

When and How Can I Estimate Corn Yields?

R.L. (Bob) Nielsen

[Agronomy Dept.](#), [Purdue Univ.](#)

West Lafayette, IN 47907-1150

Email address: <mailto:rnielsen@purdue.edu>

Corn growers are especially keen on estimating their grain yield potential this year for two reasons. The first reason is the recent rally in grain prices and the uncertainty about whether the rally will continue in coming weeks or fade down the stretch. The other reason lies with corn growers' uncertainty about the effects of this year's multitude of crop stresses on the eventual grain yield. Obviously, to satisfy the desire to sell grain at higher prices requires that there be grain to sell.

Therein lies the interest in field-by-field yield estimations to help develop their grain marketing plans. A number of yield prediction methods exist, but the one most commonly used in the field is probably the **Yield Component Method**. Sometimes referred to as the *Slide Rule Yield Calculator*, this method was developed by the University of Illinois many years ago.

The Yield Component Method can be used well ahead of harvest; at least by the time that kernel development has reached the late milk to early dough stages (R3 to R4). Under "normal" conditions, this point in kernel development occurs about 25 days after pollination is complete (see my related article on grain fill stages). Estimates made earlier in the kernel development period risk being overly optimistic if subsequent severe stresses cause unforeseen kernel abortion prior to about the roasting ear stage (R3 or milk).

Crop uniformity greatly influences the accuracy of any yield estimation technique. The less uniform the field, the greater the number of samples that should be taken to estimate yield for the field. There is a fine line between fairly sampling disparate areas of the field and sampling randomly within a field so as not to unfairly bias the yield estimates up or down.

1. At each estimation site, measure off a length of row equal to 1/1000th acre. For 30-inch rows, this equal 17 ft. 5 in. For 36-inch rows, this would equal 14 ft. 6 in. For other row spacings, divide 43560 by the row spacing (in feet) and then divide that result by 1000.
2. Count and record the number of harvestable ears (in your judgement) on the plants in the 1/1000th acre of row. If ear droppage has occurred (e.g., due to European corn borer damage), do not count the dropped ears unless you also have a vacuum cleaner attachment mounted on your combine header.
3. For every fifth ear in the 1/1000th acre of row, count the number of complete kernel rows per ear. Do not sample nubbins or obviously odd ears, unless they represent a large

portion of the sample area. Calculate and record the average number of kernel rows for all ears sampled.

4. Using the same ears, determine the average number of kernels per row on each ear. If numbers of kernels per row are not equal among the rows of an ear, estimate an average value for the ear. Calculate and record the average kernel number per row for all ears sampled.
5. Estimate the yield for each site by multiplying the ear number by the average row number by the average kernel number, then dividing that result by 90. The value of '90' represents the average number of kernels (90,000) in a bushel of corn.

For example, let's say you counted 24 harvestable ears at the first sampling site. Sampling every 5th ear resulted in an average row number of 16 and an average number of kernels per row of 30. The estimated yield for that site would $(24 \times 16 \times 30)$ divided by 90, which equals 128 bu./ac.

Repeat the procedure in as many sites within a field as you deem representative. Calculate the average yield for all the sites to estimate the yield for the field.

Remember that this method for estimating pre-harvest grain yield in corn indeed provides only an estimate. Since kernel size and weight will vary depending on hybrid and environment, this yield estimator should only be used to determine "ballpark" grain yields. Yield will be overestimated in a year with poor grain fill conditions (e.g., low kernel size and weight from a drought year) and underestimated in a year with excellent grain fill conditions (e.g., larger kernel size and weight from non-stress grain fill periods).

For example, if you believe that kernel weight will be less due to stress during grain fill, you may elect to replace the value of '90' in the equation with '100' to reflect the potential for smaller and lighter kernels (i.e., more kernels per bushel). Conversely, in a good crop year, you may elect to replace the value of '90' in the equation with '80' to reflect the potential for larger and heavier kernels (i.e., fewer kernels per bushel).

The Yield Component Method for estimating corn grain yield is probably accurate within plus or minus 30 bushels of the actual yield. Obviously, the more sampling performed within a field, the more accurately you will 'capture' the variability of yield throughout the field. Use the yield estimates obtained by this method for general planning purposes only.

Related Reference:

Nielsen, RL (Bob). 2002. Grain Fill Stages in Corn [Online]. Purdue University, Agronomy Dept., W. Lafayette, IN 47907-1150. On the Web at http://www.kingcorn.org/news/articles.02/Grain_Fill-0723.html (Verified 7/23/02).

Don't forget, this and other timely information about corn can be viewed at the Chat 'n Chew Café on the World Wide Web at <http://www.kingcorn.org/cafe> . For other information about corn, take a look at the Corn Growers' Guidebook on the World Wide Web at <http://www.kingcorn.org/>

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