Signs of stress appear in cornfields

By **TOM J. BECHMAN**

THE wettest April since 1895 was followed by the second-hottest July on the books. The result may be corn yields that are subpar, notes Bob Nielsen, Purdue University corn specialist.

"We began documenting stress problems in late July, especially in northeastern Indiana," he says.

Even for corn planted three weeks late, Nielsen notes by Aug. 1, it was only about a week behind. He and Peter Thomison at Ohio State University documented that late-planted corn can reach maturity with about 200 less heat units.

"What we're seeing this year is due to a combination of excessive heat and dry soils," he says. "The corn developed very rapidly. We likely won't see the problems we saw with wet corn in 2009."

Key Points

- It was a tough year for growing corn in Indiana.
- Pull back shucks to know what you really have.
- Stress forced plants to make cutbacks during grain fill.

Grain-fill problems

Even if things were good until grain fill, problems negated decisions the plant made earlier, Nielsen notes. Stand loss, incomplete kernel set, decreased kernel weight and premature plant death are all factors that can rob yield.

If plants give up the ghost after pollination, the only way other plants compensate is by increasing kernel weight. And if that doesn't happen, there's more yield loss.

"It isn't always evident from a windshield survey," Nielsen says. "The husks and cobs continue to lengthen, but kernel set may be incomplete. You've got to pull back the husks and check."

The damage can range from kernel abortion at the tip to complete failure.

Cause unknown

If you're a fan of crime shows where they use high-tech methods to find criminals, you may be disappointed to know that even in high-tech agriculture, it may not be possible to know exactly what went wrong, Nielsen notes. Drought stress could have delayed pollination until pollen shed was nearly over, especially on fields that were further behind. Likewise, corn insects could have clipped silks. Fields that pollinated very late were more susceptible to insect clipping.

NO MORE TIP KERNELS: The stalk aborted the kernels on the tip because conditions weren't right to fill them.

NUBBIN TIME: Bob Nielsen says poor pollination caused this fill pattern on this small ear.

In some cases, where the light was green for high yields until pollination began, pollen may have been gone before the tip got pollinated.

Kernels can abort for a number of reasons, including severe drought, nutrient deficiencies, loss of leaf tissue by disease or hail, and consecutive cloudy days. Only the last cause may not apply this year.

On top of everything else, the black layer may form early if stress is severe in the dough and dent stages, Nielsen explains. Once it forms, no more starch will be added, and kernel weight will be lower.

If frost or severe drought stress kills leaves or even whole plants, even if an ear is developed, there will be yield loss, Nielsen concludes. The amount of loss depends upon when plant death occurs. Grain moisture may also be stuck at about 35%.

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High temps helped corn catch up

Breeder's Journal

By **DAVE NANDA**

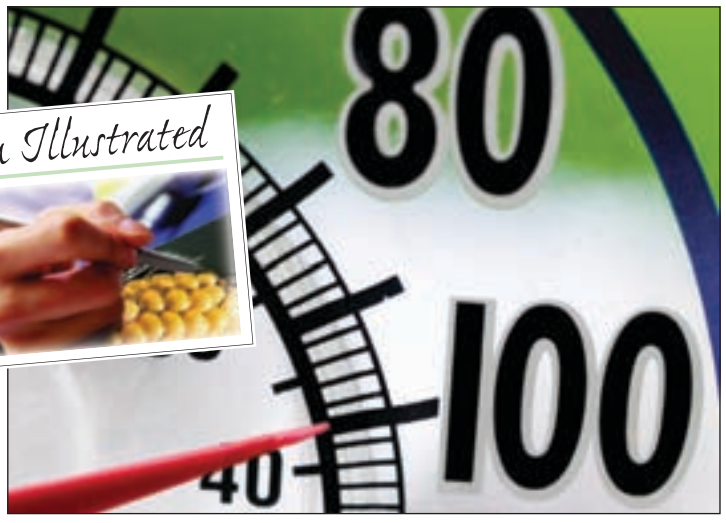
Key Points

- Whether or not corn matures is all about GDDs.
- GDDs accumulated quickly in June and July.
- Best guess: Late-planted corn will beat frost; yields will be hurt.

IT'S a well-known fact that corn growth is driven by heat units, measured in growing degree days. The maximum GDDs available at any location are counted from March 1. So in later plantings you've already lost a certain number of GDDs before the seed goes into the ground.

Corn hybrids most often used in Indiana, Ohio and Illinois range in relative maturity from 105 to 115 days, or 2,400 to 2,800 GDDs. To calculate GDDs, subtract 50 from the average daily temperature to get GDDs for each day.

If the low temperature falls below 50 degrees F, use 50 as the low. If the temperature goes above 86, use 86 as the high for that day. Add the GDDs of each day from planting to physiological maturity, which occurs around 32% moisture, and you have the GDDs needed by the hybrid to mature.



Relative maturity

There is a reason why the word "relative" is used to describe relative maturity of hybrids. It's not a constant, and it's affected somewhat by planting date. In the central Corn Belt, if you plant after May 10, GDDs needed to reach physiological maturity, or black layer, are reduced.

A very black layer forms at the tip of the kernel at physiological maturity. No more dry matter goes into the kernels, and the process of drydown begins.

Bob Nielsen of Purdue University and Peter Thomison of Ohio State University discovered a few years ago that late-planted corn requires about 200 fewer GDDs to reach maturity than earlier-planted corn. The exact reason is not known. I think it may have to do with the survival of the species in an evolutionary sense.

Can plants detect from the day length that they need to speed up the process of maturing? Remember, corn plants aren't concerned about how much yield you're going to get. Instead, their concern is how many mature kernels they can produce.

Weather records

Roger Glick, a farmer and seedsman near Columbus, tracks weather numbers carefully each year. Columbus is about 40 miles southeast of Indianapolis.

Weather records show that July was one of the hottest ever, and the hottest July since 1936. Data shows there were 23 days of 90-degree-F or higher readings near Columbus in July.

When temperatures hit above 86 degrees, the corn crop shows stress. There were only three days when the high temperature was below 86 degrees. Totals show an accumulation of 712 GDDs in June and 897 in July.

So we need only 800 to 900 additional GDDs in August and September combined to mature late-planted corn. Most likely those GDDs will accumulate.

However, high temperatures have hurt the yield. But they have helped maturity of late-planted crops at the same time. Normal rains in August and September, during grain fill, would help salvage the 2011 corn crop.

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