Kansas Insect Newsletter

For Agribusinesses, Applicators, Consultants and Extension Personnel

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Caterpillars Pests: Chewers That Have The Munchies!

A variety of caterpillars feed on trees and shrubs growing in landscapes and gardens throughout the season, and in some cases caterpillars can cause severe damage. There a four primary caterpillar feeding types including open-feeding, nest-building, leaf-rolling, and wood-boring. Open feeders are those that do not build nests and feed openly in groups such as the yellow-necked caterpillar (*Datana ministra*) and the walnut caterpillar (*Datana integerrima*), and others that are solitary in nature such as the tomato hornworm (*Manduca quinquemaculata*) and the tobacco budworm (*Heliothis virescens*). Nest-building caterpillars create protective nests or structures (encasements), which serve as protection from natural enemies, insecticide sprays, and environmental conditions (temperature and rainfall). These include Eastern tent caterpillar (*Malacosoma americanum*), bagworm (*Thyridopteryx ephemeraeformis*), mimosa webworm (*Homadaula anisocentra*), and fall webworm (*Hyphantria cunea*). Leaf-rolling caterpillars such as the redbud leafroller (*Fascista cercerisella*) roll-up individual leaves that serve to as protection from natural enemies, rainfall, and insecticide sprays. Wood-boring caterpillars are those that actually tunnel into plants and feed internally, thus inhibiting the ability of plants to up-take and translocate water and nutrients. These caterpillars include the ash/lilac borer (*Podosesia syringae*), Zimmerman pine moth (*Diorystria zimmermani*), and the pine pitch moth.

Caterpillar feeding behavior and subsequently the damage caused to plants may be influenced by a multitude of factors, which are presented below:

* Specialist vs. generalist. Specialist feeders are those that feed on a limited-range of plants where as generalists feed on a wide-variety of plants. As such, this will impact the type of plants fed upon by individual caterpillars.

* There are usually feeding differences between early (skeletonization) and later instars (consume entire leaf) in regards to the type of visible damage.

* The amount of food consumed and thus damage caused by caterpillars depends on age, rate and duration of feeding.

* Food quality (protein and amino acids) affects growth rate and caterpillar size. For example, if caterpillars take less time to development than normally, then this may reduce exposure to natural enemies (parasitoids and predators) and other intrinsic factors (weather) that provide mortality of caterpillars. Furthermore, food quality changes in time

(young vs. old leaves) and if not sufficient then caterpillars might increase their feeding rate. This is referred to as "compensatory feeding."

* Leaf moisture content influences feeding and growth rate of caterpillars. For example, leaves with high moisture contents may have abundant nutrient levels, which could stimulate feeding; possibly resulting in more plant damage. Leaves with low moisture contents may experience greater feeding by caterpillars because caterpillars have to consume more plant tissue in order to obtain the required moisture and nutrients.
* Plant location (sun vs. shade) may influence food quality (nutritional value and chemical defenses) and leaf characteristics (thickness), which may affect caterpillar preferences and ability to feed.
* Plant allelochemicals or secondary metabolites have been shown to affect metabolism and growth of caterpillars. In general, plants may produce two types of defenses: quantitative and qualitative. Quantitative defenses commonly involve digestibility reducers that inhibit caterpillar feeding. This decreases the availability of plant nutrients and slows caterpillar growth. These are considered carbon-based defenses and are expensive for plants to produce. Examples include tannins, resins, certain phenolics, and lignin. Qualitative defenses are typically associated with toxins produced by plants that either directly kill or repel caterpillar pests. These are considered nitrogen-based compounds and relatively inexpensive for plants to produce. Examples include alkaloids, certain phenolics, and cyanogenic glycosides.
* Timing of attack by caterpillars during the season (spring vs. fall) may impact the extent of plant damage.

Caterpillar Management

Managing caterpillar pest populations in landscapes or gardens involves a holistic approach including hand-picking, weed removal, insecticides, and biological regulation. If feasible, hand-picking quickly removes caterpillars (for example, bagworms), which can then be placed into containers of soapy water. Weeds within the landscape or in fields or surrounding areas are sources of adults that can migrate into landscapes and/or gardens and lay eggs on plants. Insecticides that may be used against caterpillars include azadirachtin (Azatrol), acephate (Orthene), *Bacillus thuringiensis* spp. *kurstaki* (Dipel), bifenthrin (Talstar), carbaryl (Sevin), chlorantraniliprole (Acelepryn), indoxacarb (Provaunt), lambda-cyhalothrin (Scimitar), spinosad (Conserve), and trichlorfon (Dylox). Many insecticides used against caterpillars have contact activity only so thorough coverage of all plant parts is essential to kill as many caterpillars as possible. The nests' of nest-building caterpillars should be destroyed or disrupted to allow sprays to contact the caterpillars inside. Remember to

make applications of *B. thuringiensis* spp. *kurstaki* when caterpillars are young and actively feeding because it takes less material to kill caterpillars and kill them quickly.

Pheromone traps are available for monitoring the presence of adults. The trap contains a lure that mimics the scent or pheromone produced by virgin female moths, which is used to attract and capture males. These traps may be helpful in timing applications of insecticides. For example, apply sprays 10 to 14 days after the first males have been captured, which will coincide with the initiation of larvae hatching from eggs.

There are also a number of natural enemies including parasitoids (braconid and ichneumon wasps) and predators (plant bugs, beetles and birds) that will attack many types of caterpillars; possibly impacting the population. However, in most cases, the natural enemies don't kill enough caterpillars or negatively impact populations enough to substantially prevent plant damage. Regardless, try to use insecticides that are either specific or non-toxic to natural enemies in order to prevent secondary pest outbreaks. If you have any questions regarding management of caterpillar pests in landscapes or nurseries contact your county or state-wide extension agent.

Raymond Cloyd

Green Cloverworm Moths

We have received numerous calls from both growers and homeowners regarding small, dark-colored, "airplane-shaped" moths. The ones we have identified are adult green cloverworms (see photos). Green cloverworm larvae have been very active for the last month, mainly in soybean fields, and what we are now seeing are the moths which resulted from all that larval feeding. These can be a nuisance to homeowners as they are attracted to lights and, because of their small size and aerodynamic shape, are quite adept at getting inside homes and other buildings. The question many growers have however is related to all the moths still in the soybean fields, and whether they will be a problem next year because they lay eggs in these fields this fall. The answer is no, because green cloverworms don't overwinter in Kansas. They may be a problem in the same or adjacent soybean fields next year but that is because they migrated back to Kansas and just happened to find the same fields. There is no correlation between this year's infestations and next years.

Jeff Whitworth

Holly Davis

Reports of LARGE Grubs ……

It does not come as much of a surprise that people have recently inquired/expressed concerns about large grubs that they are encountering on the surface of lawns and adjacent paved areas (driveways, sidewalks, streets, gutters). They are startled at the large numbers of exposed grubs, alarmed by their large size and mystified by their strange mode of moving about.

First things first. The grubs in question are the larvae of green June beetles (Figure 1A), tremendous numbers of which began flying in July (see Kansas Insect Newsletter #14, July 15, 2011). Beetles deposited eggs from which small grubs emerged, and which have been continuously feeding/growing. Occasionally larvae are forced out of the ground after rains have saturated soils. Their numbers and their aggregations (Figure 1B) attract attention. Larvae possess 6 small legs which lack the capacity to support/move the bulk of the grub. Therefore, a larva will flip onto its back and quickly and efficiently move about with an undulating accordion-like motion (Figure 1C).

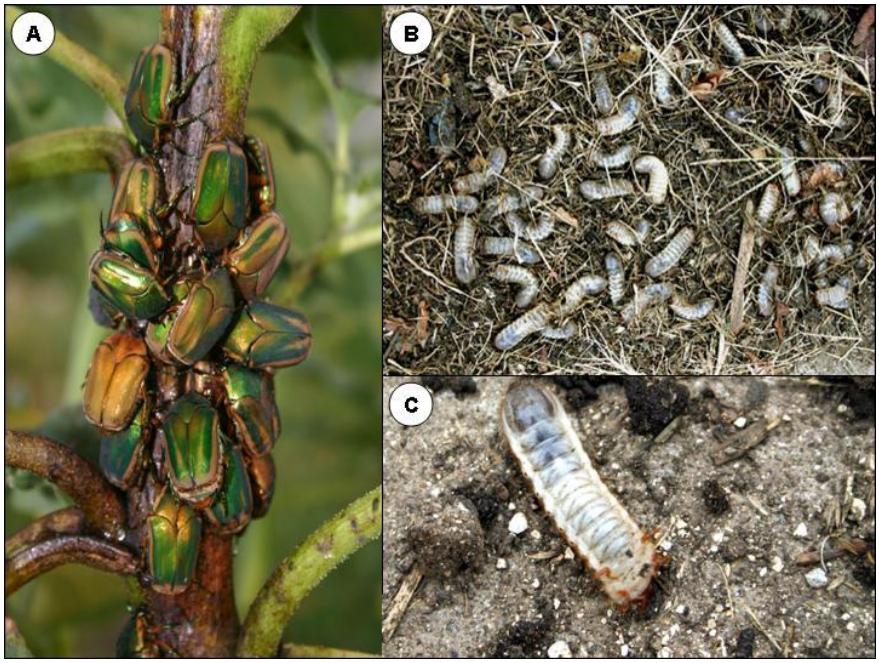

Figure 1

Although the current grubs appear large, they have a bit of growing to reach next year's mature length approaching 2-inches and their mature diameter of ½-inch (Figure 2).

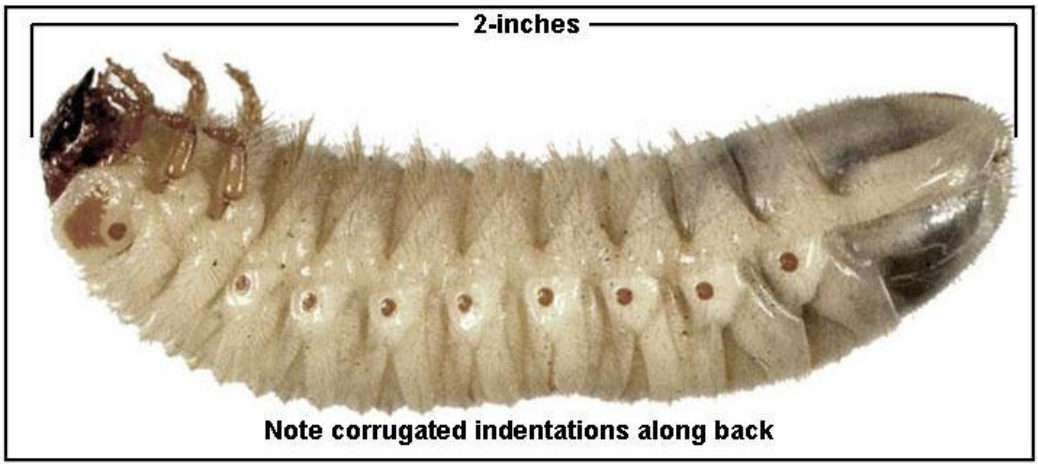

Figure 2

Despite their ominous presence, green June beetle larvae pose little threat to lawns/turf areas. Showing little interest in root tissues, their primarily food is decomposing vegetation in the soil and on the soil surface. IF THERE IS DAMAGE TO TURF, it is of indirect cause. Green June beetle larvae create burrows in which they live. Sometimes the springtime burrowing/tunneling activities of large green June beetle larvae may result in creating soil mounds which (as stated in some references) interfere with mowing ---- the resultant being that turf

roots may be exposed and damaged. The operative words are may result --- most likely this will not happen, and therefore one should lose little sleep over green June beetle larvae.

Do we ever stop learning?.....

At a recent 50th High School Reunion in Milwaukee, Wisconsin, 3 of the attendees included a classmate now living in Alabama, another in Iowa and myself. Alabama Jim (retired financial guru) asked Iowa Jim (a USDA Entomologist) and myself about something making a nest of grass in the channel of one of his windows. We entomologists thought and speculated, but nothing we offered seemed to fit Alabama Jim's situation. After the reunion, we all returned to our homes.

Eventually, Alabama Jim sent each of us a sample of the nest. We each sorted through the samples extracting various identifiable fragments of insect body parts. To make a long story short, Iowa Jim recalled some 1960 publications detailing the work of certain sphecid **wasps** that made nests of grass and then provisioned the nests with paralyzed tree crickets. And suddenly Alabama Jim's situation was no longer a mystery ---- The Grass Carrier(ing) Wasp, *Isodontia mexicana*. Another common name, "The Cricket Carrier", originally appeared in an 1888 publication in which was detailed/described the wasp's habits, and its preferred food source ---- snowy tree crickets.

It turns out that Alabama Jim's situation was not as mysterious as originally thought. Due to frequent inquires, Iowa State University, PennState, Cornell and Minnesota have produced on-line publications addressing these wasps and their nest-building habits. The subgroup of sphecid wasps involved are commonly referred to as thread-waisted wasps due to the elongated slender front portion (pedicel) of their abdomen (Figure 3). "Cricket Carrier" grass carrying wasps approach ¾ of an inch in length.

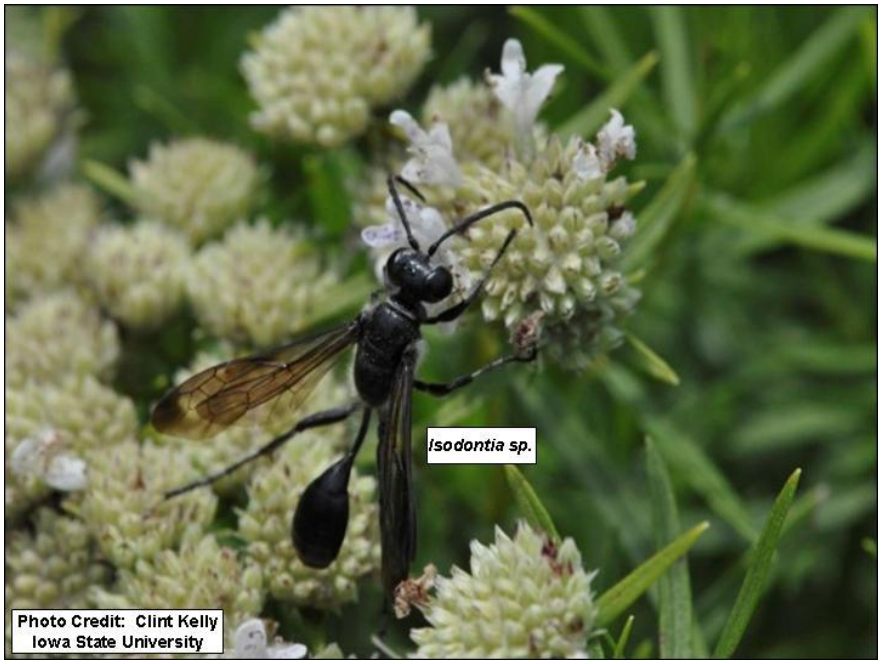

Figure 3

These wasps produce 2 generations per year. After overwintering within their cocoons located in "grass nests", they emerge and mate in early summer. Each mated female (on its own) locates a pre-existing cavity into which she will construct her nest. In nature, such openings include hollow plant stalks, galleries in wood (such as abandoned bee galleries), and holes in clay banks or in the ground and any other available crack or crevice.

The wasp makes many trips to cut grass blades to construct her nest. With each cut blade of grass trailing behind her as she flies, she returns to her nest and drags the blades in behind her. Once the nest has been completed, the female searches/hunts for (preferably) tree crickets which she will sting to immobilize/paralyze. She then provisions her nest with those bodies which will serve as a living food source for the wasp larvae which emerge from the eggs deposited by "mother wasp". After completing their development, larvae produce a papery cocoon inside of which they pupate. The next generation of wasps then emerges, deposit eggs leading to second generation larvae which produce the overwintering cocoons.

Generally, all of these activities happen around us without our being aware. It isn't until wasps select nesting sites around homes that people become aware of their presence ----- as it was with Alabama Jim when he noticed collections of grass in the channel of one of his windows. Examples of "nests" are presented in Figure 4.

Figure 4

Is it possible that Kansans might encounter similar situations? It may well be that people have simply cleaned window channels without thinking about what they were removing while routinely washing/cleaning windows. Kansas is well represented as being home to *Isodontia mexicana* as evidenced on the 1963 distribution map prepared by R. M. Bchart and A. S. Menke (Figure 5). (Interesting to note that Alabama Jim has seen them whereas I who live in the heart of *Isodontia mexicana*'land have not!)

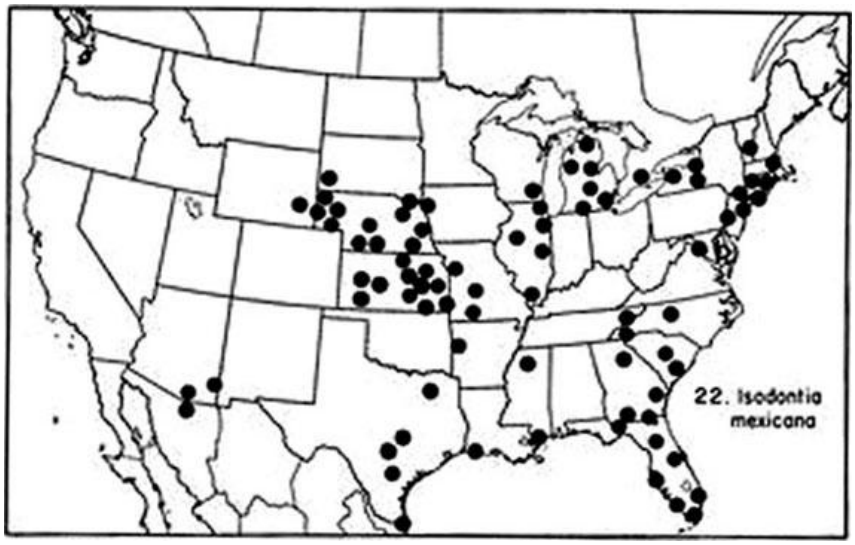

Figure 5

The good news is that these wasps (like all sphecid species) are not aggressive. Being solitary wasps, they are very unlike colony-type vespids (i.e. yellow jackets, baldfaced hornets, paper wasps) or bumble bees, all of which will "defensively" protect their homes/colonies/nests. For people interested in these fascinating grass carrier/cricket carrier wasps, take a few minutes to watch the following three short U-Tube clips. Guaranteed that you will come away with an appreciation of and good feeling towards these industrious "little ladies". (when you click onto these "buttons", a warning will pop-up. The sources are trustworthy)


isodontia1.htm


Isodontia2.htm


Isodontia3.htm

NOTE: If you click on buttons but files do not open, please contact me at: rbauernf@ksu.edu

I will then send you the direct buttons to open the U-Tube clips

Bob Bauernfeind

Report from the Kansas State University Insect Diagnostic Laboratory:

The following samples were submitted to the Insect Diagnostic Laboratory from September 16th to September 22nd.

September 16 2011 – Barton County – White banded crab spider in garden
September 16 2011 – Riley County – Lacewing larvae in home
September 16 2011 – Harvey County – Brown lacewing in home
September 20 2011 – Johnson County – Fruit flies found in home
September 20 2011 – Atchison County – Green June beetle grubs in grass
September 21 2011 – Sedgwick County – European fruit lecanium on multiple hosts
September 21 2011 – Mitchell County – *Heliothis* sp. caterpillars on broccoli
September 22 2011 – Neosho County – Tomato rust mite on tomatoes
September 22 2011 – Sumner County – Moth/drain fly and mosquito in home
September 22 2011 – Buchanan County. MO – Armored scale
September 22 2011 – Wilson County – Cynipid galls on pin oak
September 22 2011 – Gove County – Pine tip moth in Ponderosa pine

If there are any questions regarding these samples or about the identification of any arthropod please contact the Insect Diagnostician at (785) 532-4739 or GotBugs@ksu.edu.

Holly Davis

Sincerely,

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