

# The Huitlacoche Project: A tale of smut and gold

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## Abstract

This is a tale, over 500 years in the making, of how a university–community farm collaborative research project turned corn smut into gold.

**Key words:** CSA, huitlacoche, university–community collaboration

Huitlacoche (wheat-la-coach-ay) is commonly called corn smut in the US. Corn farmers know it for the economic damage it inflicts. The Aztecs saw huitlacoche in a different light: as a culinary delicacy. Gourmets around the world are beginning to catch on.

Since ‘discovering’ huitlacoche nearly 500 years ago, Western scientists have tried to find ways to eradicate it and to prove that *Ustilago maydis*, the fungus responsible, is harmful. The only effective means to control the fungus is to select varieties of maize that are not susceptible. *U. maydis* thwarted scientists by being irritatingly nutritious and stubbornly non-toxic; however, the fungicides developed to eradicate it did prove to be deadly to humans.

## A University–community Partnership

To encourage cooperation between universities and community organizations, the W.K. Kellogg Foundation sponsored a project that is a collaboration between the University of Wisconsin-Madison (UW) and the newly formed Friends of Troy Gardens (FTG). FTG is a non-profit organization dedicated to the development, management and stewardship of 10.5 ha of open space site in Madison, WI, USA. The purpose of the project was to develop the site, strengthen the FTG organization, and establish educational programs for the community. The UW faculty and graduate students involved in the project are conducting research and outreach to help improve the agronomic and economic sustainability of Troy Community Farm and the social sustainability of FTG. UW students also have the opportunity for agricultural internships with FTG and faculty use the site for demonstration of

community projects, natural areas management and agricultural practices.

The land includes community gardens; a kids’ garden; handicapped-accessible gardens; woodland and prairie restoration; nature trails; and edible landscaping to provide the community with open space, access to fresh produce and educational opportunities. In addition, there is an organic, urban farm to provide financial support for FTG as well as access to fresh local produce for those not able to garden. On 2 ha adjoining the site, the Community Land Trust is building 24–30 units of affordable co-housing.

## A University–community Farm Research Partnership

Established in 2001 as Madison’s first and only urban farm, Troy Community Farm occupies 2 ha of the FTG site and is certified organic. The farm is organized as a community-supported agriculture (CSA) enterprise. In order to reach a wider community, the farm also sells at a farm stand on site and at two farmers’ markets. CSA members receive fresh, organic produce from the farm each week for 21 weeks from June through October. To make membership accessible, members can pay in installments; low-income households can receive subsidized shares; and can exchange their labor for membership (worker-shares). In addition, the farm has adopted a strategy of selling a small range of profitable crops wholesale to keep CSA membership fees low.

The Huitlacoche Project is a specific project of the UW–FTG partnership to promote the agronomic and economic sustainability of the Troy Community Farm as well as reach out to the Hispanic community<sup>1</sup>. UW faculty

and students are conducting research and outreach in cooperation with FTG staff and volunteers to improve the agronomic, economic and social sustainability of Troy Community Farm. FTG and the farmer set the research objectives. One objective was to identify a profitable crop that could be sold wholesale to keep the cost of CSA membership low. This pointed to a strategy to identify high-value and preferably perishable crops. The latter would give a comparative advantage to local production. Another objective was to identify crops that would create ties with ethnic communities. FTG already had a large number of Southeast Asians involved in the community gardens (over 60% of the gardeners are in fact Southeast Asians), but at the start of the project, no Hispanics and very few African-Americans. Several crops were discussed that might simultaneously meet the criteria of high-value, perishable and ethnic appeal. Huitlacoche fit the bill.

### What is Huitlacoche?

Huitlacoche was first described in 1575 by Bernardo Sahagun, a European, in his book *Earthly Things*, an amazing catalog of new world animal and plant species, complete with drawings by indigenous artists, and descriptions in Nahuatl and Spanish<sup>2</sup>. His description of huitlacoche reveals that he saw it through European eyes, as a blight on a far more interesting crop, maize. The Spaniards immediately saw the economic potential of maize, a grain that dwarfed their own crops. The literal translation of the roots of the word (excrement, to sleep) did nothing to disrupt this European perspective. Though, had Sahagun reflected on the roots of the Nahuatl words for silver and gold, divine and yellow excrement, he might have enquired more carefully about huitlacoche. And in light of the bearded foreigners' reaction to divine and yellow excrement, the indigenous informants had every incentive to say as little as possible. (As examples of different cultural perspectives, the Aztecs viewed excrement as a valuable fertilizer. They also bathed frequently and tried, but failed, to introduce the custom to the Spanish conquistadors).

What is clear is that the indigenous peoples of Central Mexico viewed huitlacoche as a highly valuable delicacy, and that it continues to be highly esteemed in Mexican cuisine. As a testament to the persistence of cultural biases, nearly 500 years after the conquest of the Aztecs, huitlacoche is just beginning to be recognized outside Mexico as a gourmet food. It has been featured in gourmet restaurants and magazines. And it also has the characteristics we were looking for in our project: high-value, perishable, and part of Mexican culture and cuisine.

### Learning to Propagate Huitlacoche

Identifying a potential crop was the first step. However, we needed to know how to grow and market it. Huitlacoche occurs naturally. The fungus *U. maydis* is endemic in the soil wherever maize is grown. The fungus can become

airborne and lands on the plants' silks, entering the kernels. The kernels swell as they fill with the black fungus, changing color from pale yellow to silver and eventually to black. If not harvested, the galls will burst and spores return to the soil.

Marketing naturally occurring corn smut is an unreliable prospect; we needed to learn how to propagate huitlacoche. Agronomy professor Bill Tracy, an expert on sweet corn at the UW, and his graduate student Camilla Vargas conducted research on how to propagate huitlacoche by reversing what they knew about preventing corn smut. They picked varieties of maize that are susceptible and developed a planting schedule to extend the season for huitlacoche<sup>3,4</sup>. To propagate huitlacoche, *U. maydis* was replicated in a laboratory to create inoculum that could be sprayed in young corn when the silks emerge<sup>5</sup>. 2005 was the third year of field trials and the second year that Troy Community Farm has been able to sell huitlacoche commercially.

### Using Outreach Events to do Research: What Chefs Wanted

Initially, the FTG staff identified high-end restaurants that featured local food, as their desired market for all their farm's products. The staff's own reaction to huitlacoche itself was, at best, tepid. Enthusiasm began to sprout as they saw the response at the events and cooking demonstrations organized to facilitate market research. Participants were interviewed in English or Spanish to gather information about interest in huitlacoche, willingness to pay and familiarity with Troy Gardens. In addition to market research, the events served as outreach activities to the community, particularly the Hispanic community. Marketing research was also conducted by interviewing restaurant and grocery store owners and chefs. I was also responsible for post-harvest research on care and processing of huitlacoche. Several graduate students have assisted me over the past 3 years: Kathy Gonzalez, Kym Leggett, Martin Hernandez and Willow Russell.

A local chef, Robert Hughes, who was familiar with huitlacoche, was enlisted to conduct the first demonstration. Chefs from several high-end restaurants were invited to watch the preparations and taste the results. They were also given samples of fresh huitlacoche to feature in their restaurants. In exchange they agreed to be interviewed.

The chefs proved to be more enthusiastic about huitlacoche than their Anglo customers who were unfamiliar with it and generally inclined to make conventional choices when dining out. The chefs said they would be interested in buying, at most, a few pounds a week. The quantities would not justify the cost of the farmer's time to make the deliveries. Nor did the huitlacoche prove to be an entrée to buying other produce from Troy Community Farm. The owner-chefs who featured local food all responded in kind that they had a long-standing relationship with a local farmer and would not violate that relationship

by buying anyone else's produce. The other chefs worked for restaurants that did one-stop shopping with a supplier and viewed it as an inconvenience to buy produce piecemeal.

The interviews also revealed that the chefs wanted fresh huitlacoche 'cleaned' off the cob and ready to use. Post-harvest research revealed that cleaned huitlacoche would not keep more than a few days. On the cob, with certain procedures, it could be stored for a week to 10 days. Freezing was considered, but required special facilities and licensing.

## Using Events to do Market Research on What the Public Wanted

To gather information about the retail market, a second cooking demonstration at a local Mexican grocery featured three Mexican cooks who made traditional dishes: tacos, tostadas and quesadillas. Publicity was targeted to the Anglo and Hispanic community. Over 100 people came and were enthusiastic. Another demonstration was conducted in 2003 at a food festival with five cooks who prepared traditional Mexican and fusion dishes. Over 300 food samples were served. Surveys at both events revealed very positive responses. However, the Anglo market for huitlacoche appeared to be quite small, not merely because they were not familiar with it, but because they cooked from scratch so infrequently. Those willing to pay for huitlacoche were the people most familiar with it, though also with the least income: the Mexican community.

In 2004, the second season of research, the results of the propagation research yielded a more reliable and abundant crop. The marketing outreach included participating in a local Hispanic festival, organizing a huitlacoche festival in cooperation with a Mexican grocery, and another cooking demonstration at a local food festival. The huitlacoche festival featured food samples, food for sale, music, and piñatas. Local TV and newspaper media covered the event, while graduate students surveyed some of the over 200 participants.

The lessons of the first year pointed to focusing the second year of marketing research on Mexican groceries and restaurants. They were familiar with the product and demanded sufficient quantity to make deliveries worthwhile. However, even the Mexican restaurants wanted it cleaned. Because the product is perishable, it became clear that some sort of preservation would facilitate marketing and freezing that was the best option. Canned huitlacoche was available, but a very inferior product and should not be substituted for fresh or frozen huitlacoche.

In year 3, 2005, the outreach efforts were focused on a single event: a huitlacoche festival as part of the summer FTG event at Troy Gardens. Over 700 people showed up, to listen to music, hit piñatas, taste samples of huitlacoche, and buy huitlacoche prepared by food vendors. Four local TV stations and other reporters covered the event.

One of the unexpected results of the marketing research was that Mexicans familiar with huitlacoche found the propagated huitlacoche odd looking. The inoculated corn developed huitlacoche galls in many of the kernels, giving propagated huitlacoche a much different look than 'wild' huitlacoche. Propagated galls tend to be smaller, more uniform, and there are many more of them.

## Final Lessons Learned

The marketing and agronomic research indicated that frozen huitlacoche is the best option for the Community Farm; propagation of huitlacoche could be consolidated to only two plantings each of two varieties of corn. This has the added benefit of reducing labor requirements, a limited resource on the Community Farm.

Land for the urban Community Farm is fixed at 2 ha and sweet corn is not included in the crops grown because land is so scarce. However, fresh huitlacoche can be sold for 30–40 times the value of sweet corn, justifying use of scarce land. Because demand for huitlacoche was found to be inelastic and the fresh crop is very perishable, the best strategy for the Community Farm is to sell fresh huitlacoche at the farm stand and farmers' markets and to sell frozen huitlacoche wholesale. Freezing allows larger volumes to be sold in a single delivery, bringing back the potential of profitable sales to high-end restaurants, the original goal of community organization.

In the end, university researchers working with an urban farm rediscovered what was known 500 years ago; that the real wealth of the Aztecs was always agriculture. For gold can be spent or stolen, while agriculture can make gold.

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