

# Earlier plantings underlie yield gains in northern corn belt

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U.S. farmers plant corn much earlier today than ever before and it seems to be paying off, at least in the north. Earlier plantings could account for up to half of the yield gains seen in some parts of the northern Corn Belt since the late 1970s, a new study has found.

Midwest corn-growers produce three times more corn today than they did a half-century ago. After finding that farmers also sow seeds around two weeks earlier now than 30 years ago, Chris Kucharik, a scientist with the University of Wisconsin-Madison Nelson Institute for Environmental Studies, set out to discover if earlier plantings - and, thus, longer growing seasons - have contributed to the jump in production.

In a study published online today (Feb. 27) in the *Agronomy Journal*, Kucharik reports that earlier planting could help explain 20 to 50 percent of the yield gains in the northern Corn Belt states of Nebraska, South Dakota, Minnesota, Iowa, Wisconsin and Michigan since 1979. Meanwhile, the other major factor he considered, climate, seems to have had little impact.

"What I found was that while climate probably has contributed in a small way to the yield trend, the overwhelming contribution has been from this land management change," says Kucharik, an expert on climate and agriculture with the Nelson Institute's Center for Sustainability and the Global Environment (SAGE).

As concerns about climate change continue to rise, scientists are

struggling to forecast the potential impacts - both positive and negative - on the world's ability to grow staple crops like corn. This is especially true now, as corn is being increasingly tapped as a feedstock for ethanol production.

While the focus on climate is warranted, Kucharik cautions that scientists can't lose sight of the role of human decision-making and management practices. His study reveals that farmers aren't necessarily planting their crops sooner because of warmer springtime temperatures brought on by global warming. Instead, seeds engineered to endure the colder and wetter soils of early spring have likely allowed northern farmers to adopt longer-season - and higher-yield - hybrids.

"Before we jump to conclusions about the impacts of climate change on agriculture, we really need to consider subtle management changes that are taking place and will likely continue to take place in the future," says Kucharik. "Anytime you deal with a system that's being managed by people, it makes for a more complicated story."

Besides climate, researchers have most often attributed skyrocketing yields to technological advances, including mechanization, better crop genetics and pesticides and fertilizers. But after finding in a previous study of U.S. Department of Agriculture data that Midwest farmers put corn into the ground much earlier now, Kucharik began pondering the possible impact of this unexpected shift.

"I thought, if farmers are planting earlier, that means they're extending the growth period of crops - the amount of time plants have to be photosynthesizing, piling on biomass and making grain," Kucharik says. "So it made sense to me that this would have contributed in some way to the yield gains we've seen over past decades."

His hypothesis turns out to be true - in part. In Iowa, for example, earlier

planting dates and longer growing seasons have potentially contributed 53 percent of the statewide yield gains over the past 30 years, Kucharik found. In Wisconsin, that number is 22 percent, and it ranges between 19 to 31 percent in other northern states.

Yet, even though southern Corn Belt states sow seeds even sooner than their more northerly neighbors, Kucharik saw no relationship in Illinois, Indiana, Kansas, Kentucky, Missouri and Ohio between planting dates and yield.

"There was definitely a split - not all of the states showed this relationship," says Kucharik. "But for the ones that did, it made sense that they were the ones more likely to benefit from an extension of the growing season" and a switch to longer-season hybrids.

He explains that because southern farmers have been planting long-season, high-yield corn hybrids for decades, expanding the growing season by another two weeks likely offers little advantage. Shorter growing seasons in the north, on the other hand, have historically limited farmers there to short- or mid-season hybrids that produce less grain.

Whether the trend toward earlier planting can continue is another matter, says Kucharik. Northern farmers will eventually hit up against frozen ground and other wintry conditions that will be impossible to overcome.

"Especially as we're going through this transition of using corn as the initial feedstock for biofuels, are we thinking that this trend in yields is going to continue indefinitely?" he asks. "If planting earlier does contribute significantly in some regions, eventually that effect will wear itself out."

Source: University of Wisconsin

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