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Kansas Insect Newsletter
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Buffalograss Webworms in Turf:

Several counties in south central Kansas have reported "something amiss" in buffalograss and bermudagrass plantings. A typical site may have visibly green grass bordered by an off-colored area (Figure 1). In off-colored areas, the grass appears mostly dead with but a little viable green grass being visible (Figure 2), whereas grass appears normal in more lush green areas (Figure 3).


Figure 1


Figure 2


Figure 3

Possibly more striking are areas of bare dirt where grass once was (Figures 4-6).


Figure 4


Figure 5


Figure 6

Zooming in on bare ground and vegetation interface areas (Figures 7-9), several features become apparent.


Figure 7


Figure 8


Figure 9

Bits and pieces of grass, and dried fecal pellets litter the ground (Figure 10). Most striking are soil-encrusted tubular structures (Figure 11) which sometimes cover more extensive areas (Figure 12).


Figure 10


Figure 11


Figure 12

Buffalograss webworms are responsible for all of the above. Buffalograss webworms are somewhat unique in the realm of "sod webworms". They are very restricted in their distribution in Kansas. In an initial distribution survey (conducted in 1966 and 1967) which included 36 counties, buffalograss webworm were documented from 10: Barber, Barton, Edwards, Ellsworth, Kingman, Meade, Pawnee, Pratt, Rice and Stafford. It is with most certainty that buffalograss webworms occur in counties which were not included in that first survey. For instance, a recent report would qualify Ford county as having buffalograss webworms.

Whereas most sod webworms species are associated primarily with cool-season grasses, buffalograss webworms are unique in their preference for both buffalograss and bermudagrass. And unlike other sod webworms which produce two generations per year in mid-latitude states such as Kansas, buffalograss webworms produce only a single generation each year.

Buffalograss webworms overwinter as first instar larvae which entered diapause soon after they hatched the previous fall. Larvae begin their feeding cycle soon after buffalograss and bermudagrasses green up in mid-April the following year. Currently, larvae are nearing the end of their feeding phase. Soon they will pupate, and from mid-August through mid-to late September moths will emerge, mate and deposit their eggs for the next generation.

Buffalograss webworm developmental stages are seldom observed. Nondescript brownish moths escape detection because they blend in well with their habitat. Females are weak fliers, and often remain motionless on the ground. Moths prefer bare soil for egglaying. Probing with their ovipositor, they deposit one egg at a time 1/4 to 1/2 -inch beneath the soil surface. After an average incubation period of 1 ½ weeks, small larvae emerge and larvae immediately form an overwintering hibernaculum.

Larval developmental stages essentially are hidden from view. As larvae begin feeding in the spring, they form a silk-lined vertical tube in the ground which serves as their main “home”. These tubes eventually average 4-inches in depth, but have been recorded as deep as 18-inches.

After they have depleted the food supply in the immediate vicinity of their vertical tube, buffalograss webworms construct surface/horizontal feeding tubes which radiate outward (to new food sources) from their vertical tubes. When constructing surface tubes, larvae gather soil particles, bits of grass leaves and stems, fecal pellets and other materials which they interweave with their silk. The daily time span for tube construction and foraging is early evening to sunrise. With the approach of day, larvae retreat into their vertical tubes where they consume their recently gathered food.

Vertical tubes also serve as the site where larvae pupate. Thus, in essence, most of the life stages proceed unseen, and are intricately/delicately intertwined and dependent upon their silk-lined abodes. In fact, there is a high failure rate when attempting to rear larvae after they have been collected/removed from their tunnel systems.

If a person wishes to view buffalograss webworms, tubes can be cut open (Figure 13). Surface tubes are the most easy to access for this purpose, although (as stated above) most will likely be empty because most larvae remain in their underground vertical tubes during the day. Buffalograss webworms reach an inch in length when fully mature, and can best be described as having an overall white appearance with a deep caramel colored head capsule. The prothoracic shield (immediately behind the head) is a lighter butterscotch shade, as are lateral spots and dorsal patches found on each body segment (Figure 14).

Figure 13

Figure 14

Buffalograss webworms are difficult to control because they remain in their tubes. Insecticides are unable to penetrate the walls and silk lining of the protective tunnel walls. Perhaps the best chance to control buffalograss webworms is with insecticide treatments applied to grass vegetation likely to be next-in-line for foraging (i.e. grass at interfaces areas). However, heat and direct sunlight may cause the rapid degradation of insecticides registered for use against webworms. Thus, a followup treatment(s) may be required when attempting to alleviate the pressures of buffalograss webworm feeding. Because there is an intimate association between buffalograss webworms and their tunnel systems, one might use a rake to break up/destroy exposed tubes or those somewhat hidden from view in grassy areas.

Another tact is to do nothing at this point in time. Buffalograss webworms are nearing the end of their feeding cycle. Already-existing bare spots will likely have to be renovated via seeding or sprigging. Damaged but yet-viable stands will reestablish themselves once the larvae cease their feed/foraging activities. In both instances, frequent irrigation and fertilization regimens will help speed-up the recovery process.

Bob Bauernfeind

Sunflower Moth (Head moth):

Western Kansas is currently experiencing a large flight of sunflower head moth. Intermittent operation of a black light trap adjacent to sunflower fields at the Agricultural Research Center-Hays has produced the following catches of sunflower head moth, *Homeosoma electellum*, over the past week.

	Adult Head Moths (Light Trap) Hays, KS	Average Number of adult moths per day collected in Two Pheromone Traps, Manhattan, KS
July 1		0.5
July 7	3	23
July 10	25	
July 12	12	
July 14	155	55
July 16	1270	60

The light trap operates from approximately 9:00 pm to 5:00 am (determined by battery life). By comparison, a series of three pheromone traps caught only a total of 53 moths over the same period with 24/7 operation. These fields were planted May 15 and began to flower July 12-13, so any commercial fields approaching flowering will probably require treatment this week to prevent egg-laying by the moth. If these are 1st generation moths migrating from the south (as we suspect), this large flight will probably affect a broad region of the state. It seems unlikely this large flight is the result of synchronous emergence of an overwintering population, but we do not yet know the rate of overwintering survival of the head moth in Kansas.

Egg laying likely follows a bell shaped curve, beginning at bloom, peaking a few days later, and tailing off over time. Higher population levels mean that populations will likely stay above treatable thresholds for a much longer period than in years when populations are low. Thus, if you usually only treat once, a few days after beginning to bloom, it's probably too late to get some of the early larvae and also misses some of the later larvae.

Sunflower moths prefer plants in early bloom for egg laying purposes. Nearly 80% of the eggs are deposited within 4 to 7 days after the bud begins opening. Eggs usually hatch in 2 to 3 days. Newly hatched larvae are yellowish in color. Larvae soon turn purplish brown to maroon in color with four cream to yellowish-green longitudinal stripes. Maximum length will approach ¾ inch.

For the first 4 to 5 days after hatching young larvae feed on pollen and florets on the flower surface. Once larvae enter the heads, significant seed damage may result. During the subsequent 2 to 2 and ½ weeks, a larva may tunnel into and destroy a dozen or more developing seeds. Some larvae never actually enter a seed but still contribute substantially to yield loss by consuming floret parts necessary for pollen reception and fertilization (stigma and style). Early damage may result in floret death or “pops” (unfilled seed hulls). However, seed filling will usually continue unaffected if stigma and style are not damaged until after fertilization is completed. Tangled mats of silken webbing, soiled by excrement and floral debris, are left as larvae move about in and on the head. Sunflowers attacked by the sunflower moth larvae are also more susceptible to infection by *Rhizopus* head rot. After feeding is completed, a majority of larvae drop to the soil on silken threads and either diapause or pupate 3 to 4 inches below the surface.

Sunflower moth larvae feeding within the head proper cannot be controlled effectively with insecticides. Therefore, sprays should be timed to coincide with the surface feeding stages. Unfortunately, sampling directly for these tiny larvae is not practical.

In practice, most researchers recommend treatment guidelines based on adult surveys. Several heads (yellow ray petals visible) should be routinely examined every 2 days for sunflower moth adults in the early morning or late evening throughout bloom (until pollen shed is complete). Relatively calm mornings or evenings are preferred for accurate sampling. Some researchers recommend treatment if ANY adults are found. Others, particularly from the more northern sunflower production states, stipulate that 2 moths per 5 heads should be present before treatment can be economically justified. Yield loss averaged 8.8 lbs. per acre based on 1 larvae per head in Kansas research trials.

Pheromone traps that lure and capture male moths with a synthetic attractant which mimics odors released by receptive female sunflower moths are available through private firms to help pinpoint moth activity periods. This information is helpful in allocating scouting efforts. Researchers in Kansas, Colorado, and Nebraska have studied the relationship between pheromone trap catches of adults and head infestations composed of sunflower moth larvae. During 1986 and 1987, a Kansas study concluded that pheromone traps could be an efficient tool for determining if moths are active in production fields. A significant relationship between the trap catch and the numbers of larvae per sunflower head was found in 2 of 3 years prior to bloom initiation until 1 week after full bloom. The relationship did not hold during 1988, an unusually hot and dry year, however. Briefly, this Kansas research indicated that if a weekly average of 29 sunflower moths were captured per pheromone trap, foliar treatment of oil seed sunflowers might be economically justified. That is, if more than 4 sunflower moths/trap/day are captured then heads will usually contain more larvae and suffer extensive damage. Infestations usually remain low when traps are capturing less than one sunflower moth/trap/day. Predictions of larval populations in heads were not conclusive where between 1 and 4 sunflower moths/trap/day were collected. Occasionally, traps placed on the south ends of fields collected more adults than traps placed on the north end.

If treatment becomes necessary, the first spray of a multiple spray schedule should be applied as the field enters early bloom. Many producers and consultants report better control when treatments are applied from the onset of bloom to 20% of plants showing yellow ray petals. Research indicates that 1 or 2 additional sprays will probably be necessary when moderate to high sunflower moth populations exist. These additional sprays (if permitted by the product label) should be applied at 5 to 7 day intervals if significant numbers of adults remain. More “failures” seem to be reported when the initial treatment is delayed and/or when producers try to ‘get by’ with one application when moth populations are heavy. In some instances, very high sunflower moth populations may require 3 treatments to prevent serious damage. Justifying multiple treatments is always difficult, but the alternative may be complete loss of the crop when pressure is extremely heavy.

Jeff Whitworth, Gerald Wilde, J.P. Michaud and Jared Hopper

The following samples were submitted to the Insect Diagnostic Laboratory for the week of July, 7 through July 11, 2003:

7-8-2003, Pratt County: Acrobat Ants in yard.
7-9-2003, Ottawa County: Oriental Cockroaches in home.
7-9-2003, Harvey County: Drugstore Beetle in home.
7-9-2003, Marion County: Dobsonfly female in home.
7-10-2003, Nemaha County: Burrower Bugs on sides of home.
7-10-2003, Butler County: Brown Recluse Spider.
7-10-2003, Anderson County: Aphids on Daylily.
7-10-2003, Pratt County: Pine Tip Moth damage on trees.
7-10-2003, Wabaunsee County: Oak Leaf Galls on tree.
7-10-2003, Nemaha County: Oak Leaf Roller/Tier, Gall Wasps on trees.
7-11-2003, Decatur County: Springtails. Booklouse in home.
7-11-2003, Lyon County: Fleahoppers on Clematis.

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

Sincerely,

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