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Watch for Panicle-Feeding Caterpillars in Sorghum

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I received my first report of “worms” feeding on sorghum this week which I identified as fall armyworms. The fall armyworm, and its cousin, the corn earworm comprise a complex of caterpillars called sorghum “headworms”. Headworms feed in the whorl and the emerged grain head of sorghum. In the past, I rarely recommended that a producer treat for headworms that were infesting whorl stage sorghum. Why? Because whorl feeding rarely causes enough yield loss to warrant treatment costs, AND it is difficult to get effective control because the worms are protected from exposure to the insecticide. Having said that and with sorghum prices at new highs, it is time to revisit those recommendations.

Damage from headworm whorl-feeding is often unnoticed until severe damage is evident, so it is important to check fields regularly. Fall armyworms and corn earworms are both striped caterpillars with very little body “hair.” The fall armyworm can be distinguished from the corn earworm by the distinctive white or yellow inverted “Y” on the head. Corn earworms can range in color from light green, to pink, to nearly black.

Threshold for Whorl Damage: We don’t have much research to evaluate yield loss due to leaf feeding. Research conducted in the late 60’s showed no measurable yield loss due to leaf feeding, because the sorghum plant can compensate for leaf damage. However, with today’s new varieties and the increased value of grain, fields should be scouted. If plants are very small (2-4 leaf stage), it is important to scout and treat if fall armyworms are feeding, because they can literally kill small, newly emerged plants by eating the growing point. Treat if 25% of small (2-4 leaf stage) plants are infested.

In larger plants examine plants for whorl feeding and presence of caterpillars. Examine 30 plants (5 consecutive plants in 6 different locations) for evidence of feeding. Pull the whorl from damaged plants and unroll the leaves to find the caterpillars that are feeding on that plant. Early signs include “windowpaning” and “shotholing”.



“Windowpaning” damage.



“Shotholing” damage.

Before making a treatment decision, split a few stalks to see where the panicle is located. If the sorghum is close to emerging (boot stage), today’s market prices suggest we should be looking at 75% of the whorls infested with 1-2 caterpillars present as a treatment threshold.

Threshold for Panicle Damage: Texas A&M entomologists recently revised published economic thresholds for the headworm complex in emerged heads after showing that the old thresholds were underestimating potential yield loss. The researchers found that headworms suffer heavy mortality until they reach the 4th instar (have molted 3 times). By that time, they are about ½ inches long and will likely live to cause economic damage. I have adapted their results to provide Oklahoma growers with a suggested treatment threshold that can be calculated for use with the “shake bucket” sampling technique in the attached worksheet. The bottom line: with today’s prices for sorghum grain, it is more important than ever to scout fields for insect pests.

An example for all worms over ½ inch: As an example, let’s say that you counted 22 plants in 17.4 ft on your 30-inch row sorghum. That is equivalent to the number of plants in 1/1000 of an acre. Your control costs are \$8.00 and you have contracted your sorghum to sell for \$7.00 per hundredweight. You sampled your field with the shake bucket method and found 47 caterpillars in 30 samples.

Worm size (Circle) Small (less than ½ inches long)
 Large (more than ½ inches long)
 Mixed (50% large, 50% small)

Control Cost =\$8.00, Market Value of Crop = \$7.00
Plants per acre = 22 x 1000 = 22,000.
Calculated EIL number of caterpillars per acre (from EIL Table) 11,000/acre
11,000 caterpillars per acre/22,000 plants per acre = 0.5 worms per head.

EIL = 0.5 worms per head.

The EIL is **0.50 worms per plant**, and you collected **1.56 worms per plant** (47 worms/ 30 plants). You **should treat** because you have exceeded the EIL.

An example for all worms under ½ inch:

Worm size (Circle) **Small** (less than ½ inches long)
Large (more than ½ inches long)
Mixed (50% large, 50% small)

Control Cost = \$8.00, Market Value of Crop = \$7.00

Plants per acre = 22 x 1000 = 22,000.

Calculated EIL number of caterpillars per acre (from EIL Table) 58,000/acre

58,000 caterpillars per acre / 22,000 plants per acre = 2.63 worms per head

EIL = 2.63 worms per head.

The EIL is **2.63 worms per plant**, and you collected **1.56 worms per plant** (47 worms/ 30 plants). You **should not treat** because you have not exceeded the EIL.

An example for worms of mixed sizes:

Worm size (Circle) Small (less than ½ inches long)
Large (more than ½ inches long)
Mixed (50% large, 50% small)

Control Cost = \$8.00, Market Value of Crop = \$7.00

Plants per acre = 22 x 1000 = 22,000.

Calculated EIL number of caterpillars per acre (from EIL Table) 34,000/acre

34,000 caterpillars per acre / 22,000 plants per acre = 1.54 worms per head

EIL = 1.54 worms per head.

The EIL is **1.54 worms per plant**, and you collected **1.56 worms per plant** (47 worms/ 30 plants). You **should treat** because you have exceeded the EIL, **or** resample in 2-3 days, especially if there is reason to believe that more worm mortality will occur due to heavy rains or numerous predators present in the field or if you can't immediately schedule a treatment.

Dr. Richard Grantham, Director, Plant Disease and Insect Diagnostic Laboratory

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Step 1: Scout your field with the shake bucket method, paying attention to the size and number of worms you collected. Estimate the Economic Injury Level from the tables (page 3) based on sample of worm size in heads. Determine control costs (cost of insecticide + cost of application) and market value of crop (\$ per hundred weight).

Worm size (Circle) Small (less than ½ inches long)
 Large (more than ½ inches long)
 Mixed (50% large, 50% small)

Control Cost = _____, Market Value of Crop = _____

Number of caterpillars per acre (from EIL Table) _____

Step 2: Estimate your plant population. Go by planting rate/acre or calculate your row spacing.

20 inch spacing----# plants in 26.2 ft _____ X 1000 = _____plants/acre

30 inch spacing----# plants in 17.4 ft _____ X 1000 = _____plants/acre

36 inch spacing----# plants in 14.5 ft _____ X 1000 = _____plants/acre

40 inch spacing----# plants in 13.2 ft _____ X 1000 = _____plants/acre

Step 3: Divide the Number of caterpillars per acre by the # plants per acre. That number equals the number of caterpillars per head for the threshold.

Caterpillars per acre _____ / # Plants per acre _____

Threshold: _____ per head.

Decision: Treat** if the threshold was met or exceeded.

** Chemical registrations can change; consult current recommendations published in CR-7170, *Management of Insect and Mite Pests of Sorghum*. Consult label for information on pre-harvest intervals and grazing restrictions.

Economic Injury Levels (EIL) for Sorghum Headworms

(Adapted from B-1220, Texas A&M University)

EIL* For Large (1/2 inch or longer) # Headworms/Acre						
Control Costs (\$) per Acre	Market Value of Crop (\$ per CWT)					
	5.00	6.00	7.00	8.00	9.00	10.00
6.00	11700	9750	8500	7250	6400	5750
8.00	15600	13000	11000	9750	8600	7750
10.00	19500	16250	14000	12250	10800	9750
12.00	23400	19500	16750	14750	13000	11750

EIL* For Small (1/4 to 1/2 inch) # Headworms/Acre						
Control Costs (\$) per Acre	Market Value of Crop (\$ per CWT)					
	5.00	6.00	7.00	8.00	9.00	10.00
6.00	61750	51500	44750	38250	34400	31250
8.00	82250	68500	58000	51250	46000	41750
10.00	102750	87750	73750	64500	56750	51500
12.00	123500	102750	88250	77750	68250	62000

EIL For Mixed (50% small, 50% large) # Headworms/Acre						
Control Costs (\$) per Acre	Market Value of Crop (\$ per CWT)					
	5.00	6.00	7.00	8.00	9.00	10.00
6.00	36750	30500	26500	22750	20500	18500
8.00	49000	40750	34500	30500	27250	24750
10.00	61000	52000	43750	38250	33750	30500
12.00	73500	61250	52500	46250	40500	36750

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