Researchers identify markers for better spud quality

Researchers have identified genetic markers in a wild potato species associated with high calcium uptake, a trait that correlates with improved tuber quality.

John O'Connell **Capital Press**
Published on March 2, 2016 10:00AM
Last changed on March 2, 2016 10:05AM

Photo submitted This wild potato species, Solanum microdontum, originated in Argentina and is known to absorb a lot of calcium, which contributes to tuber quality. Wisconsin researchers have identified DNA markers associated with the trait and are making crosses from it for use by breeding programs. #

Wisconsin researchers have identified DNA markers in a wild potato species associated with high calcium uptake, a trait known to contribute to good tuber quality.

University of Wisconsin-Madison horticulture professor Jiwan Palta, one of the study's authors, explained markers expedite crop breeding, enabling scientists to quickly screen hundreds of thousands of progeny resulting from crosses for specific desired traits.

Palta said breeding for improved calcium uptake has the potential to reduce potato defects such

as bruising and hollow heart.

“Calcium is absolutely one of the more important minerals for potatoes,” Palta said.

John Bamberg, project leader with the Potato Introduction Station in Sturgeon Bay, Wis., and Shelley Jansky, a UW associate professor of horticulture and a research geneticist with the USDA Agricultural Research Service’s Crop Research Unit, were also authors of the paper, published in a recent edition of Crop Science.

The markers were found in Solanum microdontum, which originated in Argentina and was the top performer among 25 wild species Palta and Bamberg had previously evaluated for calcium. Palta said S. microdontum can transport about six times more calcium to its tubers than most cultivated varieties, from the same soil.

Within the past year, Bamberg has also been developing crosses from S. microdontum for use by potato breeders interested in elevating calcium levels.

“In the short term, I would think the best prospect for improving things would be to get microdontum germplasm into pedigrees,” Bamberg said.

Palta has been researching calcium in spuds since the early 1980s, when he concluded calcium deficiency contributed to poor storage. Back then, Palta said spuds tended to store somewhat better in Idaho, known for high-calcium soils. Palta explained irrigation tends to transport calcium deep into the soil, where it’s accessible by potato plant roots but not the roots that directly serve the tuber. Very little calcium from the deep roots is transported to tubers, so Palta advised growers to apply liquid calcium at the mid-hill level to be accessible by tubers — now a common practice, even in Idaho, that’s dramatically improved tuber quality and storage.

By also improving the genetics of calcium uptake, Palta and his colleagues hope to enable farmers to apply less calcium while being “more assured of growing a better potato.”

Palta is an author of a paper awaiting publication on the chipping varieties Atlantic and Superior. Atlantic is preferred by chip companies but is prone to hollow heart, brown centers and other tuber defects due to low calcium. Superior, by contrast, produces consistently good tubers and has double the calcium of Atlantic. Palta and his colleagues have crossed the two varieties.

“The whole breeding part for U.S. cultivars (for calcium) has not happened as quickly as I would like to see,” Bamberg said. “We really haven’t attacked that problem.”