Estimating Grain Corn Yield

It can be interesting to estimate corn yields prior to harvest, and to see how close those estimates are to reality when the grain is in the bin. In dry years, when producers are making decisions on harvesting corn for grain or silage, these estimates can help inform production decisions. The Yield Component Method, originally described by the University of Illinois, can be used to estimate yields as early as the milk stage of kernel development.

The Yield Component Method uses the following yield components to estimate grain yield: ears per acre, kernel rows per ear, kernels per row, and weight per kernel. While the first three yield components can be easily measured in the field, kernel weight cannot be measured until the grain is mature. A numerical constant for kernel weight is figured into an equation in order to calculate grain yield. This constant is sometimes referred to as a "fudge-factor" since it is based on a predetermined average kernel weight.

Yield Component Method:

1) **Determine the number of harvestable ears.** Measure a length of a single row equal to 1/1000th of an acre and count the harvestable ears. For a 30" row this is 17'4", for a 36" row this is 14'6".
2) **Average kernels per ear**

- Select 3 representative ears from the row
- Record the number of complete kernel rows per ear and the average number of kernels per row (Note: do not count the extreme butt or tip kernels, but begin and end where you perceive there are complete rings of kernels around the cob. Do not count aborted kernels.)
- Multiply each ear's row number by its number of kernels per row to determine total number of kernels for each ear
- Calculate the average number of kernels per ear by summing the values for all sampled ears and dividing by the number of ears measured.

3) **Estimate yield** for each site by multiplying the number of ears (Step 1) by the average number of kernels per ear, then divide by the "fudge factor".

- In the formula below the value of 90 represents the average number of kernels (90,000) in a bushel of corn at 15.5 % grain moisture (90,000 kernels in a bushel of corn is about 282.2 mg/kernel). If grain fill conditions have been excellent (larger kernels, fewer per bushel), use a lower value such as 80 (80,000 kernels is about 320 mg/kernel). If grain fill conditions have been stressful (smaller kernels, more per bushel), use a larger value such as 100 (100,000 kernels is about 225 mg/kernel).

Yield (bu/acre) = (number of ears per row x average number of kernels per ear)/90

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It is recommended that this yield estimation is performed in at least 5 locations per field. Crop uniformity influences the accuracy of this technique. More sampling areas may be needed for less uniform fields.

Example:
At the first sampling site you counted 27 harvestable ears in 1/1000th of an acre. Average number of kernels per ear, based on sampling 3 ears in the sampling row, was 425. Use "fudge factor" values of 80, 90, and 100 in the formula to represent excellent, good, and more stressful growing conditions:

Excellent grain filling conditions: Yield = (27 x 425)/80 = 143 bu/acre
Average grain filling conditions: Yield = (27 x 425)/90 = 128 bu/acre
Poor grain filling conditions: Yield = (27 x 425)/100 = 115 bu/acre

Considerations:

This method should only be used to provide an estimate of grain yields. Weight per kernel will vary depending on hybrid and environment. If below normal rainfall occurs during grain fill, kernel weights will be low. In a dry year the yield component method will overestimate yields, while in a year with good grain fill conditions this method will underestimate grain yields. Keep environmental conditions in mind when using this method.