



EXTENSION

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Scouting for the Alfalfa Weevil in Oklahoma

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Serious loss in production may result from alfalfa weevil infestations. Researchers in several states have worked to provide the guidelines discussed in this report to assist growers in deciding when it is profitable to apply insecticides against this pest. These guidelines help determine the need for insecticide use and proper timing for applications to avoid serious weevil damage. The sampling procedures described in this report provide the most accurate means available for decision-making regarding insecticide use to control alfalfa weevil larvae. They take into consideration the prevailing temperatures by way of day degree calculations; the growth stage of alfalfa, which affects the capability of plants to withstand weevil feeding; and the population levels of weevil larvae which can be permitted in alfalfa before insecticide application becomes profitable. When a decision has been made that use of an insecticide is necessary, information on registered compounds for weevil control may be obtained from your county extension office or OSU Extension Fact Sheet EPP-7150.

Day Degree Concept

The response of insects to temperature is similar to that of plants. Each species has a minimum or threshold temperature below which no growth or development can take place. This minimum level for the alfalfa weevil is about 50 F. As temperatures increase above 50, weevils develop. With sufficient numbers of warm days during winter and spring, weevil eggs hatch and damaging larval populations may be seen.

The amount of warm weather required for completion of weevil development is measured in heat units called day degrees. Intervals for checking alfalfa fields as part of this program are based on day degrees and, thus are related closely to weevil development. With cool weather and little chance of weevil development or damage, fields are usually sampled once a week. When weather is warm and there is greater likelihood of weevil damage occurring, fields are checked more frequently. This basis for sampling provides a more reliable means of monitoring weevil activity than any other sampling method that has been used.

Day degrees are computed for each 24-hour period in which the temperature rises above 50 F. Numbers of day degrees are added together to compile totals beginning Jan. 1 of each year for several locations across Oklahoma. The day degree totals are being made available through the OSU Extension in conjunction with the 'Mesonet' system in operation throughout Oklahoma. This information is provided to radio and television stations as part of the Oklahoma Agricultural Weather Advisory prepared by the National Weather Service. This fact sheet informs producers how to keep temperature records and compile day degree totals for their areas.

The alfalfa weevil often lays large numbers of eggs during fall and winter months. Eggs hatch and larvae feed during early spring. Field checking for weevil larvae should begin when a total of 150 day degrees have accumulated after January 1. This accumulation is reached by late February to mid-March in southern and central Oklahoma. Northwestern and Panhandle areas will be somewhat later in reaching 150 day degrees.

Field Sampling

It is important to 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. Sampling should be conducted when foliage is dry so large larvae will be found in samples.

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 must be selected at random. Pick the first stem the hand touches. Next, beat the 30 stems vigorously against the inside of the container for 10 to 20 seconds. This will shake out all medium-sized and large larvae for counting. Small larvae, which remain in terminals, do not pose an immediate threat of damage to the alfalfa. The decision to spray is based on numbers of larger larvae, which may cause damage within a few days of sampling. Transfer the larvae to a shallow pan for counting and record the number. Randomly select 10 stems from the original 30

and record their average length to the nearest inch. In large fields (30 acres or more), take two or more 30-stem samples and then average the results.

Decision Making

Refer to the recommendation chart in this report to determine when spraying is necessary. For example, if during sampling after 225 day degrees from Jan. 1, 18 larvae are found on 7-inch alfalfa, the chart says resample after five to seven days. Suppose that in resampling this field at 275 day degrees, 32 larvae are found 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 three to five days 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 unfavorable weather. It is suggested that fields be sampled at least one or two days after these weather conditions have occurred.

Early in the growing season (early February), when small larvae reach high numbers on stubble growth of alfalfa, treatment is not recommended, since a freeze event is still likely to affect the populations (2002 season) and provide at least some regulation (or mortality) of larval numbers. If high numbers of large weevil larvae are present, because of mild fall and winter weather, then caution should be taken concerning insecticide choices. Many of the pyrethroid chemistries are slow-acting under cold conditions and long-residual compounds should not be expected to provide control until harvest. If early treatment is needed, careful consideration should be given to product usage per cutting and modes of action to reduce changes of resistance.

Summary

- Obtain day degree accumulations from the OSU Extension, farm news programs or personal computations.

- Count the number of larvae dislodged from a 30-stem sample of alfalfa from each field checked.
- Measure the height of 10 stems from each 30-stem sample.
- Refer to the recommendation chart in this report to determine when insecticide application is needed to prevent serious yield reduction.

Measuring and Recording Temperature

This section is for use by producers who wish to calculate day degree accumulations for their own localities.

A record of daily high and low temperatures should be kept from Jan. 1 until the end of the alfalfa weevil season. Obtain this information from the daily newspaper, local weather stations, radio or television information or a thermometer located on the farm. Once the daily high and low have been obtained, the next step is to convert this information into day degrees (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. At the point where columns for daily high and low intersect, the day degree value for that day is read. Note the table has two parts; the top portion for days when low temperatures are less than 40 F, the bottom for lows above 40 F. For example, assume that in your newspaper the previous day's high and low temperatures were reported as 65 F and 46 F. In the bottom portion of 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, eight day degrees were accumulated the previous day.

A chart can be prepared to show day degrees for each date and the total accumulated from Jan. 1. Simply add the number for each day to the total to keep updated records for use with field sampling information.

As noted above, daily degree day accumulations from Jan. 1 also are available through the Alfalfa Weevil Advisor located on the Mesonet at https://www.mesonet.org/index.php/agriculture/category/crop/alfalfa/degree_day_heat_unit_calculator

Oklahoma Recommendation Chart

		<i>Alfalfa Height (inches)</i>																	
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18 or more	
		<i>Number of larvae collected from a 30-stem sample</i>																	
150 to 240 dd*																			
SPRAYING RECOMMENDED		13	20	30	35	40	40	40											
Resample in five to seven days		0-12	0-19	0-29	0-34	0-39	0-39	0-39											
240 to 290 dd																			
SPRAYING RECOMMENDED		10	10	15	15	15	20	20	25	25	25								
Resample in five to seven days		0-9	0-9	0-14	0-14	0-14	0-19	0-19	0-24	0-24	0-24								
290 to 340 dd																			
SPRAYING RECOMMENDED		12	12	18	25	25	25	30	30	30	30	30	30	30	35	35			
Resample in five to seven days		0-11	0-11	0-17	0-24	0-24	0-24	0-29	0-29	0-29	0-29	0-29	0-29	0-29	0-34	0-34			
340 to 390 dd																			
SPRAYING RECOMMENDED		20	20	20	20	25	25	30	30	30	35	35	35	35	35	35	40		
Resample in three to five days		0-19	0-19	0-19	0-19	14-24	14-24	14-29	14-29	14-29	14-34	17-34	17-34	17-34	37-34	17-34	18-39		
Resample in five to seven days						0-13	0-13	0-13	0-13	0-13	0-13	0-16	0-16	0-16	0-16	0-16	0-17		
390 to 540 dd																			
SPRAYING RECOMMENDED		20	20	20	20	20	25	25	25	25	25	25	30	30	35	35	40		
Resample in three to five days		0-19	0-19	0-19	0-19	0-19	8-24	8-24	8-24	8-24	8-24	8-24	14-29	14-29	14-34	18-34	18-39		
Resample in five to seven days							0-7	0-7	0-7	0-7	0-7	0-7	0-13	0-13	0-13	0-17	0-17		
		<i>Change in number of larvae since last sample</i>																	
		<i>Decreased 10 or more.</i>					<i>Within 10</i>					<i>Increased 10 or more</i>							
540 TO HARVEST																			
SPRAY OR HARVEST							35					30					25		This section is to be used as the first crop reaches 15-18 inches in height and peak larval populations for the weevil have typically been reached.
Resample in three to five days							18-34					14-29					8-24		
Resample in five to seven days							0-17					0-13					0-7		

* Day degree total from January 1

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President for Agricultural Programs and has been prepared and distributed at a cost of 20 cents per copy. 08/2020 GH