

# Geneticists find joy in Spudville

June 27 2011, By Jim Wyss

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David Tay heaves aside a metal door that leads into an earthquake-proof room chilled to 42 degrees. There, under the glow of blue-tinged lights, are thousands of test tubes, each with small green sprouts trapped inside.

This room is the heart of the International Potato Center and home to more than 7,000 varieties of spuds.

For the past 40 years, the center, known by its Spanish acronym of CIP, has scoured the globe building up the world's most complete collection of [potatoes](#). In the process it has become a genetic Noah's Ark, safeguarding tuber varieties in the face of manmade and [natural disasters](#).

"It may not be sexy," said Tay, the head of the CIP's genetic resources and conservation division, "but I think somebody has to do it. And the whole idea is that we carry this social responsibility to humankind so that we can face the future."

Along with the in-vitro gene bank, the CIP is keeping root tips in [cryopreservation](#) - frozen in [liquid nitrogen](#) - at -321 degrees Fahrenheit, and has potatoes under guard at the fortified "Doomsday Seed Vault "in Spitsbergen, Norway. In addition, it has sent samples to more than 100 countries, and offers Andean farmers disease-free local varieties to keep them alive in the wild.

The obsession with preserving obscure potatoes may seem odd in the [United States](#), where most people are only familiar with russets,

fingerlings, yellow, red and white potatoes.

But Tay is fond of reminding visitors that potatoes are not from Idaho, but from the Andes.

"These are the great-grandparents of all the potatoes in the world," he said, waving an arm at the gleaming test-tubes. And there's no way of telling which one of the 7,000 varieties may have "the winning gene" that could make it the ideal crop for a changing planet.

Peru is a natural fit for the CIP. Scientists believe the first potatoes were domesticated in the southeastern part of the country, near [Lake Titicaca](#), about 8,000 years ago. Spanish explorers took home potatoes in the mid-16th century.

Since then, this New World crop has become an Old World hit. China, Russia, India and the Ukraine are now the world's top potato producers. The United States is the fifth-largest grower, churning out 19 million metric tons a year.

But Peru still has the monopoly on potato diversity. Of the 187 wild species in existence, Peru is home to 91. The next closest country is Mexico with 36. The United States, by comparison, is home to three wild species.

Peru's genetic bounty is on display at the Mercado de Zurquillo in Lima, where stalls overflow with dozens of different types of spuds. There are long horseshoe-shaped potatoes, tiny balls of deep purple, and conical yellow potatoes that look like carrots.

Lisbeth Marisol, who tends one of the stalls, picks up a small red potato as knobby as a baby's fist. It's called the pusi pina, and Marisol said protective mothers ask their son's girlfriends to peel them.

"When you peel it, you have to take out all the eyes very carefully and leave it really pretty," Marisol said. "If you can do that, then they'll let you stay with their son. If you can't, then you lose him."

Many of the varieties at the CIP are like the pusi pina - interesting to look at but not likely to catch on with consumers. Yet they possess genetic traits that make them invaluable.

Shelley Jansky is a research geneticist with the U.S. Department of Agriculture and a professor at the University of Wisconsin-Madison. She has been developing strains of potatoes that are resistant to diseases such as blight, the common scab and virus Y.

What she has found is that wild potato species - those that have been left to fend on their own for generations - often have inborn defenses.

"Anytime we have looked for any kind of disease resistance in wild species we've eventually found it," she said. Recently, a colleague discovered a wild potato that can fight off the virus Y - an emerging global threat - even when rising temperatures have destroyed the resistance in other varieties.

"If we can have resistance that holds up under warm temperatures, that will be a significant improvement," she said.

Jansky gets her wild potatoes from the United States Potato Gene Bank in Sturgeon Bay, Wis. But the U.S. [gene bank](#) often exchanges material with the CIP.

One of the CIP's biggest successes stories has been the development of an amarilis variety potato that is resistant to late blight. Blight is the same disease that wiped out the potato crop in Ireland in the 19th century sparking a famine that killed more than a million people. Today, late

blight is estimated to cause \$10 billion in losses to the potato industry worldwide.

While potatoes are the world's third-largest food crop after rice and wheat, their ability to grow amid harsh conditions makes them ideal for countries that are seeing the effects of climate change, Tay said.

And unlike wheat, corn or rice, potatoes are not internationally traded. That has shielded them from the price spikes that have rocked other commodities.

"If climate change affects world food prices, the potato could play an important role in price stability," Tay said. "This is an important crop for local food security."

If the lowly potato does emerge as the crop of the future, the CIP will be able to take some of the credit.

"We don't own them," Tay said of the potatoes. "We are just holding them in custodianship for the whole world."

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