Horticulture 2020 Newsletter

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Video of the Week: Common Tomato Problems; Part 1
K-State Garden Hour Webinar Series: Bugs Galore: Bagworm, Japanese Beetle, Mosquitoes and Other "Bug" Related Pests (be sure to register)

UPCOMING EVENTS

The 2020 Kansas Turfgrass Field Day is Canceled
The 2020 Kansas Turfgrass Field Day scheduled for Thursday, August 6 in Manhattan is canceled due to the complications arising from COVID-19.

The K-State campus is not allowing face-to-face contact through July 31. In addition, although turf research is continuing at Rocky Ford, the Olathe Horticulture Center, and the Pair Center, all centers are closed to the public and researchers must minimize their time at the facilities. We do plan to post written and video research updates through the remainder of the year on the Turf and Landscape Blog, accessible through our website, ksu.edu/turf. Next year's Kansas Turfgrass Field Day will be at the Rocky Ford Turfgrass Research Center in Manhattan on August 5, 2021. We are looking forward to seeing you at the 70th Kansas Turfgrass Conference, December 8, 9, and 10, 2020 in Topeka, KS.

Reminders

- Renovate strawberry beds after last picking of fruit by cutting off leaves, fertilizing and narrowing row to 10 inches. https://tinyurl.com/y7mlwn3k
- Check for bagworms and spray if needed. https://tinyurl.com/yaoawohb

VEGETABLES

Hornworms on Tomatoes

Hornworms are the largest larval insect commonly seen in the garden. Though usually seen on tomato, they can also attack eggplant, pepper, and potato.

The larval stage of this insect is a 3 ½- to 4-inch long pale green caterpillar with five pair of prolegs and a horn on the last segment. The two most common hornworms are the tobacco hornworm (seven diagonal white stripes and, most commonly, a red horn) and the tomato hornworm (v-shaped markings with a horn that is often blue or black).

The adult of the tobacco hornworm is the Carolina sphinx moth. The five-spotted hawk moth is the adult of the tomato hornworm. Both moths are stout-bodied, grayish-colored insects with a wing spread of 4 to 5 inches. The larva is the damaging stage and feeds on the leaves and stems of the tomato plant, leaving behind dark green or black droppings.

Though initially quite small with a body about the same size as its horn, these insects pass through four or five larval stages to reach full size in about a month. The coloration of this larva causes it to blend in with its surroundings and is often difficult to see despite its large size. It eventually will burrow into the soil to pupate. There are two generations a year.

This insect is parasitized by a number of insects. One of the most common is a small braconid wasp. Larva that hatch from wasp eggs laid on the hornworm feed on the inside of the hornworm until the wasp is ready to pupate. The cocoons appear as white projections protruding from the hornworm's body. If such projections are seen, leave the infected hornworms in the garden. The wasps will kill the hornworms when they emerge from the cocoons and will seek out other hornworms to parasitize.

Handpicking is an effective control in small gardens. Though large, these larvae are surprisingly difficult to see. Missing foliage is often the first clue that you have an interloper. Bt (Dipel, Thuricide), spinosad (Conserve; Colorado Potato Beetle Beater Conc; Captain Jack's Dead Bug Brew, Monterey Garden Insect Spray), cyfluthrin (BioAdvanced Vegetable & Garden Insect Spray) and other insecticides may also be used to control hornworms. Pay attention to the harvest interval. The harvest interval is the number of days between when the spray is applied and when the fruit can be harvested. (Ward Upham)

Squash Bugs

Squash bugs are the grey, shield-shaped bugs that feed on squash and pumpkin plants. If you have had problems with these insects in the past, you know that they are almost impossible to control when mature. This is because the squash bugs have a hard body that an insecticide has difficulty penetrating. Thus, spraying when the insects are small is important. Look on the underside of the leaves for cluster of brick-red eggs and small green insects with black legs. These nymphs will eventually become adults, which will lay eggs that will become the second generation. The second generation is often huge and devastating. Therefore, it is important to control as many squash bugs of the first generation as possible.

Because squash bugs feed by sucking juice from the plant, only insecticides that directly contact the insect will work. General use insecticides such as permethrin (Bug-B-Gon Multi-Purpose Garden Dust; Green Thumb Multipurpose Garden and Pet Dust; Bug-No-More Yard and Garden Insect Spray; Eight Vegetable, Fruit and Flower Concentrate; Garden and Farm Insect Control; Lawn & Garden Insect Killer), malathion, and methoxychlor provide control if a direct application is made to young, soft-bodied squash bugs. This means that you MUST spray or dust the underside of the leaves because this is where the insects live. (Ward Upham)

Physiological Leaf Curl in Tomatoes

Every year we have calls from gardeners who have tomato plants with leaves that curl up. When tomato plants grow vigorously in mild, spring weather the top growth often exceeds the root development. When the first few days of warm, dry summer weather hit, the plant 'realizes' that it has a problem and needs to increase its root development. The plant tries to reduce its leaf area by rolling leaves. The leaves curl along the length of the leaf (leaflet) in an upward fashion. It is often accompanied by a thickening of the leaf giving it a leathery texture. Interestingly,

leaf roll is worse on some varieties than others.

Though rolling usually occurs during the spring to summer shift period, it may also occur after a heavy cultivating or hoeing, a hard rain, waterlogged soil or any sudden change in weather. This leaf roll is a temporary condition that goes away after a week or so when the plant has a chance to acclimate, recover from injury, or the soil has a chance to dry out. (Ward Upham)

TURF

Grub Control in Lawns

If you plan on using a grub preventative on your lawn, the first half of July is a good target date for most products. Preventatives are normally used on areas that have had a history of grub problems.

Traditional grub insecticides such as Dylox or carbaryl (Sevin) are normally applied in late July after grubs are present or as a rescue treatment once damage is seen. Products that contain Merit (imidacloprid) are considered grub preventers. Actually, these products do not prevent grubs, but rather kill grubs when they are quite small, and long before they cause damage. Merit is safer to use around pets and humans than traditional grub killers. Merit can be found in BioAdvanced Season-Long Grub Control, Bonide Grub Beater, Gordon's Grub No-More and Hi-Yield Grub Free Zone II and III.

Another grub preventer with the trade name GrubEx contains chlorantraniliprole. Though this product is very effective, it is less water soluble than imidacloprid. It should be applied earlier, preferably April or May, but applications through June should still be effective. Remember, all grub products should be watered in soon after application. (Ward Upham)

Controlling Yellow Nutsedge in Lawns

Yellow nutsedge is a relatively common problem in lawns, especially in wet years or in lawns with irrigation. Although sedges look much like a grass, they are different.

Unlike grasses, sedges have triangular stems, and the leaves are three-ranked instead of two-ranked, which means the leaves come off the stems in three different directions. Yellow nutsedge is pale green to yellow and grows rapidly in the spring and early summer. Because of this rapid shoot growth, it

sticks up above the rest of the lawn only a few days after mowing. This weed is a good indicator of poor drainage, but it can be introduced into well-drained sites through contaminated topsoil or nursery stock. As with many weeds, nutsedge is less competitive in a dense, healthy lawn than in an open, poor lawn.

Nutsedge is difficult to control culturally because it produces numerous tubers that give rise to new plants. Pulling nutsedge will increase the number of plants because dormant tubers are activated. However, it is possible to control nutsedge by pulling, but you must be persistent. If you are, eventually the nutsedge will die out though this will likely take more than one season.

If you were going to treat with an herbicide, it would be better to leave the nutsedge plants undisturbed so the herbicide can be maximally translocated to the roots, rhizomes, and tubers. Several herbicides are available for nutsedge control.

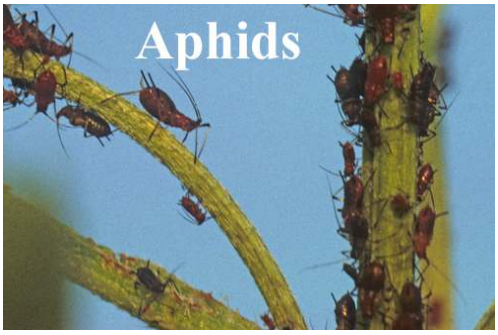
SedgeHammer and Hi-Yield Nutsedge & Horsetail Control contain halosulfuron and are effective and safe products. The SedgeHammer label says to apply after the nutsedge has reached the three- to eight-leaf stage. Waiting until this growth stage apparently results in improved translocation of the active ingredient to the underground tubers and rhizomes.

Products with sulfentrazone such as Bonide Sedge Ender, Ortho Nutsedge Killer and Spectracide Weed Stop for Lawns Plus Crabgrass Killer are also effective.

Research has shown that the first application should go down by June 21. If the initial spray is after June 21, mature daughter tubers may be stimulated to grow. (Ward Upham)

MISCELLANEOUS

Fundamentals of Using Soaps as Insecticides



Insecticidal soaps are classified as biorational or "reduced risk" insecticides and are used in certain situations because they leave minimal residues, are less toxic to humans, and are short-lived in the environment because they degrade rapidly. A soap is a substance derived from the activity of an alkali such as sodium (hard soap) or potassium (soft soap) hydroxide on a fat. In general, fats are a blend of particular fatty acid chain lengths. Soap is a general term for the salts of fatty acids. Soaps may be combined with fish, whale, vegetable, coconut, corn, linseed, or soybean oil. For example, "Green Soap" is a potassium/coconut oil soap that was used widely as a liquid hand soap in public restrooms. It is now available as a hand soap or shampoo, and has been shown to be effective, as an unlabeled insecticide, in controlling soft-bodied insects.

Commercially available insecticidal soaps containing the active ingredient, potassium salts of fatty acids, are used against a variety of soft-bodied insect and mite pests including aphids, scales, mealybugs, thrips, whiteflies, and the twospotted spider mite, *Tetranychus urticae*. The young life stages (nymphs, larvae, or crawlers) are most susceptible to soap applications. Soaps have minimal activity on beetles and other hard-bodied insects although this is not always the case as certain soaps have been shown to kill hard-bodied insects such as cockroaches. Soaps are effective only when insects or mites come into direct contact with wet spray residues. Dried residues on plant surfaces have minimal insect or mite activity as soap residues degrade rapidly; especially under sunlight (ultraviolet

light).

The mode of action of soaps is still not well-documented; however, soaps may kill insect and mite pests in one of three ways. First, soaps may work when fatty acids penetrate through the insect's outer covering (cuticle) and dissolve or disrupt cell membranes. This interferes with cell integrity causing cells to leak and collapse, destroys respiratory functions, and results in dehydration and death of an insect or mite. Second, soaps may act as insect growth regulators interfering with cellular metabolism and the production of growth hormones during metamorphosis. Third, soaps may block the spiracles (breathing pores), which disrupts normal respiration.

There are a variety of fatty acids; however, only certain fatty acids have insecticidal properties, which is associated with the length of the carbon-based fatty acid chains. Most soaps with insect and mite activity are composed of long chain fatty acids (10 or 18-carbon chains) whereas shorter chain fatty acids (9-carbon chains or less) have herbicidal properties, so using materials that have short chain fatty acids can kill plants. For example, oleic acid, an 18-chain carbon fatty acid, that is present in olive oil and other vegetable oils, is very effective as an insecticidal soap.

Insecticidal soaps may directly and indirectly harm beneficial insects and mites. For example, one study showed that insecticidal soap was directly harmful to the predatory mite, *Phytoseiulus persimilis*. Another study reported that applying an insecticidal soap at a 4% application rate resulted in 80 to 99% mortality of the predatory mite, *Neoseiulus* (=*Amblyseius*) *cucumeris*.

There is a general misconception that any soap or laundry detergent can be used as an insecticide. This is not true. As already mentioned, only a few select soaps have insecticidal properties, but many common household soaps, laundry detergents, and dishwashing liquids including Palmolive®, Dawn®, Ivory®, and Joy® which are unlabeled insecticides, may have some activity on soft-bodied insects when applied at a 1% or 2% aqueous solution. However, reliability is less predictable than soaps (potassium salts of fatty acids) that are formulated and registered as insecticides.

Examples of various dishwashing liquids on insect and mite pests are provided below:

1) Palmolive®, Dawn, Joy®, Ivory®, and Dove® reduced the numbers of sweet potato whitefly, *Bemisia tabaci*; green peach aphid, *Myzus persicae*; cabbage aphid, *Brevicoryne brassicae*; and twospotted spider mite on a variety of vegetable crops.
2) Dawn Ultra® dishwashing liquid was effective on the German cockroach, *Blattella germanica*, causing 100% mortality.
3) Ivory® liquid dishwashing soap applied at 0.4 to 3.0% concentrations controlled spider mites, aphids, and psyllids.
4) Ivory® liquid dishwashing soap at 1 and 2% concentrations was effective in controlling aphids, spider mites, psyllids, and thrips.
5) New Day® dishwashing detergent applied at 2.0 ml/L provided 95% mortality of silverleaf whitefly, *Bemisia argentifolii* (=*Bemisia tabaci* biotype B), nymphs.
6) Ivory® liquid dishwashing soap and Tide® detergent were effective in reducing populations of aphids; citrus red mite, *Phyllocoptruta oleivora*; psyllids; and greenhouse thrips, Heliothrips haemorrhoidalis, on landscape plants.

However, dishwashing liquids and laundry detergents are primarily designed to dissolve grease from

dishes and clean clothes; not kill insects and mites. The type of fatty acid, length of the carbon-based fatty acid chain, and concentration in many laundry and dish soaps is not known. In addition, the insecticidal effectiveness of these products may be compromised by the presence of coloring agents or perfumes, which often times leads to inconsistent results. Certain laundry and dish soaps will precipitate or solidify in "hard" water, thus reducing their effectiveness. Furthermore, these materials may cause plant injury by dissolving the waxy cuticle on the leaf surface. Registered, commercially available insecticidal soaps are less likely to dissolve plant waxes than household cleaning products. Also, plants with pubescent (hairy) leaves may be more susceptible to injury from dishwashing liquids and detergents.

Dishwashing liquids and laundry detergents, like insecticidal soaps, lack any residual activity and thus more frequent applications are required. However, too many applications will harm certain plant types. Moreover, detergents are chemically different from soaps and may cause phytotoxicity (plant injury). In fact, many hand soaps are not necessarily pure fatty acids. Most importantly, these solutions are not registered insecticides. Soap companies do not intend for their products to be used as insecticides as they have not gone through the Environmental Protection Agency (EPA) registration process.

Although some dishwashing liquids and laundry soaps are active on insect and mite pests, they should not be used because they are not registered insecticides. Even more important is that a pest control company will generally stand behind a product when there is a problem. However, if a dish or laundry soap is used and plants are injured—there is no recourse. (Raymond Cloyd)

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