U of I research elevates sweet corn production

FOR more than a quarter of a century, Jerald "Snook" Pataky's research at the University of Illinois Sweet Corn Disease Nursery has been helping growers make important decisions to increase profitability.

His observations and trends from evaluating sweet corn hybrids for disease resistance were recently featured in the journal *Plant Disease*.

"Few crop scientists have anywhere near a quarter-century of data — from their own lab — that tells such a comprehensive story," says Marty Williams, a weed ecologist with the USDA Agricultural Research Service at the U of I. "Although the nursery represented only a portion of his research program, it shed light on major changes in the sweet corn industry from 1984 to 2010. I suspect this paper, or rather his program, will be seen as a landmark to the industry."

Nursery established in '84

Since 1984, nearly 3,700 commercial or pre-commercial sweet corn hybrids have been evaluated for disease reactions in nurseries at the University of Illinois.

Key Points

- Jerald Pataky began evaluating sweet corn hybrids in 1984.
- Nearly 3,700 hybrids have been evaluated at U of I nursery.
- Pataky's work has helped battle diseases such as rust.

"Prior to the initiation of the U of I Sweet Corn Disease Nursery, well-documented information about disease reactions of sweet corn hybrids was not readily available," Pataky says. "But now, the reactions of nearly all commercial hybrids to the most prevalent diseases are known throughout the industry and easily accessible at *www.sweetcorn.illinois.edu*."

The nursery has achieved worldwide recognition and has served as an impetus for commercial sweet corn breeders to improve the resistance of new hybrids being developed.

"The disease nursery helps identify hybrid reactions to diseases such as rust, maize dwarf mosaic, northern corn leaf blight and others," Pataky notes. "We want to help the industry know which lines are not subject to injury as a result of host resistance, and those that are likely to sustain economic losses if any of the diseases are prevalent."

Breeding better sweet corn

U of I researchers have played an important role in developing disease resistance in sweet corn. In 1985, approximately five sweet corn hybrids had rust resistance. Today, more than half of the 600 commercial and pre-commercial hybrids available are rust-resistant and use genes that were identified by A.L. Hooker at U of I.

On a similar note, in the 1980s, only a handful of hybrids were resistant to maize dwarf mosaic virus, or MDM. Today, nearly 100 commercial or pre-commercial MDM-resistant hybrids exist. The primary sources of resistance were the M-series of inbred lines developed by Dusty Rhodes and Mark Mikel at U of I.

Pataky says breeding disease resistance into sweet corn is not easy because it's a very diverse crop with three different endosperm types, three kernel colors, varying maturities and three primary uses: processing, fresh market-shipper and fresh market-local sale.

JERALD "SNOOK" PATAKY

"It's a matter of incorporating the right combination of resistances to multiple diseases in the hybrids that are suited for various market niches in different locations throughout the country," Pataky adds. "And with genetically diverse and changing pathogens, it's a unique challenge."

Post herbicide reactions

In 2002, at the request of companies in the sweet corn seed and food-processing industries, evaluations of hybrid responses to applications of postemergence herbicides were added to the U of I Sweet Corn Disease Nursery.

"The sweet corn industry was aware that certain hybrids were sensitive to various postemergence herbicides with various modes of action, but no one connected the common method by which these herbicides were metabolized," Pataky explains. "Nor had anyone realized that mutation in a single gene in corn caused cross-sensitivity to all of these herbicides."

Because of this research, plant breeders now understand the genetic basis for this sensitivity and can eliminate the problem by selecting against the mutant CYP alleles, or by enhancing P450 metabolism with "safeners," substances that protect plants from herbicide damage.

Pataky is a professor emeritus in the U of I Department of Crop Sciences. He taught more than 50 classes during his 28 years as a faculty member.

Source: University of Illinois