Current Report

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SAMPLING FOR THE ALFALFA WEEVIL IN OKLAHOMA*

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The alfalfa weevil has been a serious pest over most of the alfalfa acreage in Oklahoma since 1972. In conjunction with research conducted to develop methods for controlling weevils, researchers in several states have worked to provide guidelines to aid producers in making decisions regarding use of insecticide against this pest. Proper timing of insecticide applications for the alfalfa weevil allows producers to avoid serious insect damage while achieving maximum returns on investments for chemical controls. When a decision has been made that use of insecticide is necessary, information on registered insecticides for alfalfa weevil control may be obtained from your county extension director or OSU Extension Facts No. 7166.

How to Use the Program

To use this procedure for sampling of alfalfa weevil populations you must:

1. Calculate degree day (dd) accumulation by recording daily high and low temperatures from January 1 until the end of the alfalfa weevil season (early May). The degree days used in this procedure are based on a developmental threshold of 48°F, because no weevil development or damage occurs at temperatures below this level.
2. Count the number of larvae on a 30-stem sample from each field that is checked.
3. Measure the height of 10 stems from the original 30.
4. Refer to the Recommendation Chart in this report to determine when chemical applications are needed to prevent serious yield reduction.

Measuring and Recording Temperature

A record of daily high and low temperatures should be kept from January 1 until the end of the alfalfa weevil season. You can obtain this information from the daily newspaper, local weather stations, radio or television information, and specialized county extension information systems. Once the daily high and low have been obtained, the next step is to convert this information into degree days (see Table 1). Locate the daily high in the left-hand column. Read across the page until the column for the daily low is located. The number in that column is the number of dd accumulated that day at those temperatures. For example, assume that in your newspaper the previous day's high and low temperatures were reported as 65°F and 46°F. In Table 1, locate 65°F in the column under daily high, then read across the page until the column for 46°F is located. In this example, 8 dd were accumulated the previous day.

A simple chart (see Figure 1) can be used to tally dd accumulation. According to Figure 1, a total of 225 dd had accumulated by the morning of March 10. On the morning of March 11, the previous day's high and low of 75°F and 38°F were obtained from a weather report and recorded. At this high/low combination, 11 dd were accumulated and the total for March 11 was then 236 (225 dd + 11 dd). Note that on March 12, an additional accumulation of 4 dd was added to the total. Field checking for weevil larvae should begin when 150 dd have accumulated from January 1. Because the alfalfa weevil often lays large numbers of eggs during the fall and winter months, damage due to weevil larvae may begin in very early spring as these eggs hatch.

Figure 1. Sample record of degree day(dd) accumulation.

Date	Temperature High	Low	degree days	Total dd (from Jan. 1)
Mar. 10	68	36	7	225
Mar. 11	75	38	11	236
Mar. 12	62	34	4	240

Field Sampling

It is important that you sample as much of each field as possible. The level of infestation may vary in different areas and inaccurate results are often obtained when only a small part of a field is checked. Avoid field edges because inaccurate sampling may result in these areas.

At 30 evenly spaced intervals carefully pick an entire stem (without dislodging any larvae) and place it in a 2 to 3 gallon container. Stems at each location must be selected at random, and this can be done by picking the first stem the hand touches. Next, beat the 30 stems vigorously against the inside of the container for a few seconds. Transfer the larvae to a shallow pan for counting and record the number you find. Randomly select 10 stems from the original 30 and record their average length to the nearest inch. In very large fields (40 acres or more), you may want to take 2 or more 30 stem samples and then average the results. After the sampling process is completed, you have all necessary information for decision making regarding insecticide application; dd totals from daily records, larval number/30 stems, and average plant height.

Decision Making

Refer to the Recommendation Chart in this report to determine when spraying is necessary. For example, if during your sampling on March 10 (225 dd) you found 18 larvae on 7 inch alfalfa, the chart tells you to resample after an additional 50 dd accumulation. Suppose that in resampling this field on March 17 (275 dd), you found 32 larvae in 10 inch alfalfa. According to the chart, spraying would be recommended. It is important to follow suggested resampling intervals to avoid the possibility of serious weevil damage. Fields which have been sprayed should be resampled 100 dd after the application date to make certain that effective control was obtained.

A sample that is preceded by frost or beating rains can result in underestimation of population density. Numerous larvae may be found on the ground following these weather conditions. Although some larvae will probably fail to crawl up the plants, it is suggested that these kinds of fields be resampled the following day.

According to this sampling program, a field may be checked every 5 to 7 days through March and April. Time spent in checking fields will yield benefits of less insect damage and more efficient use of chemical insecticides

*Information in this report is adapted from programs developed at the University of Illinois.

REFERENCE

Wedberg, J.L. and W.G. Ruensink. 1977. Alfalfa weevil pest management program. University of Illinois, Coop. Ext. Serv. Circ. No. 1136, 8p.

Oklahoma Recommendation Chart

Total dd	Alfalfa height (inches)

Alfalfa height (inches) — Number of larvae collected from a 30-stem sample

Total dd	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18 or more
150-230																	
SPRAY	13	23	33	42	50	50	50										
Resample 50 dd	0-12	0-22	0-32	0-41	0-49	0-49	0-49										
240-280																	
SPRAY	10	10	15	15	15	20	20	25	25	25							
Resample 50 dd	0-9	0-9	0-14	0-14	0-14	0-19	0-19	0-24	0-24	0-24							
290-330																	
SPRAY		12	18	25	25	25	30	30	30	30	30	30	30				
Resample 50 dd		0-11	0-17	0-24	0-24	0-24	0-29	0-29	0-29	0-29	0-29	0-29	0-29				
340-380																	
SPRAY					25	25	30	30	30	35	35	35	35	35	35		
Resample 50 dd					14-24	14-24	14-29	14-29	14-29	14-34	17-34	17-34	17-34	17-34	17-34		
Resample 100 dd					0-13	0-13	0-13	0-13	0-13	0-13	0-16	0-16	0-16	0-16	0-16		
390-530																	
SPRAY										20	20	25	30	30	35	35	40
Resample 50 dd										8-19	8-19	8-24	14-29	14-29	14-34	18-34	18-39
Resample 100 dd										0-7	0-7	0-7	0-13	0-13	0-13	0-17	0-17

	Change in number of larvae since last sample		
	Decreased 10 or more	Within 10	Increased 10 or more
540 TO HARVEST			
SPRAY or harvest	35	30	25
Resample in 50 dd	18-34	14-29	8-24
Resample in 100 dd	0-17	0-13	0-7

Table 1. Degree-Day Values

High temperature	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
45-50	— When daily high is 50 degrees or less, the degree-day value is 0.																																								
51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
52	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
53	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
54	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
55	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
56	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3
57	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3
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59	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4
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63	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	6
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83	10	10	10	10	10	10	11	11	11	11	11	11	11	11	11	11	11	12	12	12	12	12	12	12	12	12	13	13	13	13	13	13	13	14	14	14	14	15	15	15	15
84	11	11	11	11	11	11	11	11	11	11	11	11	11	12	12	12	12	12	12	12	12	12	12	13	13	13	13	13	13	13	14	14	14	14	14	15	15	15	15	15	15
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90	13	13	13	13	13	13	13	13	14	14	14	14	14	14	14	14	14	15	15	15	15	15	15	15	15	16	16	16	16	16	16	16	17	17	17	17	17	18	18	18	18

Table 1. Continued

High temperature	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
45	0	0	0	0	0	0																																			
46	0	0	0	0	0	0	0																																		
47	0	0	0	0	0	0	0	0																																	
48	0	0	0	0	0	0	0	0	0																																
49	0	0	0	0	0	0	0	0	0	1	1																														
50	0	0	0	0	1	1	1	1	1	2	2																														
51	1	1	1	1	1	1	1	1	2	2	3	3																													
52	1	1	1	1	1	1	2	2	2	3	3	4	4																												
53	1	1	2	2	2	2	2	2	3	3	4	4	5	5																											
54	2	2	2	2	2	2	3	3	3	4	4	5	5	6	6																										
55	2	2	2	2	3	3	3	3	4	4	5	5	6	6	7	7																									
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