

The North American Pawpaw Variety: 'KSU-Atwood'TM

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Abstract

The North American pawpaw variety 'KSU-Atwood'TM ('KSU8-2' cultivar) is released for grower trial by the Horticulture Program of the Kentucky State University Land Grant Program. This pawpaw variety is a high yielding, medium sized fruited, middle to late season ripening variety, with a unique mango-banana-pineapple-like flavor. This selection also naturally forms strong right-angled branches to support high crop loads. The release is named for Rufus B. Atwood, who served as president of Kentucky State College (now University) from 1929 to 1962 and also led efforts for desegregated education in Kentucky in the 1940s.

Origin

The North American pawpaw [*Asimina triloba* (L.) Dunal] is a tree-fruit that is still in the early stages of commercial production (6, 7, 9). Pawpaws can be grown successfully in USDA plant hardiness zones 5 (minimum of -29°C) through 8 (minimum of -7°C) (2). The fruit is very nutritious (4) and has an intense flavor that resembles a combination of banana (*Musa acuminata* Colla.), mango (*Mangifera indica* L.), and pineapple [*Ananas comosus* (L.) Merr.] (1, 3, 10). Pawpaw fruit have fresh market appeal for farmers' markets, community supported agriculture, and organic markets, as well as processing potential for frozen pulp production (1, 11). Currently, over 45 cultivars are available from nurseries (5, 8); however, new high yielding cultivars with excellent fruit and shipping quality are needed for further development of a pawpaw industry.

'KSU-Atwood'TM ('KSU8-2' cultivar) is the first pawpaw variety released by the Kentucky State University (KSU) Horticulture Program. This selection was grown from open pollinated seed donated by R. Neal Peterson in 1990 that was collected from a seedling

tree growing at Wye Research and Education Center (Queenstown, Maryland); this Maryland seedling tree was grown from seed collected from a tree [BEF-49 (Row 10, tree 29)] at the Blandy Experimental Farm (Boyce, Virginia) of unknown genetic origin. Trees at the Blandy Experimental Farm include numerous wild seedlings plus seedlings from portions of G.A. Zimmerman's collection, donated posthumously; assembled by Orland E. White and staff at Boyce, Va., from 1926 to 1955. This KSU seedling (MD90W062-3) was added to the KSU germplasm collection by Dr. Brett Callaway in 1990. Through the efforts of Dr. Desmond Layne, KSU was designated as a satellite repository for *Asimina* preservation in the U.S. Department of Agriculture (USDA), National Plant Germplasm System (NPGS) in 1994 to pursue pawpaw germplasm evaluation, preservation, and dissemination. 'KSU-Atwood'TM is named for Rufus B. Atwood, who served as president of Kentucky State College (now University) from 1929 to 1962. While improving educational opportunities for African Americans and bringing full accreditation to the college, he also led efforts for desegregated education in Kentucky in the 1940s.

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Description

‘KSU-Atwood™’ has a unique mango-banana-pineapple like flavor and displays strong right angled branching compared to other pawpaw varieties; this will make this selection less susceptible to wind damage when bearing large fruit loads. The fruit is medium to large-sized compared to other commercial varieties and the skin of the fruit has an appealing greenish-blue appearance when ripe.

In a comparison of mature ‘KSU-Atwood™’ to other high yielding commercial varieties, this selection displays superior fruiting characteristics. In a trial at KSU, seedling rootstock was budded in 1999 with the selections ‘KSU-Atwood™’, ‘PA-Golden’ (seedling from George Slate, selected in Amherst, NY), and ‘Mitchell’ (selected from the wild in Jefferson Co., IL) and grown in the greenhouses at KSU Research and Demonstration Farm in Frankfort, KY. In May of 2000, successfully budded trees of ‘KSU-Atwood™’, and the pawpaw cultivars ‘PA-Golden’ and ‘Mitchell’ were planted at the KSU Research and Demonstration Farm (Frankfort, KY) in three replicated

blocks. To compare yield and production characteristics of mature trees, cluster counts were conducted in early August for trees of all selections. Trunk cross-sectional area (TCA), yield, yield efficiency (YE), and fruit weights (all fruit produced for each mature tree) were recorded in 2009 and 2010.

Tree size, as measured by TCA, was similar for trees of all cultivars each year (Table 1). The selection ‘KSU-Atwood™’ had similar yields to the high yielding commercial selections ‘PA-Golden’ and ‘Mitchell’. The total number of fruit per tree varied by year, but was similar for all three selections; yield efficiency was higher for ‘KSU-Atwood™’ than in ‘Mitchell’ for 2010. Average fruit weight for ‘KSU-Atwood™’ was greater than either ‘PA-Golden’ or ‘Mitchell’ in both 2009 and 2010. The percentage of large fruit, which would command a higher retail price, was greater in ‘KSU-Atwood™’ than ‘Mitchell’ in both 2009 and 2010. Fruit pulp Brix concentration was higher for ‘KSU-Atwood™’ than ‘PA-Golden’ in both years of the study. ‘KSU-Atwood™’ fruit also had a lower percent seed than

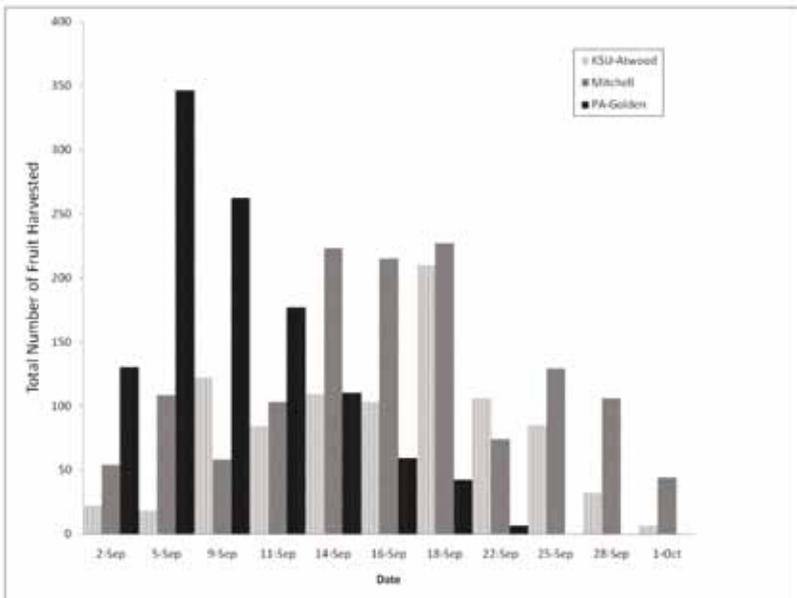


Fig. 1. Harvest dates for ‘KSU-Atwood™’, ‘PA-Golden’, and ‘Mitchell’ for mature trees in 2009 that were planted in 2000 at the Kentucky State University Research and Demonstration Farm.

Table 1. Vegetative and fruiting characteristics of ‘KSU-Atwood™’, ‘PA-Golden’, and ‘Mitchell’ in 2009 and 2010 for trees that were planted in 2000 at the Kentucky State University Research and Demonstration Farm.

Cultivar	TCA (cm ²)		Yield/tree (kg)		Yield efficiency ¹		Total fruit/tree		Average fruit weight (g)		Fruit > 100g (%)		°Brix	Propn. seed (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2010
‘PA-Golden’	67.6	76.2	29	12	0.43	0.15 ab	377	112	79 ab	107 ab	26 ab	47 a	12 b	24 b	8.0 b
‘Mitchell’	78.7	88.8	29	10	0.36	0.11 b	447	132	64 b	73 b	9 b	22 b	23 a	24 b	13.0 a
‘KSU-Atwood™’	68.5	74.4	33	15	0.48	0.20 a	305	114	109 a	138 a	53 a	66 a	26 a	28 a	8.0 b
P-value	NS	NS	NS	NS	NS	*	NS	NS	*	*	*	**	***	***	***

¹ Numbers followed by the same letter are not significantly different (least significant difference P = 0.05). Trunk cross-sectional area [TCA (cm²)] and yield efficiency [Y.E. (kg yield·cm⁻² TCA)] are reported in the table.

‘Mitchell’ fruit. Fruit on ‘KSU-Atwood™’ trees ripen over a period of weeks; in 2009 fruit ripened on trees from 2 September until 1 October (Fig. 1). Characteristics of fruit and tree branch angle for the pawpaw cultivars KSU-Atwood™(K8-2) PA-Golden, and Mitchell are shown in Figure 2.

Diseases and Pests

Pawpaw pest problems are limited for ‘KSU-Atwood™’ and have not required control measures. ‘KSU-Atwood™’ leaves can exhibit leaf spot, principally a complex of *Mycocentrospora asiminae* (Ellis & Kellerm.) Deighton, *Rhopalocnidium asiminae* (Ellis & Morg.) Petr., and *Phyllosticta asiminae* Ellis & Kellerm. Especially during wet years, fungal spot (*Phyllosticta* species) on leaves and the surface of fruit can lead to problems; infested fruit can split during development. The pawpaw peduncle borer (*Talponia plummeriana* Busck) is a small moth larva, about 5 mm long, which burrows into the fleshy tissues of the flower causing the flower to wither and drop. Usually, the great abundance of unaffected flowers on trees does not require control of this insect. The zebra swallowtail butterfly (*Eurytides marcellus* Cramer), whose larvae feed exclusively on young pawpaw foliage, will damage leaves, but this damage has been negligible. The larvae of the leafroller (*Choristoneura parallela* Robinson) may damage leaves and damage is also negligible. Japanese beetles (*Popillia japonica* Newman) can damage young leaves on pawpaw trees, but once again, the damage is usually not severe.

‘KSU-Atwood™’ and the Pawpaw Industry

The selection ‘KSU-Atwood™’ is being released to the public and should assist the continued expansion of commercial production of the North American pawpaw. This is a high yielding variety with excellent fruit flavor with good branch angles (Fig. 2). Fruit from this selection should have fresh market appeal for farmers’ markets, community supported agriculture, and organic markets, as well as processing potential for frozen pulp production. Kentucky State University has licensed a number of nurseries for propagation of ‘KSU-Atwood™’. A list of



Fig. 2. Examples of fruit and tree branch angle for the pawpaw cultivars 'Mitchell', 'PA-Golden', and 'KSU-Atwood™' (K8-2).

licensed propagators can be found on the KSU website at: <http://www.pawpaw.kysu.edu/LicensedPropagators.htm>.

Literature Cited

- Duffrin M.W. and K.W. Pomper. 2006. Development of flavor descriptors for pawpaw fruit puree: a step toward the establishment of a native tree fruit industry. *Family and Consumer Sciences Res. J.* 35:118-130.
- Kral, R. 1960. A revision of *Asimina* and *Deeringothamnus* (Annonaceae). *Brittonia* 12:233-278.
- Layne, D.R. 1996. The pawpaw [*Asimina triloba* (L.) Dunal]: a new fruit crop for Kentucky and the United States. *HortScience* 31:777-784.
- Peterson, R.N., J.P. Cherry and J.G. Simmons. 1982. Composition of pawpaw (*Asimina triloba*) fruit. *Northern Nut Growers Assoc. Annu. Rep.* 73:97-107.
- Peterson, R.N. 2003. Pawpaw variety development: a history and future prospects. *HortTechnology* 13: 449-454.
- Pomper, K.W., S.B. Crabtree, D.R. Layne and R. N. Peterson. 2008. Flowering and fruiting characteristics of eight pawpaw (*Asimina triloba*) selections in Kentucky. *J. Amer. Pom. Soc.* 62:89-97.
- Pomper, K.W., S.B. Crabtree, D.R. Layne, R. Neal Peterson, J. Masabni and D. Wolfe. 2008. The Kentucky pawpaw regional variety trial. *J. Amer. Pom. Soc.* 62:58-69.
- Pomper, K.W., S.B. Crabtree and J.D. Lowe. 2009. The 2009 pawpaw cultivars and grafted tree sources. Kentucky State University Land Grant Program. <http://www.pawpaw.kysu.edu/pawpaw/cvsr98.htm>.
- Pomper, K.W. and D.R. Layne. 2005. The North American pawpaw: botany and horticulture. *Horticultural Reviews* 31:351-384.
- Shiota, H. 1991. Volatile components of pawpaw fruit (*Asimina triloba* Dunal). *J. Agr. Food Chem.* 39:1631-1635.
- Templeton, S.B., M. Marlette, K.W. Pomper and S.C. Jones. 2003. Favorable taste ratings for several pawpaw products. *HortTechnology* 13: 445-448.