Better sweet corn research, better production

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While grain yield is economically important in field corn production, there are other metrics more important in sweet corn grown for processing, said Marty Williams, a USDA-ARS ecologist and University of Illinois crop sciences researcher.

In a study recently published in *Field Crops Research*, Williams questioned whether the crop yield responses that have been previously reported in sweet corn research are actually helpful to the industry.

"What has been done in the past is analogous to predicting someone's height based on their shoe size, as opposed to actually measuring their height," Williams said.

After collecting and studying sweet corn data representing 31 hybrids across 22 locations in Illinois over an 8-year period, Williams said he sees a disconnect in what researchers are measuring in the field and what processors and seed companies need to know in order to make improved production decisions.

In other words, Williams said researchers need to start speaking the same language as the sweet corn industry.

Williams explained that the two variables that affect processor decisions most include recovery (percentage of kernels that can be canned or bagged from the green-ear mass) and case production (cases per acre of processed kernels).

However, he added that nearly all historic and recent field research in processing sweet corn reports neither of these variables, regardless of whether the studies pertained to plant pathology, fertility management, pest control, or sweet corn breeding and genetics.

"Ear number or green-ear mass are often the only crop responses reported in research on field productivity of processing sweet corn. Sometimes, other crop responses are reported, including plant traits such as height or canopy density, or ear traits such as ear length or ear width," he said.

In his study, Williams looked for relationships between processor variables and 17 crop traits (5 plant traits, 8 ear traits, and 4 yield traits). He determined that none of the crop traits predicted recovery.

"Recovery is something that has to be measured directly. Currently, there's no way to predict it," he explained.

When comparing the variability of the estimates in case production based on traits such as green-ear mass, husked-ear mass, and ear number, he determined that fresh kernel mass also was a far superior predictor of case production.

"Essentially, the more a measured yield response physically resembled a case of sweet corn, the more precise and accurate the estimate of case production," he reported.

The challenge in getting the necessary data is the costs associated with the equipment and labor, according to Williams.

In order to collect information on fresh kernel mass, Williams and his team designed and built a portable, "mini-processing plant" that they use in the field at harvest to husk ears and cut fresh kernels.

"At the moment there isn't a viable alternative that's less expensive," he said. "Does the research community continue to report mediocre data, or do we invest in an approach that gives the sweet corn industry exactly what it needs to make use of our research?"

Another obstacle is the narrow window of time when sweet corn is harvested, usually by hand, for research. Though field corn for grain production is harvested at physiological maturity, sweet corn is harvested at the R3 stage (milk stage), while kernel moisture is at approximately 72 to 76 percent. "When sweet corn is ripe, waiting is not an option," Williams explained.

A change in the way sweet corn research is done will have an impact on how processors, growers, and seed companies make decisions in the future, according to the researcher.

"Applied research aimed at improving crop productivity is predicated on the ability to accurately measure important crop responses, such as yield. For processing sweet corn, the most important responses include recovery and case production," he said. "Those of us in the research community can't expect the sweet corn industry to adopt our research-based findings when we're failing to measure what's truly important."

  More information: "Few crop traits accurately predict variables important to productivity of processing sweet corn," www.sciencedirect.com/science/ … ii/S0378429013004073

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