

A Summary of Pawpaw Regional Variety Trials

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A Summary of Pawpaw Regional Variety Trials

- Potential for Pawpaw in Kentucky
- Production Information
- Summary of Variety Trials
- Cultivar Recommendations

Introduction:

What is Pawpaw?

- *Asimina triloba* (L.) Dunal.
- Native tree fruit in the southeastern U.S.
- Fruit can weigh up to 2 lbs.



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)

The Pawpaw Fruit

- Tropical-like flavor and aroma resembles mixture of banana, mango, 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.



Zimmerman

Pawpaw Market Potential

Farmers Markets

- Fruit: \$1 each
- \$2 to \$3/pound

Gourmet Market

- Frozen pulp
- Ice cream

Restaurants



Pawpaw Production

- “Pawpaw Planting Guide”

- Site

- air drainage (frost)
- deep, fertile, well-drained soil, pH 5.5-7.0
- water source for irrigation



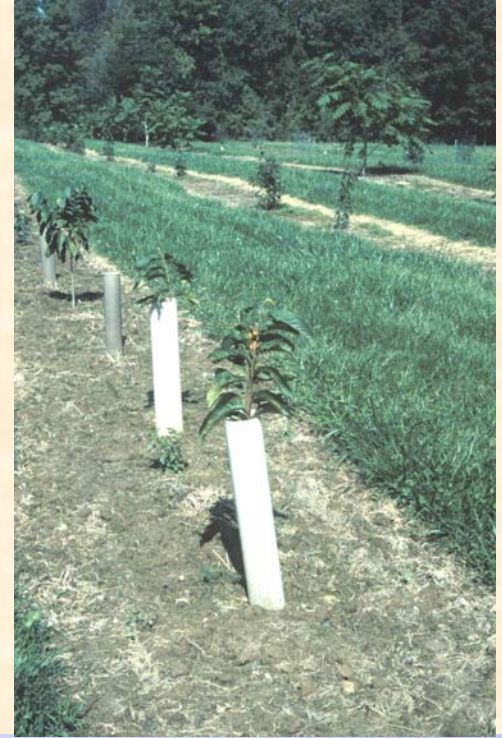
Seedlings and Cultivars

- 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
- Pricing
 - Seedlings \$5.00-\$10.00
 - Grafted trees \$15.00-\$30.00



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



Pawpaw Pruning



Field Planting Pawpaw



- 8' between trees, 18' between rows
- 295 trees/ac
- Tree seldom grow taller than 25 feet

Flowering and Harvest Time

- Flowers can be found on the same tree from early April until May in Kentucky
- Ripe fruit should yield when squeezed and give way with a gentle tug
- Color change not a reliable indicator of ripeness
- Fruit may be harvest from the same tree over several weeks



Pawpaw Pests

- Organic production possible?
- Some Past Problems
 - Japanese beetles
 - Leaf rollers
 - Zebra swallowtail butterfly-not necessarily a pest
 - *Talponia plummeriana* - pawpaw peduncle borer



Pawpaw Regional Variety Trials (RVT)

Pawpaw Regional Variety Trial

Cooperators and Cooperating Institutions

- Conceived by R. Neal Peterson (PawPaw Foundation) and Desmond Layne (then KSU)
- 12 Locations across the United States
- Contains 10 cultivars and 18 selections from R. Neal Peterson and PPF.



<u>State</u>	<u>Cooperator</u>	<u>Institution</u>	<u>Location</u>
Indiana	Bruce Bordelon	Purdue University	West Lafayette
Iowa	Patrick O'Malley and Tom Wahl	Iowa State University	Crawfordsville, Iowa
Kentucky	Kirk Pomper	Kentucky State Univ.	Frankfort, Ky.
Kentucky	Joseph Masabni	Univ. of Kentucky	Princeton, Ky.
Louisiana	Charlie Johnson	Louisiana State Univ.	Baton Rouge, La.
Michigan	Dennis Fulbright	Michigan State Univ.	Jackson, Mich.
Nebraska	Stan Matzke/Bill Gustafson	Univ. of Nebraska	Lincoln, Nebr.
New York	Ian Merwin	Cornell University	Ithaca, N.Y.
North Carolina	Mike Parker	N.C. State University	Raleigh, N.C.
Ohio	Brad Bergefurd	Ohio State University	Piketon, Ohio
Oregon	Kim Hummer	USDA-NCGR	Corvallis, Ore.
South Carolina	Greg Reighard	Clemson University	Clemson, S.C.

Some Desirable Pawpaw Tree characteristics

- Small tree size, easier harvest
- Precocious bearing, 4 years or less
- Vigorous growth with low to medium inputs
- Open branching with strong crotch angles
- High flower density
- High fruit set under natural pollination
- Consistently high fruit yields
- Cold hardiness and drought tolerance

Some Desirable Pawpaw Fruit Characteristics

FRUITFULNESS

over 40 fruit per tree

FLAVOR

sweet, firm texture, delicate blend of flavors, rich but not cloying, no bitter aftertaste

FLESHINESS

visually: mostly flesh. by weight: less than 5% of the fruit is seed

FRUIT SIZE

over 10 ounces

SEEDS

over 45 seeds per oz., av. seeds as small as 3/4" (2 cm) long

APPEARANCE

bright clear colors, no brown mottling (ripe); even, symmetrical

PECULIARITIES

SKIN: waxy/ fuzzy/ thick and hard/ yellow/ bluish.

FLESH (ripe): white/ pink/ red.

SEEDS: in a single row.

RIPENING TIME: early / late

KEEPING ABILITY: 2+ in refrig.

Collections

- Neal Peterson and Dr. Harry Swartz began collecting pawpaw germplasm in 1981
- They assembled a germplasm collection of about 1500 accessions
 - Open pollinated seedlings from the historic collections of Buckman, Zimmerman, Hershey, Allard, the Blandy Experimental Farm, Ray Schlaanstine, and some modern cultivars



Objective

- To evaluate commercially available named pawpaw varieties and PPF's advanced selections in Kentucky

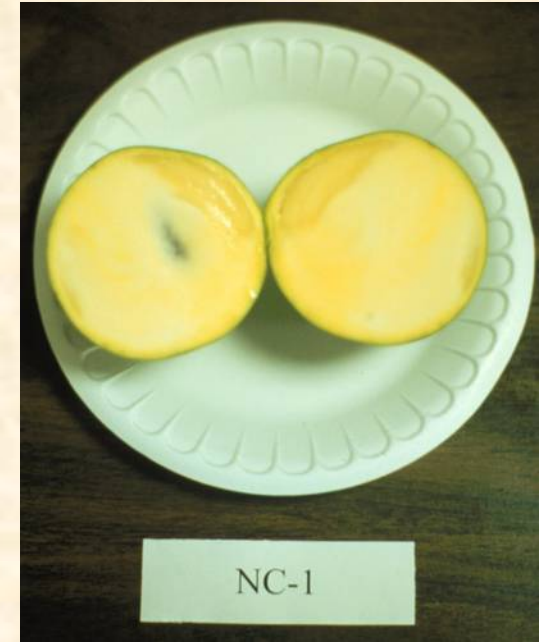
Materials and methods

- 28 selections, 10 named varieties, 224 total grafted trees on PPF seedling rootstock (half-sib seed)
- Spacing 2 m (6.5 ft) between trees, 5.5 m (18 ft) between rows

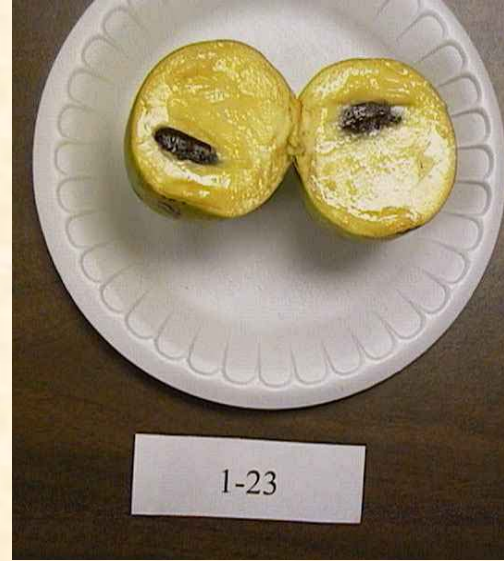


Commercially Available Cultivars

Clone	Genetic background
‘Middletown’	Wild seedling from Middletown, Ohio
‘Mitchell’	Wild seedling from Iuka, Ill.
‘NC-1’	‘Davis’ female × ‘Overleese’ male
‘Overleese’	Cultivated (open-pollinated) seedling from Rushville, Ind.
‘PA-Golden’	Second-generation seedling from G.A. Zimmerman collection
‘Sunflower’	Wild seedling from Chanute, Kans.
‘Taylor’	Wild seedling from Eaton Rapids, Mich.
‘Taytwo’	Wild seedling from Eaton Rapids, Mich.
‘Wells’	Cultivated (open-pollinated) seedlings from Salem, Ind.
‘Wilson’	Wild seedling from Cumberland, Ky.



Seedlings of Commercially Available Cultivars



Clone	Genetic background
1-7-1 Shenandoah	Open-pollinated seedling of ‘Overleese’
1-23	Open-pollinated seedling of ‘Taylor’
1-68	Open-pollinated seedling from ‘Overleese’
8-20	Open-pollinated seedlings of ‘Sunflower’

Seedlings from Collections

Clone	Open-pollinated seedling of
1-7-2 Wabash	BEF-30
2-10	BEF-30
2-54	GAZ-VA
3-11	BEF-33
3-21	BEF-43
4-2 Potomac	BEF-53
5-5	BEF-54
7-90	RS-2
8-58 Rappahannock	BEF-30
9-47	BEF-49
9-58	BEF-50
10-35	BEF-49
11-5 Susquehanna	BEF-53
11-13	BEF-53

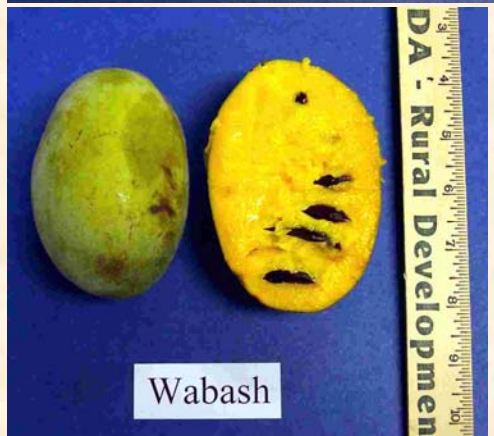
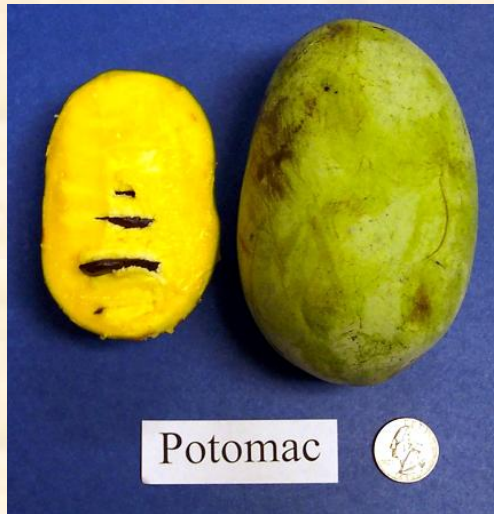


BEF = Blandy Experimental Farm Collection, Boyce Va.

GAZ = George A. Zimmerman Collection., Linglestown, Pa.

RS = Ray Schlaanstine Collection, West Chester, Pa.

Fruit Production on Mature Trees 2004-2006 in Frankfort



Clone	Average fruit weight (g)	Average number of fruit per tree
Potomac	235 a	44 ghi
5-5	188 b	39 hi
Wabash	185 b	65 fg
Susquehanna	184 b	39 i
NC-1	179 bc	44 ghi
Overleese	170 bcd	54 fghi
8-20	170 bcd	59 fghi
1-68	167 bcd	90 cde
2-10	160 cde	52 fghi
Shenandoah	156 def	78 def
Sunflower	155 def	74 def
9-58	146 efg	79 def
10-35	145 efg	105 abc

Fruit Production on Mature Trees 2004-2006 in Frankfort

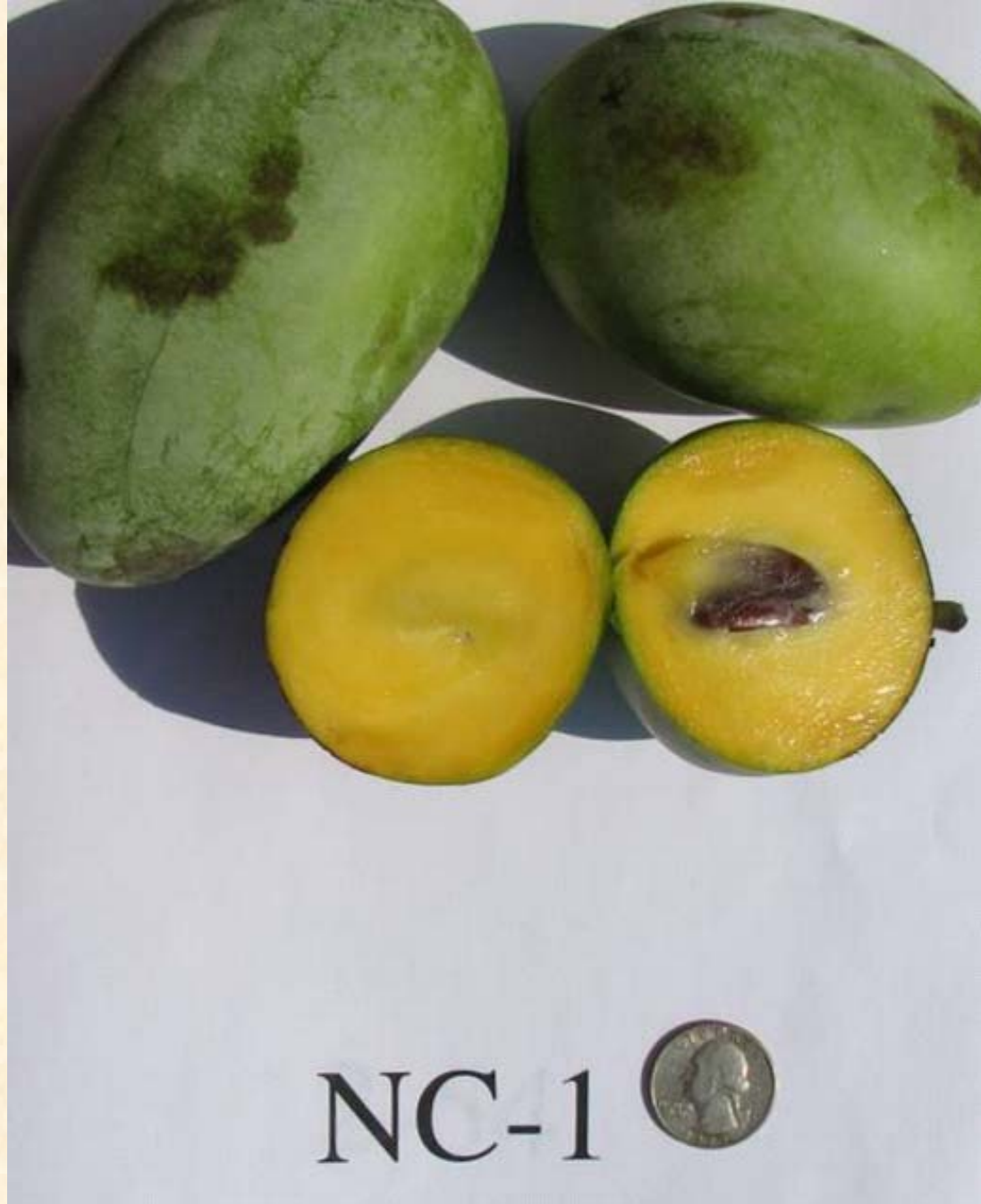


Clone	Average fruit weight (g)	Average number of fruit per tree
3-11	137 efgh	68 ef
7-90	135 fghi	74 def
1-23	126 ghij	90 cde
11-13	124 hij	75 def
Taytwo	121 hijk	73 def
2-54	121 hijk	73 def
3-21	115 ijkl	60 fghi
Mitchell	112 jkl	58 fghi
PA-Golden	108 jklm	118 ab
Taylor	106 jklm	68 efg
Wells	104 klm	64 fgh
9-47	100 lm	74 def
Rappahannock	96 lm	96 bcd
Wilson	89 mn	128 a
Middletown	75 n	74 def

What cultivars should I plant?

NC-1

- Fruit weight: 167 g
- Number of fruit/tree: 36
- Good flavor
- Available from many commercial nurseries



NC-1

Overleese

- Fruit weight: 157 g
- Number of fruit/tree: 40
- Good flavor
 - (melon)
- Available from many commercial nurseries



Overleese



Sunflower

- Fruit weight: 165 g
- Number of fruit/tree: 63
- Mild flavor
- Available from many commercial nurseries



Sunflower



Potomac

- Fruit weight: 244 g
- Number of fruit/tree: 31
- Good flavor
- Fruit cracking?
- Peterson Pawpaws
 - Limited availability



Potomac 

Shenandoah

- Fruit weight:
157 g
- Number of
fruit/tree: 61
- Mild flavor
- Peterson
Pawpaws
 - Limited
availability




Shenandoah



Susquehanna

- Fruit weight: 184 g
- Number of fruit/tree: 39
- Good flavor
- Peterson Pawpaws
 - Limited availability

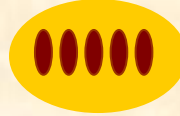


Susquehanna 

Wabash

- Fruit weight:
183 g
- Number of
fruit/tree: 51
- Dark flesh
- Cracking issues
- Peterson
Pawpaws
 - Limited
availability





Pawpaw RVT Overview

- There is great variation in fruit size, yield, and quality among the pawpaw selections examined
- About 4 to 5 years to come into production
- A number of pawpaw selections in the trial show promise for production in Kentucky [**Potomac, Susquehanna, Wabash, Overleese, Shenandoah, NC-1, and Sunflower**] can be recommended.



<http://www.pawpaw.kysu.edu/>

Pawpaw Information Website

Frankfort, Kentucky

Pawpaw Links

[Personnel](#)

[Contact Information](#)

[Recent PowerPoint Presentations on pawpaw, gooseberries and currants, and blackberries](#) **NEW**

[Register for the KSU/OPGA/PPF Pawpaw Workshop to be held on September 6, 2008](#) **NEW**

[2008 Nursery List](#) **NEW**

[2008 Cultivar List](#) **NEW**

[Updated Kentucky Nut Growers Association Website](#) **NEW**

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[Pawpaw Bibliography and Search Tool](#) **NEW**

[KSU Reports and Publications](#) **NEW**

[PawPaw Foundation](#)

[2008 Ohio Pawpaw Festival Website](#) **NEW**

[Ohio Pawpaw Growers Association](#)

[Pawpaw FAQ](#)



Photograph of pawpaw flower in patch at Cove Spring Park in Frankfort, Kentucky taken on May 6, 2008. Photo by K. Pomper.

KSU Pawpaw Program

The pawpaw (*Asimina triloba*) fruit has both fresh market and processing appeal, with a tropical like flavor that resembles a combination of banana, mango, and pineapple. [Kentucky State University](#) has the only full-time pawpaw research program in the world as part of the [KSU Land Grant Program](#). Pawpaw research efforts are directed at improving seed and clonal propagation,



Questions?