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FIELD NOTES

Peru | New Potato Helps Farmers Weather the Frost

By William Schaefer



Three women harvest Wiñay potatoes from trial plots at the Instituto Nacional de Innovación Agraria experimental station in Puno, Peru. Photos by William Schaefer

In a country with more than 5,000 potato varieties, you might not expect the arrival of another one to be a big deal. But this is Peru, where the potato was first domesticated and still plays a vital role in national identity.

In Spanish you might call it *patrimonio* or *orgullo*; in English it translates to national pride or honor. However it's phrased, for the people of Peru, the concept is forever entwined with the potato, a totemic symbol of the indigenous cultures and heritage of their country and the surrounding Andes.

Now, a trio of CALS scientists has helped extend this rich tradition by introducing a new, frost-resistant variety that can help Peruvian potato farmers contend with difficult growing conditions caused by a changing climate. It's the latest outcome of a decades-long collaboration with Peruvian researchers that is still going strong.



Jiwan Palta reviews data from field trials during the May 2018 harvest at the Instituto Nacional de Innovación Agraria experimental station in Puno, Peru.

The three UW scientists — [John Bamberg](#), [Alfonso Del Rio](#), and [Jiwan Palta](#) — worked closely with researchers from Peru’s International Potato Center (CIP) and the Instituto Nacional de Innovación Agraria (INIA), and with Peruvian farmers, to develop the new variety, called Wiñay. The word means “to grow” in Quechua, one of Peru’s indigenous languages. The frost-resistant potato is long and thin with brown skin and yellow flesh and is grown for the fresh market. It was developed to be cultivated in Peru’s Altiplano at elevations of up to 14,000 feet above sea level.

Palta, a professor of horticulture and plant physiologist with the Plant Breeding and Plant Genetics program, says many of the wild potato varieties found in the Altiplano are naturally hardy and can tolerate temperatures down to 14 degrees F. However, these potatoes are small and have a bitter taste due to high levels of chemical compounds called glycoalkaloids.

The need for a hardier, frost-resistant potato in Peru’s highlands stems, in part, from climate change, according to both Palta and del Rio, a senior scientist in charge of the U.S. Potato Genebank research lab at UW. They say more frequent late-season killing frosts are causing greater yield losses for Peru’s farmers.

But developing a new potato variety to withstand such conditions is a time-consuming project, one that typically spans 10 to 15 years. The devil can be in the genetic details when crossing potato varieties to develop a new one. And an effective frost-resistant potato also needs good commercial qualities, including appropriate size, yield, and taste, and must be suitable for the growing conditions of the Altiplano.

Bamberg, director of the USDA Agricultural Research Service’s U.S. Potato Genebank in Sturgeon Bay, Wisconsin, and a professor of horticulture, compares the process to looking for a needle in a haystack.

“Sorting out the offspring, you get just a bewildering number of possibilities to select from,” says Bamberg. “Breeders put out thousands and thousands of progeny and select from them over decades to find that one better one.”

The project began in 2005 using progeny of a Wisconsin potato clone that had good frost tolerance, yield, tuber size, and eating quality. The clone carried the genes for frost hardiness from a wild potato species called *Solanum commersonii*. The progeny of this clone was selected in Wisconsin, but, when tested in frost-prone areas of the Peruvian highlands, it didn’t perform well because the Peruvian summer days are shorter than the Midwest’s.

“So Jiwan, John, and I discussed using some of the Peruvian potatoes we have in the collection at Sturgeon Bay,” del Rio says.



A basket of Wiñay potatoes serves as the centerpiece at the main table of a ceremony to introduce the new potato variety in Puno, Peru.

They chose seven Peruvian varieties. After crossbreeding with the Wisconsin frost-hardy clone, they sent about 20,000 seed potatoes to Peru for field trials at the INIA experimental station in the southern city of Puno. With each passing year, they evaluated new progeny for the preferred qualities and traits and narrowed the pool until arriving at the one potato that came to be Wiñay.

After 10 years of field trials, the culling process, the final variety selection, and the naming of the potato, there came a time to celebrate. In November 2018, near the shoreline of Lake Titicaca in Puno, del Rio, Palta, and Palta's wife, Mari, participated in the public introduction of the Wiñay potato.

More than 200 students, farmers, producers, scientists, and industry and government officials attended the four-hour fete, which concluded with the distribution of Wiñay potatoes in brown paper bags. Both Palta and del Rio found the ceremony to be an enjoyable opportunity to recognize everyone's hard work.

"It's always heartening to see the end result of your labor," says Palta. "Research by definition means you search again and again, and sometimes you hit a winner, and in this case, we have one. Scientists [in Peru] have evaluated it and feel good about it."

Following the celebration, a jovial **Jesús Arcos Pineda**, senior potato researcher at INIA, says he is looking forward to more cooperation and interaction with the CALS research team. Pineda is one of the CALS research team's closest collaborators, along with **Rene Gomez**, senior curator at CIP's gene bank.

In addition to the practical side of the potato ceremony, del Rio says there is a spiritual gratitude for the potato's role in Peruvian villages. "The farmers receiving the potatoes, they appreciate whatever comes from Mother Earth, and potatoes have been such an important part in the life of these communities that they appreciate it very much."

This article was posted in [Changing Climate](#), [Field Notes](#), [Food Systems](#), [Summer 2019](#) and tagged [Alfonso Del Rio](#), [Grow Summer 2019](#), [Horticulture](#), [Jesus Arcos Pineda](#), [Jiwan Palta](#), [John Bamberg](#), [Peru](#), [Plant Breeding and Plant Genetics Program](#), [plant pathology](#), [potato](#), [Potato Genebank](#), [Quechua](#), [Rene Gomez](#), [Winay](#).

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