

ASHS





Workshop 13: Native Fruits of the Midwest

2:00 PM

Pawpaw and the American Persimmon: Niche Tree Fruit Crops for the Midwest and Eastern United States Kirk Pomper, Kentucky State University; Sheri Crabtree, Kentucky State Univ; Jeremiah Lowe, Kentucky State Univ; Jerry Lehman, Indiana Nut Growers Association

2:20 PM

Nut Crops of the Midwest Michele R. Warmund, Ph.D., Univ of Missouri

2:40 PM

Elderberry Research and Development In Missouri Patrick Byers, Greene County Extension Office; Andrew Thomas, University of Missouri; John Avery, Missouri State University; Chad Finn, USDA ARS HCRL; Penelope Perkins-Veazie, North Carolina State University; Hwei-Yiing Li-Johnson, Lincoln University; Sanjun Gu, Lincoln University

3:00 PM

Blackberry Breeding In the Midwest John Clark, University of Arkansas

3:30-4:00 PM

Discussion

4:00-5:00 PM Fruit and Nut Tasting

5:00-6:00 PM American Pomological Society Business Meeting







Pawpaw and the American Persimmon: Niche Tree Fruit Crops for the Midwest and Eastern United States

Kirk Pomper, Sheri Crabtree, Jeremiah Lowe, Kentucky State University, Land Grant Program, Frankfort, KY and Jerry Lehman Indiana Nut Growers Association



American Persimmon

- Diospyros virginiana
- Slow growing, moderate sized tree
- Fruit: 1-2 inches in diameter
- Lose astringency when ripe; sweet



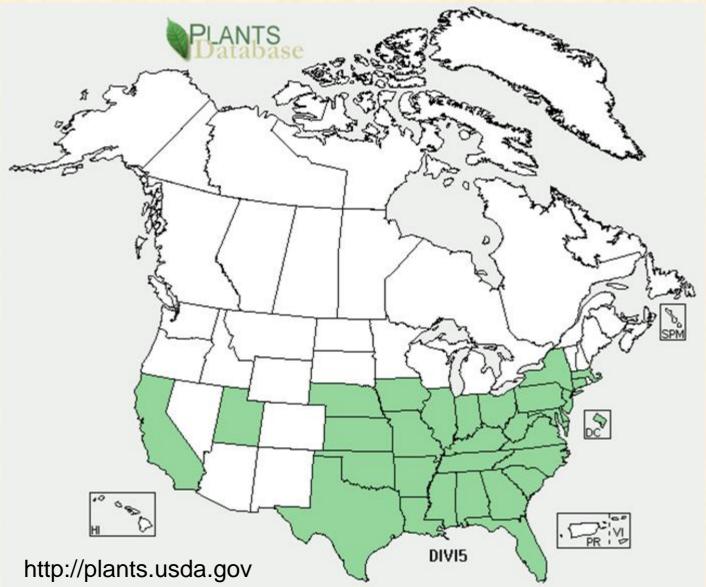


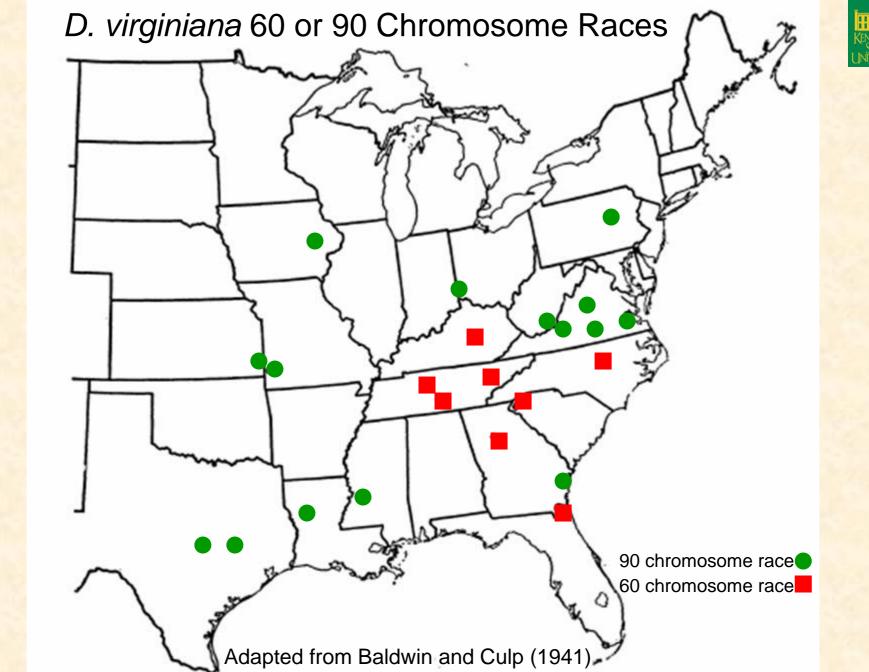
Staminate Pistillate

Flowers usually dioecious; staminate and pistillate flowers are borne on separate trees; female trees may have a small number of male flowers.

Native Range (Diospyros virginiana)









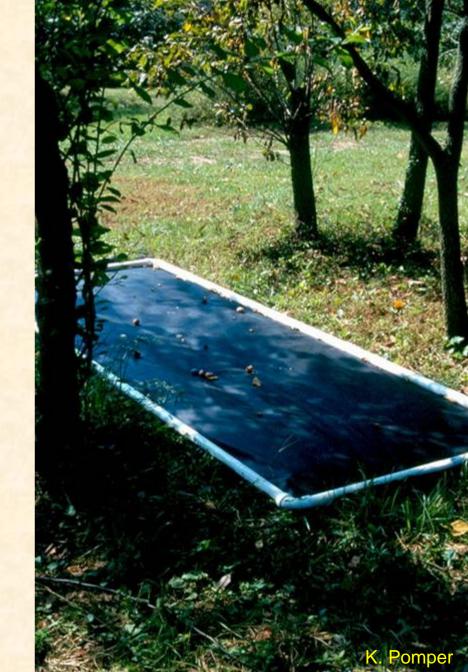
Seedless Persimmon Fruit

- Most named varieties are 90-chromosome type
- When 90-chromosome type are grown in Kentucky and pollinated by the 60chromosome type, the seeds abort and many of the fruit are seedless or have few seeds
- 'Meader' is self-fruitful and will set seedless fruit



Fruit Production

- Seedlings bear fruit in 4-9 years
- Grafted trees can begin fruiting in 3-5 years
- Fruit is hand-picked with care to maintain the cap for fresh market
- Bearing trees may yield35 to 75 pounds/tree





Persimmon Pests and Diseases

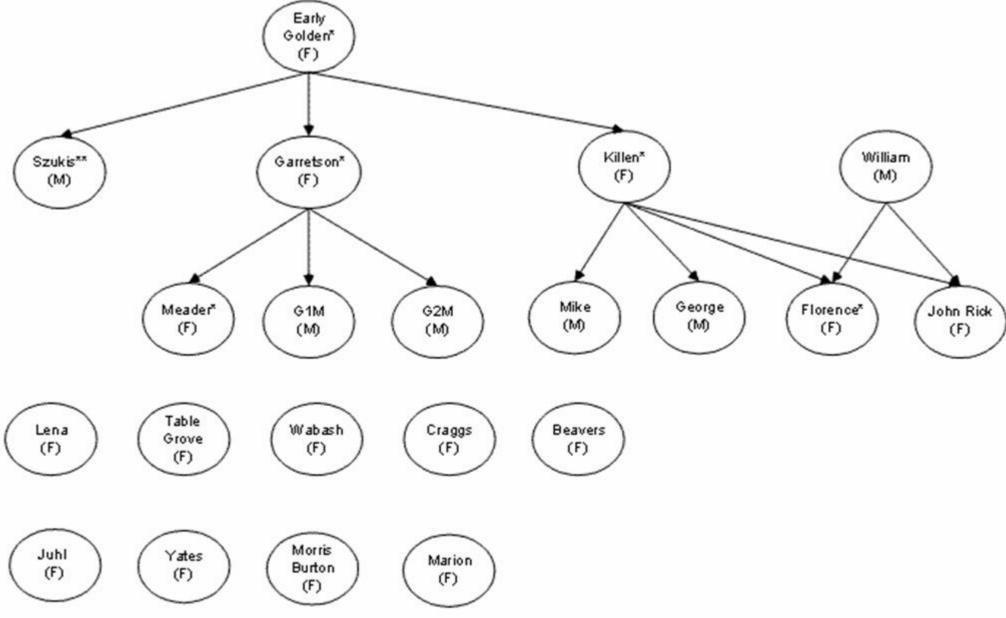
- Insect pests include psyllid, persimmon borer, fall webworm, bagworm, hickory horned devil, and twig girdler
- The ambrosia beetle is a new pest in KY
- Leaf spot, persimmon wilt, and other diseases





Domesticating Persimmon

- Latter half of the 19th century:
 - Logan Martin (Borden, IN), James A. Little (Cartersburg, IN), Samuel Miller (Bluffton, MO), F. O. Harrington (York Center, IA), and James Troop (Purdue University)
- More recently:
 - J. C. McDaniel (Univ. of Illinois), James Claypool, Jerry Lehman, and Don Compton



^{*} Females observed to sport male flowers

(from J. Raymond)

* Males observed to sport female flowers



Processing

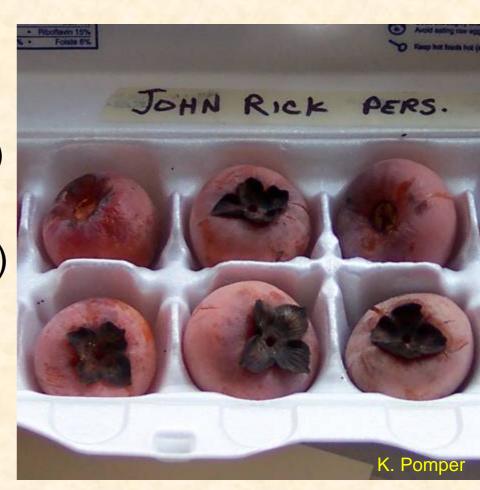
- Fruit of most varieties contain black flecks in the pulp, which are not attractive in the processed product.
- 'Meader,' 'Killen,' and 'Morris Burton' are varieties that contain few or no black specks.



Promising Persimmon Cultivars

KENTUCKY STATE UNIVERSITY

- 'Early Golden'
 - (Alton IL, 1880)
- 'Yates'
 - (Southern Indiana, 1983)
- 'John Rick'
 - (Seedling of Killen, 1958)
- 'Morris Burton'
 - (Indiana, 1957)
- Others: NC-10 (Campbell), Elmo, Dollywood (other Claypool selections?)





Challenges for Persimmon

- Little information on cultivar performance
 - Yield trials
- Limited science based cultural recommendations
 - Fertilization, training, etc.
- Harvest and Processing issues



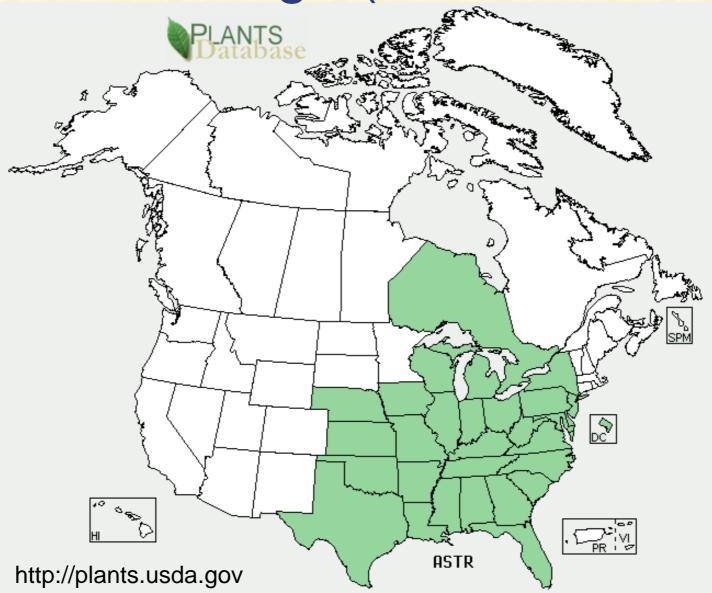
The North American Pawpaw

- Asimina triloba (L.)
 Dunal.
- Slow growing, moderate sized tree; pyramidal in full sun
- Fruit:
 - Clusters of 1-13 fruit
 - Fruit up to 2 lbs.



Native Range (Asimina triloba)





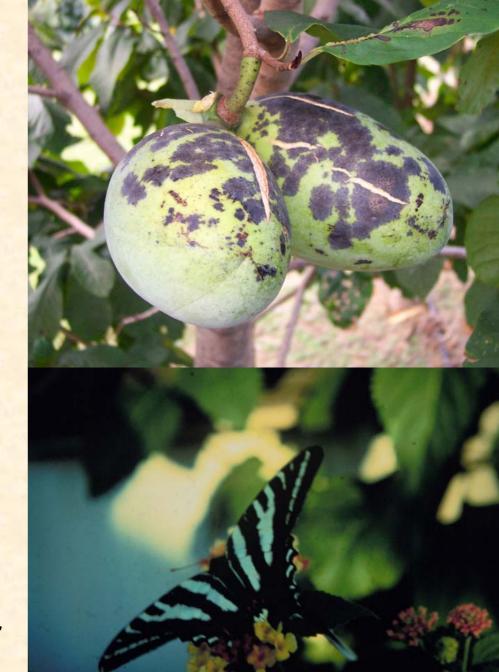
Pawpaw Flowering and Harvest

- Flowers: monoecious
- Cross-pollinate (self-fruitful?)
- Pollinated by flies and beetles
- Ripe fruit-soft
- Color change not a reliable indicator of ripeness
- Harvest from the same tree over several weeks



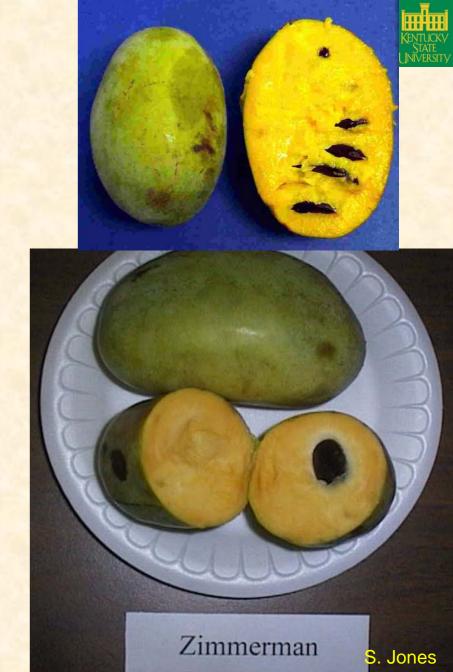
Pawpaw Pests and Diseases

- Leaf and fruit spot (Phyllosticta)
- Japanese beetles
- Leaf rollers
- Zebra swallowtail butterfly-not necessarily a pest
- Talponia plummeriana pawpaw peduncle borer



The Pawpaw Fruit

- Tropical-like flavor and aroma
 - banana, mango, and pineapple
- Nutritious and high in antioxidant activity
- blended fruit drinks, ice creams, yogurt, etc.



The Potential of Pawpaw

- Fresh market-unique flavor
- Appearance-not unappealing
- Post harvest handling issues
 - Bruising
 - Short shelf-life of about 7 days at room temp
 - Storage for 2-3 wks under refrigeration



The Potential of Pawpaw

- Processing pulp
 - Hand processing
 - Labor intensive





Pawpaw Market Potential

- Farmers Markets
 - Fruit: \$1 each
 - \$2 to \$3/pound
- Gourmet Market
 - Frozen pulp
 - Ice cream
- Restaurants





Domesticating Pawpaw

- In 1916, best pawpaw contest sponsored by the American Genetics Association
 - "intelligent breeding" would result in commercial quality varieties and an industry would begin (Popenoe 1916, 1917).
- An industry did not develop
- One reason for the failure of pawpaw to become popular could be rapid perishability of fruit



New Interest in Pawpaw

- From 1950 and 1985, interest grew nurtured by individuals in the Northern Nut Growers Association
- The PawPaw Foundation was founded in 1988, by R. Neal Peterson
- Ohio Pawpaw Festival (1999-present), Ohio Pawpaw Growers Association (2000), and Appalachian Pawpaw Growers Association (2008)

The Kentucky State University Pawpaw Research Program



- Program Leaders:
 - Brett Callaway (1990-1993)
 - Desmond Layne (1994-1997)
 - Kirk Pomper (1998-Present)
- USDA National Clonal Germplasm Repository for Pawpaw; satellite of Corvallis, OR (1994)
- 2000 accessions from 17 different States; over 45 cultivars





PawPaw Foundation Collections

- Neal Peterson and Harry Swartz
 - germplasm collection (1981)
- Screening of about 1500 accessions at the University of Maryland
 - Open pollinated seedlings from collections of Buckman, Zimmerman, Hershey, Allard, the Blandy Experimental Farm, Ray Schlaanstine, and some modern cultivars
- Pawpaw Regional Variety Trial initiated in 1994 by R. Neal Peterson and Desmond Layne
 - 10 cultivars and 18 PPF advanced selections



Pawpaw Regional Variety Trials (1995-2000)



Jackson, Mich.

Lincoln, Nebr.

Ithaca, N.Y.

Raleigh, N.C.

Piketon, Ohio

Corvallis, Ore.

Clemson, S.C.

	9		, Charles
<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 State Univ.

Univ. of Nebraska

Cornell University

N.C. State University

Ohio State University

Clemson University

USDA-NCGR

Dennis Fulbright

Stan Matzke/Bill

Gustafson

Ian Merwin

Mike Parker

Brad Bergefurd

Kim Hummer

Greg Reighard

Michigan

Nebraska

New York

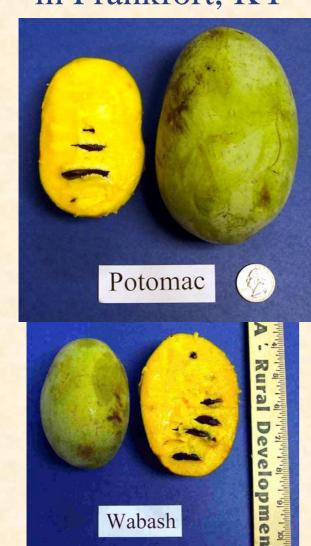
Ohio

Oregon

North Carolina

South Carolina

RVT Fruit Production on Mature Trees 2004-2006 in Frankfort, KY



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

RVT Fruit Production on Mature Trees 2004-2006 in Frankfort, KY



		Average
	Average	number
	fruit	of fruit
Clone	weight (g)	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

Average



Challenges for Pawpaw

- Can yields and quality be improved:
 - Training systems and rootstocks (KSU)
 - Fruit thinning (KSU)
 - Nutrient management
- Harvest, post-harvest, and processing issues
 - New cultivars (firmer fruit)
- Market development
 - Education
 - How large is the market?



Questions?

