

# Is a phantom stealing corn yields?

BY GIL GULLICKSON

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ROBB EWOLDT HAD a hunch. But he didn't fully realize how corn yields declined until he compared check strips of corn harvested at 26% moisture versus later-harvested 16%-moisture corn in 2024.

"There was 25 to 30 bushel [per acre] yield loss — about a 10% yield decrease — from harvesting later [at 16% moisture] in that 140-acre field," says the Davenport farmer.

Steve Luther noticed the same pattern occurring whenever combines switched from corn to soybeans and back to the same cornfield seven to 10 days later.



STEVE LUTHER

"Corn in that field could be making 245 bushels an acre, but when we came back, the yield would drop around 12 bushels an acre," says Luther, who manages Stine Seed Farm in Adel.

"You think to yourself, 'What's going on? Is there a hole in the bottom of the combine?'"



**ON-FARM DRYING:** Robb Ewoldt says his on-farm drying costs tally 1.4 cents per moisture point, far below commercial drying costs. PHOTOS BY GIL GULLICKSON

## PHANTOM YIELD LOSS

There's no question that as natural dry-down occurs, corn contains less water. Ultimately, less corn is left to sell. There's a belief, though, that a phenomenon called phantom yield loss slices yields even more.

True to its name, this proposed yield loss is akin to a phantom mysteriously snatching away dry matter — and, ultimately, yield — over several days to several weeks in the fall. The theory is that as grain dries and releases moisture, kernels also release carbon dioxide. This triggers lower kernel weight and lower yields.

However, mechanical damage and natural causes also play a role.

"There are all kinds of ways that corn can be lost during harvest," says Charlie Hurburgh, an Iowa State University Extension agricultural engineer. "Stalks can lodge or drop ears. Kernels can shatter on the combine head, or end up as fines in the grain tank, or go out the back of the combine."

## WHAT STUDIES SAY

One study that phantom yield loss believers cite is from Purdue University. It documented about a 1% dry matter loss (and corresponding yield loss) for every 1% de-

crease in corn grain moisture from 28% to 18% from 1991 to 1994.

Later studies by Ohio State University and the University of Nebraska couldn't duplicate these results. In 2016 and 2017, ISU researchers launched a similar study to determine whether dry matter loss ac-

companied grain moisture loss.

They evaluated two sites over two years, with two planting dates and three hybrids with different relative maturities at each site. Researchers hand-harvested each plot to nix any losses from mechanical damage. Rather than moisture meters, they

oven-dried samples to determine moisture levels. Hurburgh says moisture meters tend to read low in wet corn and even lower in hand-harvested corn. This can alter findings by increasing converted dry weights, he adds.

"We started harvesting at roughly 30%, right after physiological maturity," Hurburgh says. "We progressively harvested the field at later dates with drier corn, tracking it by measuring kernel weights. We couldn't find any differences in moisture-adjusted kernel weights. We even had one hybrid that kept gaining dry matter as it dried down."

University of Illinois researchers found yields stayed similar at different moisture levels through a month-long harvest period in 2023 and 2024 trials. As in the ISU study, they hand-harvested plots to eliminate mechanical damage as a cause of yield loss (see adjacent chart).

"It is interesting to note there were very different yield levels and weather patterns for the two years, but the same result occurred," says Connor Sible, a University of Illinois research assistant professor.

If yield declines occur, Sible agrees

University of Illinois yield and harvest moisture studies		
2023		
Harvest date	Harvest moisture	Yield (bushels per acre)
Sept. 11	26.8%	206
Sept. 18	23.3%	213
Sept. 25	20.2%	213
Oct. 2	18.5%	212
Oct. 9	17.3%	212
2024		
Harvest date	Harvest moisture	Yield (bushels per acre)
Oct. 3	25.8%	295
Oct. 11	20.9%	294
Oct. 17	19%	300
Oct. 24	17%	303
Nov. 1	16.4%	299

with Hurburgh that mechanical reasons or weather could be the culprit. Ditto for wildlife feeding.

Failure to recalibrate moisture yield monitors also may explain losses. “Yield monitors will not read 24% and 17% moisture the same way,” Sible says. “If farmers do not recalibrate yield monitors, this could explain the bulk of the change.”

When reviewing studies, Hurburgh says it’s important to confirm that yields or weights have been mathematically adjusted to 15% moisture for comparison purposes. That’s akin to what seed companies use with plot comparisons, he says.

### MAYBE, MAYBE NOT

Still, ambiguity exists. A 2018 to 2022 Nebraska field study by Pioneer found yields declined an average of 9.1 bushels per acre with later harvest compared with earlier harvest. It found that neither change in grain moisture nor duration in time between an early and later harvest had any relationship with the yield difference.



MIKE SWOISH

“The reason it’s called phantom yield loss is because we still don’t have a 100% explanation,” says Mike Swoish, a Pioneer field agronomist.

Phantom yield loss may or may not be occurring, Luther admits.

“There are a lot of things that lead to losses as corn starts to dry on its own,” he says. “Machine damage accounts for some of that. But we always see a yield gain by starting harvest in the 24%-to-27% range before we work our way down in the 18% range.”



**CORNFIELD PHANTOM?** Akin to a phantom stealing corn yields, the belief behind phantom yield loss is that kernel release of moisture and carbon dioxide triggers lower kernel weight and lower yields.

### ‘PRETTY COOL’

Ewoldt’s findings have spurred him to start harvesting corn at 27% moisture. Aiming to harvest his estimated 1,100 acres of corn then could save an extra 20 bushels per acre on average, he says. Depending on corn prices, he figures this could result in annual gross corn sales of \$75,000 to \$100,000.

“Those are a lot of bushels we couldn’t otherwise sell,” he says.

To manage high-moisture corn, he built a drying and storage system that receives 8,000 bushels hourly in a 25,000-bushel capacity wet holding bin. From there, corn travels to a mixed-flow dryer that can remove 10 moisture points from 800 bushels hourly. Then, corn moves into two storage bins with a combined 175,000-bushel capacity.

The \$1.3 million investment has a 10-year payback, Ewoldt says. So far, it has trimmed drying costs to 1.4 cents per moisture point, far below that of commercial drying costs, he says.

The additional storage also enables Ewoldt to capture grain market carry. This refers to the price premium a deferred futures contract may hold over the nearby futures price. Farmers who store grain can capture this “carry” between the two.

“Last year, we were able to pick up about 70 to 80 cents per bushel that way,” Ewoldt says.

The expansion also is rooted in a belief that a late friend had, he says.

“He always told me that if corn got below 25% moisture, we were losing money,” Ewoldt says. “We finally got to a spot to show him he was right all along. He would have thought this was pretty cool.”

**+ Read more about corn moisture and drying on Page 8.**

## 4 benefits to early corn harvest

Even without phantom yield loss, harvesting corn at moisture levels of 24% and above has several perks, including the following:

**1. Early corn harvest can hedge against adverse late-fall weather.** “The more we get in early, the less of a chance we have for high winds or late-season disease to move in on vulnerable stalks,” says Steve Luther, farm manager of Stine Seed Farm in Adel.

**2. End users may pay a basis premium for early-harvested corn.** Prior to harvest, end users such as ethanol plants may run short of corn. “There’s a basis premium you can get by harvesting corn early and delivering it to them,” Luther says.

**3. Hybrid yield potential increases.** “I can plant a racehorse hybrid [with high yield potential] that might have stalk issues later in the season,” says Robb Ewoldt, who farms near Davenport. He has simultaneously expanded the relative maturities of his hybrid lineup, moving from a top of 112-day corn to one of 119-day corn. Longer-maturing hybrids have higher yield potential, he adds.

**4. Full-season soybeans have higher yield potential.** Ewoldt has flipped his spring planting schedule by planting soybeans before corn. This enables him to plant



**FULL-SEASON EDGE:** Harvesting corn at higher moisture has enabled Robb Ewoldt to plant more full-season hybrids with higher yield potential.

fuller-season soybean varieties with higher yield potential.

“By mid-October, I’m normally done with corn to where I can harvest full-season soybeans,” he says.

This also enables Ewoldt to dodge potential adverse September soybean harvest weather. “In September, hot temperatures and high winds can drive soybean moisture down to 9%,” he says.

Drier soybeans lead to more cracking and fewer soybeans harvested. A University of Nebraska analysis calculated a 4.4% yield decline for 9%-moisture soybeans compared with soybeans harvested at 13% moisture.

## How to harvest at high moisture

Thinking about harvesting your corn in September at a higher moisture? You’ll need to revamp your combining strategy if you normally harvest corn in the “sweet spot” of 17% to 22% moisture.

“That’s where the mechanical threshing mechanisms work best,” says Charlie Hurburgh, an Iowa State University Extension agricultural engineer. “You want to shell off the entire kernel, so you don’t have fines and tip caps, while at the same time not grinding up the cob.”

Harvesting wetter corn requires more finesse, says Steve Luther, who manages Stine Seed Farm near Adel.

“It’s easier to tear up wet corn, so you have to pay attention to this when setting your combine,” he says.

Luther’s tips include:

**Lower speeds.** Reduce ground speed and combine rotor speed to help ensure smooth threshing. Although twin rotor combines help accomplish this, Luther still closely monitors speed to ensure kernels smoothly roll off the cob.

**Bars and rotors.** Run less-aggressive feed accelerator bars in front of the rotors.



**HARVEST ADJUSTMENTS:** Harvesting corn at moistures above 22% requires combine adjustments to keep corn churning out of the combine and into the grain cart.

**Different concaves.** Luther shifted to Bauer Built Concaves to lessen grain damage potential. “They aren’t as aggressive as other ones and don’t tear the grain up,” he says.

**Fan speed.** Increase fan speed to ensure proper separation.

**Adjustments for daily moisture.** “Harvesting wet corn is a bit like harvesting soybeans,” Luther says. “You might be harvesting a bit differently in the mornings than at noon and again in the evening, when more moisture comes in.”



**ON-FARM DRYING:** Harvesting corn between 26% and 27% moisture has garnered more yields in Precision Planting's Precision Institute Technology trials. However, Jason Webster, Precision Planting lead commercial agronomist, says on-farm drying is key to maximize net income. TOM J. BECHMAN

# On-farm drying gives corn harvested at high moisture edge in profitability

BY GIL GULLICKSON

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HARVESTING CORN AT a moisture between 26% and 27% bagged the most bushels in 2023 and 2024 trials at Precision Planting's Precision Technology Institute in Pontiac, Ill. Net income, however, is another story.

"It depends on if you are drying corn yourself [on the farm] or taking it to the elevator for drying," says Jason Webster, Precision Planting lead commercial agronomist.

## WHAT THE NUMBERS SAY

The 2023 trial examined four hybrids harvested at moisture levels of 18%, 20%, 24% and 27%.

Corn combined at 27% moisture yielded

the most at 254.3 bushels per acre. It also had the highest net return of \$1,304 per acre, but only when dried on-farm with PTI's drying system. When dried commercially, 24%-moisture corn yielding 252 bushels per acre was the most profitable, with a \$1,272-per-acre net return.

A similar yield and moisture pattern emerged in 2024. An average of five corn hybrids harvested at 26% moisture yielded 269.3 bushels per acre. This topped yields of corn harvested at 24.3%, 19% and 14.2% moisture.

This time, though, there was a wider gap between commercial and on-farm drying for net returns. When commercially dried, corn harvested at 14.2% moisture had the highest net return of \$1,044.28 per acre. Commercial drying was accompanied by a 1.4% shrink factor in a final drydown

to 14% moisture. (To avoid paying for the unwanted weight of water in corn greater than 15% moisture — called "wet" — grain buyers will mathematically "shrink" the weight of "wet" grain to the equivalent weight of "dry" grain.)

Net return flipped with PTI's on-farm drying system. Corn harvested at 26% moisture was the most profitable, tallying \$1,078.82 per acre. On-farm drying also helped net returns by decreasing shrink to 1.2% for a final 15% storage moisture, Webster says.

On-farm drying makes it easier for corn harvested at 26% to 27% moisture to pay, he adds.

"The reason why folks have not been harvesting at these higher moistures is it costs them [in commercial drying costs]," Webster says.

## 3 ways to better handle wetter corn

Differences loom between drying and storing corn harvested at 18% moisture and corn combined at 27% moisture, says Steve Luther, who manages Stine Seed Farm near Adel.

Here are three tips for how to make drying and storing corn harvested at high moistures run smoother:

**1. Avoid "flash drying."** Luther uses this term for corn not dried as thoroughly as initially believed.

"We'll be running multiple combines and bringing in corn at 26% or 27% moisture, and we'll have the heat [on the dryer] cranked up high," Luther says. "This has led to times when we think the corn is dried to 16% moisture, and it might really be at 18% moisture. We make sure to check if corn is really dried because there have been cases where we've had to run it through again."

**2. Install monitoring systems for storage bins.** These can alert farmers of the development of hot spots that may lead to spoilage.

"We have installed carbon dioxide detectors that move through corn and let us know if microbial activity [that may lead to spoilage] is happening," says Robb Ewoldt, who farms near Davenport.

**3. Buy propane wisely.** Contract early to ensure a plentiful propane supply at harvest, Luther says.

"Drying higher-moisture corn can take a lot of heat," he adds.

Ewoldt buys propane in liquid propane bullet tanks of 9,000 gallons at a time.

"We can buy LP that way for about a third of what it would cost when buying it from a [delivery] truck," he says.



**BIN MONITORING:** Harvesting wetter corn makes it particularly important to more closely monitor grain in storage, says Robb Ewoldt, who farms near Davenport. GIL GULLICKSON