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This is a list of our current breeding projects with Andean root and tuber crops as of 2018.

## **Achira**

I suppose that main trait that I am breeding for in achira is flavor. I find the existing varieties a bit insipid. I would like something a little more memorable, but I'm not sure how to get there. I'm not sure that there is enough variation in the existing varieties to select from, so I am looking farther afield into related *Cannas*.

## **Ahipa**

My ahipa breeding project is currently entirely about seed production. I want earlier flowering and seed set. Until I get that, outdoor ahipa breeding is not a viable pursuit in this climate.

## **Arracacha**

My arracacha breeding project is purely aspirational at this point. I have never gotten any flowering from arracacha. Until I do, or until I can source seeds elsewhere, there will be no progress.

## **Maca**

I have been able to develop the technique for dissecting and crossing the tiny maca flowers, but it is incredibly laborious. Still, I have the basis for breeding this plant. My only breeding goal at this point is earlier maturity. Plants that mature in eight months or less would be much easier to work with.

## **Mashua**

### **Breeding for Improved Flavor**

In this population, I am breeding for varieties that have milder flavor, to the exclusion of all other traits. I am primarily selecting against the flowery flavor of mashua tubers, which I find more objectionable than the spicy flavor, but I am willing to select varieties in which both flavors are reduced.

### **Breeding for Dark Color**

I began selecting several years ago for a mashua with the color of mashua negra, which has a dark purple/brown skin and flesh. In 2017, I got some real mashua negra, but I am continuing with the project since I had already made some progress. I will avoid crossing in mashua negra for now and continue to work with my breeding lines. I suppose this project is more about curiosity than anything else at this point. I'm not sure I will introduce anything from it.

### **Breeding for Tuberization at Longer Day Length**

I am working with a large pool of crosses made originally between Ken Aslet (a longer photoperiod

tuberizer) and other mashua varieties. I am selecting those that tuberize at 13 hours or more and working toward longer day lengths. I think that tuberization under long days is a multi-gene trait and it has been hard to make much progress. The end goal of this project is to develop varieties that are homozygous for the necessary genes and that can be more effectively used to introduce this trait.

## **Mauka**

Although I have successfully made crosses between the two varieties of mauka that we have, I've concluded that there is not enough variation available to bother. For there to be much value in doing mauka breeding, I need more varieties.

## **Oca**

### **Multiple Trait Breeding Pool**

I am breeding oca primarily for flavor, improved yield, tuberization at longer photoperiods, larger tuber size, heavy flowering, and tolerance for wet soil.

### **Breeding for Red Flesh**

I am breeding for varieties with the reddest possible flesh. I want to achieve varieties that have fully red flesh even at larger tuber sizes.

### **Breeding for Yellow Flesh**

I am breeding for varieties with the yellowest possible flesh. While it is easy to get varieties with fully yellow flesh, it is harder to get a really intense yellow.

## **Ulluco**

Although there are many directions that I would like to go with ulluco breeding, at the moment, the goals are dictated by necessity. I am breeding for improved seed set over all other traits. I am also screening for varieties that tuberize at longer day lengths, but I can't really afford to do selection on any trait other than seed set at this point. Once I have a population that seeds more readily, then I can get a little choosier about which progeny to keep.

## **Yacon**

### **Breeding for Early Flowering**

I am selecting yacon varieties with the earliest flowering to facilitate breeding in climates with shorter growing seasons.

### **Breeding for Red Roots**

I am selecting varieties with the darkest red storage roots, while maintaining good flavor and yield.

## **Breeding for Sweetness**

I am selecting varieties that have the sweetest roots at harvest, before storage or exposure to cold.

## **Breeding for Orange Flesh**

I am selecting varieties that have the darkest orange colored flesh. Currently, the color is not very dark at all, but there are darker varieties in the Andes.

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