

Fruit-breeding at the University of Minnesota

Background

The University of Minnesota operates one of the oldest fruit-breeding programs in North America. It's the only such program in the Upper Midwest—and one of only four remaining in the United States.¹ University researchers have developed 102 cold-weather varieties of grapes, blueberries, strawberries, raspberries, blackberries, pears, apricots, black currants and other less common fruits that have generated millions of dollars in income for Minnesota growers.²

- Beginning with the release of the Minnehaha apple in 1920, and the Haralson in 1923, 25 varieties of apples—including the popular Honeycrisp and Zestar varieties—have been introduced to Minnesota by the University.
- Tens of thousands of Honeycrisp apple trees alone have been planted in Minnesota since 1990. The gross income from each tree is estimated at approximately \$1,000. This represents tens of millions of dollars in income for Minnesota apple growers.
- The Minnesota apple industry is based on varieties developed by the University—an estimated 80 percent of the trees grown commercially are varieties developed by the University.
- Approximately 200 apple growers in Minnesota grow more than 400,000 trees (2,500 acres) whose annual production value is estimated at \$8 million.³ Minnesota ranks 25th in the nation in apple production, producing 595,000 bushels at 42 pounds per bushel in 2004.⁴
- Minnesota growers receive the fifth highest price for their fruit in the United States—due, in part, to the high quality, unique varieties developed by the University.
- To date, the University has received \$3.7 million in royalties from the Honeycrisp apple which helps fund apple-breeding research at the University.⁵ The Honeycrisp was recently named one of the top “25 innovations that changed the world” by the Association of University Technology Managers.⁶
- The University invests approximately \$400,000 per year in its apple-breeding program. About a quarter of that sum (\$100,000) is from state funds. More than half of the program is funded by royalties generated from University intellectual property, primarily Honeycrisp.
- The University is committed to developing and providing apple varieties that serve the interests of Minnesota growers and Minnesota consumers.

Intellectual property for Minnesotans

In 1999, the Board of Regents adopted an intellectual property policy and the Minnesota Agricultural Experiment Station created the following guidelines for all University-developed agricultural technologies:

- > To ensure that the results of University research have the maximum possible beneficial effect for Minnesotans and the larger public.
- > To realize a fair financial return to the University as long as this does not interfere with the first principle.
- Since 2001, the University has entered into 166 different licensing agreements related to the growing of apples, grapes, strawberries, grains (barley, wheat, oats), grasses, soybeans, trees, flowers and other agricultural crops (sugarcane, wood).⁷
- Forty eight of these different licensing agreements are for apples—the most of any University-bred cultivar. There are 29 agreements for soybeans, 25 for grapes, 20 for trees and flowers, 19 for grasses, 13 for grains, five for strawberries and seven for other crops.⁸
- The University is now using a combination of managed and nonmanaged arrangements to release new varieties. The SnowSweet apple was released in 2006 as a nonmanaged public variety that will be freely available to anyone who wishes to plant it.
- The management rights to the University's newest apple, MN 1914, have been licensed to Pepin Heights Orchard, a Minnesota-based apple grower. MN 1914 was licensed in this manner because of its potential as a “premium” variety.

Preserving and enhancing Minnesota's premium brands

- The University's experience with Honeycrisp has pointed out the difficulties with nonmanaged public varieties of premium apples. University apple breeders began working on Honeycrisp in 1961, and it was released in 1991. Its unique crisp and juicy taste created a new market for a premium apple at a time when fresh produce marketing was moving to more differentiation in what had traditionally been a generic market.
 - The popularity of the Honeycrisp apple has been good for the University, but the apple's patent expires in 2008. Royalties on planting of Honeycrisp trees will cease at the same time that demand for the variety is accelerating. The loss of Honeycrisp royalties will directly impact the University's ability to produce future varieties. The University's experience with Honeycrisp points out four problems with public releases of premium apple varieties:
 1. The ramp-up in demand for a public variety will be slow if no company has an active interest in marketing it. Combine the length of time between planting a new tree and selling apples with the longer demand cycle for premium apples and in most cases the patent will run out before the market potential is realized.
 2. The University's work on a public variety can result in a private company having a patented variety handed to them free of charge. This happened with Honeycrisp. One of the University's licensees identified a "sport" Honeycrisp tree that produced a redder fruit. They named and patented it and will soon be selling this redder apple in competition with the University and also with Minnesota growers. The University is losing out on royalties, and the Minnesota growers planting Honeycrisp end up competing against another apple that is very similar to the Honeycrisp.
 3. Quality control of a premium variety is difficult. Not every Honeycrisp apple has the crisp and juicy flavor that established the apple as a premium variety. Low quality Honeycrisp apples being sold today are eroding the quality of the brand and compete with those growers who only sell top quality Honeycrisp apples. This has resulted in a decrease in the price that Minnesota growers are now receiving for Honeycrisp, which directly decreases their profit margins.
 - 4. Developing an apple's market position and making sure every grower pays the royalty is not the mission of the University. We know that there are growers raising Honeycrisp who don't pay the royalty, and we know the Honeycrisp market could have been developed faster. But, the University is not in the apple marketing business. Private businesses do that better than the University does. The University is in the apple breeding business.
- The University decided to license MN 1914 exclusively to a Minnesota company. After a lengthy consultative process, Pepin Heights Orchard was chosen as the licensee. The University believes exclusive licensing of MN 1914 will serve the interests of the consumer, Minnesota apple growers and the University's breeding program.
 - Hopefully, the potential for earlier royalty payments and management of MN 1914 sports will result in funding to continue the breeding program's development of apple varieties suited for Minnesota's unique growing conditions.
 - The University built into the license agreement a requirement that all apple orchards agreeing to plant between 100 and 1,000 trees can receive a sublicense to grow and sell MN 1914 in their own retail outlets.
 - These individual growers will benefit from Pepin Heights investment in establishing the MN 1914's market and brand image. More than 90 percent of Minnesota's apple growers sell their crop directly to consumers either at their farms or at a farmers' market. The license agreement requires Pepin Heights to make MN 1914 available to those growers.

Conclusion

- Exclusive agreements like the MN 1914 agreement are a viable model for future agricultural and horticultural research. The University is committed to helping farmers and horticultural growers thrive in a harsh and diverse climate. Exclusive agreements like the one used for MN 1914 assure a source of funds to continue research during a time of declining federal and state support for research. Soybean growers and others have seen the benefits of such agreements and signed on as University partners.
- Most Minnesota apple growers will benefit from the agreement. Ninety percent of Minnesota growers are retail growers who will be able to sell a premium

variety at their farms or through farmers' markets. Pepin Heights is also willing to consider means to allow Minnesota growers direct access to Minnesota wholesale markets. If MN 1914 proves to be a successful variety, the funding stream will pay for research for new and better varieties.

- The University of Minnesota is the people's university. It is committed to working with apple growers and others to assure that its research, education and outreach meets their needs.

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- 1 Minnesota Impacts, University of Minnesota Extension Service, www.mnimpacts.umn.edu/impact.aspx?impactId=242
 - 2 Minnesota Impacts, University of Minnesota Extension Service, www.mnimpacts.umn.edu/impact.aspx?impactId=242
 - 3 Minnesota Impacts, University of Minnesota Extension Service, www.mnimpacts.umn.edu/impact.aspx?impactId=242
 - 4 "Minnesota Apple Facts and Figures," Star Tribune, April 11, 2006, www.startribune.com/332/story/362249.html
 - 5 Patents and Technology Marketing, Office of the Vice President for Research, University of Minnesota, www.research.umn.edu/spp/roles/ptm.html
 - 6 "Another Sweet Accomplishment," UMNnews, University of Minnesota, March 10, 2006, www.umn.edu/umnnews/Feature_Stories/Another_sweet_accomplishment.html
 - 7 Patents and Technology Marketing, Office of the Vice President for Research, University of Minnesota, www.research.umn.edu/spp/roles/ptm.html
 - 8 Patents and Technology Marketing, Office of the Vice President for Research, University of Minnesota, www.research.umn.edu/spp/roles/ptm.html

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