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Kansas Insect Newsletter

For Agribusinesses, Applicators, Consultants, and Extension Personnel

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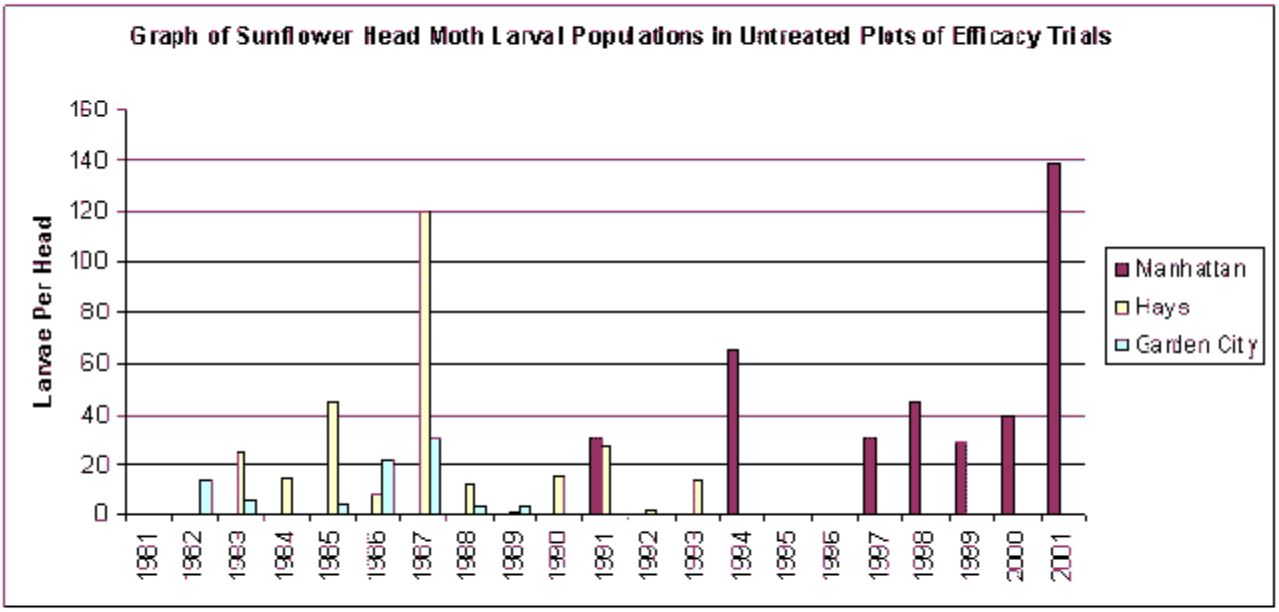
Sunflower Moth

The sunflower moth or “head moth” is one of the most common pests of sunflowers in Kansas. In 2001 we received several calls from people disappointed with the control of head moth in their sunflower fields. This prompted us to examine what may have caused this apparent lack of control. Most of the discussion has focused on three issues: weather, application problems, and population levels.

The hot dry weather that many people experienced during the application window was probably one of the factors that decreased satisfaction with control efforts. The hot weather undoubtedly caused the insecticides to break down more quickly. Reduced rates of carrier may have also played a role. However, the striking thing about last year was that population levels were much higher than what had been common for several years before (refer to graph).



Data from Wilde, Harvey and Depew * no tests 1995 and 1996

Since oviposition in a field 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 would stay above treatable threshold levels for a much longer period than in years where populations are low. Thus, people that were used to treating once, a few days after beginning bloom, were probably treating too late to get some of the early larvae and also missing some of the later larvae. Many people reported making additional applications, but again they may have missed a significant portion of the early eggs if they kept to their normal schedule of when they made their first application. For example: Research data from 1999 shows that in years with low to moderate moth pressure we can often achieve 70 to 90% control with one application. However, in years with heavy moth pressure like 2001, single application treatments may not provide significant reductions in larval numbers.

Sunflower Head Moth Trial
Wilde - Manhattan, Ks - 1999

Treatment	AI/A	Worms/Head	% Control
Lorsban	0.75	3.4 b	88
Baythroid	0.031	5.9 b	79
Asana	0.03	6.5 b	76
Warrior	0.03	9.4 b	67
Untreated	--	28.3 a	

- Hand Sprayer, 20 gal/A, treated at 100% bloom on 12 July, counted 30 July

** slide prepared by PES 11/00, selected treatments only*

Sunflower Head Moth Trial
Wilde - Manhattan, KS - 2001

Treatment	AI/A	Worms/Head	% Control
Baythroid	0.03+0.03	17.7 g	87
Baythroid	0.03	93.0 bcde	32
Asana	0.03	114.0 abc	17
Warrior	0.03	121.9 abc	12
Untreated	--	128.0 ab	
Untreated	--	148.2 ab	

- Hand Sprayer, 20 gal/A, treated at 5% bloom on 4 July, second application of Baythroid at 100% bloom on 13 July, counted 28 July

** slide prepared by PES 11/00, selected treatments only*

Another thing that one must keep in mind is that many times applications get delayed until after the optimum time for treatment for two reasons. First, growers may not understand the description of beginning bloom. Second, they don't allow for the fact that it may take 2-3 days or longer to get a field sprayed once they make the decision. Keep in mind that the recommendation for spraying head moth at 35% flowering – is when 35% of the plants are showing yellow ray petals, not when 35% of the florets in a head have bloomed. And if you want to have the flowers sprayed at that stage you are going to have to make your treatment decision even earlier.

Thus, what should we expect or recommend this year. First, there is probably no reason to believe that we will have numbers as high as we did last year. When we look back over our records, we find that the levels of larvae that we saw last were not unprecedented. We saw similar levels in 1987, and then following year populations were back to more normal levels. It is quite likely that the high levels of larvae last year may have created an opportunity to have higher than normal parasitism. On the other hand, we probably can not totally rule out abnormally high populations given last year's relatively

mild winter. Thus, we advise growers and consultants to be vigilant during this year's scouting season. If we see a repeat of the high number of moths that we saw last year, then we need to be ready to make applications earlier and not stop with just one application.

In hindsight we should have been quicker to spray last year given the high numbers of moths that were being reported. Often we recommend waiting until evening or early morning to scout for head moth because they often hide during the day. However, last year we had several reports of people finding high numbers of moths active during the day. If that occurs again then be prepared for serious head moth injury. If moths are hard to find during the day then maybe we will be back to more normal control efforts. Phil Sloderbeck, Jeff Whitworth and Gerald Wilde.

Sunflower Moth Recommendations

Adults are buff to grayish moths with a 3 4 inch wing span and 3 8 inch long body. Other moths are attracted to sunflowers, so be wary of misidentifications. When at rest, sunflower moth wings are tightly clasped to the body (cigar-shaped). A couple of pinpoint (dark) spots, near the center of the leading edge on the front wings, may be evident (depending upon moth condition).

Sunflower moths prefer plants in early bloom for egg laying purposes. Nearly 80 percent of the eggs are deposited within 4 to 7 days after the bud begins opening. Eggs usually hatch in 2 or 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 3 4 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 1 2 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 most treatments can be economically justified. Yield loss averaged 8.8 pounds 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 in fields within 1 week of bloom initiation. Traps had value for monitoring sunflower moth from 1 week 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 many 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 end of fields collected more adults than traps placed on the north end.

The first spray of a multiple spray schedule should be applied as the field enters early bloom. Many producers and consultants report better control if treatments are applied when about 20 percent of plants are 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.

Most reports indicate that early planted fields (blooming before late July) probably stand the greatest chance of developing significant infestations. Planting in early July greatly reduced head moth infestations at several Kansas research stations located around the state during the 1986 to 1988 growing seasons. However, delayed planting does not guarantee that treatments will not become necessary and early frost, plus seed weevils, may become factors reducing yield potential.

Planting date studies were conducted at Belleville, Hays, Hesston, Hutchinson, and Manhattan to assess the effect of different planting dates on sunflower moth infestations. Greater numbers of sunflower moth larvae and a greater percentage of each head were damaged with early (mid-May or early June) than later (early July) plantings. Location

made some difference, with Belleville and Hays plantings having less damage when the crop was planted after the second week in June; however, at Hesston, Hutchinson, and Manhattan, reduced numbers of larvae were only associated with the early July plantings. Highest net returns occurred where insecticide treatments were applied. Greatest return resulted when the crop was planted during the first week of June at Hesston, and the first week of July at Hutchinson if the insecticide was effective. However, if no insecticide was used, maximum net return was obtained by planting during the second or third week of June at Belleville, Hesston, and Manhattan, and by planting during the first week of July at Hutchinson.

Reports from growers and researchers in 2001 reinforced the importance of watching sunflower moth populations carefully and the need for timely and repeated applications when infestations are high. High populations increase the importance of getting the first application on just as sunflowers are beginning to bloom (first sign of yellow color in a field may not be too early in many years where infestations will be intense). In addition, high temperatures (several days above 100 degrees F) may have affected insecticide residual activity. Thus, additional applications may be needed sooner than in cooler weather.

Sunflower moth (Head Moth)

Insecticide: Chlorpyrifos (Lorsban 4E, Nufos 4E)
Rate: 1 2 to 3 4 lb. a.i./a (1 to 11 2 pt.)
Special instructions: Two treatments are permitted at 7-day intervals. 42-day preharvest restriction. Do not graze or feed treated forage.

Insecticide: Cyfluthrin (Baythroid 2)
Rate: 0.031 to 0.044 lb. a.i./a (2.0 to 2.8 fl. oz./a)
Special instructions: A total of 0.132 lb. a.i./a (8.4 fl.oz.) may be applied per season. 30 day pre-harvest interval.

Insecticide: Esfenvalerate(Asana XL)
Rate: 0.03 to 0.05 lb. a.i./a (5.8 to 9.6 fl. oz./a)
Special instructions: Repeat as necessary to maintain control. Do not exceed 0.2 lb. a.i./a per season. 28-day preharvest waiting interval

Insecticide: Lambda-cyhalothrin (Warrior T or Warrior with Zeon Technology)b
Rate: 0.02 to 0.03 lb. a.i./a (2.56 to 3.84 fl.oz./a)
Special instructions: Follow ‘special instructions’ under stem weevils.

Insecticide: Parathion, methyl
Rate: 1 lb. a.i./a
Special instructions: Up to 3 applications at 5-day intervals are permitted. 30-day preharvest restriction. Do not feed seeds to birds.

Sincerely,

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