

# KSU Blackberry Trial Update



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# Introduction

- *Rubus*
- Native to Kentucky
- Historically wild harvested
- The official State Fruit
- “U-pick”
- Small commercial production
- 110 acres in Kentucky in 2002
- Interest increasing



# Blackberry Terminology

- Canes: Stems of bramble plants
- Canes last for two seasons, then die
- Primocane: A bramble cane going through its first year of growth
- Floricane: A bramble cane going through its second year of growth
- Most blackberries are floricane fruiting
- Some blackberries are primocane fruiting

# Blackberry Types & Cultivars

- Erect Thorny
  - Cherokee
  - Shawnee
  - Chickasaw\*
  - Kiowa
- Erect Thornless
  - Apache\*
  - Ouachita\*
- Semi-erect Thornless
  - Hull Thornless
  - Triple Crown\*
  - Chester
- Trailing
  - Boysen (not hardy)
  - Marion (not hardy)
- Primocane Fruiting, Thorny
  - Prime-Jan\*
  - Prime-Jim\*



# Apache

- Erect thornless
- Ripens after Ouachita
- Very attractive, largest thornless erect berry, 8-10 g, size remains large all season
- No sterile drupelets
- Very good flavor and sweetness, 9.8% SS, stores well
- Highest yielding of erect thornless varieties
- Vigorous plant
- Problem with white drupelets
- Tolerant to rosette, no orange rust observed



# Ouachita

- Erect thornless
- Earlier than Apache with similar hardiness
- Attractive 6-7g berry
- Excellent flavor, 10+ % soluble solids
- Excellent yields
- Good post harvest handling
- Vigorous plant
- Resistant to rosette, no orange rust reported



# Chickasaw

- Erect thorny
- Season – mid
- Yield – high
- Fruit size – large 11 g
- Flavor – excellent 9.6%
- Moderately hardy
- Excellent flower and fruit fertility, very attractive berry
- Moderately resistant to anthracnose, no orange rust observed, unknown rosette



Photo from  
University of Arkansas

Data from Dr. John Strang  
University of Kentucky



# Triple Crown

- Ripens with or slightly after Hull Thornless
- Attractive, largest thornless semi-erect berry, 7.6 g
- Very good sweet aromatic flavor with pleasant aftertaste, 11.1% SS
- Lower yields than Chester and Hull
- Berries firm, but do not hold up as well as Chester and Hull
- Resistant to rosette, orange rust, and phytophthora





# Prime Jim & Jan

- Performance very variable due to location
  - In Aug. and early Sept., 5 days of 85 F or more reduces yield, fruit size and quality.
  - No understanding of hardiness, survived 10 F
- Fruit are 2-10 g
- Plants produced fruit up into November in Kentucky with the 2004 mild fall
- Fruit set problems with hot temperatures

# Prime Jim & Jan

- Recommended for home gardeners now and for very limited commercial trial
- Fruit do not have the shipping characteristics of the thornless erect blackberries.
- Considerably improved thorny and thornless varieties will be available in the next 4-6 years.



# Growing Blackberries





# Weed Control

- Manual
  - Hand
  - Hoe
  - Weedeater
- Mulching
  - Straw
  - Hay
  - Wood chips





# Irrigation

- Lack of water seriously reduces yields
- Require 1" water/wk during growing season
- Best to irrigate throughout entire season
- Irrigation very important after harvest
- Without irrigation, more severe pruning improves berry size



# Tipping

- Increases lateral growth
- Increases flowering and fruit set
- Makes plants more manageable
- Tipping of Prime-Jim and Prime-Jan is very important (canes will grow tall)
  - Tipped by hand at a height of 1 meter











# White Tail Deer

- Browse damage
- Electric fencing





# Red-Necked Cane Borer

- Adults lay covered eggs
- Larvae exit egg directly into plant
  - Not exposed to pesticides
- Larvae move into pith and downward
- Larvae over winter in cane
- Pupate in April
- Adult emerges in 20-40 days



# Japanese Beetle

- Damages both foliage and fruit
- Appearing in orchards now





# Tarnished Plant Bug





# White Drupelets



Sunburn-often a problem on Apache

Photo from Dr. John Strang  
University of Kentucky

# Aphids





# Ladybeetle





# Virus





# Orange Rust

- Remove and destroy infected plants



# Crown Gall

- Dig out and remove infected plants





# Blackberry Harvest

- Thorny
  - June 15-July 15
- Thornless erect
  - June 16-Aug. 5
- Thornless semi erect
  - July 1- Sept. 1
- Primocane fruiting
  - Late August-frost
- Avoid harvesting wet berries
- Pick gently lifting berries with thumb and fingers
- When harvesting for sale, don't pick fruit when dead ripe

# Blackberry Harvest

- Harvest interval
  - 3-5 day interval at first
  - 1-2 day interval at peak harvest
- Harvest quantity
  - 10 lb/hr experienced picker
  - 14 lb/hr excellent
  - 6-7 lb/hr less effective harvesters
- 8-10 pickers/ A at maximum production



# Blackberry Quality Maintenance

- Place berries in shade immediately after harvest
- Refrigerate 40 to 60 minutes after harvest
- Cool to 32 to 40 F at a high relative humidity
- Each hour delay in getting berries refrigerated reduces storage life by one day.

# KSU Blackberry Variety Trial

- Advanced selections from the University of Arkansas
- Primocane fruiting
- Floricane fruiting
- Commercially available primocane and floricane fruiting varieties.



# Blackberry Trial Map

		Block 1		Block 2		Block 3		Block 4				2 rows comprise 1 block
<b>border row 1</b>	<b>border row 2</b>	<b>row 3</b>	<b>row 4</b>	<b>row 5</b>	<b>row 6</b>	<b>row 7</b>	<b>row 8</b>	<b>row 9</b>	<b>row 10</b>	<b>border row 11</b>		14 ft between rows
Triple Crown	Apache	Triple Crown	Prime Jan	Heritage	Prime Jim	Prime Jim	Heritage	Triple Crown	Prime Jan	Apache		11 rows (8 rows in <b>variety trial</b> , 3 <b>border rows</b> )
Triple Crown	Apache	Triple Crown	Prime Jan	Heritage	Prime Jim	Prime Jim	Heritage	Triple Crown	Prime Jan	Apache		= 140 ft wide planting (E-W)
Triple Crown	Apache	Triple Crown	Prime Jan	Heritage	Prime Jim	Prime Jim	Heritage	Triple Crown	Prime Jan	Apache		
Chickasaw	Apache	Triple Crown	Prime Jan	Heritage	Prime Jim	Prime Jim	Heritage	Triple Crown	Prime Jan	Apache		
extra?	Apache	Triple Crown	Prime Jan	Heritage	Prime Jim	Prime Jim	Heritage	Triple Crown	Prime Jan	Apache		
												2 ft between plants within a row
Triple Crown	Triple Crown	Apache	APF-40	APF-46	APF-40	Prime Jan	Apache	Prime Jim	APF-46	A-2215T		5 ft between groups of 5 plants within a row
Triple Crown	Triple Crown	Apache	APF-40	APF-46	APF-40	Prime Jan	Apache	Prime Jim	APF-46	A-2215T		7 groups of 5 plants in each row
Triple Crown	Triple Crown	Apache	APF-40	APF-46	APF-40	Prime Jan	Apache	Prime Jim	APF-46	A-2215T		(5 grps/ 5 <b>variety trial</b> , 2 grps/five <b>border</b> )
Chickasaw	Triple Crown	Apache	APF-40	APF-46	APF-40	Prime Jan	Apache	Prime Jim	APF-46	A-2215T		= 86 ft long planting (N-S)
extra?	Triple Crown	Apache	APF-40	APF-46	APF-40	Prime Jan	Apache	Prime Jim	APF-46	A-2215T	<b>code no.</b>	<b>Cultivar</b>
											1	A-1937T
Prime Jan	A-1937T	APF-41	Chickasaw	APF-77	Apache	Prime Jim	APF-46	APF-40	APF-41	Triple Crown	2	A-2215T
Prime Jan	A-1937T	APF-41	Chickasaw	APF-77	Apache	Prime Jim	APF-46	APF-40	APF-41	Triple Crown	3	A-2241T
Prime Jan	A-1937T	APF-41	Chickasaw	APF-77	Apache	Prime Jim	APF-46	APF-40	APF-41	Triple Crown	4	A-2315T
Prime Jan	A-1937T	APF-41	Chickasaw	APF-77	Apache	Prime Jim	APF-46	APF-40	APF-41	Triple Crown	5	Apache
extra?	A-1937T	APF-41	Chickasaw	APF-77	Apache	Prime Jim	APF-46	APF-40	APF-41	Triple Crown	6	APF-27
											7	APF-40
Prime Jim	A-2215T	APF-27	APF-42	Prime Jim	Prime Jan	APF-40	APF-77	APF-77	APF-42	A-2315T	8	APF-41
Prime Jim	A-2215T	APF-27	APF-42	Prime Jim	Prime Jan	APF-40	APF-77	APF-77	APF-42	A-2315T	9	APF-42
Prime Jim	A-2215T	APF-27	APF-42	Prime Jim	Prime Jan	APF-40	APF-77	APF-77	APF-42	A-2315T	10	APF-46
Prime Jim	A-2215T	APF-27	APF-42	Prime Jim	Prime Jan	APF-40	APF-77	APF-77	APF-42	A-2315T	11	APF-77
extra?	A-2215T	APF-27	APF-42	Prime Jim	Prime Jan	APF-40	APF-77	APF-77	APF-42	A-2315T	12	Chickasaw
											13	Heritage
TC (KSU)	A-2241T	Prime Jim	APF-46	APF-42	Chickasaw	APF-27	APF-42	Chickasaw	Prime Jan	A-1937T	14	Prime Jan
TC (KSU)	A-2241T	Prime Jim	APF-46	APF-42	Chickasaw	APF-27	APF-42	Chickasaw	Prime Jan	A-1937T	15	Prime Jim
TC (KSU)	A-2241T	Prime Jim	APF-46	APF-42	Chickasaw	APF-27	APF-42	Chickasaw	Prime Jan	A-1937T	16	Triple Crown
TC (KSU)	A-2241T	Prime Jim	APF-46	APF-42	Chickasaw	APF-27	APF-42	Chickasaw	Prime Jan	A-1937T		
extra?	A-2241T	Prime Jim	APF-46	APF-42	Chickasaw	APF-27	APF-42	Chickasaw	Prime Jan	A-1937T		
Prime Jim	A-2315T	APF-77	Prime Jan	APF-27	APF-41	APF-41	Chickasaw	Apache	APF-27	A-2241T		
Prime Jan	A-2315T	APF-77	Prime Jan	APF-27	APF-41	APF-41	Chickasaw	Apache	APF-27	A-2241T		
TC (KSU)	A-2315T	APF-77	Prime Jan	APF-27	APF-41	APF-41	Chickasaw	Apache	APF-27	A-2241T		
TC (KSU)	A-2315T	APF-77	Prime Jan	APF-27	APF-41	APF-41	Chickasaw	Apache	APF-27	A-2241T		
extra?	A-2315T	APF-77	Prime Jan	APF-27	APF-41	APF-41	Chickasaw	Apache	APF-27	A-2241T		
extra?	Apache	Triple Crown	Prime Jim	Prime Jan	Triple Crown	Apache	Prime Jim	Triple Crown	Prime Jan	Apache		
Triple Crown	Apache	Triple Crown	Prime Jim	Prime Jan	Triple Crown	Apache	Prime Jim	Triple Crown	Prime Jan	Apache		
Triple Crown	Apache	Triple Crown	Prime Jim	Prime Jan	Triple Crown	Apache	Prime Jim	Triple Crown	Prime Jan	Apache		
Triple Crown	Apache	Triple Crown	Prime Jim	Prime Jan	Triple Crown	Apache	Prime Jim	Triple Crown	Prime Jan	Apache		
Triple Crown	Apache	Triple Crown	Prime Jim	Prime Jan	Triple Crown	Apache	Prime Jim	Triple Crown	Prime Jan	Apache		

# First Year Survival & Vigor

- Taken in October 2006
- Survival
- Number of canes
- Number of flowering/ fruiting canes
- Vigor



# First Year Survival & Vigor

<i>Selection</i>	<i>Survival</i>	<i># of canes</i>	<i># of flowering or fruiting canes</i>	<i>Vigor</i>
APF-27	100 a	39	4 d	6.6
APF-40	100 a	32	6 cd	6.1
APF-41	100 a	34	5 cd	6.8
APF-42	100 a	32	6 cd	6.0
APF-46	100 a	39	15 a	7.0
APF-77	100 a	29	4 cd	6.0
PrimeJan	85 a	31	12 bc	4.1
PrimeJim	55 b	22	9 bc	5.0
P-value	0.001	0.020	0.001	0.052
Significance	***	N.S.	***	N.S.

# Results

- APF selections had good survival
- Prime Jim had poor survival
- Total cane number was similar for all genotypes
- APF-46 produced the most flowering/fruiting canes
- APF-27 and APF-77 produced the fewest
- Vigor was similar for all genotypes; however, there was a trend for Prime-Jim® and Prime-Jan® plants to be less vigorous than the APF selections



# Discussion

- APF-46 produced more flowering/fruiting canes than other genotypes
- Although first year survival and vigor were acceptable for APF selections, fruit weight, flavor, total yield, flowering and harvest dates, disease/insect resistance, and overall plant vigor characteristics will need to be evaluated over the next 5 years to determine suitability for Kentucky growers.

# 2007 Freeze Event

- Long lasting freeze event
- 15 F recorded at the KSU research farm
- All actively growing blackberry shoots killed



# Winter Cane Dieback

<i>Selection</i>	<i>Percent Cane Dieback</i>	<i>Significance</i>
A-1937T	3.0	ef
A-2215T	0.0	f
A-2241T	2.0	ef
A-2315T	0.5	f
Apache	5.0	ef
APF-27	17.5	ef
APF-40	25.0	de
APF-41	38.8	cd
APF-42	15.0	ef
APF-46	77.5	a
APF-77	15.0	ef
Chickasaw	4.3	ef
Prime Jan	57.8	b
Prime Jim	45.6	bc
Triple Crown	5.6	ef

# Discussion

- APF-46 had the highest cane dieback
- Prime Jim & Jan also suffered from high dieback
- Primocane fruiting genotypes tended to have more dieback than floricanes
- May not be an issue if plants are mowed down every season



# Conclusions

- Primocane fruiting blackberries have the potential to produce a niche-market crop for Kentucky growers from late summer until frost; However, the currently available primocane blackberry selections Prime-Jim® and Prime-Jan® are not suitable for commercial production.
- APF selections may have improved characteristics over currently available primocane fruiting selections
- Mowing plants down in spring may delay blooming until the hottest weather has past

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# Questions?

