You Ain't From Around Here! Exotic Invasive of the Quarter:
Japanese Beetle (*Popillia japonica*)

By: Jennifer Gagnon, Virginia Tech

For this month's article, I looked to nature for inspiration. I quickly found it while picking blackberries in July. Japanese beetles love blackberries. They also love buzzing in your face when you try to pick said fruit. Adding to the fun are the bald-faced hornets who also have a penchant for blackberries – so you are left guessing if the buzzing insect is going to sting you in the face, or just fly harmlessly away. Needless to say, there is a lot of yelling involved while I'm fruit picking.

According to the University of Kentucky's entomology department, the Japanese beetle is probably the most devastating pest of urban landscape plants in the eastern United States. So, even though they aren't technically forest pests, they do affect all of us who are homeowners in addition to woodland owners.

The Japanese beetle arrived in Burlington County, NJ, in 1916 on the roots of ornamental azaleas. Seemingly, they enjoyed the climate and the food, and decided to set up residence in the United States.

According to a news article in The Reading Eagle, there was a desperate search for biological controls as early as 1923 because, only 8 years after introduction, the beetles were wreaking havoc on agriculture. Farmers in many Mid-Atlantic states were reporting total crop losses. Natural parasites from Hawaii, China, Korea, and Japan were brought in and "[These specimens], with others [were] being turned loose as rapidly as possible." Based on what we know about biological controls today and the rigorous testing they must undergo before release, I have to wonder what other destructive forces were unleashed in the name of Japanese beetle biological control.

Today, this insect is the most widespread turfgrass pest in the United States. Control efforts cost more than $460 million per year. Annual losses attributed to the larval stage alone are estimated at $234 million. Japanese beetles have been well-established throughout Virginia since the 1970's. They are in all eastern states; west of the Mississippi, they are found in isolated pockets.

The Japanese beetle lifecycle is 1 year. Adults emerge from the soil in early June and are most abundant from late June through early August. During this time, adults start feeding and mating on host plants. Periodically, mated females will take a late afternoon trip down to the lawn where they grub out a hole 2-3 inches deep and do some egg laying. A female can lay 40-60 eggs over the course of her 4-8 week life span.

Laying females prefer irrigated over non-irrigated lawns because eggs and newly hatched larvae are sensitive to soil moisture levels. In droughty years, many will not survive. As a result, heavy Japanese beetle outbreaks tend to be cyclical. With all the rain we had last year, it's no wonder populations were high here in Montgomery County this summer.

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Newly hatched larvae seek out grass roots to feed on. Larvae are fully grown by September and are then less sensitive to drying. Most of the feeding damage to your lawn is apparent by this late in the season. Larvae feed until soil temperatures drop below 60 degrees F, then they burrow down deep in the soil to overwinter. When the soil warms back up in the spring, larval activity resumes and adults emerge after another 4-6 weeks of feeding on grass roots.

Adult Japanese beetles having a dinner party on my sweet cherry. Photo by: Jennifer Gagnon, Virginia Tech.

The highly-mobile adults love to feed on many of the same plant species as we humans. Unlike some of the exotic invasive species we've covered in this column, which are specific to one or a few species, Japanese beetles feed on about 300 different species. Some of their favorites include maples, soybeans, ornamental apples, roses, grapes, corn, species in the *Prunus* genus, including plums, cherries, peaches, and of course, blackberries. They are also major pests of Christmas trees.

Adults feed in groups and eat soft leaf tissues, leaving the veins. This results in a skeletonized leaf appearance. They will also feed on fruits and buds. Beetles chew small holes in the tender twigs of Christmas trees creating a wound that collects resin and leaves small white marks on the bark.

How to identify the Japanese beetle

Adults: 3/8" long, metallic green with coppery wing covers, tufts of white hairs along outer edge of abdomen, mouths full of leaves from your fruit trees.

Grubs: Off-white, C-shaped, brown head, distinctive V-shaped row of abdominal spines.

An adult Japanese beetle (left). Notice the distinguishing white tufts of hair along the abdomen. Grubs, found in your lawn, are white (right). Photos by: Clemson University, USDA Cooperative Extension Slide Series and Jim Baker, North Carolina State University.

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Control:

The mess on my back deck. Photo by: Jennifer Gagnon, Virginia Tech.

Although Japanese beetles typically do not kill the plants they feed on, they do result in less than aesthetically pleasing foliage. If you are a commercial grower, they can definitely cause financial loss. In addition, the litter, frass, and dead beetles make a mess. One of the most eaten plants in our yard this year was the sweet cherry that overhangs our back deck. We had to pressure wash the deck and the furniture last week to get rid of the mess the beetles created. So depending on what you're growing, where you're growing it, and why you're growing it, you may want to consider some controls:

Trapping: If, for some demented reason, you appreciate the skeletonized appearance of leaves, by all means, purchase a commercially available Japanese beetle trap. These traps typically use pheromones and floral scents to lure beetles. Once they fly in to the trap, they cannot get out. Unfortunately, traps tend to attract far more beetles then they actually catch, making them more effective lures than control methods.

Manual: Small beetle infestations can be controlled by hand. In the morning, place a tarp under an infested plant and give the plant a good shake. The beetles will fall onto the tarp. Their dew-soaked wings will prevent them from flying off. Drop the beetles into soapy water. Repeat daily.

Avoidance: Despite the seemingly endless list of species they eat, there are plants Japanese beetles do not like to munch on. These include arborvitae, baby's breath, begonia, bleeding heart, boxwood, buttercups, caladium, carnations, columbine, coralberry, coreopsis, cornflower, daisies, dogwood (flowering), dusty miller, euonymus, firs, forget-me-not, forsythia, foxglove, hemlock, hollies, hydrangeas, junipers, kale (ornamental), lilacs, lilies, magnolias, maple (red or silver only), mulberry, nasturtium, oaks (red and white only), pines, poppies, snapdragon, snowberry, speed well, sweet pea, sweetwilliam, tulip-poplar, violets and pansies, and yews. Use more of these species in your landscape to avoid attracting Japanese beetles. Additionally, not irrigating your lawn will create drier conditions less suitable for eggs and new larvae.

Biological: Milky spore disease was once touted as an effective means of controlling grubs. Recent studies, however, have shown the disease may not be as effective as once thought. Nematodes, specifically entomophagous nematodes, can provide effective grub control. Use preparations containing *Heterorhabditis* spp., and apply them in mid-August. Irrigate with about 1/4 inch of water both before and after application of the nematodes. To treat an acre will cost between $30-40.

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Chemical: There are many suitable chemicals available for controlling both grub stage and adult Japanese beetles. A full list and recommended application methods is available from Virginia Cooperative Extension's 2014 Pest Management Guide (http://pubs.ext.vt.edu/456/456-018/456-018-14_Home_grounds_and_animals.pdf).

Here in Montgomery County, this summer was dry early on. But the last couple of weeks have been exceedingly wet. Have the stars aligned making 2015 another bad beetle year? We will have to wait and see.

On a final note: Strangely enough, yelling at Japanese beetles is hereditary. From the New England days of my youth, back in the 1970's, I clearly recall my mother, an avid gardener, bemoaning the Japanese beetle. I'm not sure which plants of hers they were feeding on, but I learned some choice words from her. Which I will not repeat. Here. I'll save them for when I'm picking blackberries.

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