

JAPANESE BEETLES: THEY'RE HERE!



By **Dr. R. Chris Williamson**, Turfgrass and Ornamental Entomologist, University of Wisconsin-Madison

Slowly but surely Japanese beetles have been making their presence known in Wisconsin. Until this year, Japanese beetles had been primarily isolated to only a few counties in Wisconsin. However, this year, damage was reported in many new locations throughout Wisconsin including the Wisconsin Dells, Sheboygan, Green Bay, as well as areas around Madison that had not yet seen Japanese beetles, just to name a few. To date, they have been found in over 30 of Wisconsin's 72 counties. It is merely a matter of time before they reach other counties.

Japanese beetle adults and grubs are fairly easy to identify. The adults are shiny, metallic green, oval, and approximately $\frac{1}{2}$ inch long. They have coppery-brown wing covers with five patches of white hairs along each side of their bodies. Male Japanese beetle adults are usually smaller than females, but otherwise

they look similar to the females. The grubs look like most other white grub species having three pairs of jointed legs, and a yellow-brown head capsule, and they are often found assuming the infamous C-shape position in the soil. However, Japanese beetle grubs can be easily differentiated or identified by the distinctive arrangement of hairs on the ventral (underside) of their abdomen (rear) near their anus. With a low-powered hand-lens (jewelers loop), you can see the arrangement of hairs that form two distinct rows of short spines that are arranged in the shape of a truncated V pattern.

Both Japanese beetle adults and larvae (grubs) can cause extensive damage to ornamental plant material (adults, foliage only; grubs, roots only) and turfgrass roots (grubs only). The adult beetles attack a wide range (over 300 known species) of ornamental plants.

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Japanese beetle adults typically begin feeding on the upper canopy of the host, on the upper leaf surface. Feeding damage results in a lace-like appearance, leaving only a skeleton of veins. Such damaged results in leaves turning brown, dying, and eventually falling-off. Some plant materials are highly preferred over others. Preferred hosts include lindens, grapes, Norway maples, purple-leaf plums, and roses just to name a few. Adult beetles are also particularly attracted to flowers and fruits, especially plants that have white, yellow, or pastel colors.

The grubs are known to feed on and destroy most all cool-season turfgrasses, as well as many woody and herbaceous plant materials. Such feeding can cause severe damage to turf (Figure 1). The grubs are below-ground (soil dwellers) feeders that feed on the roots and rhizomes of nearly all commonly used turfgrass species and cultivars. The grubs are capable of eliminating a plant's entire root system. Where in high numbers (25 grubs per square foot), they can destroy large areas of turf in a relatively short period of time, especially if the turf is stressed by dry soil conditions, drought, or heavy traffic. First evidence of injury by grubs is localized-patches of pale, discolored and dying turfgrass that displays

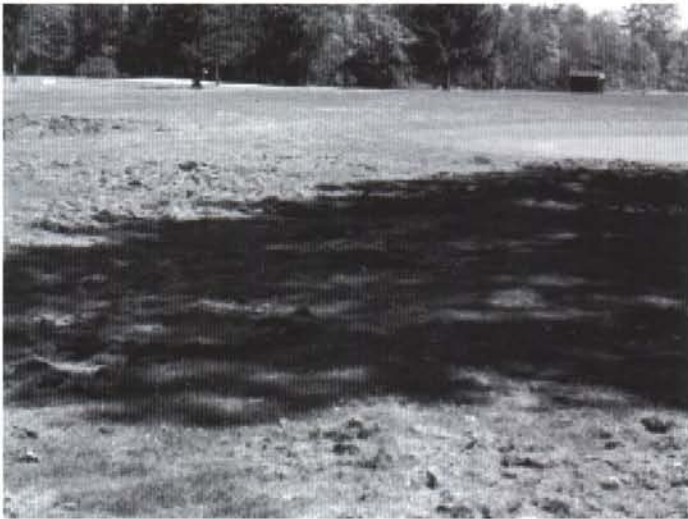


Figure 1. Japanese beetle grub damage, accentuated by raccoon and skunk damage

symptoms of drought stress. The small damaged areas often rapidly enlarge and coalesce as grubs grow and expand their feeding range. Such areas of turf will have a "spongy" feel under foot and can be easily lifted or rolled much like a carpet. Raccoons, moles, and skunks are highly attracted to white grub infested turf, and the foraging of these animals are strong indicators of white grub activity. Also, flocks of birds, especially starlings, feeding are potential indi-

cators of possible white grub infestations.

Fortunately, Japanese beetles only have a one-year life cycle. The adults emerge from the soil beginning mid to late-June, and peak adult activity occurs in mid-July in Wisconsin. Mating and egg-laying begins within a few days after emergence, mating, and adult feeding. Virgin females produce a pheromone (air-borne sex attractant) that attracts males. As many as 20-100 males may aggregate on the ground around a single female. Female adults prefer to lay their eggs in turf that is irrigated rather than in dry, compacted soil. Each females lays between 1—4 eggs in the upper three inches of soil, and this cycle is repeated every few days until the life-span of the female is completed. A typical life-span ranges from 30—45 days and as many as 60 eggs can be laid by each female.

The eggs usually hatch in approximately two weeks depending upon environmental conditions. Thereafter, the young grubs (first instar) begin feeding on the fine roots and organic matter in the upper three inches of soil where the eggs were laid. Grubs go through a physiological process called molting, whereby the insect grows from a certain life stage (instar) to an advanced or larger stage. Japanese beetle grubs remain in the second instar for approximately 2—3 weeks and the third instar for 3—4 weeks. Later in the summer (late August), most grubs will feed in the upper two inches of the soil, however they will burrow deeper during periods of drought. The grubs will continue to feed and grow until late fall, or around the first frost. Thereafter, the grubs will begin to burrow deeper as soil temperature fall below 60 degrees Fahrenheit. Most grubs will overwinter 2—8 inches in the soil. However, grubs will continue to burrow further into the soil profile as soil temperatures continue decrease. In the spring when soil temperatures begin to reach 50 degrees Fahrenheit, the grubs will slowly move back into the root zone and resume feeding vigorously for another 4—6 weeks. After this event, the grubs will burrow slightly deeper to begin preparation of an earthen cell which is created for the Japanese beetle to transform (pupate) from the grub stage into the adult beetle whereby it begins its life-cycle over again.

Effective management of Japanese beetles depends on the targeted life stage (adult or grub). Japanese beetle adults can be controlled by implementing plant selection, chemical control, or a combination of these strategies. Trapping of adults is not an effective means of control.

ADULTS

Plant Selection

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landscape or replacing plant materials is an effective management strategy of Japanese beetle adults. Certain plants are highly attractive and often sustain heavy feeding damage. Also, other plants such as grapes, multiflora rose, sassafras, smartweed, and Virginia creeper may attract adult beetles resulting in a higher incidence of egg-laying in adjacent turf.

Chemical Control

Several insecticides are labeled for use for control of Japanese beetle adults. Such products include bifenthrin (Talstar), carbaryl (Sevin), acephate (Orthene), cyfluthrin (Tempo), deltamethrin (DeltaGard), imidacloprid (Merit), lambda-cyhalothrin (Scimitar), and permethrin (Astro). The aforementioned products are foliage sprays, and where beetles are highly abundant, they may require repeated applications to protect susceptible host plants. Because of the systemic properties of Merit (imidacloprid), it can be used as a soil drench or injection the fall preceding. This control approach allows the product to be applied to larger trees (> 50 feet) that may be difficult to treat with a foliar spray.

GRUBS

Cultural Control

Because eggs and young grubs rarely survive in relatively dry soils, withholding irrigation during peak adult beetle flight may help to reduce respective grub populations. However, adequate moisture in late August and September can help the turf tolerate and/or recover from grub damage.

Biological Control

There are plethora of biological products that allegedly control Japanese beetle grubs, however performance of many of these products has been quite inconsistent. Such products include Milky disease spore, insect-infecting nematodes, and fungal pathogens such as *Beauveria bassiana* and *Metarrhizium*.

Chemical Control

Most soil insecticides provide adequate control of Japanese beetle grubs, as well as other white grub species. However, specific criteria or conditions must be fulfilled in order for achieve optimal control. These include factors such as accurate timing of the treatment, treatment must be watered into the turf, and minimal thatch must be present. Until now, the most common approach to grub control was to apply short-residual insecticides after eggs had hatched, and before grubs had caused visible damage. This approach is termed "curative" control. And, the ideal treatment time is early to mid - late August. Such curative treatments can be applied later even after the damage appears, but larger grubs (2nd and 3rd

instars) are often much more difficult to control. From a curative control perspective, only two products are recommended for effective grub control. These products include: carbaryl (Sevin) and trichlorfon (Dylox/Proxol). Although Dursban is labeled for grub control, it is an extremely poor choice. In the spring, when grubs are distributed variably throughout the soil profile, curative grub control applications are not typically recommended unless circumstances dictate.

As a result of the development of new chemistries or improved grub control products, preventative treatments of long-residual insecticides are now available and are gaining popularity as the preferred control or management strategy of many turfgrass managers. Turfgrass managers are choosing to apply products such as halofenozide (Mach 2) and imidacloprid (Merit) during June and July to control young grubs as soon as they hatch in late July and early August. This approach seems to provide added value from the standpoint of an "insurance policy" against potential grub damage.

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We'll Never Be The Same

By **Monroe S. Miller**, Golf Course Superintendent, Blackhawk Country Club

The unimaginable tragedies of September 11th have changed all of us in ways we won't fully understand for a long time. The healing is just beginning for many of us, even as removed from it as we are here in the middle west. I cannot fathom the suffering of those in New York City, Washington, D.C. and Pennsylvania.

Although the world seems full of uncertainty these days, President Bush has responded with strength and leadership and common sense. His confidence has given comfort to Americans and I am among those who believe he will make the right decisions for us and for the civilized world. The guilty are going to pay and the polls indicate that Americans support the president in this to the tune of a 90% approval rating. That is just as it should be.

It has been difficult to stay focused, but the weather still

interests people like us. Dry soils from summer were replenished with substantial rain in September. Fall color was slow to come on, and leaf drop in our town didn't really get underway until mid-October. Soil moisture conditions are presented here from the Wisconsin Agricultural Statistics Service.

The Almanac has been predicting weather for 210 years. It predicts the five-month winter season (from November through March) should be pretty mild in most places except for the Pacific Northwest, where colder temperatures above normal snowfall are forecast. More snow than normal is also possible in New England, the northern Great Lakes, the Texas Panhandle and from Denver to eastern Iowa.

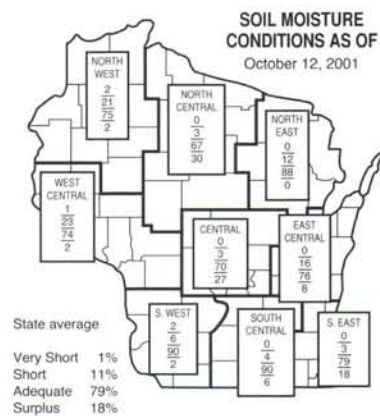
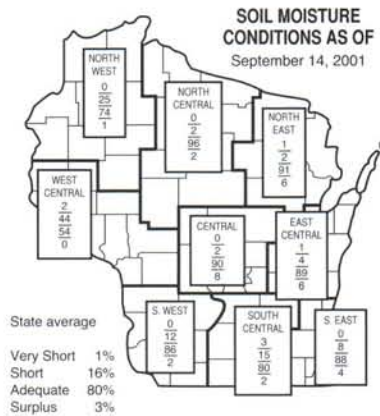
We'll see.

These things only happen in America, I thought, but never in dear old Scotland.

The future of John Muir's birthplace in Dunbar, Scotland, is under threat. Muir enthusiasts (count me among them) on both sides of the Atlantic are upset.

John Muir was born in 1838 in a three-story sandstone home, built in about 1780. It came into public ownership in 1999 and the John Muir Birthplace Trust has the responsibility to renovate it and to interpret Muir's life and legacy. Many people from around the world have made the pilgrimage to Dunbar on the North Sea to visit the home and his other childhood haunts. He became the inspiration for America's national parks and saving vast lands in Scotland.

The Muir family emigrated to Wisconsin in 1849 when John had just turned 11. In "The Story of My Boyhood and Youth," he described his formative years on two Marquette County farms – his adventures, the hard work, his observations of nature, his self-education, the inspiration of the diverse landscape, and the fulfilling years at the University of



The Old Farmer's Almanac weather forecasts from last year were extremely accurate – above the 80% accuracy they usually post. That success rate puts a lot of pressure on them for this winter.

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Wisconsin – Madison. All propelled him to pursue his career in conservation. And now the Birthplace Trust is on the verge of completely gutting the home and installing a free-standing high-tech tower to create only a virtual reality interpretation of Muir's life and legacy. Many of us feel this is not the way to properly honor him.

Dunbar's Graham White, an international figure in his own right, has mounted a campaign to change course. There has already been a tremendous worldwide response.

I agree with John Muir's grandson, who wrote: "You have in your possession a resource that is truly valuable... please, let the people experience the space he was born into. What better way to experience the space he was born into? What better way to experience the essence of a person?"

We should know before long if the pressure from all over the world will force a change in the plans for John's birthplace.

Although the leaves have fallen, the beauty their color in autumn brings to Wisconsin is fresh in our memories. Every fall thousands of Americans head for the woods and back roads to see summer extinguished in a blaze of color. We celebrate Colorama all over Wisconsin. In New England, visitors like Cheryl and me are known as "leaf peepers." People travel miles and miles north for the reds and yellows and oranges of autumn.

University of Wisconsin – Madison Department of Horticulture faculty members have a new theory about why autumn leaves turn scarlet and why the hues are more vibrant some years than others. They argue that the red pigments – call anthocyanins – in plants such as maples, oaks, dogwoods and viburnums act like sunscreen.

"The pigments shade sensitive photosynthetic tissue in fall while trees reabsorb nutrients from their leaves," says horticulturist Bill Hoch. "Trees need to store as many of those nutrients as they can before the leaves drop."

Co-authors Hoch, Eric Zeldin and Brent McCown laid out their ideas in an article featured on the cover of the journal *Tree Physiology*. "The scientific literature contains many different explanations for why trees make anthocyanins in fall," Hoch says. "Some theories account for the color change in one tree, but not in other species. Other ideas are clearly wrong. For example, the red does not come about because sugars are trapped in leaves and converted to anthocyanins."

"Light that is too bright can inhibit photosynthesis any time of the year," Hoch says. But in fall when trees are breaking down and reabsorbing important nutrients from their leaves, their photosynthetic tissues are especially unstable and vulnerable to too much light and other stresses. Yet trees need the energy from photosynthesis to drive the processes that allow them to recapture as many of those nutrients as possible. Just as this process begins, leaves start producing large amounts of anthocyanins near the leaf surface. The UW – Madison scientists argue that the pigments protect the leaves' dwindling ability to gener-

ate energy during this period.

In addition to high light levels, other plant stressors such as near-freezing temperatures, drought, and low nutrient levels trigger increased levels of the pigments. The researchers' theory agrees with the observation that autumn colors are best when the fall features dry weather with bright, sunny days, and cold nights. It also makes sense of observations that the outer leaves of maple trees, for example, are more colorful than shaded leaves inside the canopy and leaves on the north side.

Hoch believes their ideas also explain why most of our native maples and oaks in the Midwest and New England turn red, while European species such as the Norway maple do not. "None of the European counterparts of these North American trees produce high levels of anthocyanins. We think it is because the weather in that part of the world is cloudier and warmer during fall. European species don't need the protection of these pigments."

There isn't a *Poa trivialis* column in this issue. Cubby O'Brien has some family issues he is dealing with and won't be able to continue his popular column. We are going to miss his writing.

Cub is a keen observer of what is going on around us. He has that excellent undergrad education in

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turfgrass science from the UW – Madison, has experience on Wisconsin golf courses, and is very knowledgeable as a sales rep. I have found his advice was always straight up and honest.

The columns he wrote were from a solid midwestern guy's point of view – a good family man who works hard and loves his work. We are lucky he wrote his column as long as he did.

But life changes and priorities shift and Cubby has to commit his time elsewhere now. He suggested two successors for him. I approached them and they agreed to give journalism a try. Rob and Steve Wasser travel most of Wisconsin's highways, know most of our WGCSA members, and command a lot of respect. They will do a fine job of reporting on the lives and activities of our WGCSA family.

I drove to West Bend for the October meeting and the opportunity to hear Bob Vavrek speak. His topic was rich – everyday tournament conditions and the risks they bring. It was a great lecture.

That got me to thinking about the upcoming Symposium and what an opportunity it is going to be to travel to Kohler and the American Club and soak up what there is to know about the new pest forces that face golf turf in Wisconsin. It will be a meeting not to miss.

Highlights and lowlights of my 2001:

Highlight: A visit from Joe O'Brien to our golf course and a long talk with him and Steve Quale in our Mendota Lounge. During my years in golf, few stand taller than Joe – he's in the company of Jim Love, Bill Bengueyfield, Gayle Worf, Stan Zontek, Chuck Koval, Gene Haas and Bob Newman. So it was an honor to have him in Madison.

Joe is excited about the turn in

his career. Have no doubt about this – he will excel at The First Tee, just like he did at GCSAA.

Lowlight: Events of 9/11. They will shape our lives for a long time.

Highlight: WSGA Centennial celebration in August. It was a singular event in my life in golf; I was fortunate to have been there for the experience it presented.

Lowlight: An up close and personal experience with Japanese beetles – adults and grubs. Not fun and not pretty.

Highlight: Completion of the Wisconsin Turfgrass Industry Survey. Thanks to the Wisconsin Agricultural Statistics Service and to John Stier.

Lowlight: Atrocious summer weather in our town – hot, humid, no rain. Made keeping golf turf healthy a real battle.

Highlight: Initiation of the

Kussow Wisconsin Distinguished Graduate Fellowship, and the first recipient – Wisconsin grad Doug Soldat.

Lowlight: Committing to attendance at the GCSAA 75th Anniversary celebration, only to have it cancelled by events of 9/11.

Highlight: Addition of another ten or so acres to the Noer Facility.

Lowlight: An up close and personal experience with GCSAA politics; it was petty and aggravating. It won't happen to me again.

Highlight: The knowledge that in America there has always been the possibility that next year will be better than this one. That STILL is true in America.

How do you assess your 2001?

Merry Christmas, Everybody. ♣



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Worth The Delay

By Tom Schwab, O.J. Noer Turfgrass Research and Education Facility, University of Wisconsin-Madison

The weatherman was correct. He called for rain on October 10th, the date for the annual WTA graduate fellowship fundraiser golf tournament. But this group of avid turf research supporters couldn't be swayed; they were going golfing. The event had to be delayed at first because the rain came down pretty strong. This resourceful group decided to eat lunch and pass out door prizes while they waited for the rain to slow down. Rod Johnson said he played in the snow at Maple Bluff, and made it through most of the holes during the Westmoor deluge, so he wasn't going to opt out this year. Actually it only rained for about three holes and the rest of the golf was pretty nice. The winds were strong, but the temperature was warm enough that some players were seen in short sleeve shirts.

The fundraiser will provide support for future graduate students for the UW-Madison Turf Program. The scholarship program is called the Wisconsin Distinguished Graduate Fellowship in Turfgrass Research. Once funded these scholarships will continue in perpetuity to keep the turf program in supply of quality graduate students. These graduate students will be investigating important problems to enhance our management of turfgrass well into the future.

Speaking of enhanced, you should have seen the Grand Geneva Highlands golf course. The event host, Jim Crothers, recently oversaw a major reconstruction of his course. I played the course once before and once after the change, and have to admit I loved it both times. But I really noticed the addition of many ornamental features that added to the beauty and enjoyment of the experience. The greens and everything else played so nice. Even when the greens were wet, they were still so fast and true. Jim's 19 years of experience at the same location really was evident.

It's unfortunate only 46 golfers signed up for the event. Others missed playing an awesome golf course. Golf wasn't the only fun part of the day. Every attendee got to choose a great door prize and many likewise won events on the course. Take a look at some of these nice door prizes and thank donors who gave prizes and helped make the event so fun.

Besides being fun, the event was a success at raising money for the fellowship. Mike Lee, the fundraiser representative on the WTA board of directors, estimated that we may have raised \$7,000, after expenses. This is in large part due to the hole sponsors that are also listed here.

Mike made another important announcement that

you should make note of. The date and location for next year's WTA fellowship fundraiser will be Thursday, October 10th at the Meadows Course of Blackwolf Run. So mark your calendars now for another wonderful day of golf, prizes, and fundraising. It will be one more great outing to match what this event has traditionally become - whether we're delayed or not.



Two fundraiser regulars prepare for battle.



Everyone is eager for golf after the delay.



Event host, Jim Crothers, was proud to show Ed Witkowski and the rest of us his wonderful course.



I think these horns are on the wrong head.