Bramble Insect Management Review

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Brambles (raspberries, blackberries and their plant relatives) are hosts for many insect species, some of which can become significant pest problems under certain conditions. Managing insect pests efficiently and effectively requires an understanding of each species biology and behavior, so that control strategies can be used to their best advantage. Preventing infestations of insects should be a primary part of any pest management program. Removing alternate hosts of bramble pests, including any and all wild bramble species is a critical step in preventing both insect and disease problems. These plants act as hosts and harbors for pest species. Growers should eliminate all wild brambles within 600 feet of the planting. Weeds can also act as hosts for insect pests, so good weed management is essential. Good sanitation in and around the planting, including the prompt removal of dead or injured canes will also reduce pest problems. Finally, encourage natural enemies of pests in your planting, such as predatory mites, lacewings and lady beetles, by using pesticides only when absolutely necessary, and avoiding broad-spectrum compounds that are very toxic to natural enemies whenever possible.

Raspberry fruitworm is a small (1/8 inch), brown beetle that feeds on raspberry leaves and flower buds in the spring. Feeding on the leaves occur near the top of the canes, and creates small, elongated holes between the veins of the leaves. The female beetles chew a small hole in the side of a flower bud and insert an egg into it. The small, white grubs feed within the ripening berries and often end up in the harvested fruit. The grubs eventually drop to the ground and pupate, overwintering as adults. Check flower buds for small holes chewed in the sides, or look for the ½ inch long, translucent grubs when picking or sorting fruit. Pesticide sprays should be applied as soon as flower buds emerge in the spring or when the damage is first noticed. Do not apply insecticides during bloom. Remove any wild brambles from the area, which act as hosts for this insect. Raspberry fruitworm tends to be more of a problem in weedy fields.

Tarnished plant bug is a small (¼ inch) bronze insect that feeds on the flowers and developing fruit of raspberries. The immature stage, or nymphs, are bright green and resemble aphids, but are much more active. The feeding results in fruit that are poorly developed, and may crumble or fall apart when harvested. This insect has a wide range of hosts. Controlling weeds in and around the raspberry planting will help reduce populations of this insect, but insecticide sprays may be necessary. Tap clusters of flowers or young fruit over a plate and look for the bright green, fast-moving nymphs. Sprays may be applied pre-bloom, if bugs are present and repeated after petal fall. Do not apply insecticides during bloom.

Strawberry bud weevil or "clipper" is a serious pest of strawberries, but it will also attack raspberries. This insect is a very small (1/8 inch) beetle with a copper colored body and a black head with a long snout. The female weevil lays eggs in raspberry flower buds and then girdles the buds, causing them to dry up and eventually fall off the stem. Recent studies have found that more than 50% of the buds may be destroyed in a field when this insect is present. Scout plantings

regularly as soon as flower buds begin to appear. If clipped buds are noticed, pre-bloom control measures can be applied.

Wasps such as yellow-jackets and bald-faced hornets can become serious pests of raspberries, especially during dry seasons, when they feed on ripe fruit and become a hazard to pickers. These insects are attracted to moisture and sugar, and are very difficult to discourage once they have discovered a good source. To prevent wasps from becoming a problem, harvest frequently and thoroughly. Do not allow over-ripe or injured berries to remain on the plants. Rotting or fermenting fruit is very attractive to wasps. Cover any nearby compost piles or trash receptacles. If you notice wasps starting to visit your field, try to find the insects' nest and destroy it. Wasps build nests underground, in hollow or rotten logs, in trees and in or on houses. Follow all precautions for using wasp-destroying compounds. If the nest cannot be found, several types of wasp traps are available which may offer some relief. The keys to successfully using traps are to determine the appropriate bait for the type of wasp, placing the traps out early, i.e. before the wasps become a problem, and deploying them around the perimeter of the entire field. Applying insecticides to the raspberries is not an effective method of controlling the wasps, because they are present when the fruit are ripe and pickers are present.

Japanese Beetles and Rose Chafers are relatively large insects that feed on raspberry foliage. Japanese beetles are about ½ inch long, robust, shiny and copper-colored with green markings. Rose chafers are also about ½ inch long, but are slimmer, dull, and buff-colored. The feeding habit of the two insects is similar, chewing holes between the veins of the leaves, resulting in a skeletonized appearance. The beetles may also feed on flowers and fruit. The larvae of both species live in the soil and are considered turf pests. When beetles are observed feeding in a raspberry planting they can be controlled with appropriate insecticide sprays applied to the foliage. Pheromone and scent traps are available to control Japanese beetles, but these are not effective in a commercial setting.

Aphids are small, green, soft-bodied insects that suck plant sap with straw-like mouthparts. These insects also transmit viruses from infected plants to healthy ones as they feed. Removal of wild brambles from the area around your planting will reduce the source of virus infections. Clear all wild brambles from within 600 feet of the planting. Keep weeds under control, because these may also act as hosts for viruses. If virus symptoms appear on your plants, dig up the infected canes, including the roots, and destroy them. Insecticides may be applied to control aphids when these insects appear. Some varieties of brambles (e.g. Royalty, Titan) are immune to aphid feeding, and thus are less susceptible to virus problems.

Potato Leafhopper adults are small (1/8") whitish-green, bullet-shaped insects which jump and fly erratically when disturbed. The immature or nymph stage are smaller and bright green and crawl sideways, like a crab, when disturbed. Both stages feed on the undersides of bramble leaves with piercing-sucking mouthparts, and inject a toxin into the plant tissue that causes the leaves to become distorted, and develop yellow streaking, commonly called "hopper burn". These insects often don't over winter in northern areas, but move in from southern states during the summer months. Scout for the adults by brushing the foliage and looking for small whitish insects to fly off. Look for nymphs on the undersides of the leaves. Insecticides and application timing is similar to aphid management.

Raspberry cane borer is one of the most common insects that infest raspberries. The adult form is a half-inch-long, narrow-bodied black beetle with long antennae and an orange band just below the head. The beetle chews two rings about 1/2 inch apart and three to six inches below the tip of a young cane, and inserts an egg in between them. The egg hatches and the larva, or grub, feeds inside the cane. The girdling rings made by the adult causes the cane tip to wilt, blacken and fall off. Cut off all wilted tips as soon as they are noticed just below the lowest girdle mark and remove them from the planting. Destroy any wild brambles in the area, which act as hosts for this pest. These two practices should bring this insect under control. An insecticide spray just prior to bloom may offer some control of the adults.

Red-necked Cane Borer is a ¼ inch long, slender, black beetle with short antennae and a reddish-orange band just below the head. The female beetle inserts an egg into young bramble primocanes near the base. As the larvae develop, a round swelling appears on the cane that may vary in length from ½ inch to nearly three inches. Infested canes become weakened from the larval feeding. During pruning in the early spring, remove all canes that show swellings. Eliminate any wild brambles nearby that act as alternate hosts for this insect. Insecticide sprays may be applied just prior to bloom to control the adults, but regular removal of infested canes and destruction of wild brambles often provides adequate control.

Raspberry Cane Maggot adults closely resemble a small housefly. The flies appear in early spring and lay eggs in the tips of primocanes. The larvae (maggots) tunnel about 6 inches down into the pith of the cane then turn outward and girdle the shoot. The tip of the cane above the girdled area wilts and dies. Although this injury looks very similar to raspberry cane borer damage, it occurs earlier and no external girdling is visible. The maggot continues boring down through the pith to the base of the plant where it pupates and overwinters. Generally, raspberry cane maggot seldom causes serious injury to a planting.

Raspberry Crown Borer is a clear-winged moth that resembles a yellow-jacket. The moths lay eggs on the undersides of raspberry leaves during late July and August. The larvae overwinter in the soil and the following spring they bore into the base of the raspberry canes to feed. Infested canes become weak and spindly. The leaves may brown along the margins and wilt. Eventually, the plants may die. Scout for the adult moths in late July and August. If moths are found, or canes with larval feeding symptoms have been noticed, insecticide drenches applied in the fall or early spring may provide control of the larvae. Elimination of all wild brambles in the area may also reduce local populations of this pest.

Two-spotted spider mites are very small (1/50 inch), insect-like creatures with oval, translucent bodies and two dark spots on their backs. They feed on raspberry foliage, sucking out plant juices and causing a white or bronze stippling on the leaves. If the plants are heavily infested, fine webbing may be seen on the leaves, which eventually turn brown and die. Mites may also move onto the fruit. Predatory mites such as *Amblyseius fallacis* may be released into an infested field and can provide significant control of spider mites, although the results are not immediate. To encourage natural predator populations, avoid the use of broad-spectrum pyrethroid insecticides, which are highly toxic to predatory mites.