 14 days
- Restricted entry interval: 24 hours

Streptomycin

- Formulations: Streptomycin
- Target diseases: Fire blight
- Average rate of applications:
 - Streptomycin 17W (60 to 100 ppm)
- Preharvest interval: 50 days

- Restricted entry interval: none

Vinclozolin

- Formulations: Ronilan 50WP, 4L
- Target pests: botrytis fruit rot (gray mold)
- Average rate of most common formulation:
-- Ronilan 50WP (1-2 lbs/A)
- Preharvest interval: 9 days
- Restricted entry interval: 12 hours

Fungicides Used on Blackberries

Crop	Class	Fungicide	Trade Name	% Ac. Trt. in 2002	Avg. # Applic.
Blackberry	Fungicide	Lime sulfur	Orthorix, Miller Lime Sulfur	90	1
Blackberry	Fungicide	Myclobutanil	Nova 40WP	10	1

Weeds

Weeds are managed in blackberry plantings by use of herbicides and/or cultivation, hoeing, and hand weed removal. If weeds are not managed effectively competition between weeds and blackberry plants, increased disease pressure, and increased insect pest activity may result in a reduction in yield and fruit quality. It can be difficult and costly to control weeds by cultivation, hoeing, and hand weeding. Consequently, pre-planting weed suppression is critical and post-planting use of herbicides is often required. Herbicides are applied as a band application in a 1.5 to 2 feet zone on either side of the blackberry row. Untreated row middles are maintained as sod strips to prevent erosion and permit vehicle traffic during wet periods. A hardy bunch type grass that doesn't spread into the crop row quickly such as tall fescue is often used in row middles.

Herbicides

Preemergence Control

Dichlobenil

- Formulations: Casoran 4G or Norosac 4G
- Target weeds: grasses and broadleaf weeds
- Application: Single application of 100 lb/ acre soil surface applied between November 15 and February 15 to weed free soil.
- Restricted entry interval: 12 hours

- Comments: Apply only to plants established one year or more. Do not apply during new shoot emergence.

Diuron

- Formulations: Karmex DF
- Target weeds: grasses and broadleaf weeds
- Application: Single application of 2-3 lb. in 25-40 or more gallons of water/acre applied in spring before weeds emerge and canes leaf out.
- Restricted entry interval: 12 hours
- Comments: Apply only to plants established one year or more.

Napropamide

- Formulations: Devrinol 50 DF
- Target weeds: grasses and broadleaf weeds
- Application: Single application of 8 lb. in at least 20 gallons of water/acre. Use only half this rate on newly established plants when root cuttings were used. Apply to the base of plants in late fall to spring on weed free soil.
- Restricted entry interval: 12 hours
- Comments: May be applied to newly planted (non-bearing) or established (bearing) plants. Requires sufficient irrigation or rainfall to wet the soil to a depth of 4 inches within one week of application for incorporation. Do not allow spray to contact fruit or foliage.

Norflurazon

- Formulations: Solicam 80 DF
- Target weeds: grasses and broadleaf weeds
- Application: Single application of 2.5 lb. (sandy or light-colored soil) to 5 lb. (heavy or dark-colored soil) in at least 20 gallons of water/acre. Apply to clean soil surface from fall to early spring when crop is dormant.
- Restricted entry interval: 12 hours
- Comments: Apply only to plants established one year or more. Requires rainfall or irrigation within 4 weeks of application for product activation. Application may result in temporary bleaching or chlorosis of leaves from which the plant will recover.

Oryzalin

- Formulations: Surflan 4 AS or Oryzalin 4 AS
- Target weeds: grasses and broadleaf weeds
- Application: Single application of 2.0 to 6.0 qt. in 20 to 40 gallons of water/acre applied to soil at the base of canes. Apply in the fall or early spring before weeds emerge or fruit set.
- Restricted entry interval: 12 hours
- Comments: May be applied to newly planted (non-bearing) or established (bearing) plants. Requires rainfall or irrigation of 0.5 to 1.0 inches to activate product. Do not spray foliage.

Simazine

- Formulations: Princep 4 L

- Target weeds: grasses and broadleaf weeds
- Application: Single application of 2.0 to 4.0 lb. in 25 to 40 gallons of water per acre. Apply in spring before weeds emerge and before canes leaf out. A second option is a split application of 2.5 lb. in fall followed by 2.5 lb. in spring.
- Restricted entry interval: 12 hours
- Comments: Do not apply more than 1.0 lb. per acre on newly established plants. Do not apply when fruit is present or illegal residues may result.

Terbacil

- Formulations: Sinbar 80W
- Target weeds: grasses and broadleaf weeds
- Application: Single application of 1.0 to 2.0 lb. per acre in a minimum of 20 gallons of water. Apply to soil at the base of canes in fall or early spring before weed growth begins or fruit set occurs.
- Restricted entry interval: 12 hours
- Comments: Apply only to plants established one year or more. Do not apply within 70 days of harvest. Do not use on soils of less than 2% organic matter or where roots are exposed.

Postemergence Weed Control

Glyphosate

- Formulations: Roundup Ultra
- Target weeds: grasses and broadleaf weeds
- Application: Apply as a single preplant broadcast application to control perennial weeds prior to establishment or as multiple applications (2-4) in established plantings as a directed spray or wiper application (20% solution in water) to actively growing weeds. Apply 0.5 to 5 qt. in 10-40 gallons of water/acre depending on weed species.
- Restricted entry interval: 12 hours
- Comments: Do not allow spray to contact desirable vegetation, including green shoots, canes, or foliage, as severe damage will result. Do not apply within 14 days of harvest.

Paraquat

- Formulations: Gramoxone Extra
- Target weeds: grasses and broadleaf weeds
- Application: Multiple applications (2-4) of 2.0 to 3.0 pt. in 50 to 100 gallons of water/acre. Apply as a directed spray to weeds before new canes emerge. Avoid newly emerged canes with spray or injury will occur.
- Restricted entry interval: 12 hours
- Comments: Use low pressure during application to produce a coarse spray. Add non-ionic surfactant at 1-2 pt. or crop oil at 1 gallon per 100 gallons of water for best results. Restricted use pesticide.

Sethoxydim

- Formulations: Poast EC
- Target weeds: grasses
- Application: Multiple applications (2-3) of 1.5 to 2.5 pt. plus 2 pt. of a crop oil concentrate in 10-20 gallons of water/acre. Apply as a directed spray when grass is actively growing.
- Restricted entry interval: 12 hours

- Comments: Do not apply more than 2.5 pt. per application or 5 pt. per season. May be applied to newly planted (non-bearing) or established (bearing) plants.

Sulfosate

- Formulations: Touchdown 5
- Target weeds: grasses and broadleaf weeds
- Application: Apply as a single preplant broadcast application to control perennial weeds prior to establishment. Application must occur when weeds are actively growing. Use an approved surfactant or wetting agent containing at least 75% active ingredient at 2 qt. per 100 gallons of water to improve coverage of weed foliage. Up to 6.4 pt. in 10-30 gallons of water/acre/year depending on weed species.
- Restricted entry interval: 12 hours
- Comments: Use for preplant site preparation.

Herbicides Used on Blackberries

Crop	Class	Herbicide	Trade Name(s)	% Ac. Trt. in 2002	Avg. # Applic.
Blackberry	Herbicide	Glyphosate	Roundup Ultra	10	1
Blackberry	Herbicide	Naproamide	Devrinol 50DF	5	1
Blackberry	Herbicide	Norflurazon	Solicam 80DF	5	1
Blackberry	Herbicide	Oryzalin	Surflan 4AS, Oryzalin 4AS	50	1
Blackberry	Herbicide	Paraquat	Graamoxone Extra, BOA	75	1
Blackberry	Herbicide	Sethoxydim	Poast EC	10	1
Blackberry	Herbicide	Simazine	Princep 4L, Princep 90WDG	75	1
Blackberry	Herbicide	Sulfosate	Touchdown 5	5	1

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