



THE FUTURE OF FOOD IS WILD

The International Potato Center uses wild crop relatives to develop a late blight-resistant potato variety

Article courtesy of Crop Trust and www.croptrust.org,
“Securing our Food, Forever”

Potatoes are grown all around the world, and almost everywhere, they are threatened by late blight, a wind-borne disease that can destroy a field of plants in a matter of weeks.

Though this disease is widely controlled with agrochemicals, millions of farmers are unable to afford or apply them as often as needed, resulting in about \$14 billion in crop losses annually, primarily in developing countries.

However, Peruvian farmers will soon have a new option for dealing with this devastating disease as the

International Potato Center (CIP, founded in 1971 as a research-for-development organization focusing on potato) prepares to release a potato variety with almost complete resistance.

This new potato, called CIP-Matilde, is the product of a breeding effort that crossed wild potatoes with cultivated ones to produce commercially viable

Above: In 2017, the Crop Trust traveled to Cusco, Peru, to visit the Parque de la Papa (Potato Park) in the center of where the potato originated. *Image courtesy of Crop Trust*

potatoes able to withstand late blight.

It is a result of a long-term effort to preserve, study and use the potato’s wild relatives in breeding supported by the Crop Trust through its Crop Wild Relatives Project, a global initiative to adapt agriculture to climate change.

The project makes all its products available to others under the rules of the Plant Treaty, an international agreement to foster the conservation and sustainable use of crop diversity.

PROJECT MILESTONE

“The release of this variety is an important milestone for the project,” says scientist Benjamin Kilian,



Left: International Potato Center (CIP) technicians harvest Matilde tubers in field trials. *Image courtesy of CIP*

Right: Farmer Mariluz Cárdenas holds CIP-Matilde tubers. *Image courtesy of CIP/J. Huanai*

manager of the Crop Wild Relatives Project. “I hope it will be one for many farmers as well.”

It was clear to researchers at CIP that farmers needed a solution to late blight when they found potato field

damage in high altitude areas of the Andes that were once free of the disease.

In mountain areas where humid conditions facilitate late blight’s spread, potato farmers need to

apply fungicides four-to-six times per month or risk losing their crops. Scientists predict that risk will increase as climate change transforms weather conditions.

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“Late blight can destroy everything. It can leave you without enough to eat, to sell, not even enough to use for seed,” says farmer Rolando Papuico, who grows potatoes near the Andean city of Huancayo, Peru.

The new variety, CIP-Matilde, was named after scientist Matilde Orrillo, who pioneered CIP’s use of wild species in potato breeding in the 1980’s.

In field evaluations at 10 locations, CIP-Matilde’s yields were comparable to those of Peru’s most popular potato variety, Yungay. However, whereas regular fungicide applications were needed to prevent late blight from devastating the Yungay fields, CIP-Matilde grew well without any fungicides.



A highland Andean landscape includes potato fields in the foreground. *Image courtesy of CIP*



COST OF FUNGICIDE

“Late blight is a big problem in my area. Farmers who have the money apply a lot of fungicide, but those of us who have to do without them, maybe we don’t harvest anything,” says Mariluz Cárdenas, a farmer who also lives near Huancayo.

“I would recommend Matilde to other farmers because it is resistant to late blight, so it costs less to grow,” she adds.

Liberating Peruvian potato farmers from the cost and risks of applying fungicides, CIP-Matilde is an example of the potential of using crop wild

Left: CIP-Matilde tubers grew well without any fungicides. *Image courtesy of CIP*

Right: Women farmers are pictured in a highland Peruvian potato field. *Image courtesy of CIP/David Duddenhoefer*

relatives for breeding climate-smart varieties, an approach that could boost food production and farmer resilience.

As climate change increases the risk of crop diseases, farmers need more robust crop varieties, Kilian notes. The hardy wild cousins of cultivated crops can come in handy for this.

Crop wild relatives have evolved to withstand harsh conditions like extreme heat and drought through a process called pre-breeding, in which scientists can transfer these useful traits into cultivated varieties.

It’s a laborious process, but the results are worth it.

“One of the reasons this initiative has been so successful is because CIP involved farmers in the process early on,” says Kilian.

COMMERCIAL POTENTIAL

Because most of the results of crosses between cultivated potatoes and their wild relatives lack characteristics that farmers and consumers want, years of field and

laboratory evaluation were needed to weed out the deficient ones and select the few with commercial potential.

CIP partnered with the Peruvian nonprofit Grupo Yanapai and more than 40 men and women farmers in two regions of Peru's Central Andes. A "participatory varietal selection" process resulted in a shortlist of five potential varieties, from which the farmers selected CIP-Matilde.

CIP potato breeder Thiago Mendes explains that CIP-Matilde is especially appropriate for growing conditions and consumer preferences in Peru's Central Andes, where it will be promoted in the coming years.

However, he adds, this and other shortlisted candidates could also be used as parents by breeding programs in other countries for the development of locally adapted, late blight-resistant varieties.

He explains that, while working

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toward the release of CIP-Matilde, CIP shared late blight-resistant potatoes with national partners in several African countries for use in the development of their own new varieties.

"Those potential breeding parents are conserved in the CIP genebank, which can share them with a potato breeding program in any country under the Plant Treaty for use in developing late blight-resistant varieties," Mendes says.

"Late blight is a major concern for potato farmers in many countries, so getting this resistance into breeding pipelines for the development of more resistant varieties is extremely important," he states.

*This work was supported by the Government of Norway through the "Adapting Agriculture to Climate Change: Collecting, Protecting and Preparing Crop Wild Relatives" initiative, managed by the Crop Diversity. **BCT***

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