

# Insect and Disease Control in Your Small Fruit Garden Patches

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It is still the best policy to avoid problems if at all possible. That is achieved through prevention practices by selecting disease resistant varieties and good sanitation (pruning to remove diseased, damaged and dead shoots, harvesting in a timely manner, removing over-ripe and diseased fruit, crop rotation, etc.). Use of *Brassicac*s is great way to prepare the soil before planting by introducing natural fumigation as pest population reduction. The very ultimate resource is applying commonly available materials labeled for insect and disease control. The market is ever-changing and what use to be available several years ago may not be on the market anymore.

Here are some suggestions for disease and insect control in strawberries, blueberries and cane-berries (brambles) with the currently registered and available material.

## Strawberry Insect and Disease Control

Root Diseases	Material	Spray Timing
<u>Black root rot</u> ( <i>Rhizoctonia spp.</i> , <i>Pythium spp.</i> , <i>Prathylenchus penetrans</i> ) <u>Red stele</u> ( <i>Phytophthora fragariae</i> ) <u>Verticillium wilt</u> ( <i>Verticillium dahliae</i> ) Nematodes (root-knot, lesion nematodes, etc.)	Several phosphorous acid fungicides are effective against red stele and leather rot: Agri-Fos, Aliette, Phostrol, ProPhyt, Topaz, etc.  Crop rotation	Early in spring
<b>Crown Diseases</b>		
<u>Anthraxnose</u> ( <i>Colletotrichum spp.</i> ) <u>Red stele</u> ( <i>Phytophthora fragariae</i> ) <u>Bud rot</u> ( <i>Rhizoctonia spp.</i> ) <u>Crown rot</u> ( <i>Sclerotium rolfdii</i> )	Captan Copper	When flower buds are visible in the crown and apply before rain or irrigation...on 7-10 day intervals. <u>Do not spray during bloom!</u>
<b>Leaf Diseases</b>		
<u>Leafspot</u> ( <i>Mycosphaerella fragariae</i> ), <u>Leaf scorch</u> ( <i>Diplocarpon earliana</i> ) <u>Leaf blotch</u> ( <i>Gnomonia fructicola</i> ) <u>Leaf blight</u> ( <i>Dentrophoma obscurans</i> ) <u>Powdery mildew</u> ( <i>Sphaerotheca macularis</i> )	Captan Copper Sulfur Neem	When flower buds are visible till harvest on 7-10 day interval. <u>Do not spray during bloom!</u>

<b>Fruit Diseases</b>		
<u>Anthracnose</u> ( <i>Colletotrichum spp.</i> ) <u>Powdery mildew</u> ( <i>Sphaerotheca macularis</i> ) <u>Leather rot</u> ( <i>Phytophthora cactorum</i> ) <u>Leaf blotch</u> ( <i>Gnomonia fructicola</i> ) <u>Angular leaf spot</u> ( <i>Xanthomonas fragariae</i> )	Captan Copper Sulfur Neem Oil	Spray on 7-10 day interval through the season. <u>Do not spray during bloom!</u>
<b>Insect Control</b>		
<u>Strawberry clipper</u> <u>Tarnished plant bug</u> <u>Sap or picnic beetle</u> <u>Black Vine Weevil</u> <u>Potato leaf hopper</u>	Sevin Malathion	After bloom, until harvest, apply sprays on a 7-10 day interval. After harvest and renovation, sprays of Captan and Malathion or an all-purpose fruit spray will reduce leaf diseases and injury from potato leafhopper.

Leafspot (*Mycosphaerella fragariae*) – small lesions with purple border 1/8" to ¼" in diameter with tan to almost white center.

Leaf scorch (*Diplocarpon earliana*) - small dark purple spots ¼" in diameter on the upper surface of the leaf, petioles and/or runners.

Leaf blotch (*Gnomonia fructicola*) – appears as brown to purple necrotic blotches, usually at the end of the leaf as inverted "V". It can attack the fruit petiole, cap and fruit itself.

Leaf blight (*Phomopsis obscurans*) – It appears as large brown spots from ½ " to 1" in diameter, with purple margins and visible black fruiting bodies in the middle of the lesions.

Powdery mildew (*Sphaerotheca macularis*) – Typical white, fluffy mycelial growth appears on the underside of the young, expanding leaves causing them to curl upwards. It attacks stems  
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Powdery mildew (*Sphaerotheca macularis*) – Typical white, fluffy mycelial growth appears on the underside of the young, expanding leaves causing them to curl upwards. It attacks stems and fruit causing significant damage.

## Blueberry Insect and Disease Control

Diseases	Material	Spray Timing
Anthracnose, Phomopsis twig blight and canker, Mummy Berry and Fruit Rot Diseases	Lime Sulfur	Dormant or delayed dormant (bud break)
	Captan 50 WP	Bud break to ¼" green followed by sprays on 7-10-day interval trough the season
	Chlorothalinol (Daconil)	Bud break-1/4" green until petal fall
Blueberry Maggot Fly, Japanese Beetle 	Malathion	Starting at "green berry" on 7-day interval through the season

Diseases	Materials for Organics	Materials for Conventional Production
Anthracnose, Phomopsis twig blight and canker, Mummy Berry, Botrytis blossom and twig blight, Septoria leaf spot, Powdery mildew, Fusicoccum canker, and Fruit Rot Diseases	<p>Copper: BadgeX2 (Cu-oxychloride, Cu-hydroxide)</p> <p>Botanicals:            Actinovate-Ag (<i>Streptomyces licydus</i>)            Serenade Max (<i>Bacillus subtilis</i>),            Sonata (<i>Bacillus pumillis</i>),</p> <p>Potassium bicarbonate:            MilStop            Kaligreen            Armicarb</p>	<p>Benomyl (Benlate)            Indar            Orbit            Elite            Pristine            Quadris</p> <p>Phosphates:            ProPhyt            Phostrol            Fosphite            Fungi-Phite</p>

## Cane – Berry Insect and Disease Control

Disease	Symptoms	Material	Spray Timing
Anthracnose ( <i>Elsinoe veneta</i> )	More of a problem on black and purple raspberries. Small sunken purple spots appear in spring on young canes. Old lesions may appear tan or gray with purple margins. Many spots can run together creating large, sunken dead areas. Leaves have small lesions that create “shot-hole” appearance	Copper  Lime sulfur  Captan	Starting at bud break until ¼” green  Dormant or delayed dormant (bud break) until shoots reach 6” in length then apply Captan at 7-10 day interval  Bud break throughout the season at 7-10 day interval
Cane blight ( <i>Didymella applanata</i> )	More of a problem on red raspberries. Purplish or brown lesions start forming around individual spurs. Wet springs favor disease development. Infection starts at that time but symptoms appear in mid-late summer.	Copper  Lime sulfur  Captan	Same as above
Cane blight ( <i>Leptosphaeria coniothyrium</i> )	All cane berries are susceptible. Lesions appear along the shoots starting with bud failure (lesions go around the whole cane), shoot wilt and death. Infections start in spring in April-May.	Copper  Lime sulfur  Captan	Starting at bud break until ¼” green  Dormant or delayed dormant (bud break) until shoots reach 6” in length then apply Captan at 7-10 day interval  Bud break throughout the season at 7-10 day interval
Gray mold ( <i>Botrytis cinerea</i> )	Overwinters on dead leaves and in litter on the ground. With rains in spring, becomes active and infects developing canes, leaves as well as fruit.	Copper  Lime sulfur  Captan	Same as above
Late leaf rust ( <i>Pucciniastrum americanum</i> )  Alternate host is white spruce ( <i>Picea americanum</i> )	Tiny chlorotic spots that turn into a orange/rusty lesions appear on the leaves causing defoliation. Symptoms may appear on fruit as well as orange/rusty specs on drupelets. Infection develops in early July. White spruce is infected in May –June by spores that develop from the overwintering teliospores present on the fallen raspberry leaves.	Lime sulfur   Sulfur or Captan	Use lime sulfur early in season. More effective control achieved by pruning to improve air circulation and speed up drying conditions. Leave no more than 5 canes per linear foot.  Once new shoots reach 6-8” in length
Orange rust ( <i>Arthuriomyces peckianus</i> ; <i>Gymnoconia nitens</i> )	Bright orange waxy pustules develop on the lower leaf surface, later becoming bright orange and powdery.	DMI ( Group 3 fungicides)	

# Cane – Berry Insect and Disease Control

Disease	Symptoms	Material	Spray Timing
Bacterial blight ( <i>Pseudomonas spp.</i> )	Lesions with water-soaked margins that appear on leaves and petioles. May cause cane death.	Copper	Dormant and/or delayed dormant copper sprays until ¼" green.
Root rot ( <i>Phytophthora spp.</i> )	Death of a plant. Roots are rotted away. They appear black and the outer layer could be easily stripped away.	Ridomil  Phosphorous acid fungicides: Agri-Fos, Aliette, ProPhyt, Phostrol, etc.	Early in spring... Prevention as in improved drainage, avoiding "wet feet"
Verticillium wilt ( <i>Verticillium spp.</i> )	Starts with wilting, leaves turning pale-yellow, vigor is significantly reduced and the whole plant die.	<i>Brassica spp.</i>	Plant rotation with <i>Brassicas</i> as natural fumigants.

Pests	Symptoms	Material	Spray Timing
Raspberry crown borer	Loss of vigor, under-developed canes that break off at the point of injury.	Sevin, Malathion, Pyrethrum	applied as drench
Raspberry cane borer	Wilting tips. Girdling bands on canes about an inch apart with an exit hole in the middle.	Sevin Malathion Pyrethrum	Spray to control adult population.
Rednecked cane borer	Larvae are feeding inside the canes making them weak, wilted and flagging.		
Japanes beetle	Signs of feeding on the leaves and fruit are easily visible.	Sevin Malathion Pyrethrum	
Rose chafer	Same as for Japanese beetle	Same as above	
Spider mites	Stppled leaves with heavy mite population on the underside of the leaves. Bronzing of the leaves is common.		
Spotted Wing Drosophila	Fruit is mushy, often has tiny holes where the fly laid eggs.	Malathion, Imidan, Pyrethrum	Monitor for fly emergence, spray as soon as they emerge every 7 days through harves.