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European corn borer growth: time and temperature

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Abstract
Early reports indicate that populations of European corn borers are becoming easier to find now that the corn is getting taller. Shannon Gomes, a crop consultant in northeastern Iowa, reports finding an average of 1.06 larvae per plant in a field north of Waterloo. Other reports from our extension specialists in field crops indicate that a density this high is rare across the state. However, field scouts should inspect fields closely during the next couple of weeks and compare populations with the economic thresholds printed in the June 21, 1999, ICM newsletter.

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A common question asked about European corn borers each summer is, "How long does it take before the borers tunnel into the stalk?" The answer depends on the influence of ambient temperatures in the cornfield. Because insects are "cold blooded," their growth is a function of temperature over a period of time. When temperatures are cooler than average, development of the larvae slows down and they stay in each larval stage a little longer. The eggs require approximately 100 degree days for larvae to hatch. The larvae need about another 225 degree days to reach the third instar, which is the developmental stage when some of the larvae start to tunnel into the stalk. With daytime temperatures of 85°F and nighttime temperatures of 60°F, the European corn borer will accumulate 22.5 degree days per 24 hours. At this rate it takes approximately 10 days from hatching to the first stalk tunneling. Sixteen days after the first larvae hatch, they will be in the fourth instar and most of them will be tunneling into the stalk at this time. See the table.

Degree days can be estimated for European corn borers in your area by using the following formula:

1. Add the daily maximum and minimum temperatures together and then divide by 2 to get a mean daily temperature (but do not use a maximum above 86 or a minimum below 50).
2. Subtract 50 from the mean daily temperature to obtain the heat units for 1 day.
3. Sum the heat units to get the accumulated degree days for a known time period.

Accumulated degree days (developmental threshold of 50°F) from initial capture of adult European corn borer moths in the spring for first occurrence of life stages.*

Accumulated degree days	First occurrence of stage or event	Days to first occurrence	General activity
0	first spring moth	—	mating and egg laying

212	1st instar	16.3	pinhole leaf feeding in whorl
318	2nd instar	6.6	shothole leaf feeding in whorl
435	3rd instar	6.5	midrib and stalk boring
567	4th instar	6.6	stalk boring
792	5th instar	10.2	stalk boring
1,002	pupa	8.8	changing to adult moth
1,192	adult moth	7.6	mating and egg laying

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Links:
[1] http://www.ipm.iastate.edu/ipm/icm/1999/6-21-1999/scoutforecb.html

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