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## With the Increased Value of Corn, What are the Economic Thresholds for First Generation European Corn Borer?

Jon J. Tollefson

Iowa State University, [tolly@iastate.edu](mailto:tolly@iastate.edu)

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# With the Increased Value of Corn, What are the Economic Thresholds for First Generation European Corn Borer?

## **Abstract**

The 2008 crop season has been unusual; not only has the weather been extreme, but the value of crops is higher than it has been historically. In the European Corn Borer Ecology and Management bulletin published in 1996 the economic injury levels for first generation European corn borer attacking corn were calculated for corn that sold for \$2.50 per bushel. Now field corn can be sold for nearly three times that amount. How will this affect the number of larvae that should be present when it is decided to apply a control?

## **Keywords**

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## **Disciplines**

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## With the Increased Value of Corn, What are the Economic Thresholds for First Generation European Corn Borer?

By Jon Tollefson, Department of Entomology

The 2008 crop season has been unusual; not only has the weather been extreme, but the value of crops is higher than it has been historically. In the European Corn Borer Ecology and Management bulletin published in 1996 the economic injury levels for first generation European corn borer attacking corn were calculated for corn that sold for \$2.50 per bushel. Now field corn can be sold for nearly three times that amount. How will this affect the number of larvae that should be present when it is decided to apply a control?

The number of pest insects that are present to justify paying to control them should increase with an increase in the cost of control (if it will cost more you don't spend the money as soon), and decrease when the crop value increases (if corn is worth more you will pay for the treatment sooner). I have recalculated the economic injury level (when the loss of corn equals the cost of control) for first generation European corn borer for corn that can be sold at \$6 and \$7 per bushel and control that costs \$15 and \$18 per acre.

The data represented in Table 1 has been compiled in an Excel spreadsheet. The Iowa State University Extension field agronomists have this spreadsheet and can provide it to you to make calculations. The spreadsheet uses the same assumptions as the corn borer management bulletin: that 40 percent of the larvae will survive to tunnel into the stocks, yield loss will be 5.9 percent per larvae in the stock, and that the field corn is in the tenth leaf stage. Setting the returns near zero (the value of yield saved is equal to the cost of control) and by calculating backward the Economic Injury Levels can be derived. The values that result are:

Control costs are \$15 if corn is figured at \$6 per bushel and there is an average of 0.88 Second stage larvae per plant. Control costs are also \$15 if corn is figured at \$7 per bushel and there is an average of 0.76 larvae per plant.

Control costs are \$18 if corn is figured at \$6 per bushel with an average of 1.06 larvae per plant. Control costs are also \$18 if corn is figured at \$7 per bushel corn with an average of 0.91 Second stage larvae per plant

These numbers will change if you change your assumptions. For example, if you assume that the larval mortality will be lower, then you can change 40 percent for the surviving larvae to a higher value. The value of corn and control costs can also be changed. To make the changes you will need the Excel spreadsheet with the mathematical functions imbedded in it so that it will react to your changes in the variables. (Access the Microsoft Office Excel spreadsheet from the link on the right.)

**Table 1. European Corn Borer 1st Generation Economic Threshold at \$6 and \$7 Corn.**

Spreadsheet

Use this MS Excel spreadsheet to enter your own variables for calculating economic thresholds for European Corn Borer. (Note: The original spreadsheet posted with this article was updated July 15, 2008 - [see article of explanation.](#))

[European Corn Borer First Generation Economic Threshold at \\$6 and \\$7 Corn](#)

	\$15 Control Cost		\$18 Control Cost	
	\$6.00 corn	\$7.00 corn	\$6.00 corn	\$7.00 corn
Larvae Found	1.00	1.00	1.00	1.00
Expected Survivorship (%)	0.40	0.40	0.40	0.40
Surviving Larvae	0.40	0.40	0.40	0.40
Plants Examined	1	1	1	1
Larvae per Plant	0.40	0.40	0.40	0.40
Yield Loss per Larva (%/L)	0.059	0.059	0.059	0.059
Yield Loss (%)	0.024	0.024	0.024	0.024
Expected Yield (bu/a)	150	150	150	150
Yield loss per acre (bu)	3.54	3.54	3.54	3.54
Price per Bushel (\$)	6.00	7.00	6.00	7.00
Loss per Acre (\$)	21.24	24.78	21.24	24.78
Percent Control (%)	0.80	0.80	0.80	0.80
Preventable Loss (\$)	16.99	19.82	16.99	19.82
Cost of Control (\$)	15.00	15.00	18.00	18.00
Profit/Loss per acre (\$)	1.99	4.82	-1.01	1.82
Economic Injury Level	0.88	0.76	1.06	0.91

*Jon Tollefson is a professor of entomology with extension and research responsibilities.*

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