

Pawpaw: A Favorite Native Edible Plant

by Eric Toensmeier¹

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Pawpaw (*Asimina triloba*) is almost our largest native edible fruit. While the related pond apple (*Annona glabra*) is larger, it tastes terrible. Pawpaw fruit is creamy, sweet, and rich—it tastes great!

It is surprising that pawpaw is not more commonly grown. It has virtually no pest problems and, in fact, many related plants are used to make pesticides in the tropics. Pawpaw forms colonies which can live for thousands of years, though individual trees do not live that long.

Pawpaw was the most popular plant in the Apios Institute wiki. It was listed in 20 sites (including in Colorado, Massachusetts, Maryland, Michigan, New York, Pennsylvania, Texas, Vermont, Virginia, and Ontario), and it was included in 13 polycultures.



Photo by Jonathan Bates³

Black Locust and Pawpaw: A Natural Association

At a workshop at the Ecosystem Farm of the Accokeek Foundation (www.accokeek.org) in coastal Maryland, I was struck by the abundance of pawpaw in the understory. They are plentiful in the area because the massive overpopulation of deer has eaten virtually everything else in the understory (except holly, shiso, and garlic mustard).



One naturally occurring polyculture I observed in at least three places was pawpaw under black locust (*Robinia pseudoacacia*), which were growing fairly close together (photo on the left). Both species are native to the area and this may be a wild association of long standing. Black locust forms a nitrogen-fixing overstory, much like the high-pruned alder overstory in Martin Crawford's garden or like leguminous ice cream bean trees over coffee in Latin America.

The pawpaws should have more fruit and better growth due to the nitrogen from the locusts (though I did not have the opportunity to observe fruit yields under black locust as compared to other overstory species). Annual leaf fall from locust releases plenty of nitrogen. However, in a managed system, locust could be chopped and dropped; locust could

also be culled for rot-resistant poles from time to time.

While black locust's shade is fairly light—which is desirable for a productive understory—its running and suckering habit can make it challenging in a design, since it keeps moving and will eventually bury clumping, part-shade-loving plants in deep shade. But pawpaw, being shade tolerant, also suckers and can move with black locust as it goes!

I also observed pawpaw growing under mature mulberries (*Morus spp.*; photo on the right).

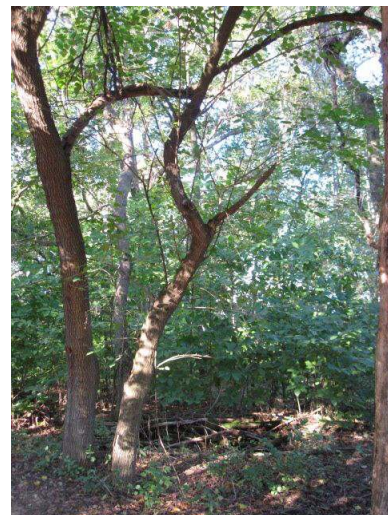
On another site, I have observed blackberry (several *Rubus* species) as an additional associate (though I did not get to see fruit yields there either). Grasses and goldenrods (*Solidago spp.*) were also common. In all of my observations, the black locusts were quite mature and it appeared that the pawpaws did not arrive until the locusts were established and casting some shade.

It strikes me that some improvements could be made to this natural polyculture. Arctic kiwifruit (*Actinidia kolomikta*) is relatively low growing and somewhat shade tolerant and could be trellised on the locusts. I believe that its fruits are similar to hardy kiwifruit, in that they can drop from a decent height when ripe and still be of good quality (unlike fuzzy kiwi). Red or white currants (*Ribes rubrum*), being very shade tolerant, could be planted below the pawpaws. Perhaps a ground cover *Rubus* like Nepalese

raspberry (*Rubus nepalensis*) or trailing dewberry (*Rubus hispidus*) could mimic blackberry but not impede access to the other plants. This might be interspersed with ramps (*Allium tricoccum*) or other useful spring ephemerals.

This could be an interesting polyculture for disturbed urban areas where black locust is often already established; I have found that pawpaws grow very well in urban soils.

I will probably have difficulty ever seeing black locust groves again without thinking pawpaws should be there.



Hand Pollination

While bugs do some of the pollination work, the pawpaws will set a lot more fruit with some help from humans. This tree (photo above) received three 15-minute pollination sessions in the spring and a bit of water. The abundance of fruit made this minimal work very worthwhile.

LincolnSmith⁴, one of the wiki contributors, explains that pawpaws are not self-fertile and that pollen must come from a different variety of pawpaw. Smith grows three Neil Peterson-selected cultivars (Shenandoah,



Rappahannock, and Susquehanna) and describes their process for hand pollination:

I use a small paintbrush and bowl for hand pollinating pawpaws. I never notice the smell of pawpaw flowers except when I'm hand pollinating, when it does get a little stinky! Pawpaws smell like carrion in order to attract pollinating flies, but they don't attract many, which is why people hand pollinate.

As pawpaw flowers mature, they [first have female reproductive parts followed by male parts]. The female flower is shown [on the previous page]. Note the sticky green-yellow stigma in the middle, where pollen is placed.



A male pawpaw flower is shown [on the right]. Note the ball of brown, dusty pollen.



Some people pick a male flower, pull off the leaves and touch it to female flowers to transfer pollen. I find it easier to use a brush and bowl because I can pollinate more female flowers at once. I use the back of the paintbrush to knock pollen from several male flowers into the bowl. It doesn't take long to collect enough pollen for many female flowers. ... [I] gently brush ... pollen onto a female flower. It only takes a little pollen. ...

Success! Four weeks after pollination, tiny fruits are starting to form [photo on the left]. September is going to be luscious!

Previous three photos by LincolnSmith⁴

A Pollination Polyculture

At Paradise Lot, we hand pollinated and wanted to add more carrion pollinated flowers to attract more carrion insects and increase pawpaw fruit set on the higher branches that we could not reach (some were 18 feet tall). Pawpaw is boring to bees, so it relies on flies and beetles to do its pollinating.

Carrion flower (*Smilax herbacea*) was near the pawpaw, though we planned to transplant wild ginger (*Asarum canadense*) and red trillium (*Trillium erectum*) from elsewhere in garden.

Stinkhorn fungi, which also certainly attract bugs that like stinky smells, appeared there on their own one year, but they did not return.

Other potential species for this polyculture include: Dutchman's pipe (*Aristolochia macrophylla*), konjac (*Amorphophallus konjak*), skunk cabbage (*Symplocarpus foetidus*), and jack-in-the-pulpit (*Arisaema triphyllum*).

The trick with this polyculture is that the plants would have to flower around the same time as pawpaw or slightly before. Perhaps if there were carrion-pollinated flowers for a month before pawpaw time and all the way up through fruit set, it would increase the population of these underappreciated pollinators. In any case, having stinky flowers still beats hanging roadkill or buckets of fish!

Spring Ephemerals with Hog Peanut Polyculture

Spring ephemerals come up early but fade away and do not make a good full-season ground cover. Ramps (*Allium tricoccum*) are a wonderful shade-loving onion crop native to eastern North American forests. Toothwort (*Dentaria diphylla*), an Eastern North American native in the brassica family with horseradish-flavored, edible rhizomes, likes shade and forms large colonies. Hog peanut (*Amphicarpaea bracteata*) is a great shade-tolerant, nitrogen-fixing native, but it does not come up until later in the season. By planting these together, we try to provide ongoing ground cover and a succession of crops.



By September of its first year, the ramps had flowered and set seed after the leaves had died back. The toothwort was already dormant and the hog peanut had filled in nicely (photo above).



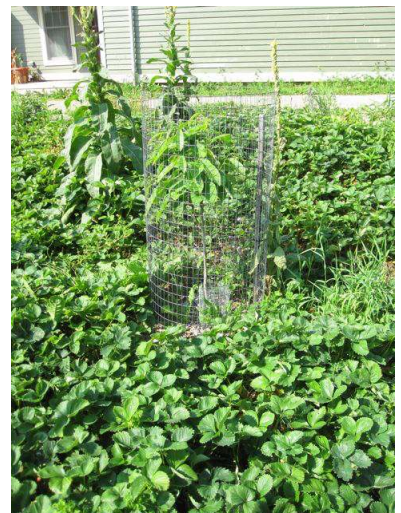
By spring of year two, bare soil patches and some weeds indicated that both species needed to be planted denser to work well (photo on the left). As the polyculture was quite successful, we expanded it to fill in under nearby pawpaw suckers.

Eight years later, it was still working well. The toothwort spread much more rapidly than the ramps, but it did not smother them. We liked this polyculture enough to spread it to cover more area under the pawpaws. I think this would be a great system for a commercial multistrata agroforestry system for cold temperate climates, perhaps under chestnuts or black walnuts.

When I last visited (12 years after we planted it), this polyculture was still doing well. However, the hog peanuts were declining, perhaps because of heavier shade.

Strawberry Ground Cover

Strawberries (*Fragaria* × *ananassa*) have a roughly three-year commercial life and offer a great short-term understory crop and ground cover while waiting for woody plants to establish. This could be any fruit tree, but it happens to be pawpaw in this case (photo on the right).



Other Novel Polycultures

One year after planting, this impressive understory, designed and installed by Aaron Guman at Green Light Plants, was thriving (photo below). The young pawpaws were surrounded by rings of wild indigo (*Baptisia australis*), lemon balm (*Melissa officinalis*), "Hidecote Blue" comfrey (*Symphytum grandiflorum* 'Hidcote Blue'), Turkish rocket (*Bunias orientalis*), and green and gold (*Chrysogonum virginianum*). In between these areas, raspberries (*Rubus idaeus*) were planted. Every species was

growing densely with very little room for weeds. (I don't think any of my polycultures had ever filled in that nicely so soon after planting.)



During this early succession phase, Dale from Green Light Plants also grew garlic in this bed with great success.

Uphill from the above polyculture, there was a nice stand of 10-foot-high pawpaws planted on contour. The grafted trees were "standards" with good light underneath, while the seedling trees were multistemmed with much denser shade below.

During an edible forest garden workshop, we planted an understory (photo below). Fortunately for us, Dale had a great nursery and almost all the plants we put in were native.

For full shade (under the seedling pawpaws): ramps (*Allium tricoccum*), toothwort (*Dentaria diphylla*), hog peanut (*Amphicarpaea bracteata*), Virginia waterleaf (*Hydrophyllum virginianum*), and wild ginger (*Asarum canadense*).

For part shade (under the grafted pawpaws): giant Solomon's seal (*Polygonatum biflorum* var. *commutatum*) and "Hidecote Blue" comfrey (*Symphytum grandiflorum* 'Hidcote Blue').

For sunny edges (which some day will be shaded out as the downhill pawpaws grow uphill): green and gold (*Chrysogonum virginianum*) and Chinese artichoke (*Stachys affinis*).



Given the natural and novel polyculture possibilities, the ease of maintenance, and the incredible fruit, pawpaw is an Apios Institute favorite. We hope this inspires you try planting and eating pawpaws. We think you'll love it too.

NOTES

1. The main author of this article is Eric Toensmeier, with additions and edits by Bonita Eloise Ford. The photos for which credits are not indicated are by Eric Toensmeier. This article was made possible by the Apios Institute.

2. The main text and the photos in this article were originally posted on the Apios Institute wiki and licensed under a Creative Commons Attribution-ShareAlike 3.0 United States License (<https://creativecommons.org/licenses/by-sa/3.0/us/>). 

3. Jonathan Bates. “Asimina triloba.” Apios Institute wiki.
<https://apiosinstitute.org/sites/default/files/files/species/781/seedlingvsgrafted.jpg>

4. LincolnSmith. “Pawpaw Hand Pollination.” Apios Institute wiki.
<https://apiosinstitute.org/comment/772#comment-772>