

## Sowing prosperity: New varieties enhance Peru's potato production capacity

"It's as much a matter of courage as it is of science," says Enrique Chujoy, Head of CIP's Acquisition & Distribution Unit.

Chujoy is describing the process of producing new potato varieties. Almost 30 potato varieties have been released

## in Peru from CIP-derived materials in recent years.

"We couldn't have achieved this," he says. "Without the Peruvian farmers and scientists who have worked side-by-side with us to develop and test the varieties. They deserve much of the credit, for their conviction and dedication."

CIP potato plant breeder Juan Landeo can testify to this. He has spent a good part of his career contributing to the pool of potatoes available to farmers in Peru. Working closely with his Peruvian partners, Landeo has been able to develop and test the new varieties on the ground.

"Talk to Alejandro Mendoza," he says. "He's helped to produce most of the varieties that have been released in Peru from CIP materials."

### Partnerships that pay

Alejandro Mendoza has worked for 20 years in close cooperation with CIP – as head of the Peruvian national experiment station in Huanuco, professor of the National University Hermilio Valdizan in Huanuco, and

now, since 2002, as a member of the Proyecto de Reducción y Alivio a la Pobreza (Proyecto PRA). Mendoza calculates that he has participated in the evaluation of some 20,000 CIP-derived potatoes.

"We have Juan Landeo to thank for placing his bet on Huanuco," he says. "And it has certainly paid off."

Mendoza is referring to the success of Canchan, a high-yielding, late blight-resistant potato variety tested and released by the Huanuco experiment station from materials developed by Landeo and his team.

Although official figures are lacking, CIP scientists estimate that Canchan easily covers at least 50 percent of the area planted to commercial potato production in Peru.

"It all began in 1983," recalls Mendoza. "Nobody wanted to invest in Huanuco – coca production and terrorism made the risks too high. But when Juan told me that CIP was looking for the ideal spot to evaluate its late blight-resistant materials,

I told him to come to Huanuco." The department of Huanuco, one of Peru's poorest, comprises enormous ecological diversity.

"Right now," continues Mendoza, signaling the surrounding landscape. "We're at 3,500 meters above sea level. But just over those mountains is the jungle. In an hour we can be in Tingo Maria, where there's 80-90 percent humidity all year long. That's late blight paradise."

### The proof is in the potato

"We had to face a lot of resistance," explains Mendoza. "Believe it or not, nobody wanted a new potato variety. The markets had been selling Yungay for twenty years and they preferred to keep the status quo. We ended up having to disguise it as another, more familiar variety to sell the product of our first cycle of seed production in the markets."

The variety's outstanding characteristics had not gone unnoticed, however, by the farmers who had been

## Checking progress on a new variety, to be called "Huanuqueñita"

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testing it in their fields. "Canchan is a classic example," says Landeo, "of how the will and effort of the small farmers can prevail." Impressed not only by how well it stood up to late blight – enabling them to cut their pesticide applications to a minimum – but also by its cooking

quality, the farmers were determined to use it.

"It didn't take long for the word to spread among them," says Mendoza. Summing up years of experience in one phrase, he adds: "If a potato is good, it will find its own way."

"I soon got a call from a farmer from Mala, a coastal

valley near Lima," Mendoza continues. "He had heard about Canchan and wanted to try it. He ended up producing 40 tonnes per hectare in his first season." Although this is a normal yield for European or US potato fields, average potato yields in Peru reach only 12 to 13 tonnes per hectare.

### **The variety that could, the farmers that would**

In terms of quality, the coastal farmer's results were even better than he had expected: at sea level, Canchan produced a potato that was extremely low in sugar content. This made it ideal for processing, an emerging source of demand.

"After this," recalls Mendoza, "we began to sell Canchan seed from Huanuco like popcorn." The variety still hadn't been officially released. But the farmers pushed the envelope.

Canchan's success has continued to this day, making it the predominant commercial variety on the Peruvian market. In 1996 CIP economists published an impact study, calculating benefits per hectare at US\$280 to \$600 – mainly from reduction in use of pesticides – with a stream of net benefits of US\$8 million. Their estimates for future success, while quite encouraging, were characteristically conservative: they foresaw some 25,000 hectares planted to Canchan in Peru by the year 2020.

According to Mendoza, they probably missed the mark by over a hundred thousand hectares. "My calculation is that Canchan covers anywhere from 140 to 150,000 hectares in Peru today," he says. "I am permanently in contact with growers and researchers all over the country, and they give me their information. Twenty hectares here, fifty there – it adds up." Updated analyses by CIP put Canchan's economic benefits in Peru at some US\$90 million per year.

### **Cultivating change**

Landeo and Mendoza both recognize, nonetheless, that it is time for a change. In 2000, Canchan's resistance to late blight began to break down. Farmers who once thought the variety was invincible began to see their fields "melt" in the face of the disease.

"They are controlling it with fungicides, but really that isn't necessary," Landeo says enthusiastically. "There's more where Canchan came from."

Landeo is referring to a new potato that has great consumer and processing

quality, unprecedented resistance to late blight, and fantastic yields. One of the secrets to the new variety's success is its ancestry, which includes native potatoes. This gives it its deep purple skin color and floury texture.

Huanuqueña, as Mendoza hopes to name the new variety, promises to do everything Canchan has done, and more. To draw farmers' attention, he planted a field of the new potatoes next to another, smaller plot sown to Canchan. After a few months, the message was clear even to the untrained eye; while Canchan's foliage was withered and brown,

"After this we began to sell Canchan seed from Huanuco like popcorn"

displaying clear signs of late blight, Huanqueña's stood tall and green, topped by beautiful purple flowers.

CIP Director General Hubert Zandstra is encouraged by the prospect of change. "Breeders are continuing to stretch the life-span of the new varieties," he says. "But they will never make one eternal. We need to make change a habit."

Peruvian farmers have given to the world one of the greatest gastronomic treasures: the potato. CIP's work with Peruvian scientists to develop new and better varieties is a way of giving back to the farmers some of that richness.

### **Building better resistance**

Canchan's defenses against late blight included what breeders refer to as "major" or "R" genes. Although these genes convey very high levels of resistance, they also have their down side.

"The problem," says Landeo, "is that there are so many different strains of the late blight pathogen. No one

gene is resistant to all of them." When breeders test potatoes with major genes, he continues, "these often 'mask' or 'mimic' resistance to certain strains, which makes it impossible to detect their vulnerability. As soon as your potatoes come up against that strain in the field, their resistance breaks down."

This is why, in the 1990s, Landeo devised a way to eliminate major genes, allowing breeders to overcome the masking and mimicking effects. "Our job," he emphasizes, "is to assure farmers that what they have will not break down, or at least, that its resistance will be long-lasting and effective."

CIP has contributed to the development of some 60 potato varieties with horizontal resistance to late blight in 22 countries. In addition, since 1996 a new batch of about 100 potatoes with higher resistance levels as well as improved adaptation and market qualities has been lined up for distribution and testing. Many of these potatoes have already made it to farmers'

fields in Africa, Asia and Latin America. Huanqueña is just one of them.