

2005 SPRING ROUND UP OF SMALL FRUIT ATHROPOD PESTS

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Management of arthropod pests begins in earnest as the temperatures increase and the growing season gets under way. Before reviewing the list of **potential** arthropod pests for each of the major berry crops, I want to summarize some changes in chemical control options included in the 2005 version of the Pest Management Guidelines for Berry Crops. Over the next few years, use of Azinphos-methyl (Guthion 50WP) will be restricted or lost. New labels have been developed to reflect these changes and product with the old labels could only be sold up until November 2003. Growers can continue to use older labeled product if registered in New York State until its used up, but be aware that only five Azinphos-methyl labels are currently registered. Check the following web site: <http://pmep.cce.cornell.edu/pims/current/>. Azinphos-methyl products currently registered in NY include: Guthion Solupak 50WSB (EPA# 3125-301, discontinued and expires 9/30/06), Guthion Solupak 50WSB (EPA# 264-733), Azinphos-M 50 WSB (10163-78, discontinued and expires 9/30/05) and Azinphosmethyl 50W (51036-164). Strawberries are no longer labeled. Caneberries will probably only be supported through 2005 and only for one pest (raspberry crown borer). Guthion can still be used on blueberries (for maggot, fruitworms, plum curculio, lecanium scale) through the 2005 field season at least, but EPA is reviewing use on blueberries and it is possible there will be an extension. U-pick operations should be aware that the general public is not allowed to enter a Guthion-treated blueberry field within 30 days of application. Thanks to Dan Gilrein, CEE from Suffolk County for updated information on azinphos-methyl as well as other pesticide related news.

The DEC has approved tolerances for additional crops for the neo-nicotinoid insecticide imidacloprid (mainly effective against sucking insects like whiteflies, aphids, and spittle bugs but also some beetle species) including strawberries, currants, and gooseberries. Note that there have been label changes in just the past 6 months (after the guidelines went to press). Initially Provado 1.6F included strawberry on the label for use against whiteflies and aphids. On the new label for Provado 1.6F strawberry is not included, although currants and gooseberries are. However, strawberry is now listed on the systemic formulation of imidacloprid, Admire for the control of aphids and whiteflies. This needs to be applied through the drip line or as a plant or hole treatment at planting (14 days PHI for Admire, max of 24 fluid ounces/Acre per season, don't use both application methods on the same crop in the same season). Note that the federal label for both Provado 1.6F (aphids, leafhoppers, Japanese beetle adults, thrips and blueberry maggot) and Admire (Japanese beetle adults, white grub larvae) now lists blueberry and this use has been approved by DEC. Restrictions for Provado 1.6F on blueberries include a PHI of 3 days, max interval between applications of 7 days, max total amount per season of 40 fluid ounces/A, and max application volume of water of 20.0 GPA for ground application, and avoid application during prebloom and bloom to protect pollinators). Restrictions for Admire on blueberries include a 7-day PHI and max amount per season of 32 fluid ounces/A). Note also that the DEC has decided, due to concerns regarding ground water contamination, to classify Provado and Admire as restricted use compounds as of 1/1/05, including product you have in storage from last year. Thus, the use of this product is limited to persons who are certified applicators.

Finally, the miticide Zeal (etoxazole) has been labeled for use against two-spotted spider mite on strawberry. Zeal is an insect growth regulator, which negatively influences the growth process (molting between immature stages of the mite). It also sterilizes adult mites, although it will not kill them. Because of its mode of action, Zeal probably is best used early in an infestation, much like Savey.

Blueberries

A number of species of **scale insects** feed on the twigs of blueberry and can greatly reduce plant vigor. Look for the hard-covered female scale on small branches early in the spring. A dormant oil spray (2-2.5%) applied at bud swell, but before the first leaf stands out, can be effective in reducing scale populations. **Cranberry Fruitworm** and **Cherry Fruitworm** are the main blueberry arthropod pests in the spring and early summer. These moths overwinter as fully-grown larvae. They pupate in the spring and begin flying in late May and early June (around the time of flowering). Egg laying begins at around petal fall with eggs being placed at the base of newly set fruit. A sex pheromone is available to monitor the flight activity of adult **cranberry fruitworm** (Great Lakes IPM, www.greatlakesipm.com, 989-268-5693). Two applications of an insecticide such as Confirm or Guthion, starting at petal fall and 10 days later, are required for sites with heavy pressure. Research in New Jersey indicates that in areas of moderate pressure, one application 5 to 7 days after petal fall provides as good control as two applications. Other pests to keep an eye out for are **plum curculio** (notice crescent-shaped scar created from egg-laying on young fruit), **leafrollers** (larvae make shelters by silking together terminal leaves), and **blueberry tip borer** (larvae bore into stem causing shoot tips to die back). Of course, later in the summer you need to be alert for **blueberry maggot flies**, **blueberry stem borer**, and **Japanese beetle** (more on these in next newsletter).

Raspberries

There are a number of potential pests of raspberries to be concerned with early prebloom to postbloom. Be on the alert for feeding damage from the adult **raspberry fruitworm** (a beetle, light brown in color) on foliage and fruit buds. The larvae of this beetle pest feed inside flower buds and young fruit. Adult feeding damage on foliage creates a skeletonized appearance somewhat similar to the feeding damage caused by larvae of **raspberry sawfly** (pale green caterpillar-like body with many long hairs). Both the fruitworm and the sawfly appear during the prebloom period. Carbaryl [Sevin] is labeled for both of these pests and the timing is similar as is Spintor [spinosad]. **Tarnished plant bug (TPB)** is another potential problem for raspberry growers during the period from bloom to harvest. Both the adults and their nymphs can cause deformed fruit, although the deformities are not as obvious in raspberries as in strawberries where TPB is also an important pest (see below). We do not have a good estimate of the economic threshold for TPB in raspberries but a rough guide would be 10 to 20% of canes infested with adults or nymphs. Carbaryl is labeled for control of TPB on raspberry. Its not the most effective material on plant bugs but pretty much all we have with plant bugs specifically on the label. Malathion can be effective against TPB, but I have yet to find a product registered in NY with plant bug on the label for caneberries. Note that weedy fields aggravate TPB problems. **Raspberry cane borer** and related beetle species make their appearance during this period. The adults emerge in the spring, mate and start laying eggs. Larvae bore into canes during the season and for some species, the next season. They cause injury and death to canes and potentially entire crowns. The best time to kill adults is during the late prebloom period (for summer-bearing raspberries), although note that there is nothing specifically labeled for it now that methoxychlor [Marlate] is no longer available. As an alternative to insecticides, during the season remove wilted shoot tips below the girdled stem (two rows of punctures around an inch apart) where the egg of the raspberry cane borer has been placed. Also, during the dormant season remove and destroy canes with swellings. Another pest that can cause serious injury to canes and the crown is the **Raspberry crown borer**. The larvae of this moth feed at the base of the cane and into the crown over a two-year period. The first signs of a problem often appear during fruit maturation. The withering of and dying of canes, often with half matured fruit, can be a symptom of feeding damage at the base. Canes with these symptoms, and the associated crowns, should be removed during the growing season and destroyed. The adult moth actually does not appear until later in the summer (early August). It is a very attractive moth, which superficially resembles a yellow jacket. Guthion is labeled for use against raspberry crown borer larvae through the 2005 season. Apply to lower parts of canes and soil only in spring to summer (you are only allowed 2 applications per season, at least 10 days apart). As noted above, the general public is not allowed into the planting within 30 days of application. During the spring

and into the summer you may find two species of aphids that attack raspberries, **large raspberry aphid** and **small raspberry aphid**. Feeding damage by aphids causes leaf curling and reduced growth of shoots. The more important injury comes from viruses transmitted by the aphids (raspberry mosaic virus by the big aphid and raspberry leaf curl virus by the small aphid). This can be a particular problem for nursery plants. Both Malathion 57 EC and Di-Syston (disulfoton) are labeled for aphids, but Di-Syston is restricted for use for nursery stock. Finally, I should mention **two-spotted spider mite (TSSM)** as a potential pest. These tiny spider-like arthropods can become very numerous on foliage, causing white stippling on leaves. They seem to be most problematic in dry sites and/or in mild growing areas such as the Hudson Valley and Long Island. As of a couple of years ago there is a miticide registered in New York for control of TSSM (Savey DF). Predatory mites can also provide control of TSSM. These beneficial mites are frequently naturally present in raspberry fields, especially where few broad-spectrum insecticides are used, but can also be purchased from a supply house. For both Savey and predatory mites, it's important to start control actions early before you see lots of severe injury to foliage (bronzing). Additional arthropod pests that might show up later in the season (bloom to harvest) include **Root weevil**, **Japanese beetle**, **picnic beetle**, and **potato leafhopper**.

Strawberries

During the prebloom period the **strawberry bud weevil (clipper)** is the main arthropod pest to watch out for. In recent years, we have learned that many strawberry cultivars, such as Jewel and Seneca, can tolerate a fair amount of bud loss from this pest, although at sufficient densities, it can still be a problem. As a rough rule of thumb, treat for clipper when you observe more than one clipped primary or secondary flower bud or more than 2 tertiary buds per truss, on more than one truss per foot of row. Note that once flowers are open they are no longer at risk from clipper. Clipper often is a more severe problem along borders of plantings, near woods. Lorsban [chlorpyrifos] and Brigade [bifenthrin] are labeled for clipper in New York. Also during the prebloom period, and extending through harvest, and sometimes after renovation, the **two-spotted spider mite** can be a problem in some plantings. Look for whitish or yellowish stippling on leaves. Current threshold is 5 mites per leaf or about 25% of leaflets have at least 1 mite. This is likely a conservative threshold for a healthy planting. There are several compounds labeled for mites on strawberries in New York: Kelthane [dicofol], Vendex [hexakis], Agri-mek [abamectin], Savey [hexthiazox], Zeal (etoxazole). Acramite (non bearing crops), Danitol [fenpropathrin] and Brigade. Kelthane, Danitol, and Brigade are hard on predatory mites. Agri-mek label calls for 2 applications, 2 weeks apart. For all these materials, coverage is very important, especially on the underside of leaves. **Tarnished plant bug (TPB)** is the key insect pest of strawberries during bloom to near harvest. Both adult bugs and the nymphs cause injury (deformed fruit) but nymphs are probably of the greatest concern for June-bearing cultivars. The economic threshold is half a nymph per flower cluster (you sample by tapping cluster over a white plate and counting nymphs that fall off). It is worth sampling for this pest on a regular basis since it varies in population size from place to place and from one year to the next. *Spraying a pesticide when nymph counts are below threshold costs you money and may kill beneficial arthropods unnecessarily.* Good weed management can help reduce problems with TPB. **Cyclamen mite** is a potentially serious pest that seemed to show up in more fields than usual three years ago but was not very prevalent recently. The mites get active in the spring with populations peaking after bloom. The mites like to feed on young leaf tissue (just as the leaves are unfolding). The mites themselves are difficult to see without a good hand lens. Cyclamen-damaged leaves tend to be stunted and crinkled. Prior to bloom or after renovation are good times to treat for this pest. Kelthane and Thiodan [endosulfan] are labeled for use against cyclamen mites. Use lots of water for thorough coverage. Two more insect pests deserve mention at this time. The first is **Strawberry sap beetle (SSB)**. This small, brownish beetle seems to be increasing as a pest in New York strawberries. Both the adult beetles and the larvae feed on ripe and overripe fruit. We still are exploring the best ways to control SSB. Two pyrethroids are labeled in New York for its control: Danitol and Brigade. Note that Brigade does not have a preharvest interval while for Danitol it is 2 days. However, Brigade is more expensive. For both materials, good coverage is likely to be important for its control. Note that SSB probably does not move into strawberry fields

in significant numbers until fruit begins to ripen. **Spittlebug** starts appearing on leaves, stems, and flowering racemes about this time (bloom) and extending into harvest. They overwinter as eggs in the soil and hatch out as temperatures rise in the spring. The nymphs crawl up the plant and begin feeding on the xylem tissue (the water conducting vessels of the plant). There are not a lot of nutrients in xylem and therefore nymphs need to process a lot of sap, extracting the few nutrients out for their use and excreting the remaining water. This water is frothed into white spittle, which helps protect the nymphs from desiccation and natural enemies. You can often find several nymphs within a spittle mass. Feeding by spittlebugs, if extensive, can stunt plants and reduce berry size. Perhaps more importantly, the spittle masses are a nuisance to pickers. Threshold for spittlebug masses is 1 mass per foot row. Thiodan, Brigade, Danitol, and Provado are labeled for use against spittlebugs. Weedy fields tend to have more problems with spittlebugs. **Root weevil** (there are several species) is the last strawberry pest I want to discuss in this issue. The larvae feed on roots and crowns and when abundant can cause serious damage to plantings. Beds with heavy infestations show distinct patches or spots that appear stunted and have reduced yields. Drought stress aggravates the injury from larval feeding. Chemical control (Brigade) is targeted at the adults that emerge in mid to late June. Look for characteristic adult feeding damage on leaves (notching from the edge) to help determine timing. The adults feed for a few days before starting to lay eggs. Some growers have also had success controlling root weevil larvae using parasitic nematodes. These can be applied either in the spring (late April and early May) and/or in the fall. Use sufficient water to get good penetration. Rotation out of strawberries is the best remedy for root weevils. They are wingless and do not move a great distance. However, new plantings should be placed 50 meters or more from an infested planting.

Currants and Gooseberries

Over the past few years we have been seeing a fair amount of leaf cupping caused by the **Currant Aphid**, especially on red currant plants. In addition to leaf cupping, rounded galls form on the topside of the leaves in response to the presence of aphids in pockets on the underside. An economic threshold for currant aphid has not been worked out. Malathion is labeled for currant aphid on currants, applied as leaf buds are opening. Recently Provado has been labeled for currants and should be quite effective against aphids. **Imported Currant Worm** (ICW), when present, can cause considerable injury to foliage. The adult, which becomes active in the spring, is wasp-like in appearance (indeed it's in the wasp group, but part of a primitive line called sawflies that are herbivorous as larvae). Eggs are laid along the midrib or on the undersides of the leaves. Larvae of the first brood appear in spring, shortly after leaves are out. They initially feed in colonies but as they become larger, feed singly. A second brood of larvae is produced in early summer and in some years a partial third brood is produced later in the summer. Malathion is labeled for use against ICW. Another currant and gooseberry pest to be on the look out for in the spring is the **currant borer**. A relative of the raspberry crown borer, the adult moth has clear wings, blue-black body with yellow markings resembling a wasp. The adult emerges in the spring, mates and begins laying brownish eggs on the bark of canes. After hatching, larvae burrow into canes and begin feeding within the pith. No insecticides are labeled for currant borer although removal of weak canes in the spring and fall will help keep populations down. Other pests that might be observed attacking currants and gooseberries in the spring to early summer include the **currant stem girdler** (lays an egg in shoot tips and then girdles stem below) and **gooseberry fruitworm** (larvae feed inside young fruit, sometimes weaving portions of stems together with silk).

(Editor's note: See [NYBN Vol. 3 No. 4](#) for pictures of the pests described above)

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