Insects

Fruit and Foliage Insect Pests

Raspberry Fruitworm (*Byturus rubi*): The raspberry fruitworm is a small (1/4") brown beetle which feeds on the flower buds and leaves of raspberry plants during the spring and early summer. Female beetles lay eggs on the flowers and green fruit. The grubs that emerge are yellowish white, and feed on the fruit, attaining about 3/8" in length. Many of the flowers and fruit can be destroyed by this insect, and the larvae may end up in the harvested fruit, greatly reducing customer appeal.

Management: There is some evidence suggesting that this insect is more of a problem in weedy plantings. If early damage is noted, (e.g., small holes chewed in flower buds and skeletonizing of leaves), cover sprays should be applied prior to bloom. Adults (beetles) tend to be most active and noticeable on plants in the early evening hours. See pest management schedule for recommended materials and timing.

Tarnished Plant Bug (*Lygus lineolaris*): The tarnished plant bug (TPB) is a small (1/4") bronze-colored insect with a triangular marking on its back. The immature stage, or nymph, is smaller and bright green, resembling an aphid, but much more active. Both adults and nymphs feed on the developing flowers and fruit, sucking out plant juices with straw-like mouthparts. This results in deformed fruit, with a few to many drupelets not enlarging, depending on the severity of the damage. Such fruit tend to crumble easily, and are generally unmarketable.

Management: Controlling weeds in and around the planting may reduce populations of this insect, but insecticide sprays may be necessary, applied prebloom and repeated after petal fall. If mowing around fields, do so after insecticides have been applied (to control migrating insects). Avoid planting alfalfa (which attracts high populations of TPB) near raspberries. White sticky traps are available for monitoring tarnished plant bug adults. These traps are used as an indication of when plant bugs begin their activity in the spring and a relative indication of their abundance, not as an indication of when to control this insect. Immature TPB (nymphs) are sampled by shaking flower trusses over a flat white surface. Thirty flower clusters should be sampled evenly from across the field (typically 6 clusters at 5 locations or 5 clusters at 6 locations). If 4 or more flower clusters are infested with nymphs (regardless of how many) a spray is recommended. A follow-up spray application may be made after bloom if TPB are still present in high numbers (check harvest interval before selecting material). See pest management schedule for recommended materials and timing. Do not apply insecticides during bloom.

Strawberry Bud Weevil (*Anthonomus signatus*): The strawberry bud weevil or "clipper" is an important pest of strawberries, but will also attack raspberries. This insect is a very small beetle (1/8") with a copper-colored body and a black head with a long snout. The female weevil chews a small hole in unopened flower buds and lays an egg in the hole. She then girdles the stem just below the bud. The flower bud dries and dangles from the stem, eventually falling to the ground. The immature weevils, or grubs, develop in the girdled buds, emerging as adults in the early summer, and the migrating to wooded areas. These insects are not always present and may only cause minimal damage in raspberries.

Management: Examine the plants before bloom, and look for dead or clipped-off buds. Insecticides which are applied prebloom for control of raspberry fruitworm may also control this insect. See pest management schedule for recommended materials and timing.

Two-Spotted Spider Mites (*Tetranychus urticae*): Spider mites are very small (1/50"), insect-like creatures that feed on raspberry foliage, sucking out plant juices and causing a white stippling or bronzing of the leaves. Under heavy infestations, leaves will turn brown and be covered in a fine webbing. Adults may also move onto the fruit, reducing consumer appeal by their presence. There is currently little available for chemical control of this pest. Foliar sprays of diazinon may suppress populations of spider mites, but this chemical may also reduce populations of natural predators which feed on the spider mites.

Management: There have been some reports that soaking sprays of water applied at relatively high pressure may temporarily suppress mite populations. Several companies now commercially produce predatory mites which feed on spider mites. These predators can be released in raspberry plantings and may provide some control of spider mites, but

research is needed to determine appropriate release rates and timing. It is important, however to encourage natural enemies of spider mites by reducing the use of pesticides which harm natural enemies, such as benomyl. See source list at end of this guide for predatory mites.

Aphids: Aphids are small, pear-shaped, soft bodied insects which feed on plant sap with straw-like sucking mouthparts. Several species of aphids ranging from 1/16" to 1/8" in size, and dull yellow to bright green in color feed on raspberries. Most are wingless and slow moving. These insects tend to congregate on the underside of leaves, where their feeding causes the leaves to curl downward and be deformed. The most damaging aspect of aphid feeding is the spread of viruses. Aphids will take in a virus from infected plants, and later inject it into healthy plants. The virus then spreads throughout the plant, resulting in symptoms such as mosaic, leaf curl or stunting.

Management: To reduce the incidence of aphids and viruses, start with certified virus-free plants; eliminate all wild brambles from within 600 feet of the planting; apply insecticides when aphids are first noted in a planting; and rogue out all plants which exhibit virus symptoms. See pest management schedule for recommended materials and timing. The varieties Canby and Titan are resistant to aphid feeding.

Japanese Beetles (*Popillia japonica*): Japanese beetles are about 1/2" long and copper-colored, with metallic green markings. They feed on raspberry foliage, skeletonizing the leaves during the mid and late summer. The larvae, or grubs, live in the soil, feeding on roots of grasses.

Management: The beetles can be controlled with sprays of carbaryl or malathion. Traps are also available which use a sex and/or feeding attractant to capture the bugs in a can or plastic bag, but such traps may not provide adequate control. Place traps near, but not in the planting. Traps placed within a planting may cause localized damage from beetles which are attracted to, but don't fall into the trap.

Yellowjackets: Yellowjackets, sometimes called hornets or wasps, are large, up to one inch or more, black and yellow stinging insects. Their closely related cousins are black and white and are known as whitejackets and bald-faced hornets. Both groups of these insects are very aggressive and will sting with little provocation.

There are several species of this group of wasps found in the Northeast. Depending on the species, the yellow jacket builds its nest underground or in hollow/rotten logs or builds a large paper nest in trees or on houses. The workers scavenge food, often meat such as insects or pieces of flesh from dead animals. However, yellowjackets also have a great fondness for ripe or injured fruit. These insects can be found on pears, apples, raspberries, etc., using these fruit for sugar and moisture which, like the meat, is taken back to the nest to feed the larvae.

This fondness for fruit makes this insect a severe nuisance pest in raspberries. They are a danger and annoyance to pickers. Pickers frequently refuse to harvest when yellowjackets are present, thus allowing the crop to get overripe and attracting more wasps. To help discourage the yellowjacket from feeding on raspberries, be sure to harvest berries as soon as they begin to ripen, even though there may be only a few early berries. Once the yellowjackets have discovered the berries, it is almost impossible to discourage them.

Management: Insecticide sprays for control of yellowjackets are not effective or recommended unless you know where a nest is and can eradicate it with a household hornet spray. This is best done in the evening when most of the members of the colony are in the nest. Yellowjackets can be discouraged by sanitation, which is regular and thorough, picking of all berries as soon as they begin to ripen, and frequent removal of overripe fruit and fruit debris.

Traps may be put up around the perimeter of the planting before the berries begin to ripen. There are many yellowjacket traps on the market, and various baits (fish, meat, jam, honey, beer, yeast, etc.) have been used with some success. Our (eastern) species of yellowjackets do not respond to trapping as well as western species. Different baits and traps may have to be tried to determine if any traps/baits will work in a particular raspberry planting. Some plantings may be infested with species of yellowjackets that do not respond to any of the commercially available traps. Fish traps, made with a fish suspended over a tub of soapy water, can be effective against all species. If traps are to be used, the key to success is to get the traps out early. Once yellowjackets have found the ripened fruit, the traps will probably not be of much help.

Cane Insect Pests

Cane Borers: Raspberries are attacked by two types of cane borers. The ***raspberry cane borer*** is a 1/2" long, slender black beetle with an orange band just below the head and has long antennae. The female beetles girdle the tips of young raspberry canes by chewing two rings, about a half inch apart, around the stems about 3 to 6" below the top. An egg is inserted into the cane between the two girdled rings. When the larvae, or grubs, emerge, they feed inside the cane, tunneling downward, and eventually destroying the cane. Soon after the cane tips are girdled, they wilt, blacken, and may fall off.

Management: As soon as the wilted tips are noticed, they should be cut off, several inches below the lowest girdle mark. Remove the infested tips from the field and destroy them. Also eliminate any wild brambles near the field which may be harboring this pest.

The ***red necked cane borer*** is 1/4" long, slender, black with a "coppery" neck. Unlike the raspberry cane borer, it has short antennae. The red necked cane borer also causes a different sort of damage. The females insert an egg into young canes, usually within 10" of the base of the cane. They do not girdle the cane, but the presence of the egg, and later the grub, causes a swelling in the cane which can vary in length from
1/2" to nearly 3". These canes become weakened and may break off.

Root and Crown Insect Pests

Raspberry Crown Borer (*Bembica marginata*): The adult phase of raspberry crown borer is an attractive clear-winged moth which resembles a wasp. These moths lay eggs on the underside of raspberry leaves in late July and August. When the eggs hatch, the young larvae crawl down the cane and into the soil to overwinter. The following spring, they bore into the base of the raspberry canes and feed on the plant tissue. This feeding interrupts the flow of water and nutrients to the cane, causing them to wilt and become weak and spindly. Early symptoms may include browning of the leaf margins on new canes. Eventually, the entire crown may die.

Management: If this insect is noticed in the field, it can be controlled by drenching around the base of the plants with diazinon in the spring before bud break, or with Sniper™ before harvest. Elimination of all wild brambles in the area can also reduce local populations of this pest.

Table 37. Bramble pest management schedule†.

Pest	Spray Material, Rate/A (pre-harvest interval)	Cultural Practices and Scouting Notes	Comments
Early spring, prior to bud swell			
Phytophthora root rot	Ridomil Gold EC, 1/4 pt/1000 linear ft. (45) Ridomil Gold GR, 5 lb/1000 linear ft. (45) Aliette 80 WDG, 5 lb (60)	Plant only in well-drained soils. Planting on raised beds also significantly reduces Phytophthora incidence. Cultivars 'Latham' and 'Newburgh' appear to be somewhat resistant.	Apply **Ridomil** in 3 ft wide band over the row in early fall; repeat in early spring before growth begins. Apply **Aliette** in sufficient water to thoroughly wet the foliage. Begin foliar sprays in the spring after bud break and continue spraying on a 45-60 day schedule up to a maximum of 4 sprays during the growing season.
Crown borers	Diazinon AG500, 2 qt (7) *Sniper 2E, 4-8pt (4)		Apply **Diazinon** as heavy drench to base of canes before bud break. Apply **Sniper** as heavy drench before harvest.
Early spring to bud swell			
Anthracnose Spur blight Cane blight	Lime sulfur, 10-20 gal (0) Kocide 101, 4 lb (0) Cabrio EG, 14 oz (0)	Prune out all canes which have fruited, thin remaining canes to only 3 to 4 per foot of row. Plant rows should be no wider than 2 feet. Remove and destroy all prunings and diseased canes.	DO NOT apply after buds are 1/2 inch long or plant damage will result. **Cabrio** Fungicide is labeled for Anthracnose and spur blight. Only 4 applications allowed per season, NO MORE than 2 sequential applications.