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Japanese Beetle Adult Emergence

Japanese beetle adults should be emerging in southern Illinois and will be emerging in central Illinois during the last week of June. They will emerge in northern Illinois during the first week of July. Look for them first on golf courses and other well-watered turf and then on smartweed, one of their favorite host plants.

Overall numbers of adults are likely to be lower this year due to last summer's drought. Eggs are laid by the adult females burrowing into the soil after mating. They tends to select areas of green grass and moist soil. Egg-laying apparently occurs primarily during the first two weeks of July in central Illinois, with first instar larvae hatching from them by early August. This timing is slightly earlier for southern Illinois and slightly later for northern Illinois.

The eggs take in water from the soil and expand after being laid. In dry soils, this does not occur completely, and many eggs do not hatch. In addition, the larvae (grubs) require eleven inches of rainfall or irrigation through the late summer into the fall to mature to the third larval instar and survive the winter.

I was surprised and encouraged last summer that very few home lawns were watered enough during the drought to be green and lush. Most were watered sparingly, enough to keep the grass alive, and some appeared to have not been watered at all. On a trip from Pontiac to Urbana in mid-July last summer, I drove by hundreds of lawns looking to get a photo of a watered next to an unwatered lawn. I could not find any heavily irrigated lawns until I was almost to Urbana and located a new housing development where irrigation was needed to keep the new lawns alive. Even sparsely irrigated turf last summer likely did not receive the required eleven inches of moisture, so most Japanese beetle grubs that hatched probably perished.

There will be heavy emergence of adult Japanese beetles from areas that were irrigated last summer, but many of these, such as golf courses, were probably treated for grubs resulting in greatly reduced grub survival in those areas. Untreated turf areas that receive enough rain for the grubs to survive are probably the major source of Japanese beetle adults from year to year. Most of those areas did not receive enough moisture last year for the grubs to survive.

East central Illinois has experienced lower than expected Japanese beetle adult numbers for several years now. This phenomenon extends across central Indiana and most of central Ohio. It may also be spreading farther west in Illinois as well. Previously, the western edge of this phenomenon appeared to be at about Monticello, but reports of fewer beetles in

the Springfield area last year may be an indication that it is moving west. The band of reduced emergence appears to extend from about Paxton on the north to Charleston on the south.

Grubs, beetles, and soils have been checked for pathogens, chemicals, and other likely causes with no results. The reduced beetle numbers remain a mystery. In previous years, none of the normal causes for population reductions have been seen including frozen winter soils, dry summer soils, and milky spore disease. Japanese beetle is one of the most heavily researched insects in the world, but this illustrates that life always has additional things to teach us.

More information on Japanese beetles and their control on woody ornamentals can be found at http://hyg.ipm.illinois.edu/article.php?id=377. (*Phil Nixon*)

Pesticide Concerns

It is important when trying to keep landscapes looking as good as possible to be aware of the consequences of some of your actions. Perhaps the likeliest situation where unintended consequences can result is in insecticide and other pesticide applications.

This was brought to bear last week when *The Oregonian* newspaper reported a major bumblebee kill in an Oregon shopping center parking lot apparently from an illegally timed application of Safari (dinotefuran) to linden trees. There are estimates of 25,000 bumblebees, important pollinators, being killed due to the insecticide application being applied during bloom time, which is specifically prohibited on the pesticide label. The news story if posted at http://www.dailykos.com/story/2013/06/20/1217444/-Massive-bumblebee-kill-in-Oregon-pesticide-spray-suspected

A similar concern is the application of imidacloprid (Merit, Xytect, others) to control Japanese beetles and other insects on linden. In some plants, imidacloprid apparently does not enter the blossoms, but it does in many plants. It is known that it enters linden flowers, and this tree blooms during July when Japanese beetles are causing the most damage. Linden is perhaps the most favored tree by Japanese beetles, commonly severely damaging the foliage on the upper one-third to one-half of even large trees. Even though imidacloprid remains in trees for slightly over one year after soil or trunk injection, higher levels of the insecticide are likely in the first few weeks after application, coinciding with Japanese beetle attack and flower production.

Research has been conducted in Indiana and other locations showing that clothianidin and thiamethoxam applied to corn and drifting to other plants has a deleterious effect on honey bees. Other research has linked imidacloprid to honey bee and bumblebee reductions. Dinotefuran, imidacloprid, clothianidin, and thiamethoxam are all chemically related and are in the same insecticide class, the neonicotinoids. These insecticides are currently being heavily scrutinized with reductions in use likely to occur.

Dinotefuran has been previously looked at for links to long-term bee reduction and not been found to be a problem. Results on imidacloprid are mixed. Clothianidin and thiamethoxam have

been shown to be of greatest concern. These two insecticides are only lightly used on turf and ornamental plants. Review articles that I have written on this situation can be found at http://web.extension.illinois.edu/ipr/#123485, http://web.extension.illinois.edu/ipr/#123486, http://web.extension.illinois.edu/ipr/i8339_829.html#119727, http://web.extension.illinois.edu/ipr/i8262_829.html#118905. (*Phil Nixon*)

Bagworms

Bagworms will have hatched in southern and central Illinois. They should hatch by the end of the week in northern Illinois. When newly hatched bagworms emerge from their mother's bag, they climb to the top of shrubs, trees, and any other erect object. They spin out two to three feet of silk which catches in the wind and blows them to new locations. They repeat this process, called ballooning, for about two weeks before settling down to serious feeding.

There is little to gain from spraying for bagworms during ballooning because most insecticide residues under the high sunlight and temperatures at this time of year only last for a few days. This allows later arriving ballooning caterpillars to feed and survive due to insecticide breakdown.

Treatment is recommended at this time in southern Illinois as ballooning should be over. Treatment will be most effective during the first week of July in central Illinois and a week later in northern Illinois. Bacillus thuringiensis kurstaki (Dipel, Thuricide), spinosad (Conserve), cyfluthrin (Tempo), permethrin (Astro), and other pyrethroids are effective even on older larvae. They are more effective on younger larvae, so treatment soon after they stop ballooning is recommended. (*Phil Nixon*)

Boxelder Bugs

Boxelder bugs have two generations per year, with the second generation becoming adult at this time. Boxelder bugs feed primarily as nymphs and adults on seeds of box elder, a native maple. They also feed on the seeds of silver maple and other maples, but apparently not very heavily.

Boxelder bugs are common every year, but are very numerous this year. Their numbers are typically much larger in hot, dry years, and we had higher numbers last year. We are currently seeing large numbers of red nymphs in many areas of Illinois. Their high numbers this year may be related to their being numerous last year, but I don't remember them previously being numerous in normal or wet year.

Boxelder bug adults are flat-topped, red and black bugs that are about 1/2 inch long. We have become used to them coming to the sunlit south and western walls of buildings in the fall. Their nymphs are similar in appearance but smaller. Their red abdomen and black wing buds make them different enough in appearance that many people don't recognize them.

Although boxelder bugs are primarily a household insect of little importance to landscape professionals, they are commonly found in masses on the trunks

and at the bases of boxelder and other maples. They are effectively killed on contact with insecticidal soap spray both on tree trunks and outside building walls. Because insecticidal soap has little residual activity, spraying may be needed every other day or even every day. Boxelder bugs are not effectively controlled by insecticide residues. (*Phil Nixon*)

Bacterial Leaf Spot of English Ivy

English Ivy (*Hedera helix*) is a ground cover/clinging vine with attractive, dark green, and glossy leaves. In the landscape, it is commonly used in shaded areas, where grass and other plants may be difficult to become established. Several leaf spots are known to infect English Ivy, but one of the more common is Bacterial Leaf Spot caused by *Xanthomonas campestris* pv. *Hederae*.

The first symptom of Bacterial Leaf Spot appears as small, circular, water-soaked lesions on leaves. As the spots enlarge, they maintain a roughly, circular shape, but may also be somewhat angled. The centers of the spots develop a red/brown to black color, and a yellow halo commonly surrounds the lesion. Under dry conditions, the lesions may dry, crack, and fall from the leaf, leaving a hole. Severely affected leaves may be killed, resulting in premature defoliation. Young stems may also be invaded through the petioles, resulting in a dark brown stem decay.

This disease can be found anywhere plants are grown outdoors. Leaves closest to the ground or near wet areas are more severely affected. The leaves in the picture above were collected from vines trailing on the ground. Nearby vines that were climbing were unaffected by the disease.

Bacterial Leaf Spot infections are favored by frequent rainfall and/or overhead irrigation. Splashing water and/or working with wet plants promote the spread the pathogen. The bacteria enters the plant through natural openings (e.g. stomates) or through wounds.

Control Options

- When purchasing English ivy, select disease free plants.
- Remove affected plant material as soon as you observe symptoms. Dispose of diseased plant tissue by burning or removing from the site.
- Keep plant tissue as dry as possible. Water early in the day, so that plants have a chance to dry before the evening. Periodically thin vines to reduce dense growth and to promote drying.
- Several pesticides are labeled to prevent bacterial leaf spot. Consult the Commercial Landscape & Turfgrass Pest Management Handbook or Pest Management for the Home Landscape for lists of recommended products.

(*Travis Cleveland*)

Why in the Heck Are My Tomato Leaves Curling?

There can be several causes for tomato leaves to roll or curl. Some of the main causes for these symptoms to occur are physiological issues, herbicide exposure, viral infection, or less common problems such as nutritional issues, insect infestation, or phytoplasma infection. When determining the cause of tomato

leaf curling/rolling, first take note of any abnormal growing conditions early or during the growing season. Check to see which leaves (old, new, or all) are rolling, determine the direction of the leaf rolling, and whether any other plant parts, including fruit, are showing abnormal symptoms. Therefore, if symptoms are not determined to be a result of virus or herbicide, the cause could be physiological. It takes a bit of detective work to determine the problem and don't forget there could be a combination of issues.

Physiological Leaf Roll

Physiological leaf roll can occur at any time during the growing season and is thought to be a growth response to environmental conditions. It is often seen as spring weather turns to summer. The mild spring weather at planting can cause vigorous top growth, even with inadequate root growth. In Illinois, we have seen this condition occur on tomatoes that have experienced unusually hot and dry conditions. Symptoms of physiological leaf roll are usually seen first on the lower, older leaves and have an upward curling of the leaves, which is followed by an inward, rolling of the leaves towards the mid-vein. In addition, leaves can be leathery and thickened, but remain normal in color and size. Not all leaves may show symptoms and leaf veins are not discolored. If environmental conditions and cultural factors are corrected and stress is reduced, the plant can recover; however if this does not occur, all leaves on the tomato plant can be affected. Thus far, physiological leaf roll is not known to affect yield and fruit quality. Some tomato cultivars, usually indeterminate (vine tomato) or those that are considered high yielding, tend to be more prone to physiological leaf roll. Many researchers have reported different causes for physiological leaf roll such as: transplant shock, heat, drought, excessive water, root injury, plants severely pruned or pruned during dry soil conditions, high nitrogen, or phosphate deficiency. No matter the cause, symptoms generally remain the same. Managing this problem can be done by following basic cultural methods such as properly hardening off tomato seedlings before planting, planting different cultivars, maintaining a consistent moisture level in the soil, maintaining temperatures below 95 degrees by shading or evaporative cooling, and avoiding over-fertilization, excess pruning, and root damage.

Chemical Injury

Damage to tomato plants can occur when tomatoes are exposed to chemicals such as herbicides, insecticides, or fungicides. The improper use of pesticides can lead to injury, so be sure to read label directions. Tomatoes are especially sensitive to herbicides such as 2,4-D, a common growth regulator herbicide. Standard symptoms of injury due to various herbicides can include the following: the downward rolling or twisting of leaves, stems that are split, thickened, callused, or twisted, entire plants that are yellowed or chlorotic, and malformed fruits. The level of herbicide exposure will determine survival, but if a plant does survive, the plant should "grow out" of the symptoms, but yield could suffer. The resulting fruit, from chemical injured tomato plants, may not be safe to consume. Some ways to avoid chemical exposure or injury would be to: follow label instructions, avoid

applications during high wind speeds, protect sensitive crops, increase droplet size (reduce spray pressure to, use correct nozzles or tips, used drift reducing additives if possible), reduce sprayer speed, and avoid tank contaminations by washing out spray tanks before and between application. Lastly, be sure that the manure, mulch, or compost added to your garden has not been exposed to chemicals that could damage your tomatoes.

Virus

Several different viruses can infect tomato, and these small, infectious, plant pathogens can replicate only inside living cells after they are vectored mostly by humans or insects. Tomato viruses are not considered to be a common problem, and some are known to cause curling of tomato leaves. Depending on the virus, symptoms can also include: yellowing, mottling, mosaic, stunted growth, small leaflets, thickening of leaves, leaf roll, halted growth, purple veins on the underside of leaves, internal browning of fruit, or fruit decline. Tobacco Mosaic Virus (TMV) has been diagnosed at the U of I Plant Clinic. It affects more than 150 herbaceous plants, including tomato, and is usually spread by human activity. It will damage leaves, flowers, and fruits, but does not usually kill the plant outright. A mosaic of discoloration and russetting will appear on the leaves. Plants will be overall stunted, leading to reduced harvest quality and yields. There is no treatment for viruses and it is strongly suggested that plants are removed and destroyed. Depending on the virus, management may also include controlling weeds or disinfecting garden tools.

Some resource links on this topic:

http://cru.cahe.wsu.edu/CEPublications/PNW616/PNW616.pdf
http://www.clemson.edu/extension/hgic/hot_topics/2008/05tomato_leaf_roll.html
http://www.cleveland.com/insideout/index.ssf/2010/07/curling_tomato_leaves_caused_b.html
http://aggie-horticulture.tamu.edu/vegetable/files/2010/10/E-626-What-Makes-Tomato-Leaves-Twist-or-Curl.pdf
http://vegetablemdonline.ppath.cornell.edu/factsheets/Viruses_Tomato.htm

(*Stephanie Porter and Sean Mullahy*)

Quackgrass - Also Known as Devils-grass and Some Other Not So Nice Names

This morning I saw the tallest, thickest stand of quackgrass I think I've ever seen growing in a perennial landscape bed. Certainly, the cool temperatures with timely rains we've had this growing season have been very conducive to growth of this cool season, perennial, grassy weed. It can grow up to 4 feet and from what I saw, it was just about there. In fact, a quick prayer for the gardener might be in order. Has he or she simply given up on this weed? This weed may be choking out the perennials but let's hope it hasn't choked out the gardener.

Quackgrass *(Elytrigia repens/Agropyron repens)* can look very different depending on whether it is being kept mowed short or allowed to grow to its full potential. Here are general characteristics to aid in identification. The leaf blades are flat, dull green to light blue-green and taper to a pointed tip. Blades grow 1/8 to 1/2 inch wide and can grow 3 to 12 inches long. On the upper surface, the blades are smooth to rough, and may be sparsely hairy.

However, on the lower surface, they are smooth. The sheaths can be hairy or smooth. Often, young plants will have hairy sheaths. The leaves have a very short (1/32-inch) membranous ligule. A key identifying feature of quackgrass is the claw-like, slender auricles that clasp the stem. This presence of these structures easily separates this plant from other grassy weeds like crabgrass, quackgrass, or various foxtail species.

This coarse-textured grass spreads aggressively by long-lived, slender, white rhizomes with sharp tips. And this, my friends, is how this plant has earned the name quick grass, devil's-grass, and other not so nice names. The rhizomes can stretch out several feet long producing new roots and shoots every few inches or so. Pulling this plant often results in breakage of stems or rhizomes. Remaining stems and rhizomes in the soil will continue to grow. Adding insult to injury, quackgrass can also spread by seed. The seed heads are 2 to 6 inch long spikes that occur from late May to September.

Quackgrass thrives in well drained soils with slightly acidic pH. It favors thin lawns and other areas where there is little to no competition. It can be a serious management problem in lawns, landscapes, nurseries, and crop areas. To decrease populations of this weed in lawns, maintain turf density and health through proper culture. Low mowing and fertility maintenance may aid in decreasing populations. Turfgrass that grows faster will compete better with this weed. Turfgrass that grows darker will perhaps mask this dark colored weed as well.

Apply herbicides in the spring and fall when this plant is actively growing. We are getting into summer, but applications could still be made now if needed. Once temperatures rise, this weed should go dormant. Unfortunately, there are not any selective herbicides available for use in lawns. In these areas, fall applications would be best as seeding can then follow when temperatures are more conducive for turf seedling growth. In gardens, cultivation yields poor control due to the rhizomes. Spot or directed applications of glyphosate (RoundUp and others) may be used. Check after a week to see if a second application is in order. There are herbicides specific for killing grasses that may be tried such as sethoxydim (Hi-Yield Grass Killer and others) or fluazifop (Fusilade II and others). Read and follow all label directions very carefully. If chemical use is not an option, digging by hand may be effective but the entire plant must be removed. Plan to monitor the site and schedule future digging attempts. (*Michelle Wiesbrook*)

Modified Growing Degree Days (Base 50°F, March 1 through June 14)

Station Location	Actual Temp.	Historical Average (11 year)	One-Week Projection	Two-Week Projection
Freeport	883	872	1040	1194
St. Charles	887	822	1036	1184
DeKalb	915	932	1075	1230
Monmouth	1023	996	1183	1342
Peoria	1043	1047	1211	1382
Champaign	1112	1082	1285	1460
Springfield	1180	1171	1360	1545
Brownstown	1175	1246	1357	1547
Belleville	1243	1261	1423	1611
Rend Lake	1343	1368	1532	1727
Carbondale	1301	1292	1476	1660
Dixon Springs	1320	1363	1500	1686

Insect development is temperature dependent. We can use degree days to help predict insect emergence and activity. Home, Yard, and Garden readers can use the links below with the degree day accumulations above to determine what insect pests could be active in their area.

GDD of Landscape Pests

GDD of Conifer Pests

Degree day accumulations calculated using the Illinois IPM Degree-Day Calculator (a project by the University Of Illinois Department Of Crop Sciences and the Illinois Water Survey). (*Kelly Estes*)