



2012

# The Edible Woody Plants of Morris Arboretum

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An independent study project report by The Hay Honey Farm Endowed Natural Lands Intern (2011-2012)

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# The Edible Woody Plants of Morris Arboretum

## **Abstract**

Discussions about food systems and food sources are symptomatic of a larger shift of focus for the U.S. population. The Morris Arboretum has an opportunity to capitalize upon this burgeoning field of interest by highlighting our holdings that are edible. This project aimed to select and highlight twenty edible plants through the creation of a printable walking guide to the edible woody plants of Morris Arboretum.

In addition to an analysis of the Arboretum's current edible holdings, this project researched, identified, placed orders for, and designed planting for selected plants that the Arboretum lacks, but that are of interest and value to it. Research was conducted through on-site visits to peer gardens and arboreta, and consultations with fruit and nut specialists in the region.

Utilizing the energy behind the local food movement, this project simply seeks to help more arboretum visitors establish an understanding of our universal dependence on plants.

## **Disciplines**

Horticulture

## **Comments**

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**Author:** Lauren Pongan  
*The Hay Honey Farm Endowed Natural Lands Intern*

**Date:** April 2012

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## INTRODUCTION

Discussions about food systems and food sources have become a focus of popular culture in the United States. The nomenclature of food systems such as food miles, CSAs, fair trade, biodynamic and organic are now commonplace in the media and increasingly so in conversations. Programs in agroecology, ethnobotany, food-studies culture, and food systems have crept up at institutions of higher education nationwide. Though it is difficult to quantitatively describe this movement, the appearance of news articles covering foods, farmers, and gardens; the increase in urban farming and gardening; the increasingly diverse offerings of permaculture and homesteading classes; as well as the successes and pervasiveness of Whole Foods Markets and Trader Joes across the country are symptomatic of a larger consumer awakening surrounding food. People are becoming increasingly curious about the methods used in food production, but also about the plants that produce their food.

This burgeoning interest in edible plants offers the Morris Arboretum of the University of Pennsylvania an opportunity to engage a new set of visitors or potential visitors. One of the most concrete ways to connect visitors with plants is by educating them about the plants that we rely on as food sources. Instead of focusing on vegetable gardening and agricultural production, the scope of this project will encompass perennial plants including woody plants such as fruit and nut trees, nut shrubs, berry bushes, and fruiting vines. Selected plants should expose homeowners to new ideas and concepts surrounding gardening and agriculture in their own homes. A goal is for these visitors to leave the Arboretum with a new curiosity about or a continued interest in what types of perennial, edible plantings would make sense in their own gardens.

Additionally, the Morris Arboretum, both on its public garden side and on Bloomfield Farm, has traditionally been a place in which edible plants were cultivated for food. Bloomfield Farm was initially utilized for agricultural production, though such pursuits had long since been abandoned when the property was incorporated into the Morris Arboretum's holdings.

On the public garden side, historically, the Morrises had an elaborate fruit and vegetable garden. Currants, Raspberries, and vegetables were grown in and around the present day rose garden, green house, and hoop houses. Though it's unknown whether the intention in edible plantings was self-reliance and subsistence, or novelty, the intentional reintroduction of edibles to the living collection is in keeping with the arboretum's dedication to its history.

### *Personal Interest*

My personal interest in this project comes from my agricultural background. I have spent several growing seasons working on farms in Pennsylvania and Maine. Agriculture was the vehicle through which I initially learned about plants; farming engendered my enthusiasm and interest in horticulture, and my experience with it was inspiration to apply for the natural lands internship. With the exception of experience with apple trees, pear trees, and raspberries, my knowledge was primarily rooted in vegetables and annuals.

This project offered me an opportunity to expand my familiarity to encompass perennial edibles that are hardy in the Philadelphia area. While initially I was only interested in native

edibles, I realized that the collection here at Morris Arboretum is conducive to the study of woody edibles from all over the world, notably Asian varieties. Though this project benefits me by allowing me to study something I am passionate about, I believe it will also benefit the arboretum by enabling us to engage a more diverse range of visitors.

## RESEARCH AND CONSULTING

The most narrowed aim of this project is to connect Arboretum visitors with edible plants and to pique their curiosity about growing food. This specific goal fits into the broadest aim of this project, which is to help Arboretum visitors to establish personal connections with plants. To begin to formulate the most effective method of establishing this connection, an examination of methods used by peer gardens and arboreta to the same effect was necessary. This examination included meetings and tours of peer public gardens with similar goals, as well as research about specific hardy edibles.

In addition to interviewing local specialists in fruits, nuts, and berries to help identify plants that fall under the scope of my project, I made site visits to relevant institutions, met with knowledgeable area specialists, and attended the Morris Arboretum's Annual Landscape Design Symposium, which focused on *Conversations across Fields: Interdisciplinary Approaches to Ecological Landscape Design*. Two relevant presentations at the symposium were "A Laissez-faire Approach to the Edible Residential Landscape" and "Farmscape Ecology: Agriculture Joins Restoration."

Visits to peer public gardens included the Brooklyn Botanic Garden (BBG) and Bartram's Garden in Philadelphia. BBG primarily used traditional vegetable gardens and children's gardens as demonstration gardens for visitors. In the children's garden specifically, hands-on educational programming was their preferred method for making connections with visitors. Unfortunately I did not see this model as applicable at the Morris Arboretum, because vegetable gardening of annuals did not fall under the scope of this project. It did, however, give me insight into potential future class offerings and interpretive signage.

Bartram's Garden, however, recently installed an orchard as part of a larger food justice project. In addition to their community gardens and a recently installed small farm on the property, the installation of an orchard was both a historically enriching horticultural component of their property and a practical food access programming tool. There were several parallels between Bartram's Garden's interests and those of the Morris Arboretum. These included the commitment not only to horticulture, but also to preserving and engaging the historical aspects of the property. For Bartram's Garden this manifested itself in the reintroduction of an orchard, as there had been one (though at a different location) on the property historically.

A visit to longtime Arboretum member and horticulture volunteer Oliver William's house was my first experience seeing fruiting pawpaws, as the Arboretum's specimen of *Asimina triloba* was stripped of its fruit by Arboretum visitors before I could see it last fall. A later foraging expedition with Sam Councilman, longtime forager and Lancaster County native,

allowed me to see pawpaws growing in their native habitat as understory trees in groves, often near riverbanks. It was helpful to see this not only to determine what might make a cultivar ideal, but also to understand the best places to plant additional pawpaws. I also learned that outcrossing is needed to bear fruit, and since the Arboretum had, at the time, only one specimen, fruiting was highly unlikely.

My visit to Rutgers yielded information from a hazelnut specialist, Dr. Tom Molnar. “We work with mostly with [*Corylus*] *avellana* (European hazelnut) but also its hybrids with *C. americana* and some *C. colurna*,” wrote Dr. Molnar in an email. His work primarily consists of isolating *Corylus avellana* individuals, procured via collection in Eastern Europe, that exhibit resistance to Eastern Filbert Blight, a fungus that has decimated *Corylus americana*, or American Hazelnuts, in North America. By isolating individuals with resistance, Dr. Molnar will be able to reestablish a population of hazelnuts in United States, making way for selections for commercial production and sale. His work demonstrates the importance of researching edible plant selection to know about potential (or, in the case of *Corylus Americana*, probable) disease or insect-related susceptibility. An example he used was that *Corylus avellana* L. ‘*Contorta*’, a cultivar of European hazelnut with attractive, contorted branching and a short growing habit, is often sold commercially in the United States, in spite of its susceptibility to Eastern Filbert Blight. In most cases these ornamental cultivars will succumb to blight within the first five years of their planting. At any given time, Dr. Molnar has 30,000 trial trees in the ground.

Although not on-site at an orchard, my meeting with Phil Forsyth of Philadelphia Orchard Project (POP) and Forsyth Gardens was the most informative, as his experience relates directly to my stated goals. Through POP and Forsyth Gardens, Forsyth has created a list of edible plants that are hardy in Philadelphia. His projects include orchard installations in Philadelphia through community partnerships and residential gardening. I used this list as a starting point for identifying potential plants. The list was broken down into the categories of trees, shrubs, vines, and groundcovers. Symbols after each plant name likewise designated the ability to be grown in containers; ability to be espaliered; requirement of an additional plant or variety for out-crossing; ability to produce fruit in the shade; and requirement of shelter from cold weather if they are tender plants.

Forsyth was able to answer general questions about permaculture planting design principles and to make specific suggestions with regard to edible plant cultivars. He made some suggestions that aren’t appropriate for the Arboretum, but that encapsulate some essential principles of permaculture that are useful to bear in mind as I designed my project, such as a spiral herb garden, rain barrels with irrigation, water gardens with edible plants, and vermicompost demonstrations. These ideas may become more useful if, in the future, the Arboretum opts to install a vegetable garden or a demonstration garden for home gardeners.

## SELECTION CRITERION AND PROCESS

### *Narrowing the Catalogue*

I began with an assessment of the woody edibles currently held by the collection. I manually analyzed the entire plant catalogue in order to narrow the database to include only

edible plants. I accomplished this by crosschecking our plants by genus (and then later species) with a variety of online sources to determine edibility, practicality and palatability of the plants in the collection.

A lack of edibility was the first cause for deletion from the catalogue. Second to edibility, I considered practicality of fruit collecting and palatability. For example, some plants provided sustenance, but were unpalatable, such as the bark layer of fir trees. Likewise, some fruits were both edible and palatable, but were unpractical to include. An example of this case was *Cephalotaxus fortune*, or the Chinese plum yew, which produces small fruits with poisonous seeds. While the fruit flesh itself was edible, it would not be practical to highlight this as a fruit producing plant since its collection is tedious and the danger of accidentally ingesting a poisonous seed.

After narrowing the catalogue from 7902 individual plants to 1292 individuals that fall under the category of edible (some of these listings are likely neither palatable nor practical to obtain) I began to further narrow the selections by identifying certain key plants. After discussions with Tony Aiello, Arboretum curator, we determined that I would be able to highlight approximately 20 plants on a self-guided map. From our Living Collections sessions and from prior study, investigation and exposure, I knew that there were certain plants I wanted to include on the tour before examining the catalogue. Examples of these selections included *Diospyros virginiana* (American persimmons), *Asimina triloba* (pawpaw), *Acer saccharum* (sugar maple) and something from the *Amelanchier* genus (serviceberry).

My meeting with Phil Forsyth proved to be highly informative with regard to selection. The majority of plants are being ordered from One Green World Nursery, in Portland, Oregon, at Forsyth's suggestion. Their nursery offers a wide variety of cultivars for edible plants, which is of special interest to the arboretum. As the plants I selected are intended as demonstration plants, rather than fruit-production plants, they will preferably be both ornamental and edible.

SELECTIONS

*Ordered Selections*

**Table A:**

Spring 2012-- Project Order					
Lauren Pongan x180					
<b>Plant</b>	<b>Unit Cost</b>	<b>#</b>	<b>Total</b>	<b>Nursery</b>	<b>Destination</b>
<i>Pyrus communis</i> 'Lady Petre'		1	25.00	POP	greenhouse
<i>Passiflora incarnata</i>	16.95	3	50.85	One Green World	Plaza in Iana's section
<i>Lonicera caerulea</i> 'Blue Sea'	21.95	1	21.95	One Green World	Widener



<i>Lonicera caerulea</i> 'Blue Bird'	19.95	1	19.95	One Green World	Widener
<i>Lonicera caerulea</i> 'Blue Forest'	19.95	1	19.95	One Green World	Widener
<i>Ziziphus jujuba</i> 'Black Sea'	32.95	1	32.95	One Green World	Crab Apple Slope
<i>Ziziphus jujuba</i> 'Lang'	32.95	1	32.95	One Green World	Crab Apple Slope
<i>Ribes uva-crispa</i> 'Friend'	9.95	1	9.95	One Green World	green house bed next to stone wall
<i>Ribes uva-crispa</i> 'Red George'	9.95	1	9.95	One Green World	green house bed next to stone wall
<i>Ribes uva-crispa</i> 'Jewel'	9.95	1	9.95	One Green World	green house bed next to stone wall
<i>Ribes rubrum</i> 'Gloire des Sablons'	9.95	2	19.90	One Green World	green house bed next to stone wall
<i>Asimina triloba</i> 'Potomac'	27.95	1	27.95	One Green World	Sculpture Garden
<i>Asimina triloba</i> 'Pennsylvania Golden'	24.95	1	24.95	One Green World	Sculpture Garden
<i>Rubus</i>		2		Bartram's Garden	
Subtotal			306.25		
Shipping	15 % of total		45.94		
Grand Total			352.19		

It was necessary to order six species of plant that I selected for this project that are new introductions to the Arboretum. Table A depicts the adapted order list that I generated for this project. Cultivars were selected to provide a variety of ornamental aesthetics; synchronized flowering time for cross pollination; taste and/or texture variability; and variety of growth habits. The common names for the above selections are, in order, Lady Petre pear, maypops, blue honeysuckle or honeyberry, Chinese jujube, gooseberries, currants, and pawpaws. Elinor Goff, Plant Recorder, will assist in the accessioning process.

As previously stated, the currants (included in the above chart) as well as raspberries (to be obtained from Bartram's Garden) are selections that prove historically relevant to the Morris Arboretum. Similarly the Lady Petre pear is likewise steeped in history. According to the verbal accounts of Todd Greenberg, Bartam's Garden's head gardener, John Bartram received seed from this butter pear tree from Lord Petre in England. He successfully germinated and planted this seed and one surviving tree was still growing on the property until fairly recently.

After this tree died, a Germantown resident contacted Bartam's Garden to inform them that she had a pear tree on her property that was propagated from cutting from the Lady Petre

pear that had grown on Bartram's property. In 2004 Phil Forsyth of POP assisted in creating four grafts from this tree, to be reintroduced to Bartram's at a later date. Graciously, Forsyth has allowed Morris Arboretum to purchase the fourth, though admittedly weakest, graft of the batch. The Arboretum will benefit from holding this historically rare plant that is relevant to both the Philadelphia area and the history of horticulture in the city. Likewise, we are obtaining a red raspberry that was cultivated by William Bartram from Bartram's Garden.

***Final Selections List:***

**Table B:**

<b>Plant</b>	<b>Latin</b>
sugar maple	<i>Acer saccharum</i> 'Bonfire'
Lady Petre pear	<i>Pyrus communis</i>
serviceberry	<i>Amelanchier</i>
pecan	<i>Carya illinoensis</i>
black walnut	<i>Juglans nigra</i>
sweet birch	<i>Betula lenta</i>
maypops	<i>Passiflora incarnata</i>
elderberries	<i>Sambucus nigra</i>
blue honeysuckle	<i>Lonicera caerulea</i>
Chinese jujube	<i>Ziziphus jujuba</i>
pawpaws	<i>Asimina triloba</i>
hazelnuts	<i>Corylus fargesii</i>
persimmons	<i>Diospyros virginiana</i>
pine nuts	<i>Pinus cembra</i> ('Columnaris' or Armandii)
Szechuan pepper	<i>Zanthoxylum simulans</i>
raspberries	<i>Rubus</i> 'odorata'
gooseberries	<i>Ribes grossularia</i>
dead man's fingers tree	<i>Decaisnea fargesii</i>
cornelian cherry	<i>Cornus mas</i> 'Golden Glory'
red currants	<i>Ribes rubrum</i>

***Interpretive Signage***

Ten to twelve of these selections will be accompanied by interpretive signage that will provide visitors with more information about this edible plant. The content of these signs will be both horticultural as well as ethnobotanical, and will include a simple line drawing of the branching pattern, leaves, and fruit if possible. Examples of things that might be relevant to include on these signs are nativity, hardiness, edible parts, products made from the plant, history, and interesting facts. See Figure 1 to view an example of interpretive signage for *Asimina triloba*.

***Downloadable Walking Guide***

Using the printable maps available on the Morris Arboretum's website as a guide, I have developed a format for a self-guided walking map. Of the maps currently available the *Great Trees Tour* most closely resembles the use and layout of the edible plants map I will create.

Aspects of this map that make it a useful model, which includes a map designating the rough location of each highlighted plant; room for a small graphic of the fruit or edible portion of each tree plant; bulleted points that include facts about each plant; and room for a brief introduction to the topic of edible hardy plants. In the introduction I will also include a specific note that the tour is designed to demonstrate specimen plants, and that people should refrain from sampling the plants, and should instead consider how they might be able to integrate these or similar plantings onto their own property. I hope to create a press release and to write an article in *Volunteer* about this new online interface to publicize the plantings and to drive more online traffic to the Morris Arboretum website.

## CONCLUSIONS

### *Obstacles*

There were several unanticipated obstacles that arose during the completion of this project, all primarily pertaining to plant selection for the map. One obstacle included the unexpected unsuitability of certain edibles for an arboretum setting. For example, red mulberries, or *Morus rubra*, seed in far too easily to be planted in the public garden section of the Arboretum. Likewise, *Actinidia arguta*, or hardy kiwi, though already accessioned in two places in the Arboretum, grows far too vigorously to be trained. Section leaders instead cut hardy kiwi back throughout the summer to keep it under control, therefore making it nearly impossible for the vine to bear fruit.

Other factors that needed to be taken into account were plant locations and plant health. Some of my intended selections were already accessioned by the Arboretum, but they were planted in areas that would be difficult for visitors to find, such as in copses or in remote corners of the arboretum that were far from the path. Sometimes, the individual plants that I selected via Plant Locator were weak, or poorly producing specimens upon examination. Additionally, some plants that I had hoped to order and plant singly required or produced more fruit when other species or cultivars were available for outcrossing. Finally, I also learned that many of the plantings that will be made this year will not produce fruit for at least two years after they have become established. Hopefully these plantings become increasingly valuable for the Arboretum both as specimens and as a foundation for potential educational experiences including a woody edibles class and a fruit tree pruning class.

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#### ACKNOWLEDGEMENTS

##### *Sites Visited*

Brooklyn Botanic Garden; Brooklyn, NY  
Bartram's Garden; Philadelphia, PA  
Philadelphia Orchard Project/Forsyth Gardens; Philadelphia, PA  
PA Nut Growers Association; Harrisburg, PA  
Rutgers University; New Brunswick, NJ  
Tucquan Glen Nature Preserve; Lancaster, PA  
Private Residence of Oliver Williams; Mount Airy, PA

##### *Knowledgeable People:*

Aiello, Tony; Director of Horticulture  
Clarke, Louise; Natural Areas Section Leader  
Greenberg, Todd; Head Gardener, Bartram's Garden  
Forsyth, Phil; Founder and Orchard Director, Philadelphia Orchard Project and Forsyth Gardens  
Molnar, Ph.D., Tom; Assistant Professor, Rutgers Department of Plant Biology and Pathology  
Sam Councilman; Forager, Lancaster County  
Oliver Williams; Horticulture Volunteer, Morris Arboretum

Figure 1



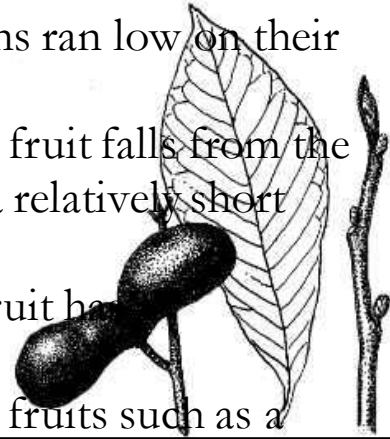
## **Pawpaw Tree**

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### ***Asimina triloba***

Native to the United States, pawpaws are a little-known but nutritious fruit. Thomas Jefferson planted them at Monticello and in written accounts Clark and Lewis subsisted on pawpaws and nuts when other provisions ran low on their journey.

Pawpaws flower in the spring and the fruit falls from the tree in early fall upon ripening. They have a relatively short shelf life compared to other commercially grown fruits. This pawpaw fruit has a custardlike texture, and its flavor is often compared to tropical fruits such as a



mixture of banana, mango, and pineapple. Plant breeding has led to cultivars producing larger fruits with fewer seeds.

Pawpaws prefer filtered sunlight, as they are an understory tree. To bear fruit, pawpaws need to outcross with other pawpaws.

In nature, they often appear in groves and/or along riverbanks.

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