

Breeding Colorful Disease and Pest Resistant Potatoes FNE06-569

The goal of the project was to create new lines of potatoes with nice color, good flavor, and resistance to potato leaf hopper (PLH). Our farm has gotten a bit smaller since we began this grant, we still maintain a small operation on about a 1/2 acre though we have scaled back on our commercial production, we still sell a few things but have been doing more growing on a subsistence level. This reduction is due to having a child and taking a full time job off the farm. We hope to expand again in a few years. This project is mostly a one person physical operation, with Dr. Kim Stoner from the Connecticut Agricultural Experiment Station giving technical advice.

In 2006 (see first interim report) the PLH resistant variety Prince Hairy (PH) was grown with several other cultivars that had superior flavor or more interesting color. Flowers of Prince Hairy were emasculated and hand pollinated. Seed balls (fruits) of Prince Hairy crossed with Kueka Gold (KG), Carola, Satina, and Banana set, and a cross with Purple Peruvian (PP) pollinated with Prince Hairy also formed a fruit. Additionally open pollinated (pollen source unknown) seed balls from Prince Hairy were collected. Seeds were collected and cleaned from the fruits and planted spring of 2007. Several seedlings of these crosses were grown through the 2007 season. Mini-tubers were collected and tracked separately from each seedling; every one is a unique genetic individual and technically its own variety. Some of the tubers did not store well and were dehydrated and non viable by the spring of 2008. Any mini-tuber that looked viable was planted. The plants grew slowly this year and yields were low, it may have been due to the small tuber size the plants were started from. None-the-less there was little sign of trouble with PLH or Colorado Potato Beetles. In November of 2008 tubers were dug, 13

lines of Purple Peruvian x Prince Hairy were recovered. The PP x PH lines as stated last year show good vigor and vary dramatically being white, pink, and purple as well as having round and fingerling tubers. Eleven lines of open pollinated PH seedlings were grown and show good vigor but look almost identical to PH and could be the product of self-pollination. Three lines of PH x Banana produced this year, they aren't as vigorous as the PH x PP but show some promise. Nine seedlings of PH x KG set tubers all were slightly russeted and round. The crosses with Carola were not found in the field where they were planted, the tubers may have been eaten by rodents, I still have a few seeds from the original cross and more plants may be started next year. The seedlings produced few flowers and were out of sequence with the King Hairy (an improved version of Prince Hairy) that they were planted with therefore no crosses could be performed. It is my opinion though that backcrossing may not necessary; some of the PP x PH lines may be suitable varieties for production.

The conditions on the farm this year were wet and weedy, the small seedlings may not have fared well with weed competition. The tubers were much slower to "bulk up" than previous potato seedlings I have grown, but several did produce 1-2 lbs of tubers. This project is currently too small to make a direct economic impact on our farm; the more promising lines need to be bulked up to the point where a full crop can be grown.

A few new ideas have been generated in the process of this breeding project. The focus now for me will be to bulk up the existing lines I have produced so that they can be further trialed by myself and others. I plan to focus on getting more tubers of the most promising lines. I hope to collaborate with Dr. Elizabeth Dyck of NOFA New York

and Dr. Keith Perry at Cornell to taste test and further evaluate the lines from this project. Additionally I hope to cross these F1 seedlings with King Hairy. Further experimentation may be done crossing King Hairy directly to the original varieties such as Purple Peruvian. If I have a good harvest I hope at the end of 2009 to send sample tubers to FEDCO, Wood Prairie, Seed Saver's Exchange, Ronnigers, and perhaps a few other companies to have them evaluated for commercial production.

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