Update on Blackberry Cultivars

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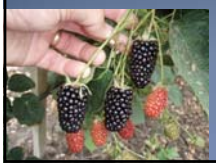


Outline

- Floricane blackberry cultivars
- Primocane blackberry cultivars

Blackberry Cultivar Update

- An exceptional blackberry has the following characteristics:
  - Plant adaptation
    - Heat tolerance
    - Hardiness
  - Thornlessness
  - Fruit quality
  - Berry size and shape
  - Yield
  - Pest resistance
    - Orange rust
    - Double blossom

Blackberry Cultivar Update

- Evaluation criteria
  - Harvest season
  - Chilling requirement – varies from 200 hours (Kiowa) to 900 hours (Navaho)
  - Postharvest handling
  - Flavor

Ouachita

- Thornless, erect
- Berry size 6-7 g
- Ripens *between Arapaho/Natchez and Navaho*; average 12 June (AR), 25 June (MO)
- Yields usually among highest of any Ark. thornless
- White drupes almost never seen
- Flavor *near that of Navaho*; 10% SS
- PH potential *much like Navaho*
- *Mid-chilling as Arapaho- 400 hours est.*
- The largest selling Arkansas variety – and most widely adapted and planted
- Has the most impressive record so far in performance in the South

Ouachita

Ouachita: Recommendation

- *Highly recommended*
- *Excellent PH capability so should fit in for shipping*
- *Ripens between Arapaho and Navaho so provides a continuous fruiting period*
- *Chilling similar to Arapaho – is working well in lots of areas*
- *If planting only one cultivar, plant this one!*

Natchez – The Newest

- 2007, Arkansas
- Ripens one week prior to Ouachita, ave. June 3-5 beginning harvest (AR)
- Yields have been large, about twice that of Arapaho (in Ark.)
- Berry size is large: 8-10 g
- Berries are long, and **remain large season long**

Natchez Characteristics

- Plants are more semi-erect than erect as with Ouachita
- Very vigorous
- Chilling not confirmed but assumed 400-500 h; but possibly lower???

Natchez Characteristics

- Quality
  - Postharvest handling has ranked near that of Ouachita (or comparable) in numerous evaluations in Ark, NC, Ga.
  - Overall firmness is usually rated less than Ouachita but loss of firmness in storage has not been an issue
  - Berries stay black in handling
  - Leakage has been minimal

Natchez Characteristics

- Flavor
  - Upon review of multi-year notes in preparation for release, comments ranged from "great" to "tart" to "excellent" to "tart" based on sample date and year
  - Soluble solids averaged 9% compared to 10% for Navaho and Ouachita
  - In 2008 and 2009, early fruits were tart, but after first week or 10 days, much sweeter for the remainder of season
  - Does Natchez vary more than others in flavor?????

Natchez - What About 2009 – The First Commercial Harvest Year????

- Concerns on one-year –old plants in south Ga with too many fruit for leaves present
- NC reports were exceptional
- Primocane numbers lower than other cultivars – develop later?
- Other comments?

Natchez and Crop Issues

- South Georgia
  - Huge crop
  - Short of leaves
  - Short of primocanes

Apache

- Arkansas, 1999
- Thornless, erect
- Large, 7-10 g; (ave. 8 g)
- Ripe 25 June (AR), 4 July (MO)
- Yield med.-high, 7-10,000 lb/a; among best of Ark. thornless
- Flavor between Navaho and Arapaho – Good! 11% SS
- PH potential –similar to Arapaho and near Navaho
- Chilling 800 hours
- White drupe limitation is a major concern and shippers are not recommending this variety; others comment only a minor concern for local sales

Apache

Apache: Recommendation

- *If performing well in area, plant further*
- *Low chill use still a concern so verify adapted to your area*
- *Major concerns with white drupes; rainfall seems to greatly increase this problem*

White Drupes

- Cause? Likely an effect of sunlight and possibly worse with moisture on berries (rain or heavy dew)
- Is usually worse early in season and less when more berries appear
- Some still consider insect damage but not proven

Arapaho

- Arkansas, 1993
- Thornless, erect
- Medium, 5-7 g
- ***Ripe 4 June (AR), 15 June (MO)***
- Yield med.-low, 4-6,000 lb/a
- Flavor very good, 10% SS
- PH potential very good, just behind Navaho
- Chilling 400-500 hours
- Tip dieback has limited use in cooler areas; hardiness concerns in colder areas; best adapted in the deep South of south Ga and east Texas
- Intended to be replaced with Natchez

Arapaho

Arapaho: Recommendation

- *Has performed better in the deep South than Arkansas, likely due to less winter injury*
- *Useful in medium-chill areas*
- *Be aware of lower yields, tip dieback, some variation in year-to-year yields*
- *Check for Natchez performance as should be better choice than Arapaho now*

Navaho

- Arkansas, 1989
- Thornless, erect
- Medium, 5 g ave.; some concern with smaller fruit later in season
- Ripe 20 June (AR), 30 June (MO)
- Yield med.-high, 8-10,000 lb/a
- Flavor exceptional; very sweet fruit, 11-12% SS
- PH potential great – the best of all blackberries tested by JRC
- Chilling 800-900 hours; not for low chill areas
- Appears the hardiest of Arkansas varieties
- Some late crop on basal shoots seen and can extend the season
- Orange rust susceptible

Navaho

Navaho: Recommendation

- *If trials in your have been good, plant further*
- *Not low chill, problem if planting in areas with less than 800 hours of chilling*
- *In marginal hardiness areas the best choice of Arkansas cultivars*
- *Use orange rust-free stock*

Chickasaw

- Arkansas, 1999
- Thorny, erect
- Large, 7-12 g; (ave. 10 g)
- Ripe 11 June (AR), 20 June (MO)
- Yield high, 10-12,000 lb/a; best of Ark. group
- Flavor near Shawnee, Kiowa, 10% SS
- PH potential –between Kiowa and Arapaho and is being shipped commercially to a limited extent
- **DB/R susceptible**
- Chilling 500 h

Chickasaw

Chickasaw: Recommendation

- *DB/R susceptibility a major limitation in areas where this disease occurs*
- *PH potential not quite as good as thornless but when demand is high shippers have used*
- *Advantages are large berries and high yields; very attractive berry due to size and longer shape*
- *Possible concern with Botryosphaeria cane blight also (seen in Ga.); susceptible in lab tests but not widely reported in field plantings*

Kiowa

- Arkansas, 1996
- Thorny, semi-erect
- Very large, 9-14 g (ave. 12 g)
- Ripe 12 June (AR), 18 June (MO)
- Yield high, 7-12,000 lb/a, long season
- Flavor good, similar to Shawnee, 10% SS
- PH potential fair to good, exceeds Choctaw and Shawnee but not for shipping
- DB/R- susceptible, but not as severe as other thornies
- Chilling 200-300 hours – lowest of Ark. group

Kiowa

Kiowa: Recommendation

- *Key point is PH handling and is best used for PYO, local sales, or non-stored fruit markets; some still say this is the best Arkansas variety for local sales*
- *Key value is very large size so possible premium value?*
- *Should be very useful in low-chill areas*
- *PYO folks like this one even with thorns!*

Chester Thornless

- USDA Beltsville, MD, 1985
- Thornless, semi-erect
- Medium, 5-7 g
- Ripe 10 July (AR, MO)
- Yield very high-25,000 lb/a (not in Arkansas)
- Flavor fair to good, among best USDA thornless; 8-9% SS
- PH handling excellent– commercially the most important in the world
- DB/R- no report but assume resistance
- Chilling- 900 hours

Chester Thornless: Recommendation

- *Excellent variety based on yield, PH handling, proven performance in mostly non-southern areas*
- *Note later season than other cultivars – heat in the South; not very commonly grown in the South*
- *Evaluate closely for season and adaptation prior to planting*
- *Major drawback is concern with flavor/sweetness/acidity to GROW the market*

Triple Crown

- Thornless, <u>*semi-erect*</u>
- Medium-large, 6-8 g
- Ripe late July – 10 Aug.?
- <u>*Yield high*</u>
- Flavor probably best among USDA thornless
- PH handling does not appear adequate for shipping
- DB/R- no report but assume resistant
- Chilling not reported but assume 700 h or more

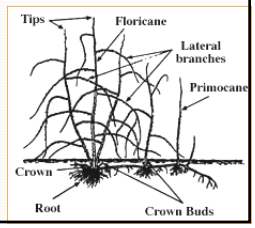
Triple Crown: Recommendation

- *PH handling reports not generally positive so not currently recommended for shipping*
- *Many comment that flavor and sweetness is excellent*
- *Should be more adapted to the South than Chester or other semi-erect thornless based on background*
- *Note later season than Arkansas cultivars*
- *Evaluate closely for season and adaptation prior to planting extensively*

Primocane Blackberry Update

Primocane Brambles

- Brambles have a biennial growth cycle
  - First year shoots – primocanes
  - Second year shoots – floricanes
- Floricane fruiting brambles
  - Primocanes – no fruit
  - Floricanes – produce fruit
- Primocane fruiting brambles
  - Primcanes – produce fruit
  - Floricanes – produce fruit



Primocane Red Raspberries

- Cultivars
  - Heritage
  - Autumn Bliss
  - Caroline
  - Anne
  - Kiwigold
  - Many others

Primocane Red Raspberries

Primocane Black Raspberries?

"Explorer" primocane black raspberry

Primocane Fruiting Blackberries

- Advantages
  - No overwintering of floricanes (cold climates)
  - Reduced pruning costs
- Disadvantages
  - Later-season crop
  - Maturing crop early enough in fall before frost
  - Overall plant hardiness in very cold climates
  - Heat related problems

Heat Effects on Primocane Fruiting Blackberries

- Fruit set in heat greatly reduced by upper 80s F and higher

Primocane Fruiting Blackberries

Prime-Ark® Primocane-Fruiting Blackberries

Prime-Jim® and Prime-Jan®

- *Thorny*, erect
- Medium berry size, 5-6 g
- Floricane crop ripe 5-10 June
- Primocane crop *late July until frost??*
- Flavor similar to other thorny varieties
- *Not for shipping* as PH potential similar to softer thorny varieties
- DB/R- *susceptible*, at least on floricanes
- ***Recommended for home gardens only***
- *Heat in summer can damage flowers and subsequent fruit*

Comparison of Arkansas vs Oregon Primocane Fruit

Arkansas

Oregon

Prime-Jim and Prime-Jan Recommendation

- *Intended for home garden use*
- *PH not adequate for shipping*
- *Only value commercially would be as a limited trial although trials in West indicate good quality, firm berries in the fall*
- *Prime-Jan® - Has Proven to the Best of the Two for PF*

The New One Coming: Prime-Ark 45 (APF-45)

- Floricane crop ripens beginning early June, with Natchez or before
- Excellent flavor
- Comparable to Ouachita and Natchez in storage – should be shippable!
- Targeted for later 2009 release with plants available spring 2010

Prime-Ark 45

- Fruit in storage:
  - Stay black
  - Stay firm
  - Few leaks
  - Little mold
  - Great flavor

Prime-Ark 45

- Berry weight 6-7g (floricanes)
- Very erect canes; thorny
- Primocane buds and crop later than Prime-Jan and -Jim
- Has been through virus testing in Oregon

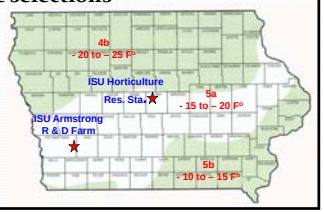
Prime-Ark 45 July 30, 2009; Some Heat Tolerance Improvement?

Prime-Ark 45 Recommendation

- *For trial where an improved primocane-fruiting cultivar is desired*
- *Heat issues continue for South*
- *Will this work in upper areas of the East (mountains of NC)?*

Iowa State University Trials

- **Directed by Dr. Gail Nonnecke**
- **Established at ISU Hort Station (central Iowa in 2007)**
- **3 advanced primocane selections**
  - **APF 41**
  - **Prime-Ark 45**
  - **APF 46**



Iowa State University Trials

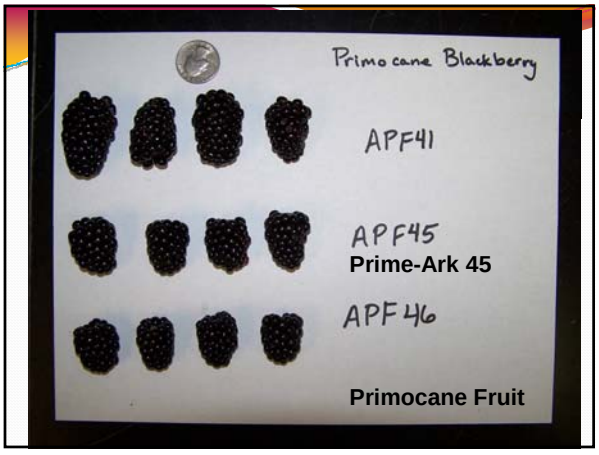
- **Plants set 3 feet apart in rows 12 feet apart**
- **Soil mulch of 4" straw for overwinter**
- **Primocane shoots were tipped at 3 feet to encourage branching: June 20 – Aug. 8 in 2008**

Harvest Dates: Aug. 5 –Oct. 16

Pruning wt. and yield variables, 2008

Selection	Pruning Weight (g)	Total Yield (g)	Total Berry No.	Avg.Berry Wt. (g)
APF-41	184	266	40 ab	6.7 a
Prime-Ark 45	187	173	34 b	5.1 ab
APF-46	107	258	68 a	3.8 b
LSD (0.05)	NS	NS	33	2.1

Averages per plant



ISU Field trials of Arkansas Selections

Flowers/fruits on plants at first killing frost (Oct. 16, 2008)

Selection	Unopened flowers	Opened flowers	Immature fruit	Mature fruit
APF-41	52	93	88	6
Prime-Ark 45	41	54	62	1
APF-46	81	90	70	3
LSD (0.05)	NS	NS	NS	NS

Number per plant

ISU Field trials of Arkansas Selections

- **Summary**
  - Plant crowns lived overwinter
  - Obtain multiple shoots from tipping
  - Unknown fruiting capacity (Aug.-Oct) (row covers in spring?)
  - Fruit quality was good - Sweet, firm, sufficient size
  - Will continue in 2009

My Thanks

- Dr John Clark, University of Arkansas
- Dr. Gail Nonnecke, Iowa State University

Any Questions?