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First Generation European Corn Borer Scouting and Treatment Decisions

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The decision to treat for European corn borer is a complex one affected by many variables, such as weather, plant maturity, borer survival and development, anticipated corn prices, insecticide efficacy, and costs versus anticipated returns. This publication discusses the factors growers need to consider when assessing the need for control of first generation European corn borers in non-Bt corn.

European corn borer moths prefer the tallest plants for egg laying. So expect initial concentrations of egg-laying moths in those fields where the corn plants are taller than in surrounding fields. If most fields are about the same height, moths may disperse evenly throughout them. Even late-planted corn can become damaged if rapid growth makes fields attractive late in the borer moth flight period. Plan to scout all corn fields for at least three to four weeks after peak moth flight, usually between early June and early July. Also, some varieties of corn are more susceptible than others. Consider locally adapted varieties that yield well and have some resistance to the borer.

Begin routine scouting during the moth flight, egg-laying and early hatching period. To determine the need to treat for first generation borer, examine at least 25 corn whorls at each of four locations in each field. Early signs of feeding by corn borer larvae are pin-hole or shot-hole damage to the leaf. Record the percentage of total plants with whorls damaged by corn borer feeding. Also, pull up and unroll several whorls at each site and record the number of live worms present. Calculate the average number of live larvae per damaged plant (total live larvae divided by number of damaged plants examined). Enter data from your sampling into the provided worksheet. This will give you an estimate of the **maximum** number of borers that might survive to produce tunnels in the plant. Remember that mortality of young borers is normally high. If you make a treatment decision when most borers are small, your scouting figures may overestimate the final borer population. It may be better to delay your treatment decision until just before borers leave whorls and enter stalks.

Caution: Borers which have left the whorl and entered the stalk cannot be controlled. If most have left the whorl, it is too late to attempt control. Be certain to sample enough plants at enough locations to ensure that estimates are typical of the field. Twenty-five plants in four locations in each field is a

minimum sample.

To make a decision on first generation European corn borer treatment you need the following information:

1. Average percentage of damaged whorls in the field and average number of live worms per damaged plant. These numbers help provide an estimate of the possible maximum number of cavities per plant at the end of the first generation.

2. Cost per acre of the insecticide application (product and application costs).

3. Anticipated dollar value of the grain per bushel.

4. Estimated percentage control given by a particular insecticide.

Example: An average of one borer cavity per plant is capable of causing an approximate 5 percent yield loss. Using the worksheet example, you would know from scouting that 50 percent of the plant whorls are damaged with an average of four live worms per damaged plant. You can calculate that 50 % x 4.0 = 2.0 worms per plant, if all worms survive. Assume 75 percent control and $2.00 value per bushel of corn with a yield expectation of 125 bushels per acre.

Additional Sources of Information

The European Corn Borer: Biology and Management, 1997, J. F. Witkowski and R. J. Wright.

European Corn Borer Ecology and Management. 1996. C. E. Mason et al. North Central Regional Extension Publication 327, Iowa State University, Ames.

Management Worksheet for First Generation Corn Borer		
An interactive web version of this worksheet is also available.		
	Example field	***Your estimates***
Yield potential for this field	125 bu/A	_____ bu/A
Number of larvae/plant = average live larvae/plant x average % damaged plants (4 larvae x 50% damaged plants = 2 larvae/plant)*	2 larvae/plant	_____ larvae/plant
Potential yield loss (2 larvae/plant x 5% loss/larva = 10% loss in yield, 10% x 125 bu = 12.5 bu loss/A	12.5 bu/A	_____ bu/A
Dollar loss/A (12.5 bu/A x $2.00 per bu = $25.00 loss/A).	$25.00	$_____
Preventable loss (if chemical is 75% effective; $25.00 x 75% = $18.75/A)**	$18.75	$_____
Chemical ($8.00/A) and application costs ($4.00/A). Estimate your own cost or call dealer/applicator. TOTAL = $12.00/A	$12.00	$_____

Compare preventable loss ($18.75/A) with treatment cost ($12.00/A). Subtract latter ($12.00/A) from former ($18.75/A) to find dollars saved by treatment per acre ($6.75/A).	+$6.75	$_____

If preventable loss (No. 5) exceeds total cost of treatment (No. 6), you may benefit from an insecticide application for first generation corn borer.

* To determine the need for treatment, it is essential to obtain an estimate of the final population of borers in each field. Ideally, you should make this final population estimate and the treatment decision after egg-laying, when the oldest borers are approaching the third stage (about half-grown), and before the oldest larvae have left the whorl. Remember that natural insect mortality caused by weather (low temperatures, low relative humidity, wind, or driving rain), other insects, diseases, and resistance factors in the corn plant is often high, especially in the very earliest borer stages. Occasionally, such mortality may be as high as 90 percent. However, warm, wet and humid, mild conditions can increase survival considerably. Therefore, due to these variables, it is nearly impossible to support the use of an "average percentage of surviving borers" and plug it into the formula. As it is, the above formula tells you what would happen if all the borers you observed survived to invade the stalk and complete a tunnel. The later you can make your treatment decision without compromising on control, the more natural mortality will occur and the greater your likelihood of making a correct treatment decision.

** A reasonable expectation for insecticidal control of first generation European corn borer under typical field conditions is approximately 75 percent. Percent control can vary considerably, depending on several factors, including timing of application, product choice and application method. Research has shown that granules generally work better than liquids for first generation European corn borers, with the exception of center pivot applications.

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