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This is a list of our current potato breeding projects. With potatoes, I am generally trying to breed for practical novelty. Our customers are interested in varieties that taste and look unusual more than anything else. So, I focus on flavor, texture, and appearance, while trying to combine them with traits essential to small scale growing, particularly in the Pacific Northwest. I avoid working with modern potatoes and instead focus on Andean potatoes and wild species. I'm not trying to find the next great monocrop potato. My varieties are mostly planted in gardens or sometimes on small farms growing fresh vegetables, so my goals are very different from those of the big potato breeders who are producing varieties to be grown in acreage. Varieties come and go. I try to keep the really good ones alive as long as possible, but nothing lasts forever.

Breeding Tetraploid Andean Potatoes for Longer Photoperiod

Andean potatoes are my main focus and this is my main breeding project with them. I have a large breeding pool of tetraploid Andean potatoes and I am selecting those with earlier tuberization while trying to maintain the balance of traits (good flavor, interesting appearance, reasonable pest and disease resistance). The end goal of this project is to produce potatoes with the more exotic shapes, colors, and flavors of Andean Potatoes, but with tuberization at 14 hours or more, which would be suitable for the maritime Pacific Northwest.

Breeding Diploid Andean Potatoes for Longer Dormancy and Photoperiod

A small project in comparison to my work with tetraploids. I have a mixed pool of stenotomum and phureja type diploids and I am selecting for those that both tuberize earlier and have sufficient dormancy for this climate. I sometimes cross the diploids into the tetraploid population as well. The end goal of this project is to produce potatoes with the most vivid phureja flesh colors but with tuberization at 14 hours or more and at least two months of dormancy.

Breeding Edible Varieties of *Solanum acroscopicum*

I made a chance discovery that tetraploids of the wild potato species *Solanum acroscopicum* have good potential for domestication, so I have begun making selections. I now have a handful of reasonably good performers that I have mass crossed. In 2020, I will start growing large numbers of plants from that cross and selecting for better varieties. The main goals are improved size and yield and better dormancy. At some point, I may try making crossing to *S. tuberosum*, but the main focus right now is working with pure *S. acroscopicum*.

Breeding Edible Varieties of Cimatli (*Solanum cardiophyllum* and *S. ehrenbergii*) and related 1EBN Species

This project is just beginning. I am building a population of non-bitter specimens of *S. cardiophyllum* and *S. ehrenbergii*. Once I have enough, I plan to mass cross these along with a selection of other 1EBN Mexican and Central American diploids. I will then begin to select for flavor, tuber size, and other agronomic traits. The end goal of this project is to introduce a domesticated variety with low glycoalkaloids and reasonable tuber size that preserves the impressive disease resistances of the 1EBN gene pool. Notably, I don't plan to do any crossing with the domesticated potato - the end goal here is to

have a variety that is mostly *S. cardiophyllum*, a different species with its own set of agronomic characteristics separate from the common potato. The 1EBN plants are, by and large, much smaller than domesticated potato plants with smaller tubers and yields. On the other hand, they have impressive resistance to many diseases. It might be possible to grow them in conditions where the domesticated potato performs poorly. One of the big problems here will be setting expectations, which is one reason why I have chosen to use the native Mexican name, cimatlí, rather than potato.

Recreating Frost Resistant Hybrids with Lower Glycoalkaloids

This is a very small project. I am working to select better parent varieties from *S. acaule*, *S. boliviense*, and domesticated diploids to produce populations of neo-ajanhui and neo-juzepczukii. From these, I plan to select varieties that have good frost resistance along with lower glycoalkaloids in the hope of having varieties that do not need to be processed before eating. I'm not sure if this project has an end goal; I am pursuing it mostly to see if it is possible. If it is, I will probably get more serious about goals.

Exploring Unusual Crosses with Wild Potatoes

There are a huge number of wild potato species and a relatively small amount of work has been done with most of them, particularly if they don't show pest or disease resistance. I am making crosses with the less commonly used wild species, just to see what I get. I now have hybridization projects with *S. hjertingii*, *S. violaceimarmoratum*, *S. infundibuliforme*, and *S. maglia* that show some promise, at least as novelties.

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