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Field Drydown of Corn

Delayed maturity of corn due to late planting or a cool growing season often translates into delayed or slow drydown of mature grain prior to harvest and, consequently, a higher than desired grain moisture content at harvest. Wetter grain at harvest increases the need for artificially drying the grain after harvest, which increases the growers' production costs and can delay the progress of harvest.

Kernel moisture content decreases as the kernels develop through the blister stage (~ 85% moisture), milk stage (~ 80% moisture), dough stage (~ 70% moisture), dent stage (~ 60% moisture), and finally physiological maturity (~ 30% moisture). Prior to physiological maturity, decreases in kernel moisture occur from a combination of actual water loss (evaporation) from the kernel plus the continued accumulation of kernel dry matter via the grain filling process. After physiological maturity (identified by presence of the kernel black layer), percent kernel moisture continues to decrease primarily due to water loss from the kernel.

Weather & Timing of Grain Maturation

Grain moisture loss in the field occurs at a fairly linear rate within a range of grain moisture content from about 40 percent down to 15 to 20 percent, and then tapers off to little or no additional moisture loss. The exact rate of field drying varies among hybrids and years.

Field drying of mature corn grain is influenced primarily by weather factors, especially temperature, humidity, and rainfall. Simply put, warmer temperatures and lower humidity encourage rapid field drying of corn grain.

A corn crop that matures in late August will dry down faster than one that matures in mid-September, due to grain drydown rates being greater when the drydown period is warmer. In fact, there is a close relationship between the date when the grain nears physiological maturity (half-milkline or 2 to 3 weeks prior to kernel blacklayer) and the subsequent average daily drydown rate. Daily drydown rates will range from about 0.8 percentage point per day for grain that nears maturity in late August to about 0.4 percentage point per day for grain that nears maturity in mid- to late September.

Weather-Related Crop Stress and Field Drydown of Grain

Farmers often question whether field drydown will occur "normally" after severe weather-related stress damages the crop prior to physiological maturity or causes premature death of the plants. Examples of weather stress include damage caused by severe drought plus heat, late-season hail storms, and frost or killing freeze events prior to physiological maturity. The answer in all cases to whether grain drydown will occur "normally" is essentially "yes," but this requires a bit of explanation.

Lingering severe stress, such as drought or foliar disease (e.g., gray leaf spot), that occurs during the latter stages of the grain filling period can cause premature death of entire plants, smaller than normal kernels, and premature formation of kernel black layer. The latter two factors usually result in earlier than expected drydown of the grain and ultimately grain moisture content in severely affected areas of a field will be much drier at harvest than lesser affected areas. The fact that grain drydown of "prematurely mature" grain begins earlier on the calendar usually means it occurs in relatively warmer time periods and so grain drydown rates per day are higher than would be expected if the grain had matured "normally" at a later date. However, the rate of grain drydown is "normal" for the time period during which the grain is drying.

The effects of a sudden single stress event like, hail or lethal cold temperatures prior to physiological maturity, often create an optical illusion of sorts relative to subsequent field drying of the grain. Because leaf or plant death of an immature crop may occur rapidly in response to severe hail damage or lethal frost / freeze events, the moisture content of the yet immature grain will "appear" to be high given the appearance of the now dead plants. The appearance of the dead plant tissue gives the illusion that field drydown was slowed by the damage from the hail or frost/freeze.

Hybrid Variability for Field Drydown

Growers desire hybrids with superior yielding ability (maximum gross income) that also dry very quickly in the fall (minimum drying or grain shrinkage costs).

The seed industry uses grain moisture content data to assign relative hybrid maturity ratings based on relative moisture differences among hybrids at harvest. Two hybrids that differ by one "day" of relative maturity will typically vary by about one half percentage point of grain moisture content (an average daily loss of moisture) if planted and harvested on the same days. Recognize that relative hybrid maturity ratings are most consistent within, not among, seed companies.

When weather conditions are favorable for rapid grain drydown, hybrids tend to dry at similar rates. When weather conditions are not favorable for rapid drydown, then hybrid characteristics that influence the rate of grain drying become more important.

For further information regarding field drydown of corn, refer to Field Drydown of Mature Corn Grain article written by Bob Nielsen, Purdue University at

<https://www.agry.purdue.edu/ext/corn/news/timeless/GrainDrying.html>

Source: *Kent Shannon, natural resource engineer*

Soil Testing is a Valuable Tool

Autumn is a good time to collect soil samples whether testing for soil fertility, soybean cyst nematode (SCN), or soil health characteristics. Testing this time of year, allows producers to make management decisions based on the results before the next growing season.

Soil Fertility Testing: Nutrient deficiencies negatively affect a plant's ability to perform at an optimum level. Having soil analyzed for soil nutrients is the only way to know what is readily available for plant growth. Applying too much fertilizer or lime can also have a negative effect on plant growth. Excessive fertilizer is not only a waste of money, but can have a detrimental effect on the environment through run off into surface water or leaching through the soil profile into groundwater.

A typical soil test analyzes the sample for phosphorus, potassium, calcium, magnesium, organic matter, pH, cation exchange capacity, and neutralizable acidity. Recommendations for fertilizer and lime applications are based on the crops being grown and expected yield.

Soybean Cyst Nematode Testing: SCN is a devastating pest of soybeans in the U.S. When SCN infects the roots, plants may appear normal, yet suffer significant yield loss. Symptoms, including yellow leaves and plant stunting, may not appear until infestations are very high and may be confused with other causes like nutrient deficiencies, herbicide injury or drought stress. SCN dramatically affects plant growth by limiting the root's ability to take up nutrients and water and affecting the number of nitrogen fixing nodules plants develop. Once a field is infested, it cannot be eradicated, it must be managed. Soil can be tested for SCN egg presence and the severity of the infestation.

Soil Health Testing: Microbial activity plays a vital role in the soil's ability to hold water and nutrients and supply them to growing plants. Soil health assessments quantify the biological components of the soil. These include physical testing such as particle size, bulk density and information about the soil type. Some of the chemical tests usually performed include total carbon, active carbon, total nitrogen, exchangeable cations, measurements of aluminum, phosphorus, potassium, sodium and pH, as well as other information.

Ideally, collect samples when the soil is moist, but not wet. Sampling depth depends on the type of analysis being performed. Soil fertility and SCN samples can be collected at the same time. Randomly collect 15 to 20 soil cores, six inches deep from an area no more than 20 acres. Thoroughly mix the soil and divide the sample between the two tests. Refer to the following YouTube video at <https://youtu.be/0Ys9Wp6XBJ4> demonstrating these soil sampling techniques. Soil health samples are collected using a three-inch diameter ring pounded into the ground and carefully dug out with a shovel. For proper soil health sampling, refer to <https://www.youtube.com/watch?v=dd0x88YJXMA>

To learn more about soil testing and sampling techniques for each type of test, contact the local University of Missouri Extension agronomist.

Lime applications made in the fall have ample time to react with the soil to improve soil pH, SCN egg counts are usually highest at plant maturity, and in the fall, the soil microbiology has had the entire growing season to flourish. The real key, though, is to test the soil the same time of year, each time you test to avoid seasonal fluctuations.

Source: *Valerie Tate, agronomy specialist*

USDA Released Details for 2019 MFP Payments

On July 25, 2019, USDA published details as to how payments will be made under the 2019 Market Facilitation Program (MFP). First announced May 23, 2019, the 2019 MFP will include up to \$14.5 billion in direct payments to producers. Signups for this program will begin Monday, July 29, and end December 6, 2019. Specific application procedures are yet to be posted.

The associated rule issued by the Farm Service Agency and Commodity Credit Corporation expands the rule issued for the 2018 MFP. It states that 2019 MFP payments will provide producers with financial assistance to give them the ability to absorb some of the additional costs from “having to delay or reorient marketing of the new crop due to the trade actions of foreign governments resulting in the loss of exports.”

Payment Basics

MFP payments will be issued in up to three separate rounds. Whether the second and third rounds of payments will be made will depend upon market conditions and trade opportunities. If authorized, the second round of payments will be made in November, and the third in early January.

Eligible Commodities

Commodities eligible for 2019 MFP payments include:

- Non-specialty crops, including alfalfa hay, barley, canola, corn, crambe, dried beans, dry peas, extra-long staple cotton, flaxseed, lentils, long grain and medium grain rice, millet, mustard seed, oats, peanuts, rapeseed, rye, safflower, sesame seed, small and large chickpeas, sorghum, soybeans, sunflower seed, temperate japonica rice, triticale, upland cotton, and wheat
- Specialty crops, including almonds, cranberries, cultivated ginseng, fresh grapes, fresh sweet cherries, hazelnuts, macadamia nuts, pecans, pistachios, and walnuts
- Dairy and hogs

Eligible Producers

- To be eligible for payments, producers must either:
Have an average adjusted gross income for tax years 2014, 2015, and 2016 of less than \$900,000 **OR**
- Derive at least 75 percent of their adjusted gross income from farming or ranching (this provision was made possible by the 2019 Disaster Relief Act)

In addition to having a share in the commodity, to be eligible for an MFP payment for non-specialty crops, each applicant is required to be a person or legal entity who was “actively engaged in farming,” as provided in 7 CFR 1409.3.

To be eligible, producers must comply with the provisions of the “Highly Erodible Land and Wetland Conservation” regulations. They also must have reported to FSA on form FSA-578, “Report of Acreage” the acreage planted for the 2019 crop year by the applicable acreage reporting dates.

Note: Producers who did not file a 2019 acreage report by applicable acreage reporting dates must file a “late filed” acreage report under existing FSA procedures.

Similarly, producers who were prevented from planting a crop by the final acreage reporting date must submit a “late filed” acreage report regarding any CCC approved cover crop that was planted.

Payment Rates and Details

The first 2019 MFP payment, which will be made in mid-to-late August, will comprise the **higher of:**

- 50 percent of a **producer’s calculated payment** or
- \$15 per acre.

Calculated Payment

Non-Specialty Crops

For non-specialty crops, the **producer’s calculated payment** is based on a single-county payment rate multiplied by a farm’s total acres of MFP-eligible crops *in the aggregate* in 2019. (See the county per acre payment rate table, <https://www.farmers.gov/sites/default/files/documents/PaymentRates.pdf>, posted on the USDA website to determine county payment rate). The total number of acres used to calculate a MFP payment on a farm is equal to **2019**

planted acres of non-specialty crops (not to exceed 2018 planted acres and prevented planted acres of non-specialty crops, as adjusted for acreage that is available for planting as the result of 2018 expired Conservation Reserve Program contracts).

Producers who filed a prevented planting claim and planted an FSA-certified cover crop, *with the potential to be harvested*, qualify for a \$15 per acre payment. ***Acres not planted in 2019 are not eligible for an MFP payment.*** Payments are *not* dependent on *which non-specialty crops* are planted in 2019. Non-specialty crops, including cover crops, must be planted by August 1, 2019, to be eligible for MFP payments.

Dairy and Hogs

Dairy producers in business as of June 1, 2019, will receive a \$0.20 per hundredweight payment based on production history.

Hog producers will receive \$11 per head based on the number of live hogs owned on a day between April 1 and May 15, 2019, selected by the producer.

Payment Limits

MFP payments are limited to a combined \$250,000 for non-specialty crops *per person* or *per entity*. MFP payments are also limited to a combined \$250,000 for dairy and hog producers and a combined \$250,000 for specialty crop producers. But ***no applicant can receive more than \$500,000.***

Some Producers Newly Eligible for 2018 Payments

The Disaster Relief Act of 2019 allows certain producers who were previously ineligible for 2018 MFP payments to now collect. This includes those with an average AGI higher than \$900,000, but 75 percent or more of their average AGI derived from farming and ranching. These producers will be eligible to sign-up to receive payments for 2018 through a supplemental MFP signup period that will run concurrently with the 2019 MFP signups, from July 29 through December 6, 2019.

Adapted from an article by Kristine Tidgren, attorney ISU Center for Ag Law and Taxation

Source: *Mary Sobba, ag business specialist*