BETWEEN THE ROWS

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Background

Many Midwest corn fields have been impacted by severe weather conditions this growing season. Early season wet and cool conditions reduced population levels and delayed parts of fields that had standing water. Later storms impacted fields with rain and heavy winds that caused root lodging and green snap to occur. Hail is generally a yearly occurrence in many parts of our corn growing area and can cause minor to devastating impact on corn performance, depending on timing and severity of the hail storm. Heat and drought in some areas also cause growers to have performance concerns. All of these weather factors can impact plant population and final yield.

Current Conditions

During August, many growers routinely evaluate fields and make yield estimates either for corn storage needs or for marketing purposes. Also, fields with reduced stands or severe root lodging cause growers concern about performance which can create interest in estimating yields.

Most information on corn performance indicates corn has great ability to compensate for lower plant populations. Generally the optimum plant population is not one number, but a range of populations where optimum performance can be expected. When growing conditions induce stand reductions, there is also yield reduction that can result. This yield reduction is not directly proportional to the stand reduction. Remaining plants each can increase the number of kernels per plant and partially compensate for missing plants.

The crop insurance industry routinely estimates the yield loss in hail damaged fields based on stand counts and stage of growth that damaged occurred. This estimate is based on the US appraisal method as outlined in the USDA Corn Loss Adjustment Standard Handbook. Yield reductions from stand loss are well documented, but the insurance industry assumes when damage occurs after V8, the remaining plants cannot compensate for lost plants.

Recent research reported in Crop Science Journal, which was funded by the National Crop Insurance Service and conducted cooperatively by IL, IA, and OH, has demonstrated that corn can still compensate for stand reductions through the V15 stage of growth. Their research was designed to evaluate the impact stand reductions had on performance at various stages of growth and to include uniform plant loss (uniform plant spacing) compared to uneven plant loss (random spacing). Their conclusions show several important factors that impact how we may estimate hybrid performance.

1. Yield reduction from stand loss appears not to be affected by uniform stand loss compared to uneven stand loss.
2. Stand reduction at earlier stages of growth has a smaller impact on yield compared to stand reductions at later stages of growth. The earlier the damage occurs, the greater the recovery can be.
3. Data from stand reductions at V11 and V15 showed yield compensation still occurred in the form of per plant yield increases in the remaining plants in response to a reduction in competition (increased kernel number/plant).
4. When the current U.S. appraisal method was compared to the study data, it was demonstrated that the U.S. evaluation method underestimated yields by 1-9% at the earlier stages of growth (V5 and V8). But the U.S. estimate for yield also underestimated yield at the later stages of damage (V11 and V15) by 10-24%.
5. This study does not account for other types of damage that occurs with hail like shredded leaves (defoliation), bruised stalks, stalk breakage, damaged ears, or damaged whorls that may make regrowth or recovery difficult (leaf wrap).

Using yield estimates on a whole field basis.

When doing yield estimates on a whole field basis, the Yield Component Method is commonly used and is calculated by multiplying average harvestable ears per acre times average k/ear divided by number of kernels per bushel. This yield estimate is determined by actual field samples to collect data on average harvestable ears per acre and number of kernels per ear.

The third component is the number of kernels per bushel. Typically, 90,000 k/bu is used as an average. Wyffels research has developed a factor for k/bu for each hybrid on the chart below. This factor was released last year and this new chart has updated numbers with 2010 data added and newly released hybrids listed. Not all hybrids have yield factor data available.

Related traited products may use the same yield factor. This factor may vary some based on the growing conditions each year. This yield estimate is best done at least 2 weeks after pollination at the R3 (milk stage) and beyond. Sampling various areas of the field to fairly represent the entire field is important to obtain an accurate estimate. In fields that were negatively impacted by weather and have reduced stands, more samples will be needed to ensure reasonable representation of the entire field.

Measure 1/1000th of an acre in one row (17'5" for 30 inch rows) and count the number of harvestable ears present. Count every 5th ear for number of kernels around and number of kernels long to determine average number of k/ear. For example 16 kernels around and 34 kernels long = 544 k/ear. Count at least 5 ears in each harvestable ear count, and do several counts across the field to fairly represent all the conditions present. Average the harvestable ear count and the number of k/ear to obtain number of kernels per 1/1000th acre. Divide the result by 90,000 k/bu to calculate the estimated yield. 90,000 is an average that many growers use. For specific hybrids use the factor listed below in the calculation.

This yield calculation uses actual harvestable ear counts and so low stand counts are accounted for in the estimation. If the field also has evidence of root lodging, some additional calculation may be necessary to account for additional yield loss. Root lodging can reduce yields, but the stage of growth has an impact on the amount of actual loss. Root lodging at early vegetative growth stages (before V10-V12) may cause yield reductions of 0-5%. When root lodging occurs at R1 and beyond, yield reductions range from 10-30%. The actual yield lost by root lodging is impacted by weather conditions and other agronomic factors that occur after damage is present.

YIELD FACTOR

W1687	84.5	W6261	84.8
W1721	87.1	W6440	86.8
W1831	86.2	W6526	87.2
W1917	85.0 *	W6871	75.1
W1941	88.1	W6927	82.6
W1953	86.3	W7071	73.2
W2329	87.7	W7147	76.9
W2681	90.5	W7213	88.7
W2751	84.1	W7251	72.6
W2849	87.0	W7381	82.2
W3127	83.0 *	W7477	79.3
W3629	80.3	W7644	81.5
W3730	85.4	W7800	80.0 *
W4179	85.3	W7997	85.0 *
W4267	80.0 *	W8125	86.2
W5051	87.7	W8253	78.2
W5077	85.3	W8360	87.0
W5159	88.6	W8437	87.0
W5281	92.1	W8681	81.8
W5560	93.2	W9121	78.6
W5641	86.5		

* = limited data; this number is estimated and is subject to change