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Converting Wet Corn Weight to Dry Corn Weight

AUTHOR: Bob Nielsen

Corn is often harvested at grain moisture contents higher than the 15% moisture typically desired by grain buyers. Wetter grain obviously weighs more than drier grain and so grain buyers will “shrink” the weight of “wet” grain (greater than 15% moisture) to the equivalent weight of “dry” grain (15% moisture) and then divide that weight by 56 to calculate the market bushels of grain they will purchase from the grower. The two sources of weight loss due to mechanical drying are 1) that due to the loss of grain moisture itself and 2) the anticipated weight loss due to dry matter loss during the grain drying and handling processes (e.g., broken kernels, fines, foreign materials).

An exact value for the handling loss, sometimes called “invisible shrink”, is difficult to predict and can vary significantly from one grain buyer to another. For a lengthier discussion on grain weight shrinkage due to mechanical drying, see Hicks & Cloud, 1991.

The simple weight loss due to the removal of grain moisture represents the greatest percentage of the total grain weight shrinkage due to drying and is easily calculated using a handheld calculator or a smartphone calculator app. In general terms, you first convert the “wet” weight (greater than 15% moisture) to absolute dry weight (0% moisture). Then you convert the absolute dry weight back to market-standard “dry” weight at 15% grain moisture.

Concept:

1. For example, if the initial grain moisture content is 20%, then the initial percent dry matter content is 80% (e.g., 100% – 20%). NOTE: The initial percent dry matter content varies depending on the initial grain moisture content.
2. If the desired ending grain moisture content is 15% (the typical market standard), then the desired ending percent dry matter content is 85% (100% – 15%).
3. Multiply the weight of the “wet” grain by the initial percent dry matter content, then divide the result by the desired ending percent dry matter content.

Example:

1. 100000 lbs of grain at 20% moisture = 80000 lbs of absolute dry matter (i.e., 100000 x 0.80).
2. 80000 lbs of absolute dry matter = 94118 lbs of grain at 15% moisture (i.e., 80000 / 0.85).
3. 94118 lbs of grain at 15% moisture = 1681 bu of grain at 15% moisture (i.e., 94118 / 56).

One take-home reminder from this little exercise is the fact that the grain trade allows you to sell water in the form of grain moisture… up to a maximum market-standard 15% grain moisture content (or 14% for long term storage). In other words, if you deliver corn to the elevator at grain moisture contents less than 15%, you are “losing” bushels. Take advantage of this fact and maximize your “saleable” grain weight by delivering corn grain to the elevator at moisture levels no less than 15% moisture content.

Related reading

Hicks, D.R. and H.A. Cloud. 1991. Calculating Grain Weight Shrinkage in Corn Due to Mechanical Drying. National Corn Handbook Publication NCH-61. https://www.extension.purdue.edu/extmedia/nch/nch-61.html [URL accessed Sep 2018]

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Stalk Rots Getting You Down? The Importance of Identifying Them Now to Help with Management Decisions in the Future.

AUTHOR: Darcy Telenko

Heavy rains and wind have started to take a toll on corn that has compromised stalks. Many factors can contribute to stalk decline – I am going to focus on the plant pathogenic causes, but note abiotic stresses factors could also play a role such as drought and flooding. Either way as stalk tissue becomes compromises below the main ear; the stalk may become brittle or weak and be prone to lodging.

There are a number of pathogens that can cause stalk rot including, Anthracnose, Bacteria, Charcoal, Diplodia, Fusarium, Gibberella, and

Pythium. Some of these stalk rots have very characteristic symptoms that can help identify the specific problem, while others may require laboratory diagnosis.

What can you do now – check field by using the **Push** or **Pinch Test** by evaluating 20 plants in at least five random areas in a field.

Pinch Test – grab the stalk somewhere between the lowest two internodes and pinch between your fingers to see if the stalk is strong enough to handle the force – if the stalk collapses, it fails

Push Test – push the stalk to a 30 degree angle – if it pops back up when released, it passes the test, if not it fails.

Threshold: 10% or more of the stalks fail then consider early harvesting to avoid risk for lodging.

Figure 1. Severe lodging after a rainstorm many stalks with symptoms of Anthracnose stalk rot. Photos Darcy Telenko.

What can you do in the future – management options will depend on the specific disease (see table 1). Production practices that promote good plant health including balanced fertilization, appropriate plant populations, and good water management can reduced stresses that might predispose corn to stalk rot. In addition, these key management tools can help mitigate future stalk rot issues.

1. **Properly diagnosis the stalk rot pathogen.** (Samples can be submitted to the Purdue Plant and Pest Diagnostic Lab (https://www.extension.purdue.edu/extmedia/BP/BP-89-W.pdf has a more detailed description of each stalk rot)
2. **Select hybrids with resistance** if available.
3. **Crop Rotation** – rotating to non-host crop will help reduce stalk rot potential in a field. Note that Charcoal rot and Gibberella stalk rot can infect other rotational crops in Indiana
4. **Tillage –** burying infected crop residue will encourage more rapid desiccation and help reduces risk of overwintering in crop residue.
5. **Good soil drainage and reduced compaction**.

Foliar Fungicides – applying foliar fungicides can help protect crop from foliar diseases that could predispose plant to stalk rot when present, but devoid of foliar disease pressure fungicides applications have not consistently been found to help reduce stalk rot.

Table 1. Stalk rot pathogens, identifying characteristics, and management options.

		Management options[z]			
Stalk rot	**Characteristics**	**Resistance[y]**	**Rotation[x]**	**Tillage[x]**	**Other**
Anthracnose	Distinctive blackening of the stalk rind, loss of pith leads to shredded interior	x	x	x	Strong stalks, reduced susceptibility to foliar diseases, and production practices that promote good plant health may reduce potential for lodging
Bacteria	Slimy, water soaked outer rind and pith			fall	Good drainage and plant health practices
Charcoal	Silver grey rind, peppered with microsclerotia – grainy, gray in color	x			Many hosts. Rotation not as effective since microsclerotia can survive for many years
Diplodia	Many small, black pycnidia embedded in rind of lower internode- that cannot be scrapped off with thumbnail, white mold might appear in wet conditions, shredded pith	x	x	x	Strong stalks, reduced susceptibility to foliar diseases, and production practices that promote good plant health may reduce potential for lodging
Fusarium	Dark lesions, external brown streaks on lower internode, internal shredding, sometimes a pale-pink to salmon color on rotted tissue	x	x	x	Strong stalks, reduced susceptibility to foliar diseases, and production practices that promote good plant health may reduce potential for lodging
Gibberella	Small, black spots (perithecia) on internodes and nodes – these can be scrapped off with thumbnail, pink discoloration and shredding in pith	x	x	x	Strong stalks, reduced susceptibility to foliar diseases, and production practices that promote good plant health may reduce potential for lodging
Physoderma	Infected nodes will snap when pushed, node is black and rotten.		Maybe	Maybe	Strong stalks, reduced susceptibility to foliar diseases, and production practices that promote good plant health may reduce potential for lodging
Pythium	Decay of first internode about soil – soft, brown, water-soaked pith. Stalk may twist. Typically no odor.				Strong stalks, reduced susceptibility to foliar diseases, and production practices that promote good plant health may reduce potential for lodging

[z]Management options that could be considered for future crops.
[y] X=Resistance may be available in some hybrids for the specific disease.
[x] Rotation and tillage can reduce inoculum potential in the field.

Potassium Deficiency on Upper Soybean Leaves is Not Uncommon during Seed Fill

AUTHORS: Jim Camberato, Shaun Casteel, Gail Ruhl, and Darcy Telenko

Soybeans in Indiana often show potassium (K) deficiency symptoms during seed fill – leaf margin chlorosis to necrosis. Although the symptoms are classic in many respects, one aspect of their occurrence differs from the norm — the symptoms are occurring on the youngest uppermost leaves, oddly enough, rather than on the older lower leaves (Figure 1).

Figure 1. Soybean leaves expressing chlorosis to necrosis along the leaf margins of the uppermost leaves (youngest) during seed fill. Picture courtesy of Brian Mitchem in Allen County, IN.

As the deficiency continues and the severity increases, the necrotic leaf margins can simply drop off the plant resulting in a ragged or tattered appearance (Figure 2). Iowa State Extension specialists described this condition in Iowa several years ago, referring to it as ‘Soybean Top Dieback’. X.B. Yang and John Sawyer describe the condition in the newsletter article Soybean Top Dieback Shows up in Iowa Again.

Figure 2. Severe potassium deficiency during soybean seed fill where the uppermost leaves appear tattered or ragged as the necrotic tissue of the leaf margins drop off. Picture courtesy of Brian Mitchem in Allen County, IN.

Low soil test K has been found in association with Soybean Top Dieback. Samples from Indiana fields exhibiting K deficiency symptoms on the upper leaves have been sent to the Purdue Plant and Pest Diagnostic Laboratory (PPDL). Although SCN and *Phomopsis* and *Diaporthe spp.* have been found in association with these symptoms in previous years, there is no proven correlation between the presence of these fungi and SCN and the top dieback symptoms.

Additionally, fields that have adequate soil test K have exhibited the same leaf symptomology during seed fill when soil moisture was limited and/or root systems were compromised (i.e., limiting water and K uptake) since the K demand was so high. Root restrictions were often related to compaction (e.g., tillage pan, sidewall compaction at planting, wheel traffic of equipment) or even early to mid-season root death due to saturation conditions.

Tissue analysis of soybeans showing symptoms of Soybean Top Dieback from three different Indiana fields showed only 0.60% K in the uppermost fully expanded trifoliate leaf, well less than half of the critical level. Soil test K levels in these soils were also extremely low, <55 parts per million for soils with cation exchange capacity ranging from 8 to 18 meq/100g. Sufficient soil test K would be 100 parts per million or higher. Several K trials conducted on Purdue farms in past years show K deficiency symptoms in the youngest leaves during seed fill (Figure 3).

Figure 3. Adequate soil test potassium in the soil of the soybeans on the left vs. deficient soil test potassium in the soil of the soybeans on the right. Notice leaf margin chlorosis to necrosis on the uppermost leaves during seed fill. Picture from Southeast Purdue Ag Center.

Soybean accumulate substantial amounts of K. In recent research[1], a 66 bu/acre crop took up approximately 150 pounds of K_2O/acre and about half was removed from the field in the grain. Seventy-five percent of the uptake occurred after R1 (beginning bloom), during reproductive development. Uptake from the soil was complete around R5 (beginning seed) at moderate and low yields (66 bu/acre or less), but continued through seed fill (R6) at high yield levels (>75 bu/acre). During seed fill, more than 75% of the K delivered to the seed arose from remobilization from pods, stems, petioles, and leaves. Remobilization from pods, stems, and petioles commenced when seed fill was initiated, but leaves retained their K until near the end of seed fill period. Similar results were obtained in another study[2]. *Also, early-season K deficiency may not occur because of lesser K demand of smaller plants and adequate soil moisture conditions that enhances K uptake.*

Potassium deficiency is often confused with SCN damage, and in fields where SCN populations are high, low-K conditions can intensify SCN symptoms. *Identifying fields with high SCN populations and low soil test K should enable improved management of next year's crop by controlling those two issues. With the fields that have adequate soil test K that still exhibit K deficiency during seed fill, efforts should be made to relieve and prevent sources of compaction or limitations to root development.*

If your soybean fields are showing Soybean Top Dieback consider sending plant samples to the PPDL for disease diagnosis. Nematode analysis is no longer provided at Purdue so here is a link for private labs that provide nematode testing

https://www.thescncoalition.com/application/files/1015/2581/0504/Private_labs.pdf

For more information on SCN visit: https://www.thescncoalition.com/

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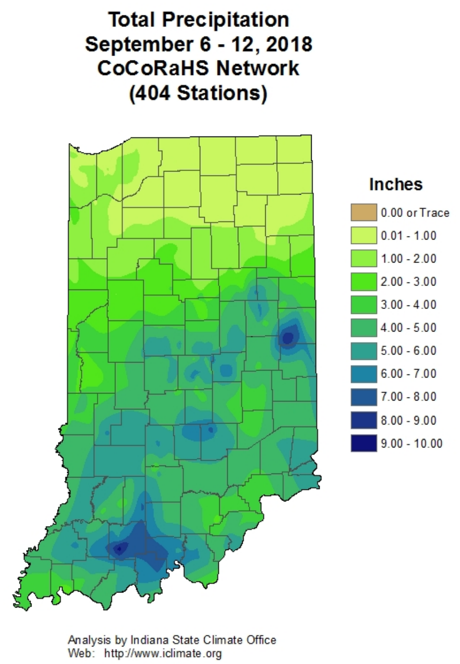
[1]Gaspar, A.P., S.L. Naeve, and S.P. Conley. 2018. Understanding nutrient requirements and utilization for high-yielding soybeans.

http://coolbean.info/library/documents/55586_03WINutrientGuide5.5×8.5_NoBleed_HR_FINAL.pdf

[2]Bender, R.R., J.W. Haegele, and F.E. Below. 2015. Nutrient uptake, partitioning, and remobilization in modern soybean varieties. Agronomy Journal 107:563-573.

Total Precipitation September 6-12, 2018



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