Pawpaw Production

Dick Glaser
Ron Powell
Asimina triloba
Pawpaw

Alabama
Arkansas
Delaware
Florida
Georgia
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maryland
Michigan
Mississippi
Missouri
Nebraska
New Jersey
New York
North Carolina
Ohio
Oklahoma
Pennsylvania
South Carolina
Tennessee
Texas
Virginia
West Virginia
Wisconsin
What is Pawpaw?

- *Asimina triloba*

  Typically small trees – 20 to 30 feet

  Forest under story near a river flood plain
Asimina triloba
Pawpaw

What is Pawpaw?

- Largest native tree fruit in the southeastern U.S.
• “Ohio’s forgotten fruit”
Asimina triloba
Pawpaw

What is Pawpaw?

- Fruit can weigh up to 2 lbs.
North America’s largest edible fruit
Flowers open in April & May
Hang upside down
Resemble a bell
May be up to 2 inches across
Dark maroon-colored petals
Three petals – “triloba”
Self-incompatible
Require cross pollination
Need 2 unrelated trees to set fruit
Flowering Time

- flower buds occur singly on the previous year's wood
- Pawpaws cross pollinate, several seedlings or cultivars are needed
- Pawpaw flowers are pollinated by flies, beetles, and possibly other insects
Asimina triloba
Pawpaw

• Harvest

  ❖ Ripe fruit should yield when squeezed and give way with a gentle tug (see OPGA handout on ripening)

  ❖ Color change not a reliable indicator of ripeness

  ❖ Fruit may be harvested from the same tree over several weeks
The Pawpaw Fruit:

- Tropical-like flavor and aroma resembles mixture of banana, mango, melon, and pineapple.
- Custard-like fruits are berries
- The fruit is very nutritious and high in antioxidant activity.
- Could be used in blended fruit drinks, ice creams, yogurt, etc.
Asimina triloba
Pawpaw

• Pawpaws in the Wild

  ❖ *A. triloba* is usually found in the forest understory in hardwood forests

  ❖ Clonal reproduction by root suckering

  ❖ You may not find many fruit (shade, self-incompatibility, lack of pollinators)
Where Are We in Terms of Developing a Pawpaw Industry?

Orchard (cultivars) vs. wild collected fruit
Where Are We in Terms of Developing a Pawpaw Industry?

Private orchards established AL, CA, KY, NC, MD, MI, MO, OH, and WV
Where Are We in Terms of Developing a Pawpaw Industry?
Where Are We in Terms of Developing a Pawpaw Industry?

Appalachian Pawpaw Growers Association
Establishing A Pawpaw Orchard

- **Site:**
  - Optimum yields are obtained in the open
  - Need some protection from the wind due to their large leaves
  - Seedlings will not survive in full sun and must be shaded for the first several years
  - Air drainage (frost)
  - Deep, fertile, well-drained soil, pH 5.5 - 7.0
  - Water source for irrigation

- **Spacing**
  - 15 – 18 feet between rows
  - 9 – 10 feet between pawpaw plants in the row

- Can be grown in USDA plant hardiness zones 5 - 8
“Pawpaw Planting Guide”

Kentucky State University
www.pawpaw.kysu.edu

Pawpaw Planting Guide
Kentucky State University Cooperative Extension Program

Pawpaw Research Project, Community Research Service, Atwood Research Facility, Frankfort, KY 40601-2355

by Stacie C. Jones¹, R. Neal Peterson², Terris Angelak Turner³, Kirk W. Pumper, Ph.D.⁴, and Desmond R. Layne, Ph.D.⁵

This bulletin was created to meet the increasing demand for information on cultivation of the native American pawpaw, *Asimina triloba*. Very little scientific research has been done on pawpaw. The advice given here is based partly on research and partly on the experiences of many pawpaw growers. These guidelines should help you to become a successful pawpaw grower.

Climate

The pawpaw is a tree of temperate humid growing zones, requiring warm to hot summers, mild to cold winters, and a minimum of 32 inches (81 cm) of rainfall spread rather evenly throughout the year, with the majority falling in spring and summer. It can be grown successfully in USDA plant hardiness zones 5 (-13°F/-26°C) through 8 (15°F/-9°C). Pawpaws grow wild over a wide range of latitude, from the Gulf Coastal plain to southern Michigan. However, the trees may not receive adequate chilling hours if planted too close to the Gulf Coast. Most named cultivars originated in the Midwest, which is the northern portion of the pawpaw’s range. A national regional variety trial is underway to determine which varieties perform best in different parts of the country, and results should become available in the next several years. In the meantime, for best results, choose cultivars that were selected in a climatic zone and latitude similar to the area where they will be planted.

Site, soils, and habitat

Although the pawpaw is capable of fruiting in the shade, optimum yields are obtained in open exposure, with some protection from wind (on account of the large leaves). Germinating seedlings, however, will not survive under those conditions because they are extremely sensitive to full sunlight, which can kill them. (Containerized seedlings may be grown without shade in a greenhouse.) Shading for the first year, and sometimes the second, is generally required outside, and it is for this reason that pawpaws are almost always found in nature as an understory tree. The soil should be slightly acid (pH 5.5-7), deep, fertile, and well-drained. Good drainage is essential to success. Pawpaws will not thrive in heavy soil or waterlogged soil. In habit it is a small tree, seldom taller than 25 feet. Grown in full sun, the pawpaw tree develops a narrowly pyramidal shape with dense, drooping foliage down to the ground level. In the shade it has a more open branching habit with few lower limbs and horizontally held leaves.

Seed Propagation

Pawpaw seed is slow to germinate, but it is not difficult to grow seedlings if certain procedures are followed. Do not allow the seed to freeze or dry out, because this can destroy the immature,
Establishing a Pawpaw Orchard

- Pawpaw will fruit in the shade, optimum yields are obtained in open exposure
- Shading recommended the first year
- Irrigation should be provided at least the first two years
What is a Cultivar?

**Cultivar** = refers to a named group of plants within a cultivated species that is distinguishable by a character or group of characters and that maintains its identity when propagated either asexually or sexually.
Pawpaw Propagation

- Historically, pawpaws have been a difficult tree species to propagate
- Seed requires stratification and is desiccation sensitive
  (see OPGA handout on Handling Pawpaw Seed)
- Commercial clonal propagation of cultivars is via chip budding onto seedling rootstock
- Many nurseries grow pawpaw seedlings in containers
- High prices for seedling and grafted trees are limiting the development of an industry
- Seedlings $5.00-$10.00
- Grafted trees $15.00-$26.00
Seedlings vs Cultivars

- Seedlings produce fruit in 5-8 years
- Grafted cultivars can produce fruit in 3 years; know fruit quality
- Takes about 5-6 years to reach full production
Seedlings vs Cultivars cont.

• Variation for fruit size – average is 8 oz
• Variation for flavor
• Variation for skin thickness
• Variation for skin color when ripening
• Variation for flesh color at ripeness
• Variation in number of seeds
• Variation in seed size
Fertilization of Pawpaw

- Granular (10-10-10)
  - First year – 1 oz nitrogen per tree (0.625 lbs or 10 oz of fertilizer)
  - Second year – 2 oz nitrogen per tree (1.25 lbs or 20 oz of fertilizer)
Seedlings or Wild Pawpaw Patches

- Seedlings and native pawpaw patches can be a valuable resource with a minimal amount of management.

- These tress may be hand pollinated
  - or

- Grafted in May with scion wood from selected trees
Commercial development?

Although the pawpaw is not yet commercially important native American fruit, others, such as the blueberry, cranberry and raspberry have come from the wild to occupy important niches in the commercial fruit market.
The economic rationale for the commercial development of pawpaw is tied to the need in certain areas of the country to identify new high-value crops to supplement or provide alternatives for old ones that are losing value.
The rich pool of pawpaw genetics in Ohio is still growing in forests, yards, riparian zones and pastures across Ohio, especially in the southern part of the state. There are several reasons why pawpaw cultivation makes so much sense for the Midwest, especially Ohio.
Pawpaws have excellent commercial potential in Ohio for these reasons:

• 1. The tree is well adapted to our region’s soils and climate

• 2. Nutritional and cosmetic value

• 3. Natural compounds produced
Future of pawpaws cont

4. Nursery wholesale and retail tree sales

5. Component in residential “edible” landscapes and butterfly gardens

6. Virtually no pests and the powerful chemicals deter browsing animals

7. Utilized for habitat restoration and biodiversification in parks, woodlots and forests

8. Potential for organic fruit production
In 2007, we are finally seeing the first faint glimmers of a pawpaw industry. Many factors have contributed to make this possible:
History of the pawpaw

Fossil records:

New Jersey
15 million years

Mississippi
45 to 55 million years
Superior fruit

- Antioxidant-rich
- Anti-tumor
- Anti-aging
- Pesticidal properties
- Superbly nutritious
  - Proteins
  - Amino acids
  - Fat
  - Calcium
  - Iron
  - Zinc
- Cosmetics, skin products and perfumes
Fruit is versatile

- Fat substitute
- Substitute for bananas in recipes
- Cooking
  - Pies
  - Cookies
  - Cakes
  - Puddings
  - Marmalade
  - Bread
  - Beer
  - Wine
  - Desserts
  - Sauces
  - Muffins
  - Danishes
Other uses of pawpaws

- Farmer’s markets
- Biomass
- Organic farmers
- Regional food
- Frozen pulp
- Specialty fruit crop
- Butterfly gardens
- Backyard fruit
- Orchards
- Specimen plants in landscape
- Wine
Organic farmers

No serious insects

No serious diseases
Future of pawpaws cont.

Neal Peterson
Pawpaw varieties to grow
based on the Regional Variety Trials

Based on fruit size and quality the pawpaw cultivars:

- Potomac
- Susquehanna
- Wabash
- Overleese
- Shenandoah
- NC-1
- Sunflower
Ohio Pawpaw Growers Association

- OPGA
- % Ron & Terry Powell
- 6549 Amelia Dr.
- Cincinnati, Ohio 45241
  - (513) 777-8367
  - Botrytis@fuse.net
  - www.Ohiopawpaw.com