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# APPROACHES TO EUROPEAN CORN BORER MANAGEMENT

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Reaching the proper management decision regarding European corn borers in field corn is dependent upon many biological and economic factors. The following procedures given below are usually effective.

Scouting is required before any decision can be made regarding the necessity of an insecticide application. During the first generation, scouting should begin when plants have an extended leaf height of 17 inches. Five random samples of 20 consecutive plants should be examined for every 40 to 50 acres. The first sample should be at least 100 feet in from the edge of the field. Examine plants for fresh whorl feeding and record the number of damaged plants. Dissect two infested plants per 20 plant sample and look for live borers. It is important to check for live larvae because borer mortality is very high the first 3 to 5 days after hatching.

After scouting the field, use the first-generation economic injury level calculation sheet to determine whether the field should be sprayed or not.

Treatment guidelines for second-generation European corn borer are a little more complex. Two items must be determined before the economic injury level can be determined. First, the date of initiation of egg laying must be established. This can best be achieved by trapping adult moths with a blacklight trap or pheromone traps (available from Trece Inc., P. O. Box 5267, Salinas, CA 93915, 408-758-0205 or Sentry Inc., P. O. Box 426, Buckeye, AZ 85326, 602-386-6737). When the first moth that will begin laying second generation eggs is collected (usually during late July or early August), this date is used as the initiation of egg laying.

The second item necessary to calculate the economic injury level is the density of the egg population in the corn field. At 8 to 10 days after the first moth is collected, egg masses should be counted in the field. Sampling at this time minimizes sampling errors caused by low egg mass densities and allows time to instigate an insecticide application if needed. To determine the egg mass density, sample plants at random throughout the field. To reduce sampling time, count egg masses on the middle seven leaves (the ear leaf and the three above and the three below the ear). Multiple the number of egg masses counted by 100 and divide by 91.

Next, refer to the table below the second-generation calculation sheet. In the left-hand column, locate the number that best matches the actual number of egg masses you counted on

100 plants in your field. Then find the column that denotes the number of days the egg mass count was taken after the initiation of egg laying (ranging from 5 to 20). Now draw a line across from the egg mass per plant column to the days column, and where the two meet is the predicted corn borer population density.

As an example, assume that field scouting occurred 10 days after the first moth was caught in the trap and an average of 0.5 egg masses were found per plant. The predicted corn borer population density is then 4.6 larvae. This population estimate of 4.6 is then factored into the first blank on line 1 of the second generation calculation sheet.

It is important to realize that only larvae that have not bored into the plant can be killed. Consequently, there is a specific time period, or "window", during which pesticides must be applied if they are to be effective. Egg deposition during the second generation may last three weeks in any given field. Available insecticides kill larvae over a relatively short period of time; therefore they must be applied before all eggs are deposited. If the treatment is delayed, larvae from eggs deposited early in the egg laying period will succeed in entering the plant. The decision to spray a field, therefore, should be based on an estimate of the potential corn borer population density expected to establish within the stalk.

For a single application, the insecticide should be applied from 10 to 14 days after the initiation of egg laying. This would be approximately 0 to 4 days after peak egg laying has occurred in the field. If it is anticipated that two applications are going to be used, then the first application would be applied at 7 days after the beginning of egg laying and the second would go on 7 days later.

The information in this article was extracted from "European Corn Borer Development and Management" by W. B. Showers et al., 1989, North Central Regional Extension Publication No. 327.

# 1st Generation European Corn Borer Economic Injury Level Calculation

1. _____ % of 100 plants infested x _____ average number borers per infested plant = _____ borers per plant
2. _____ borers per plant x 5% yield loss per borer = _____ % yield loss
3. _____ % yield loss x _____ expected yield (bushels per acre) = _____ bushels per acre loss
4. _____ bushels per acre loss x $ _____ price per bushel = $ _____ loss per acre
5. $ _____ loss per acre x 80%* control with granules = $ _____ preventable loss per acre
6. $ _____ preventable loss per acre - $ _____ cost of control per acre = $ _____ profit (loss) per acre

* use 50% control with liquid formulations

# 2nd Generation European Corn Borer Economic Injury Level Calculation

1. _____ predicted borers per plant* x _____ % yield loss per borer** = _____ % yield loss
2. _____ % yield loss x _____ expected yield (bushels per acre) = _____ bushels per acre loss
3. _____ bushels loss per acre x $ _____ price per bushel = $ _____ loss per acre
4. $ _____ loss per acre x _____ % control*** = $ _____ preventable loss per acre
5. $ _____ preventable loss per acre - $ _____ cost of control per acre = $ _____ profit (loss) per acre

* from chart below
** use 4.4% for pollen-shedding corn, and 3.0% if kernels are initiated
*** use 67% control unless other information is available

Table 6. Predicted potential population densities of ECB larvae for various egg mass densities per whole corn plant (or corrected egg mass densities if 7-leaf count used[1]) collected on different dates during the oviposition period.

| | Days after initiation of egg laying and proportion of egg laying complete (in parentheses) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of egg masses/plant | 5 (0.125) | 6 (0.180) | 7 (0.245) | 8 (0.320) | 9 (0.405) | 10 (0.500) | 11 (0.595) | 12 (0.680) | 13 (0.755) | 14 (0.820) | 15 (0.875) | 16 (0.920) | 17 (0.955) | 18 (0.980) | 19 (0.995) | 20 (1.00) |
| 0.02 | 0.72 | 0.50 | 0.37 | 0.28 | 0.22 | 0.18 | 0.15 | 0.13 | 0.12 | 0.11 | 0.10 | 0.10 | 0.09 | 0.09 | 0.09 | 0.09 |
| 0.04 | 1.44 | 1.00 | 0.74 | 0.56 | 0.44 | 0.36 | 0.30 | 0.26 | 0.24 | 0.22 | 0.21 | 0.20 | 0.19 | 0.18 | 0.18 | 0.18 |
| 0.06 | 2.24 | 1.56 | 1.14 | 0.88 | 0.69 | 0.56 | 0.47 | 0.41 | 0.37 | 0.34 | 0.32 | 0.30 | 0.29 | 0.29 | 0.28 | 0.28 |
| 0.08 | 2.96 | 2.06 | 1.51 | 1.16 | 0.91 | 0.74 | 0.62 | 0.54 | 0.49 | 0.45 | 0.42 | 0.40 | 0.39 | 0.38 | 0.37 | 0.37 |
| 0.10 | 3.68 | 2.56 | 1.88 | 1.44 | 1.14 | 0.92 | 0.77 | 0.68 | 0.61 | 0.56 | 0.53 | 0.50 | 0.48 | 0.47 | 0.46 | 0.46 |
| 0.12 | 4.40 | 3.06 | 2.24 | 1.72 | 1.36 | 1.10 | 0.92 | 0.81 | 0.73 | 0.67 | 0.63 | 0.60 | 0.58 | 0.56 | 0.55 | 0.55 |
| 0.14 | 5.12 | 3.56 | 2.61 | 2.00 | 1.58 | 1.28 | 1.08 | 0.94 | 0.85 | 0.78 | 0.73 | 0.70 | 0.67 | 0.55 | 0.64 | 0.64 |
| 0.16 | 5.92 | 4.11 | 3.02 | 2.31 | 1.83 | 1.48 | 1.24 | 1.09 | 0.98 | 0.90 | 0.85 | 0.80 | 0.77 | 0.76 | 0.74 | 0.74 |
| 0.18 | 6.64 | 4.61 | 3.39 | 2.59 | 2.05 | 1.66 | 1.40 | 1.22 | 1.10 | 1.01 | 0.95 | 0.90 | 0.87 | 0.85 | 0.83 | 0.83 |
| 0.20 | 7.36 | 5.11 | 3.76 | 2.88 | 2.27 | 1.84 | 1.55 | 1.35 | 1.22 | 1.12 | 1.05 | 1.00 | 0.96 | 0.94 | 0.92 | 0.92 |
| 0.22 | 8.08 | 5.61 | 4.12 | 3.16 | 2.49 | 2.02 | 1.70 | 1.49 | 1.34 | 1.22 | 1.10 | 1.10 | 1.06 | 1.03 | 1.02 | 1.01 |
| 0.24 | 8.80 | 6.11 | 4.49 | 3.44 | 2.72 | 2.20 | 1.85 | 1.62 | 1.46 | 1.34 | 1.26 | 1.20 | 1.15 | 1.12 | 1.11 | 1.10 |
| 0.26 | 9.60 | 6.67 | 4.90 | 3.75 | 2.96 | 2.40 | 2.02 | 1.76 | 1.59 | 1.46 | 1.37 | 1.30 | 1.26 | 1.22 | 1.21 | 1.20 |
| 0.28 | 10.32 | 7.12 | 5.27 | 4.03 | 3.19 | 2.58 | 2.17 | 1.90 | 1.71 | 1.57 | 1.47 | 1.40 | 1.35 | 1.32 | 1.39 | 1.29 |
| 0.30 | 11.04 | 7.67 | 5.63 | 4.31 | 3.41 | 2.76 | 2.32 | 2.03 | 1.83 | 1.68 | 1.58 | 1.50 | 1.45 | 1.41 | 1.39 | 1.38 |
| 0.50 | 18.40 | 12.78 | 9.39 | 7.19 | 5.68 | 4.60 | 3.87 | 3.38 | 3.05 | 2.80 | 2.63 | 2.50 | 2.41 | 2.35 | 2.31 | 2.30 |
| 0.75 | 27.60 | 19.17 | 14.08 | 10.78 | 8.52 | 6.90 | 5.80 | 5.07 | 4.57 | 4.21 | 3.94 | 3.75 | 3.61 | 3.52 | 3.47 | 3.45 |
| 1.00 | 36.80 | 25.56 | 18.78 | 14.38 | 11.36 | 9.20 | 7.73 | 6.76 | 6.09 | 5.61 | 5.23 | 5.00 | 4.82 | 4.69 | 4.62 | 4.60 |
| 1.25 | 46.00 | 31.94 | 23.47 | 17.97 | 14.20 | 11.50 | 9.66 | 8.46 | 7.62 | 7.01 | 6.57 | 6.25 | 6.02 | 5.87 | 5.78 | 5.75 |
| 1.50 | 55.20 | 38.33 | 28.16 | 21.56 | 17.04 | 13.80 | 11.60 | 10.15 | 9.14 | 8.41 | 7.89 | 7.50 | 7.46 | 7.23 | 6.93 | 6.90 |

[1]Whole plant count = $\frac{\text{7-leaf count}}{91} \times 100$