# Study offers new method of identifying sweet corn hybrids for increased yield and profit

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Corn hybrids with improved tolerance to crowding stress, grown at higher plant populations than their predecessors, have been a driver of rising field corn yields in recent decades. Large differences in crowding stress tolerance (CST) recently reported among popular sweet corn processing hybrids has growers and processors wondering if newly emerging hybrids also offer improved CST.

Martin Williams, a University of Illinois crop scientist and ecologist with the USDA-Agricultural Research Service, said this question is fundamentally important in improving the sustainability of sweet corn production in the United States and maintaining dominance in sweet corn production globally.

In order to identify CST hybrids in field corn, researchers usually compare hybrids grown across a range of plant populations. However, Williams explained sweet corn trials are hand harvested, as opposed to being mechanically harvested, and during a very narrow window of time. Sweet corn is then processed, which involves husking ears and cutting fresh kernels, also often by hand.

"Because of time and labor constraints in processing sweet corn, comparing more than a few hybrids with the 'field corn approach' is impractical," Williams said.

In a recently published study, Williams identified a more efficient method for comparing and identifying processing sweet corn hybrids for

CST.

Based on previous research, Williams had identified a single "high" plant population that could be used to reveal the level of CST among different hybrids. "We had a good sense of the optimum population of previous top-performing hybrids, so we went just beyond that level," he said.

In the Midwest, processing sweet corn is grown at approximately 23,000 plants per acre. Williams's previous research showed that profitability of hybrids with improved CST was maximized at approximately 27,000 plants per acre. In his most recent "stress test" trial, all hybrids were grown and compared at 29,000 plants per acre.

The approach enabled his team to compare, in replicated field trials across various environments, CST among every 'super sweet' processing sweet corn hybrid provided by the seed industry, which included 26 hybrids from 8 companies.

As a result of the study, the researchers were able to rank the list of processing sweet corn hybrids for CST.

Part of the study also addressed whether there was a relationship between CST and nitrogen fertilization. Williams did not observe an interaction between hybrid use and nitrogen fertilization. "While additional nitrogen increased yield as expected, it provided the same benefit to all hybrids. In other words, hybrid rankings were consistent whether the crop was nitrogen stressed or not," he said.

The highest-yielding hybrid produced 50 percent more green ear mass than the lowest-yielding hybrid. Recovery, which is the fraction of ear mass represented by recoverable kernel mass, ranged from 36 to 42 percent for most hybrids, with the highest exceeding 46 percent.

Additionally, the hybrid at the top of the list for case production produced 61 percent more cases of corn kernels per acre than the lowest. Based on an economic analysis, the highest CST hybrid was 71 percent more profitable than the lowest hybrid.

In addition to showing growers and processors which hybrids could be planted at higher populations than normal, results of the study also challenge seed companies to improve CST. "There's a quantifiable benefit to having plants that can tolerate more neighbors," he said. "That has been a large driver to yield gains in field corn, and it's a logical route to increasing sweet corn yield."

Williams added that the "stress test" they created for this study will also aid in testing future germplasm.

**More information:** "Identifying crowding stress-tolerant hybrids in processing sweet corn" was recently published in *Agronomy Journal* and can be accessed online at dl.sciencesocieties.org/public … ts/0/0/agronj15.0011

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