

# Commercial Crop Production

## Small Fruits – Blackberry (Brambles)

Blackberries are the most commonly grown brambles in Louisiana. Blackberries are native to Louisiana and most commercial cultivars are well-adapted to growing conditions in the state. Thorny type varieties such as CVs. Brazos, Brison, Womack are very productive and early bearing in Louisiana but are susceptible to the fungal disease rosette (double blossom). These cultivars require careful attention to disease management tactics such as pruning on time and preventative fungicide spray programs. Alternatives to the thorny varieties are CVs. Navaho and Arapaho, which are thornless types. These two varieties are not as susceptible to double blossom and don't require as high a level of management as the thorny types.

### DISEASE

**Symptoms, source of inoculum and management of blackberry, raspberry and other bramble diseases.**

#### **Anthraxnose** (*Elsinoe veneta*)

**Symptoms:** Symptoms appear on canes and leaves. Both current and second-year canes can be affected. Circular, light gray spots form on canes; as the disease progresses the spots become sunken with a dark purple margin. Leaf spots start off yellow, turn grey with a purple border and eventually dry up and drop out, resulting in shot holes. Fruit may ripen abnormally and have an "off" flavor. Anthracnose can cause loss of winter hardiness.

**Source of Inoculum:** The fungus overwinters on bark and cane lesions. In the spring spores are produced, released and spread to new canes by splashing rain and wind.

**Management:** Remove and destroy infected canes. Do not compost canes. Remove and destroy wild brambles. Immediately after harvest remove floricanes to reduce overwintering fungus. Follow a fungicide spray program. Do not use lime sulfur.

#### **Botrytis fruit rot and cane blight** (*Botrytis cinerea*)

**Symptoms:** White lesions (bleaching effect) form on new canes and floricanes. Cane blight is more severe on blackberries than raspberries. Botrytis causes flowers to shrivel and turn brown. As the fruit develops and ripens, the fruit becomes soft and covered with grey tufts of fungal spores.

**Source of Inoculum:** The fungus survives as sclerotia (overwintering structure) on infected canes and dead leaves and as spores on mummified fruit. During wet and cool conditions, sclerotia germinate and the fungus begins to sporulate. Spores are dispersed by wind, rain and overhead irrigation.

**Management:** Promote good air circulation in the planting by pruning and trellising plants. Minimize the use of nitrogen fertilizer. Partial resistance is available for red raspberry varieties. Minimize fruit damage during harvest. Follow a fungicide spray schedule.

#### **Cane blight** (*Leptosphaeria coniothyrium*)

**Symptoms:** Dark red to purple lesions form on the canes around wounds. Lesions may be on one side of the cane or may girdle it and kill the shoots.

**Source of Inoculum:** The fungus survives in infected tissues and dead canes. Spores are rain-splashed.

**Management:** Prune out infected canes and remove floricanes immediately after harvest. Avoid wounding the plants.

#### **Cane and leaf rust** (*Kuehneola uredinis*)

**Symptoms:** First seen on floricanes in late spring when large yellow pustules split the bark. Small yellow pustules develop on the lower surface of leaves on the floricane and may lead to premature defoliation.

**Source of Inoculum:** The fungus overwinters on infected canes. Spores are wind dispersed.

**Management:** Prune out old diseased canes after harvest. Follow the fungicide spray schedule.

#### **Orange rust** (*Gymnoconia nitens*)

**Symptoms:** Disease is evident on new growth in spring as many weak, spindly shoots are formed rather than one strong shoot. Bright orange pustules form on the undersides of infected leaves, and no blooms are produced on the floricanes.

**Source of Inoculum:** The fungus overwinters within systemically infected canes. Spores are wind dispersed.

**Management:** Use only disease-free planting materials. Remove infected plants as soon as they are observed. Follow a fungicide spray schedule.

#### **Phytophthora root rot** (*Phytophthora* spp.)

**Symptoms:** Infected primocanes may rapidly wilt and die in the spring, or they (and the floricanes) may slowly become chlorotic, wilt and die in the summer. Infected roots exhibit a reddish-brown discoloration of the cortex.

**Source of Inoculum:** The pathogen can be introduced on infected planting material but it also survives in soil. Spreads primarily in water.

**Management:** Use disease-free transplants, improve drainage and avoid low spots. Rogue out infected plants and treat surrounding plants with fungicide.

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### **Powdery mildew** (*Podosphaera aphanis*)

**Symptoms:** A whitish gray coat covers both sides of the leaves, flowers, fruit and shoots. Diseased new growth is stunted and distorted.

**Source of Inoculum:** The fungus overwinters as mycelium or chasmothecia in dormant buds of stunted cane tips. Spores are spread by wind.

**Management:** Blackberries are not susceptible to powdery mildew. Plant resistant red raspberry varieties such as Chief, Marcy and Malling Orion. Follow a fungicide spray schedule.

### **Rosette** (double blossom) (*Cercospora rubi*)

**Symptoms:** Infected buds give rise to a proliferation of small shoots or witches' broom. Infected flower buds give rise to distorted blossoms from which fruit do not develop.

**Source of Inoculum:** The fungus survives in wild blackberries and dewberries. Spores are wind dispersed.

**Management:** Eradicate wild blackberries and dewberries in the vicinity. Remove infected blossom clusters before they open. Remove the floricanes immediately after harvest. Follow a fungicide spray schedule.

### **Septoria leaf spot** (*Septoria rubi*)

**Symptoms:** Frogeye lesions with whitish centers and brown to purple margins are produced on leaves. Similar lesions are found on canes and petioles.

**Source of Inoculum:** The fungus overwinters in dead leaves and stems. Spores are wind dispersed.

**Management:** Follow a fungicide spray schedule for leaf spots.

### **Spur blight** (*Didymella applanata*)

**Symptoms:** Symptoms appear in primocanes in late spring. Brownish purple lesions appear just below on the lower portion of the stem just below the leaf or bud. In late fall, the bark of infected canes splits longitudinally. Leaflets may have V-shaped brown lesions with chlorosis.

**Source of Inoculum:** The fungus survives the winter in lesions on diseased canes. Spores are carried to new growth in the spring by splashing rain and wind.

**Management:** Promote good air circulation in the planting by pruning and trellising plants. Avoid excessive nitrogen applications, which promote rapid and excessive growth of new tissue. Remove and destroy wild brambles. Follow a fungicide spray schedule.

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## Small Fruits – Blackberry (Brambles)

**Table 1. List of disease-resistant blackberry cultivars recommended for production in Louisiana. Resistant categories: R = resistant; MR = moderately resistant; MS = moderately susceptible; S = susceptible; - indicates no data for the variety or disease.**

Type, cultivars	Disease			
	Anthracnose	Rosette (double blossom)	Orange Rust	Sunburn (abiotic)
<b>Thorny</b>				
Brazos	R	S		
Brison	-	S	-	-
Cheyenne	-	S	R	-
Womack	-	S	-	-
Apache	-	S	-	-
Rosborough	-	S	-	-
Shawnee	R	S	R	-
Choctaw	-	S	R	-
Kiowa	-	S	R	-
Chickasaw	R	S	R	-
<b>Thornless</b>				
Arapaho	-	R	R	-
Navaho	R	MR	S	-
Apache	R	R	-	S
Ouachita	R	R	R	S
<b>Trailing</b>				
Youngberry	-	S	-	-

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## Small Fruits – Blackberry (Brambles)

**Table 2. Seasonal fungicide spray schedule for blackberry, raspberry and other bramble diseases.**

<b>Developmental Stage</b>	<b>Diseases</b>
<b>Delayed dormant</b> (Bud swell to green tip)	Anthrachnose Cane blight Spur blight
<b>Shoots 6 inches long until prebloom</b>	Anthrachnose Cane blight Leaf spots Phytophthora root rot Powdery mildew Rusts Spur blight
<b>Early bloom (5-10%)</b>	Anthrachnose Botrytis gray mold Cane blight Leaf spots Rosette Rusts
<b>Full bloom</b> (Bramble bloom periods are protracted. Bloom and cover spray stages can be difficult to define clearly. Make sure that the pathogens indicated are addressed with a thorough fungicide program as defined by the variety but do not exceed labeled rates or spray intervals.)	Anthrachnose Botrytis gray mold Cane blight Leaf spots Rosette Rusts
<b>Petal fall</b>	Anthrachnose Botrytis gray mold Cane blight Leaf spots Rosette Rusts
<b>Cover sprays</b>	Anthrachnose Botrytis gray mold Cane blight Leaf spots Rosette Rusts
<b>Preharvest</b> (14 days before anticipated harvest date)	Anthrachnose Botrytis gray mold Cane blight Leaf spots Rosette Rusts
<b>Harvest</b>	Anthrachnose Botrytis gray mold Cane blight Leaf spots Rosette Rusts
<b>Postharvest</b>	Cane blight Leaf spots Orange cane blotch Phytophthora root rot Powdery mildew Rusts

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**Table 3. Efficacy of selected fungicides against blackberry, raspberry and other bramble diseases. Table was reproduced from the 2022 Southeast Regional Canberries Integrated Management Guide ([https://secure.caes.uga.edu/extension/publications/files/pdf/AP%20121-2\\_1.PDF](https://secure.caes.uga.edu/extension/publications/files/pdf/AP%20121-2_1.PDF)).**

Efficacy ratings: - = ineffective; 1 = Poor to 5 = Excellent. No data are provided for products that are not labeled for the specific disease or if the efficacy is unknown. These ratings are benchmarks; actual performance will vary.

Chemical name (Fungicide product name)	Anthraco-nose	Cane blight	Spur blight	Leaf spots	Botrytis gray mold	Rusts	Powdery mildew	Rosette	Phytophthora root rot
azoxystrobin (Abound FL)	5	5	5	4	-	5	5	5	-
azoxystrobin + propiconazole (Quilt Xcel)	5	5	5	4	-	5	5	5	-
captan (Captan 80WDG, Captec 4L, Captan 50W)	3	2	2	-	2	-	-	-	-
copper (various products)	1	1	1	-	-	-	-	-	-
myclobutanil (Rally 40WSP)	-	3 After pruning	-	-	-	5	5	-	-
mono and di-potassium salts of phosphorus acid (K-phite) or potassium phosphite (ProPhyt)	-	-	-	-	-	-	-	-	4
pyraclostrobin (Cabrio EG)	5	5	5	5	-	5	5	-	-
pyraclostrobin + boscalid (Pristine WG)	5	5	5	4	4 <sup>R</sup>	5	-	5	-
cyprodinil + fludioxonil (Switch 62.5WG)	-	-	-	-	5	-	-	5	-
fenhexamid (Elevate 50WDG)	-	-	-	-	5	-	-	-	-
iprodione (Rovral 4F, Nevado 4F)	-	-	-	-	3	-	-	-	-
mefenoxam (Ridomil Gold SL)	-	-	-	-	-	-	-	-	4
fosetyl-AL (Aliette WDG)	-	-	-	-	-	-	-	-	4
sulfur (various products)	-	-	-	-	-	-	3	-	-
propiconazole (Tilt 3.6EC)	-	-	-	4	-	5	-	-	-

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oxathiapiprolin <b>(Orondis Gold 200)</b>	-	-	-	-	-	-	-	-	-	-	4
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<sup>R1</sup> Isolates of this pathogen with resistance to this fungicide have been identified in southeastern United States.

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## Small Fruits – Blackberry (Brambles)

**Table 4. Recommended pesticides, rates and pesticide use restrictions for blackberry, raspberry and other bramble diseases.**

Chemical Name (Product Mode of Action Group <sup>1</sup> )	Product Name <sup>2</sup>	Rate <sup>3</sup>	Maximum Use	PHI <sup>4</sup>	Diseases
<b>azoxystrobin (11)</b>	Abound FL	6.0-15.5 fl oz	92.3 fl oz	0	Anthracnose Cane blight Leaf spots Rosette Rusts Spur blight
<b>azoxystrobin + propiconazole (11, 3)</b>	Quilt Xcel	14-21 fl oz	105 fl oz	30	Anthracnose Cane blight Leaf spots Powdery mildew Rosette Spur blight
<b>captan (M4)</b>	Captan 50WP Captac 4L	2-4 lb 0.75-1.0 qt/100 gal	10 lb ai 10 lb ai	3 3	Anthracnose Cane blight Leaf spots Spur blight
<b>copper (M1)</b>	ChampWG  Kocide 3000 Kocide 2000 Cuprofix Disperss Cuprofix Ultra 40 Disperss	2-3 lb  0.8-1.3 lb 1.5-2.3 lb 2.5-5 lb 1.25-2.5 lb	See labels	1-2  1-2 1-2 0.5 0.5	Anthracnose  Cane blight Leaf spots Orange cane blotch Spur blight
<b>fosetyl-AL (33)</b>	Aliette WDG	5 lb	20 lb	60	Phytophthora root rot
<b>myclobutanil (3)</b>	Rally 40VSP	1.25-3 oz	10 oz	0	Powdery mildew Rusts
<b>phosphorous acids (33)</b>	Confine Extra Fosphite Fungi-phite Helena Prophyt Rampart	1-3 qt 1-3 qt 1-2 qt 4 pt 1-3 qt	6 app 4 app	0 0 0 0 0	Leaf spots Phytophthora root rot
<b>propiconazole (3)</b>	Bumper 41.8EC Propi-Star EC Tilt Topaz	6 fl oz 6 fl oz 6 fl oz 6 fl oz	30 fl oz 30 fl oz 30 fl oz 30 fl oz	30 30 30 30	Leaf spots ( <b>post-harvest only</b> ) Powdery mildew Rusts
<b>pyraclostrobin (11)</b>	Cabrio EG	14 oz	56 oz	0	Anthracnose Cane blight Leaf spots Powdery mildew Rusts
<b>pyraclostrobin + boscalid (11, 7)</b>	Pristine WG	18.5-23 oz	92 oz	0.5	Anthracnose Botrytis gray mold Cane blight Leaf spots Powdery mildew Rosette Rusts Spur blight
<b>cyprodinil + fludioxonil</b>	Switch 62.5WG	11-14 oz	56 oz	0	Botrytis gray mold

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Chemical Name (Product Mode of Action Group!)	Product Name <sup>2</sup>	Rate <sup>3</sup>	Maximum Use	PHI <sup>4</sup>	Diseases
(9, 12)					
<b>fenhexamid (17)</b>	Elevate 50WDG	1.5 lb	6 lb	0	Botrytis gray mold (resistance isolates have been detected in other regions of the south)
<b>iprodione (2)</b>	Iprodione 4L AG Nevado 4F Rovral 4F	1-2 pt 1-2 pt 1-2 pt	4 app 4 app 4 app	0 0 0	Botrytis fruit rot
<b>mefenoxam (4)</b>	Ridomil Gold SL	0.25 pt/1000 linear feet, 3 ft band	1 app	See label	Phytophthora root rot <b>(raspberries only)</b>
<b>sulfur (M)</b>	Microfine Sulfur Microthiol Disperss Yellow Jacket Dusting Sulfur	10-30 lb 6-15 lb 3-50 lb	See labels	1 1 1 1	Anthracnose Cane blight Powdery mildew Spur blight

The information in the bramble section was updated October 2022 by R. Singh.