Home and Horticultural

PESTS

K-STATE Research and Extension

Turfgrass Insects

Turfgrass beautifies home, industrial sites, roadsides, parks and sports venues. It reduces erosion, runoff, glare and noise pollution, increases property values, and adds to the safety and enjoyment of leisure activities. Although quality standards vary, turf managers are all concerned with factors affecting turf performance, one being insect and arthropod pests. This fact sheet provides information to help identify and manage the most common insect pests of turfgrass in Kansas: white grubs, billbugs, cutworms, and chinch bugs.

Coleopterans (Beetles)

Scarab beetles do not damage turf, but root-feeding larvae may weaken plants and kill lawns. White grubs are the larvae of several species of scarab beetles: black turfgrass ataenius, *Ataenius spretulus* (Haldeman); May beetles/June beetles, *Phyllophaga* spp.; masked chafers, *Cyclocephala* spp.; and Japanese beetles, *Popillia japonica* Newman.

All turf scarab species undergo metamorphosis from egg to larva, pupa, and adult. (Figure 1). They differ in the time it takes them to complete development. Black turfgrass ataenius produce two generations per year. Beetles overwinter beneath soil debris, which protects them from extremely low temperatures. They become active in late March and early April when temperatures rise. Females seek grassy sites for laying eggs. Larvae mature by late June and enter the pupal stage. Newly emerged adults mate and deposit second-generation eggs. Adults from this generation overwinter. Although many ataenius species are associated with dung, black turfgrass ataenius larvae also thrive on decomposing thatch and plant roots. Adult beetles are barely 3⁄16 inch long (Figure 2).

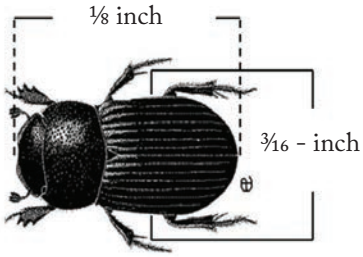

Figure 2

Black turfgrass ataenius grubs are relatively small (5⁄16 inch). Individually, they do not consume much root tissue, so the treatment threshold is 30 to 50 per square foot. Vigorous, well-maintained turf can withstand larger larval populations. Black turfgrass ataenius can be a serious golf course pest, harming tees, fairways and greens, and occasionally roughs throughout North America. They rarely cause damage in Kansas, despite clouds of beetles that have been reported to fill the air at dusk.

Numerous **May/June beetle** species are present in Kansas (Figure 3). They produce one generation every three years. Development spans four calendar years (Figure 4). *Phyllophaga* spp. grubs may damage turf during the second year of their life cycle. Beginning that spring as overwintered second instar grubs, they molt into the third instar stage and feed heavily throughout the summer. Although *Phyllophaga* grubs can be recovered from most turf venues, populations rarely are sufficient to cause visible damage.

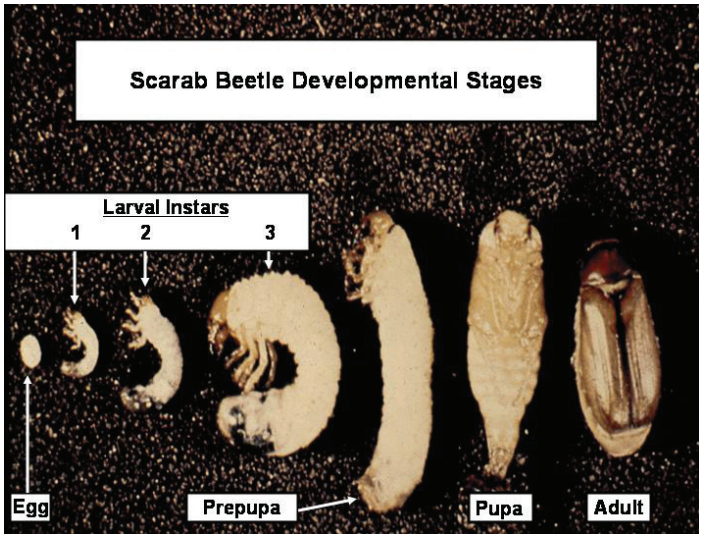

Figure 1


Figure 3

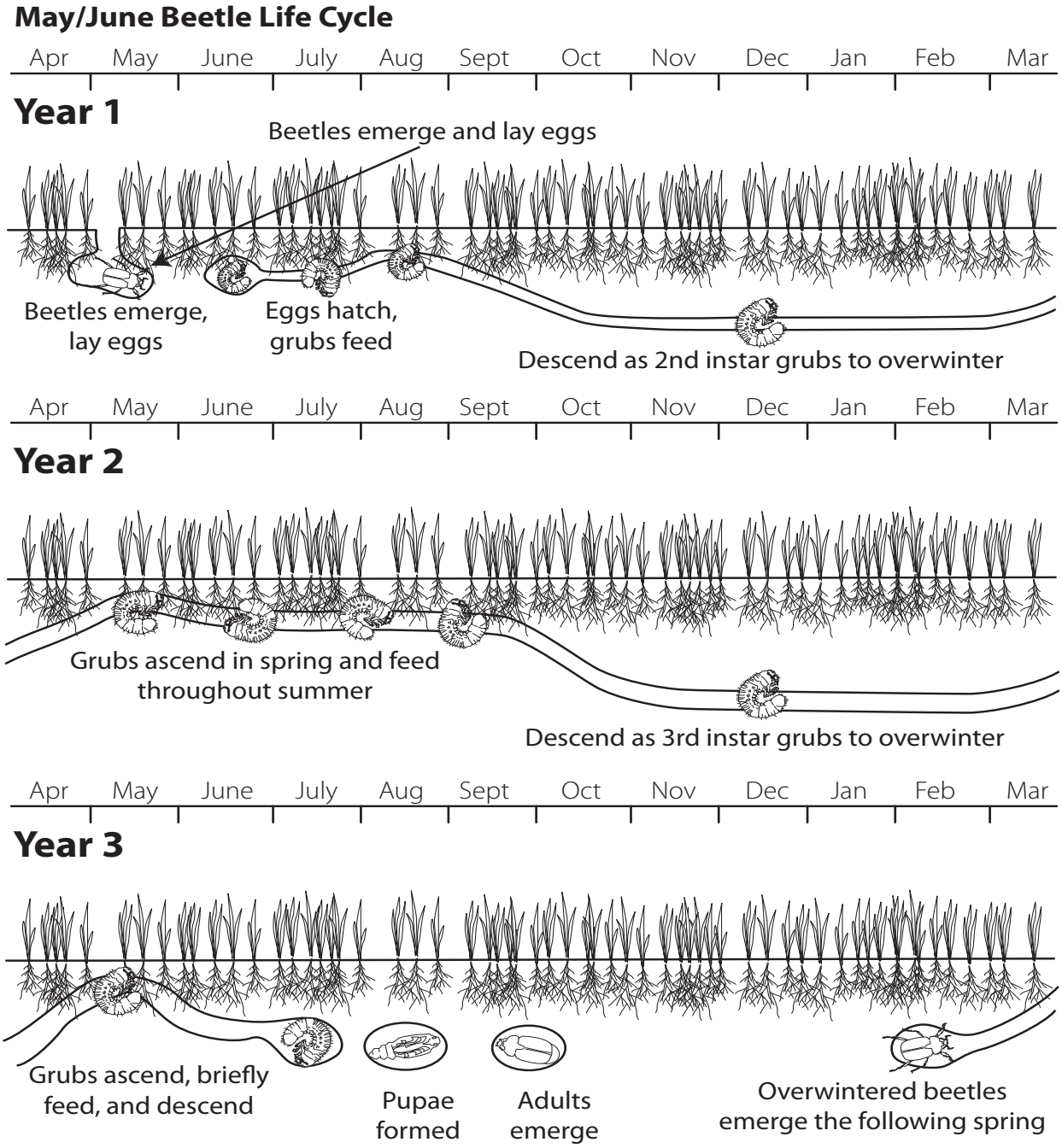

Figure 4

Masked chafers and **Japanese beetles** produce one generation per year. These annual white grubs are the primary species responsible for turfgrass damage. Development from first to third instar occurs in about two months (Figure 5, page 3).

Masked chafer is native to Kansas. Of six documented species, only four are abundant. For economic purposes, annual white grubs may be grouped as one. Masked chafer adults are named for their dark heads, which contrast with their yellowish-brown color (Figure 6). They are not known to feed.

Japanese beetles are not native to North America. Discovered in New Jersey in 1916, they became established east of the Mississippi River. They moved west on infested nursery stock and are now established in major metropolitan areas in Kansas, including Wyandotte, Johnson, Shawnee, Douglas, and Sedgwick counties.

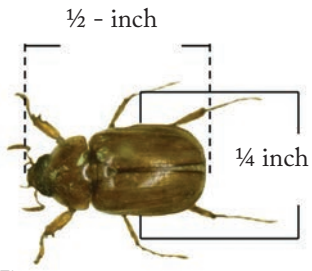

Figure 6

The seasonal life history of Japanese beetles mirrors that of masked chafers. While both pose a turf threat as larvae, Japanese beetles also defoliate many landscape ornamentals.

Japanese beetles are slightly less than ½ inch long, metallic green with coppery brown outer wings. A distinct series of white hair clusters along each side of the abdomen with an additional pair on the back of the last abdominal segment, distinguishes Japanese beetles from other species (Figure 7). For more information, see *Japanese Beetle*, MF3151.

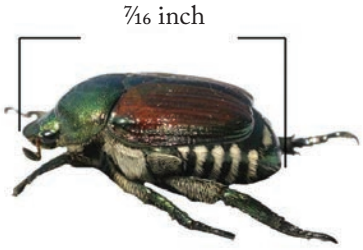

Figure 7


Figure 8

Grub Damage

Symptoms of grub damage include wilted grass, thinned stands, yellowed or browned areas, and dead spots. Turf should be examined closely to rule out turf diseases, fertilizer burn (including urine spots from dogs), improper herbicide applications, improper mowing, environmental stresses (hot weather, lack of moisture, soil type), or feeding by aboveground insects.

Damage typically appears in fall, beginning mid to late September (Figure 8). If turf can be pulled back easily, grubs likely are responsible because they destroy anchoring root systems (Figure 9).

Although at this point the number of grubs and species is not important, they can be identified. Black turfgrass ataenius grubs are ruled out because of their size — barely 5/16 inch long. This leaves grubs of May/June beetles, masked chafers, and Japanese


Figure 9

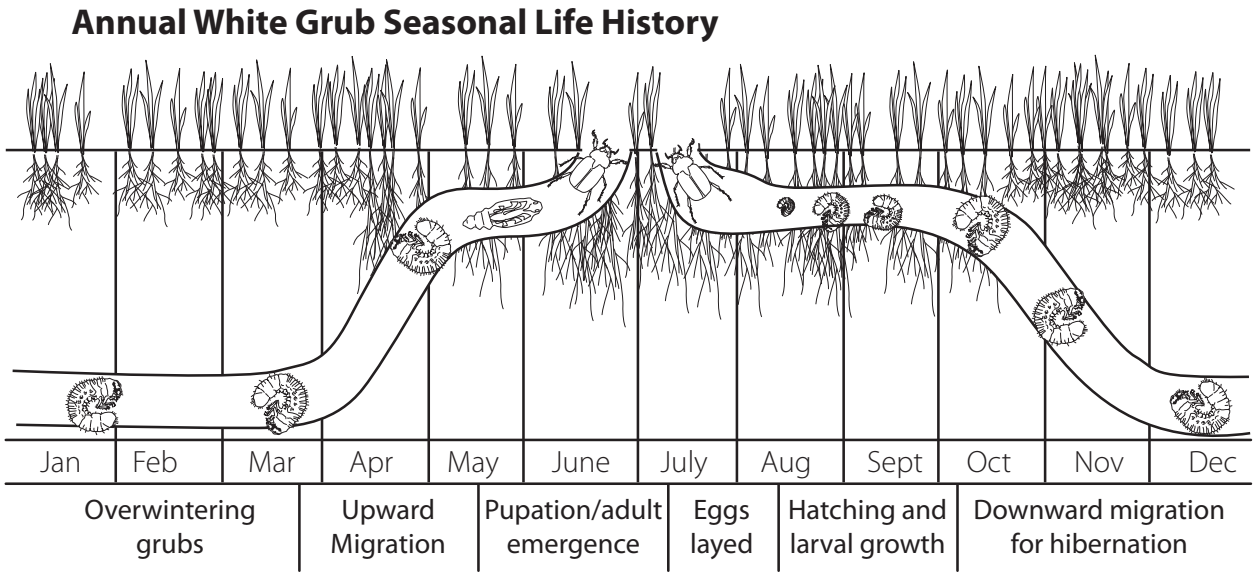

Figure 5

beetles as alternative possibilities. These grub species can be distinguished by using a magnifying lens to examine spines, hairs and bare areas on the rear abdominal segment (Figure 10). See K-State Research and Extension publication *Annual White Grubs in Turf*, MF-2635, for information on effective grub control.

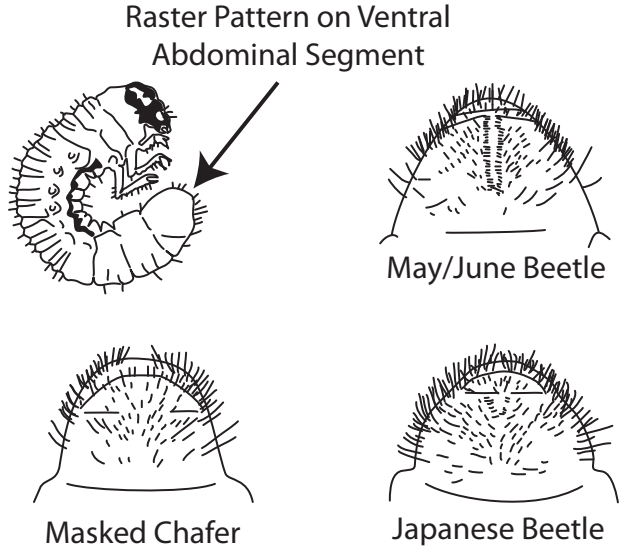

Figure 10

Green June beetles, *Cotinus nitida* (Linnaeus), produce one generation per year. Although common, they do not damage turf. The life cycle is similar to masked chafers and Japanese beetles. Sudden adult emergences usually occur in late June or early July after a rain. Green June beetles often are mistaken for a swarm of loud, buzzing bumblebees skimming over grassy areas. But with their velvety green wing covers and shiny, metallic undersides, they do not remotely resemble bumblebees. (Figures 11 and 12).

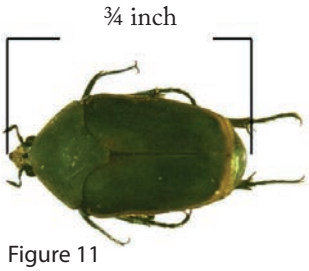

Figure 11

Figure 12

Mature larvae look imposing because of their size — up to 2 inches long and the width of a pinkie finger (Figure 13). Bulky bodies and tiny legs do not equip them to move on the soil surface. Instead they roll over and move in accordion-like fashion on their corrugated backs. (Figure 14).

Green June beetle larvae tend to burrow deep in the soil. They feed on dead organic matter and remain hidden. When forced to the surface by excessive soil moisture, sidewalks and driveways teem with displaced larvae. Homeowners may worry about lawns, which are unharmed despite the larvae's presence.

Figure 13

Figure 14

Billbugs are not bugs, but beetles. Specifically they are a type of weevil possessing an elongated snout with chewing mouthparts (Figure 15). Their legless larvae are typical of weevils (Figure 16).

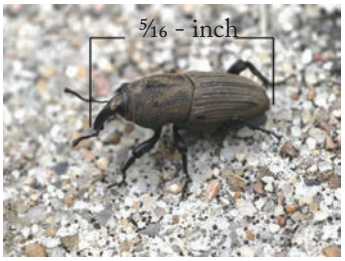

Figure 15

Figure 16

Two species of turf-infesting billbugs are found in Kansas. Bluegrass billbugs, *Sphenophorus parvulvus* Gyllenhal, are associated with cool-season grasses. Hunting billbugs, *S. venatus vestitis* Chittenden, prefer warm-season varieties. Although specific seasonal life histories have not been defined in Kansas, billbugs typically produce a single generation per year.

Billbugs are weak fliers that migrate by walking. In April as temperatures warm, adult beetles may be seen crawling across paved surfaces adjacent to turf. They deposit eggs in holes chewed into grass stems and crowns. Larvae emerge and feed within stems and crowns until they outgrow them. They enter the soil to complete development by feeding on roots. Mature larvae construct small earthen chambers in which to pupate. Newly emerged adults are soft and pale, darkening as exoskeletons harden. They overwinter beneath surface litter in nearby hedgerows, tree lines, ditches, and building foundations.

Billbug damage appears late June through July when accumulated feeding damage coincides with heat and drought stress to produce dead zones (Figure 17). Billbug damage can be determined by raking fingers through turf and pulling handfuls of dead grass that has been severed by tunneling larvae. Closer examination often reveals accumulations of white sawdust-like frass, or excrement.

Lepidopterans (Moths)

The families Pyralidae and Noctuidae contain lepidopteran species of importance as turf pests. Moths do not cause damage, but foraging larvae do. Generally, larval feeding activities affect turf appearance temporarily. Small larvae do not consume entire

grass blades. Feeding causes leaf tissue to wilt and lawns appear yellow to brown. After consuming an entire grass blade, larger larvae move to the next tender leaf. Activity is equivalent to a close mowing and does not damage the plant's ability to produce leaf tissue. Regrowth is the norm with adequate moisture.

Pyralid moths are commonly referred to as lawn moths because of their association with grassy habitats. They are also called snout moths because of their protruding palpal sensory structures. Larvae are referred to as sod webworms because they produce silk to line tubes in which they live. They prefer to eat plants in the grass family Gramineae, which includes turfgrass species. As they grow and forage, larvae enlarge tubes camouflaging them with bits of grass, thatch, and other debris. Individual tubes converge to form a webbed mat over the soil surface.

Bluegrass sod webworms, *Parapediasis teterrella* (Zincken), are found throughout Kansas and are primarily associated with bluegrass and fescue lawns, and sometimes bentgrass greens and tee-boxes. Occasionally they have been found in Bermudagrass.

Figure 18

Figure 19

In Kansas, webworms produce two generations per year. They overwinter as partially grown larvae, which resume feeding in early spring. Larval development is completed by mid-May. Following a 1 to 2 week pupation, moth emergence peaks in June. Female moths drop eggs as they hover above grass. Hatching within a week, newly emerged first-generation larvae mature in 6 to 7 weeks, then pupate. Second-generation moth flights peak in August, producing another batch of eggs. Newly hatched second-generation larvae overwinter.

Sod webworm moths (Figure 18) are flushed out when mowing or walking across lawns. After brief zigzagged flights moths quickly settle on undersides of grass blades. They do not migrate great distances, so moths are produced locally. Large numbers of moths signal large numbers of larvae, which (Figure 19) were undetected because they did not cause noticeable damage.

Figure 17

Sod webworm larvae rarely cause serious harm. Occasionally, damage appears when overwintered larvae mature in late April and early May, and when first-generation larvae mature in late July and August. Early-season damage is generally masked by lush spring turf. But in late July and August, with fewer grass blades to protect from direct sun exposure, delicate crowns may die resulting in bare spots in lawns. Sod webworm presence is confirmed by silken tubes in trouble spots as well as accumulations of sawdust-like green fecal pellets on the soil.

Buffalograss webworms, *Surattha indentella* Kearfott, are not widely distributed in Kansas. They have been documented in Ellsworth, Rice, Barton, Pawnee, Edwards, Stafford, Pratt, Kingman, Barber, Meade, and Hodgeman counties but may occur elsewhere. Buffalograss webworms have been observed in Bermudagrass. Zoysiagrass could also serve as a host.

Unlike surface-dwelling bluegrass sod webworms, buffalograss webworms construct silk-lined vertical tunnels in the soil. At night, they inhabit and extend horizontal tubes on the soil surface as they collect grass clippings, which they store in vertical burrows. During the day, they remain in their vertical homes to consume the previous night's forage.

Buffalograss webworms produce a single generation per year. They overwinter as first-instar larvae and resume feeding mid to late April when warm-season grasses begin to grow. After feeding throughout the summer, mature larvae retreat to vertical tunnels to pupate. Moth emergence, mating, and egg production peaks in late August and extends through September. Newly emerged first-instar larvae create overwintering cells.

Buffalograss webworm moths are seldom seen. They are nondescript light to dark brown moths, 7⁄16 to 5⁄8 inch, that blend into the ground. Tending to move only when disturbed, females are weak fliers. They scurry about as they deposit eggs, preferably in patches of bare soil.

Figure 20

First-instar larvae are virtually undetectable. As larvae develop in the spring and summer, their distinctive feeding tubes grow and attract attention (Figure 20). By this time, larvae are well developed with a distinct appearance. Mature larvae are 1 inch long with an overall white appearance and a deep caramel-colored head capsule (Figure 21). The prothoracic shield immediately behind the head is lighter as are the lateral spots and dorsal patches found on each body segment.

Figure 21

Because of limited geographic distribution, only a few studies have looked at buffalograss webworms, leaving speculation about factors accounting for the sporadic nature of this pest. Although they are likely present every year, environmental conditions may restrict population levels. Under favorable circumstances excessive moth populations may lead to massive egg and larval production and survival over several consecutive years. When this coincides with drought conditions, stands of buffalograss and Bermudagrass may succumb to repeated defoliations and dead/barren areas may appear.

Noctuid moths are named for their nocturnal (nighttime) flight activities. Larvae are commonly referred to as armyworms and cutworms. Cutworms are generic looking — plump, fleshy, smooth, sparsely haired, and up to 1½ inches long. When disturbed, larvae curl in a protective posture. Armyworms tend to be elongated and striped.

Black cutworms, *Agrotis ipsilon* (Hufnagel), are a subtropical species incapable of surviving Kansas winters (Figure 22). They originate along the Gulf coast and migrate north, traditionally arriving in Kansas around the first of April. Primarily grass feeders, black cutworms are not considered a lawn pest, but can damage golf greens. Moths deposit a single to several eggs at the tips of grass blades. Newly emerged larvae feed on grass in the roughs bordering fairways and greens. Larvae eventually move onto greens where they burrow into the soil. Subsequent tunneling and feeding results in depressions that mar the putting surface (Figure 23). In Kansas, black cutworms produce at least two complete generations per year.

Figure 22

Figure 23

Variegated cutworms *Peridroma saucia* (Huber), are native to Kansas and overwinter in the soil as pupae. Moths emerge in the spring, mate, and deposit eggs. Larvae develop rapidly, leading to pupation and the production of new moths. There are three generations per year.

Figure 24

Of all cutworm and armyworm species, variegated cutworms (Figure 24) have the greatest potential for damaging turf because of the large number of eggs produced by female moths — in excess of 2,000 each. Also, because variegated cutworms feed on a wide variety of broadleaf and grass species, moths are able to indiscriminately deposit eggs (Figure 25). Larvae will find acceptable host plants. After hordes of variegated cutworms have depleted local vegetation, they assume the armyworm habit of moving en masse in search of food. Lawns, particularly in newly established neighborhoods bordering croplands or areas of native vegetation, are susceptible to invasion by foraging variegated cutworms. Variegated cutworms are easily identified by a series of yellow to white dorsal spots (Figure 26).

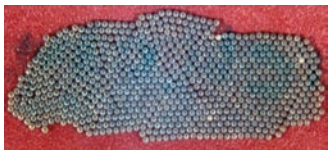

Figure 25

Figure 26

Bronzed cutworms, *Nephelodes minians* Guenée, are native to Kansas. They overwinter as fall-laid eggs, which hatch in early spring, sometimes under snow cover. Larvae (Figure 27) rapidly mature by late May and spend summer in the pupal stage. Moths (Figure 28) emerge and produce eggs from late September through October. There is one generation per year.

Figure 27

Figure 28

Newly hatched bronzed cutworm larvae feed on the tender blades of cool-season grasses emerging from winter dormancy. Under ideal conditions, plants can withstand the feeding of moderate cutworm populations. When conditions are less favorable, especially when cutworm populations are dense, turf damage may appear as dead areas in green turf. Mature bronzed cutworm larvae also may be found in these locations.

Native to Kansas, **armyworms**, *Pseudaletia unipuncta* Haworth, overwinter as pupae. Moths (Figure 29) are light tan with a single distinct white dot on each forewing. Armyworm larvae (Figure 30) possess distinctive stripes running the length of their bodies. Moth activity consists of two distinct flight periods indicating that there are two generations per year. While armyworms occasionally infest turf, they are primarily considered to be pests of agronomic crops and native grasses. Lawns in newly-established residential neighborhoods bordering wheat, corn, and sorghum crops, or native grasses are more likely to be invaded by foraging armyworms. Invaders generally

Figure 29

Figure 30

are nearly fully developed and disappear as quickly as they are detected, stopping in their tracks and burrowing into the soil as they prepare to pupate.

Figure 31

Fall armyworms, *Spodoptera frugiperda* (J. E. Smith), are a semitropical species that does not overwinter in Kansas. Fall armyworm moths (Figure 31) migrate into Kansas from southern regions along the Gulf coast or further south from Mexico and Central America. Considered more of an agronomic pest in Kansas, on rare occasions (in late summer), there have been simultaneous statewide reports of fall armyworm infestations in lawns. It is the large, nearly mature larvae (Figure 32: Note the four dorsal spots on the last body segment) that are responsible for lawns disappearing overnight. Similar to true armyworms, fall armyworms quickly cease feeding and enter the soil to pupate.

Figure 32

Chinch Bugs (Hemipterans)

Hemipterans in the suborder Heteroptera are commonly referred to as true bugs. Two chinch bug species occasionally cause concern in Kansas. The common "field" chinch bug, *Blissus leucopterus* (Say) (Figure 33), is primarily an agronomic pest associated with wheat, corn, and sorghum. They sometimes migrate out of production fields and infest adjoining cool- or warm-season lawns. The western chinch bug, *Blissus occiduus* Barber (Figure 34), historically has been associated with wheat, brome, and native grasses. They became popularly known as the buffalograss chinch bug when they emerged as a serious pest in buffalograss lawns. Given their wide host range — including zoysiagrass, perennial rye, and Kentucky bluegrass and fescues as well as historical hosts — western chinch bug is the more accurate common name.

Figure 33

Chinch bugs cause damage when they insert their stylet mouthparts into leaves, stems, or stolons and withdraw plant sap. At the same time, they inject a salivary secretion that injures cells and inhibits the translocation of water and nutrients. Initial yellowing progresses to entire plants taking on a straw-brown appearance. Damage ranges from minor thinning to extreme cases where grass is killed. Both species produce two generations per year.

Figure 34

Predicting when and where chinch bug damage will occur is not possible, especially for field chinch bugs whose adults fly from infestation sites to overwintering bunch grasses. When western chinch bugs cause late-season damage, there is a greater likelihood those same sites may experience damage the next year. This is because an estimated 95 percent of second-generation adults are wingless and cannot leave the area. Rather, they overwinter in protected sites near grass stands infested the previous season and resume activities the following season.

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MF2901 **April 2015**

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